

# **Responses to Comments**

on the

## **Draft Environmental Analysis Prepared for the Control Measure for Ocean-Going Vessels At Berth in California**

**California Air Resources Board  
1001 I Street  
Sacramento, California, 95814**

**Released August 25, 2020**

**to be considered at the  
August 27, 2020, Board Hearing**

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## 1. INTRODUCTION

The California Air Resources Board (CARB) released a Draft Environmental Analysis (Draft EA) for the proposed Control Measure for Ocean-Going Vessels At Berth, herein referred to as the Proposed Regulation (i.e., the proposed project under the California Environmental Quality Act [CEQA]) on October 15, 2019, for a public review and comment period lasting more than 45 days that concluded December 9, 2019. Revisions to the Proposed Regulation were released on March 26, 2020, for an additional comment period which concluded on May 1, 2020. Additional revisions to the Proposed Regulation were released on July 10, 2020, for an additional comment period which concluded on July 27, 2020. CARB received numerous comment letters through the comment docket opened for the Proposed Regulation, including the Draft EA, during these comment periods. All of the comment letters are available for viewing on the comment docket at:  
<https://www.arb.ca.gov/lispub/comm/bccommlog.php?listname=ogvatberth2019>.

CARB staff carefully reviewed all comment letters received and amended the Proposed Regulation in preparing the final Regulation (released on August 25, 2020). In addition, CARB staff reviewed all comment letters received to determine which ones raised significant environmental issues related to the analysis in the Draft EA and require a written response under CARB's certified regulatory program implementing CEQA. This document includes CARB staff's written responses to that subset of comments and will be provided to the Board for consideration prior to it taking final action on the Proposed Regulation, as amended through public input.

The written responses include a brief summary of each comment, followed by the written response. The full comment letters, from which the comments responded to were extracted, are provided in Attachment A of this document. Although this document includes written responses only to those comments related to the Draft EA, all comment letters received were considered by staff and provided to the Board members for their consideration.

### 1.1. Requirements for Responses to Comments

These written responses to public comments on the Draft EA are prepared in accordance with CARB's certified regulatory program to comply with CEQA. CARB's certified regulations states:

*California Code of Regulations, title 17, Section 60004.2(b)(3). Response to Public Comment*

*CARB shall evaluate comments on environmental issues received during the noticed comment period and shall respond as follows:*

*(A) Comments received during the noticed public comment period regarding environmental impacts that may result from the proposed*

*project shall be considered, and a written response shall be prepared where required by section 15088 of title 14 of the California Code of Regulations.*

*(B) CARB may, but is not required to, respond to late comments made outside the noticed comment period.*

*(C) When responding to a comment raising significant environmental impacts from a public agency, a written proposed response shall be provided to that agency at least 10 days prior to certifying an Environmental Impact Analysis.*

*(D) The response to comment may be prepared in the form of (1) a revision to the draft Environmental Impact Analysis, (2) a separate section in or attachment to the Final Environmental Impact Analysis, or (3) a separate response to comments document.*

*(E) The response to comment shall include the following:*

- 1. Comments and recommendations concerning significant environmental issues received during the noticed public review period on the draft Environmental Impact Analysis, either verbatim or in summary;*
- 2. A list of persons, organizations, and public agencies commenting on the draft Environmental Impact Analysis during the noticed public review period; and*
- 3. The responses to significant environmental issues raised during the noticed public review period.*

Public Resources Code (PRC) Section 21091 also provides guidance on reviewing and responding to public comments in compliance with CEQA. While this section refers to environmental impact reports, proposed negative declarations, and mitigated negative declarations, rather than an EA, it contains useful guidance for preparing a thorough and meaningful response to comments.

PRC Section 21091, subdivision (d) states:

*(1) The lead agency shall consider comments it receives if those comments are received within the public review period.*

*(2) (A) With respect to the consideration of comments received, the lead agency shall evaluate any comments on environmental issues that are received from persons who have reviewed the draft and shall prepare a written response*

*pursuant to subparagraph (B). The lead agency may also respond to comments that are received after the close of the public review period.*

*(B) The written response shall describe the disposition of each significant environmental issue that is raised by commenters. The responses shall be prepared consistent with section 15088 of Title 14 of the California Code of Regulations.*

California Code of Regulations, title 14, Section 15088 (CEQA Guidelines) also includes useful information and guidance for preparing a thorough and meaningful response to comments. It states, in relevant part, that specific comments and suggestions about the environmental analysis that are at variance from the lead agency's position must be addressed in detail with reasons why specific comments and suggestions were not accepted. Responses must reflect a good faith, reasoned analysis of the comments.

California Code of Regulations, title 14, Section 15088 (a–c) states:

*(a) The lead agency shall evaluate comments on environmental issues received from persons who reviewed the draft EIR and shall prepare a written response. The Lead Agency shall respond to comments received during the noticed comment period and any extensions and may respond to late comments.*

*(b) The lead agency shall provide a written proposed response to a public agency on comments made by that public agency at least 10 days prior to certifying an environmental impact report.*

*(c) The written response shall describe the disposition of significant environmental issues raised (e.g., revisions to the proposed project to mitigate anticipated impacts or objections). In particular, the major environmental issues raised when the Lead Agency's position is at variance with recommendations and objections raised in the comments must be addressed in detail giving reasons why specific comments and suggestions were not accepted. There must be good faith, reasoned analysis in response. Conclusory statements unsupported by factual information will not suffice.*

## **1.2. Comments Requiring Substantive Responses**

CARB is required to prepare written responses only to those comments that raise "significant environmental issues" associated with the proposed action, as outlined in California Code of Regulations, title 17, Section 60004.2(b)(3). A total of 62 comments were submitted electronically on or before December 15, 2019, to the comment docket set up for the Proposed Regulation and its appendices, including the Draft EA. Of the 62 comments, two written comments were presented during the public hearing. An additional 80 comments were submitted on or before May 1, 2020, during the subsequent comment period. During the third comment period an additional

19 comments were received on or before July 27, 2020. An additional comment letter was received outside of the designated comment periods on August 21, 2020. Out of the 162 total comment letters received, 42 were determined to include comments raising significant environmental issues related to the Draft EA and requiring a written response under CARB’s certified regulatory program and CEQA. CARB staff was conservative and inclusive in determining which comments warranted a written response and even included comments that did not mention the analysis included in the Draft EA but did raise an issue related to potential adverse impacts related to the Proposed Regulation.

## 2. RESPONSES TO COMMENTS

### 2.1 Comments Received

The comment letters responded to in this document were coded by the order in which they were received. Table 2-1 provides the list of comment letters that contain substantive environmental comments. As previously explained, CARB staff was conservative and inclusive in determining which comments warranted a written response and even included comments that did not mention the analysis included in the Draft EA but did raise an issue related to potential adverse impacts related to the Proposed Regulation. Responses to these comments are provided below. Comment letters, bracketed to indicate individual comments, are provided in Attachment A.

<b>Table 2-1: List of Comment Letters Receiving Responses for CEQA Purposes</b>			
<b>Comment Number</b>	<b>Date</b>	<b>Name</b>	<b>Affiliation</b>
Draft EA Comment Period			
1	October 26, 2019	Dennis Miller	(None stated)
17	December 2, 2019	Richard Sinkoff	Port of Oakland
20	December 2, 2019	Dragos Rauta	INTERTANKO
22	December 3, 2019	Catherine Reheis-Boyd	Western States Petroleum Association
37	December 6, 2019	Matthew Sullivan	SSA Marine
41	December 9, 2019	Donald Brown	Cruise Lines International Association
45	December 9, 2019	Douglas Schnieder	World Shipping Council
46	December 6, 2019	Lee Kindberg	Maersk
47	December 9, 2019	Kathy Metcalf	Champing of Shipping America
51	December 9, 2019	Bill Schopp	TraPac
52	December 9, 2019	Thomas Jelenic	Pacific Merchant Shipping Association
53	December 9, 2019	Giles Pettifor	Port of Hueneme

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<b>Table 2-1: List of Comment Letters Receiving Responses for CEQA Purposes</b>			
<b>Comment Number</b>	<b>Date</b>	<b>Name</b>	<b>Affiliation</b>
59	December 9, 2019	Eugene Seroka	California Association of Port Authorities
First 15-Day Comment Period			
12	April 23, 2020	Art Mead	Crowley
27	April 29, 2020	Lee Kindberg	Maersk
28	April 29, 2020	Lee Kindberg	Maersk
30	April 30, 2020	Henry T. Perea	Chevron
34	May 1, 2020	Dragos Rauta	Intertanko
44	May 1, 2020	Frances and Dave Low	N/A
48	May 1, 2020	Richard Sinkoff	Port of Oakland
49	May 1, 2020	Catherine Reheis-Boyd	Western States Petroleum Association
52	May 1, 2020	William E. Adams	International Longshore & Warehouse Union
53	May 1, 2020	William E. Adams	International Longshore & Warehouse Union
55	May 1, 2020	Giles Pettifor	Port of Hueneme
57	May 1, 2020	Doug Schneider	World Shipping Council
58	May 1, 2020	Sande George	Cruise Lines International Association
68	May 1, 2020	Mike Jacob	Pacific Merchant Shipping Association
69	May 1, 2020	Mike Jacob	Pacific Merchant Shipping Association
72	May 1, 2020	Brian McDonald	Marathon Petroleum Corporation
Second 15-Day Comment Period			
1	July 22, 2020	Art Mead	Crowley
2	July 23, 2020	Wayne Nastri	South Coast Air Quality Management District
4	July 24, 2020	Lee Kindberg	Maersk
5	July 27, 2020	N/A	California Association of Port Authorities, Cruise Lines International Association, Pacific Merchant Shipping Association, World Shipping Council, Western States Petroleum Association

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<b>Table 2-1: List of Comment Letters Receiving Responses for CEQA Purposes</b>			
<b>Comment Number</b>	<b>Date</b>	<b>Name</b>	<b>Affiliation</b>
6	July 27, 2020	Doug Schneider	World Shipping Council
7	July 27, 2020	Donald Brown	Cruise Lines International Association
9	July 27, 2020	Thomas Jelenic	Pacific Merchant Shipping Association
10	July 26, 2020	Eugene Seroka, Mario Cordero	Port of Long Beach, Port of Los Angeles
11	July 27, 2020	Richard Sinkoff	Port of Oakland
12	July 27, 2020	Jesse Marquez	Coalition for a Safe Environment
15	July 27, 2020	Catherine Reheis-Boyd	Western States Petroleum Association
19	July 27, 2020	Bill Magavern	Coalition for Clean Air
Late Comment Submittal (Outside of Designated Comment Period)			
1	August 21, 2020	Art Mead	Crowley

Comments received during the Draft EA comment period are referenced as “Draft EA Comment N,” where N is the comment number. A comment received during one of the 15-day comment period is referred to as “First 15-Day Comment N” or “Second 15-Day Comment N,” where N is the comment number. Comments received late and outside of a designated comment period are referenced as “Late N”, where N is the comment number.

## **2.2 Master Responses**

The following Master Responses address recurring themes within the comments listed in Table 2-1. These Master Responses are referenced within the individual responses, where applicable.

### **Master Response 1: Approach to Environmental Impact Analysis**

**Comment:**

Various comments asserted, in a general sense, that the Draft EA fails to adequately assess all reasonably foreseeable compliance responses and thus underestimates the environmental impacts of the Control Measure for Ocean-Going Vessels At Berth (Proposed Regulation). A comment also stated the Draft EA should use the berth-by-berth detail in the Initial Statement of Reasons (ISOR).

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**Response:**

Because the comments addressed by this response are general in nature, a general response is appropriate. (See *Paulek v. Department of Water Resources* (2014) 231 CA4th 35, 48.)

The ISOR prepared by CARB for the Proposed Regulation, also known as the Staff Report, includes in Appendix D an environmental analysis specific to the Proposed Regulation on a programmatic level. The EA provides a good-faith effort to evaluate programmatically the potential for significant adverse impacts associated with implementation of the Proposed Regulation based on what is known at this time.

In Section 2.0, "Project Description," the EA provides an overview of the project objectives, concepts of the Proposed Regulation, and outlines the potential compliance responses that could occur because of implementation of the recommended actions. As described in the last paragraph on page 3 of the EA, "[t]he level of detail of impact analysis is necessarily and appropriately general because the Proposed Regulation is programmatic."

The reasonably foreseeable compliance responses are analyzed in a programmatic manner for several reasons: (1) any individual action or activity would be carried out under the same program; (2) the reasonably foreseeable compliance response would result in generally similar environmental effects that can be mitigated in similar ways (Cal. Code Regs., tit. 14, Section 15168 (a)(4)); and (3) while the types of foreseeable compliance responses can be reasonably predicted, the specific location, design, and setting of the potential actions are unknown at this time. The Proposed Regulation, by design, is flexible, taking a performance standard-based approach rather than requiring specific infrastructure improvements at specific berths or terminals. While CARB performed a berth-by-berth analysis for purposes of estimating costs and benefits, that analysis presents one possible scenario only. CEQA is clear that an indirect impact should be considered only if it is a reasonably foreseeable impact caused by the project. (Cal. Code Regs., tit. 14, Sections 15064(d)(3), 15358(a)(2).) An environmental impact that is speculative or unlikely to occur is not reasonably foreseeable. (Cal. Code Regs., tit. 14 Section 15064(d)(3).) Attempting to predict decisions by entities regarding the specific location and design of infrastructure undertaken at ports, which involves extensive decision-making processes in response to implementation of the Proposed Regulation, is speculative given the influence of other business and market considerations in those decisions. As a result, CARB's CEQA analysis covers all reasonably foreseeable activities, and avoids engaging in speculation about what specific actions may occur at individual berths.

As mentioned previously, the-berth by berth analysis was conducted by staff as part of the requirements for a cost-based analysis. For the analysis CARB staff evaluated the California ports and terminals likely to be subject to the requirements of the Proposed Regulation. Based on conversations with industry members and representatives, staff selected a method of emissions control technology to be used at each berth, for

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purposes of analyzing costs (a requirement under the Administrative Procedural Act (APA)). However, the results of the berth-by-berth analysis are not final as terminals and vessels may choose any method of emissions reductions that best fits their operations, including unlimited emission reductions options available under the Innovative Concept Compliance Option. Each vessel category (container, cruise, reefer, ro-ro, tanker) requires a different type of berth to conduct their operations and each terminal will have different operational methods with different configurations depending on the vessels that call there and the geographical location of the terminal. For example, some terminals will have vessel size restrictions (length, width, depth, etc.) that will determine which vessels can berth at their terminal, while others may be able to accept vessels of all sizes. This means that the emissions control technology needed to control at-berth emissions will vary from terminal to terminal, depending on the business needs of each terminal and shipping line. As such, the results of the berth-by-berth analysis are not final. Additionally, as part of the Innovative Concept Compliance Option added in the 15-day changes in March 2020 (section 93130.17) terminals and vessels may choose from a wide array of potential creative emission reductions options in the port or port community as long as they achieve equivalent or greater emissions that would be achieved by reducing emissions from vessels at berth, as well as the other requirements as specified in the Proposed Regulation. Thus, without formal engineering evaluations provided by each regulated terminal, CARB staff has no way of knowing which compliance responses are reasonably foreseeable at each terminal. For example, at the Port of Long Beach tanker terminal T121, terminal operators may opt to use shore power to comply with the regulation because it is already installed at that berth, but they could also opt to put in a barge- or land-based capture and control system if that fits better with the vessels they receive most regularly and with their daily operations. Therefore, CARB has no way to accurately analyze the specific compliance responses at each individual berth in the EA. Any such analysis done at this stage, prior to terminals conducting their own evaluations, would amount to speculation, which is not required by CEQA.

Given these considerations, beginning on page 5 of the EA CARB explains why, even though the ISOR has a berth-by-berth analysis, the EA does not use the berth-by-berth analysis to analyze environmental impacts. In brief, in contrast to CEQA, the APA requires agencies to prepare cost estimates for the compliance obligations resulting from proposed regulations, even where the compliance obligations are uncertain. The berth-by-berth analysis was created to satisfy this APA obligation. This explanation is in the context of air quality impacts but applies to all resource areas in the EA. The Draft EA has been revised as follows to provide additional clarification for the impact analysis in general:

### Page 5:

5. This ~~Draft-Final~~ EA generally does not analyze site-specific impacts when the location of future facilities or other infrastructure changes are speculative. However, the ~~Draft-Final~~ EA does examine regional (e.g., air

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district and/or air basin) and local issues to the degree feasible where appropriate. As a result, the impact conclusions in the resource-oriented sections of Chapter 4, Impact Analysis and Mitigation Measures, cover broad types of impacts, considering the potential effects of the full range of reasonably foreseeable actions undertaken in response to the Proposed Regulation. For the development of the Proposed Regulation and in response to the Administrative Procedure Act's (APA) economic impact analysis provisions, CARB completed a berth-by-berth analysis for all vessel categories that would be required to reduce emissions (Appendix E of ISOR; see California Government Code section 11346.3). California Government Code section 11346.3(a) requires that "[a] state agency proposing to adopt, amend, or repeal any administrative regulation shall assess the potential for adverse economic impact on California business enterprises and individuals, avoiding the imposition of unnecessary or unreasonable regulations or reporting, recordkeeping, or compliance requirements." For this analysis, CARB analyzed several different factors for each berth and determined a scenario that could reasonably occur under the Proposed Regulation. The purpose of the analysis under the APA was to determine how many systems would be expected in order to ultimately provide a basis for determining cost. While the berth-by-berth analysis was completed for development of the Proposed Regulation (including to help inform CARB's APA related analysis), using the scenarios based on this evaluation would be speculative under CEQA.<sup>1</sup> The CARB staff analysis is a scenario that could occur, but is not necessarily "reasonably foreseeable" as defined under CEQA, as various other scenarios could also occur. Conducting a berth-by-berth impact analysis for the hundreds of berths in California would provide information that could be misleading, should a different berth-by-berth scenario come to fruition. Therefore, this EA does not contain a berth-by-berth analysis.

<sup>1</sup> CEQA Guidelines section 15145 states that, "[i]f, after thorough investigation, a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact."

Consequently, the EA, as explained on page 5, takes a reasonably conservative approach in its post-mitigation significance conclusions (i.e., tending to overstate the risk that feasible mitigation may not be implemented by the agency with authority to do so, or may not be sufficient) and discloses, for compliance purposes with CEQA, that potentially significant environmental impacts may be unavoidable, where appropriate. Specific actions undertaken to implement the Proposed Regulation would undergo project-level environmental review as required and compliance processes at the time they are proposed.

As explained on page 4 of the EA, the degree of specificity required in a CEQA document corresponds to the degree of specificity inherent in the underlying activity it

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evaluates. The environmental analysis for broad programs cannot be as detailed as for specific projects. (Cal. Code Regs., tit.14, Section 15146.) For example, the assessment of a construction project would naturally be more detailed than for the adoption of a plan because the construction effects can be predicted with a greater degree of accuracy. (Cal. Code Regs., tit.14, Section 15146, subd. (a).) The level of detail in the EA reflects that the project is a broad statewide action framework. Consequently, the analysis does not provide the level of detail that would be provided in subsequent environmental documents prepared for specific regulatory actions that CARB or other agencies decide to pursue to reduce air pollutant emissions and exposures in California Ports and communities within their vicinity. (Cal. Code Regs. tit. 14, Section 15152.)

As explained on page 5 of the EA, lead agencies that oversee implementation of shore power or other emission control technologies would undertake some level of CEQA evaluation, which would include rigorous technical and environmental analyses where significant environmental impacts are possible. Such analyses would include mitigation as necessary to lessen any potentially significant environmental impacts. Additionally, lead and responsible agencies overseeing construction of future projects would coordinate with the applicable air district. California's air districts are statutorily authorized to "adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards" within their respective jurisdictions. (Health & Saf. Code, Section 40001(a).)

### **Master Response 2: Feasibility of Compliance Timelines**

#### **Comment:**

Various comments were provided claiming that the compliance timelines are infeasible, including:

- Project-level CEQA evaluation and acquisition of necessary permits and other regulatory requirements would impede achievement of the proposed timeline under the Proposed Regulation. Project implementation would require additional time to comply with the Proposed Regulation.
- Timelines for unproven technology are infeasible.
- The acceleration of deadlines for certain vessels—particularly tanker vessels—exacerbates the issues with meeting the compliance deadlines, and there is no basis for accelerating the tanker timeline.
- The Proposed Regulation requires marine terminal operators and vessel operators to put into place untested and unsafe equipment prior to feasibility and safety studies.

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- There is no evidence in the record that supports the feasibility of the compliance deadlines, and the projects evaluated by CARB to determine feasibility of the timelines do not reflect the real amount of work needed.

### **Response:**

These comments are not directly concerning the EA for the Proposed Regulation; rather, they question whether the overall Proposed Regulation is implementable. Nevertheless, responses to these comments are provided for transparency.

The Proposed Regulation's implementation timeline is described in the July 10, 2020, 15-Day Notice,<sup>1</sup> as well as in the ISOR. Beginning on page III-9, the ISOR describes the process that staff undertook to develop the proposed implementation dates, which included development of a berth analysis and an analysis of numerous project timelines. The 15-Day Notice updates the discussion with the revised implementation dates set forth in that notice.

For development of CARB Staff Analysis of Potential Emission Reduction Strategies" (Appendix E to the ISOR, also referred to as "Berth Analysis"),<sup>2</sup> CARB considered numerous sources, which importantly included comment letters from industry stakeholders and extensive discussions with terminal operators, port staff, and harbor pilots that service ports in Northern and Southern California.<sup>3</sup> Relevant to container, reefer, and cruise implementation dates, CARB staff determined that minimal additional infrastructure would be required to support the increased regulatory requirements under the Proposed Regulation due to the existing infrastructure currently in operation at covered ports. Additionally, as further explained on ISOR page III-10, most of the cruise, container and reefer vessels calling California are in fleets subject to the Existing Regulation such that operators have already installed shore power infrastructure on many of their vessels. Refer to pages III-10 through III-14 for a more detailed discussion of this process and findings for container, reefer, and cruise implementation dates. Additionally, to help with implementation, and as a result of economic hardship sustained by the industry during development of the Proposed Regulation, implementation dates for all cruise, container and reefer vessels were extended to 2023 and the implementation date for ro-ro vessels returned to the originally proposed compliance date of 2025, as described in the July 10, 2020, 15-

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<sup>1</sup> Available at <https://ww3.arb.ca.gov/regact/2019/ogvatberth2019/2nd15daynotice.pdf>.

<sup>2</sup> As noted above, from a CEQA impact analysis legal perspective, this Berth Analysis would be considered speculative, as it represents only one potential set of compliance responses that CARB believes are "reasonably foreseeable" as that term is legally defined under CEQA. However, the Berth Analysis provides a useful hypothetical scenario for analyzing the potential feasibility of the control measures.

<sup>3</sup> CARB staff's Berth Analysis Record of Development is available for public review and includes a record of the conversations and emails provided to CARB staff that formed the Berth Analysis (ISOR Appendix E). For information on how to access these records, please see CARB staff's "Second Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information" released July 10, 2020.

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Day Notice. (The existing At Berth regulation will remain applicable to the currently regulated cruise, container and reefer vessels until the new control requirements phase in at the beginning of 2023.) The implementation dates for tanker vessels remain at 2025 and 2027, as there is evidence that the tanker industry will rebound relatively quickly from the current situation.

For the ro-ro implementation date, as explained on ISOR page III-14, CARB staff assessed technical and operational feasibilities and engaged in conversations with vessel operators, terminal operators, and port staff. Pages III-15 through III-16 note that CARB anticipates that capture and control systems would be the primary pathway of compliance, and timelines for similar systems were used to develop the ro-ro compliance timelines. For tanker implementation dates, staff recognized additional safety concerns and regulations associated with tankers. As explained from pages III-16 through III-20, CARB staff anticipates compliance would involve capture and control systems. Extensive consideration was given to this implementation timeline, which included evaluation of similar projects.

In response to Board direction in December 2019 and numerous comments received during the comment period for the regulation as originally proposed, CARB accelerated the implementation dates for tanker vessels at the Port of Los Angeles and Long Beach to 2025 and all remaining tanker terminals to 2027 to achieve greater and earlier public health benefits.

However, CARB recognizes there is no single solution for every terminal throughout California. Construction activities at certain terminals may present unique challenges or require more complicated installations than others. As a result, the Proposed Regulation provides for a 2022 interim evaluation for new technologies and applications (Section 93130.14(d)). To briefly explain, staff would conduct an interim evaluation to assess the progress in adopting emission control technologies applicable to tanker and ro-ro vessel operations, as well as the status of landside infrastructure improvements that may be needed to support emission reduction systems at ro-ro and tanker terminals. If CARB determines, after evaluation, that the compliance deadlines for ro-ro or tanker vessels warrant an adjustment, staff may propose formal regulatory amendments.

Additionally, as part of the first 15-day changes, staff developed an "Innovate Concept Compliance Option." This alternative compliance strategy may be used for a specified period of time in lieu of meeting the required emission reductions from a vessel, if the innovative concept project meets or exceeds the required emissions reductions otherwise achieved by controlling vessel emissions while at berth (see regulation text Section 93130.17).

Staff believes these provisions and anticipated advancements in technology will help regulated entities meet compliance obligations by the implementation dates set forth by the Proposed Regulation. The length of time that CEQA review may take can vary based on the applicant, the project location, the project impacts, and the lead agency.

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Should one compliance pathway appear infeasible or lengthy due to CEQA review, the Proposed Regulation contains other pathways to compliance if additional time is needed. For example, there is an option to pay a mitigation fee into a remediation fund. The various opinions that the implementation timeline is infeasible due to CEQA requirements are; however, noted and included in the record for decisionmakers.

See also Response to Comment 22-2 for additional detail regarding CARB's consideration of permitting timelines for emissions control infrastructure.

### **Master Response 3: Industry Coalition Alternative**

#### **Comment:**

Several commenters state that CARB should, but did not, evaluate the Industry Coalition Alternative that was submitted during development of the Proposed Regulation.

#### **Response:**

Contrary to a commenter's claim, CARB evaluated the Industry Coalition Alternative in the ISOR as Alternative 3, "Alternative Proposal for Amendments to At-Berth Regulations." The analysis in the ISOR begins on page X-8 and notes that the industry coalition submitted this alternative.

From a CEQA perspective, as explained on page 162 of the EA, it is not necessary to "consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative" (Cal. Code Regs., tit. 14, Section 15126.6(f)(3)). While the Industry Coalition Alternative has concrete provisions for vessels, fleets, ports, and terminals that are already regulated (i.e., the categories already regulated under the baseline scenario), the alternative defers provisions for currently unregulated vessels, fleets, ports, and terminals to a future date after completion of a feasibility study. Those additional vessel categories, ports, and terminals are essential components of the Proposed Regulation. CARB cannot evaluate the environmental effects resulting from implementation of any yet-to-be-identified provisions. As a result, CEQA does not require evaluation of this alternative. Such evaluation would be speculative at best.

For the sake of thoroughness and public disclosure, this Master Response compares the Industry Coalition Alternative against CEQA alternative requirements to the extent practicable. Alternatives to the proposed project must (1) meet most of the basic project objectives, (2) be potentially feasible, and (3) reduce at least one significant impact of the proposed project (Cal. Code Regs., tit. 14, Section 15126.6, Cal. Code Regs., tit. 17, section 60004.2(a)(5)). Therefore, the Draft EA has been revised as follows to consider, but dismiss, the alternative from further evaluation:

#### **4. Alternative 7: Industry Coalition Alternative**

##### **a) Alternative 7 Description**

An industry coalition comprising of five marine industry groups submitted their proposal to CARB as an alternative to the Proposed Regulation. Alternative 7 would involve amending the Existing Regulation, consisting of addressing implementation challenges for the regulated vessel (i.e., container, reefer and cruise vessels) fleets and calls for feasibility and cost effectiveness studies prior to future expansion of the regulation. Mainly, Alternative 7 calls for a series of feasibility studies and reports to the Board before any expansion of the Existing Regulation's requirements or setting regulatory implementation dates. Feasibility studies conducted in cooperation with industry stakeholders would be required. Before any additional vessel types or terminals could be subject to control requirements, feasibility studies must be conducted for ro-ro, bulk/general cargo, and tanker vessel categories and the port/terminals where they visit to establish whether or not these categories would be suitable candidates for inclusion in the Proposed Regulation. These feasibility studies would identify cost effective emissions control programs based on reasonable implementation deadlines, safety concerns associated with the use of potential emissions control strategies, infrastructure readiness, and technological feasibility.

##### **b) Alternative 7 Impact Discussion**

###### **i. Objectives**

This alternative would fail to meet several of the Proposed Regulation's key objectives. This alternative would not meet Objective 1, which is to achieve criteria pollutant and GHG reductions to provide public health benefits near ports and marine terminals because, for unregulated ports, the only action required would be to comply with recordkeeping and reporting requirements. As stated on ISOR page X-9, "Alternative 3 would achieve substantially less emissions reductions for NO<sub>x</sub>, ROG, PM<sub>2.5</sub>, DPM, GHG, and black carbon. As a result, it would fail to provide significant additional public health benefits including communities adjacent to ports and terminals throughout the state..." For the same reason, this alternative would not meet Objective 2, which is to reduce at berth emissions at additional

ports, fleets, and terminals beyond those covered under the Existing Regulation. Likewise, the alternative would not meet Objective 3, which is to expand the existing emissions reductions requirements to include ro-ro vessels and tankers. Nor would it meet Objective 4, which is to achieve reductions from small fleets. Again, the sole action under this alternative for currently unregulated fleets is to comply with recordkeeping and reporting requirements. This alternative may not meet Objective 8, which is to implement a regulatory structure that is based on individual vessel visits. A feasibility study with requirements to be determined later provides no definition or standard for what the resultant regulation would require; therefore, it is uncertain whether the regulatory structure would be based on individual vessel visits. This alternative would not meet Objective 11, which is to assist in achieving attainment of health-based federal national ambient air quality standards (NAAQS) over the next 15 years as part of nonattainment area State Implementation Plans (SIP). With the provisions that would apply to unregulated vessels, fleets, ports, and terminals not yet identified, it is not certain what emissions would be achieved. As a result, the alternative does not meet most of the basic project objectives.

#### **ii. Potential Feasibility**

Because the alternative requires only using shore power when possible and safe, this alternative is potentially feasible from a technological perspective. It may also reduce potentially significant impacts associated with construction of new infrastructure that would occur with the Proposed Regulation. But, because the alternative would not meet most of the project objectives (Cal. Code Regs., tit. 14 Section 15126.6, Cal. Code Regs., tit. 17 section 60004.2(a)(5)) and because it is too vague to analyze (Cal. Code Regs., tit. 14 Section 15126.6(f)(3)), it is properly eliminated from detailed consideration in the EA.

Furthermore, this alternative is largely identical to Alternative 2 (Implementation Fixes Through an Amendment of the Existing Regulation Only), but with the potential to expand the regulatory requirements to new vessel categories at a future date, contingent upon the results of further feasibility studies. Given the uncertainty under this alternative regarding whether or when the regulatory requirements would expand to cover the additional vessel categories, CARB views this alternative as largely identical to Alternative 2, with the possibility of ultimately looking like a delayed version of the Proposed Regulation depending on further

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study results. Therefore, this suggested alternative is not considerably different from the others previously analyzed in the Draft EA. Furthermore, given that the ultimate outcome of this alternative is itself speculative, CARB also views this alternative as presenting a speculative scenario that does not lend itself to typical CEQA alternatives evaluation. It also remains unclear whether and how this alternative would reduce or avoid any significant environmental impacts identified for the Proposed Regulation. These considerations are further reasons for eliminating this alternative from detailed consideration in the EA.

## **Master Response 4: Feasibility and Safety of Capture and Control for Tanker Vessels**

### **Comment:**

Numerous comments were made during the Draft EA and first and second 15-day comment periods related to safety issues around tanker vessel compliance with the Proposed Regulation, including:

- There is no safe or feasible technology for capture and control at tanker terminals.
- CARB staff's assertion that feasible capture and control technology exists for tankers is incorrect.
- Industry stakeholders "clearly stated to CARB" that alternatives would need to be implemented instead of the proposed reduction requirements for tankers, not in addition to the requirement or only until infrastructure could be built. The part of the Proposed Regulation that allows for innovative emission reduction concepts reflects the incorrect assumption that technology for tanker capture and control will be feasible in the future, and that assumption is unsupported by evidence. The rule needs to provide for permanent alternatives.
- There has been no demonstration that tanker safety systems can be modified to comply with the Proposed Regulation in a safe way. A feasibility study is needed prior to adoption of the Proposed Regulation to address health and safety concerns.
- The accelerated timeline for tanker vessel compliance exacerbates safety issues.
- Stack capture and control systems would result in numerous safety risks for tanker vessels, such as failures in controlling electrostatic hazards, boiler pressure, and emergency disconnection. These accidents can lead to explosions and fires, which can then cause oil spills.
- Use of an emissions capture barge for petroleum tanker vessels as a safe alternative is unsupported by evidence.
- CARB's EA does not evaluate these hazards under CEQA and does not identify adequate mitigation. CARB cannot rely on a future interim evaluation of hazards impacts.
- The 15-Day Changes increase the risk of a hazardous incident from deployment of untested technology. A hazardous incident could result in impacts to human health and safety and may also result in an oil spill that could impact the aquatic environment. The Draft EA does not evaluate health and safety impacts of emissions capture systems for tanker vessels. They have not been tested and proven safe for use on tankers.
- Inert gas systems are vital for safety, and the Proposed Regulation would require modifications to these and other safety systems, but there is no demonstrated safe technology.

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### **Response:**

On page 100, the EA explains that it is most likely that land-based capture and control systems would be used for tanker vessels. CARB staff recognizes that there currently are no capture and control projects for tankers in California. However, as described by CARB staff at the December 5, 2019, Board meeting, CARB has been assured by technology manufacturers that there are engineering solutions for tanker vessels.<sup>4,5</sup>

CEQA does not require that CARB determine what these engineering solutions are or how to design them. Additionally, in the context of responding to comments, CEQA Guidelines section 15204 states that “CEQA does not require a lead agency to conduct every test or perform all research, study and experimentation recommended or demanded by commenters.” Instead, CEQA requires an evaluation of the “reasonably foreseeable indirect physical changes in the environment which may be caused by the project” (CEQA Guidelines section 15064(d)). Master Response 1 explains that attempting to predict decisions by entities regarding the specific location and design of infrastructure undertaken at ports that involve extensive decision-making processes in response to implementation of the Proposed Regulation is speculative given the influence of other business and market considerations in those decisions. As a result, the EA evaluates the effects of reasonably foreseeable compliance responses at a programmatic level, as explained in Master Response 1. Therefore, CARB is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation. Consistent with that statement, it is not CARB’s responsibility to determine engineering solutions for inert gas systems, boiler pressure, and emergency disconnections.

In terms of designing and implementing safe technology for tankers, the EA does discuss safety impacts related to tankers on pages 99–100 and recognizes the need for additional safety measures, consistent with assertions made by several commenters. Additionally, the EA’s assumption that safety practices would continue but at an increased level is a reasonable assumption because CARB has not been made aware of any safety issues with the current shore power or capture and control systems since the start of implementation of the current regulation in 2014. This indicates that industry has been successful at innovating and responding to similar regulatory mandates.

This text has been revised to further emphasize the need for safety measures, consistent with the statement in the ISOR and statements from the commenters.

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<sup>4</sup> Letter from Clean Air Engineering – Maritime, Dated August 12, 2019

<sup>5</sup> Letter from Ruben Garcia, Advanced Environmental Group, Dated October 14, 2019, posted to the Comment Log for “To Consider Proposed Control Measure for Ocean-Going Vessels At Berth” on December 5, 2019. Available at:  
<https://www.arb.ca.gov/lispub/comm/bccommlog.php?listname=ogvatberth2019>.

Hazardous materials that may be classified as flammable, corrosive, or reactive are often transported in ocean-going tanker vessels. Accidents (e.g., spills, fires, and explosions) that could occur during the transportation of these hazardous materials could include things such as spills, fires, and explosions that could involve terminal equipment or vessels at berth. As expressed in the 2014 Chevron Refinery Modernization Project, the transport and processing of oil involves acutely hazardous materials. Accidents could occur, resulting in public exposure to hazards or hazardous materials. Some of the hazards mentioned by Chevron include heat radiation from a fire, blast overpressure from an explosion, and airborne exposure to hazardous materials.<sup>72</sup>

As such, there is an inherent need for additional safety measures for all tanker vessels visiting California ports and marine terminals. As part of individual project-specific efforts to comply with the Proposed Regulation, it is anticipated that safety studies need to be performed for tanker terminals prior to implementation of specific compliance responses to ensure all safety considerations are met, given that the tanker vessels may carry flammable or explosive cargos.

The tanker industry has, since its inception, innovated to avoid and mitigate safety hazard risks. The tanker industry, at its core, is about moving potentially hazardous and flammable substances from place to place across the globe. Generally, a vessel arriving at an oil terminal will be moored and its position continuously controlled during the unloading/loading of cargo to reduce the potential for spills. Crude oil loading/discharging can only occur when the piping systems are properly aligned with the refinery or oil storage tanks, the terminal, and the vessel. As such, the vessel must be aligned and moored properly in order to reach and connect to pipelines. This process is not dissimilar to what would be needed for alignment with an emissions capture system. Once in place and in the correct position, in absence of a direct hose hookup, the vessel will be connected to the oil pipeline via marine loading arms. The loading arms can be found either on the vessel itself or dockside and consist of approximately 3 or 4 arms per vessel. The loading arms resemble and function comparably to the cranes and loading arms thought to be needed for the placement of capture and control technology on a vessel's stack.

Next, the pumping line is set by opening or closing a relevant line's valves to tanks or the refinery. After confirming readiness, loading or discharge of cargo can occur. Initially, the discharge/loading rates are relatively slow. Gravity starts the flow of cargo and the vessel's boiler operated pumps take over to sustain the desired flow rate. During loading/discharging, the operational parameters (e.g., pressure, temperature and flow rate) and infrastructural integrity are inspected on a regular basis. At the end of the cargo discharge, the remaining residue inside the tanker's cargo tank is typically removed through a crude oil

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washing (COW) process, which involves spraying heated crude oil back into the tanks to dislodge the remaining residue. Finally, the pumps stop, relevant valves are closed, and the loading arms are disconnected. These various steps require carefully heating, handling, and moving a hazardous and flammable substance, and demonstrate the tanker industry's ability to develop ways to perform these steps safely.

Spill-related hazards are dangerous and most often occur due to technical problems or human error during connecting the ship's manifold from the loading arm. Spills can also result from hydraulic impact due to a sudden valve closure on the ship or a valve closure at the terminal. Additionally, overflow can result from failure to stop loading onto the ship at the right time.<sup>73</sup>

Further, explosions can occur if proper precautions are not taken. For example, tanker vessels commonly have auxiliary marine boilers that can be used for heating residual fuel, production of hot water and space heating for passengers or crew, distillation of seawater to generate fresh water, and for crude oil tankers driving steam turbine pumps to offload crude oil or other petroleum products. For crude tanker vessels, these boilers burn fuel to produce the high-pressure steam used for off-loading cargo. Any malfunctioning boiler could lead to hazardous conditions, especially when the vessel contains flammable cargo. However, many safety precautions are in place to avoid hazardous conditions.

Additional explosion risk can occur during off-loading cargo. Crude oils usually found in tankers cannot burn in an atmosphere containing less than approximately 11 percent oxygen by volume. As cargo is pumped out of the vessel tanks the air volume increases furthering the amount of oxygen present and the potential for combustion. Thus, keeping oxygen levels below that in cargo tanks is an effective way to reduce explosion risk. Oxygen levels are often reduced via an inert gas system. The inert gas is pumped into each cargo tank reducing oxygen and in turn the flammability.<sup>74</sup>

While at berth, tanker vessels conduct numerous activities that could present a safety risk if not performed properly. Loading and unloading tanker cargo is a delicate balance of human safety measures, safety equipment and technological automation. However, despite the hazards, tanker vessel incidents and accidents have been increasingly rare.

Additionally, numerous laws have been enacted to regulate hazardous materials and wastes, including regulations specific to the oil and gas industry. California has the most stringent regulation and oversight of oil and gas operations in the U.S. To provide one example, a list of some of the regulatory statutes involving safety and hazards mentioned in connection with the 2014 Chevron Refinery Modernization Project,<sup>75</sup> are:

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1. Emergency Planning and Community Right-to-Know Act. Facilities must notify their State Emergency Response Commission and Local Emergency Planning Committee of the presence of any extremely hazardous substances (EHS) (40 CFR Part 355, Appendices A and B) if the EHS exceeds the threshold planning quantity. The facility must also appoint an emergency response coordinator.
2. The U.S. Environmental Protection Agency's (U.S. EPA) Risk Management Plan (RMP) Rule. This rule implements Clean Air Act Section 112(r). The RMP Rule established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce regulated substances in amounts over specified threshold quantities.
3. Occupational Safety and Health Act (Public Law 91-596), which mandates safety requirements in the workplace.
4. The Resource Conservation and Recovery Act (RCRA) Hazardous Waste Program (RCRA Subtitle C) (42 U.S.C. Section 6901 et seq.; 40 CFR Part 260) controls hazardous waste from "cradle to grave"—including generation, transportation, treatment, storage, and disposal.
5. The Oil Pollution Prevention Act (33 U.S.C. Section 2701 et seq.) of 1990 sets forth requirements for prevention of, preparedness for, and response to oil discharges at specific non-transportation-related facilities.
6. The CalARP Program (HSC Sections 25531 et seq.; 19 CCR Division 2, Chapter 4.5) includes the federal program for prevention of accidental releases of regulated substances adopted by the EPA pursuant to Clean Air Act Section 112(r).
7. The City of Richmond has an Industrial Safety Ordinance (RISO) that supplements the CalARP requirements described above by requiring additional measures to prevent and reduce the probability of accidental releases of regulated substances from industrial facilities.
8. The Interagency Working Group on Refinery Safety, composed of 13 agencies and departments and the Governor's office, released a report, "Improving Public and Worker Safety at Oil Refineries", outlining findings and making recommendations to improve public and worker safety at and near the state's oil refineries.<sup>76</sup>

In addition, Chevron also has created emergency response manuals for operations that describe the emergency response procedures that would be followed in the event of any dangerous scenarios and outlines the responsibilities for key response personnel. Additionally, Chevron also maintains

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its own emergency response capabilities, including on-site equipment and trained emergency response personnel who are available to respond to emergency situations anywhere within the refinery, which includes the terminal. CARB staff believes the operations outlined here are similar to those routinely undertaken by other tanker terminal operators throughout California.<sup>77</sup>

In sum, tanker operators have successfully been able to manage operating boilers and electrical systems on their vessels for decades. Additionally, shore power has already been demonstrated successfully on tanker vessels at the Port of Long Beach.<sup>78</sup> Given these achievements by the tanker industry, CARB reasonably believes the industry will be able to handle alternative control technology and shore power connections on a broader scale.

<sup>72</sup> Chevron Products Company – El Segundo Refinery Heavy Crude Project, Final EIR August 2006. (accessed June 24, 2020) <http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2006/chevron/finaleir.pdf?sfvrsn=4>

<sup>73</sup> Agnieszka Blokus-Roszkowska Bożena Kwiatkowska-Sarnecka Publications of the Hazard Project, Analysis of the Crude Oil Transfer Process and Its Safety. Gdynia Maritime University, Gdynia, Poland. December 2017

<sup>74</sup> OCIMF. Inert gas systems – The use of inert gas for the carriage of flammable cargoes. First Edition 2017

<sup>75</sup> Chevron Products Company – El Segundo Refinery Heavy Crude Project, Final EIR August 2006. (accessed June 24, 2020) <http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2006/chevron/finaleir.pdf?sfvrsn=4>

<sup>76</sup> Chevron Refinery Modernization Project Environmental Impact Report. Consolidated Version – Volume 1: Draft EIR October 2015 pp. 4.13-1 – 4.13-45.

<sup>77</sup> Chevron Products Company – El Segundo Refinery Heavy Crude Project, Final EIR August 2006. (accessed June 24, 2020) <http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2006/chevron/finaleir.pdf?sfvrsn=4>.

<sup>78</sup> Gamette, S., et al, Challenges Associated with Implementing Operations for the First Cold Ironing of Oil Tanker Vessels, Port of Long Beach Pier T Berth T121 BP Cold Ironing Project For Alaska Class Tanker, Published date unknown (presented at the 12th Triennial International Conference in Jacksonville, Florida, April 25-28, 2010) (accessed July 23, 2019).

Importantly, the need to conduct safety studies and develop safety measures does not mean the technology would be unsafe; to the contrary, it demonstrates an intent to plan properly to ensure that such technology will be developed to be safe.

The fact that there are existing interfaces at ports similar to those that would be used for the control measures under the Proposed Regulation, as described above, provides a strong indication that developing safety practices and procedures for the new control equipment is feasible and will be effective to minimize hazard risks. The EA reflects this on page 100 by noting that practices regarding land-based capture and control systems would be like those used today for similar activities already occurring at California ports:

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CARB staff believes the most likely control option for tanker vessels would be land-based on-capture and control systems. Use of capture and control technology would require additional interfaces at ports, which requires safety management due to the transfer of flammable materials from vessels. Use of these interfaces would be similar to activities already occurring at California ports, where there are interfaces for other purposes. It is assumed that the same safety practices would continue to be used, but that use of capture and control technology would result in increased safety management efforts.

Generally applicable safety regulations would also apply to compliance responses. The Draft EA has been revised on page 101 as follows to clarify the analysis of new vessel emission control technologies that would be developed for the regulation:

### **Impact 9.B-2: Long-Term Operational-Related Impacts to Hazards and Hazardous Materials**

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage.

Operation of Proposed Regulation-related infrastructure would entail the use of potentially hazardous equipment such as electrical cables and reel systems. However, vessels support an existing suite of hazardous infrastructure and comply with appropriate vessel safety procedures to minimize harmful exposure to hazardous equipment or materials. They also are able to transit through compact areas with little space alongside the vessel, such as crowded ports and canals (including, for example, the Panama Canal). Vessels based in the United States would be required to comply with standards established by the Occupational Safety and Health Administration (OSHA) and the U.S. Environmental Protection Agency (U.S. EPA). Existing regulations applicable in the shore power context include 29 C.F.R. 1915.83(c)(1), (c)(2), and (c)(3). These regulations require precautions before energizing vessel circuits. Additionally, OSHA has developed an entire suite of safety regulations for the longshoring industry.<sup>79</sup> As stated in Section 2.B.3 of this EA, “[w]hile there are currently no on-board emission control strategies verified by CARB for ocean-going vessel applications, CARB believes such control strategies will be developed.” As a result, it is not possible to determine what safety regulations would govern new vessel technologies, but it is reasonable to assume that safety regulations would address any previously unidentifiable safety hazards. Furthermore, CARB expects that vessel operators will undertake necessary safety precautions, as doing so is in their interest. As such, long-term operational-related hazardous impacts to vessels would be **less than significant**.

<sup>79</sup> U.S. Department of Labor, “Longshoring Industry Booklet,” 2001 (accessed January 15, 2020), <https://www.osha.gov/Publications/OSHA2232/osha2232.html>.

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As described in Master Response 2, the Regulation provides for a 2022 interim evaluation for new technologies and applications (Section 93130.14(d)). Staff would conduct an interim evaluation to assess the progress in adopting emission control technologies applicable to tanker vessel operations, as well as the status of landside infrastructure improvements that may be needed to support emission reduction systems at tanker terminals. If CARB determines, after evaluation, that the compliance deadlines for ro-ro or tanker vessels warrant an adjustment, staff may propose formal regulatory amendments. Moreover, the Proposed Regulation contains other pathways to compliance if additional time is needed due to safety concerns. For example, there is an option to pay a mitigation fee into a remediation fund. Through the first 15-day changes, CARB staff also introduced the innovative concept compliance option as an additional compliance pathway. Therefore, given alternative means of compliance, CARB respectfully disagrees with assertions in comments that the compliance deadline would force vessels and terminals to use unsafe and unproven technology and result in hazards impacts more significant than those disclosed in the EA.

### **Master Response 5: Environmental Impacts Associated with Accelerated Compliance Timelines**

#### **Comment:**

Numerous comments were made during the first 15-day comment period asserting that the accelerated timelines would worsen environmental impacts and the EA should be revised to address these impacts. Specific comments were raised regarding special-status fish, animals, and plants. Commenters also stated the accelerated compliance timelines should be evaluated in the cumulative impact analysis because the accelerated timeline will compress and intensify impacts. Commenters state that recirculation is required.

#### **Response:**

Following the release of the first 15-day changes amending the compliance schedule of the Proposed Regulation and again during the second 15-day comment period, public comments were submitted by oil industry and shipping industry representatives emphasizing that this accelerated schedule would result in more severe adverse impacts, particularly to biological species. First, note that the timelines are now being proposed as follows:

- Container, reefer, and cruise vessels must comply by 2023 (extended from the originally proposed compliance timeline of 2021).
- Ro-ro vessels must comply by 2025 (the same as the originally proposed compliance timeline).

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- Tanker terminals must comply by 2025 for the Ports of Long Beach and Los Angeles, and other terminals must comply by 2027 (accelerated from the originally proposed compliance timeline of 2027 and 2029, respectively).

Due to these changes, the question of impacts under accelerated timelines is only addressed here for tanker terminals because only the tanker terminal deadline would be accelerated compared to the originally Proposed Regulation.

The EA describes on page 107 that it is most likely that land-based capture and control systems would be used for tanker vessels. The Draft EA addresses environmental impacts from construction of land-based capture and control systems, and the first 15-Day notice discusses potential impacts of the accelerated implementation dates. On page 33, the first 15-Day Notice states, “these modifications would not result in any new reasonably foreseeable significant environmental impacts or substantially increase the severity of an identified environmental impact.” The first 15-Day notice states on page 34 that “[a]ccelerating implementation dates for...tanker vessels would not change the nature or extent of physical changes to the environment; it would simply result in them occurring one or two years sooner...”

While the oil and shipping industry commenters claim that the Draft EA needs to be revised to consider the environmental effects of the Proposed Regulation, the acceleration of tanker timelines does not result in greater severity of impacts, though they may occur sooner, because the Draft EA’s impacts analysis does not hinge on the duration of construction at ports but instead, as stated in the first 15-Day notice, relies on the nature and extent of impacts. For example, Impact 4.A-1 discusses short-term construction-related impacts on biological resources. The discussion states that capture and control devices could require construction of new pilings and surface area. This construction could cause temporary direct and indirect adverse impacts to special status species, including species mortality and disturbance from noise. Ports are in areas that are generally disturbed and maintained as free of substantial amounts of vegetation. Nesting birds may also be affected by construction noise. Mitigation is available, but impacts would remain significant and unavoidable. Because this conclusion is not based on the implementation timeline, the conclusion in the Draft EA is still valid for the accelerated tanker implementation timelines, and no revisions are needed.

Furthermore, also as part of the initial first 15-Day notice, CARB staff have proposed to add an “Innovative Concept Compliance Option” (Section 93130.17) that would give regulated entities considerable flexibility in determining when to install any needed infrastructure, provided they can secure equivalent benefits in some other manner, as specified in the regulation text. As a result, entities will not necessarily develop all of their selected infrastructure during the shortened time before the regulatory compliance deadlines become effective. This provision would add flexibility for infrastructure installation timeframes. Recirculation is required only when “significant new information” is added to an EA, as defined in California Code of

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Regulations, title 14, Section 15088.5. No revisions were made to the Draft EA; nor were any such revisions required to be made to the Draft EA. Therefore, recirculation of the Draft EA is not warranted.

**Master Response 6: Changed Economic and Environmental Conditions**

**Comment:**

Industry comments suggest that severely changed economic conditions indicate that the Proposed Regulation should be put on hold or modified because industry is focusing its effort on personnel safety and addressing supply chain changes. Comments were largely made on the Proposed Regulation in general or on the other administrative record documents rather than the Draft EA. Industry comments also suggest that the changed economic conditions also affect baseline conditions and the impact of the Proposed Regulation on emissions, health costs, and economic impacts; and these changes should be addressed. The comments state that the use of economic data that does not account for very recent economic conditions results in an overstatement of potential emissions savings. A commenter indicated that the assumptions made in the modeling performed for the Proposed Regulation should be reevaluated to account for a new economic climate to better characterize baseline conditions. For these reasons, these industry comments recommended recirculation of the Draft EA.

**Response:**

Although many of these comments did not pertain to the Draft EA, a response is provided here to address how changed economic and environmental conditions affect the analysis in the Draft EA. CARB recognizes that California and nations throughout the world are experiencing very recent economic downturns compared to the conditions at the time of preparation of the Draft EA and supporting documents. CARB has determined that, per well-established CEQA practice, the appropriate baseline for the Proposed Regulation was established when the Notice of Preparation (NOP) was released pursuant to Section 15125(a)(1) of the CEQA Guidelines, which states “the lead agency should describe physical environmental conditions as they exist at the time the notice of preparation is published.” The NOP for the Proposed Regulation was released in August 2018. The environmental setting, included as Attachment A to the Draft EA, provides an overview of California’s existing physical and regulatory setting in 2018 as they apply to each resource area evaluated in the Draft EA. Because the baseline is 2018, CEQA does not require that CARB update the baseline in the Draft EA to account for conditions that have changed in 2020.

The current economic climate is unique, and its full implications are unknown at this time. For multiple reasons, the behaviors of individuals, jurisdictions, and economic sectors cannot be predicted with accuracy, nor the environmental or economic results of these future behaviors. First, the economic conditions have only very recently begun to change, earlier this year. Second, economic conditions continue to change rapidly in

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response to public health conditions. As a result, there is insufficient data to project trends forward in a meaningful way. Therefore, to attempt to predict the length and magnitude of the current economic conditions, and any associated changes to environmental benefits or effects, would be a speculative exercise, which CEQA does not require (CEQA Guidelines Section 15145). Therefore, vessel and terminal operations described in the Draft EA that are based on economic activity need not be re-considered based on recent economic changes. Recirculation is required only when "significant new information" is added to an EA, as defined in California Code of Regulations, title 14, Section 15088.5. No revisions on this topic were made to the Draft EA, nor did any such revisions need to be made. Therefore, recirculation of the Draft EA is not warranted.

Even if existing operations did decrease from levels in 2018, the comments do not make clear how this would result in any potential new significant impacts, or in any substantial increase to a previously identified significant impact.

Emissions reductions are occurring as a result of reduced vessel visits associated with the current economic downturn, and CARB staff expect these reductions to continue for the next few years, particularly for the cruise and ro-ro vessel categories. CARB staff evaluated historical data from the 2008-2010 economic recession and found that under those economic conditions, cruise vessels took on the order of four to five years to return to pre-recession visit levels while ro-ro vessels took on the order of three to four years. Separately, container and tanker vessel visits took around one to two years to recover. Because the current circumstances are unique from past recession events, CARB staff expect there may be a reduction in emissions to continue over the next few years from reduced vessel visit activity, but outcomes are unknown. Therefore, CARB did not make changes to its inputs or methodologies at this time.

### 2.3 Responses to Comments on Draft EA

Comment Letter 1 October 26, 2019	Dennis Miller
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**1-1:** The comment suggests that ships at berth operating fossil fuel-powered engines should be required to switch to hydrogen fuel cell engines to reduce emissions.

**Response:** This comment does not set forth a CEQA alternative because such an alternative must reduce or avoid at least one of the Proposed Regulation’s significant environmental impacts. (Cal. Code Regs., tit. 14 Section 15126.6.) The emissions at issue in this comment are not caused by the Proposed Regulation, but rather by regulated entities, and the purpose of the Proposed Regulation is to reduce these emissions. Therefore, the commenter’s suggested alternative is a suggested regulatory/policy alternative, rather than a CEQA alternative to address any impacts from the Proposed Regulation. Nevertheless, staff includes the following response for transparency.

Although the Proposed Regulation does not require use of hydrogen fuel cells, the Proposed Regulation also does not prevent the use of hydrogen fuel cells as a compliance pathway to achieve emissions reductions from vessels at berth. The regulation allows for submittal of an application requesting approval from CARB for an emission control strategy, and the Executive Officer may approve the application if it meets the requirements outlined in the regulation. Therefore, the Proposed Regulation contemplates a suite of compliance pathways, which can include hydrogen fuel cells if they are approved by the Executive Officer.

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Comment Letter 17 December 2, 2019	Sinkoff, Richard Port of Oakland
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**17-1:** The comment summarizes CARB’s process in developing the health risk assessment (HRA) conducted for the Proposed Regulation in the ISOR. The Port of Oakland indicates that it would be amenable to coordinating with CARB staff to better refine the assumption made in the HRA that accompanies the ISOR.

**Response:** The comment addresses a previous version of the HRA. To clarify, the Draft HRA was updated and finalized before being used in the Proposed Regulation. The finalized HRA was created in coordination with stakeholders.

The comment pertains specifically to findings of the ISOR and does not address the adequacy of the Draft EA’s analysis. No further response is required in response to this comment.

**17-2:** The comment states that the role of the HRA from November 2018 is not clear. The commenter also notes that the Preliminary Health Analysis Report calls the risk reductions from the Proposed Control Measure as “significant,” a term used under CEQA and CARB’s Certified Regulatory Program, but not for the rulemaking progress.

**Response:** The Draft HRA was released for comment prior to being finalized and used for the ISOR. The purpose was to allow for affected entities to review and comment on the support document used for the rationale of the Proposed Regulation.

Appendix G to the ISOR contains the Health Analysis released on October 15, 2019, which supersedes preliminary health information. The Health Analysis includes the HRA and concludes on page G-39 that “[t]he Proposed Regulation would provide significant risk reductions by reducing the potential cancer risk to the MEIR and MEIW” and that “potential cancer risk would be significantly reduced.” Other similar conclusions are included in the Health Analysis. To clarify, significance conclusions made under CEQA—which are a substantial adverse change in the environment—for the Proposed Regulation are included in the EA, and not in the ISOR. The use of “significant” in the Health Analysis and preceding versions of the health analysis are not CEQA conclusions.

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Comment Letter 20 December 2, 2019	Dragos Rauta INTERTANKO
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**20-1:** The comment states that CARB should seek clarification from terminals and port authorities regarding their safety regulations for using electricity while transferring flammable cargoes. The commenter also states that the risk of using electrical power in tankers with hydrocarbon cargoes should be evaluated.

**Response:** The Draft EA evaluates the impacts related to ocean-going tanker vessels that are transporting flammable materials. The EA explains on page 107 that:

the most likely control option for tanker vessels would be land-based air capture and control systems. Use of capture and control technology would require additional interfaces at ports, which requires safety management due to the transfer of flammable materials from vessels. Use of these interfaces would be similar to activities already occurring at California ports, where there are interfaces for other purposes. It is assumed that the same safety practices would continue to be used, but that use of capture and control technology would result in increased safety management efforts.

Additionally, the EA discusses long-term operational-related impacts to hazards and hazardous materials on pages 96 through 100. Refer to Master Response 4 for additional discussion of safety related to tanker compliance, including alternate pathways to compliance such as the innovative concept compliance option of the Proposed Regulation. Note that, although it is not the most likely control option for tanker vessels, shore power use currently occurs for tankers at one terminal at the Port of Long Beach.

The commenter does not identify additional specific environmental impacts that the Draft EA should examine related to safety risks. Therefore, no additional response is required.

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Comment Letter 22 December 3, 2019	Reheis-Boyd, Catherine Western States Petroleum Association
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**22-1:** The comment states that vibrations and wind would require a wide operating window and that there is no standard to determine what that window should be. In Enclosure B of Comment Letter 22, the commenter categorizes this as a safety issue and states that a complete set of standards needs to be developed for shore-side emissions control systems prior to more detailed discussions.

**Response:** The commenter does not elaborate on what kinds of standards should be developed, when those standards apply, and what the implications of those standards are. Therefore, this response more generally addresses wind and vibration impacts as they may pertain to the Proposed Regulation and its environmental evaluation.

The commenter does not elaborate on how wind could result in safety hazards. It is presumed the commenter implies that wind may adversely affect operation of emissions control infrastructure.

CEQA requires an analysis of impacts of the project on the environment rather than impacts of the environment on the project. (*California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369; Cal. Code Regs., tit. 14 Section 15126.2(a)). At the same time, a project's exacerbation of existing hazards is within the purview of CEQA. CARB agrees with the commenter that it is essential that any shore-side control technologies developed for tankers undergo a complete and thorough safety evaluation and test plan of the physical and operational standards necessary to ensure safe operation. Manufacturers of future control technologies will need to account for the hazardous operations that are involved in tanker operations and obtain the proper certifications to align with various safety and operational standards.

CARB's 2019-20 Funding Plan for Clean Transportation Incentives authorized \$10 million dollars towards a demonstration of a capture and control system for oil tankers. This funding will help to showcase innovative solutions to address the unique safety requirements of tanker vessels. Projects will also demonstrate expanded capability to the existing barge-based capture and control technologies for container vessels by controlling higher flow rates of emissions from the large boiler and auxiliary engine loads of oil tankers with additional potential to demonstrate capturing emissions diverted directly to the control system rather than routed through the vessel stack before being controlled.

Regarding the comment that wind and vibration impacts will require the need for a wide equipment operating window of the shore-side control equipment, the commenter does not elaborate on why a wide equipment window would be required and what information this comment is based on. It is presumed the commenter implies that wind may adversely affect operation of emissions control infrastructure. Shore-based emission control systems are available today and technologies such as the

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Advanced Cleanup Technologies, Inc. Advanced Maritime Emissions Control System (AMECS 1) shore-side control technology, has been shown to safely operate in wind gusts under 45 knots and has been safely used on hundreds of vessels during various meteorological conditions. Wind events may restrict when tall construction equipment can be used so it is possible the commenter is suggesting that these time limitations may also hinder timely compliance with the Proposed Regulation. Regarding safety and the possibility of infeasible compliance with the Regulation's timeline, the Proposed Regulation contains other pathways to compliance if additional time is needed due to safety concerns. For example, there is an option to pay a mitigation fee into a remediation fund. And, the Proposed Regulation allows for other compliance options, such as by developing innovative concepts. Finally, the Proposed Regulation also includes an exception for safety and emergency events, defined as an event where a responsible official reasonably determines that compliance with this Control Measure would endanger the safety of the vessel, crew, cargo, passengers, terminal, or terminal staff because of severe weather conditions, a utility event, or other extraordinary reasons beyond the control of the terminal operator or vessel operator. To the extent the commenter's hypothetical scenario constitutes a legitimate danger to the vessel or its crew due to severe weather conditions (including wind), that exception would apply.

In addition, CEQA requires an analysis of impacts of the project on the environment rather than impacts of the environment on the project. (*California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369; Cal. Code Regs., tit. 14 Section 15126.2(a)). A project's exacerbation of existing hazards is within the purview of CEQA. By contrast, impacts from wind—an existing environmental condition—on control operations would be considered an impact of the environment on the project, rather than an impact of the project. The Proposed Regulation also would not exacerbate wind. Therefore, wind-related impacts may be excluded from the environmental analysis.

It is not clear from the comment what source of vibration may cause safety impacts, nor what safety impacts those may be; therefore, no revisions have been made to the Draft EA's environmental analysis. Note that the EA also addresses vibration impacts on pages 121 – 129.

CARB believes that the commenter could be referring to vibration from project implementation that may affect aquatic species. Activities that affect aquatic species can be subject to seasonal limitations. Additionally, wind events may restrict when tall construction equipment can be used. It is possible the commenter is suggesting that these time limitations may also hinder timely compliance with the Proposed Regulation. Refer to Master Response 2 for a discussion of implementation timelines. Regarding safety and the possibility of an infeasible timeline, the Proposed Regulation contains other pathways to compliance if additional time is needed due to safety concerns. For example, there is an option to pay a mitigation fee into a remediation fund. And, as described above, the Proposed Regulation allows for other compliance

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options, such as with the innovative concept compliance option. The Proposed Regulation also includes an exception for safety and emergency events, defined as an event where a responsible official reasonably determines that compliance with this Control Measure would endanger the safety of the vessel, crew, cargo, passengers, terminal, or terminal staff because of severe weather conditions, a utility event, or other extraordinary reasons beyond the control of the terminal operator or vessel operator. To the extent the commenter's hypothetical scenario constitutes a legitimate danger to the vessel or its crew due to severe weather conditions (including wind), that exception would apply.

**22-2:** The comment asserts that the construction schedule recommended in the Proposed Regulation is unrealistic. The commenter claims the timeline is unrealistic in part because of permitting. Permitting requires CEQA review, which cannot begin until at least 30 to 60 percent of project design has been completed.

**Response:** This comment does not raise any significant environmental issues regarding the Proposed Regulation, but rather comments on the CEQA process for future physical development in a general sense. As such, CEQA does not require a response to this comment. However, staff provides the following response for informational purposes.

As stated on EA page 5, "[s]pecific actions undertaken to implement the Proposed Regulation would undergo project-level environmental review and compliance processes as required at the time they are proposed." The EA also contains a table listing the various permits that may be required for infrastructure installations undertaken in response to the Proposed Regulation. (See Table D.2-1 at page 23. In addition, approval from various other permitting Agencies or Commissions may be required for Port infrastructure or construction projects, such as the San Francisco Bay Conservation and Development Commission (for projects occurring in the San Francisco Bay). The Proposed Regulation was developed with various permit approvals in mind, but CARB staff cannot predict all permitting pathways necessary for each individual project to be approved for construction.

At the December 5, 2019, Board meeting, the Bay Area Air Quality Management District (BAAQMD) requested that CARB advance the implementation dates for tankers, and also mentioned concerns regarding the lengthy permitting process, particularly in the Bay Area. BAAQMD has worked with planning agencies in and around the Bay Area and has experience in how the interagency groups could approach the permitting and timing challenges by working together as a consortium and identifying concerns prior to the submittal of permit applications. At the same hearing, CARB Board Member Supervisor John Gioia mentioned the Bay Restoration Regional Integration Team to CARB staff, which is made up of six different agencies that have permitting authority in the Bay Area. This team is designed to make the pre-application permitting process of various projects in the Bay Area more efficient and to ultimately save time.

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In February 2020, CARB management and staff also participated in a conference hosted by the Bay Area Planning Coalition. Richard Corey, CARB's Executive Officer, presented on the At Berth regulation, discussed the nexus between permitting and the regulation, and also discussed ways that CARB can coordinate with the various permitting agencies on future marine terminal infrastructure projects. CARB Staff are aware of the extensive design, application, and permitting required for ports to install additional at-berth electrification and any capture and control equipment to comply with the Proposed Regulation. CARB is committed to being part of a consortium of planning and permitting agencies to help streamline the process for port project approval so the ports can begin construction to comply with the regulation as soon as possible.

Contrary to the commenter's assertion that 30 to 60 percent design is needed to provide an accurate and stable project description for project-level CEQA review, CEQA does not contain a minimum level of design at which CEQA review can begin. "Choosing the precise time for CEQA compliance involves a balancing of competing factors. [Environmental impact reports] and negative declarations should be prepared as early as feasible in the planning process to enable environmental considerations to influence project program and design and yet late enough to provide meaningful information for environmental assessment." (Cal. Code Regs., tit. 14 Section 15004(b)). In practice, it is common for CEQA review to run concurrently with project design, and detailed design and final engineering are not necessary. Once the desired control strategy is identified for a specific berth, the project description (and range of environmental impacts) for developing that strategy is fairly limited; the applicant need not have every last technical detail to commence environmental review. Nevertheless, the commenter's description of needing to have construction contracts in place to begin construction and other such schedule notes are included in the record for decisionmakers.

See Master Response 2 for further discussion of the feasibility of CARB staff's proposed timeline under the Proposed Regulation and its relation to future CEQA evaluation.

**22-3:** The comment states that: The Timeline Survey Summary provides steps including technical and feasibility studies, site-specific design, engineering, CEQA review, regulatory agency permitting and approval, contracting, construction, and commissioning. However, projects cannot commence without permitting from many local and state agencies. The commenter claims that some responsible agencies will not begin processing applications until the lead agency completes CEQA review. The commenter asserts that limited resources at permitting agencies is likely to result in a staggered process, which means regulated parties may be at risk of noncompliance.

**Response:** This comment does not raise any significant environmental issues regarding the Proposed Regulation, but rather comments on the CEQA process for future physical development in a general sense. As such, CEQA does not require a response

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to this comment. However, staff provides the following response for informational purposes.

The commenter's description of project planning, permitting, and construction is noted and included in the record for the decisionmakers. Additionally, CARB recognizes that any new equipment development and infrastructure could be delayed from mechanisms outside of CARB's control such as permitting and construction work; therefore, CARB proposes an interim evaluation in 2022 to assess the progress that has been made in adopting control technologies for tankers and ro-ro vessels. The findings of this report would be submitted for public review and would amend the timeline under the Proposed Regulation if applicable.

Regarding application processing by responsible agencies, a responsible agency is an "agency, other than the lead agency, which has responsibility for carrying out or approving a project." (Public Resources Code Section 21069). Most often, the responsible agency will consider the lead agency's CEQA document prior to acting upon or approving the project (see Cal. Code Regs., tit. 14 Section 15050(b)). A responsible agency can begin to process an application prior to certification of the CEQA document but may not issue a discretionary permit or approval without complying with CEQA (that is, without reviewing the CEQA document and making a determination about its adequacy as pertains to the responsible agency's approval role). The commenter's perception that some responsible agencies will not begin processing applications prior to certification of a CEQA document by the lead agency is noted and included in the record for decisionmakers. This may be the case for some agencies such as the Bay Conservation and Development Commission (BCDC) who require a certified EIR or negative declaration prior to action on permitting.<sup>6</sup> See also response to comment 22-2.

As part of the 15-day changes released in March 2020, CARB staff included the Innovative Concept Compliance Option (section 93130.17). This option was intended to bridge the gap for more complex infrastructural projects that may require long permitting processes. The innovative concept option allows for an alternative compliance pathway in that, regulated entities pursue any emissions reductions strategies that might achieve equivalent or greater emissions reductions as reducing emissions from vessels at berth. The provision once approved by CARB is valid for five years before requiring renewal. This alternative compliance pathway is anticipated to be particularly useful during the early years of the regulation, giving vessels, terminals, and ports additional time to develop infrastructure.

See Master Response 2 for further discussion of the feasibility of CARB staff's proposed timeline under the Proposed Regulation.

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<sup>6</sup> San Francisco Bay Conservation and Development Commission. (June 2020). BCDC Application Form: Box 8, Environmental Impact Documentation. <https://www.bcdc.ca.gov/forms/appform.pdf>.

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**22-4:** The comment indicates that two projects cited in the ISOR were exempt from CEQA or evaluated in a limited Negative Declaration, which is not a suitable example for future projects under the Proposed Regulation because future projects would be larger in scale.

**Response:** This comment does not raise any significant environmental issues regarding the Proposed Regulation, but rather comments on the CEQA process in a general sense. As such, CEQA does not require a response to this comment. However, staff provides the following response for informational purposes.

As recognized in the comment, the two projects mentioned by the commenter are not the only cited projects in the ISOR. To clarify, the ISOR does not limit its scope of evaluation to two projects; rather, the ISOR also analyzed other terminal infrastructure projects: the Port of Richmond International-Matex Tank Terminals Wharf Modification project and the POLA Berths Marine Oil Terminal Wharf Improvements projects (see ISOR page III-20). Combined with the Chevron Richmond Long Wharf MOTEMS and Wharf Maintenance and Efficiency projects and the ShoreKat land-side capture and control project, the discussion represents a range of physical improvements that occurred over a duration of an average of five to seven years for completion depending on the elements of the project under review.

**22-5:** The comment indicates that the scope of the construction impacts cited in the Draft EA are underrepresented.

**Response:** Reasonably foreseeable construction impacts are disclosed throughout the Draft EA under Impacts 1.A-1, 1.B-1, 2.A-1, 2.B-1, 3.A-1, 4.A-1, 4.B-1, 5.A-1, 5.B-1, 6.a, 7.A-1, 7.B-1, 8.A-1, 9.A-1, 9.B-1, 10.A-1, 10.B-1, 11.A-1, 11.B-1, 12.A-1, 12.B-1, 13.A-1, 13.B-1, 14.A-1, 14.B-1, 15.A-1, 15.B-1, 16.A-1, 16.B-1, 17.A-1, and 17.B-1. Mitigation includes Mitigation Measures 1.A-1, 2.A-1, 3.A-1, 4.A-1, 5.A-1, 7.A-1, 9.A-1, 10.A-1, 12.A-1, 13.A-1, and 17.A-1. The Draft EA provides a programmatic evaluation of the physical environmental effects of the reasonably foreseeable compliance responses from implementation of the Proposed Regulation. See Master Response 1 for additional discussion of the programmatic nature of the Draft EA. Because this comment does not provide specifics about where the commenter believes the consequences of construction are inadequately discussed, no further response is required.

**22-6:** The comment asserts that CEQA review cannot begin until a lead agency is assigned and at least 30 to 60 percent of the design is complete to provide a stable project description as the basis of review.

**Response:** This comment does not raise any significant environmental issues regarding the Proposed Regulation, but rather comments on the CEQA process for future physical development in a general sense. As such, CEQA does not require a response to this comment. However, staff provides the following response for informational purposes.

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Refer to Response to comment 22-2 regarding when CEQA review can begin during the design and engineering process. See Master Response 2 for additional discussion of future CEQA review of projects related to implementation of the Proposed Regulation.

**22-7:** The comment claims that responsible agencies will not begin processing applications before certification of a CEQA document, resulting in project delays.

**Response:** This comment does not raise any significant environmental issues regarding the Proposed Regulation, but rather comments on the CEQA process for future physical development in a general sense. As such, CEQA does not require a response to this comment. However, staff provides the following response for informational purposes.

The commenter's perception that some responsible agencies will not begin processing applications prior to certification of a CEQA document by the lead agency is noted and included in the record for decisionmakers. See response to comment 22-3, and Master Response 2.

**22-8:** The comment asserts that lead and responsible agencies might require completion of some mitigation measures before construction commences, and that this may delay compliance response progress.

**Response:** This comment does not raise any significant environmental issues regarding the Proposed Regulation, but rather comments on the CEQA process for future physical development in a general sense. As such, CEQA does not require a response to this comment. However, staff provides the following response for informational purposes.

The comment is correct in stating that some mitigation must be implemented prior to the beginning of construction. Examples of such mitigation are included in the Draft EA, such as the requirement in Mitigation Measure 4.A-1 that requires preparing a biological inventory of site resources prior to ground disturbance or construction. Such measures are common to reduce impacts. The commenter's assertion it would cause project delays is noted and included in the record for decisionmakers.

**22-9:** The comment asserts that specified project examples support the claim that compliance with at-berth regulations is unattainable by 2027/2029.

**Response:** This comment does not raise any significant environmental issues regarding the Proposed Regulation, but rather comments on the CEQA process for future physical development in a general sense. As such, CEQA does not require a response to this comment. However, staff provides the following response for informational purposes.

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CARB believes that the implementation timelines are feasible. See Master Response 2 regarding feasibility of implementation timelines.

**22-10:** The comment suggests that the Bay Area Air Quality Management District's (BAAQMD's) letter, which suggests that interagency partnerships with CARB could shorten review of individual projects, is incorrect because the partnerships could require additional time that would hinder meeting the Proposed Regulation's compliance deadlines.

**Response:** This comment does not raise any significant environmental issues regarding the Proposed Regulation, but rather comments on the CEQA process for future physical development in a general sense. As such, CEQA does not require a response to this comment. However, staff provides the following response for informational purposes.

The commenter's opinion that the interagency coordination would add more time to implementation is noted and included in the record for decisionmakers. See Master Response 2 regarding feasibility of implementation timelines.

**22-11:** The comment states its feasibility study would improve the efficiency of the project review and permitting process.

**Response:** This comment does not raise any significant environmental issues regarding the Proposed Regulation, but rather comments on the CEQA process for future physical development in a general sense. As such, CEQA does not require a response to this comment. However, staff provides the following response for informational purposes Refer to Response to Comment 22-46.

**22-12:** The comment introduces the subsequent comments.

**Response:** The comments serves as an introductory statement indicating that the subsequent comments will pertain to the Draft EA pursuant to the CEQA Guidelines. No further response is required.

**22-13:** The comment summarizes the requirements under CARB's certified regulatory program to consider adverse impacts to other resource areas beyond air quality and GHG emissions. The comment states that the Draft EA contains "hundreds of pages" of analysis of air quality and GHG analyses and does not provide enough discussion of other environmental issue areas. The commenter also states that the purpose of CEQA review by regulatory agencies is to require consideration of impacts outside their jurisdiction.

**Response:** The Draft EA evaluates the reasonably foreseeable environmental impacts of the methods of compliance pursuant to Public Res. Code Section 21159(a)(1) on pages 27 through 137. This evaluation includes all resource areas included in Appendix G to the State CEQA Guidelines including, but not limited to, aesthetics,

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agricultural and forestry resources, biological resources, hydrology and water quality, noise, population and housing, recreation, and utilities and service systems. While the commenter is correct that the air quality and GHG discussions cover a substantial number of pages, the quantity of pages dedicated to each resource is not a meaningful proxy for whether an analysis is adequate under CEQA. For example, the discussion “shall focus on the significant effects on the environment. The significant effects should be discussed with emphasis in proportion to their severity and probability of occurrence.” (Cal. Code Regs., tit. 14 Section 15143) Furthermore, the Proposed Regulation’s primary purpose is to reduce emissions, and CARB is the State agency responsible for air quality. As a result, the air quality and GHG analyses naturally are longer. Therefore, the number of pages of each resource analysis is not a meaningful metric for CEQA adequacy.

The commenter’s claims that the purpose of CEQA review by regulatory agencies is to require consideration of impacts outside their jurisdiction. CARB notes that when CARB undertakes an Environmental Impact Analysis, CARB must evaluate environmental impacts that are both within and outside CARB’s jurisdiction (Cal. Code Regs., tit. 17 Section 60004.2(a)).

**22-14:** The comment supports CARB’s conclusion that land-based and control systems would constitute the reasonably foreseeable means of compliance for tanker vessels. The commenter notes a broad concern with feasibility of compliance with the regulation.

**Response:** The commenter’s agreement with CARB’s assumption is noted and included in the record for decisionmakers. See Master Response 2 and response to comment 22-2 regarding commenter’s feasibility concerns.

**22-15:** The comment summarizes the requirements under California Code of Regulations, title 14, Section 15126.6(a) and (c) regarding the developing of alternatives to a project.

**Response:** The comment summarizes CEQA requirements for alternatives. It is noted and included in the record for decisionmakers.

**22-16:** The comment asserts that the compliance deadlines under the Proposed Regulation are infeasible and unreasonable.

**Response:** See Master Response 2 and response to comment 22-2 for further discussion of the feasibility of CARB staff’s proposed timeline under the Proposed Regulation.

**22-17:** The comment states the Draft EA fails to evaluate the environmental impacts of the Proposed Regulation. The comment also claims that the Draft EA’s deferral of specific project-level review to a future date demonstrates that CEQA review would make the compliance timelines practically impossible. The comment also describes the

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use of tiering under CEQA and specific to CARB and states that CARB has prepared the Draft EA with the intent that future project-level CEQA review would be conducted by agencies with jurisdiction over projects.

**Response:** Refer to Master Response 1 regarding the level of detail and the programmatic evaluation in the Draft EA. Refer to Master Response 2 regarding the claim that the compliance timelines are infeasible.

**22-18:** The comment quotes direction provided in California Code of Regulations, title 14, Section 15152(b) regarding tiering approach and suggests that the Draft EA does not provide an adequate evaluation of the reasonably foreseeable significant environmental effects of the Proposed Regulation based on the CEQA concept that impact analyses cannot be deferred until a later time.

**Response:** Refer to response to Comment 22-17 regarding tiering and to Master Response 1 regarding the level of detail and the programmatic evaluation in the Draft EA.

Regarding *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, the court also states, “[t]iering is properly used to defer analysis of environmental impacts and mitigation measures to later phases when the impacts or mitigation measures are not determined by the first-tier approval decision but are specific to the later phases. For example, to evaluate or formulate mitigation for site specific effects such as aesthetics or parking may be impractical when an entire large project is first approved; under some circumstances analysis of such impacts might be deferred to a later EIR” (citations and internal quotations omitted). While CARB does not anticipate tiering from the EA, this rule demonstrates the general concept that CEQA allows for deferral of analysis when it is impractical. On page 5 the EA states, “Specific actions undertaken to implement the Proposed Regulation would undergo project-level environmental review and compliance processes as required at the time they are proposed.” In practice, tiering is generally used for General Plans and Specific Plans, when CEQA review is needed for a later project undertaken within the plan area, where the lead agency has prepared the original CEQA document and is undertaking CEQA review for the later project. Therefore, to clarify, although tiering is allowable under CEQA, CARB does not anticipate that local jurisdictions would substantially tier their CEQA document off the Draft EA when they conduct CEQA analysis of the project under consideration.

As explained in Master Response 1, it would be speculative to evaluate specific impacts of compliance responses, and the programmatic level of analysis is appropriate.

**22-19:** The comment indicates that the Draft EA’s impact analysis identifies impacts as speculative and notes that the Draft EA concludes they must be considered potentially significant and unavoidable due to CARB’s lack of authority with respect to implementing mitigation measures.

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**Response:** The EA explains on pages 4–5 CARB’s approach to analysis. On page 4 the EA states that “The analysis addresses environmental impacts within California and outside the State to the extent that they are reasonably foreseeable and do not require speculation.” Regarding mitigation, on page 5 the EA notes “the potential that feasible mitigation may not be implemented by the agency with authority to do so.” While CARB recommends project-level mitigation measures that should be implementable by local lead agencies reviewing project-specific development proposals, CARB does not have the authority to implement these measures at the project level because CARB would not be the lead agency overseeing future environmental review, and because CARB lacks the general land use authority to require mitigation in many instances. Therefore, as explained on page 5 of the EA, CARB takes the “conservative approach in its post-mitigation conclusions...and discloses, for CEQA compliance purposes, that potentially significant environmental impacts may be unavoidable, where appropriate.” The comment does not raise a specific issue with this environmental impact analysis approached; therefore, no additional response is necessary.

**22-20:** The comment asserts that although the Draft EA contains language specifying that adverse and beneficial impacts of the reasonably foreseeable compliance responses are identified, the Draft EA fails to make a “rigorous effort” in identifying those impacts and instead concludes detailed information in the record is speculative.

**Response:** Refer to Response to Comment 22-19 about the Draft EA’s scope of analysis in terms of deeming certain impacts “speculative.” See also Master Response 1 for additional information pertaining to the programmatic nature of the Draft EA. The commenter is correct that the rulemaking record includes more-specific information about what kinds of activities could occur in response to the Proposed Regulation. The commenter does not specify which part of the rulemaking record they are referring to; however, Response to Comment 22-22 contains an explanation of why, even though the ISOR has a berth-by-berth analysis, the Draft EA does not use the same information as that analysis to analyze impacts.

**22-21:** The comment suggests that because CARB identifies 21 land-based capture and control projects at specific ports, a more-detailed analysis should have been undertaken.

**Response:** Refer to Response to Comment 22-22 for an explanation of why, even though the ISOR has a berth-by-berth analysis, the Draft EA does not use the berth-by-berth analysis to analyze environmental impacts. While the EA mentions these 21 land-based capture and control projects, the EA also states on pages 4 through 5 that

While the general locations of ports in California which may be covered under the Proposed Regulation are known, decisions by the regulated entities regarding compliance options and the precise location of the many components covered in the Proposed Regulation are unknown. Furthermore, attempting to predict decisions by entities regarding the specific location and

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design of infrastructure undertaken in response to implementation of the Proposed Regulation would be speculative (if not impossible) at this early stage, given the influence of other business and market considerations in those decisions.

Therefore, the approach taken in the Draft EA is appropriate under CEQA.

**22-22:** The comment asserts that because ISOR Appendix E provides a berth-by-berth analysis that details 21 projects by berth, the Draft EA must use this information for the impact analysis.

**Response:** Refer to Master Response 1 regarding the ISOR's use of a berth-by-berth analysis and the use of this detail for the Draft EA.

**22-23:** Citing PRC Section 21159(c), the comment asserts that the environmental analysis must consider a reasonable range of environmental, economic, and technical factors, populations, and geographic areas and specific sites; therefore, the programmatic disclaimer is inappropriate.

**Response:** Importantly, PRC Section 21159(d) states that "[t]his section does not require the agency to conduct a project-level analysis." PRC Section 21159(a) also notes that "the agency shall not be required to engage in speculation or conjecture." Contrary to the commenter's assertion that the Draft EA contains a "generic programmatic disclaimer," the Draft EA appropriately contains a program-level analysis and states specifically when impact analysis is too speculative for consideration under CEQA. See also Master Response 1.

**22-24:** Citing California Code of Regulations, title 14, Section 15091, the comment asserts that if CARB adopts a statement of overriding considerations, this action would not be supported by substantial evidence. Moreover, the comment suggests that CARB is overstating the benefits of the Proposed Regulation.

**Response:** To clarify, California Code of Regulations, title 14, Section 15093 governs statements of overriding considerations, while CEQA Guidelines Section 15091 governs findings in general. No statement of overriding considerations has been circulated for public review at the time of public review of the Draft EA. Any such statement would be adopted at the time of project approval, pursuant to California Code of Regulations, title 14, Section 15093. Therefore, the commenter's assertion regarding an eventual statement of overriding considerations is speculative opinion. It is noted and included in the project record for consideration by the decisionmakers.

This comment does not provide a specific critique of any discussion of beneficial environmental impacts; therefore, no detailed response is required. Note, however, that the Proposed Regulation was prepared and designed as a mechanism to address local and regional sources of air pollution and to provide a range of benefits, as described in the objectives on EA pages 163–164. These long-term operational air

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quality benefits are discussed on pages 52 through 59 of the EA and would occur from transitioning vessels away from energy derived from diesel generators to the electrical grid, which, due to statewide law and policy, is becoming increasingly more renewable. Diesel fuel combustion is a source of criteria air pollutants and precursor emissions (i.e., NO<sub>x</sub> and PM) and contributes to nonattainment of the NAAQS and the California ambient air quality standards (CAAQS). Additionally, diesel exhaust is a source of diesel PM (DPM), which has been identified by CARB as a toxic air contaminant for which there is no healthful concentration. The use of barge- and land-based capture and control systems would be equipped with technologies that would filter or otherwise control emissions of NO<sub>x</sub>, PM, and sulfur dioxide (SO<sub>x</sub>). Therefore, the Proposed Regulation does result in air quality benefits consistent with the objectives. The general opinion that benefits are overstated is nonetheless noted and included in the project record for consideration by the decisionmakers.

**22-25:** The comment asserts that the Draft EA's conclusions that hazard-related construction and operational impacts to vessels would be less than significant is premature and that the impacts would be significant and unavoidable without conducting a feasibility study.

**Response:** The comment does not explain why the commenter believes these impacts are significant and unavoidable. The portion of the ISOR quoted in the comment is part of CARB's discussion of how CARB staff formulated compliance schedules for tankers. See Master Response 4 for a discussion of safety and tanker vessels.

**22-26:** The comment claims that, while the EA states that vessels based in the United States must comply with Occupational Safety and Health Administration (OSHA) and U.S. Environmental Protection Agency (EPA) standards, safety protocols do not exist for operating the new vessel emission control technology to be developed for the regulation.

**Response:** See Master Response 4.

**22-27:** The comment states that electrostatic hazard, stack pressure maintenance, safe and secure stack connection, and emergency disconnection are potential operational hazards associated with the Proposed Regulation and are not identified in the Draft EA. The commenter also claims that the Proposed Regulation does not allow enough time to develop safe approaches to compliance.

**Response:** See Master Response 2 regarding the timeline for implementation. See Master Response 4 regarding safety concerns.

**22-28:** The comment states that the Draft EA takes a "default approach" of finding Impact 9.A-2 significant and unavoidable and that the Draft EA includes a "vague generic statement" that accidents may occur and "assumes" continuance of the same safety practices for shore-side installation of capture and control systems.

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**Response:** Contrary to the commenter's assertion, it is not a "default" to conclude in the EA that impacts are significant and unavoidable. See Master Response 1 regarding the approach to analysis in the Draft EA. While the commenter may believe that stating accidents may occur is vague and generic, the statement is true, and that section of the Draft EA includes more detail than the commenter acknowledges. Indeed, even the commenter quotes the EA page 99, which states "Accidents that could occur during the transportation of these hazardous materials could include things such as spills, fires, and explosions that could involve terminal equipment or vessels at berth." Furthermore, the assumption that safety practices would continue but at an increased level is a reasonable assumption because similar activities are already occurring at California ports. See Master Response 4 for additional discussion of the safety of shore-side capture and control systems for tankers.

**22-29:** The comment says it is unclear what significance conclusion is reached in the Draft EA.

**Response:** Staff thanks the commenter for pointing this out. As indicated throughout the EA, the Proposed Regulation is expected to have significant and unavoidable hazards-related impacts, pertaining to both construction and operations. Page 100 of the Draft EA contains two sentences with scriveners' errors. The Draft EA has been revised on page 100 to address a scrivener's error.

**Page 100**

This technology would therefore ~~not~~ increase the risk of the release of hazardous materials. ~~Therefore, the requirements of the Proposed Regulation would not be expected pose significant risk for the public or the environment.~~ As such, long-term operational-related effects associated with the Proposed Project to hazards and hazardous materials could be potentially significant.

The Draft EA has also been revised on page 100 to address a related scrivener's error.

**Page 108**

Consequently, while impacts could be reduced to a less-than- significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant ~~short-term construction-related~~ long-term operational impacts regarding hazards and hazardous materials associated with the Proposed Regulation would be **potentially significant and unavoidable**.

To clarify, the impact could be potentially significant. With Mitigation Measure 9.A-1, impacts may still not be reduced to less than significant; therefore, impacts would be potentially significant and unavoidable. This revision does not introduce a new

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significant impact (which is accurately discussed elsewhere in the Draft EA), but merely corrects scrivener's errors.

**22-30:** The comment indicates that the Draft EA disregards increased risk to the operation of terminals and vessels. These risks include fire, explosion, loss of life, and significant pollution events.

**Response:** Impact 9.A-2 evaluates long-term operational hazards associated with the compliance responses. Pollution is addressed on EA pages 100–102. Fire and explosion are addressed on EA page 102–103. See also Response to Comment 22-30, which clarifies the Draft EA's analysis of hazards impacts by correcting scrivener's errors.

**22-31:** The comment states the EA disregards the safety risks of using new and untested technology by assuming that safety practices would continue to be used with increased safety management efforts. The comment also states that the Draft EA does not mention a hazard that the air pollutant emissions calculations note, that emissions control systems that require a burner should be placed far from cargo.

**Response:** Contrary to the commenter's assertion, the Draft EA does not "disregard[] the risks associating with requiring new and untried technology..." The EA describes on page 107 that it is most likely that land-based capture and control systems would be used for tanker vessels, and that safety practices would be like those used today for similar activities already occurring at California ports:

CARB staff believes the most likely control option for tanker vessels would be land-based on-capture and control systems. Use of capture and control technology would require additional interfaces at ports, which requires safety management due to the transfer of flammable materials from vessels. Use of these interfaces would be similar to activities already occurring at California ports, where there are interfaces for other purposes. It is assumed that the same safety practices would continue to be used, but that use of capture and control technology would result in increased safety management efforts.

The note in the emissions calculations was included to support the evaluation of a land-based system, with a burner far from the vessel. Indeed, the Draft EA assumes land-based capture and control systems. As a result, it is not necessary to mention that a burner should be far from the vessel, as it already would be under the land-based system scenario.

**22-32:** The comment states that the mitigation recommended to reduce construction and operational hazard impacts lacks performance standards.

**Response:** As discussed in Master Response 1, the Draft EA provides a programmatic evaluation of potentially significant impacts related to the compliance responses under

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the Proposed Regulation. Additionally, EA page 5 explains that due to unknowns about specific compliance responses:

there is some inherent uncertainty in the degree of mitigation that would ultimately need to be implemented to reduce any potentially significant impacts identified in this Draft EA. Consequently, this Draft EA takes the conservative approach in its post-mitigation significance conclusions (i.e., tending to overstate the potential that feasible mitigation may not be implemented by the agency with authority to do so, or may not be sufficient) and discloses, for CEQA compliance purposes, that potentially significant environmental impacts may be unavoidable, where appropriate. It is also possible that the amount of mitigation necessary to reduce environmental impacts to below a significant level may be less than disclosed in this Draft EA on a case-by-case basis.

It would not be feasible to identify more specific standards for mitigation, given how much information is not known at this time. For example, applicable regulations, environmental context, and other required permits are not yet known. Therefore, the ultimate type or types of mitigation used cannot be currently known; in this case, the Draft EA appropriately concludes impacts would potentially significant and unavoidable.

**22-33:** The comment states that the Draft EA understates impacts to fire protection services. The comment compares the analysis under Impact 15.A-1 (less than significant impact to fire services) to that under Impact 17.A-2 (significant impact to emergency access) and indicates the findings are inconsistent.

**Response:** An impact under CEQA is an adverse physical impact on the environment (Cal. Code Regs., tit. 14 Section 15358). As indicated in Appendix G of the State CEQA Guidelines, the public service impacts section evaluates effects to public services that would result in the potential for new or altered government facilities. CARB believes that the compliance responses would not cause unplanned increases in population levels and is unaware of evidence to the contrary. Refer to Responses to Comments 22-25, 22-26, and 22-32 for a discussion of hazards impacts. CARB is unaware of evidence that these potential impacts would increase fire protection needs to the extent that, for example, a new fire department would need to be constructed. As a result, the evaluation of impacts to fire protection services in the Draft EA is adequate.

Impact 15.A-2 and Impact 17.A-2 contain evaluations of distinct impacts: Impact 15.A-2 focuses on the potential need for new or altered government facilities to maintain service goals, while Impact 17.A-2 focuses on whether there would be impacts to roadways and access routes that would block emergency access. The latter topic is unrelated to fire protection services demand but instead focuses on whether fire protection agencies can access facilities where services are needed. Therefore, contrary to the commenter's assertion, the Draft EA does not contain an internal inconsistency on the topic of fire protection.

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**22-34:** The comment states that the Draft EA is wrong to dismiss wildfire impacts.

**Response:** CEQA focuses on the impact of a project on the environment and generally does not require the analysis of the environment's impact on the project (*California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369; Cal. Code Regs., tit. 14 Section 15126.2(a)). Therefore, mere exposure to wildfire is not within the purview of CEQA. A wildfire that merely enters the Port area would not be considered an impact of CEQA unless compliance responses somehow exacerbated fire risk.

As stated on page 99 of the EA, ports and terminals are located within previously disturbed areas and would not introduce new sources of wildfire that would cause on- or off-site wildfire events. The Proposed Regulation would not exacerbate wildfire conditions because the equipment would be located in disturbed areas that are already industrial in nature. Refer to Responses to Comments 22-25, 22-26, and 22-32 for a discussion of hazards impacts, which includes fire and explosion hazards caused by compliance response construction and operation.

**22-35:** The comment mentions public safety power shutdowns and suggests that the Draft EA should consider the consequences of power shutdowns and the need for backup systems.

**Response:** The potential for shutdowns in California's electrical grid exists under current conditions and is considered part of the environmental baseline. Future power outages may occur from a number of factors including wildfire safety and infrastructure damage and are largely unpredictable because they are based on forecasted weather conditions. CEQA focuses on the impact of a project on the environment and generally does not require the analysis of the environment's impact on the project (Cal. Code Regs., tit. 14 Section 15126.2(a)). If one considers electrical supply part of the environmental baseline, then the effect of a public safety power shut down on compliance responses is not within the purview of CEQA. As a result, the Draft EA does not need to evaluate this impact. Furthermore, the Proposed Regulation would not itself cause public safety power shutdowns; therefore, no additional analysis is needed in the Draft EA. Additionally, to address this and other similar comments, CARB staff clarified the definition of "utility event" to include power disruptions due to fire prevention efforts.

**22-36:** The comment states that the Draft EA only provides a cursory discussion of biological resources. The comment provides a handful of quotes from the Draft EA biological resources section, suggesting the Draft EA "downplays" effects and "minimizes" impacts.

**Response:** The comment does not contain any explanation of why the analysis is incorrect or insufficient. For example, the comment calls the description of capture and control device a brief acknowledgement but does not explain what additional information is needed. The commenter notes the Draft EA identifies "only" two

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species; however, these species are provided as examples and the Draft EA does not indicate that impacts would be limited to only these two species. Though the comment claims the Draft EA “downplays” as “unlikely” adverse turbidity and water quality impacts from dredging, the EA makes a conclusion based on facts regarding impacts to benthic species on page 64:

Although unlikely, dredging activity could adversely affect subtidal benthic species and communities by producing suspended sediments and disturbing latent toxic substances that could increase the turbidity and quality of water. Sediments could later settle on subtidal species.

Because CARB does not, and cannot, know at this stage what specific physical improvements are reasonably foreseeable at which berths, the Draft EA takes a programmatic approach to evaluation. This approach meets the requirements of CEQA. See Master Response 1 for additional explanation of the programmatic approach.

The comment appears to disagree with the use of the word “all” in the discussion of page 60 of the EA in reference to the physical characteristics of existing ports. Note that the portion of the EA the quote was taken from includes more nuance than the quotation suggests. The full quote from page 65 of the EA states (emphasis added):

*In general, ports and terminals exist in areas that are, or have been, subjected to substantial disturbance including grading, trenching, paving, and construction of roads and structures. Daily activities often include the presence of humans, movement of automobiles, trucks, vessels, heavy equipment, and the operation of stationary equipment. In general, port facilities where vessels are berthed are not considered conducive to many biological resources. Vegetation is often removed and controlled, and local wildlife is displaced to more suitable surroundings. Port-related modifications associated with the Proposed Regulation would occur within the industrial facility boundaries or in areas already highly disturbed with industrial applications (e.g. electricity grid transmitters). These areas are all highly disturbed and not likely to be supportive of a large range of biological species.*

Therefore, the Draft EA recognizes that ports may have areas that have not been subject to substantial disturbance, but the modifications would occur within industrial facility boundaries or in already highly disturbed areas. It is this type of area that is highly disturbed and not likely to be supportive of a large range of biological species. Nonetheless, the EA does provide on page 60 that “[t]here are, however, some plant and animal species that occur in industrially developed areas.” Therefore, the Draft EA contains an adequate analysis of biological resources under CEQA. The commenter’s opinion that it is cursory is noted and included in the project record for decisionmakers.

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Note that, among other agencies, the Notice of Preparation was sent via the State Clearinghouse to the California Department of Fish and Wildlife, the California Coastal Commission, and the San Francisco Bay Conservation and Development Commission. These same agencies were also among the reviewing agencies for the Draft EA. CARB has not received any concerned comments from environmental organizations or expert environmental trustee agencies regarding this impact or any other environmental impact relating to the Proposed Regulation, as shown in Table 2-1. It is worth noting that only the industry commenters (who would incur compliance obligations under the regulation) have raised concerns about these claimed impacts. In reality, the physical improvements necessary to achieve compliance with the Proposed Regulation are relatively minor; while some modifications may need to be made to terminals, these improvements overall constitute relatively minor modifications to existing industrial facilities.

**22-37:** The comment suggests that the Draft EA downplays biological resource impacts because the Draft EA disregards surrounding estuaries, wetlands, and other biological rich coastal areas.

**Response:** See Response to Comment 22-27 regarding the discussion of birds in the Draft EA. See Master Response 1 for additional information pertaining to the programmatic nature of the Draft EA, which is why not every species and possible impact is specifically named in the Draft EA. See Response to Comment 22-1 regarding construction windows. See Response to Comment 22-36 regarding the potential for biological resources impacts.

Following the identification of adverse biological impacts from construction of the reasonably foreseeable compliance responses under the Proposed Regulation, the Draft EA recommends Mitigation Measure 4.A-1 on page 66. Mitigation Measure 4.A-1 includes measures for aquatic species, such as implementing acoustic mitigation like a bubble curtain. The analysis has been clarified on EA page 64 to show that aquatic species may be affected by pilings.

### Page 64

Shore power and capture and control devices could require the construction of new pilings and surface area. Pile driving can cause impacts on aquatic species, including acoustic impacts and individual mortality. Increased use of shore power could also require the use of peaker plants and; lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation

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could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

**22-38:** The comment summarizes that CEQA review and permitting would be overseen by the California Coastal Commission, State Lands Commission, California Department of Fish and Wildlife, San Francisco Bay Conservation and Development Commission, Regional Water Quality Control Boards, U.S. Fish and Wildlife Service, and National Marine Fisheries Service. The comment states that baseline disturbance is limited to the footprints of existing structures and that biological impacts from the Proposed Regulation would occur within undisturbed waterways and wetlands.

**Response:** See Master Response 1 for a discussion of the programmatic approach in the EA. On pages 64 through 71 of the EA, CARB makes a good faith effort to disclose the potential adverse biological impacts that could occur from the construction and operation of shore power infrastructure and barge- and land-based capture and control systems, consistent with the approach described in Master Response 1. For example, the EA discusses impacts to benthic species on page 64:

Although unlikely, dredging activity could adversely affect subtidal benthic species and communities by producing suspended sediments and disturbing latent toxic substances that could increase the turbidity and affect water quality. Sediments could later settle on subtidal species.

On page 65, the EA states:

In general, ports and terminals exist in areas that are, or have been, subjected to substantial disturbance including grading, trenching, paving, and construction of roads and structures. Daily activities often include the presence of humans, movement of automobiles, trucks, vessels, heavy equipment, and the operation of stationary equipment. In general, port facilities where vessels are berthed are not considered conducive to many biological resources. Vegetation is often removed and controlled, and local wildlife is displaced to more suitable surroundings. Port-related modifications associated with the Proposed Regulation would occur within the industrial facility boundaries or in areas already highly disturbed with industrial applications (e.g. electricity grid transmitters). These areas are all highly disturbed and not likely to be supportive of a large range of biological species.

See also response to comment 22-37 regarding pile driving. Therefore, the Draft EA provides support for the focus on impacts from work within already disturbed areas, consistent with the approach described in Master Response 1. The EA also addresses the scenario where this work could address protected species on page 65.

There are, however, some plant and animal species that occur in industrially developed areas. For example, birds may nest in built infrastructure on

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coastlines. However, most shore birds prefer open, sparsely vegetated nesting cover near shallow water.<sup>42</sup> (U.S. Department of Agriculture Natural Resources Conservation Service 2000). Further, alternative fuel-related infrastructure constructed as a result of implementation of the Proposed Regulation could occur on undeveloped areas that support species and habitat of special consideration. Construction of new infrastructure could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for fuel lines, and paving of delivery areas and roadways. Construction noise may also disturb birds nesting nearby.

The commenter's input regarding some other lead agencies' treatment of impacts is noted and included in the record for decisionmakers. The commenter's opinion that barge-based construction work would result in longer construction impact periods that may extend over multiple seasons is noted and included in the record for decisionmakers.

**22-39:** The comment indicates that CARB's berth-by-berth assessment contained in the ISOR prepared for the Proposed Regulation contains biological impacts that suggest it would not be infeasible for the Draft EA to identify site-specific impacts.

**Response:** See Response to Comment 22-22.

**22-40:** The comment states that the Draft EA ignores the potential impacts related to land use plan conflicts. The comment cites Local Coastal Programs, General and Specific Plans, and regional plans as relevant land use plans that would potentially conflict with future projects under the Proposed Regulation.

**Response:** An impact under CEQA is an adverse physical impact on the environment (Cal. Code Regs., tit. 14 Section 15358). Therefore, related to land use conflicts, the land use conflict must itself cause a significant physical effect to be considered an impact under CEQA. Contrary to the commenter's assertion, a conflict or inconsistency with a land use plan by itself is not an impact under CEQA. For example, a project's conflict with a General Plan policy that is protective of water quality would not by itself cause an environmental impact. Environmental impacts would, or would not, occur to water quality regardless of that conflict. The assumptions that construction would take place in areas that allow it under existing zoning or that projects would undergo appropriate permitting procedures is also a reasonable assumption. Therefore, the Draft EA land use analysis is adequate.

**22-41:** The comment asserts that the cumulative impact analysis using the EA prepared for the State Implementation Plan (SIP) is not sufficient because the Proposed Regulation would affect berths rather than the entire state.

**Response:** Cumulative impacts are introduced on page 145 of the EA. As explained on page 145, the EA relies on a summary of projections contained in an adopted planning document or an adopted or certified environment document for the planning

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document (Cal. Code Regs., tit. 14 Section 15130(b)). The EA then relies on the summary of projections contained in the EA prepared for the 2016 State SIP Strategy. This regulation, and associated environmental document, is an appropriate option for cumulative impacts analysis for the Proposed Regulation because the Proposed Regulation's primary objective is to reduce emissions of criteria air pollutants and TACs from the operational of auxiliary engines while vessels are at berth in California ports. The SIP represents the state's overall plan to attain the NAAQS pursuant to the requirements of the federal Clean Air Act (CAA). Air districts prepare air quality management plans that include inventories of sources of air pollution within their jurisdictions as well as a trajectory to attaining or maintaining the NAAQS; these plans are included the SIP.

The emissions associated with ports would be accounted for in regional SIPs prepared by air districts whose jurisdictions contain ports. As a source of criteria air pollutants, ports' emissions would contribute to the attainment designation of an air basin. The SIP identifies the Existing Regulation as a measure to reduce off-road federal and international sources of air pollution. Therefore, projects under the Proposed Regulation would be covered under the EA prepared for the 2016 SIP. Therefore, CARB has determined that for a cumulative analysis of the Proposed Regulation, it is appropriate to rely on the cumulative analysis contained in the State SIP Strategy EA. No edits to the Draft EA are required in response to this comment.

**22-42:** The comment states that the Draft EA must consider a reasonable range of alternatives to the Proposed Regulation and summarize why Alternative 6 was dismissed from consideration.

**Response:** To clarify, Alternative 6 was dismissed under CEQA because it would fail to meet many project objectives, including one of the Proposed Regulation's most important objectives to achieve reductions of NO<sub>x</sub>, ROG, DPM, PM<sub>2.5</sub>, GHG and black carbon emissions. This comment does not otherwise raise any environmental issues with the analysis in the Draft EA; therefore, no additional response is required.

**22-43:** The comment states that the Draft EA fails to consider the "Alternative Proposal for Amendments to At-Berth Regulations," (Coalition Alternative).

**Response:** See Master Response 3.

**22-44:** The comment requests that the Coalition Alternative be addressed in the Final EA.

**Response:** See Master Response 3.

**22-45:** The comment summarizes the components of the Coalition Alternative specifying that it would require feasibility and cost effectiveness studies prior to expansion of the existing regulation. The comment also reiterates that the compliance timelines under the Proposed Regulation are infeasible.

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**Response:** See Master Response 2 and Master Response 3.

**22-46:** The comment asserts that CARB should use reasonable objectives in the consideration of alternatives. The commenter outlines some requirements of alternatives and objectives under CEQA—that they meet most of the basic project objectives and that the objectives may not be overly narrow. Specific to the objective of achieving attainment for federal NAAQS over a 15-year time period, the commenter believes that objective should not be read to preclude changing deadlines in the Proposed Regulation to allow compliance at tanker terminals.

**Response:** In outlining some CEQA requirements for alternatives and objectives, the commenter does not link those CEQA requirements to deficiencies in the Draft EA. The commenter’s opinion that the timeline objective should not preclude modifying compliance deadlines is an opinion and does not raise an issue with the analysis in the Draft EA. The opinion is noted and included in the record for decisionmakers.

**22-47:** The comment states that compliance deadlines do not satisfy the project objective related to safety issues.

**Response:** See Master Response 2 and Master Response 4.

**22-48:** The comment states that the Draft EA will have been amended in response to the aforementioned comments and would trigger recirculation of the Draft EA.

**Response:** Recirculation is required only when “significant new information” is added to an EA, as defined in California Code of Regulations, title 14, Section 15088.5. None of the revisions made constitute “significant new information, and recirculation of the Draft EA is not warranted. No further response is required.

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Comment Letter 37 December 6, 2019	Matthew Sullivan SSA Marine
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**37-1:** The comment suggests that one-hour requirement under the Proposed Regulation would result in a safety issue related to the handling of high voltage power equipment.

**Response:** Currently, vessels using shore power are allowed to run auxiliary engines for up to three hours while at berth to connect and disconnect from shore power, with two exceptions that allow exceeding the three-hour period. These exceptions relate to delays caused by, lowering the gangway, securing the vessel, waiting for clearance, or waiting for labor to connect the vessel. Note that in the March 2020 15-Day Revisions CARB has proposed changing the requirement to a two-hour requirement: the Proposed Regulation would provide that vessels must be plugged in within two hours of the vessel being "Ready to Work"<sup>7</sup> and disconnecting shore power no more than one hour before "Pilot on Board." Therefore, the two -hour plug in requirement is not substantially different from the existing three-hour total allowance for the labor force.

Additionally, the two-hour requirement is not absolute; nor is the requirement to use shore power. The Proposed Regulation contains other pathways to compliance if additional time is needed due to safety concerns. For example, there is an option to pay a mitigation fee into a remediation fund. And, the Proposed Regulation allows for other compliance options, such as capture and control systems, on-board technologies, and alternative fuels (with a test plan and proof of meeting specified reduction requirements).

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<sup>7</sup> "Ready to work" means that the vessel is tied to the berth, the gangway has been lowered with netting down, and all government authorities with jurisdiction over the vessel visit have cleared the vessel.

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Comment Letter 41 December 7, 2019	Donald Brown Cruise Lines International Association
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**41-1:** The comment indicates that the ISOR and Standardized Regulatory Impact Assessment (SRIA) do not properly analyze the possibility of vessel diversion and the economic impacts of these diversions.

**Response:** See Response to Draft EA Comment 45-2.

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Comment Letter 45 December 9, 2019	Doug Schneider World Shipping Council
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**45-1:** The comment indicates that tug boats would be required to move barge-based capture and control systems and their emissions are not accounted for in the Draft EA.

**Response:** Contrary to the commenter's assertion, the Draft EA accounts for emissions of criteria air pollutants and GHGs from operation of tug boats. Page 55 of the EA summarizes the level of criteria pollutant emissions anticipated from tug boat usage under the Proposed Regulation:

There is inherent uncertainty regarding the type and size of tug boat that would be available to assist the barge-based system. According to POLB's Air Emissions inventory - 2017<sup>34</sup>, the average harbor tug boat has 1.94 main engines each running at 943 horsepower (hp) and an average of 1.5 auxiliary engines operating at 78 hp each. The Port of Long Beach Emission Inventory also indicates that on average, harbor tug boats have model year 2012 main and auxiliary engines. Emission factors and load factors were obtained from CARB's Emissions Estimation Methodology for Commercial Harbor Craft Operating. Load factors are 0.68 and 0.43 for main and auxiliary engines (emission factors were obtained for PM, NO<sub>x</sub>, and ROG in Appendix A).<sup>35</sup> Analysis assumed CO<sub>2</sub> emission factors were 529 g CO<sub>2</sub>/bhp-hr for main engines, and 589 g CO<sub>2</sub>/bhp-hr for auxiliary engines, consistent with CARB's 2017 off-road emission inventory.

<sup>34</sup> Port of Long Beach "Air Emissions Inventory - 2017," July 2018 (accessed July 11, 2019), <http://www.polb.com/civica/filebank/blobload.asp?BlobID=14652>.

<sup>35</sup> CARB, "Emissions Estimation Methodology for Commercial Harbor Craft Operating in California," 2012, (accessed July 11, 2019) <https://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf>.

Page 61 of the EA also states:

CARB estimates that the additional tug boat emissions could be up to 7.1 tons/year NO<sub>x</sub>, 0.14 tons/year DPM, 1.2 tons/year ROG and 827 metric tons/year of CO<sub>2</sub> throughout California. These estimates may be lower in future years due to full implementation of CARB's Existing Commercial Harbor Craft Regulation, and anticipated future requirements that may take effect beginning in 2023 for tug boats and other harbor craft.<sup>37</sup> Tug boat emissions attributed to the placement of barge-based capture and control systems are considerably lower than the overall emissions reductions achieved from the use of the system on a vessel. For example, in the year 2021, capture and control systems are expected to reduce NO<sub>x</sub> emissions by approximately 32 tons per year (tpy) and 970 tpy in 2031.

<sup>37</sup> CARB "Airborne Toxic Control Measure for Commercial Harbor Craft," April 2006 (accessed July 11, 2019),

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<https://govt.westlaw.com/calregs/Document/I0FD137A0A3C111E0BACCB30E82542E24?contextData=%28sc.Default%29&originationContext=documenttoc&transitionType=CategoryPageItem&viewType=FullText>.

For GHG emissions, the EA states on page 94:

There is inherent uncertainty regarding the type and size of tug boat that would be available to assist the barge-based system; however, according to the Port of Long Beach's Air Emissions inventory - 2017<sup>58</sup>, the average harbor tug boat has 1.94 main engines each running at 943 horsepower (hp) and an average of 1.5 auxiliary engines operating at 78 hp each. The Port of Long Beach Emission Inventory also indicates that on average, harbor tug boats have model year 2012 main and auxiliary engines. Emission factors and load factors were obtained from CARB's Emissions Estimation Methodology for Commercial Harbor Craft Operating. Load factors are 0.68 and 0.43 for main and auxiliary engines (emission factors were obtained for PM, NO<sub>x</sub>, and ROG in Appendix A).<sup>59</sup> Analysis assumed CO<sub>2</sub> emission factors were 529 g CO<sub>2</sub>/bhp-hr for main engines, and 589 g CO<sub>2</sub>/bhp-hr for auxiliary engines, consistent with CARB's 2017 off-road emission inventory. The CO<sub>2</sub>e contribution from CH<sub>4</sub> and N<sub>2</sub>O emissions was not considered because tug boats are diesel powered that are certified to either Marine Tier 2 or Tier 3 standards. CH<sub>4</sub> emissions from diesel-powered engines is negligible, and Tier 2 and 3 marine engines do not use after treatment that is responsible for increasing the N<sub>2</sub>O fraction of the nitrogen species in the exhaust. If the contribution of N<sub>2</sub>O and CH<sub>4</sub> were considered, CO<sub>2</sub>e would increase by a trivial amount.

<sup>58</sup> Port of Long Beach "Air Emissions Inventory - 2017," July 2018 (accessed July 11, 2019), <http://www.polb.com/civica/filebank/blobdload.asp?BlobID=14652>

<sup>59</sup> CARB, "Emissions Estimation Methodology for Commercial Harbor Craft Operating in California," 2012, (accessed July 11, 2019) <https://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf>

Therefore, the EA adequately analyzes tug boat emissions.

**45-2:** The comment asserts that ro-ros would likely be diverted to concentrated docks within the state or to out-of-state alternative ports due to lack of control technology, access to alternatives, or for economic reasons which would result in an increase in emissions associated with increased reliance on other freight options such as rail and trucks.

**Response:** The abovementioned concept of increased emissions associated with cargo diversion is discussed in the EA on pages 95 and 96. The EA contains the following language regarding the speculative nature of trip diversions associated with economic constraints:

The Proposed Regulation marginally increases costs to California ports and terminals, and the vessels that visit them, which has resulted in some feedback

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from industry stakeholders that vessels may be directed elsewhere in an effort to avoid the increased costs at California ports and terminals. Cargo owners and international cargo transport delivery companies rely on sophisticated proprietary models and factors to guide decisions on where to ship goods. The factors include access to consumer markets and intermodal transportation networks; reliability and velocity of transport modes; port and trans-loading infrastructure; the overall efficiency of the supply chain as it is impacted by the availability of labor; congestion delays and other impediments; and costs, including compliance costs for all regulations. To date, the available data and research has been insufficient to quantify the Proposed Regulation's potential effects regarding cargo diversion. CARB staff directly engaged industry stakeholders for their experience or data and found that a company's decision to divert cargo from one port to another is complex and unique to individual businesses. CARB staff was unable to obtain information on business level responses to regulatory costs due to the highly competitive nature of the freight industry.

Quantifying the potential for the Proposed Regulation to cause cargo diversion requires a detailed understanding of how increased regulatory costs would impact each beneficial cargo owner's use of a specific port, such as from the perspective of a person making those decisions for a cargo owner. Alternatively, absent industry knowledge, assessing the potential for diversion would require making inferences about what changes in port uses were caused by cost changes, which requires an understanding of all factors that affect choice of port and, then, isolating the changes caused by port use cost. CARB staff did not find empirical research that focused on the impact of regulatory costs on cargo diversion. A number of studies have explored the relationship between general cost increases and the likelihood of cargo diversion. One case study on the potential impact of a container fee suggested that cargo diversion is unlikely for modest per TEU cost increases, up to \$30 per TEU.<sup>62</sup> To put this into context, the Proposed Regulation would add additional costs of approximately \$1.11 per TEU in 2030 for container and reefer vessels, far below the \$30 level (Appendix D of ISOR). However, studies also found that there is a very wide range of estimates for how increased costs may impact cargo volumes,<sup>63, 64, 65</sup> that the estimates are highly uncertain, and that these responses may change markedly in the span of only several years due to the dynamics of industry and global economics.

Furthermore, analyzing direct regulatory cost increases from a particular regulation is of limited use in determining the potential for diversion or leakage. Direct regulatory cost is also only one variable that can affect choices about shipping routes. Other variables include, but are not limited to: access to consumer markets and intermodal transportation networks; reliability and velocity of transport modes; port and trans-loading infrastructure; the overall efficiency of the supply chain as it is impacted by the availability of labor; congestion delays and other impediments; and costs generally, including

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compliance costs for all regulations. A 2018 study conducted by the Texas A&M Transportation Institute, *The Potential Impacts of the Panama Canal Expansion on Texas Ports*, found that intermodal routes throughout California are consistently more favorable for high-valued goods. Intermodal routes between East Asia, California, and Texas are faster than all water routes to Texas from East Asia, and research shows shippers prefer more expensive routes through West Coast ports, including California, because of the shorter travel time.

In sum, it is difficult to predict how businesses may react to increased costs of using California ports in response to implementation of the Proposed Regulation. It is possible, though unlikely, that some may decide to change shipping mode or may divert to another port. In that case, the Proposed Regulation could result in additional emissions of air pollutants associated with mode shift and diversion. If California berths continue to be used as they would regardless of the Proposed Regulation, as expected, long-term operational-related air quality impacts would be beneficial.

<sup>62</sup> Corbett, James J., James J. Winebrake, and Erin Green, (2006) "Cargo on the Move through California: Evaluating Container Fee Impacts on Port Choice," [https://www.nrdc.org/sites/default/files/air\\_06081401a.pdf](https://www.nrdc.org/sites/default/files/air_06081401a.pdf), Accessed July 23, 2019.

<sup>63</sup> Leachman, Robert C., (2005) "Final Report: Port and Modal Elasticity Study," <http://www.freightworks.org/Documents/Port%20and%20Modal%20Elasticity%20Study.pdf>.

<sup>64</sup> Leachman, Robert C., (2010) "Final Report: Port and Modal Elasticity Study, Phase II," <http://www.freightworks.org/DocumentLibrary/Port%20and%20Modal%20Elasticity%20Study%20Phase%20II%20-%20Final%20Report.pdf>

<sup>65</sup> Corbett, James J., James J. Winebrake, and Erin Green, (2006) "Cargo on the Move through California: Evaluating Container Fee Impacts on Port Choice," Accessed July 23, 2019, [https://www.nrdc.org/sites/default/files/air\\_06081401a.pdf](https://www.nrdc.org/sites/default/files/air_06081401a.pdf).

<sup>66</sup> Prozzi, Overmyer, Texas A&M Transportation Institute "The Potential Impacts of the Panama Canal Expansion on Texas Ports," PRC 17-78, January 2018.

For these reasons identified in the Draft EA, the potential for cargo diversion would be speculative. See also Response to Comment 52-7, on page 63. The analysis of potential diversions under CEQA is adequate.

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Comment Letter 46 December 6, 2019	Lee Kindberg Maersk
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**46-1:** The comment requests that CARB evaluate alternatives, including port-specific concepts, industry alternatives, allowing currently regulated fleets to continue under the Equivalent Emissions Reduction Option, or an approach based on the percent of time the fleet is connected.

**Response:** The Commenter’s suggestions are in the context of potential regulatory alternatives. The comment does not raise any CEQA alternatives that would reduce or avoid any significant project impacts. The commenter also does not provide enough information on these alternatives to evaluate their potential environmental implications. Nevertheless, for informational purposes CARB provides the following response. See Master Response 3 regarding the Industry Coalition Alternative. An alternative with technical amendments to the Existing Regulation, which would retain the equivalent emissions reduction option referenced by the commenter, was considered in the EA as Alternative 2.

Under CEQA, alternatives to the proposed project must (1) meet most of the basic project objectives, (2) be potentially feasible, and (3) reduce at least one significant impact of the proposed project (Cal. Code Regs., tit. 14 Section 15126.6). However, the commenter’s proposal provides insufficient information to evaluate their remaining two suggested alternatives for CEQA purposes. The commenter does not provide detail about “port-specific concepts.” Therefore, it is not possible for CARB to evaluate the suggested alternative under CEQA, including any analysis regarding whether the alternative would meet most of the project objectives, or whether it would reduce or avoid a significant environmental impact. This is also the case with regard to the suggested percentage-based alternative.

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Comment Letter 51 December 9, 2019	Bill Schopp TraPac
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**51-1:** The commenter does not agree with the one-hour time limit for plug and unplug because it creates a scenario where the labor or port electrician may feel rushed and make a mistake.

**Response:** See Response to Comment 37-1.

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Comment Letter 52 December 9, 2019	Thomas Jelenic Pacific Merchant Shipping Association
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**52-1:** The comment states it had previously submitted an alternative for consideration with California Association of Port Authorities, Cruise Lines International Association, Western States Petroleum Association, and World Shipping Council (“Industry Coalition Alternative”), but that CARB never responded to the alternative and did not include it in the SRIA. This alternative was included in the comment as Attachment D. The alternative described in Attachment D generally involves the following:

- A requirement for currently regulated vessels to use shore power when available and safe without time-based rules.
- For unregulated vessels and ports, comply with recordkeeping and reporting requirements.
- For alternative emissions control strategies, operators must show cost-effectiveness and greater emissions control than the average.
- For all vessels, conduct a feasibility study to identify cost-effective emission controls in cooperation with industry stakeholders and based on data, existing infrastructure, costs, cost effectiveness, and other elements.
- For all vessels, conduct feasibility check-ins tri-annually until 2031.

**Response:** See Master Response 3.

**52-2:** The comment states that the ISOR does not consider alternatives submitted by PMSA in 2017, which included a fleet average approach that the commenter claims can achieve the same or greater emissions reductions. In reviewing the commenter’s submittal from October 2017, CARB notes the commenter provided a regulatory proposal and an alternative pathway. The regulatory proposal has two primary pathway options. The first primary pathway option is a simplified feet approach, which has a threshold at which a fleet is subject to the regulation, and there are exemptions, such as vessel commissioning and vessels that visit California no more than one time per year. The threshold number of vessel calls per year in California is not specified, nor is the list of exemptions exhaustive. The second primary pathway option is an individual vessel-based approach that sets a threshold for each vessel to be subject to the regulation, and also provides exemptions. Like the first pathway option, the threshold is not defined, and the list of exemptions is not exhaustive. Both pathway options also eliminate the 3 hour/5 hour rules.

**Response:** Under CEQA, alternatives to the proposed project must (1) meet most of the basic project objectives, (2) be potentially feasible, and (3) reduce at least one significant impact of the proposed project (Cal. Code Regs., tit. 14 Section 15126.6). However, the commenter’s proposal provides insufficient information for key parts of

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their proposal to evaluate this alternative for CEQA. The lack of thresholds at which the alternative would begin to take effects for fleets or vessels, and when exemptions applies, means it is not possible to determine the amount of emissions reductions and; therefore, whether the alternative meets several important objectives of the Proposed Regulation related to emissions reductions. Similarly, from the information provided, it is unclear whether the proposal would avoid or substantially reduce any environmental impacts of the proposed project. For example, it is possible the same types of infrastructure would be needed as described in the Draft EA, meaning the proposal would not reduce or substantially avoid any environmental impacts. There is insufficient detail to make a definitive conclusion. As a result, this alternative need not be evaluated in the Draft EA.

**52-3:** The comment states that the Proposed Regulation reduces NO<sub>x</sub> emissions at almost three times the level required by the State Implementation Plan. The commenter notes that in the alternatives analysis the EA compares air quality benefits to that of the Proposed Regulation rather than the goal of the SIP, which result in dismissing alternatives that would have adequately met the SIP goal. The commenter also says that the ISOR's claim that the SIP directs CARB to increase reductions by redeveloping the Existing Regulation is false and not contained in the SIP. The commenter encourages CARB to act consistent with the SIP emissions targets and SIP Mobile Source Reduction Strategy.

**Response:** Adopted CARB policies and plans, such as the SIP, are important procedural maps for programs to achieve emission reduction benchmarks and goals. The numbers outlined in the plans need to be achieved; however, they are not meant to be restrictive. That is, the requirement in the SIP for NO<sub>x</sub> reductions is a minimum, and reductions that would be obtained under the Proposed Regulation can be greater than the minimum requirement in the SIP. When incorporating the changes made in the second 15-day package, in 2031 the Proposed Regulation is projected to reduce 5.91 ton per day of NO<sub>x</sub>. However, as described in the EA on pages 163–164, note that the Proposed Regulation has numerous other objectives in addition to reducing NO<sub>x</sub>.

In the evaluation of alternatives, CEQA requires inclusion of "sufficient information about each alternative to allow meaningful evaluation, analysis and comparison with the proposed project." (Cal. Code Regs., tit. 14 Section 15126.6(d)). Therefore, the EA correctly evaluates the effects of alternatives against those of the Proposed Regulation.

Note that the CARB-approved State SIP Strategy (March 2017) directs CARB to evaluate how the Regulation can be amended to achieve further emission reductions by including smaller fleets, additional vessel types, and additional operations.<sup>8</sup>

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<sup>8</sup> See <https://ww3.arb.ca.gov/planning/sip/2016sip/rev2016statesip.pdf> at pages 96-98.

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**52-4:** The comment suggests the Proposed Regulation is inconsistent with California's greenhouse gas goals because the Proposed Regulation would increase GHG emissions from ro-ros by 50 percent. The increased use of barge-based systems would significantly increase GHG emissions. Additionally, the comment states the ISOR does not reference that the State Bill 32 (SB 32) Scoping Plan contains a provision for consideration of feasibility and expansion of the Existing Regulation and does not require getting rid of the current rule. The commenter also states that the SB 32 Scoping Plan (sic) supports the concept of completing feasibility studies.

**Response:** CARB respectfully disagrees with the commenter's assertion GHG emissions would increase by 50 percent from ro-ro vessels using barge-based systems and the calculations provided. As part of the approval, emissions from control system generators are accounted for in the overall systems control efficiency. Additionally, for this Proposed Regulation GHG emissions from capture and control systems are required to emit no more than if the strategy were powered by the California grid (93130.5(d)).

As explained on page 26 of the EA, CARB "assumed ro-ro vessels would primarily use barge- and land- based capture and control systems for compliance." The EA recognizes on page 93 that

Use of land- and barge-based capture and control devices to reduce vessel emissions may result in net increase in GHG emissions for some vessel categories (e.g. ro-ro or tanker vessels). While using a capture and control device, auxiliary engines aboard a vessel are still servicing the vessel with the required energy it needs for operations. These auxiliary engines create GHG emissions. In addition to the auxiliary engines, the capture system's generators and the treatment unit's burner(s) are operating, or if powered by the grid, an increase energy consumption factor is applied to the vessel visit. To address additional GHG emissions from these devices, CARB requires the operation of these systems to be grid neutral, emitting no more GHG emissions than if the strategy were powered by the California grid as represented in the most recent eGRID Summary Table for State Output Emission Rates as the California CO<sub>2</sub>e emissions rate. An emission control strategy powered by the utility grid is by default grid neutral. Emission control strategies can also reduce their CO<sub>2</sub>e emission rate by using low carbon fuels like hydrogen or low carbon diesel.

Further, as described on page 94 of the EA, tugboats and barges are regulated by CARB's Harbor Craft Rule. CARB staff is currently re-evaluating the feasibility of Tier 4 engine technology and advanced retrofit emission control devices in commercial harbor craft applications, and exploring other operational control strategies for reducing emissions.

See Master Response 3 regarding the EA's consideration of feasibility studies as an alternative to the Proposed Regulation.

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**52-5:** The comment states that the ISOR mischaracterizes the relationship between the Proposed Regulation and Assembly Bill (AB) 617 and does not discuss inconsistencies in terms of applying the Proposed Regulation and port communities. The commenter further states that the Proposed Regulation would result in short-term increases in DPM emissions in Barrio Logan and Oxnard.

**Response:** CARB respectfully disagrees with the commenter's assertion that the Proposed Regulation "...mischaracterizes the relationship between the At Berth Regulation and AB 617...." AB 617 directs CARB to assess and develop measures to reduce air pollution in disproportionately burdened communities across the State. It is well known that many portside communities are heavily burdened by freight related emissions. On page 14 of the Final Community Air Protection Blueprint for AB 617 the Proposed Regulation is announced as a statewide measure already underway that is helping communities heavily impacted by freight sources.<sup>9</sup>

Because the Draft EA does not contain a berth-by-berth analysis (like that found in the ISOR refer to Response to Comment 22-23), there is no analysis of DPM emissions specific to Barrio Logan and Oxnard. However, the Draft EA discusses DPM emissions from tug boats at a statewide scale on page 66, noting that they could measure up to 0.14 tons per year.

**52-6:** The comment states that the inventory analysis overstates emissions benefits by ignoring tug and bunkering emissions. The Proposed Regulation would increase GHG emissions from increased tug and fuel bunkering. The ISOR does not take these effects into account.

**Response:** Refer to Response to Comment 52-4, on page 61, regarding the EA's analysis of tug emissions. See also pages 55-56 of the EA for more discussion on air quality emissions from increased tug use and pages 90-91 for discussion on tug use and GHGs.

Staff agree that barge-based systems may impede bunkering in some cases. Bunkering challenges could be avoided by using a land-based system or a control system designed to be used simultaneously with bunkering. In addition, vessels may choose to disconnect early from control systems to allow for bunkering. Bunkering could occur when using a VIE or by paying into the remediation fund.

Generally, anchorages are further from shore and as such, further from sensitive receptors and impacted communities and at this time no control system is capable of reducing emissions at anchor. However, at anchor emissions still contribute to health and environmental impacts. As part of the July 2020 15-day changes to the Proposed Regulation, CARB staff proposes a 2022 interim evaluation that will review feasibility of

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<sup>9</sup> CARB, Community Air Protection BLUEPRINT, October 2018, [https://ww2.arb.ca.gov/sites/default/files/2018-10/final\\_community\\_air\\_protection\\_blueprint\\_october\\_2018.pdf](https://ww2.arb.ca.gov/sites/default/files/2018-10/final_community_air_protection_blueprint_october_2018.pdf)

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control requirements for bulk and general cargo vessels, and for ocean-going vessels at anchor (Section 93130.14(d)).

**52-7:** The comment states the ISOR should evaluate the global increases in GHG emissions from diversion of vessels away from the West Coast that would occur as a result of the Proposed Regulation. The commenter provides a link to a document called "Greenhouse Gas Route Comparison Tool Overview and Description," which Starcrest Consulting Group prepared for Pacific Merchant Shipping Association in August 2017. This document states that regulations to reduce GHGs and other emissions "increase operational costs for cargo owners and may have the unintended consequence of shifting cargo flows to less expensive gateways with longer transit times – and therefore generate higher GHG emissions."

**Response:** CARB agrees that the East Coast and Gulf Coast shipping routes represented by the alternative could result in greater overall emissions. However, CARB staff notes that the report did not include any information to indicate that cargo would switch to alternative routes. In fact, the greater emissions resulting from use of alternative routes (east coast or gulf coast ports rather than California ports) correlate directly with higher fuel use and cost. These additional costs would discourage use of longer alternative routes. CARB considers added expenses, such as tolls for the Panama Canal and additional fuel and longer shipping times, would diminish any diversion from West Coast ports.

However, the EA does address the potential for vessel diversion and its impacts on GHG emissions on pages 91–92. Text from the "Greenhouse Gas Route Comparison Tool Overview and Description" further supports the EA's conclusion on page 93 that "it is difficult to predict how businesses may react to increased costs of using California ports in response to implementation of the Proposed Regulation." For example, the "Greenhouse Gas Route Comparison Tool Overview and Description" contains statements such as:

- "Shipping lines and cargo owners are influenced by three main factors when deciding on preferred cargo routes: speed to destination, reliability and cost. Those factors, particularly cost, are *influenced by a number of variables that can be impacted by local policy*. These variables include: port and inland infrastructure, availability of skilled labor, vessel and network capacity, government and regulatory issues, and environment and energy efficiency. In sum, cargo owners have many reasons for implementing route changes." (emphasis added)
- "Regulations that are designed to reduce GHGs and other emissions from maritime and other logistics operations along the supply chain in California increase operational costs for cargo owners and *may have the unintended consequence of shifting cargo flows to less expensive gateways with longer transit times...*" (emphasis added)

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The EA similarly states on page 93 that:

- “Direct regulatory cost is also only one variable that can affect choices about shipping routes. Other variables include, but are not limited to: access to consumer markets and intermodal transportation networks; reliability and velocity of transport modes; port and trans loading infrastructure; the overall efficiency of the supply chain as it is impacted by the availability of labor; congestion delays and other impediments; and costs generally, including compliance costs for all regulations.”
- “It is possible, though unlikely, that some may decide to change shipping mode or may divert to another port.”

While the “Greenhouse Gas Route Comparison Tool Overview and Description” makes various claims about prioritization of “logistics efficiency improvements” and “market advantage,” the document does not contain supporting industry data. Indeed, the EA states on page 96, “To date, the available data and research has been insufficient to quantify the Proposed Regulation’s potential effects regarding cargo diversion. CARB staff directly engaged industry stakeholders for their experience or data and found that a company’s decision to divert cargo from one port to another is complex and unique to individual businesses. CARB staff was unable to obtain information on business level responses to regulatory costs due to the highly competitive nature of the freight industry.” Furthermore, the EA cites on page 96 several studies about costs and at which point the choice to divert would occur, noting also that “studies also found that there is a very wide range of estimates for how increased costs may impact cargo volumes, that the estimates are highly uncertain, and that these responses may change markedly in the span of only several years due to the dynamics of industry and global economics” (citations omitted). Therefore, no additional analysis is needed in the EA. For the same reasons, the ISOR does not address cargo diversion.

See also response to comment 45-2 regarding the potential for cargo diversion generally.

**52-8:** The comment observes that CARB analyzes tugboat emissions in the Draft EA but not in the ISOR regulatory analysis.

**Response:** Refer to Response to Comment 52-4, on page 61, for a discussion of the EA’s analysis of tugboat emissions.

As discussed in the EA, (pages 60-61 and 94-95) tug boat emissions are anticipated to be minimal and the use of barge-based capture and control systems reduce far more pollutants than the additional activity of tugboats. Additionally, tug boat emissions will be further addressed by the upcoming Commercial Harbor Craft Regulation. Therefore, these emissions – and associated future reductions from the tug boat

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sector – are relevant to the upcoming Commercial Harbor Craft Regulation’s regulatory analyses, rather than to the Proposed Regulation.

**52-9:** The comment states that CARB assumes in the Draft EA that wharf improvements and electrical infrastructure upgrades would occur during construction for land-side control systems and ro-ro terminals but that these assumptions are not carried through to the cost analysis.

**Response:** The Draft EA assumes the most reasonably conservative approach that could be used for compliance. For ro-ros this conservative assumption was to install landside infrastructure in addition to the control system. This option would cause a considerable amount of ground disturbance and demonstrate the greatest level of environmental impacts. However, based on discussions with industry, CARB staff do not believe this is the most likely system configuration. The cost analysis uses what CARB staff considers to be the most likely compliance option and what has already been demonstrated in currently operated systems. Accordingly, the cost analysis omits improvements or infrastructure other than the control system.

**52-10:** The comment states the one-hour connection timeframe for shore power could present safety issues.

**Response:** See Response to Comment 37-1.

**52-11:** The comment states that CARB has not forecasted statewide increase in energy usage from electric- and battery-powered capture and control systems.

**Response:** Guidance on evaluation of energy impacts in CEQA Guidelines Section 15126.6(b) states that the “analysis is subject to the rule of reason and shall focus on energy use that is caused by the project.” CEQA does not require energy use forecasting. The EA discusses increased energy use from electric- and battery-powered capture and control systems on pages 76–81 and notes that the increase in electrical use are not expected to require an expansion of capacity.

**52-12:** The comment asserts that the emissions reduction attributed to the Proposed Regulation over the Existing Regulation needs further justification. The comment also requests that CARB provide an explanation as to why there is an increase in emissions from the Proposed Regulation over the Existing Regulation for the ports of Hueneme and San Diego.

**Response:** Detailed information regarding CARB’s emissions inventory for the Existing Regulation and the anticipated reductions from the Proposed Regulation by comparison can be found in Appendix H of the ISOR and Appendix C of the proposed 15-day changes; however, a brief summary of the assumption, methodology, and estimates used to derived these values in included in this document.

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CARB staff used vessel transponder data and GIS mapping to determine the number of vessel visits for each port covered by the Proposed Regulation by vessel type and size. CARB staff also obtained vessel broadcasting data to estimate the average length of stay for each vessel visit, organized by vessel type, size, and port. Information on the average engine effective power was then combined with the aforementioned vessel data points.

These data were then extrapolated to estimate vessel activity for future years categorized by port, vessel type, and vessel size using an assumed growth rate. These values also assumed an equivalent age distribution of vessel visits as existing rates. Shore power compliance data from CARB's Enforcement Division was used to determine reduced engine activity time. CARB-developed emissions factors were applied to these data, which generated the estimated reductions achieved from the Proposed Regulation.

CARB projected NO<sub>x</sub>, DPM, PM<sub>2.5</sub>, GHGs, and ROG emissions from auxiliary engine and boilers under two scenarios for all regulated and unregulated ocean-going vessels from 2020 to 2032 using CARB's updated emissions inventory. The two scenarios assume:

- 1) No further requirements were imposed beyond the Existing Regulation after 2020.
- 2) The Proposed Regulation takes effect January 1, 2023 and is phased in through 2029. Container, reefer, and cruise vessels would be subject to the requirements on January 1, 2023; the implementation of the Proposed Regulation phase-in requirements for ro-ros would start in 2025 and tanker vessels in 2025 and 2027 for the Port of Los Angeles (POLA) and Port of Long Beach (POLB) and the remainder of the state, respectively.

Relative to the Existing Regulation, the Proposed Regulation with 15-day changes is projected to reduce a cumulative total of 17,500 tons of NO<sub>x</sub> from 2023 to 2032. In 2032, when comparing the Proposed Regulation to the Existing Regulation, NO<sub>x</sub> emissions would be reduced by about 44 percent, from 4,500 tpy to 2,500 tpy (15-Day Changes Appendix C).

Relative to the Existing Regulation, the Proposed Regulation is projected to reduce approximately 270 tons of diesel PM from 2023 to 2032. In 2032, when comparing the Proposed Regulation to the Existing Regulation, diesel PM emissions would be reduced about 51 percent, from 67 tpy to 32 tpy (ISOR page V-4).

Relative to the Existing Regulation, the Proposed Regulation is projected to reduce approximately 370 tons of PM<sub>2.5</sub> from 2023 to 2032. In 2032, when comparing the Proposed Regulation to the Existing Regulation, PM<sub>2.5</sub> emissions would be reduced by about 35 percent, from 141 tpy to 91 tpy (ISOR page V-5).

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Relative to the Existing Regulation, the Proposed Regulation is projected to reduce approximately 431,000 metric tons of carbon dioxide equivalent from 2023 to 2032. The year-to-year reductions between the Proposed Regulation and Existing Regulation are far less substantial compared to the reductions in NO<sub>x</sub>, diesel PM, PM<sub>2.5</sub>, and ROG. In 2032, when comparing the Proposed Regulation with the Existing Regulation, GHG emissions would be reduced by about 6 percent, from 752,000 to 704,000 metric tons per year (ISOR page V-6).

Relative to the Existing Regulation, the Proposed Regulation is projected to reduce approximately 870 tons of ROG from 2023 to 2032. In 2032, when comparing the Proposed Regulation to the Existing Regulation, ROG emissions would be reduced about 45 percent, from 250 tpy to 137 tpy (ISOR V-7).

GHG emissions would increase a minimal amount in some areas from the use of capture and control systems starting in 2025. However, from 2023 to 2032, the Proposed Regulation is expected to reduce GHG emissions overall by 356,000 metric tons CO<sub>2</sub>e. Therefore, any minor increases resulting from the use of capture and control technology would be more than compensated for by the Proposed Regulation's considerable overall GHG reductions.

**52-13:** The comment states that CARB should conduct a comprehensive GHG analysis related to barge-based control systems that includes the totality of GHG emissions from the vessel and barge-based control system itself to the likely shift in bunkering activities.

**Response:** See Response to Comment 45-1.

**52-14:** The comment recognizes the 2025 grid-neutral control systems requirement, and notes that GHG emissions increase for tankers and ro-ros in 2027 and 2031. This increase should be clarified.

**Response:** In contrast to shore power, vessels using capture and control systems do not turn off their auxiliary engines. Therefore, even with grid-neutral control systems, GHG emissions will slightly increase over their baseline for vessels controlled by capture and control systems. However, note that the Proposed Regulation would reduce GHG emissions overall compared to the environmental baseline, as discussed in the EA on page 85 and 97.

**52-15:** The comment indicates that the Proposed Regulation's emissions reduction exceeds what is necessary under the SIP.

**Response:** See Response to Comment 52-3, on page 61.

**52-16:** The comment notes that in the alternatives analysis the EA compares air quality benefits to that of the Proposed Regulation rather than the goal of the SIP, which result in dismissing alternatives that would have adequately met the SIP goal.

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**Response:** See Response to Comment 52-3, on page 61.

**52-17:** The comment states that CARB should analyze the emissions associated with constructing a new shore power berth in the Port of San Francisco. The comment suggests that the berth-by-berth analysis contained in the ISOR could inform the development of an example project located in the Port of San Francisco.

**Response:** The Draft EA appropriately does not contain a berth-by-berth analysis like the ISOR's; refer to Response to Comment 22-23 for a distinction between the approach in the ISOR and the approach in the Draft EA.

**52-18:** The comment states that combined construction emissions exceed significance thresholds in the Bay Area Air Quality Management District (BAAQMD) if one considers all the land-based systems that must be constructed in the BAAQMD.

**Response:** Construction of multiple projects could be undertaken simultaneously under the Proposed Regulation within one air basin; however, the construction schedules and overlap as well as the level of construction best management practices applied to each individual project is unknown at this time. Furthermore, it is probable that each compliance response would be considered a separate project under CEQA, which would be evaluated on its own against significance thresholds rather than in combination with other compliance responses. The BAAQMD's significance thresholds, like most air quality significance thresholds, are intended to ensure that cumulative projects across the air basin would not worsen regional nonattainment. Indeed, many air districts prepared their project-level GHG and criteria air pollutant thresholds of significance in a cumulative context, such that the thresholds are representative of a cumulative scenario and special calculations to incorporate other projects do not need to be made.<sup>10</sup> Therefore, even if multiple projects were to occur at once, the Draft EA's treatment of their air quality impacts as individual projects is correct. Adding emissions of multiple projects together would not be appropriate given the design of air quality thresholds and the likely treatment of each compliance response as an individual project under CEQA.

**52-19:** The comment states that CARB should analyze the impacts in the geographic location in which they are expected to occur based on the berth-by-berth analysis contained in the ISOR.

**Response:** See Response to Comment 22-23.

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<sup>10</sup> Sacramento Metropolitan Air Quality Management District. 2019. Friant Ranch Interim Recommendation. Available: <http://www.airquality.org/LandUseTransportation/Documents/FriantInterimRecommendation.pdf>. Accessed January 22, 2019.

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**52-20:** The comment states that CARB should analyze energy impacts by utility or region.

**Response:** See Master Response 1. The energy demand analysis is based on overall energy demand. Energy demand is appropriately assessed at a statewide level because the transmission grid is interconnected within a much larger region (the Western Interconnection) such that the location of demand is not a critical element to how CARB evaluates energy demand for a state-wide program. The energy demand analysis is adequate under CEQA.

**52-21:** The comment states that CARB should analyze energy demand increases resulting from capture and control systems. The comment states that Attachment B of the Draft EA does not support the statement in the body of the EA that “some capture and control systems may be powered by electricity, but it is expected the additional electricity needed would be minimal.”

**Response:** The statement in the body of the EA is consistent with the material in Attachment B. Attachment B does not make a statement about a need for “significant electrical infrastructure...to develop and install land-based capture and control systems for RoRos and tankers.” Rather, Attachment B mentions trenching of electrical and gas lines of less than 1 mile through conduit to an existing substation. Nonetheless, though compliance responses would require installation of electrical infrastructure, that does not mean that the increase in electrical demand would be substantial. Naturally, shore power would require an electrical line, as recognized on page 2 of EA Attachment B. Therefore, no changes are necessary to address energy demand increases from capture and control systems.

**52-22:** The comment states that CARB assumes capture and control systems would have no impact on utilities, while Attachment B shows that significant electrical infrastructure would be needed for land-based control systems.

**Response:** As suggested on EA page 10, existing capture and control systems use clean-diesel generators for powering their systems and operating the crane arm. In Response to Comment 52-22, the following text on page 141 has been amended as follows to clarify that barge-based systems would use diesel while landside systems would be connected to the electrical grid.

**Page 141:**

Shore-side and barge-based capture and control systems would generally be powered by clean diesel; barge based systems and would not be connected to public utility infrastructure, but shore-side systems may be connected to public utilities with trenched gas and electrical lines and would use electricity as discussed for shore power, above. Additional natural gas consumption would be minimal. For barge-based systems, it is expected that existing production of clean diesel associated with the Low Carbon Fuel Standards would be sufficient

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to meet the energy needs of capture and control systems such that new or modifications to existing refineries or manufacturing facilities would not be required to increase their use under the Proposed Regulation.

See Response to Comment 52-21, on page 69 regarding the assertion that “significant electrical infrastructure” would be necessary.

**52-23:** The comment states that CARB should analyze vessel-traffic impacts associated with barge-based control systems indicating that the project may increase vessel traffic and result in navigational hazards.

**Response:** Use of barge-based control systems could increase traffic in waterways depending on the timing of operation and volume of existing vessel traffic. Title 33 of the Code of Federal Regulations contains a section on ports and waterways safety that includes a ports and waterways safety section. Therefore, safety impacts are unlikely.

Proposed At Berth Regulation  
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Comment Letter 53 December 9, 2019	Giles Pettifor Port of Hueneme
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**53-1:** The commenter states that adding more power load at the port will require additional power supply from Southern California Edison, which has informed the commenter that circuitry upgrades will be needed. The commenter states the utility upgrade would preclude the port’s compliance with the zero-emissions alternative control system by 2023 for roro vessels.

**Response:** Note that the currently proposed compliance deadline for roro vessels is 2025, per the July 10, 2020, 15-Day Notice.

The Draft EA evaluates utility upgrades as part of the reasonably foreseeable compliance responses to the Proposed Regulation. The EA describes on page 19 the various electrical transmission infrastructure that may be needed for ports and terminals to provide shore power. These activities are then evaluated for each resource (see, for example, the discussion of aesthetic impacts on EA page 32, which states, “Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide land-based capture and control devices.”). The comment does not raise any specific issues with the analysis in the EA; therefore, no additional response is required.

**53-2:** The commenter states that the Proposed Regulation may result in significant net increases in emissions of toxic pollutants and greenhouse gases because it may cause goods to be shipped into non-California ports and then trucked into the State.

**Response:** See Response to Draft EA Comment 45-2.

**53-3:** The commenter states that they provided to CARB a list of potential projects that could result in emissions reductions to show the potential for in-lieu emissions reductions. The commenter states it appears that CARB will be requiring such projects in the interim instead of in lieu of the new requirements when compliance is infeasible in the short term. A regulation that requires the alternative projects in the short term would have to ensure it is procedurally and legally sound, scientifically valid, and equitable to regulated parties.

**Response:** This comment does not raise an issue with the environmental analysis in the EA. However, CARB provides this response for informational purposes. The Proposed regulation currently includes the Innovative Concepts (IC) provision as a compliance option, which was first described in the 15-day changes published by CARB on March 26, 2020, and are also described in the Final EA. The IC provision enables entities to use lower cost options to achieve an earlier or equivalent emissions

## Proposed At Berth Regulation Response to Comments

reduction through providing additional pathways for regulated ports to continue using fleet averaging methods of compliance. To utilize the IC provision, applicants must first receive approval from the Executive Officer to ensure that equal or better reductions in DPM, NO<sub>x</sub>, and ROG emissions would be achieved without increasing GHG emissions. IC projects would need to be operational within the proximity of a covered port to ensure that these emissions reductions have localized air quality benefits.

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Response to Comments

Comment Letter 59 December 9, 2019	Eugene Seroka California Association of Port Authorities
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**59-1:** The comment states that CARB should undertake a thorough alternatives analysis.

**Response:** The EA contains an evaluation of alternatives to the Proposed Regulation in Section 7, Alternatives Analysis.

**59-2:** The comment states that there is a risk that the Proposed Regulation could divert cargo to ports outside California, increasing air and GHG emissions.

**Response:** Refer to Draft EA Response to Comment 45-2.

## 2.4 Responses to First 15-Day Comments

Comment Letter 12 April 23, 2020	Art Mead Crowley Maritime Corporation
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**12-1:** The comment states the accelerated timeline for tanker vessels is impractical. Use of an emissions capture barge for petroleum tanker vessels as a safe alternative is unsupported by evidence. The comment further states that shore-side electrical power or shore-side capture and control may be safe but only if time is allowed for design, which could not reasonably be completed by the accelerated compliance deadlines.

**Response:** See Master Response 2 regarding the accelerated timeline for tanker vessels. See Master Response 4 regarding safety and tanker vessels. See Response to Draft EA Comment 20-1 regarding shore power use for tanker vessels.

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Comment Letter 27, 28 April 29, 2020	Lee Kindberg Maersk
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**27-1, 28-1:** The comment states the implementation timeline has become infeasible under current economic conditions, where key stakeholders must prioritize personnel safety and react to change in operational and supply chain needs. The comment further states that with a focus on addressing these prioritizes, there is limited bandwidth for thoughtful analysis and suggestions for new regulatory proposals. The commenter recommends waiting for economic adversity to subside before moving forward, which would allow for studies on technology and feasibility to continue.

**Response:** See Master Response 6.

Proposed At Berth Regulation  
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Comment Letter 30 April 30, 2020	Henry T. Perea Chevron
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**30-1:** The comment states that there is no safe or feasible technology for capture and control at tanker terminals required by the Proposed Regulation. Should a feasible technology be created, the compliance timeline of 2029 is infeasible. The accelerated 2027 deadline exacerbates these issues.

**Response:** Refer to Master Response 2 regarding the feasibility of the compliance timeline for tanker vessels. Refer to Master Response 4 regarding safety of capture and control systems for tanker vessels.

**30-2:** The comment states there has been no demonstration that tanker safety systems can be modified to comply with the Proposed Regulation in a way that is safe and does not increase the risk of an accident. The accelerated 2027 deadline exacerbates these issues.

**Response:** Refer to Master Response 4 regarding safety of CAECS for tanker vessels with flammable cargoes.

**30-3:** The comment states that CARB has not adequately evaluated potential biological construction impacts associated with accelerated, simultaneous construction projects that would occur under the accelerated implementation timelines.

**Response:** CARB disagrees that the accelerated implementation dates would result in new significant impacts or would substantially increase the severity of previously identified impacts. Short-term construction biological impacts of the Proposed Regulation are discussed on pages 64 through 67 of the EA. In the discussion, the EA identifies adverse biological impacts related to implementation of infrastructure improvements to existing ports and recommends Mitigation Measure 4.A-1 to minimize project-level impacts to biological resources. CARB concludes that impacts may be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval. However, in taking the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, CARB concludes that construction impacts to biological resources would be potentially significant and unavoidable. See Responses to Draft EA Comments 22-36 and 22-37 for additional discussion of biological impacts and the approach taken in the Draft EA. Master Response 5 addresses the potential for impacts associated with accelerated compliance timelines.

**30-4:** The comment states that CARB has not adequately addressed cumulative biological impacts, and that CARB exacerbates the flaw in the Draft EA by failing to evaluate how accelerated construction activities to achieve the accelerated compliance timeline would contribute to cumulative impacts. The commenter points to comments that provide specific examples of other projects that should be included.

## Proposed At Berth Regulation Response to Comments

**Response:** Cumulative biological impacts are discussed on pages 155 through 156 of the EA. Refer to Response to Draft EA Comment 22-41 for a discussion of the cumulative impact approach used in the Draft EA. The response explains that the Draft EA relies on the summary of projections contained in the EA prepared for the 2016 State SIP Strategy, which analyzed the collective impacts from a suite of proposed statewide air quality and greenhouse gas-reducing regulations. As described on page 146 of the EA, the cumulative impacts analysis summarizes the compliance responses associated with the State SIP Strategy, discusses the cumulative impacts identified for each resource area in the State SIP Strategy EA, then makes a significance determination about whether the Proposed Regulation could result in a significant cumulative effect or make a considerable contribution to an existing significant cumulative impact. Using this summary of projections approach, other specific development projects need not be considered in the cumulative impact analysis. Rather, the Proposed Regulation is considered along with CARB's other statewide regulations.

In terms of cumulative effects and the 15-day rule changes, page 34 of the March 2020 15-day notice explains that:

accelerating implementation dates for ro-ro and tanker vessels would not change the nature or extent of physical changes to the environment; it would simply result in them occurring one or two years sooner, depending on the vessel category. CARB staff do not anticipate this change to have a large potential to cause cumulative impacts from other marine-related construction associated with this regulation, as no other compliance dates for ocean-going vessels or their related terminals are scheduled to go into effect during the new implementation years.

The 15-day notice is therefore evaluating whether the 15-day changes may change the conclusion about whether the Proposed Regulation could result in a significant cumulative impact or make a considerable contribution to an existing significant cumulative impact. For that determination, only the activities done in response to the Proposed Regulation need be discussed. Therefore, the cumulative analysis in the 15-day notice is adequate under CEQA. See also Master Response 5.

Finally, it bears mentioning that only industry commenters (who would incur compliance obligations under the regulation) have raised concerns about potential cumulative impacts from the proposed accelerated implementation dates. In reality, the physical improvements necessary to achieve compliance with the Proposed Regulation are relatively minor; while some modifications may need to be made to terminals, these improvements overall constitute relatively minor modifications to existing industrial facilities. Furthermore, these improvements are for the express purpose of generating considerable long-term operational benefits in air quality. Accelerating the implementation timeframes will help achieve the Proposed Regulation's intended air quality benefits as early as possible. It is important to bear

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this context in mind in considering the commenters' concerns regarding the accelerated implementation timeframes.

**30-5:** The comment asserts that emissions control systems for tanker vessels must be demonstrated as feasible, reliable, and safe before adoption of the Proposed Regulation. The compliance deadline is infeasible, as demonstrated by previously provided information and comments on the proceeding. The accelerated 2027 deadline exacerbates these issues.

**Response:** Refer to Master Response 2 regarding the feasibility of the compliance timeline for tanker vessels. Refer to Master Response 4 regarding safety of capture and control systems for tanker vessels.

**30-6:** The comment asserts that stack capture and control systems would result in numerous safety risks for tanker vessels, such as failures in controlling electrostatic hazards, boiler pressure, and emergency disconnection. These accidents can lead to explosions and fires, which can then cause oil spills that adversely affect water quality, marine species, and human health and safety. A feasibility study should be done prior to adopting the Proposed Regulation to determine if the systems can be designed to be safe. The EA does not address these hazards, and there is not adequate mitigation.

**Response:** Refer to Master Response 4 regarding safety of capture and control systems for tanker vessels.

**30-7:** The comment provides an analysis of why using inert gas in cargo tanks is critical to maintain safety. The analysis discusses incidents and fatalities and concludes that use of inert gas systems substantially increase safety by preventing fire and explosions in cargo tanks. The comment indicates the following: A study should be conducted to determine if modifying these systems can be done in a safe way to allow for operation of capture and control systems. There are currently no standards for how this interface should be integrated into existing systems. The EA does not address these hazards. Other hazards include electrostatic hazards, boiler pressure, and emergency disconnection. The commenter also provides an attachment titled "Inert gas systems, The use of inert gas for the carriage of flammable oil cargoes," which was produced by the Oil Companies International Marine Forum in 2017.

**Response:** While the commenter provides support for the general assertion that inert gas systems are critical for safety, the commenter does not explain how they believe that capture and control systems on tanker vessels would interfere with the safe operation of inert gas systems. As explained in Master Response 4, CARB is not responsible for engineering such solutions. Master Response 4 also discusses safety of capture and control systems for tanker vessels more generally.

**30-8:** The comment asserts the following: CEQA requires an assessment of an impact's probability and severity, and the EA does not do that for hazards of transitioning to a new emissions control technology for oil tankers. CEQA requires these impacts be

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disclosed and that mitigation be developed and adopted before a proposed project is approved. CARB cannot rely on a future "interim evaluation" to address hazardous conditions.

**Response:** To clarify, CEQA does not have a specific requirement to assess the probability of an impact. "The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data. An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting" (CEQA Guidelines section 15064(b)(1)). Therefore, the EA does not need to evaluate probability of certain impacts in making significance determinations, beyond determining whether impacts are reasonably foreseeable.

Contrary to the commenter's claim, CARB is not relying on a future evaluation to address hazardous conditions. See Master Response 4, which explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation. Refer to Master Response 4 regarding safety of capture and control systems for tanker vessels and how the EA addresses safety impacts under CEQA.

**30-9:** The comment asserts that accelerated implementation timelines exacerbate hazards issues associated with tankers.

**Response:** Refer to Master Response 4 regarding safety of capture and control systems for tanker vessels, including the accelerated timeline.

**30-10:** The comment states that CARB's biological analysis is insufficient because it only lists 2 species of concern and assumes that construction activities would occur within areas highly disturbed and not likely to be supportive of a large range of biological species.

**Response:** See Responses to Draft EA Comments 22-36 and 22-37.

**30-11:** The comment summarizes several examples of listed species that exist within the vicinity of existing ports throughout the states including, but not limited to, steelhead, salmon, and delta smelt and suggests that CARB's evaluation of biological impacts in the Draft EA is deficient. The comment also introduces studies and environmental permits issues for facilities improvements required by MOTEMS overseen by the State Lands Commissions and states that CARB should have included these studies in the EA. The comment provides the Chevron Richmond Long Wharf and Marathon Martinez Refinery as examples of studies that could have been consulted.

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**Response:** While it is possible that the aforementioned species could be affected by the compliance responses under the Proposed Regulation, the Draft EA analysis is adequate. The Draft EA provides a programmatic review of the reasonably foreseeable compliance responses and associated environmental impacts from implementation of the Proposed Regulation, consistent with the approach explained in Master Response 1.

The Chevron Richmond Long Wharf and Marathon Martinez environmental documents provide project-level environmental review for those specific projects. Project-level CEQA review calls for a more detailed explanation of potential environmental effects pursuant to CEQA Guidelines Section 15161, whereas the Draft EA prepared for the Proposed Regulation provides a programmatic review consistent with Section 15168 and as explained in Master Response 1. As stated on page 64 of the EA, “[c]onstruction activities related [to] the implementation of the Proposed Regulation could cause temporary direct and indirect adverse impacts to special status species (including coastal species such as California Least Tern, California Brown Pelican).” Consistent with the approach summarized in Master Response 1, the EA provides examples of species that could be adversely affected by the compliance responses of the Proposed Regulation; however, the list of example species is not exhaustive. As noted throughout the EA, site-specific project environmental review is neither possible nor required at this stage in the programmatic rulemaking process. Given the programmatic level of detail that is possible for this EA given this point in the statewide regulatory process (as explained further in Master Response 1), the programmatic level of detail in the biological resources analysis is adequate under CEQA.

**30-12:** The comment asserts that construction noise, vibration, and other effects that would result in adverse impacts to threatened endangered fish species, special status plants, and protected marine mammals, or sensitive shoreline animals is omitted from the biological discussion in the Draft EA. The comment also states that CARB does not provide mitigation to minimize these potential impacts.

**Response:** See Response to Draft EA Comment 22-37 for additional text that has been added to the EA to account for aquatic species.

**30-13:** The comment states that the program-level environmental review performed by CARB does not relieve CARB from providing an accurate depiction of the types of environmental impacts that the adoption of the Proposed Regulation could cause. The commenter provides material that cites *Cleveland National Forest Foundation v. San Diego Association of Governments* (2017) 17 Cal.App.5th 413, 440 in stating that “a lead agency preparing a program EIR must disclose what it reasonably can, and any determinations that it is not feasible to provide specific information must be supported by substantial evidence.”

**Response:** This comment does not raise a specific issue with the environmental analysis in the Draft EA, but is noted. CARB notes that its environmental analyses for its generally applicable statewide regulations are, by necessity, programmatic in

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nature. CARB has met its burden of describing the reasonably foreseeable indirect impacts that may result from the Proposed Regulation. See Master Response 1 for a description of the programmatic approach taken in the Draft EA.

**30-14:** The comment states that labeling impacts to biological resources as significant does not relieve the agency of the obligation under CEQA to provide sufficient information about the extent of an impact and emphasizes that the Draft EA must describe the nature and magnitude of the adverse effect.

**Response:** See Response to First 15-Day Comment 30-11 above for discussion of the biological resources evaluation in the Draft EA.

**30-15:** The comment states that the 15-day rule changes accelerating the compliance deadlines would change the nature and extent of the physical changes in the environment.

**Response:** See Master Response 5 for a discussion of potentially significant impacts from the March 2020 15-day regulatory changes.

**30-16:** The comment states the following: Accelerated compliance timeframes could impede the ability of facilities to conduct construction of new facilities. They also may not be able to construct within seasonal windows that are protective of fish species. In-water work in the San Francisco Bay may be limited outside of June 1 to November 30 to protect fish species protected by the National Marine Fisheries Service, and there may be other restrictive time windows. CARB has not evaluated whether in-water construction work done to comply with the Proposed Regulation can comply with seasonal work windows and has not evaluated the impacts of simultaneous construction activities.

**Response:** Refer to Master Response 5 regarding the potential environmental impacts associated with accelerated compliance timelines. See Master Response 2 for discussion regarding comments raising feasibility questions about the implementation dates.

**30-17:** The comment asserts that CARB's assertion that acceleration of the compliance timeframes would not affect its environmental analysis is incorrect. CARB should revise the EA to address construction effects to special-status fish, animals, and plants under the accelerated compliance deadlines.

**Response:** Refer to Master Response 5 regarding the potential environmental impacts associated with accelerated compliance timelines.

**30-18:** The comment states that CARB's CEQA review does not adequately address cumulative impacts. The comment faults the cumulative analysis' reliance on the SIP Strategy as an approach to evaluate cumulative impacts, particularly cumulative biological impacts.

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**Response:** Refer to responses to Draft EA Comment 22-41 and response to First 15 day comment 30-4 for a discussion of the cumulative impact approach used in the Draft EA. The response explains that the Draft EA relies on the summary of projections contained in the EA prepared for the 2016 State SIP Strategy. Under this approach, other specific projects need not be analyzed in the cumulative impact analysis.

**30-19:** The comment claims that CARB's cumulative impacts discussion for the March 2020 15-day rule changes is flawed because it discusses only how construction activities done in response to the Proposed Regulation would combine with each other rather than looking at impacts of other projects.

**Response:** Refer to Response to Draft EA Comment 22-41 for a discussion of the cumulative impact approach used in the Draft EA. The response explains that the Draft EA relies on the summary of projections contained in the EA prepared for the 2016 State SIP Strategy. As described on page 146 of the EA, the cumulative impacts analysis summarizes the compliance responses associated with the State SIP Strategy, discusses the cumulative impacts identified for each resource area in the State SIP Strategy EA, then makes a significance determination about whether the Proposed Regulation could result in a significant cumulative effect or make a considerable contribution to an existing significant cumulative impact. The March 2020 15-day notice states that:

Accelerating implementation dates for ro-ro and tanker vessels would not change the nature or extent of physical changes to the environment; it would simply result in them occurring one or two years sooner, depending on the vessel category. CARB staff do not anticipate this change to have a large potential to cause cumulative impacts from other marine-related construction associated with this regulation, as no other compliance dates for ocean-going vessels or their related terminals are scheduled to go into effect during the new implementation years.

The 15-day notice is therefore evaluating whether the 15-day changes may change the conclusion about whether the Proposed Regulation could result in a significant cumulative impact or make a considerable contribution to an existing significant cumulative impact. For that determination, only the changes to compliance responses resulting from the Proposed Regulation need be discussed. Therefore, the cumulative analysis in the 15-day notice is adequate under CEQA.

**30-20:** The comment asserts that CARB needs to revise its cumulative impact discussion for biological resources in the San Francisco Bay. Additionally, CARB needs to revise the cumulative impact analysis to address how the cumulative impacts to biological resources will worsen due to the accelerated timeline.

**Response:** Refer to Response to Draft EA Comment 22-41 for a discussion of the cumulative impact approach used in the Draft EA. The response explains that the Draft EA relies on the summary of projections contained in the EA prepared for the 2016

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State SIP Strategy. For this approach, specific projects need not be considered. CARB addressed the accelerated timeline on page 34 of the March 15-day notice.

**30-21:** The comment states that the cumulative impacts analysis for biological resources should include shoreline projects, rather than relying on an air planning approach that does not result in examination of specific projects. Past projects that should be included include those constructed to comply with the State Lands Commission's MOTEMs requirements, the San Francisco RWQCB's Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay, Fiscal Years 2015 – 2024, the USACE's San Francisco Bay to Stockton, California Navigation Study, and the City of Oakland's Howard Terminal project.

**Response:** Refer to Response to Draft EA Comment 22-41 and response to First 15 day comment 30-4 for a discussion of the cumulative impact approach used in the Draft EA. The response explains that the Draft EA relies on the summary of projections contained in the EA prepared for the 2016 State SIP Strategy. For this approach, other specific projects need not be analyzed in the cumulative impact analysis.

**30-22:** The comment states that CARB needs to complete additional studies to meet its statutory obligations under the Health & Safety Code and CEQA. The comment suggests that the March 2020 15-day changes warrant new environmental review and recirculation.

**Response:** See Response to First 15-Day Comment 30-11 and Master Response 5.

**30-23:** The comment asserts that CARB's schedule for implementing land-based capture and control systems for tankers underestimates the time needed by approximately 5 years. CARB must conduct a feasibility study to make sure the technology can be safely and effectively implemented prior to mandating use of the technology, using input from stakeholders. At best, the in-service date for a terminal-side tanker control technology is 2033. The timeline adds 1 to 2 years to CARB's estimate for feasibility, engineering, and permitting and adds 3 years to CARB's estimate for construction of terminal infrastructure.

**Response:** Refer to Master Response 2 regarding the feasibility of the compliance timeline for tanker vessels.

**30-24:** The commenter states that CARB has not provided the commenter an updated emissions inventory to review. The commenter believes there has been an overestimation of emissions from tankers berthing at the Richmond Long Wharf, which can lead to an overestimation of benefits. The commenter is specifically concerned that the emissions inventory does not account for implementation of future IMP regulations, does not account for the commenter's Tier 3 equivalent vessels, overestimates the growth of vessel visits to the Richmond Long Wharf, and assumes tankers are pumping constantly while at berth.

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**Response:** CARB engaged in many beneficial meetings and received constructive feedback from the commenter. After careful consideration CARB staff incorporated many of the commenters concerns by refining the emissions inventory in the March 26, 2020 *“Analyses Supporting the Proposed 15-Day Changes to the Proposed Regulation. Updates to Appendix H: 2019 Update to the Inventory for Ocean-Going Vessels At Berth: Methodology and Results”*. These refined emissions inputs included adjusting effective power based on data provided by Chevron Richmond Refinery:

- Adjusting auxiliary engine effective power for two unique suezmax vessels (set to zero during berth times) at the Richmond Long Wharf (RLW).
- Adjusting effective power for boilers for two unique suezmax vessels at the RLW.

See the March 26, 2020, *“Analyses Supporting the Proposed 15-Day Changes to the Proposed Regulation. Updates to Appendix H: 2019 Update to the Inventory for Ocean-Going Vessels At Berth: Methodology and Results”* for more information on how the emissions inventory changed based on the information previously provided by the commenter, Chevron.

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Comment Letter 35 May 1, 2020	Dragos Rauta INTERTANKO
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**35-1:** The comment expresses concern about safety for tanker vessels. They request assessment of assumption of responsibility by the shore power provider if there are damages or pollution events that occur due to insufficient power provided to tankers. They request construction and certification standards for capture and control system and other innovative options when they are shore based or on barges. They also request safety procedures for these systems when operated with tankers.

**Response:** Refer to Master Response 4 regarding the EA evaluation of safety under CEQA. The commenter's request for adding provisions to regulations are noted and will be provided for the decisionmakers as part of the record.

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Comment Letter 44 May 1, 2020	Frances and Dave Low
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**44-1:** The comment summarizes classes of toxic chemical compounds that have been found in diesel exhaust.

**Response:** The comment does not raise significant environmental issues with the content of the Draft EA. Page 93 of the EA demonstrates that operational emissions of diesel exhaust would be reduced through implementation of the Proposed Regulation. CARB notes that the Proposed Regulation would result in fewer emissions of the toxic chemical compounds referenced in the comment.

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Comment Letter 48 May 1, 2020	Richard Sinkoff Port of Oakland
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**48-1:** The comment indicates that the Port of Oakland’s lack of compliance methods would result in diverted trips from the Port, resulting in additional emissions of GHGs and air pollutants.

**Response:** The abovementioned concept of increased emissions associated with cargo diversion is discussed in the EA starting on page 61 and is addressed in Response to Draft EA Comment 45-2.

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Comment Letter 49 May 1, 2020	Catherine Reheis-Boyd Western States Petroleum Association
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**49-1:** The comment asserts that: There is no basis for accelerating the tanker compliance deadline. The accelerated deadline creates serious safety risks for tanker terminals. The changes fail to address the need for a feasibility study articulated in the commenter’s letter from March 6, 2020.

**Response:** Refer to Master Response 2 regarding the accelerated tanker compliance deadlines. Refer to Master Response 4 regarding safety of capture and control for tanker vessels. See Response to Draft EA Comment 20-1 regarding the safety of shore power use for tanker vessels. Refer to Master Response 3 regarding industry stakeholders’ suggestion that a feasibility study be completed.

**49-2:** The comment states that: All engineering and safety considerations must be evaluated and determined feasible for a technology to be considered proven. Technologies in the rulemaking must be determined feasible before setting a compliance date. Technologies required by the Proposed Regulation have not been proven safe and feasible. There is not proven technology that would allow for terminals to meet the deadlines in the original regulation.

**Response:** See Master Response 4, which explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design specific compliance responses to comply with the Proposed Regulation. See Master Response 2 regarding feasibility of implementation timelines. Refer to Master Response 4 regarding additional safety issues.

**49-3:** The comment asserts that: CARB proposes to accelerate deadlines, with the sole rationale being that the CARB Governing Board directed CARB staff to accelerate the deadline. There is no evidence in the record to justify the accelerated timeline and there has been no explanation of how regulated entities can meet the new deadlines. There is no response to information in the record showing that the lack of safe and feasible capture and control systems would make meeting these deadlines infeasible.

**Response:** CARB’s Board gave its direction to CARB staff after careful consideration of the written evidence before it, and after hearing CARB staff’s presentation. Regarding safety considerations, see Master Response 4, which explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation. See Master Response 2 regarding feasibility of implementation timelines. Refer to Master Response 4 regarding additional safety considerations.

**49-4:** The comment asserts that accelerated timelines place tanker vessel operators and marine terminal operators in a dangerous position because they require putting into place untested equipment and processes before feasibility and safety studies are done.

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**Response:** The Proposed Regulation, including the accelerated timeframes, do not require that regulated entities use untested technologies prior to conducting feasibility and safety studies. See Master Response 2 regarding feasibility of implementation timelines. Refer to Master Response 4 regarding safety issues.

**49-5:** The comment asserts that the Proposed Regulation does not have any modifications to account for current economic conditions. The comment indicates that from a practical standpoint, resources and personnel are unavailable to focus on meeting the new compliance deadlines.

**Response:** This comment does not raise any concerns with the adequacy of any required elements of the environmental impacts analysis. As such, no response is required here. However, to provide additional transparency, staff provides the following response: See Master Response 6.

**49-6:** The comment states the current economic situation will significantly affect baseline emissions, estimated emissions reductions, health cost savings, economic impacts to California ports and terminals, and the California economy in general. CARB should have addressed these issues prior to releasing the March 2020 15-day changes.

**Response:** This comment does not raise any concerns with the adequacy of any required elements of the environmental impacts analysis. As such, no response is required here. However, to provide additional transparency, staff provides the following response: See Master Response 6.

**49-7:** The comment states CARB's estimates for economic activity associated with ports are no longer realistic in the wake of current economic conditions. They result in an overstatement of the value of the regulation and potential emissions savings.

**Response:** This comment does not raise any concerns with the adequacy of any required elements of the environmental impacts analysis. As such, no response is required here. However, to provide additional transparency, staff provides the following response:

The commenter's statement regarding potential emissions savings does not demonstrate any new or substantially increased significant environmental impacts. See Master Response 6.

**49-8:** The comment asserts that CARB staff must reassess the impacts current economic conditions may have on regulated parties. The acceleration of compliance deadlines makes it even more difficult to reach the deadlines, and the current economic conditions constrain marine terminals' ability to undertake major capital programs.

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**Response:** This comment does not raise any concerns with the adequacy of any required elements of the environmental impacts analysis. As such, no response is required here. However, to provide additional transparency, staff provides the following response:

See Master Response 2 regarding feasibility of implementation timelines. See Master Response 6 regarding the current economic climate.

**49-9:** The comment asserts that acceleration of implementation dates for ro-ro vessels and tanker vessels are not supported by evidence. The deadlines in the original Proposed Regulation were infeasible, and the accelerated deadlines exacerbate the feasibility issue. The accelerated deadline will not result in more emissions reductions or health benefits because the reductions cannot be achieved by tanker terminals by the original or accelerated deadlines.

**Response:** This comment does not raise any concerns with the adequacy of any required elements of the environmental impacts analysis. As such, no response is required here. However, to provide additional transparency, staff provides the following response:

CARB disagrees with the commenter's suggestion that the accelerated deadlines are not achievable. See Master Response 2.

**49-10:** The comment asserts that: Capture and control systems for compliance with the Proposed Regulation have not been shown safe or feasible to use on tankers at marine terminals. Therefore, there is no evidence that shows meeting deadlines is feasible. A feasibility study should be conducted before any capture and control requirements are imposed.

**Response:** This comment does not raise any concerns with the adequacy of any required elements of the environmental impacts analysis. As such, no response is required here. However, to provide additional transparency, staff provides the following response:

See Master Response 2 regarding feasibility of implementation timelines.

**49-11:** The comment states that: Evidence in the record provides strong support that the original tanker deadline was unrealistic and that the accelerated deadline would be dangerous. Oil tankers carry flammable cargo. Designing and constructing marine capture and control for oil tankers prior to conducting a feasibility study would put human lives at risk. Tankers are subject to extremely rigorous safety guidelines, and California law requires oil tankers to maintain the ability to leave a dock quickly during loading and unloading should an emergency occur.

**Response:** See Master Response 4 for discussion of the potential risks associated with fire, explosion, and spills. Additionally, CARB staff anticipates that any control systems

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designed for use with tanker vessels will not restrict the ability to quickly break away from a berth, as is required by California law. Control system designs that have been shared with both CARB and industry stakeholders, show the bulk of the control system being placed in front of, or behind a vessel, or on the dock/landside and each design allows for an expeditious departure from the berth. Additional design elements would include safety features such as quick release connection points and breakaway couplings.

**49-12:** The commenter provided a summary of three accidents that occurred due to tanker vessels and empty cargo space and noted the failure to follow stringent safety measures in handling empty cargo space at berth can cause accidents. One accident in 1976 was caused by insufficient dispersion of crude oil vapors that spurred changes in rules for oil tankers at berth, and the commenter stated the accident resulted in changes in rules for tankers during loading and unloading. One accident in 2003 occurred after an unloading and loading stop due to an explosive atmosphere in the tanks caused either by static electricity or other ignition. The third accident occurred in 2012 after a tanker offloaded cargo, with the likely cause of the explosion being vapor ignition due to static electricity.

**Response:** The commenter's assertion that failure to follow safety measures can result in accidents is noted and included in the record for consideration by decisionmakers. This comment provides information and does not raise significant environmental issues with the current proposal; therefore, no further response is required. However, to provide additional transparency, staff provides the following response:

The catastrophic accidents involving tanker vessels provided by the commenter are excellent examples of the many dangers of operating oil tanker vessels. CARB agrees safety is the highest priority for a vessel and its crew. Thus, as part of the proposed regulatory language, control requirements do not apply to any portion of a vessels stay that is deemed to be a safety and emergency event. A safety and emergency event is when a responsible official reasonably determines that compliance with the regulation would endanger the safety of the vessel, crew, cargo, passengers, terminal, or terminal staff because of severe weather conditions, a utility event, or other extraordinary reasons beyond the control of the terminal operator or vessel operator. Additionally, these events have generated an increased awareness of safety issues and measures that can and will be executed when using control equipment and are discussed further in Master Response 4. Note also that CARB has considered the potential risks associated with fire, explosion, and spills, as discussed in Master Response 4.

**49-13:** The comment states that: There has been no feasibility study to assess whether safe shore-based capture and control systems could be designed for oil tankers. The scrubber equipment would have to be explosion proof or outside certain areas, which is too far for an articulating arm, and will need to maintain exhaust vapors in the vapor phase and at levels needed for the scrubbing equipment to function. On-vessel changes might be needed and there has been no assessment of what changes will be

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needed on vessels. CARB does not have evidence that shore-based technology is safe or feasible, there is no standard for designing it, there is no guidance for safe operation, and there is no assessment of on-vessel changes required.

**Response:** Refer to Master Response 4, which explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to precisely determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation. See Master Response 2 regarding feasibility of implementation timelines. Refer to Master Response 4 regarding additional safety issues.

**49-14:** The comment states that: Assuming standards for shore-based capture and control could be developed for oil tankers, CARB has no evidence this could occur under the accelerated deadlines. Five or more years are usually required to research new safety procedures and rewrite guidelines for implementation, and new systems are then phased in. CEQA and permitting review could take 5 to 10 years.

**Response:** Refer to Master Response 2 regarding feasibility of implementation timelines.

**49-15:** The commenter states that oil tankers likely will not be in a position to safely accommodate shore-based capture and control for more than a decade. As a result, oil tankers will go to terminals outside California where they are not subject to these controls. CARB has not analyzed the economic impacts for the original tanker deadline and have not assessed economic impacts from moving the deadline up by two years.

**Response:** Refer to Master Response 2 regarding feasibility of implementation timelines. Refer to Response to Draft EA Comment 45-2 regarding the assertion that vessels will divert their operations to other terminals. Refer to Master Response 4 regarding safety considerations.

**49-16:** The commenter states that: At the December 5, 2019, Board hearing, CARB staff stated a feasibility study was completed for tankers. The documents CARB staff referred to do not reference safe use of stack capture for tankers or how existing technology can be redesigned for tankers. The studies outline that more studies need to be performed for stack capture for tankers.

**Response:** The testimony referenced by the commenter can be found beginning on page 168 of the transcript of the December 5, 2019, Board meeting. To summarize, the testimony provides:

- Staff completed a technology assessment in 2018, part of which examined what technologies were feasible and areas in which they needed improvement.
- The staff report addresses feasibility aspects raised by industry, including cost, market availability, cost effectiveness, and ability for companies to scale up.

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CARB staff has discussed with companies about technology solutions and safety issues.

- Between the technology assessment and staff report, CARB staff has studied feasibility aspects of the Proposed Regulation. CARB staff reasonably believes that technology can be adapted for tankers, while recognizing that there are safety challenges that will be addressed in design.

Although the commenter states these studies do not state how technology can be designed, that is not required. Refer to Master Response 4, which explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate precisely how regulated entities will design compliance responses to comply with the Proposed Regulation.

**49-17:** The commenter states that, despite CARB's assertion that technology manufacturers have assured CARB staff there are engineering solutions, they have not stated the solutions currently exist. A technology provider noted that there are a number of design challenges for tankers, including safety-related challenges.

**Response:** Refer to Master Response 4, which explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation. Also refer to Master Response 4 regarding additional safety issues.

**49-18:** The commenter states that CARB staff suggested in the December 5, 2019, Board meeting that shore power is widely used, feasible, and demonstrated to be effective for tankers. The commenter asserts this does not reflect real-world practice or evidence in the record. Shore power use for tankers has substantial technical and financial hurdles that make it infeasible. Vessels would need to be retrofitted, which would require time. Tankers that cannot use shore power would not be able to charter to California. Substantial work would need to be done at ports, and implementation would be complicated by grid-neutral requirements.

**Response:** This comment does not raise any concerns with the adequacy of any required elements of the environmental impacts analysis. As such, no response is required here. However, to provide additional transparency, staff provides the following response:

At the December 5, 2019, Board meeting, CARB staff did not state that shore power is "widely used" for tankers. To clarify, CARB staff made the following statements:

- "[T]he existing regulation has resulted in significant investments in shore power at...regulated ports and on over 500 vessels that are visiting these ports" (Transcript page 11).

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- “[S]hore power is “currently the most commonly used way for vessels to reduce emissions at berth in California” (Transcript page 12).

These statements pertain to shore power in general, not shore power specifically for tankers. Further, it is correct that shore power is feasible and demonstrated to be effective. As stated on page 37 of the transcript, “shore power has been and is in use at a terminal in Long Beach at T121.” The use of shore power at Long Beach does demonstrate it is a feasible and effective technology. However, following that testimony, CARB staff explains that capture and control technologies are the most likely to be used for tankers. Consistent with that statement, the EA explains on page 100 that “the most likely control option for tanker vessels would be land-based ~~on~~ capture and control systems.” This reflects CARB’s awareness that shore power is not currently widely used for tankers, and that it is not expected to be widely used for tankers with implementation of the Proposed Regulation.

**49-19:** The comment refers to letters and a presentation and states that the two letters and the one presentation do not support the accelerated timelines proposed in the March 2020 15-Day Changes. The commenter states that one comment letter does not address safety and feasibility concerns related to capture and control for tankers. The other comment letter provides no information on technical changes needed for vessel equipment or the feasibility or safety of modifying marine terminal infrastructure for the technology. One letter identifies a device that needs to be created for each ship but has not proposed how this could be done under the accelerated deadline.

**Response:** Refer to Master Response 4, which explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation. Refer to Master Response 2 regarding feasibility of implementation timelines. Refer to Master Response 4 regarding additional safety issues.

**49-20:** The commenter states that a presentation given by a commenter at the December 5, 2019, Board meeting focuses on the Advanced Maritime Emissions Control System that has been used for container ship applications but does not present evidence that the system can be used for tankers. The commenter states there are also other inaccuracies about the presentation given on December 5.

**Response:** Refer to Master Response 4, which explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation. Refer to Master Response 2 regarding feasibility of implementation timelines. Refer to Master Response 4 regarding additional safety issues.

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**49-21:** The comment asserts that the Draft EA should be recirculated following the release of the March 2020 15-day changes and new, accelerated compliance timeline.

**Response:** See Master Response 5.

**49-22:** The comment states that the March 2020 15-Day Changes increase the risk of a hazardous incident from deployment of untested technology. A hazardous incident could result in impacts to human health and safety and may also result in an oil spill that could impact the aquatic environment. The Draft EA does not evaluate health and safety impacts of emissions capture systems for tanker vessels. They have not been tested and proven safe for use on tankers. Inert gas systems are vital for safety, and the Proposed Regulation would require modifications to these and other safety systems, but there is no demonstrated safe technology.

**Response:** Refer to Master Response 4 regarding safety issues. Refer to Response to First 15-day Comment 30-7 regarding inert gas systems.

**49-23:** The comment states that three documents on shore power have been added, pertinent to tanker vessels and that if CARB is changing the reasonably foreseeable compliance response for tanker vessels, the Draft EA needs to be revised to consider the potential effects of electrical power demand at terminals, new safety concerns, and new environmental impacts.

**Response:** CARB has not substantially changed the reasonably foreseeable compliance responses. CARB has provided information about a number of technologies in the administrative record because the Proposed Regulation does not prescribe any particular compliance response. As described by CARB staff at the December 5, 2019, Board meeting, “[t]he regulation is developed in such a way that it doesn’t prescribe a certain type of technology. It’s based on the fact that it would have to meet some emissions level. And so it doesn’t prescribe that a tanker would have to use shore power, or the bonnet system, or on board. It’s flexible in that manner.” As a result, information on a number of technologies has been discussed in developing the Proposed Regulation. For the sake of the Draft EA and identification of compliance responses, it is still the case that “the most likely control option for tanker vessels would be land-based on-capture and control systems,” as explained on page 107 of the EA. Additionally, the Draft EA addresses electricity required to support shore power at existing ports under Impact 18.A-1: Long-Term Operational-Related Impacts to Utilities and Service Systems, which starts on page 140 of the EA. Therefore, no revisions to the Draft EA are required.

**49-24:** The comment states that the accelerated compliance timeline included in the March 2020 15-day changes would intensify adverse biological resource impacts. The comment also states that the Draft EA was deficient to begin with in its evaluation of biological resources impacts.

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**Response:** See Response to Draft EA Comments 22-26 and 22-27, and Master Response 5.

**49-25:** The comment states that: CARB has not evaluated cumulative impacts following the March 15-Day Changes. The cumulative analysis in the 15-Day notice disregards cumulative development not associated with the regulation. The accelerated deadlines compress and potentially intensify severity of impacts, including cumulative impacts.

**Response:** Refer to Response to First 15-Day Comment 30-19 for a discussion of cumulative impacts. Refer to Master Response 5 regarding environmental impacts associated with accelerated compliance timelines.

**49-26:** The comment indicates that the accelerated timeline in the March 2020 15-day changes should trigger CARB to re-examine each impact in the Draft EA and that the evaluation in the 15-Day Notice is insufficient.

**Response:** CARB staff did re-visit each impact in light of the 15 day changes, which resulted in the evaluation set forth in the 15-Day Notice. See Master Response 5.

**49-27:** The comment states that the Draft EA should be recirculated to evaluate the heightened hazards and impacts to biological resources resulting from the Proposed Regulation.

**Response:** See Master Response 4 and Master Response 5.

**49-28:** The comment asserts that the Proposed Regulation does not address safety and feasibility issues associated with capture and control equipment for tanker vessels. A feasibility study should be conducted, as there are many design challenges and no rules and standards for safe design and operational procedures. There are challenges to fitting tanker vessels for shore power.

**Response:** Refer to Master Response 4 for a discussion of safety impacts and a feasibility study for capture and control technologies. The EA explains on page 100 that "the most likely control option for tanker vessels would be land-based on-capture and control systems" and, as a result, evaluates the impacts of that technology as the compliance response for tanker vessels.

**49-29:** The comment states that technology for tanker vessels must first be shown to be feasible. The commenter explains tankers have unique components and safety concerns, and these engineering challenges pose safety concerns.

**Response:** Refer to Master Response 3, which discusses a feasibility study as an alternative to the Proposed Regulation. Also refer to Master Response 4, which discusses the feasibility and safety of capture and control for tanker vessels.

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**49-30:** The comment states that economic changes beginning in March of 2020 will have impacts on estimates of baseline emissions, estimates of health-related savings, costs and savings to regulated entities, and broader economic impacts of the regulation.

**Response:** Refer to Master Response 6.

**49-31:** The comment states that reductions in vessel activity caused by economic changes will lower baseline emissions and will lower potential emissions reductions and health benefits from the Proposed Regulation.

**Response:** Refer to Master Response 6.

**49-32:** The comment provides a comparison between tanker vessels and states a feasibility study is needed for capture and control technologies on tanker vessels, in particular due to safety considerations. Several differences in vessels are stated, but there is not a clear description of the significance of these differences and how the commenter believes CARB should consider them.

**Response:** Refer to Master Response 4.

**49-33:** This article is referenced in First 15-Day Comment 49-12. The comment provides an article about a crude oil tanker explosion in 2018. It discusses that the explosion occurred in an empty tank. Other incidents are also discussed in the article, including one in 1976. US Coast Guard regulations for inert gas systems were passed for vessels built after 1974, and the World Maritime Organization rules required inert gas systems on certain new oil tankers built after May 1982, and then in 1985 it was amended to cover all vessels. The article explains how these systems provide safety protections. The author speculates that the 2018 explosion might have to do with a failure that prevented the inert gas system from being effective.

**Response:** See response to comment 49-12.

**49-34:** This material is referenced in First 15-Day Comment 49-12. The comment provides a technical report about the explosion of the Chassiron, an oil tanker. The report concludes that several factors may have contributed to the explosion.

**Response:** See response to comment 49-12.

**49-35:** This article is referenced in First 15-Day Comment 49-12. The commenter provides an article that reflects that industry supports the use of inert gas systems on small tankers.

**Response:** See response to First 15-Day Comment 49-12.

**49-36:** The comment quotes a CARB staff statement from the December 5, 2019, Board hearing that they have been assured there are engineering solutions for ro-ro

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and tanker vessels. The commenter asserts that, while that assurance may have happened, the technology manufacturer has not stated there are current solutions or that the timeline can be met. One company stated a feasibility study would be needed at each terminal to determine how technology would be incorporated into the terminal operations.

**Response:** Refer to Master Response 2 regarding feasibility of implementation timelines. Refer to Master Response 4 regarding safety issues. CARB staff also recognizes that site-specific considerations exist. As explained at the December 5, 2019, Board meeting, “[w]e do feel there are safety challenges that are going to have to be addressed during the design. There are going to be site-specific issues that need to be addressed during design and engineering” (Transcript, page 169). However, see Master Response 4, which explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation.

**49-37:** The comment quotes a CARB staff statement from the December 5, 2019, Board hearing that staff has evaluated several terminal infrastructure projects in their assessment of timelines. The commenter believes that the projects CARB staff evaluated do not reflect the level of work required at terminals to meet the regulation requirements.

**Response:** See Master Response 2.

**49-38:** The comment quotes a CARB staff statement from the December 5, 2019, Board hearing that staff proposes an interim evaluation in 2023 to address timeline uncertainties for new vessel types. The commenter says the issue is not uncertainty. The issue is whether compliance with the regulation is feasible for oil tanker terminals. The regulation has “hard deadlines” that must be met regardless of the interim evaluation results. A Board member expressed concern about the timelines during the Board meeting.

**Response:** See Master Response 2.

**49-39:** The comment quotes a CARB staff statement from the December 5, 2019, Board hearing that CARB has earmarked \$10 million for capture and control technology. The commenter states this is evidence that capture and control technology has not been demonstrated on tanker vessels and belies the claim it is shown to be feasible. It would be unsafe to demonstrate this technology at this time. The commenter also indicates that a feasibility study is required, and industry needs to engineer the technology first.

**Response:** Refer to Master Response 2 and Master Response 4.

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**49-40:** The comment provides several quotes from the December 5, 2019, Board hearing regarding innovative alternatives that stress that use of the concepts would be allowable for a limited time, until infrastructure to ultimately comply with the regulation is completed. The commenter asserts industry stakeholders “clearly stated to CARB” that alternatives like these would need to be instead of the proposed reduction requirements for tankers, not in addition to the requirement or only until infrastructure could be built. The part of the Proposed Regulation that allows for innovative technologies reflects the incorrect assumption that technology for tanker capture and control will be feasible in the future, and that assumption is unsupported by evidence. The rule needs to provide for permanent alternatives.

**Response:** See Master Response 4. The commenter’s opinion that the rule should provide for permanent use of innovative technologies is noted and included in the record for consideration by the decisionmakers. However, refer to Response to First 15-Day Comment 49-23, which explains that multiple pathways to compliance are available under the Proposed Regulation.

**49-41:** The comment provides a quote from the December 5, 2019, Board meeting in which CARB staff states that shore power is being used at a terminal at the Port of Long Beach for tanker vessels. The commenter states this situation is unique because the tanker that uses the vessel is equipped with diesel electric engines, and that other vessels cannot be retrofitted to use shore power.

The comment also provides a quote in which South Coast Air Quality Management District staff suggests an earlier compliance date for ro-ro vessels based on the existence of currently approved technologies. The commenter also quotes an earlier statement by CARB staff that technology manufacturers have assured staff that there are engineering solutions for tanker and ro-ro vessels. The commenter quotes a letter from the Port of Long Beach that states that it is not true that ro-ro vessels can use current capture and control technology, and that new technology will need to be developed.

**Response:** The portion of this comment pertaining to shore power does not raise a significant environmental issue with the Draft EA; therefore, it is noted and included in the record for consideration by decisionmakers. However, CARB has determined that the most likely control option for tanker vessels would be land-based capture and control systems—not shore power—as explained on page 107 of the EA. And refer to Response to First 15-Day Comment 49-23, which explains that many pathways to compliance are available under the Proposed Regulation.

Regarding capture and control technology for ro-ro vessels, the commenter’s disagreement with the South Coast Air Quality Management District staff testimony does not raise a significant environmental issue with the Draft EA; therefore, it is noted and included in the record for decisionmakers. However, CARB has not asserted that control equipment for ro-ro vessels currently exists, as demonstrated by the quote in the comment where CARB staff states that technology manufacturers have assured

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CARB staff that there are engineering solutions for ro-ro vessels. See also Master Response 4, which explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation.

**49-42:** The comment quotes testimony from a Point Richmond resident at the December 5, 2019, Board meeting regarding use of electricity at Chevron's Long Wharf dock in Richmond. The commenter disagrees with the testimony provided by the Point Richmond resident and provides information of the work needed to support shore power or capture and control at the dock. The commenter states Chevron has provided comments to CARB that the timeline for this work would be 10 years and possibly longer.

**Response:** The commenter's disagreement with the Port Richmond resident's testimony does not raise a significant environmental issue with the Draft EA; therefore, it is noted and included in the record for decisionmakers. Refer to Master Response 2 regarding feasibility of meeting the compliance deadlines.

**49-43:** The comment states that Staff describes an AMECS system on pages 81 through 89 of the December 5, 2019, Board meeting transcript. The commenter states the system described is a capture and control system for container vessels at the Port of Long Beach and has not been designed or tested for tankers.

**Response:** To clarify, the testimony referenced in the transcript was not provided by CARB staff. It was provided by a public commenter during the Board meeting. The commenter's note about the testimony does not raise a significant environmental issue with the Draft EA; therefore, it is noted and included in the record for decisionmakers. Refer to Master Response 4 about feasibility of capture and control technology for tankers, generally.

**49-44:** The comment provides quotes from CARB Chair Nichols and CARB counsel at the December 5, 2019, Board meeting in response to a commenter who had commented regarding the summary of CEQA impacts in the Draft EA. The commenter lists this statement in its "List of Inaccurate Staff and Public Statements" at the December 5, 2019, hearing. The commenter states that the Draft EA discloses several environmental impacts that are potentially significant and unavoidable. The commenter indicates that the Draft EA understates and fails to address environmental impacts, as expressed in other comments submitted by WSPA. The commenter states time needed for local governments to review projects, which would also result in mitigation, is a key reason the compliance deadlines are infeasible.

**Response:** CARB disagrees that this statement was inaccurate or misleading. The quoted testimony from CARB representatives at the hearing was in the context of reassuring the person testifying that the proposed regulation is designed to provide significant overall benefits to the communities near the ports, which, as the person testifying correctly noted, are already bearing a disproportionate burden from

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industrial activities already taking place near the ports. WSPA is correct that the Proposed Regulation would have multiple potentially significant impacts under CEQA, as disclosed fully in the EA and as further explained in these responses to comments. However, the fact remains that the Proposed Regulation will present substantial overall benefits to communities surrounding California's busiest ports. Master Response 1 explains the "reasonably conservative approach" taken in the Draft EA. That is, the Draft EA tends to overstate the risk that feasible mitigation may not be implemented by the agency with authority to do so or may not be sufficient. Refer to Master Response 2 regarding feasibility of timelines.

**49-45:** The comment provides quotes from CARB staff from the December 5, 2019, meeting regarding feasibility of technologies for tankers and the need for site-specific design to address challenges at specific locations. The commenter critiques the CARB Draft Technology Assessment and states staff has not done a robust feasibility assessment. The commenter further states the costs used by CARB in the ISOR are inaccurate.

**Response:** Refer to Response to First 15-Day Comment 49-16. Individual responses are provided to the critique of the technology assessment.

**49-46:** The comment states that the CARB 2018 Technical Assessment and ISOR recognize the need to re-design and scale up existing technologies due to the unique characteristics of tankers and marine terminals but does not discuss how the technology can be redesigned and does not discuss safety concerns.

**Response:** Master Response 4 explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation. See Master Response 4 regarding additional safety issues.

**49-47:** The comment states that tanker vessel operators have expressed safety concerns with barge-based systems, and that land-based capture and control systems would be needed. These could require significant infrastructure improvements. CARB omits industry's safety concerns about land-based systems and does not provide an example of shore-based capture and control adapted for tankers.

**Response:** See Master Response 4 regarding safety. Master Response 4 also explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation.

**49-48:** The comment claims CARB does not explain how existing terminals can be adapted to operate safely. Terminal infrastructure in Northern California may require more complex improvements due to local environmental conditions.

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**Response:** See Master Response 4 regarding safety. Master Response 4 also explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation. Note that the Proposed Regulation requires compliance by Northern California ports by 2027, which is two years longer than the Ports of Los Angeles and Long Beach, as explained on page 7 of the First 15-Day Notice.

**49-49:** The comment claims a longer implementation timeline is needed for Northern California due to permitting timelines and infrastructure requirements. Safety studies must be conducted for tanker vessels. Site-specific engineering needs to be accomplished prior to implementation.

**Response:** See Master Response 4 regarding safety. Master Response 4 also explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation. Note that the Proposed Regulation requires compliance by Northern California ports by 2027, which is two years longer than the Ports of Los Angeles and Long Beach, as explained on page 7 of the First 15-Day Notice.

**49-50:** The comment provides responses to a presentation given by the Coalition for Safe Environment at the December 5, 2019, Board meeting. In summary, the commenter disagrees with the presentation in the following ways:

- There are no certified, approved, or tested shore power connections or ship emissions control technologies for tankers at tanker terminals.
- There are challenges to safe implementation of ship emissions control technologies for tankers at terminals.
- Current ship emissions control technologies are not big enough for tanker boilers and cannot be used alongside tankers due to hazards.
- Ships would likely need to be modified, and the extent of modifications is not known because no system has been designed for tankers.

**Response:** The commenter's disagreement with another commenter's testimony does not raise a significant environmental issue with the Draft EA; therefore, it is noted and included in the record for decisionmakers. However, see Master Response 4 regarding safety. Master Response 4 also explains that CARB is required to identify reasonably foreseeable indirect impacts and is not required to determine or evaluate how regulated entities will design compliance responses to comply with the Proposed Regulation.

**49-51:** The comment provides responses to a presentation given by the Coalition for Safe Environment at the December 5, 2019, Board meeting. The commenter states that it is accepted that barge-based systems alongside tankers are not feasible, and

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that most if not all terminal berths would be unable to accept structural loading from mobile systems, necessitating permanent infrastructure.

**Response:** The commenter's disagreement with another commenter's testimony does not raise a significant environmental issue with the Draft EA; therefore, it is noted and included in the record for decisionmakers. Note, however, that CARB has determined that the most likely control option for tanker vessels would be land-based capture and control systems as explained on page 107 of the EA.

**49-52:** The comment provides responses to a presentation given by the Coalition for Safe Environment at the December 5, 2019, Board meeting. The commenter disagrees with the presentation and states that major construction and permitting, in addition to CEQA review for discretionary projects, would be required.

**Response:** The commenter's disagreement with another commenter's testimony does not raise a significant environmental issue with the Draft EA; therefore, it is noted and included in the record for decisionmakers. CARB recognizes that permitting and CEQA review may be required for compliance responses. See, for example, Master Response 2, which discusses CEQA review and compliance timelines.

**49-53:** The comment provides responses to a presentation given by the Coalition for Safe Environment at the December 5, 2019, Board meeting. The commenter states that it is accepted that barge-based systems alongside tankers are not feasible. Constructing a shore-side system will take a decade to complete, and there will be cumulative and substantial environmental impacts from construction of new dock space.

**Response:** The commenter's disagreement with another commenter's testimony does not raise a significant environmental issue with the Draft EA; therefore, it is noted and included in the record for decisionmakers. However, CARB has determined that the most likely control option for tanker vessels would be land-based capture and control systems as explained on page 107 of the EA. Refer to Master Response 2 regarding compliance timelines. The Draft EA discloses environmental impacts from compliance responses, some of which are significant and unavoidable under CEQA. The comment does not claim this analysis is inadequate; therefore, no additional response needs to be provided.

**49-54:** The comment provides responses to a presentation given by the Coalition for Safe Environment at the December 5, 2019, Board meeting. The commenter disagrees with the assertion that systems can work on any class of ship. No system has been tested for tankers, tankers pose significant safety considerations, and CARB has not evaluated the safety risk of deploying a ship emissions control technology

**Response:** The commenter's disagreement with another commenter's testimony does not raise a significant environmental issue with the Draft EA; therefore, it is noted and

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included in the record for decisionmakers. Also refer to Master Response 4 regarding safety and feasibility for emissions control technologies for tankers.

**49-55:** The comment provides responses to a presentation given by the Coalition for Safe Environment at the December 5, 2019, Board meeting. The commenter states that the risk evaluations for AMECs did not include hazard review of large marine boilers and the systems are not built to any recognized standard or certification.

**Response:** The commenter's disagreement with another commenter's testimony does not raise a significant environmental issue with the Draft EA; therefore, it is noted and included in the record for decisionmakers. Also refer to Master Response 4 regarding safety and feasibility for emissions control technologies for tankers.

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Comment Letter 52 May 1, 2020	William E. Adams International Longshore & Warehouse Union
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**52-1:** The comment asserts that ro-ro vessels will take vehicles to non-California ports, which will eliminate jobs.

**Response:** Refer to Response to Draft EA Comment 45-2 regarding the assertion that ro-ro vessels will go elsewhere.

**52-2:** The comment asserts the Proposed Regulation would result in burdensome requirements and penalties, causing cargo to be diverted to outside California, especially in light of the current economic conditions.

**Response:** Refer to Response to Draft EA Comment 45-2 regarding the assertion that ro-ro vessels will go elsewhere. Refer to Master Response 6 regarding the effects of current economic uncertainties on the Proposed Regulation.

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Comment Letter 53 May 1, 2020	William E. Adams International Longshore & Warehouse Union
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**53-1:** The comment asserts that ro-ro vessels will take vehicles to non-California ports, which will eliminate jobs.

**Response:** Refer to Response to Draft EA Comment 45-2 regarding the assertion that ro-ro vessels will go elsewhere.

**53-2:** The comment asserts the Proposed Regulation would result in burdensome requirements and penalties, causing cargo to be diverted to outside California, especially in light of the current economic conditions.

**Response:** Refer to Response to Draft EA Comment 45-2 regarding the assertion that vessels will go to non-California ports. Refer to Master Response 6 regarding the effects of current economic uncertainties on the Proposed Regulation.

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Comment Letter 55 May 1, 2020	Giles Pettifor Port of Hueneme
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**55-1:** The comment states that, while the local demand for goods will not change, the Proposed Regulation will result in an increase of costs at California ports. This will result in shipping items to out-of-state ports, and the items will need to be trucked back to local stores and warehouses, resulting in significant net increase in emissions of toxic pollutants and greenhouse gases.

**Response:** Refer to Response to Draft EA Comment 45-2 regarding the assertion that vessels will go to non-California ports.

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Comment Letter 57 May 1, 2020	Doug Schneider World Shipping Council
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**57-1:** The comment states there is no evidence from CARB that demonstrates a cost-effective and practicable way for ro-ro emissions controls to be implemented. CARB also does not address operation, safety, and cost issues that would occur for ro-ro emissions controls. Nor does CARB account for tugboat emissions from maneuvering the emissions control systems to and from the vessels.

**Response:** Refer to Master Response 2 regarding the implementation timelines and interim evaluation for ro-ro vessel compliance. Refer to Response to Draft EA Comment 52-9, on page 65, regarding costs. Refer to Response to Draft EA Comments 45-1, on page 54, and 52-4, on page 61, regarding increased emissions from tugboats.

**57-2:** The comment addresses the feasibility of using shore-based capture and control systems for controlling ro-ro emissions and indicates that CARB should account for GHG emissions associated with generator usage.

**Response:** The EA discloses, on page 18, that use of generators to power shore-based capture and control systems would result in increased GHG Emissions on an individual basis unless GHG reduction measures are implemented. Further, to address these additional GHG emissions from generators, the Proposed Regulation requires the operation of these systems to be grid neutral, emitting no more GHG emissions than if the strategy were powered by the California grid as represented in the most recent eGRID Summary Table for State Output Emission Rates as the California CO<sub>2</sub>e emissions rate (page 93 of the EA).

**57-3:** The comment is concerned about time limits for connecting high-voltage systems and the potential for safety risks to workers, damage to equipment, and noncompliant vessel calls.

**Response:** Refer to Response to Draft EA Comment 37-1.

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Comment Letter 58 May 1, 2020	Sande George Cruise Lines International Association
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**58-1:** The comment states that draft regulations have caused the loss of cruise line visits for vessels that visit California ports two to four times per year because the only option for cruise lines to comply with the regulation is the use of shore power. Therefore, the pending requirement has resulted in companies that do not have shore power deciding not to visit California.

**Response:** While the commenter states that “draft regulations” have caused vessels not to visit California, it is not clear how or why a draft regulation would affect current vessel operations. Therefore, this response focuses on the future effects of the Proposed Regulation. Refer to Response to Draft EA Comment 45-2 regarding the assertion that vessels will go to non-California ports. Similar to costs for the vessels discussed in Response to Draft EA Comment 45-2, costs associated with shore power for cruise vessels are not expected to result in cruise ship diversion to non-California ports. As can be seen on page 96 of the Standardized Regulatory Impact Assessment, additional requirements may result in an additional cost of \$5.25 per cruise ship passenger.

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Comment Letter 63 May 1, 2020	Fred Hottinger Sapphire Tower HOA
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**63-1:** The comment provides a New York Times article that addresses how exposure to air pollution can increase risk of having more severe respiratory infections.

**Response:** The comment does not address the adequacy of the Draft EA; therefore, no additional response is required. However, refer to EA Attachment A, Table 3, for a discussion of health effects of criteria air pollution.

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Comment Letter 68 May 1, 2020	Mike Jacob Pacific Merchant Shipping Association
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**68-1:** The comment states that economic changes beginning in March of 2020 will have impacts on estimates of baseline emissions, estimates of health-related savings, costs and savings to regulated entities, and broader economic impacts of the regulation.

**Response:** See Master Response 6.

**68-2:** The comment states that CARB should re-evaluate baseline emissions, proposed emissions reductions, health benefits, costs, and cost effectiveness of the Proposed Regulation.

**Response:** The comment is made in reference to the ISOR and does not directly address the adequacy of the Draft EA; however, a discussion of the current economic climate and its effect on the assumptions and analysis contained in the Draft EA is addressed in Master Response 6.

**68-3:** The comment states that the requirement for an applicant to submit documentation from the local lead agency explaining it need not conduct CEQA review does not make sense because it is not normal for an agency to do so.

**Response:** CARB agrees that not all CEQA lead agencies have a practice of documenting their determinations that an activity is not a "project", or is not otherwise subject to CEQA. However, that does not necessarily mean that an agency is not able to provide an applicant the documentation required by the Proposed Regulation. It is not uncommon for project proponents to coordinate formally or informally with lead agencies to determine the level of CEQA review that is needed. For example, an applicant can request a letter from the local lead agency that states it need not conduct review under CEQA. However, CARB has taken the commenter's point into consideration, and in the 15-day changes released in July 2020, CARB has proposed to modify this requirement to allow the applicant to provide this documentation as well (Section 93130.17(b)(3)(F)(ii)).

**68-4:** The comment asserts that the Draft EA should be revised and recirculated to account for the changes to emissions estimates resulting from the current economic climate and accelerated timeline included in the March 2020 15-day changes.

**Response:** See Master Response 5 for discussion of environmental impacts associated with the accelerated timeline. See Master Response 6 for a discussion of the current economic climate and its effects on the Draft EA.

**68-5:** The comment states that economic changes beginning in March of 2020 will have impacts on estimates of baseline emissions, estimates of health-related savings,

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costs and savings to regulated entities, and broader economic impacts of the regulation.

**Response:** Refer to Master Response 6.

**68-6:** The comment states that the current economic climate will have impacts to baseline emissions, emissions reductions and health-related savings from the proposal, costs and savings, and broader economic impacts.

**Response:** See Master Response 6.

**68-7:** The comment suggests revisiting potential cost impacts on California port competitiveness considering new economic conditions.

**Response:** Refer to Response to Draft EA Comment 45-2 regarding the potential for vessels to go elsewhere. Refer to Master Response 6 regarding changed economic conditions.

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Comment Letter 69 May 1, 2020	Thomas Jelenic Pacific Merchant Shipping Association
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**69-1:** The comment states that the current economic climate will have impacts to baseline emissions, emissions reductions and health-related savings from the proposal, costs and savings, and broader economic impacts.

**Response:** See Master Response 6.

**69-2:** The comment states that the requirement for an applicant to submit documentation from the local lead agency explaining it need not conduct CEQA review does not make sense because it is not normal for an agency to do so.

**Response:** See Response to First 15-Day Comment 68-3.

**69-3:** The comment asserts that accelerated timelines will require reevaluation of impacts in the Draft EA and trigger recirculation under CEQA. Peak emissions will be higher due to overlapping construction. The current economic climate is also significant new information that will require reevaluation of impacts, including a change in activity estimates.

**Response:** Refer to Master Response 5 regarding environmental impacts and the accelerated compliance timelines. Refer to Master Response 6 regarding changed economic conditions. CARB disagrees that the current economic climate presents any significant new information revealing any significant new impacts or substantial increases to the severity of any previously identified impacts resulting from the Proposed Regulation. Commenter does not elaborate further on the nature of the impacts referenced. No further response is necessary.

**69-4:** The comment asserts that the revised time limit for connecting to shore power is arbitrary and capricious and not based on evidence of safety or feasibility. This can lead to hazardous conditions and would also be ineffective.

**Response:** Refer to Response to Draft EA Comment 37-1.

**69-5:** The comment incorporates all prior correspondence by reference into their comment letters.

**Response:** Prior comments by PMSA have been responded to, as appropriate, throughout this response to comments document. See Response to Draft EA Comment Letter 52, starting on page 60.

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Comment Letter 72 May 1, 2020	Brian McDonald Marathon Petroleum Corporation
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**72-1:** The comment expresses concern about the accelerated deadlines for tankers due to safety concerns.

**Response:** Refer to Master Response 4.

## 2.5 Responses to Second 15-day Comments

Comment Letter 1 July 22, 2020	Art Mead Crowley
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**1-1:** The commenter states that in excluding Articulated Tug Barges (ATBs) from the At-Berth Rule, CARB failed to consider all relevant industry and environmental factors, and so it did not demonstrate any a rational connection between those factors, the choice made, and the purposes of the enabling statute.

**Response:** This comment appears to be raising a traditional mandamus / abuse of discretion based claim, rather than commenting on any perceived deficiencies in the project's environmental analysis. As such, no response is required for CEQA purposes. However, for transparency, CARB responds as follows:

To the extent the commenter suggests that excluding ATBs from the Proposed Regulation would somehow create emissions impacts, CARB disagrees. ATBs are not currently subject to the Existing Regulation, therefore continuing to exclude them from the Proposed Regulation would not create new emissions impacts.

ATBs operate considerably differently from regulated tanker vessels. Staff believe both parts of an ATB, the tugboat and the barge, align more closely with other definitions for Commercial Harbor Craft (CHC), and intend to regulate them as such: both tugs and barges (including ATBs) exceeding 400 feet, 10,000 gross tons, or 30 L/cylinder displacement, will still be considered CHC for CARB regulatory purposes. Using this approach, all barges, whether transported as ATBs or line-towed by other ocean-going tugs, will be subject to the same regulatory requirements.

The CHC regulation requires the use of ultra-low sulfur diesel (ULSD) for all vessels, including tugs and barges. By redefining ATBs there would be a potential for the use of higher sulfur content fuels allowed for use in OGVs, resulting in higher emissions. Additionally, the CHC regulation includes in-use emission standards for both main and auxiliary engines, resulting in in-transit emissions reductions as well as reductions at berth. Considering ATBs as OGVs, reduces the opportunity to control in-transit emissions.

ATBs engage in coastwise trade, where additional operations outside of Regulated California Waters could still be impacting air quality in coastal California communities. Regulating ATBs as CHC provides stronger public health protections due to the timing and extent of intended emission reduction targets.

As can be seen throughout the At Berth ISOR, controlling tanker vessel emissions is complex and costly. Staff believe adding emissions control systems for ATBs at terminal locations already requiring tanker emissions reductions could potentially add

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significant costs that terminal operators and ports would incur and could cause a redundancy of emissions control technologies.

As explained in more detail at page IV-6 of the Initial Statement of Reasons, ATBs are properly considered to be CHC, and are regulated under CARB's Commercial Harbor Craft Regulation. Maintaining this existing distinction here is based on reasoned consideration and evidence in the record, is neither arbitrary nor capricious, and would not create any environmental impacts.

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Comment Letter 2 July 23, 2020	Wayne Nastri South Coast Air Quality Management District
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**2-1:** The commenter states that they are concerned that delaying compliance start dates for container ships, reefers, and cruise ships from 2021 to 2023 will result in greater emissions of NO<sub>x</sub> and diesel particulate matter in 2021 and 2022 in the South Coast Air Quality Management District's air basin. The commenter suggests a 1-year delay instead of a 2-year delay.

**Response:** The significance conclusions in the Draft EA are not based on the implementation timeline; therefore, the conclusions in the Draft EA are still valid for the extended implementation timelines, and no revisions are needed in the Draft EA.

CARB also notes the commenter's suggestion for a shorter extension of the compliance timeline and will include the comment in the record for consideration by decisionmakers. Note that, although the implementation schedule for container, reefer, and cruise vessels has been extended from the originally proposed compliance timeline, emissions reductions are already occurring due to the current economic crisis. While air quality benefits from regulation of vessels may occur later than originally proposed, pollutant and GHG emissions have already declined due to reduced vessel traffic. Furthermore, emissions benefits that occur later than originally proposed in this rulemaking would not be considered emissions impacts under CEQA, since no emissions increases would occur compared to the environmental baseline.

Further, the container, refrigerated cargo and cruise vessels are currently included under the existing At-Berth Regulation with an 80 percent control requirement. At the June 25, 2020, CARB Board Meeting, the Board directed staff to continue compliance for the container, refrigerated cargo and cruise vessels under the existing At-Berth Regulation through 2022 and begin compliance under the Proposed Regulation in 2023. The adjustment in implementation timeline intended to provide additional time for these vessel sectors to recover from the economic impacts that resulted from the pandemic. In 2021 and 2022, the existing At-Berth Regulation and the Proposed Regulation achieve similar estimated emissions reductions and health benefits. As the commenter notes, there are comparatively small differences in the reduction benefits for the existing At-Berth Regulation and the Proposed Regulation in 2021 and 2022. CARB staff anticipate that additional emissions benefits will be achieved beyond those reflected in the emissions inventory estimates for the existing At-Berth Regulation due to reduced vessel activity from the economic downturn. Staff believes reductions achieved from the drop in vessel visits and subsequent slower recovery offsets the adjustment of compliance date of 2023 from 2021.

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Comment Letter 4 July 24, 2020	Lee Kindberg Maersk
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**4-1:** The commenter questions whether the infrastructure can be funded, permitted, and in place to support a 2023 implementation for currently regulated fleets.

**Response:** See Master Response 4 regarding implementation timelines.

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Comment Letter 5 July 27, 2020	California Association of Port Authorities, Cruise Lines International Association, Pacific Merchant Shipping Association, World Shipping Council, Cruise Lines International Association, Western States Petroleum Association
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**5-1:** The commenter suggests that, with recent economic changes, the estimates of emissions and health impacts are no longer valid. Even before the current economic conditions began, the commenter says they submitted data that showed emissions estimates were wrong. The commenter states CARB should re-evaluate baseline emissions and proposed emission reductions.

**Response:** Refer to Master Response 6 regarding changed economic conditions and their treatment under CEQA. To account for the economic downturn, some requirements of the Proposed Regulation were adjusted, such as implementation dates for control requirements. CARB staff believes reflecting the economic downturn in growth calculations at this time is too speculative to calculate, as the true scope of the changed economic conditions continues to evolve and is impossible to forecast. However, as new data and reports become available CARB inventory staff will continue to update the inventories with the best available information. Future updates will be completed and included in the inventory prior to the Board review of the interim evaluation scheduled for 2022.

Prior to the economic downturn, a draft of the emissions inventory used to support the Proposed Regulation was released for review and comment in January 16, 2019. Modifications to the baseline and inventory numbers used by CARB staff for analysis were released for public review in the first 15-Day change package from March 26, 2020, through May 1, 2020, and many stakeholder comments were taken into consideration at that time. The end goal of the inventory is not an absolute agreement across all different port systems in California (no single methodology would match each port in any case as each uses different systems); rather, the goal is to use the best available data and to corroborate it with available information from ports which allows for a reasonable approximation.

**5-2:** The commenter states that, even before the current economic crisis, the emissions inventory had unknown problems related to estimates of growth, leading to a significant overestimation of emissions benefits.

**Response:** Refer to Response to Second 15-Day Comment 5-1.

**5-3:** The commenter believes the 2-hour requirement for connection is arbitrary and not based on evidence of feasibility or safety. The commenter states that the shore power connection process should not be performed according to a time limit, and the 2-hour requirement would be ineffective. Further, the commenter states that the 2-hour requirement would not be effective because an exceedance of the 1-hour requirement would result in seeking a safety exemption. The commenter claims that

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CARB has not provided a basis for concluding connection times can be consistently and safely accelerated.

**Response:** Refer to Response to Draft EA Comment 37-1.

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Comment Letter 6 July 27, 2020	Doug Schneider World Shipping Council
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**6-1:** The commenter states that existing barge-based capture and control service providers can be unreliable, costly, and pose substantial operational and safety challenges for ro-ros.

**Response:** Refer to Master Response 2 regarding the implementation timelines and interim evaluation for ro-ro vessel compliance.

**6-2:** The commenter states that unreasonably short time limits for connecting shore power could result in safety risks to workers, could damage equipment and may result in a substantial percentage of non-compliant vessel calls.

**Response:** Refer to Response to Draft EA Comment 37-1.

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Comment Letter 7 July 27, 2020	Donald Brown Cruise Lines International Association
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**7-1:** The commenter states that the regulation will prohibit additional visits to California ports.

**Response:** See Response to Draft EA Comment 58-1.

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Comment Letter 9 July 27, 2020	Thomas Jelenic PMSA
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**9-1:** The commenter suggests that, with recent economic changes, the estimates of emissions and health impacts are no longer valid. Even before the current economic conditions began, the commenter says data were submitted that showed emissions estimates were wrong. The commenter claims the CEQA review is, as a result, based on flawed data. The commenter states CARB should re-evaluate baseline emissions and proposed emission reductions.

**Response:** See Master Response 6 regarding how changes in economic conditions affect the analysis in the Draft EA. Refer to Response to Second 15-Day Comment 5-1 regarding emissions inventories.

**9-2:** The commenter suggests that, with recent economic changes, the estimates of emissions and health impacts are no longer valid.

**Response:** See Master Response 6 regarding how changes in economic conditions affect the analysis in the Draft EA. Refer to Response to Second 15-Day Comment 5-1 regarding emissions inventories.

**9-3:** Even before the current economic conditions began, the commenter says data were submitted that showed emissions estimates were wrong. The commenter says the inventory must be updated to correct the issues.

**Response:** Refer to Response to Second 15-Day Comment 5-1 regarding emissions inventories.

**9-4:** The commenter believes the 2-hour requirement for connection is arbitrary and not based on evidence of feasibility or safety. The commenter said that the shorepower connection process should not be performed according to a time limit, and the 2-hour requirement would be ineffective. Further, the commenter states that the 2-hour requirement would not be effective because an exceedance of the 1-hour requirement would result in seeking a safety exemption. The commenter claims that CARB has not provided a basis for concluding connection times can be consistently and safely accelerated.

**Response:** Refer to Response to Draft EA Comment 37-1. As explained on page B-4 of the March 26, 2020, 15-Day Notice, "This is based on past compliance data for the original At-Berth Regulation. Staff do not anticipate that a large portion of the vessel visits will require the entire two hours to connect to shore power or to an alternative CAECS."

The two-hour connection time change was based both on comments received by stakeholders as well as information provided by CARB enforcement staff based on

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actual connection times seen during the implementation of the 2007 At-Berth Regulation.

As part of the 2007 At-Berth Regulation, fleets must provide CARB with data that includes the times a vessel is plugged in and taken off of shore power or connected/disconnected to an alternative control strategy. If a vessel is unable to comply with the 2007 At-Berth Regulation's 3-hour rule (the vessels auxiliary engines are not allowed to be uncontrolled for more than 3 hours in a visit) the reasoning must be noted. CARB staff evaluated this data from 2014 through 2018 to determine why vessels generally exceeded the 3-hour time window.

In addition to reviewing compliance data, staff requested information from fleets concerning recommendations on the timeline for the connection window. CARB received many comments, generally recommending a connection timeline defined as "as soon as practicable." Staff believes that this recommendation is too subjective to determine compliance and would fail to achieve certainty in levels of control during visits. However, CARB staff found that most connections could be achieved within a two-hour connection time without needed to use a TIE, VIE or the remediation fund.

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Comment Letter 10 July 26, 2020	Eugene Seroka, Mario Cordero
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**10-1:** The commenter states there are significant safety challenges to developing tanker vessel emission capture and control technology, and a hazard assessment must be conducted.

**Response:** Refer to Master Response 4.

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Comment Letter 11 July 27, 2020	Richard Sinkoff Port of Oakland
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**11-1:** The commenter claims CARB staff has acknowledged discrepancies between data assumptions and observed practices. The commenter is concerned that 2016 baseline data for Oakland has not been incorporated, and that several other incorrect assumptions have not been addressed.

**Response:** This comment does not appear to raise any significant environmental issues with the Proposed Regulation. However, CARB provides the following response for informational purposes.

As noted in the inventory documentation, the growth forecast for Oakland in the current inventory is based on the Freight Analysis Framework (FAF), which forecast container goods delivered to Northern California and specifically the Bay Area. The container goods are moved by container vessels, which (almost completely) pass through the Port of Oakland if they come through Northern California. The forecast uses the increase in containers as a surrogate for forecasting the total power of vessels visiting the Port of Oakland.

CARB's emission inventory staff met with the Port of Oakland and discussed potential changes to be made to the Port's growth forecast. Staff is currently evaluating a new forecast as well as the efficiency gains, and plans to incorporate relevant portions in the next OGV inventory, currently planned for late-2020. The commenter mentioned, Tioga Group's forecast was not included in the previous version of the emissions inventory as the Bay Conservation and Development Commission (BCDC) Board had neither reviewed nor approved the forecast by the time of the initial CARB Board Hearing for OGV (December 5, 2019). It would be neither scientific nor a good policy to use Tioga's updated draft growth rates before the commission sponsoring the study had a chance to review and possibly request changes. Using the forecast prior to BCDC's approval would place the CARB's emissions inventory and Board members in the position of making the Tioga's cargo growth rates official prior to the BCDC. The growth rates that are currently used by CARB for the Ports of Oakland matches the previous Tioga report within 0.2 percent per year, and actually falls slightly below the previous Tioga's growth rate (which would be the Port of Oakland's officially adopted growth rate at the time of inventory development and initial CARB board hearing).

The efficiency gain was not included for Oakland as it was based on a study specific to the Ports of Los Angeles and Long Beach, and no similar studies have been completed for the Port of Oakland. CARB inventory staff are evaluating methods to apply the projected efficiency gains from Ports of Los Angeles and Long Beach to similar large container ports such as the Port of Oakland, for inclusion in future emissions inventories.

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CARB inventory staff modeled emission reduction estimates, as well as shore power usage based on fleet decisions and Prop 1B berth utilization by using actual compliance data to inform the inventory model. The 2016 baseline incorporated actual compliance data from the regulation to determine emissions reductions achieved at the compliance rate in 2016. Therefore, the commenter's assertion that the inventory baseline does not account for over compliance with the 2007 At-Berth Regulation is incorrect.

A draft of the emissions inventory used to support the Proposed Regulation was released for public review and comment on January 16, 2019. In a data-rich environment such as container vessel shipping, new data and reports are available not only every year but every few months. CARB inventory staff will continue to update the inventories with the best available information, and these future updates will be completed and included in the inventory prior to the Board review of the progress in port infrastructure and technologies scheduled for 2022.

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Comment Letter 12 July 27, 2020	Jesse Marquez Coalition for a Safe Environment
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**12-1:** The commenter states that delays in compliance timelines will have significant impacts on public health, the environment, and climate change.

**Response:** See Response to Second 15-Day Comment 2-1. No revisions to the Draft EA are necessary, and actual emissions reductions have already occurred and are expected to continue to occur due to reduced vessel traffic as a result of depressed economic conditions.

**12-2:** The commenter states that CARB staff have failed to include 99 percent of the environmental justice community input that was submitted during the comment period. The commenter states that CARB should not approve the Proposed Regulation until it includes these recommendations and inputs.

**Response:** CARB respectfully disagrees with the commenter’s assertion regarding CARB staff’s consideration of environmental justice community concerns. The first objective of the Proposed Regulation, as listed on page of the Draft EA, is to “Achieve reductions of NO<sub>x</sub>, ROG, DPM, PM<sub>2.5</sub>, GHG and black carbon emissions above those from the Existing Regulation to provide public health benefits in communities near ports and marine terminals that are heavily burdened by freight pollution.” Providing health benefits to disproportionately impacted communities is a central purpose of the Proposed Regulation. Furthermore, CARB has received letters of support from groups concerned about environmental justice and disproportionate impacts on those living near ports and marine terminals. For example, the Environmental Defense Fund’s comment from December 3, 2019, notes that the Proposed Regulation is responsive to a mitigation strategy in the West Oakland Community Action Plan. The comment docket has many letters from industry groups opposing central pieces of the Proposed Regulation, including the accelerated compliance timelines for tanker vessels (see, for example, the Western States Petroleum Association’s July 27, 2020, comment letter). Given the current economic conditions that have resulted in real pollutant reductions (see 15-Day Response to Comment 2-1) as well as the accelerated timeline for tanker vessels, which will result in substantial emissions reductions, CARB believes that the Proposed Regulation meets the objective of providing health benefits in communities located near ports and marine terminals. Prior comments by this commenter were not identified as meeting the criteria for a response to environmental comments as outlined in this document starting on page one. Therefore responses to those comment letters will be included in the Final Statement of Reasons released subsequent to Board adoption.

**12-3:** The commenter states that delays in compliance timelines will have significant impacts on public health, the environment, and climate change.

**Response:** See Response to Second 15-Day Comment 12-1 on page 123.

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**12-4:** The commenter again states that CARB staff have failed to include 99 percent of the environmental justice community input that was submitted during the comment period. The commenter states that CARB should not approve the Proposed Regulation until it includes these recommendations and inputs.

**Response:** See Response to Second 15-Day Comment 12-2 on page 123.

**12-5:** The commenter claims that vessels are not in compliance with the Existing Regulation, in particular when there is an unplanned event such as a labor strike, and CARB staff have not provided data on vessels that are not in compliance. The commenter states that there have been over 30 vessels at anchor at the Ports of Los Angeles and Long Beach. The commenter claims CARB has failed to enforce the Existing Regulation and that CARB “bends over backwards” for the shipping industry by providing extensions and exemptions.

**Response:** CARB provides compliance data on the 2007 At-Berth Regulation and publishes enforcement reports annually. Reports are found at: <https://ww2.arb.ca.gov/resources/documents/enforcement-reports>. CARB respectfully disagrees with the commenter’s suggestion that CARB makes undue efforts to accommodate industry concerns; refer to Response to Second 15-Day Comment 12-2, on page 123, for a description of why CARB believes the Proposed Regulation protects communities near ports and marine terminals. Additionally, at this time, CARB staff is not aware of any emissions control strategies available for vessels moored at sea (at anchor). However, as part of the 2022 interim evaluation CARB staff will review the potential for requirements and the availability of control technologies for ocean-going vessels at anchor.

**12-6:** The commenter states that most of the environmental justice community concerns and public comments were not included in the current amendments.

**Response:** See Response to Second 15-Day Comment 12-2 on page 123.

**12-7:** The commenter claims that TIEs and VIEs are unacceptable non-compliance schemes, and that these are ways that allow industry to maximize profit, pollute air and water, and allow for health impacts.

**Response:** See Response to Second 15-Day Comment 12-2, on page 123. CARB respectfully disagrees that TIEs and VIEs are unacceptable. As explained for VIEs, for example, the Draft EA states on page 14 that they are for limited visits where a vessel is unable to reduce emissions. The allowed VIEs are based on a percentage of visits by a California fleet during the previous year, and the number of VIEs allowed for each fleet is determined at the beginning of each year. This additional compliance option accounts for the uncertainty that often surrounds vessel movements and cargo operations, such as vessel redeployment. VIEs are limited to certain operational events and the number of VIEs available for use are capped in order to keep emissions reductions high for surrounding port communities.

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TIEs would function similarly to VIEs, as explained on page 24 of the EA. In summary, the number of VIEs and TIEs that can be used are capped and limited to certain events, and are not a way to indefinitely avoid reducing emissions, as the commenter seems to suggest.

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Comment Letter 15 July 27, 2020	Catherine Reheis-Boyd Western States Petroleum Association
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**15-1:** The commenter states that emissions capture and control equipment required for tankers has not been proven safe for tankers at marine terminals. Therefore, the original and accelerated compliance deadlines are unrealistic and potentially dangerous. The commenter references testimony about catastrophic explosions and loss of human life and states this shows the original and accelerated compliance deadlines are unrealistic and potentially dangerous. The commenter states that a feasibility study is needed to determine whether and how such technology can be accomplished safely.

**Response:** Refer to Master Response 4.

**15-2:** The commenter states that the Sixth Edition of the International Safety Guide for Tankers and Terminals (ISGOTT) was published in June 2020, and reinforces the safety concerns documented by the commenter during the rulemaking process.

**Response:** The Sixth Edition of ISGOTT referenced in this comment letter has not been provided to CARB by the commenter and is currently only available for purchase for 385 British pounds; therefore, CARB has not been able to analyze its contents in detail.

However, CARB provides the following response for informational purposes. While the ISGOTT is relevant to safety practices within the industry, it should be noted that best practices constantly evolve, and the release of a revised ISGOTT does not change the analysis in the Draft EA. Notably, the ISGOTT was last updated in 2006,<sup>11</sup> meaning that 14 years has passed between the ISGOTT 5 and the version released in 2020. As explained in Master Response 4, industry has successfully been able to manage operating boilers and electrical systems on their vessels for decades. This includes the 14-year period since the ISGOTT was last updated. Master Response 4 provides a list of some regulatory requirements for hazards and safety in one port project evaluated in 2014 as an example of safety regulations pertinent to the oil and gas industry. As a result, CARB assumes that industry will continue to account for updates in safety guidance, regulations, and best practices, independent of ISGOTT updates. Therefore, the latest ISGOTT update is not significant new information that requires revision of the hazards analysis in the Environmental Assessment.

Refer to Master Response 4 regarding safety concerns more generally.

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<sup>11</sup> Oil Companies International Marine Forum. International Safety Guide for Tankers and Terminals (ISGOTT 6). Available at [https://www.ocimf.org/publications/books/international-safety-guide-for-tankers-and-terminals-\(isgott-6\)](https://www.ocimf.org/publications/books/international-safety-guide-for-tankers-and-terminals-(isgott-6)). Accessed July 31, 2020.

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**15-3:** The commenter states that the latest edition of the ISGOTT is new information CARB must take into account for the hazards analysis in the Final Environmental Assessment.

**Response:** Refer to Response to Second 15-Day Comment 15-2.

**15-4:** The commenter states it is CARB's duty to assess impacts the current economic crisis will have on future economic activity and vessel trips at California ports, and only with that information can CARB evaluate impacts on health.

**Response:** This comment does not appear to raise any significant environmental issues with the Proposed Regulation. However, CARB provides the following response for informational purposes.

See Master Response 6 regarding how changes in economic conditions affect the analysis in the Draft EA. Refer to Response to Second 15-Day Comment 5-1 regarding emissions inventories.

**15-5:** The comment states that the second 15-day changes do not account for a CARB study from 2019 that shows a lower emission factor for tankers than the factor that CARB staff currently use. CARB staff must disclose and discuss the findings and address the new emissions data.

**Response:** This comment does not appear to raise any significant environmental issues with the Proposed Regulation. However, CARB provides the following response for informational purposes.

The preliminary emissions data attached to WSPA's letter were completed on the newest generation of tankers that came into service in the last few years. These vessels come equipped with the latest and most efficient modern boiler systems. Therefore, the emissions data found in the report represents the newest generation of tanker boiler design and it is both unclear why, and unlikely that, these results would be broadly applicable to the wider tanker fleets, which are largely comprised of older boiler technologies.

The emission factors used in the inventory for the Proposed Regulation were (and are) the best available at the time and are also used by U.S. EPA, other states, and other international groups, such as the Marine Emissions Tool developed by the Canadian government.

As marine technology advances and marine fuels become cleaner, CARB consistently performs new emissions test studies. To advance the knowledge base related to tanker vessels, CARB is contracting with the University of California, Riverside to perform emission testing of tanker boilers. CARB incorporates new data in the inventory as soon as possible and after appropriate vetting and analysis.

Proposed At Berth Regulation  
Response to Comments

Additionally, during the development of CARB's emissions estimates, CARB staff worked with the tanker industry to better reflect actual operation parameters of any advanced engine and boiler systems. These updates are reflected in the inventory, where appropriate, and display the collaboration CARB has committed to in developing the emissions inventory.

Proposed At Berth Regulation  
Response to Comments

Comment Letter 19 July 27, 2020	Bill Magavern Coalition for Clean Air
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**19-1:** The commenter opposes moving back emissions control requirements for ro-ros because it will result in greater emissions in 2024.

**Response:** Refer to Response to Second 15-Day Comment 2-1.

## 2.6 Responses to Late Submittal Comments

Comment Letter L1 August 21, 2020	Art Mead Crowley
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**L1-1:** The commenter claims that if ATBs are not regulated under the At-Berth Rule, Crowley’s ATB fleet will inevitably be withdrawn from California, and the clean petroleum products (CPP) currently transported by ATBs would be carried by increased numbers of Medium Range (MR) tankers.

**Response:** The written comment period for this item ended on July 27, 2020. As such, this comment is untimely, and does not require a response. However, for informational purposes, CARB provides the following response.

As explained in response to comment L1-2 below, the Commercial Harbor Craft regulation is not part of the Proposed Regulation. It is a separate regulation, one of many CARB regulations concerning vehicular and marine emissions. It serves different purposes than the Proposed Regulation, and it regulates different vessel types than the Proposed Regulation.

Furthermore, since tugboats operating as ATBs are already regulated under the Commercial Harbor Craft regulation, it remains unclear why retaining them under that regulation would necessarily result in the commenter’s fleet being withdrawn from California. CARB staff acknowledges that barges operating as ATBs are not part of the current Commercial Harbor Craft regulation. While the company has provided staff with a limited set of vessel retrofit costs that they expect could occur as a result of amendments to the Commercial Harbor Craft regulation, they have not provided cost information that includes the shore power terminal infrastructure costs for the Proposed Regulation. As those costs are significant, staff believe the commenter has significantly underestimated the total costs needed to comply if ATBs are subject to the Proposed Regulation. Additionally, estimating relative costs of complying with the Proposed Regulation versus the pending amendments to the Commercial Harbor Craft regulation, which are in their early stages of development, is essentially impossible. The Commercial Harbor Craft regulation amendments are currently in the initial stage of development and are likely undergoing substantial changes, the scope of which remain unknown at this time. Therefore, it is too early to determine compliance costs under the modified CHC regulation and too speculative to compare compliance costs between the two regulations which would impact competitiveness.

Furthermore, as explained in the Final EA, transport companies typically rely on sophisticated proprietary models and factors to guide decisions on where to ship goods. The factors include access to consumer markets and intermodal transportation networks; reliability and velocity of transport modes; port and trans-loading

## Proposed At Berth Regulation Response to Comments

infrastructure; the overall efficiency of the supply chain as it is impacted by the availability of labor; congestion delays and other impediments; and costs, including compliance costs for all regulations (i.e., not just the Commercial Harbor Craft and At Berth regulations). CARB staff disagrees with the commenter that continuing to regulate ATBs under the Commercial Harbor Craft regulation would result in considerable diversion of activities out of California.

**L1-2:** The commenter states the Draft Environmental Analysis violates CEQA by failing to accurately and comprehensively describe the “project”, including analyzing impacts and mitigation from the decision to exclude ATBs from the regulation.

**Response:** The written comment period for this item ended on July 27, 2020. As such, this comment is untimely, and does not require a response. However, for informational purposes, CARB provides the following response.

The commenter seems to be confusing the project with other CARB programs. The commenter is correct that CEQA requires a general description of the whole of the project. It does not follow, however, that the “project” must include components that are expressly not part of the project. ATBs are not currently regulated under the existing At Berth regulation; they are currently partially regulated under CARB’s Commercial Harbor Craft regulation, and CARB has publicly released concepts to include them entirely within the Commercial Harbor Craft regulation. therefore, CARB proposes nothing more than to retain this existing construct, ATBs would simply continue to not be part of the At Berth regulation.

By the commenter’s logic, agencies undertaking a project would need to analyze the environmental effects of not only the activities which *actually comprise* the project, but the entire range of activities that theoretically *could have* been made part of the project – even when they are expressly not part of the project, as is the case here. For obvious reasons, this would vastly expand the scope of CEQA analysis in countless ways for all lead agencies. This would represent a paradigm shift in how CEQA works, and it would result in vast, largely irrelevant environmental analyses focusing on an array of activities that are not part of the project. CEQA plainly does not require this, as the citations listed by the commenter confirm.

Finally, it is worth noting that, as fully analyzed in the draft and final Environmental Analyses, the significant adverse environmental impacts from the Proposed Regulation result from activities necessary to install and operate emissions control technology. The commenter does not further specify how continuing to exclude a vessel category from the regulation would worsen these environmental impacts.

**L1-3:** The commenter claims that continuing to exclude ATBs would result in increased emissions. The commenter sets forth tables purporting to show these emissions increases.

Proposed At Berth Regulation  
Response to Comments

**Response:** The written comment period for this item ended on July 27, 2020. As such, this comment is untimely, and does not require a response. However, for informational purposes, CARB provides the following response.

The commenter's assertion regarding impacts from the Proposed Regulation is based on a fundamental misunderstanding regarding the concept of CEQA "baseline". Per CEQA, the existing environmental conditions typically constitute the baseline for impact analysis. (CEQA Guidelines § 15125(a).) CEQA further provides that, fundamentally, "[i]n assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the *existing physical conditions* in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced." (CEQA Guidelines § 15126.2(a).) As stated in the Draft EA, the baseline is properly set in 2018, the year in which the notice of preparation was posted. (Draft EA at 24.) The baseline is not a future hypothetical world in which ATBs are regulated under the At Berth regulation, which has never been the case.

As explained above, ATBs are not part of the project, as they are not currently, and would continue to be, not regulated as ocean-going vessels. The commenter's calculations pertain to claimed additional emissions *reductions* that the commenter claims could be achieved from ATBs if those vessels were regulated instead under the Proposed Regulation. However, the commenter does not state how a theoretical foregone reduction in emissions constitutes an impact under CEQA. Such a foregone emissions benefit is not an adverse impact, because there is no increase in emissions above the environmental baseline, as described above.

Furthermore, even setting aside the commenter's misunderstanding regarding the baseline, CARB staff disagrees with the commenter's calculations. The commenter's calculations are misleading; they evaluate only emission reductions from ATBs at-berth, and fail to calculate the potential in-transit emission reduction benefits that would be realized by requiring ATB tug engines to meet more stringent engine performance standards under the Commercial Harbor Craft regulation.

The amendments to the CHC regulation continue requiring the use of ultra-low sulfur diesel (ULSD) for all vessels, including tugs and barges that operate as ATBs. Currently, most barges that operate as part of ATBs are exempt from the CHC regulation. CARB staff is aware that some operators use ULSD for their ATB barges today, but if amendments are adopted as planned, use of ULSD will be required for all engines used onboard ATB barges and tugs starting in 2023. . Because ocean-going vessels have higher fuel sulfur content requirements than commercial harbor craft, redefining ATBs as OGVs could present a potential for the use of higher sulfur content fuels allowed for use in OGVs, resulting in higher emissions. Additionally, the CHC regulation includes in-use emission standards for both main and auxiliary engines,

## Proposed At Berth Regulation Response to Comments

resulting in in-transit emissions reductions as well as reductions at berth. As a result, staff anticipate that the CHC regulation will provide greater emissions reductions and stronger public health protections for ATB vessels due to the timing and extent of intended emission reduction targets than if ATBs were regulated under the At Berth Regulation.

Finally, from a policy and regulatory perspective, CARB staff also disagree with the commenter's position that ATBs should be considered ocean-going vessels instead of commercial harbor craft. Because ATBs are considered two separate vessels (a tugboat and a barge) that are subject to two separate sets of U.S. Coast Guard regulations<sup>12</sup>, are not equipped with boilers to power steam-driven pumps (like crude oil carriers have), are cheaper to build, and require fewer workers to operate, they align more closely with other definitions for CHC, and CARB intends to continue its existing practice of regulating them as such. By classifying ATBs as CHC, it ensures that all barges, whether transported as ATBs or line-towed by other ocean-going tugs, will be subject to the same regulatory requirements.

**L1-4:** The commenter claims the environmental analysis fails to assess the feasibility of mitigation measures.

**Response:** The written comment period for this item ended on July 27, 2020. As such, this comment is untimely, and does not require a response. However, for informational purposes, CARB provides the following response.

As noted in response to comment L1-3 above, the only "impacts" claimed by the commenter concerning the Proposed Regulation are actually claimed foregone emissions *benefits*, which are not the same as impacts. Furthermore, the "mitigation" the commenter discusses here appears to be inclusion of ATBs in the Proposed Regulation. Mitigation must only be considered if it would reduce or avoid one or more of the project's significant environmental impacts. As the project would result in no adverse environmental impacts as pertains to ATBs, "mitigation" that involves regulating ATBs under the Proposed Regulation is unnecessary. Furthermore, the commenter's claims regarding emissions benefits from regulating ATBs under the Proposed Regulation are misleading and speculative; see discussion regarding this point in response to comment L1-3 above.

See also response to comment L1-5 below regarding the commenter's request to add ATBs to the Proposed Regulation as a project alternative.

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<sup>12</sup> Tugboats are subject to 46 CFR Subchapter M requirements and tank barges are subject requirements in 46 CFR Subchapter O.

Proposed At Berth Regulation  
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**L1-5:** The commenter claims the Draft EA failed to analyze “the feasibility of the alternative to the proposed regulation which will mitigate or minimize the environmental impact of excluding ATBs from the At-Berth Rule.”

**Response:** The written comment period for this item ended on July 27, 2020. As such, this comment is untimely, and does not require a response. However, for informational purposes, CARB provides the following response.

The Draft EA analyzed a reasonable range of alternatives. CEQA includes the following threshold criteria for identifying suitable alternatives: (1) alternatives must reduce or avoid one or more of the project’s significant impacts; (2) alternatives must implement most basic project objectives; (3) alternatives must be potentially feasible; and (4) alternatives must be reasonable. (CEQA Guidelines § 15126.6.)

Here, the commenter casts the inclusion of ATBs in the Proposed Regulation as a project alternative. However, as a threshold matter, this alternative would not reduce or avoid any significant environmental impact. As described in responses to comments L1-2, 3 and 4, not including ATBs in the Proposed Regulation is (1) not part of the CEQA “project”, and (2) would not result in any significant environmental impacts even if it were properly viewed as part of the project. Thus, an ATB inclusion alternative would not reduce or avoid any of the project’s significant impacts.

Shifting ATBs from the CHC Regulation to the Proposed Regulation could also be considered a relaxation of their current emission reduction requirements, and thus would not as effectively meet the objective the Proposed Amendments to assist in achieving CARB’s proposed strategy to attain health-based federal air quality standards over the next fifteen years as part of nonattainment area State Implementation Plans (objective 11).

In light of the comment received, the EA has been revised as follows to include an alternative that is considered and properly dismissed from further evaluation:

**Page 193:**

**Alternative 8: All Proposed At Berth Regulation requirements with the inclusion of Articulated Tug Barges (ATB)**

**a) Alternative 8 Description**

Alternative 8, “All Proposed At Berth Regulation requirements with the inclusion of Articulated Tug Barges (ATB)”, would change the Proposed Regulation’s definition of Ocean-going vessels to include ATBs. This Alternative would require all container, cruise, reefer, ro-ro, tanker vessels, and ATBs calling a California port or terminal (over

the appropriate thresholds) to reduce emissions via a CARB approved emission control strategy (CAECS) while at berth.

## **b) Alternative 8 Impact Discussion**

### **i. Objectives**

Since alternative 8 would include all aspects of the Proposed Regulation as proposed with the only difference being adding in ATBs to the definition of an ocean going vessel, the majority of the project objectives would continue to be met. Alternative 8 would therefore meet objectives 1 – 10 as outlined above in this chapter. However, it is important to note that the Proposed Regulation already meets those objectives; the addition of ATBs to the program would not cause the Proposed Regulation to better meet those objectives.

ATB tugboats and barges less than 400 feet and under 10,000 gross tons are currently regulated under the Commercial Harbor Craft Regulation . ATBs operate as a combination of a tugboat, and a petrochemical tank barge. As part of the CHC Regulation, the tugboat portion of the ATB is required to use CARB ultralow sulfur diesel (0.005% sulfur), and the main and auxiliary engines must meet U.S. EPA Tier 2 or Tier 3 engine standards. Tanker vessels are currently subject to CARB's OGV Fuel Regulation (requiring 0.1% sulfur distillate fuel) and will have requirements under the Proposed At Berth Regulation. Tanker vessels operate on higher sulfur content fuels and CARB does not require tanker vessel main engines to meet any specific emission standards, as emissions standards for international OGVs are set by the International Maritime Organization.

CARB staff believes that continuing to regulate ATBs under the CHC Regulation would achieve greater PM and NOx reductions overall compared to emissions benefits that could be achieved from the requirements of the Proposed Regulation. For example, the Proposed At Berth Regulation requires the use of a CAECS while at berth. The CAECS is required to have a minimum of 80 percent control of NOx and PM for auxiliary engines and some tanker boilers only. In comparison, the CHC Regulation requires that both main and auxiliary engines of the tugboat are subject to more stringent emission standards not only at berth, but also while in-transit.

By continuing to regulate ATBs and other tugs and barges as CHC, there are greater emissions reductions to be realized compared to regulating these sources under the Proposed Regulation. CARB staff expects to achieve greater NOx and PM reductions from ATBs under the CHC rule because expanded applicability to include tank barges, regardless of weight or length, and more stringent requirements on main and auxiliary engines on tugboats. Shifting ATBs from the CHC Regulation to the Proposed

Proposed At Berth Regulation  
Response to Comments

Regulation could be considered a relaxation of their current emission and planned reduction requirements, and thus would not meet the objective the Proposed Regulation to assist in achieving CARB's proposed strategy to attain health-based federal air quality standards over the next fifteen years as part of nonattainment area Strategy Implementation Plans (objective 11).

***ii. Environmental Impacts***

As discussed in detail in Chapter 4, the Proposed Regulation would result in new or modified facilities or infrastructure throughout California. Vessels, terminals, and ports not included or not previously modified under the Existing Regulation could also undergo new modifications. New or additional infrastructure and modifications to vessels would result in construction and operational environmental impacts. Including ATBs in the Proposed Regulation would not serve to reduce or avoid any of these potential environmental impacts, since all infrastructure and modifications already analyzed in this EA would still be required, along with potential further new infrastructure needed to serve ATBs. As noted above, this alternative also would likely not result in any emissions benefits, either. Given that it would not reduce or avoid any significant impact of the Proposed Regulation, and given that it would not offer any significant environmental advantages, this alternative is properly dismissed from further consideration.

**L1-6:** The commenter states Draft Environmental Analysis is also deficient under CEQA in its failure to disclose whether the data used to calculate the baseline analysis and measure the effect of the At-Berth regulation includes or excludes ATBs. It thus fails to provide the public with any proper basis to determine the claimed impact of the proposed regulation.

**Response:** The written comment period for this item ended on July 27, 2020. As such, this comment is untimely, and does not require a response. However, for informational purposes, CARB provides the following response.

As discussed in response to comment 2, regulating ATBs has never been part of the existing At Berth regulation, and CARB does not propose including them in the Proposed Regulation. ATBs are outside the scope of the Proposed Regulation. Therefore, they need not be included in the emissions inventory, baseline, or emissions analysis for the Proposed Regulation, since those aspects must focus on the proposed project.

**ATTACHMENT A**  
**COMMENT LETTERS**

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**Draft EA  
Comment  
Period  
Letters**



Letter  
1

# Comment Log Display

**Below is the comment you selected to display.  
Comment 1 for To Consider Proposed Control Measure for Ocean-Going Vessels At Berth (ogvatberth2019) - 45 Day.**

First Name: Dennis  
Last Name: Miller  
Email Address: dfmiller@msn.com  
Affiliation:

Subject: comments on ships at berth  
Comment:

Ships at berth allowed to operate engines using fossil fuels should be required to switch from such engines to Hydrogen Fuel Cells (HFC) as an energy source. Such HFC when operated have no air emissions. Using renewable Hydrogen, the supplier of Hydrogen will be eligible for financial benefits, which will help lower production cost. The only by-product of operation is water, which can be recycled in the ship's water system. Without air emissions, the air in the Port will be cleaner and there will not be any CO2 emissions that contribute to climate change. In addition, the health and public safety of ship employees, workers supplying the ship with goods and services, guests on the ship, and people working in and near the port will have improved health, which will contribute to lowering medical costs in support of all people who are in or near the ship. HFC's are currently in use in cars, buses, trucks, trains, and in some ships around the world. HFC is an emerging technology that will surpass the use of battery power for all such vehicles, trains, and ships without the problem of toxic battery disposal and the length of time required to recharge batteries. Refueling time for HFC equipment takes less than five minutes for an auto. Larger systems will probably require more time, but still much shorter time than battery recharging. Looking at this issue holistically, such ships should be served by trucks and buses and even fork lifts that use HFC as a source of energy. The sale price of the renewable Hydrogen is about the same as high test gasoline or diesel now used by many vehicles. If questions arise about the practically or cost of such renewable HFC, I can easily provide supporting data and cost analysis for all points briefly stated above.



1-1

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2019-10-26 12:26:35

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If you have any questions or comments please contact [Clerk of the Board](#) at (916) 322-5594.

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December 2, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

**Subject: Comments on October 15, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents**

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the rulemaking materials posted October 15, 2019, for the Proposed Control Measure for Ocean-Going Vessels At Berth (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) plans to replace the current Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the current “At-Berth Regulation”) with the Proposed Control Measure, with the goal of taking the Proposed Control Measure to the CARB Governing Board on December 5, 2019 at a special meeting to be held in West Oakland. The Port understands that the CARB Governing Board will not vote on the Proposed Control Measure on December 5, 2019, and that comments are due December 9, 2019.

The Port fully supports CARB’s efforts to reduce emissions from ocean-going vessels at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff track shore power usage in real time, collecting detailed information from marine terminal operators. The Port regularly posts up-to-date shore power usage statistics, reasons for vessels not plugging in, and cost information on the Port’s shore power website: <https://www.oaklandseaport.com/development-programs/shore-power/>.

In 2018, 75% of all vessel calls at the Port of Oakland drew shore power (the number for all vessel calls includes steamships and “infrequent callers” which are both exempt from the current At-Berth Regulation), which surpassed the regulatory requirement of 70% compliance. The plug-in rates at the Port of Oakland continue to increase. For example, in October 2019, 100% of vessels

that were equipped with shore power plugged in and 83% of all vessel calls plugged in. This was the third time in 2019 and the second consecutive month where shore power plug-in rates were above 80%. For 2019, the year-to-date average, including October 2019, was 76%.

The Port has commented on previous drafts of the Proposed Control Measure and various supporting documents, and those previous comment letters are enclosed with this comment letter. The Port appreciates CARB's consideration of its past comments and sets forth its new and continuing comments and concerns below.

### **Comments on Emissions Inventory**

The Port has reviewed Appendix H: 2019 Update to Inventory for Ocean-Going Vessels at Berth: Methodology and Results. This inventory is extremely important, as it lays the foundation for the need for, and cost-effectiveness of, the Proposed Control Measure.

The Port appreciates all the hard work that went into the inventory, and the willingness of CARB staff to attempt to explain their methodology. At the same time, Port staff (along with other public seaport authorities and shipping partners that operate in the State) have struggled to understand the inventory results and implications for both Oakland and the State as a whole. Based on the collective feedback that has been received from stakeholders, CARB staff continues to revisit the baseline and forecasted emissions assumptions with updated calculations and results even as this Proposed Control Measure is being put before the CARB Governing Board. In other words, the methodology and analysis upon which the Proposed Control Measure is based, are still in flux.

To highlight just one particularly notable example, the 2020 estimated total hours at berth divided by typical call durations by vessel size indicate that there will be 2,580 calls for the Port of Oakland in 2020, which is a dramatic departure and increase (a deviation of over 40%) from observed operational realities and shipping trends. For context, the Port of Oakland had 1,175 calls in the first 10 months of 2019, 1,543 calls in 2018, and 1,598 calls in 2017. The same calculation applied to CARB values for the Ports of Los Angeles and Long Beach predicts 2,405 calls in 2020, which means Oakland would see 175 more calls than the Ports of Los Angeles and Long Beach combined. Such an order of magnitude difference has implications for evaluating the effectiveness and potential impact of the Proposed Control Measure and any marginal benefits that could be achieved by it.

Port staff compared the 2016 baseline values used by CARB in the inventory to 2016 actual values recorded at the Port. It appears that CARB's 2016 values for total time at berth are about 8% higher than actual, and that CARB's estimates for average power by ship size (which were derived from values at the ports of Los Angeles and Long Beach) are about 9% higher than actual for Oakland. Additionally, it seems that CARB has underestimated the total activity for the regulated fleet in 2016 by about 11%, which makes it appear that the Proposed Control Measure overestimates projected reductions. These over- and under-estimates do not balance out. In fact, they lead to further discrepancies which are compounded by CARB's assumed 21.5% growth rate which is applied equally across all vessel size bins. The Port understands that this growth rate was

developed from the Federal Highway Administration’s Freight Analysis Framework and requests that CARB explain how this growth rate applies to hours at berth, cargo volumes, emissions, ship calls, and cost.

The Port appreciates CARB staff’s recent acknowledgment that the cargo growth rate for Oakland needs to be adjusted. Port staff and CARB staff have had multiple discussions about the growth rate issue, and the Port understands that CARB will consider instead the Oakland-specific cargo forecast commissioned by the Bay Conservation and Development Commission (“BCDC”)<sup>1</sup>. This will lower the forecasted annual growth rate for Oakland from ~4.6% to a more realistic, but still high, forecast of 2.2%. For reference, the Port’s historical compounded annual growth rate from fiscal year 2008 to fiscal year 2018 was 0.4%.<sup>2</sup>

We look forward to evaluating the results and implications of these revised forecasts when the technical work is presented at a future date by CARB staff. The Port seeks assurance that no CARB vote will proceed until the emission reduction estimates reflect more realistic growth rates, for example as provided in the BCDC report.

The Port appreciates CARB staff’s willingness to apply an “efficiency factor” that acknowledges efficiency gains produced by moving more cargo on fewer, larger ships. One point of caution is that the layering of percentages makes it extremely difficult to follow the logic and relate CARB’s forecasted activity and emissions to any real-world metrics. Small errors and invalid assumptions with an initial set of data points can be magnified as these results are extrapolated into later forecast years, which lead to unrealistic and unreliable conclusions. The Port understands the complexity of the task, but a regulation as important and expensive as the one being proposed needs to be based on data that can be fact-checked, and must include forecasts that are grounded in factual operational data.

As an alternative, the Port of Oakland prefers and requests that CARB re-evaluate the inventory using 2016 baseline values provided by the Port and a Port-specific growth forecast. The Port further requests that the forecast activity levels be related to ship calls, which can be readily understood by all ports, regulatory agency staff as well as by the public. This would be consistent with how the Port tracks shore power usage and compliance. Lastly, and most importantly, the Port asks that these changes be made and the inventory fully peer-reviewed before the CARB Governing Board contemplates further action on the Proposed Control Measure.

### **Broad Concerns about the Proposed Control Measure**

The Port is extremely concerned that the Proposed Control Measure adds a substantial additional regulatory burden and cost to carriers and terminals that are already achieving high levels of plug-ins and emissions reductions. As the Port has discussed with CARB previously along with other California seaports, CARB could achieve more cost-effective emissions reductions from other source categories. In fact, during a conference call with CARB staff on Friday, November 22,

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<sup>1</sup> BCDC is currently amending its Seaport Plan for the San Francisco Bay Area.

<sup>2</sup> From Budget and Finance report at May 23, 2019 Port Board Meeting (File ID 098-19), slide 6.

2019, the Port joined its sister ports in proposing potentially preferred emissions reductions project alternatives based upon readily available specific equipment replacements, which will result in a significant reduction of emissions.

A second broad concern is that the Port of Oakland would be disadvantaged under the Proposed Control Measure because it does not have the option of a CARB approved emission control strategy (“CAECS”) other than shore power. As CARB itself found, the Port of Oakland cannot use a barge-based capture and control (“C+C”) method at three of its four terminals “due to concerns expressed from SF Bar Pilots about wave interaction from passing vessels and channel space and navigational constraints.” (See Appendix E: *Berth Analysis*.) The three terminals cited in CARB’s Appendix E (Everport, Matson, and OICT) account for over 83% of the Port’s call volume.

To elaborate, the potential negative impact to the Port and its carriers, tenants, and the community from the Proposed Control Measure is foreseeable. It is well established that almost every vessel calling Oakland also calls the ports of Los Angeles and Long Beach. Unlike Oakland, the ports of Los Angeles and Long Beach can use a barge-based C+C strategy. What will happen if carriers rely on a barge for compliance at the ports of Los Angeles and Long Beach, and then come to Oakland where a barge is not possible? The Port is very concerned that carriers may bypass Oakland if the Proposed Control Measure is enacted as currently written. Oakland has no feasible C+C alternative<sup>3</sup>, which could put the Port of Oakland at a serious competitive disadvantage.

To address the fact that a barge-based C+C will not work in Oakland, the Port requests that CARB grant Oakland exemptions corresponding to the number of calls that rely on barge-based C+C in Southern California.

As a third concern, the Port understands that the Proposed Control Measure anticipates other emission control strategies such as a land-based C+C system. However, the Port is concerned that landside emissions control approaches were never contemplated for use in the container fleets, have not been analyzed by CARB staff for use in the container shipping trades, and by CARB’s own analysis can result in an increase in greenhouse gas emissions<sup>4</sup>, which would seem to be an unacceptable outcome given the purpose and intent of this rulemaking.

The Port’s fourth concern is the introduction of shared responsibility which potentially creates conflict among vessels, terminals, and ports (see Table 5 of Proposed Control Measure) where none now exists. Upon the adoption of the initial At-Berth Regulation, CARB rightly acknowledged that in a global shipping environment it was not reasonable to expect that every vessel in every fleet would be equipped to receive shore power, hence the creation of fleet compliance averages and an exemption for infrequent callers. The Port has seen that its diligent involvement with carriers and terminals has resulted in a continuous positive trajectory in shore power usage.

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<sup>3</sup> Appendix E of the ISOR, page 12

<sup>4</sup> Appendix C-1 of the SRIA, page 15

The Proposed Control Measure continues the acknowledgement that there will be instances when ships cannot plug in, due to circumstances on the vessel or at the terminal, hence the inclusion of alternative compliance options and a complex regime of Terminal Incident Events (“TIEs”) and Vessel Incident Events (“VIEs”). The Port understands the goal of the TIE and VIE regime, but it creates more problems such as record-keeping and dispute resolution, than it solves. The Proposed Control Measure has no clear grievance or dispute resolution process when conflicts arise

### **Specific Comments on Proposed Control Measure**

1. Regarding the Terminal and Port Plans required for Container terminals in Section 93130.14, the deadline of July 1, 2021 is confusing because the Compliance Start Date listed in Section 93130.7(b) is shown as January 1, 2021. Shouldn’t the Plans and associated 90-day review window be completed prior to requiring compliance?

Port staff object to the text in Section 93130.14(a) that “[a]s an alternative, Ports may submit plans for their terminal operators.” Ports should not be expected to submit plans for terminal operators. In addition, the statement in Section 93130.14(b)(1) that “Ports should use terminal plans as [the] basis for developing port plans” seems to indicate that the deadline for Port Plans should be adjusted to come after the deadline for Terminal Plans.

2. The definition of “Fleet” in Section 93130.2(b)(29) does not explain how fleets will be established. What will CARB require at the beginning of each compliance year to establish fleets? How will this work?

The proposed regulation does not address how or whether VIEs will be granted for new fleets entering the California market, or for fleets that expand. New entrants should be allowed to estimate their annual ship calls and be granted the associated number of VIEs for the coming year. Otherwise, this is a barrier to entry for new fleets because they will be granted zero VIEs in their very first year of operation. This puts California ports at a competitive disadvantage compared to ports in Oregon, Washington, Canada, Mexico, and on the U.S. Gulf and East Coast.

The definition of Fleet and the requirements for VIEs also need to be responsive to changes in the shipping industry, for example when businesses merge or alliances change. It is not clear whether VIEs will be granted on a port-specific or State-wide basis. It is also not clear how disagreements will be resolved on whether a specific instance should use a TIE or a VIE. Will CARB adjudicate these?

3. The Port is glad to see that Vessel Commissioning is specifically exempt from the rule, as listed in visit exception Section 93130.8(c). However, the Port notes that it should not be limited to only the first visit, and should not matter whether the commissioning was successful. What happens if the commissioning was not successful? The Port of Oakland requires that vessels be re-commissioned if they have not been in Oakland for over a year. Further, the same vessel might need commissioning on both port side and starboard side. For these reasons, the same ship might require multiple commissioning trips.

Port staff request that vessel commissioning events that do not successfully connect to shore power as discussed in Section 93130.8(c) be eligible for exceptions under the regulation without the use of a VIE. The commissioning attempt shows that the goal was to reduce emissions through shore power and as such should be an exception in this situation. Port staff conduct each vessel commissioning (with the exception of those at Berths 61-6<sup>5</sup> to ensure the safety of the vessel, terminal, and workforce. Vessel commissioning is an invaluable safety procedure and should not be penalized under the Proposed Control Measure.

The Port requests that the definition of “Vessel Commissioning” in Section 93130.2(b)(76) of the Proposed Control Measure be expanded to include the port authority as the commissioning agent, as is the case at the Port of Oakland. The same language is found in Section 93130.7(e)(2) (“Ensure the vessel is commissioned as required by terminal operator”), Section 93130.8(c)(2) (“The terminal requires that the vessel be recommissioned”), and Section 93130.9(a)(2) “The terminal operator is responsible for commissioning vessels equipped with shore power.”). The commissioning requirement should be determined by the port authority or the terminal operator.

4. The Port requests that the definition of “Ready to Work” in Section 93130.2(b)(55) be expanded to include “Auxiliary Marine Power (AMP) container has been loaded on the ship and is in position, if applicable.” This is crucial for the requirement in Section 93130.9(d)(2)(D) that the vessel be plugged in “within 1 hour of vessel “Ready to Work”.” Many of the ships that call at the Port of Oakland rely on an AMP container to connect to shore power. The AMP container is often domiciled at the terminal and needs to be loaded onto the vessel by a ship-to-shore crane prior to plugging in. Some of the major carriers calling in Oakland rely on an AMP container to use shore power [MOL, NYK, K-Line (the ONE Alliance), Hyundai, and APL]. A vessel is not ready to plug in until the AMP container is in position.

Likewise, the Port requests that the disconnection requirement in Section 93130.9(d)(2)(E) be re-written to accommodate certain situations where the AMP container has been removed from the ship prior to the pilot boarding.

5. The Port appreciates the increase in TIEs to 15% for the first four years of the regulation as listed in Table 3 of Section 93130.11. The Port requests that the number of TIEs and VIEs be rounded *up* to the nearest whole number instead of rounding to the nearest whole number for instances where the number of TIEs or VIEs is calculated at a fraction of ship call as stated in Section 9310.11(a)(2). Any fractional call should be counted as a whole call. For example, if a carrier made 49 calls to a California port in 2019, the VIE calculation

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<sup>5</sup> The Port does not commission vessels at the Matson Terminal because these shore power vaults were installed by the former tenant, APL. The current terminal operator has assumed responsibility for these vaults.

would award 2.45 VIEs at the 5% level. This should be rounded up to three, not down to two.

6. Regarding the Remediation Fund described in Section 93130.15 of the Proposed Control Measure, what is the procedure and timeline for CARB to approve a public entity to manage the funds generated at the Port? What happens if no Remediation Fund administrator is established per Section 93130.15(a)? Does that mean the Remediation Fund would not be an option?
7. Port staff request further information from CARB on when and where the Remediation Fund will be deployed. Given that CARB anticipates zero-emissions regulation on trucks, transport refrigeration units, forklifts, and cargo-handling equipment in the time frame of enhanced usage of the Remediation Fund, would those categories be ineligible for incentive-funded emissions reductions?
8. Port staff note that the power meter readings required in Section 93130.9(d)(2)(C) and (F) and Section 93130.9(d)(3)(I) are not available until the close of each calendar month. This means that it will often not be possible to report the power usage within seven calendar days of a vessel's departure, as required in the Proposed Control Measure.
9. In Section 93130.1 of the Proposed Control Measure, the stated intent of the Proposed Control Measure is "to reduce oxides of nitrogen (NOx), reactive organic gases (ROG), particulate matter (PM), diesel particulate matter (DPM), and greenhouse gas (GHG) emissions from ocean-going vessels while docked at berth at California ports." How will CARB monitor GHG emissions after implementation of the Proposed Control Measure? What is the GHG emissions baseline?
10. The Port requests that maintenance events of landside shore power equipment be included in Section 93130.9(f) along with "construction or repair" so that maintenance events also have the option of using a TIE.
11. The Port requests that the Proposed Control Measure include an exemption for liquefied natural gas (LNG) powered vessels. This would have the desired effect of incentivizing cleaner ships, which would provide significant emission reductions throughout the ship's voyage, not just the small fraction of time while the ship is at berth in California.

## **Conclusion**

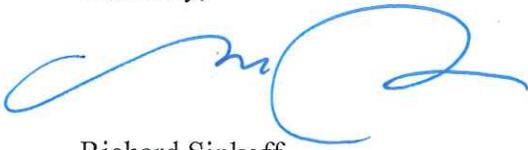
In conclusion, the Port of Oakland is fully committed to reducing emissions, and is proud of the results achieved with its industry and regulatory partners. In fact, the Port is unaware of any other port authority in the world that plugs in as many container vessels on an annual basis as the Port of Oakland. The partnership and collaboration with CARB, the Bay Area Air Quality Management District, and the Port's shipping and marine terminal customers have been a key to the success of

this program. The Port believes that these efforts can be used a model for other states and nations who might seek to reduce localized emission from ships at berth.

Port staff appreciate the opportunity to review and comment on the Proposed Control Measure and attend the public workshop on December 5, 2019. We look forward to continuing to work with CARB towards improving shore power effectiveness, emissions inventories, and associated analyses and to collaborate together to achieve cost-effective and feasible air quality improvements to protect public health.

Please contact Ms. Tracy Fidell, P.E., Port Associate Environmental Planner/Scientist at [tfidell@portoakland.com](mailto:tfidell@portoakland.com) with any follow-up questions.

Sincerely,



Richard Sinkoff  
Director of Environmental Programs and Planning

Enclosures:

- 1) June 10, 2019 Port letter to ARB re: Comments on May 10, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents
- 2) February 15, 2019 Port letter to ARB re: Comments on Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor
- 3) January 31, 2019 Port letter to ARB re: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

CC:

Danny Wan, Executive Director  
Michele Heffes, Acting Port Attorney  
Matt Davis, Director of Government Affairs  
Delphine Prevost, Manager Maritime Administration and Finance  
Diane Heinze, Environmental Assessment Supervisor



June 10, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on May 10, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the rulemaking materials posted May 10, 2019, for the Proposed Control Measure for Ocean-Going Vessels At Berth (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. On May 10, 2019, CARB posted the revised text of the Proposed Control Measure, and provided, as supporting documents, the presentation from the May 14 and May 16, 2019 public workshops, Cost Inputs and Assumptions in PDF format, and Cost Estimates in Excel format.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGVs”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting detailed information from marine terminal operators. The Port posts shore power usage statistics, reasons for equipped vessels not plugging in, and cost information on our shore power website: <https://www.oaklandseaport.com/development-programs/shore-power/>. In 2018, 75% of all calls to the Port drew shore power.

Public comments on the Proposed Control Measure are due to CARB June 10, 2019. Port staff understand CARB will then finalize the regulatory language and prepare an Initial Statement of

Reasons (“ISOR”) to release on October 18, 2019, with public comment on the ISOR closing on December 2, 2019. The CARB Governing Board is scheduled to hear the Proposed Control Measure on December 5, 2019. Do CARB staff intend to respond to public comment on the ISOR? Three days does not leave time for meaningful CARB response to public comment or public review of subsequent changes to the Proposed Control Measure. Port staff suggest a minimum of 14 days for CARB staff to review and respond to public comment, and for the public to review any changes, before the Proposed Control Measure can be heard.

The Proposed Control Measure includes the concept of an Incident Exemption, which is new since CARB published its draft Proposed Control Measure in August 2018. Vessel fleets would be granted Vessel Incident Exemptions (VIEs) and terminals would be granted Terminal Incident Exemptions (TIEs). Starting in 2021 for container ships and terminals, VIEs and TIEs would be granted at levels of 5% of the previous calendar year’s calls. CARB stated at the May 14, 2019, public workshop that the expected plug-in level for the container fleet is 90% in 2021.

Port staff submit the following comments and questions, divided into the topic areas of the draft regulatory text of the Proposed Control Measure, the presentation from the May 14, 2019 and May 16, 2019 public workshops, and the Cost Inputs and Assumptions in PDF format.

### **Comments and Questions on the Draft Regulatory Text of the Proposed Control Measure**

1. Port staff request clarification on the definition of “necessary infrastructure...that will enable a terminal to comply with this Control Measure” in Section 93130.10(b) of the Proposed Control Measure and what, in this context, “subject to verification by [CARB] enforcement staff” means. From Table XI Berth and Terminal Counts, Anticipated Infrastructure Needs, and Unique Vessels of the CARB Cost Inputs and Assumptions in PDF format, it appears that CARB believes that three new shore power vaults “would be installed in response to the Draft Regulation [Proposed Control Measure]...” at the Port. Accordingly Port staff request documentation supporting CARB staff’s berth-by-berth infrastructure analysis and determination that three new shore power vaults would be required at the Port in response to the Proposed Control Measure.
2. Regarding the Terminal and Port Plans required for Container terminals in Section 93130.11 of the Proposed Control Measure, the deadline of June 1, 2020 does not allow for sufficient time after the anticipated adoption of the Proposed Control Measure for ports and terminals to submit plans. Port staff object to the text in Section 93130.11(a) that “[a]s an alternative, Ports may submit plans for their terminal operators.” Ports should not be expected to submit plans for terminal operators. In addition, the statement in Section 93130.10(b) of the Proposed Control Measure that “Ports should use terminal plans as [the] basis for developing port plans” seems to indicate that the deadline for Port Plans should be adjusted to come after the deadline for Terminal Plans.
3. The definition of “Fleet” in Section 93130.2(b)(22) of the Proposed Control Measure does not explain how fleets will be established. What will CARB require at the beginning

of each compliance year to establish fleets? Will this be part of the online Freight Regulations Reporting System (“FRRS”) mentioned in the presentation from the May 14, 2019 and May 16, 2019 public workshops?

Port staff request an initial accommodation for new fleets entering the California market. New entrants should be given an opportunity to estimate the coming year’s ship calls and estimate the number of VIEs to be awarded for the coming year.

The definition of Fleet and the requirements for VIEs also need to be responsive to changes in the shipping industry, for example when businesses merge or alliances change. Likewise, CARB should clarify what provisions will accommodate changes in the terminal industry, such as new terminals or changes in ownership, in the allocation of TIEs.

4. Port staff have two comments regarding vessel commissioning. Port staff request that vessel commissioning events that do not successfully connect to shore power as discussed in Section 93130.7(f)(2) of the Proposed Control Measure be considered eligible for exceptions under the regulation. The commissioning attempt shows that the goal was to reduce emissions through shore power and as such an Exception should be available to operators in this situation. Port staff conduct each vessel commissioning (with the exception of those at the Matson Terminal) to ensure the safety of the vessel, terminal, and workforce. Vessel commissioning is an invaluable safety procedure and should not be penalized under the Proposed Control Measure.

Port staff request that the definition of “Vessel Commissioning” in Section 93130.2(b)(61) of the Proposed Control Measure be expanded to include the case in which the port authority is the commissioning agent, as is the case at the Port of Oakland. Likewise, in Section 93130.7(d)(1) (“If applicable, commission vessel as required by terminal operator”), Section 93130.8(a)(4) (“It is the terminal operator’s responsibility to commission vessels equipped with shore power”), and Section 93130.8(d)(1) (“If applicable, commission vessel for use of shore power”), the commissioning requirement should be determined by the port authority or the terminal operator.

5. The reduction in VIEs and TIEs for Container, Reefer, and Passenger vessels from 5% each to 3% each discussed in Sections 93130.7(g)(1)(A)(ii) and 93130.8(h)(1)(A)(ii) of the Proposed Control Measure serves to increase the usage of the Remediation Fund [Section 93130.12(a)] in and after 2023. Port staff request further information from CARB on when and where the Remediation Fund will be deployed, given that CARB anticipates zero-emissions regulation on trucks, transport refrigeration units, forklifts, and cargo-handling equipment in the time frame of enhanced usage of the Remediation Fund, making those categories ineligible for incentive-funded emissions reductions.

6. The allotted VIEs and TIEs for vessels other than Container, Reefer, and Passenger vessels in Sections 93130.7(g)(1)(A) and 93130.8(h)(1)(A) of the Proposed Control Measure reduce from 5% to 3% after only one year. Port staff note that at the advent of the ATCM, the requirement was 50% of all calls in the first year. An initial expectation of 90% usage does not accommodate the fact that the Proposed Control Measure is the first-of-its-kind requirement for Ro-Ro and Tanker vessels in the world, and the technologies and equipment required do not exist at this time and have not been tested.
7. Regarding the Remediation Fund described in Section 93130.12 of the Proposed Control Measure, what is the procedure and timeline for CARB to approve a public entity to manage the funds generated at the Port?
8. Port staff request clarification from CARB of what constitutes a failure to achieve “full emission reductions” as referenced in Section 93130.12(a)(3) of the Proposed Control Measure, regarding when the Remediation Fund may be used.
9. In response to the suggestion in Section 93130.8(a)(2) of the Proposed Control Measure that a terminal operator should be responsible to interrupt a vessel call to shift the vessel to a berth with shore power if no berth was previously available, Port staff request CARB prepare and share an analysis of harbor craft emissions associated with such a shift at each port. Second to OGV, harbor craft are the second-highest emitting sources of emissions in the Port’s 2017 Emissions Inventory. Given the short duration of the average vessel call to the Port, the suggestion to call additional harbor craft to reduce the remaining hours of an OGV call’s auxiliary emissions could lead to increased overall emissions.
10. Likewise, Port staff question if the suggestion in Section 93130.8(a)(3) of the Proposed Control Measure that a terminal operator should be responsible to provide an alternative CARB-approved emission control strategy if a commissioned shore power vessel is berthed such that it cannot connect to shore power is necessary. CARB’s own analysis in the Cost Inputs and Assumptions in PDF format, Table XI, declares that no barge-based capture and control system is anticipated for the Port.
11. Port staff note that the “power meter readings at the time of shore power connection and disconnection” requested in Section 93130.8(e)(2)(C) of the Proposed Control Measure are typically not available within 7 calendar days of a vessel’s departure, as anticipated by CARB. Power meter readings at the Port are typically available at the close of the calendar month and not sooner.
12. In Section 93130.1 of the Proposed Control Measure, the stated intent of the Proposed Control Measure is “to ensure that operators of ocean-going vessels reduce emissions using a California Air Resources Board (CARB) approved emission control strategy to reduce PM, NOx, and ROG emissions at berth without increasing overall GHG emissions from this Control Measure...” How will CARB monitor GHG emissions after

implementation of the Proposed Control Measure and what is the GHG emissions baseline?

### **Comments and Questions on the presentation from the May 14, 2019 and May 16, 2019 public workshops**

13. On Slide 4 of the presentation for the May 14, 2019 and May 16, 2019, public workshops, CARB staff show OGV at-berth emissions for the entire state. Port staff request to see these emissions totals further tabulated both by port or marine terminal and by vessel type. This is especially important as, per Section 93130.7(g)(2) of the Proposed Control Measure, VIEs are specific to the Fleet-Port pairing they are granted to.
14. On Slides 5 and 29 of the presentation for the May 14, 2019 and May 16, 2019 public workshops, CARB staff show a table of cost effectiveness for this rulemaking. The Port provides specific comments on the cost estimates below. Port staff request to see the total cost estimates and cost effectiveness estimates further tabulated both by port and by vessel type.

### **Comments and Questions on the Cost Inputs and Assumptions in PDF format**

15. In Table V. Auxiliary Engine Effective Power Values, CARB states that it is relying on “the same power values cited in Table 7 of the emission inventory methodology <https://ww3.arb.ca.gov/msei/ordiesel/draft2019ogvinv.pdf>. Values used in cost analysis for container/reefer and tanker vessels are calculated as one kW-average per vessel type, weighted by average vessel kW at each port/terminal and vessel visits to each port/terminal.”

As noted in the Port’s February 15, 2019 letter to CARB regarding the emissions inventory, the emissions inventory relies on the assumption that container vessel effective power is a function of vessel size bin. Will this assumption in the emissions inventory be modified to align with the cost estimate?

16. In Table VI. Duration of Emission Control at Berth, CARB shows that it is estimating statewide emissions reductions based on average duration of emission control at berth per vessel visit. The Port requests an emissions and cost analysis specific to each port or marine terminal and each vessel type. The stated average Container/Reefer duration of emission control at berth of 38.8 hours is about twice the average time for shore power connections at the Port. The difference between Port data and the average shows that the statewide average is not meaningful for the Port, and the conclusions of the averaging analysis may not apply to the Port.
17. Table VIII. Electricity and Fuel Cost Inputs and the associated Cost Estimates in Excel format show that CARB expects 100% of any Low Carbon Fuel Standard (“LCFS”) credits would be reinvested into shore power. It is not guaranteed that the credits would

all be reinvested into shore power. What assumptions did CARB staff make in projecting the LCFS credit value through 2032?

18. Related to the duration of emission control at berth in Table VI, Port staff would like to reiterate that shore power usage at the Port is billed based on hours of use, not kWh drawn. This affects the assumptions in Table VIII. Electricity and Fuel Cost Inputs, as well. While the cost of Pacific Gas & Electric electricity is relevant to the Matson Terminal and the overall discussion of electricity costs, the Port is the utility serving shore power at all but the Matson Terminal.
19. The growth assumptions in Table IX. Growth Factors overestimate actual TEU growth for the Port between 2016 and 2018 and continue to use a 3.9% compound annual TEU growth rate between 2018 and 2032. Port staff request that in addition to this high estimate of TEU growth, CARB prepare an estimate of emissions using a realistic growth estimate. For reference, the Port's CAGR between 2008 and 2018 was 0.4%. Port staff understand that the growth estimates CARB is using for emissions and costs for the Port will align with the vessel fleet projections (such as larger vessels each year) that are being used for the Ports of Long Beach and Los Angeles.
20. Port staff note that the cost of compliance with the existing At-Berth Regulation is high and requires frequent vessel retrofits. In 2018, the Port commissioned or re-commissioned nearly 100 vessels, or about 25% of the ever-commissioned vessel list. The ongoing costs of retrofitting vessels when the line rotation changes, maintaining vessel equipment, and commissioning vessels with the current At-Berth Regulation apply equally to comply with the Proposed Control Measure and should be included in the cost estimates as they are real and necessary costs of compliance with the Proposed Control Measure. The Proposed Control Measure is not additive and incremental to the At-Berth Regulation, but rather a replacement and as such the entire cost to comply with the Proposed Control Measure needs to be factored into the cost effectiveness.

## **Closing**

Port staff appreciate the opportunity to review the Proposed Control Measure and attend the public workshop on May 14, 2019. We look forward to working with CARB on refinements to improve the Proposed Control Measure, emissions inventory, and associated analyses.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,



Colleen Liang, Port Environmental Supervisor, for

**Richard Sinkoff**

Director of Environmental Programs and Planning

Enclosures: January 15, 2019 Port letter to ARB re: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

February 15, 2019 Port letter to ARB re: Comments on *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor



February 15, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* posted January 15, 2019, for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. CARB posted the text of the Proposed Control Measure on August 31, 2018. The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* was prepared in support of the Proposed Control Measure.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGVs”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting detailed information from marine terminal operators and posting that information on the Port’s website for public information purposes.<sup>1</sup>

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<sup>1</sup> <https://www.oaklandseaport.com/development-programs/shore-power/>

The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* document includes emissions from California ports and CARB-defined Marine Terminal Complexes (“MTCs”). The emissions for 2016 are tabulated in Appendix B, while emissions for other years are only represented graphically in figures in the document and in tables published by CARB on November 9, 2018.

Comments on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* are due to CARB February 15, 2019. CARB will then host a public workshop to discuss the emissions on February 26, 2019. After that, Port staff anticipate the need for a revised emissions inventory for the Proposed Control Measure that responds to public comments. The Port provides wharfinger information to CARB annually as required by grant funding obligations. In addition, Port staff request that CARB staff work with the Port to refine assumptions made in the emissions estimates.

Given the scheduling of the public workshop after the public comment period has closed, this letter includes comments and questions that may best be addressed in the workshop. Thus, the Port is providing a list of comments and questions on the draft emissions inventory and topics for discussion at the February 26 public workshop.

**Comments and Questions on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results***

1. Why was 2016 selected as the baseline calendar year for the emissions inventory? Does CARB plan to conduct in-depth emissions inventories for 2017 and 2018?
2. Table 4 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* shows vessel visit counts to California ports and MTCs in 2016 only. However, current trends are for fewer calls by larger vessels for a given amount of containerized cargo. The discussion on page 25 of the draft clarifies that “vessel practice changes” are not considered, even as the total number of calls is dropping in real time. Since 2013, total annual calls to the Port have been decreasing. Container cargo throughput is thus decoupled from vessel call activity. CARB should expand the vessel growth forecasting for the baseline scenario to include the effects of larger vessels and fewer calls for the same amount of containerized cargo.
3. Table 7 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* relies on the assumption that for all ports and MTCs, container vessel effective power will match that of the Ports of Los Angeles and Long Beach in 2016. The effective power does not appear to be a function of vessel size bin, so the level of detail with which the effective power is classified by CARB-defined size bin is not appropriate. In addition, given the variation between data from the Port of Los Angeles and the Port of Long Beach within the same CARB-defined size bin, the data may not be meaningful when averaged by CARB-defined size bin. CARB should use an average effective power for container vessels regardless of size.

4. The growth rates in the Freight Analysis Framework (“FAF”) for ports and MTCs outside of the San Pedro Bay are at odds with current trends. The FAF assumption for container cargo at the Port of Oakland is a 5% year-over-year growth rate between 2016 and 2020. Actual growth rates between 2016 and 2018 have not kept pace, with current Oakland planning documents estimating about half the FAF compound annual growth rate.<sup>2</sup> CARB should adjust the FAF growth forecasting for the baseline scenario to align with actual trends.
5. Page 27 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* discusses statistical significance in the context of the emission forecasting. If CARB staff have conducted an uncertainties analysis, it should be included in the methodology and results document.
6. Table 15 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* does not treat all ports and vessel types equally when assuming “Projected 2020 and Later Time on Shorepower,” without justifying the differences. For instance, CARB assumes container vessels at the Port of Hueneme spend 80% of their time on shore power after 2020, while CARB assumes at the Ports of Los Angeles and Long Beach container vessels spend only 65% of their time on shore power. Impossibly, CARB-defined size bins 7, 9, and 12 container vessels at the Port of Oakland are assumed to spend 100% of their time at berth on shore power.<sup>3</sup> Port staff request further justification for and synchronization of the assumptions for “Projected 2020 and Later Time on Shorepower.”
7. In the discussion of the “static age distribution model” versus a survival and turnover model, CARB staff do not consider the abnormally high number of OGV keels laid in 2015. How did CARB decide that the spike in keels laid in 2015 was not material to estimating NOx emissions through 2050?
8. CARB should revise its assumption that sulfur content in fuel is 0.1% based on the results of enforcement analyses of in-use fuel sulfur. The sulfur content of in-use fuel as sampled by the CARB enforcement team in calendar years 2017 and 2018 is lower than 0.1% by 30% and almost 50%, respectively, presenting information that actual emissions are lower than those estimated by CARB. (As stated on page 12, information from CARB’s enforcement team is already used to determine reduced emissions from reduced engine activity time.)

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<sup>2</sup> <https://www.portofoakland.com/community/environmental-stewardship/maritime-air-quality-improvement-plan/>

<sup>3</sup> Vessels arriving at berth need time to tie lines and lower gangways before they can connect shore power and likewise vessels need time to disconnect from shore power when leaving the berth. With these bookends on each vessel call, a vessel cannot be plugged into shore power for 100% of the time at berth.

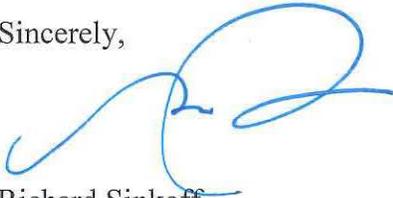
9. CARB should elaborate in the text on the Particulate Matter (“PM”) emission factor for Marine Gas Oil (“MGO”) at 0.1% sulfur. The 2007 Initial Statement of Reasons for At-Berth Regulation rulemaking used a value of 0.25 g/kW-hr for 0.1% S MGO. The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* uses a PM emission factor of 0.18 g/kW-hr for the same fuel. The root source for OGV auxiliary engine emission factors is stated in both cases as the 2002 Entec study, with no description of why two different values of PM emission factors are used for the same fuel.
10. Please add References to the Table of Contents and to the document (Sources of emission factor information are only included at the end of Appendix A).
11. On page 42, should the last sentence read “it excludes emissions from boilers,” not “it excludes emissions from auxiliary engines”?

### Closing

Port staff look forward to working with CARB to support the updated emissions inventories referred to in the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* after the workshop on February 26.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,



Richard Sinkoff  
Director of Environmental Programs and Planning



January 31, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the Preliminary Draft HRA posted November 5, 2018, for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. CARB posted the text of the Proposed Control Measure on August 31, 2018. The November 5, 2018, Preliminary Draft HRA and associated air dispersion modeling files that CARB released December 14, 2018, were prepared in support of the Proposed Control Measure.

The Preliminary Health Analyses document contains two types of assessment, 1) an HRA using air dispersion modeling and impacts estimation guidance from the California Environmental Protection Agency Office of Environmental Health Hazard Assessment (“OEHHA”) and 2) an Incidents per Ton (“IPT”) analysis.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGV”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting

detailed information from marine terminal operators and posting that information on the Port’s web site for public information purposes.<sup>1</sup>

**The key input to the Preliminary Draft HRA is the estimated emissions from vessels at berth, which are not yet final. Emissions estimates need to be final and the Preliminary Draft HRA updated before the Preliminary Draft HRA results can be used.**

CARB conducted two HRAs addressing only the Ports of Long Beach and Los Angeles together and the Richmond Complex. CARB’s use of AERMOD and the 2015 OEHHA Risk Assessment Guidelines for HRAs represents current best practices. However, the robustness of the findings is limited by the emissions estimates. Emissions estimates are typically completed before the HRA but in this case are open for public comment and discussion through the end of February 2019, at which point they may be refined.

The air dispersion model AERMOD, which CARB selected for the Preliminary Draft HRA is the preferred model from the US Environmental Protection Agency. Required inputs to AERMOD include meteorological data, emissions information for each pollutant considered, and exhaust parameters for release points. Of these inputs, the estimated emissions are key, since emissions have a direct linear relationship with the estimated ambient concentrations and health impacts from each source.

On November 5, 2018, CARB posted the Preliminary Draft HRA. CARB then posted a hard-coded spreadsheet of “Draft At Berth Emissions Estimates” used in the Preliminary Draft HRA on November 9, 2018, and air dispersion modeling files in mid-December with a public comment period for the Preliminary Draft HRA closing January 31, 2019.

17-1

CARB also posted the “Draft: 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results”—for the emissions that were entered into the Preliminary Draft HRA—on January 16, 2019, with a separate public comment period for the emissions methodology and results closing February 16, 2019.

Without greater understanding of the emissions used as data inputs to the air dispersion model and risk estimation calculations, the utility of the Preliminary Draft HRA is limited. Port staff are reviewing the emissions methodology released on January 16, 2019, and are comparing it with the spreadsheet posted November 9, 2018. Port staff look forward to discussing the emissions with CARB staff at the public workshop CARB scheduled for February 26, 2019. After that, Port staff anticipate the need for a revised HRA for the Proposed Control Measure that relies on emissions that have been reviewed and understood by all parties.

The AERMOD input and output files and risk estimation databases CARB provided on December 14, 2018, appear to carry out the methodology discussed in the Draft Preliminary HRA, but further review is not warranted until emissions are finalized. In addition to the

<sup>1</sup> <https://www.oaklandseaport.com/development-programs/shore-power/>

wharfinger information provided by the Port to CARB annually as required by grant funding obligations, Port staff are happy to work with CARB staff to refine assumptions made in the emissions estimates.

17-1  
cont.

**The role of the Preliminary Draft HRA posted November 5, 2018, in rulemaking for the Proposed Control Measure is not clear.**

The Proposed Control Measure is not an ATCM, in fact its stated purpose is to reduce NO<sub>x</sub>, PM, and GHG but not the toxic air contaminant DPM—which is the focus of the Preliminary Draft HRA. The inclusion of an HRA for any of the ports in California is therefore not a fundamental driver of the Proposed Control Measure (leaving the CARB Governing Board direction, Mobile Source Strategy, and Sustainable Freight Action Plan as drivers). Thus, any reductions in risk shown in the Preliminary Draft HRA are purely informational. Indeed, CARB’s elimination of the At-Berth Regulation ATCM by focusing on a Proposed Control Measure for NO<sub>x</sub> and PM but not DPM seems to imply that no further risk reductions are required.

17-2

The Preliminary Health Analyses report announces that the risk reductions of the Proposed Control Measure are “significant,” a term defined in the California Environmental Quality Act (“CEQA”) and used in CARB’s Certified Regulatory Program, but not defined in the CARB rulemaking process. While CARB staff present the percentage of reduction in risk of the Proposed Control Measure over the current At-Berth Regulation, the total residual risk should be compared to that of other source categories to prioritize the need for the Proposed Control Measure.

**Health impacts from Criteria Air Pollutants are managed through SIP Planning, which does not require a new Proposed Control Measure for the container fleet.**

PM<sub>2.5</sub> is a criteria air pollutant, not a toxic air contaminant, and the California Ambient Air Quality Standards (“CAAQS”) and National Ambient Air Quality Standards (“NAAQS”) are the appropriate health-protective standards for PM<sub>2.5</sub>. Regional ambient air concentrations of PM<sub>2.5</sub> are managed to levels below the CAAQS and NAAQS through SIP planning. Even so, CARB’s Mobile Source Strategy calls for an evaluation of emissions reductions from currently unregulated fleets, not the already regulated container fleet which calls Oakland. Thus, SIP planning for PM<sub>2.5</sub> attainment does not mandate an amended At-Berth Regulation to reduce statewide emissions through an “every vessel, every visit” control strategy like CARB staff have proposed.

**The Incidents Per Ton (“IPT”) methodology presented for PM<sub>2.5</sub>, a criteria air pollutant, is not a cost effectiveness metric.**

The IPT methodology provides information on health effects assuming ambient PM<sub>2.5</sub> concentration is the sole contributor to adverse health effects, with a direct linear relationship. The IPT methodology is not, however, part of a cost-effectiveness evaluation. CARB released a “Preliminary Cost Information” document in August 2018 as part of this rulemaking effort,

which relies on the same assumptions as the emissions inventory (which, as discussed above, may need refinement). The preliminary costs data evaluated total costs of the Proposed Control Measure, but not cost effectiveness of proposed measures calculated in terms of cost per ton of emissions removed. CARB has also not yet prepared a socio-economic impact analysis of the proposed rule.

**Closing**

Port staff are interested in working with CARB to improve the current ATCM focused on DPM to allow for 100% compliance. We look forward to seeing enhanced supporting documentation for the CARB emissions estimates and a revised HRA and cost effectiveness analysis once the emissions are updated.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Richard Sinkoff", with a stylized flourish at the end.

Richard Sinkoff  
Director of Environmental Programs and Planning



California Air Resources Board  
1001 I Street  
Sacramento, CA 95821  
USA

Letter  
20

Monday, December 2, 2019  
Our Ref.: 3943-11117/DR

Dear Madame/Sir,

## INTERTANKO comments to Public Hearing to Consider Proposed Control Measures for Ocean-Going Vessels At Berth

The International Association of Independent Tanker Owners (INTERTANKO) would appreciate submitting a few relevant comments to the proposed amendments to the current regulation for Control Measures for OGV at Berth. The comments we submit should be considered as contributions aiming at safe and practical solutions for such a regulatory development.

INTERTANKO is a non-profit association of independent tanker owners from 40 countries operating approximately 4,000 oil, chemical and gas tankers trading worldwide. INTERTANKO has made previous contributions to this process and we apologise if some of the comments are repetitive.

The proposed amendments are aimed to extend At Berth Measures to tankers. The options suggested are:

- a) vessel based options like use of clean fuels, including dual fuel boilers and
- b) shore side options like “cold ironing”, use of shore electric pumps or “emissions capture and control systems” either located on shore or on barges coming side by side when the tanker is at berth.

As in our previous submissions, INTERTANKO recognises all these measures could be applied but there are a number of practical and very important safety issues that need to be clearly addressed, defined and implemented.

### Vessel based options

Use of “clean fuels” while at-berth in boilers. According to another CARB regulation, all ships calling at California ports as well as trading within 25 nautical miles from the California shores use distillate fuels which, in accordance with the MARPOL Annex VI ECA regulation have a Sulphur content limited to maximum 0.10% by weight. Use of natural gas as fuel in boilers will only marginally reduce SO<sub>x</sub> and PM emissions versus the significant cost to retrofit and change operations of boilers for use of natural gas at berth. Such a cost should be taken into account versus the emissions from 0.10% Sulphur content (or lower) distillate fuels.

With regard to the NOx emissions, California ports are located in a MARPOL Annex VI NECA sea area, meaning that ships with a keel laid on and after January 1, 2016 have to be compliant with NOx Tier III emissions level which means a 90% reduction of such type of emissions. Should tanker be equipped in the future with dual fuel boiler and engines, then California ports should develop LNG supply infrastructure.

Shore side options

Use of cold ironing. There are three main important issues to be addressed. Firstly, clarification should be sought with Terminals and local Port Authorities of their safety regulations for use of electricity in transfer of flammable cargoes. Secondly, the risk of using electrical power instead of classic steam power in tankers transporting hydrocarbon cargoes should be assessed. Thirdly and very importantly, there has to be a very clear crafted legal scheme to address incidents and consequences of incidents in case the shore power is cut during the cargo operations. INTERTANKO acknowledges that automatically closed systems and procedures can be established, but tankers should not have any liability in the aftermath of an incident caused by such an event.

Use of capture and control systems. Once again, if the capture system is based on the shore, this has to be clarified with Terminals and Port authorities first. Costs and operation of such systems also have to be taken into consideration versus the low levels of SOx, PM and NOx emissions from distillates with ultra-low Sulphur content and from increased number of tankers meeting NOx Tier III level of emissions. Another aspect to be addressed is emergency situations when the tanker has to leave the terminal quickly. Such an emergency could be due to an incident on board the ship but also an incident on the shore side. A capture system operated from the shore should be capable of quickly disconnecting, independent of the cause and the nature of the emergency at the terminal.

For capture and control systems based on board barges, the same comments apply. Additional assessments and strict procedures will be needed for a safe ship-to-ship stability of operation and positioning.

INTERTANKO appreciates the opportunity to provide its input on this rule development. We will continue to assist to the best of our ability and hope that CARB recognises the challenges that need to be addressed, since, as long as the tanker is moored at-berth, particularly during cargo operations, there is not much it can do to control many of the associated risks indicated.

Looking forward to further dialogue.

Yours sincerely,



Dragos Rauta  
dragos.rauta@intertanko.com

December 3, 2019

Clerk's Office  
California Air Resources Board  
1001 I Street  
Sacramento, California 95814

*sent via e-mail to:* <http://www.arb.ca.gov/lispub/comm/bclist.php>

Re: WSPA Comments on CARB Proposed Control Measure for Ocean-Going Vessels at Berth

To the Office of the Clerk:

Western States Petroleum Association ("WSPA") appreciates the opportunity to provide comments on the California Air Resources Board's ("CARB") Proposed Control Measure for Ocean-Going Vessels at Berth ("At Berth Regulations"), released October 15, 2019, and its accompanying Draft Environmental Analysis ("Draft EA"), released October 1, 2019. WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states.

WSPA is providing these comments as part of a continuing effort to provide feedback on the At Berth Regulations. We incorporate our previous comments submitted on February 15, March 29, May 30, June 14 and August 15, 2019 by reference herein. This letter contains both comments on the At Berth Regulations and on the Draft EA pursuant to the California Environmental Quality Act ("CEQA").

Under the California Health and Safety Code, CARB must make and support several findings before adopting the At Berth Regulations, including the following:

- CARB must document that the At Berth Regulations are necessary to attain ambient air quality standards, cost effective, and technologically feasible. See Cal. Health & Safety Code ("HSC") §§ 38560, 38562, 39602.5, 43013, 43018.
- The At Berth Regulations must be designed "in a manner that is equitable," must "minimize costs and maximize the total benefits to California," and must minimize administrative burden and "leakage" (i.e., "a reduction in emissions of greenhouse gases within the state that is offset by an increase in emissions of greenhouse gases outside the state.") See HSC § 38505(j), 38562.
- The At Berth Regulations must achieve emissions reductions that are "real, permanent, quantifiable, verifiable, and enforceable" by CARB. See HSC § 38562.

As discussed further below, WSPA continues to have serious concerns that the At Berth Regulations, as currently proposed, are neither technologically feasible nor cost-effective, particularly in the context of operations at marine terminals hosting vessels carrying hazardous materials such as crude oil and other petroleum products. WSPA further believes that the At Berth Regulations impose certain unnecessary costs on regulated parties that result in little or no incremental benefit to California's air quality or its greenhouse gas ("GHG") levels. Many aspects of the At Berth Regulations, as detailed below, also are not likely to produce the real, permanent,

quantifiable, verifiable and enforceable emissions reductions Staff claims, and risk driving marine vessels out of California and to out-of-state marine terminals where those vessels' GHG emissions will continue unaffected by the Rule.

## **I. Land-Based Capture and Control Systems are Not Reasonably Feasible and Would Pose Serious Safety and Reliability Problems**

In the Initial Statement of Reasons ("ISOR") for the At Berth Regulations, CARB Staff notes that it "assumed that the majority of tanker visits will use land-based capture and control systems based on industry feedback." ISOR, p. III-19. However, at numerous points in this rulemaking, WSPA and its members have informed Staff that land-based emission capture and control systems have not been designed, tested, or demonstrated to be a feasible, safe or reliable option for tankers<sup>1</sup>. To date, WSPA is not aware of any real-world examples of such land-based systems being successfully implemented on tankers at the scale typically seen at California marine terminals.

This real-world evidence reflects that the majority of marine terminals would be poorly situated to feasibly install and safely operate land-based capture and control systems at marine terminals. At a minimum, very large shore cranes would need to be constructed at each berth in order to reach all vessel designs, considering many tanker vessel exhaust stacks sit nearly 160 feet above the wharf. These cranes' connections to the vessel stack are not designed with the emergency break away coupling required for all tanker vessels, nor do they come with an engineered working safety margin for movement between vessels. Indeed, no emergency protocols exist *at all* for the type of connection the At Berth Regulations would mandate.

There is no data to support the concept that a land-based system can operate safely at a marine terminal. At the very least, the land-based systems currently required by the At Berth Regulations would create several significant safety concerns at California terminals:

- Exhaust systems and combustion control systems are not designed for connection to external capture devices. Such connections change the fluid dynamics of gas flow from the stack and increase the risk of an unsafe combustion space. Additionally, establishing and safely maintaining connections can be extremely difficult at night and in adverse weather conditions.
- Executing emergency disconnection procedures (which have not been developed) for such land-based systems would add steps and delay tankers in responding in an emergency (e.g., to allow safe disconnection from power, removal of shore-side equipment, engine start up, etc.). Federal anchorage regulations (33 C.F.R. § 110.215(a)(2)(B)(iv)) and California State Lands Commission regulations (2 Cal. Code Regs. ("CCR") § 2340(c)(28)) enforced by the U.S. Coast Guard (and included in local fire codes and standards under the International Safety Guide for Oil Tankers and Terminals) require all tankers moored alongside an oil terminal to be capable of safely vacating the berth within 30 minutes in order to minimize risks from dangerous flammable materials on the vessel or shore-side and avoid escalation of an incident. The additional steps required to disconnect from the capture and control system would likely extend the disconnection process to longer than 30 minutes.

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<sup>1</sup> WSPA Comment Letter to CARB entitled "Additional WSPA Comments on CARB Proposed At Berth Regulation Working Draft, dated August 15, 2019.

- Third party owners and operators are not manned with crews and officers properly trained on how to safely operate shore-side control systems and facility operators do not have the legal authority to regulate crews aboard third-party vessels.
- Concepts for a shore-based capture and control system have not undergone a safety evaluation to assess potential fire and explosion risk associated with collection, pressurization, and transportation of gases in a crowded terminal. Additionally, no standards or procedures exist to conduct such a safety evaluation for a shore-based system.
- A wide equipment operating window would be required to account for vibrations and wind. No standards exist to assess how to define that window for a shore-based control system.
- Safety standards related to any required manual operation of the control system must be considered, especially in relation to immediately dangerous to life or health (IDLH) environment and nighttime operation.
- As no technology has been proven in practice, the ability to control key connections at the shore-based emissions control to boilers is unknown. This includes the possible inability to adjust for changes in load and while controlled, as well as the unknown effect of a control technology on the boiler combustion space.
- No tanker industry standards exist for the safe operation of this technology while transferring hazardous cargo.

22-1

See Exhibit 1, WSPA's March 29, 2019 comment letter, Enclosure B, "Proposed CARB At Berth At Anchor Regulation – Limitations and Issues Presented by Shore Based Emission Controls", which details many other dangers and complications that would be associated with the attempted operation and interface of a shore-side emissions control system with a tanker carrying hazardous and flammable liquid. Moreover, all interfaces between any emission control strategy and a tanker must be designed in conformance with an international standard endorsed by a classification society to safely and feasibly accommodate all vessels, and vessel interfaces then must be certified to that standard. To date, there is no such standard or certifications available for safe operation of shore-based emissions control during the transfer of hazardous cargo, and manufacturers have not yet designed or built systems that would qualify under such a future standard. Even if there were such a standard, boiler manufacturers have informed WSPA that in order to connect a capture and control system, modifications would be required on board every ship to be connected to the system, in order to install higher capacity blowers and modified control systems.

Woodbridge Marine, Inc., an independent marine consultant engineering firm specializing in safety inspections on oil tanker vessels, has provided a letter (attached hereto as Exhibit 2) containing further detailed discussion of feasibility and safety issues, including electrostatic hazard, handling inert gas in cargo tanks and exhaust stack pressure maintenance, emergency disconnection, the need to develop equipment suitable for all tank vessel types that visit California, safety standard certification and the need to consult standards organizations and develop new standards for emission control system safety, and review for compliance with

California's Marine Oil Terminal Engineering and Maintenance Standards ("MOTEMS"). To date, none of these issues has been addressed for tanker exhaust gas capture systems.

In addition, Woodbridge points out specific operational concerns that must be resolved, such as the need for the system to maintain a secure and safe connection accommodating both a wide range of vertical motion (during tidal movement and vessel draft changes during cargo discharge) and a wide range of lateral distances (due to variation in vessel widths and the fact that vessels can be docked either with port or starboard side facing the wharf). Thus, as Exhibits 1 and 2 demonstrate, by mandating a shore-based control system before such systems have been developed and proven feasible and safe at scale, the At Berth Regulations create a host of safety and feasibility problems with no immediate solutions yet available.

CARB Staff also incorrectly assumes that existing marine terminal berths can accommodate such mandated land-based capture and control equipment. Again, real-world evidence contradicts this assumption in many instances. For example, contrary to Staff's assertions, the existing wharf structures may not be large enough to accommodate all the equipment that would be required to install a land-based capture and control system, meaning significant and costly structural upgrades would be required. In several cases, wharfs may have to be rebuilt entirely to accommodate the weight and movement of the crane (as vessel stack locations may vary from vessel-to-vessel).

Indeed, given these numerous concerns, WSPA and other industry stakeholders have repeatedly urged Staff to delay this rulemaking and have invited Staff to partner with industry to conduct a study. This study would evaluate the technical feasibility, safety, reliability and operability of shore-based emission capture and control systems for tankers at real-world scale, and the feasibility of permitting, constructing and commissioning such a system in the timeframes in the At Berth Regulations. Staff have repeatedly declined this invitation, proposing instead to mandate compliance dates knowing a feasible real-world compliance path does not exist. This has made it impossible for Staff to point to any empirical evidence justifying the ISOR's assumption that land-based capture and control systems are feasible for tankers at California terminals. Regulations requiring tasks that cannot be practically implemented in the time periods provided are not equitable, do not minimize costs for Californians, and do not demonstrate technological feasibility as required by California law.

## **II. The At Berth Regulation's Compliance Deadlines are Infeasible and Do Not Reflect Experience With Real-World Terminal Construction Projects**

The At Berth Regulations impose compliance deadlines of January 1, 2027 for tanker vessels that visit the Ports of Los Angeles ("POLA") and Long Beach ("POLB"), and January 1, 2029 for all remaining tanker vessels. See Proposed 17 CCR § 93130.7(b), (c). Section 93130.14(a) requires tanker terminal operators to develop and submit compliance plans by December 2021, detailing the "most likely control strategy" to meet the deadlines. Section 93130.14(d) requires Staff to assess the status of tanker control technologies and landside infrastructure improvements and report to the public and the Board by July 1, 2023. If this "interim evaluation" finds that the compliance deadlines need to be extended, Staff may "initiate development of potential regulatory amendments." *Id.* However, unless and until the Board adopts amendments, the deadlines will remain in effect. Regulated entities must undertake their best efforts to timely comply and, if that proves impossible, are at risk of noncompliance.

A. Completing All Steps Necessary for Construction and Permitting of Infrastructure Projects Would Be Impossible By the Proposed Deadlines

As WSPA has advised in previous written comments and in discussions with CARB Staff, it is already abundantly clear that compliance with the 2027 and 2029 deadlines is infeasible. In comments submitted August 15, 2019 (attached hereto as Exhibit 3), WSPA compiled information from member companies in an “Estimated Timeline-CARB At Berth Regulation Shore-Based Emission Control System” and “Timeline Survey Summary” (Exhibit 3, Att. A & B). The Estimated Timeline chart demonstrates that – starting with general and site-specific technical, safety and other studies immediately on rule adoption in 2020 – completion and commissioning of land-based capture and control systems for tanker vessel emissions<sup>2</sup> is not expected before mid-2034 in most cases and is likely to extend at least to the end of 2035 for complex installations.

In general, larger and more complex terminals will need more time to complete each step due to the larger scale of the engineering, design and construction effort. Real-world experience demonstrates that, for complex installations, it is difficult to anticipate precise timelines for each step at the outset of the process, and timelines typically lengthen as the project proceeds. With unknown permitting timelines and delays, contracting and vendor timelines, the earliest compliance demonstration for most facilities is not before 2033 (i.e., a minimum of four to six years later than the proposed 2027 and 2029 deadlines). Some of the steps in the process may partly overlap, as shown in the Estimated Timeline. However, numerous dependent steps exist and are unavoidable. Construction cannot begin until construction contracts are in place. The terms and conditions of construction contracts cannot be finalized until all necessary permits and approvals are issued. State and local permits and approvals cannot be issued until CEQA review is completed. CEQA review cannot begin until at least 30-60% of the design is complete, in order to provide an accurate and stable project description as the basis for review. Detailed design and engineering cannot begin until the preliminary project scoping, feasibility evaluation and supporting technical studies are conducted.

22-2

The Timeline Survey Summary provides additional detail on the necessary steps to achieve compliance and their estimated durations. These necessary steps include technical and feasibility studies, site-specific design, engineering, CEQA review, regulatory agency permitting and approvals, contracting, construction and commissioning. Moreover, no construction can begin without all required permits and approvals from numerous state and local regulatory agencies including the California State Lands Commission, the California Coastal Commission (where coastal permitting is not delegated to the local city or county), the California Department of Fish and Wildlife, the San Francisco Bay Conservation and Development Commission (for northern Californian terminals), the local Regional Water Quality Control Board, and the local city or county, as well as federal permits and approvals from the U.S. Coast Guard, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service and National Marine Fisheries Service. The operators have no control over the duration of environmental review and permit processing by these agencies. Some responsible agencies will not even begin processing applications until the lead agency completes CEQA review. Even if the many agencies could promptly process applications for a few projects, their limited resources would be overwhelmed when facing the simultaneous application for projects throughout the state as required for all applicants to achieve compliance by the deadlines in the At Berth Regulations. It is highly likely that the agencies would need to

22-3

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<sup>2</sup> As discussed below in the CEQA comment section, WSPA agrees with CARB’s assumption that land-based capture and control systems constitute the reasonably foreseeable means of compliance with the At Berth Regulations for tanker vessels.

stagger permit processing, so that regulated entities at the end of the queue would again be at risk of noncompliance.

22-3  
cont.

Again, these deficiencies demonstrate that, as currently worded, the At Berth Regulations require an implementation schedule that is not technologically feasible.

B. Staff's Cited Terminal Project Examples are Not Representative of the Massive Infrastructure Work Needed to Comply With The At Berth Regulations

CARB Staff concedes that the time needed for permitting and construction of the required new infrastructure may delay compliance; indeed, that is the stated reason for providing for the interim evaluation. ISOR, pp. ES-30-32, III-19-23. Nevertheless, Staff claims that the proposed timeline “is both aggressive and technically feasible for implementation” (ISOR, p. ES-30) – a claim that appears to be based entirely on a handful of examples of recent projects at tanker terminals whose timelines purportedly “ranged roughly from five to seven years for completion.” ISOR, pp. III-21-22. On the contrary, the real-world evidence, including evidence regarding the projects cited in the ISOR, refutes this claim.

The ISOR concedes that “[i]nfrastructure development and the permit process stand out as the most time consuming and complex parts of utilizing land-based capture and control technology to control emissions from a tanker vessel.” ISOR, p. IV-52. Even so, the ISOR greatly underestimates the time required to install infrastructure at the substantial scale contemplated in the At Berth Regulations. Staff’s asserted timeline of “five to seven years for completion” is based on a survey of five recent projects, four of which were undertaken to address issues identified in MOTEMS audits in 2008-2010. ISOR, pp. III-21-22. However, the ISOR presents only a truncated picture of the anticipated timelines that would be needed for wharf infrastructure projects to comply with the At Berth Regulations, by including minor projects taking far less time than At Berth Regulations projects, and by presenting only subsets of the time required for the remaining, more substantial projects.

*1. Two of Staff's Cited Projects are Far Smaller Than the Scale of Infrastructure That Would Be Required By the At Berth Regulations*

Two of the projects cited in the ISOR – the Chevron Richmond Long Wharf MOTEMS compliance project and Green Omni Terminal ShoreKat Demonstration Project – were limited to repairs of existing structures and minor equipment installation. The timelines for those two projects are not properly comparable with those for planning, permitting and constructing substantial new wharf infrastructure, such as the large cranes and other major equipment installation on new or expanded wharf decking with new supporting piles required by the At Berth Regulations. Moreover, the ShoreKat project appears to have been exempt from CEQA review, while the modest Chevron MOTEMS project did not require a full-scale EIR, only a limited Negative Declaration allowing a much shorter CEQA review timeline.

22-4

The massive scale of anticipated infrastructure projects that would be needed for compliance with the At Berth Regulations is illustrated in the ISOR (see ISOR, pp. IX-11 to IX-13):

- As Staff recognizes, project components include the emission treatment unit itself, “foundational support structures” for the control system with “construction of additional pilings into the sea floor”, electrical connections, “[h]undreds to thousands of feet of piping and associated support structure . . . to pipe exhaust from the vessel stacks to the

emission control system,” and “[s]pecially constructed crane(s) . . . to move the exhaust capture device to the vessel stack(s).”

- Staff also concedes that “support structures would be needed for the crane(s) at each berth regardless of whether the crane(s) were built on the wharf or on an adjacent standalone support structure. These structures may also require pilings into the sea floor.”
- As the ISOR further notes, Staff conducted a berth-by-berth evaluation of compliance strategies at tanker terminals and found that significant infrastructure improvements would be needed at each facility to support land-based capture and control systems. See ISOR Appendix E, CARB Staff Analysis of Potential Emission Reduction Strategies by Port/Terminal/Berth for Crude and Product Tanker Vessels (September 2019).<sup>3</sup> Except in a few cases where it may be possible to place facilities on land, Staff conceded that substantial wharf improvements would be needed to support the weight of emission capture and control systems, between one and eight large cranes, and extensive piping.

Moreover, the Draft EA (p. 9) acknowledges that: “Adding berth-side equipment may require ports and/or terminals to upgrade wharf infrastructure. This may include the addition of new pilings and new surface area to existing piers/ports and/or terminals to allow for additional weight or space for vault and cable systems... Increasing power loads for vessels to use while at berth may require electrical and support infrastructure, which would be installed by existing utility service providers. It is reasonably assumed that additional power would require the installation of new or additional high-voltage lines and substations to increase the power supply required by vessels while at berth. Construction equipment, workers, and material deliveries for power utility modifications would be needed at the ports/terminals, as well as in areas subject to upgrading along the utilities’ existing infrastructure.” However, the consequences of that scope of work are given short shrift.

22-5

To further clarify the scale of infrastructure projects needed to comply with the At Berth Regulations, additional information was provided to Staff by Chevron in a presentation on June 10, 2019 (attached hereto as Exhibit 4). As shown in slides 2 and 3 of Exhibit 4, the existing wharf at Chevron’s Richmond Long Wharf contains no space to accommodate installation of an emission control system and cranes. At a minimum, installation of equipment at those sizes would require construction of half an acre of new deck structure as well as 4,000 to 6,000 feet of new piping. Slides 4-6 illustrate the scale of heavy pile driving activities for Chevron’s MOTEMS project, which would be multiplied by the estimated 700 to 800 concrete piles, driven deep into the sea floor, necessary to provide support for an At Berth Regulations compliance project. Slide 7 illustrates the magnitude of required electrical infrastructure improvements, including miles of new electrical cable, replacement of two transformers and changes to the utility interconnection. Nor is Chevron’s wharf configuration unusual; other tanker terminal wharves have similarly narrow linear designs with comparable space constraints, and likely would require a comparable magnitude of expansion, as demonstrated by the aerial photographs of Shell’s Martinez dock and Marathon Petroleum’s Amoco and Avon facilities in Martinez; see Exhibit 5, slides 1-3. Moreover, available space is heavily utilized and potential locations for new equipment are highly constrained even at terminals where berths are not located at the end of narrow linear docks, as illustrated by Marathon’s Terminal 2 at the Port of Long Beach and Valero’s Berth 164 at the Port of Los Angeles; see Exhibit 5, slides 4 and 5.

<sup>3</sup> Note that footnote 3 on the last page in ISOR Appendix E is incomplete. The sentence ends “this does not preclude the terminals or vessels from.” The text should be revised to state what is not precluded.

*2. Staff's Discussion of the Other Three Project Timelines Ignores the Additional Time Those Projects Incurred for Planning, Design, Permitting and Project Delays*

The other three projects cited in the ISOR are more comparable to the scale expected for At Berth Regulations compliance projects, but ISOR reports only part of their timelines:

- The ISOR describes the Chevron Richmond Wharf Maintenance and Efficiency Project (“WMEP”) as starting in 2014, when Chevron submitted its initial permit applications. However, the ISOR omits the necessary steps of project scope development following the MOTEMS audit, planning, design and technical studies, which preceded the applications.
- The ISOR describes the Port of Richmond IMTT Terminal Project as starting in 2011 and quotes an estimated completion date from a 2014 document. The ISOR again omits scoping and planning following the MOTEMS audit and also the delay in actual project completion.
- The ISOR describes only the construction period for the Berths 167-169 Shell MOTEMS Wharf Improvement Projects at POLA, omitting all planning, design and permitting steps prior to construction.<sup>4</sup>

The average duration for the project stages reported in the ISOR is 5.2 years, with a range of 3 - 9 years. Even based on Staff’s reported information, a project taking 9 years would exceed the “five to seven years” claimed in the ISOR, p. III-21, and would be unable to meet the 2027 deadline.<sup>5</sup> Additional project steps omitted from the ISOR are included in the attached “Timelines for Projects Involving Substantial New Wharf Infrastructure Comparable to At Berth Regulations Compliance Projects” (attached hereto as Exhibit 6).

Below are examples of other agency approvals, construction and commissioning not discussed by Staff in the ISOR, but that likely would hinder further progress on an infrastructure project until completed:

- For any pilot test of the equipment installed at a terminal, permitting, design and construction will require additional time.
- Detailed engineering cannot begin until the feasibility evaluation study is completed, and the risks associated with the control technology are well understood, to allow for design of appropriate mitigation.
- CEQA review cannot begin until a lead agency is assigned and at least 30-60% of the design is complete, in order to provide an accurate and stable project description as the basis for review.

22-6

<sup>4</sup> A more accurate picture is presented elsewhere in the ISOR (p. IX-13), conflicting with these abbreviated timelines: “Ports and tanker terminals would need to conduct feasibility assessments, engineering analysis and design, and secure required permits to construct terminal infrastructure projects needed to support the land-based capture and control systems.”

<sup>5</sup> If the two minor projects are included, the average duration of project stages discussed in the ISOR decreases to 4.6 years, with a range of 3-9 years.

- Building and other permits are dependent on completing the CEQA analysis and certifying a final Environmental Impact Report (EIR) or Negative Declaration. Many responsible agencies with permit or approval authority will not begin processing applications before the CEQA document is approved.
- Contracting for construction and installation cannot be finalized until the permits and approvals are received; before that time, the conditions under which construction will occur remain yet unknown. Additionally, construction cannot commence until contracting is complete.
- CEQA lead agencies and responsible regulatory agencies may require completion of some mitigation measures before construction commences.
- In some cases, commissioning of individual pieces of equipment can occur in parallel with the construction; however, overall commissioning cannot begin until all construction is completed.<sup>6</sup>

22-7

22-8

California law prohibits adopting the At Berth Regulations until and unless the proposed Regulations reflect realistic timelines that are both technologically feasible and provide sufficient time for regulated entities to minimize unnecessary implementation costs.

C. Real-World Experience With Terminal Infrastructure Projects Shows That Compliance With the At Berth Regulations Is Unattainable By 2027/2029

In addition, two other MOTEMS compliance projects at tanker terminals, involving substantial new wharf infrastructure, are included in Exhibit 6 for comparison.<sup>7</sup> Based on the full timelines in Exhibit 6, the actual average duration of projects comparable to At Berth Regulations projects is 11.6 years, with a range of 7-15 years. Exhibit 6 also demonstrates that, more often than not, actual project completion dates are later than the projected completion dates on schedules in planning and CEQA documents, suggesting that the ultimate timelines for projects not yet completed will run still longer, resulting in an average duration of more than 11.6 years.

Moreover, even the larger scale MOTEMS projects listed in Exhibit 6 may not fairly represent the magnitude of new wharf infrastructure for compliance with the At Berth Regulations. For example, large cranes will be needed to reach tanker stacks,<sup>8</sup> but no cranes have been installed for any MOTEMS work, and none of the projects described in the ISOR involved installing cranes. Major wharf expansions necessary to provide room and support for such large and heavy cranes will not only take longer to design and construct; they will also entail greater environmental impacts (as discussed in CEQA comments below), potentially involving longer CEQA review and permitting timelines including approval by additional agencies – again resulting in an average duration of more than 11.6 years.

22-9

<sup>6</sup> See also Slide 7 of Exhibit 4, which lists the permits that were required for Chevron's WMEP project as an example.

<sup>7</sup> For example, the Avon Terminal MOTEMS project included a new vessel loading/unloading platform and mooring dolphin on new steel pilings, with construction of associated facility structures, electrical, mechanical and piping systems – work which appears reasonably comparable to the scope of an At Berth Regulations compliance installation.

<sup>8</sup> Approximate heights which must be reached for different tanker vessel categories are: MR, 130 feet, Aframax, 133 feet, Suezmax, 140 feet, VLCC, 165 feet.

This record of timelines for comparable past projects, together with the estimated timelines for At Berth Regulations projects in WSPA's August 2015 comments, demonstrates that the 2027 and 2029 deadlines are unattainable for the majority of At Berth Regulations projects, even if project-level planning begins immediately on rule adoption in 2020.

Comments from Power Engineering Construction Co. ("Power"), attached hereto as Exhibit 7, provide independent confirmation for these concerns. Power has experience with all phases of preconstruction, design, entitlement and construction of a wide variety of marine engineering projects. Based on that experience, and on several examples of non-oil terminal projects, Power concludes that "empirically, all but the most basic construction projects prove to track into an 8 to 10-year timeline.... [d]ue to the complexity of regulatory review, the challenges of over-water design, and the limitations and work windows imposed during construction." In addition, Exhibit C to the Power comments describes timelines for projects involving large container cranes (average duration 33 months) and dock-mounted marine hydraulic cranes (average duration 17 months per crane). As noted above, the At Berth Regulations compliance projects require installation of between one and eight cranes. Cranes will need to be installed one at a time due to space limitations and to allow partial operation of the marine terminal during construction, so for some terminals, total installation time could take as long 22 years.

Finally, and perhaps most importantly, the project timelines in the ISOR, as well as those described in Exhibits 6 and 7, all involve deployment of **existing** technology. As the ISOR notes, the technology for land based capture and control systems for tanker vessels does not yet exist and would be "more complex than the existing demonstration system at POLA . . . need[ing] to be scaled up from the existing systems in order to handle higher exhaust flow rates from tanker vessels." ISOR, p. III-19. In particular, designing emission controls for tanker vessels presents unique safety issues. See Exhibit 2, Letter from Woodbridge Marine, Inc. No technology is currently tested and proven safe for tankers, as was communicated to CARB staff by vendors during the CARB vendor meeting on April 16, 2019,<sup>9</sup> and also discussed in WSPA's comment letter of June 14, 2019. Significant work is needed up front to assess the risks and ensure that technology is safe, feasible and available, which will take additional time before individual projects can begin to be developed.<sup>10</sup>

#### D. The Suggestion That the Compliance Deadline Should Be Shortened is Unsupported by Real-World Evidence

In a letter dated November 26, 2019, the Executive Officer of the Bay Area Air Quality Management District ("BAAQMD") dismissed the ISOR's discussion of the lengthy regulatory

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<sup>9</sup> At a meeting between CARB, vendors and industry stakeholders including WSPA members on April 16, 2019, one of the vendors, AEG, stated that the technology is not ready for a tanker demonstration. AEG's concerns included the large variation in gas volume and temperature from tanker boilers, which must be accounted for in designing emissions capture and control systems, and the need to address explosion risk from static electricity. AEG also noted the need for workable connection devices for every vessel and that relative movement of the tanker at berth is important, as large movements can rip the ducting off the stack.

<sup>10</sup> The Power comment letter (Exhibit 7) also explains that "issues surrounding the technical feasibility" of the system "will add to the overall project timeline through both feasibility testing and extended equipment procurement." Since Power's estimated 8-10 year "timeline should begin once a feasibility study is completed and appropriate emission control technology is proven to be readily available," it appears consistent with the 11.6 year average for projects listed in Exhibit 6.

approval process for construction over or adjacent to bay waters, stating “I believe this concern is overstated.” However, the letter provides no facts or evidence to support that belief, which is contradicted by the evidence of long permitting timelines cited in and attached to this letter. The record shows that marine projects subject to the approval of multiple regulatory agencies (e.g., MOTEMS compliance projects) have taken substantially more time, not less, than estimated by CARB staff. The same record demonstrates that shortening the compliance deadline for tanker vessels to January 1, 2025, as suggested in the BAAQMD letter, is simply impossible.

The BAAQMD letter speculates that an interagency group could assist CARB in identifying and addressing concerns, and mentions the long-established interagency organization that issues dredging permits in San Francisco Bay as an example. However, that organization is narrow in its scope and only reviews dredging projects. More important, no such organization currently exists to review the projects that would be required for compliance with the At Berth Regulations. Coordination up front by an inter-agency group could ultimately result in more efficient and effective review and permitting of individual projects by individual agencies. However, BAAQMD’s letter ignores the additional time needed to establish such a group and for it to carry out its coordinating efforts, which must precede the purportedly shortened review of individual projects. The more likely outcome of this additional time is that the total duration for interagency coordination plus individual project permitting would extend significantly beyond the proposed compliance deadlines.

22-10

In fact, the interagency dredging group cited in the BAAQMD letter – the Dredged Material Management Office (“DMMO”) – is a particularly poor example to suggest as a model for the At Berth Regulations. The DMMO took six years to establish, beginning with a 1992 task group, followed by an initial pilot phase, a 1996 inter-agency Memorandum of Understanding (“MOU”) establishing two additional pilot phases, and finally a revised MOU in 1998. See DMMO MOU (<https://www.spn.usace.army.mil/Portals/68/docs/Dredging/memounderst.pdf>); DMMO Third Pilot Phase Review Report (1999) (<https://www.spn.usace.army.mil/Portals/68/docs/Dredging/Annual%20Reports/3rdpilot.pdf>). The Long Term Management Strategy (“LTMS”) which the DMMO implements was developed over an 11 year period, initiated in 1990 and finally adopted in 2001, as described in the DMMO’s 2018 report, ([https://www.spn.usace.army.mil/Portals/68/docs/Dredging/Annual%20Reports/2018%20DMMO%20Annual%20Report\\_Final.pdf?ver=2019-11-15-131717-210](https://www.spn.usace.army.mil/Portals/68/docs/Dredging/Annual%20Reports/2018%20DMMO%20Annual%20Report_Final.pdf?ver=2019-11-15-131717-210)).

While BAAQMD’s letter offers its assistance with inter-agency review, it will play only a relatively small role in the projects to comply with the At Berth Regulations. Instead, the agencies most involved will be some of the same agencies participating in the DMMO, as well as local land use authorities. There is no reason to think those agencies could move faster in the future than they have in the past.

Nevertheless, WSPA does not oppose engagement with other regulatory agencies. On the contrary, WSPA has proposed a feasibility study which would involve multiple regulatory agencies. The study would not only serve as a natural lead-in to developing an interagency process for permit review, but would also have regulatory agencies engaged up front in the safety and technical feasibility evaluations. CARB staff should recognize that while the permitting review process is a major factor in a project timeline, the first and principal roadblock is successfully addressing the technical feasibility and safety challenges outlined in this letter. WSPA’s proposed study involves all the necessary stakeholders to address both challenges. This will minimize

22-11

project design recycle and improve the efficiency and effectiveness of subsequent individual project review and permitting.

22-11  
cont.

E. The Interim Evaluation Report Provides No Assurance of Relief from the Unattainable Deadlines in the At Berth Regulations

The interim evaluation report envisioned under the At Berth Regulations would be of little help to regulated entities in avoiding the practical consequences of these unrealistic deadlines. Under the At Berth Regulations, Staff would have until July 2023 to prepare a report on “the progress made in adopting control technologies for use with tanker and ro-ro vessels, as well as the status of landside infrastructure improvements that may be needed to support emission reductions at ro-ro and tanker terminals.” See Proposed 17 CCR 93130.14(d). At that time, “[i]f staff finds that the compliance deadlines for ro-ro or tanker vessels need to be extended, the report will include recommendations to initiate staff’s development of potential formal regulatory amendments.” *Id.*

As WSPA has explained to CARB Staff, while we agree with the need for a feasibility study (in coordination with industry stakeholders) with respect to tanker control technologies, the time to do that study is **before** adopting the At Berth Regulations that would set timetables for installation of potentially non-existent technologies, not after. Regardless of the feasibility of control technologies in 2023, regulated parties would not be able to wait until direction from Staff in late-2023 (or later) to begin the process of upgrading terminals in time to reach compliance in less than six years. By including a mandatory 2027/2029 compliance deadline in the At Berth Regulations, Staff would be effectively forcing regulated parties to commit to capital expenditures, construction planning, and permitting efforts years before the actual regulatory deadline for compliance. Even if Staff’s interim evaluation report were to find continuing technology barriers in 2023, regulated parties would continue to be subject to a 2027/2029 compliance deadline until and unless CARB were to adopt changes to the At Berth Regulations (which this interim evaluation provision does not require). Staff have not produced any evidence in the record that regulated parties would be able to feasibly wait until 2023 or later to begin construction work and still reach compliance by 2029.

In sum, the evidence presented in this rulemaking strongly suggests that, even assuming that a safe and workable international standard can one day be developed for an interface between a tanker and a land-based capture and control system, the 2027 and 2029 compliance deadlines cannot feasibly be met. The ISOR’s presentation of partial timelines for five projects, including two projects not comparable to the ISOR’s own characterization of At Berth Regulations projects, does not contradict that conclusion. As such, there is no basis or support for imposing these deadlines as mandatory compliance requirements, subject to potential amendment following a future interim evaluation. If adopted as proposed, with patently unachievable default compliance dates (and penalties for failure to achieve them), the At Berth Regulations will be arbitrary, capricious and not supported by law or evidence. WSPA believes the Government Code, Health and Safety Code and other California laws and regulations require CARB to revise the proposed interim evaluation and compliance deadlines for proper development preparation and consideration of feasibility and cost effectiveness. See, e.g., HSC §§ 38560, 39602.5, 39665, 43013; see also Gov. Code § 11346.36 & 1 CCR §§ 2000-2004 (Standardized Regulatory Impact Assessment (SRIA) requirements).

WSPA recommends that CARB incorporate a thorough and technically sound feasibility evaluation study into the regulation, with input from relevant agencies and stakeholders, to provide guidance for the most applicable compliance dates possible.

### III. The Draft EA Fails to Comply With CEQA

This section contains WSPA's comments on the Draft EA pursuant to CEQA, the State CEQA Guidelines (14 CCR § 15000 et seq.), and CARB's CEQA implementation regulations, 17 CCR § 60000 et seq. Where indicated, other comments in this letter are also incorporated in our CEQA comments.

22-12

#### A. CEQA Requires CARB to Fully and Fairly Consider Environmental Effects Beyond Air Quality and Greenhouse Gases

The Draft EA – titled “Draft Environmental Analysis” though technically it is a “Draft Environmental Impact Analysis” under CARB's CEQA regulations, 17 CCR § 60004.2 – functions as a substitute for a traditional CEQA Environmental Impact Report (EIR) under CARB's certified regulatory program. Nevertheless, the Draft EA must comply with the substantive requirements of CEQA. CEQA Guidelines § 15250, 17 CCR § 60004(b).

In general, CEQA requires lead agencies to evaluate the potentially significant environmental impacts of their proposed actions, and to the extent feasible, mitigate those impacts to less than significant levels. In addition, CARB is subject to more specific requirements: before adopting a regulation that requires installation of pollution control equipment or compliance with performance standards or treatment requirements, CARB must (i) identify reasonably foreseeable methods of compliance; and (ii) analyze reasonably foreseeable environmental impacts of, mitigation measures for, and alternatives to, the reasonably foreseeable methods of compliance. CEQA §§ 21159(a), 21159.4. The environmental analysis must take into account a reasonable range of environmental, economic and technical factors, populations and geographic areas, and specific sites. CEQA § 21159(c).

22-13

Even though the At Berth Regulations are intended to benefit the environment by reducing air pollutant and GHG emissions, CARB must undertake a full and fair evaluation of its potential to result in unintended adverse environmental side-effects in other media. *POET LLC v. State Air Resources Board* (2012) 218 Cal.App.4th 681. The Draft EA, ISOR and attachments devote hundreds of pages to analysis of air pollutant and GHG emissions and reductions under CARB's regulatory jurisdiction. However, the central purpose of CEQA review by regulatory agencies such as CARB is to require consideration of impacts in other media, outside their jurisdiction. As discussed below, issues other than air quality and GHG are given short shrift in the Draft EA. That is impermissible under CEQA.

#### B. Land-Based Capture and Control Systems Constitute the Reasonably Foreseeable Means of Compliance for Tanker Vessels

As required by CEQA, the Draft EA identifies reasonably foreseeable means of compliance for vessel categories subject to the At Berth Regulations, in order to provide the basis for analysis of environmental impacts resulting from implementation of those means of compliance. For oil tanker vessels, the Draft EA finds that land-based capture and control systems constitute the reasonably foreseeable means of compliance. Draft EA, pp. 9-10, 22.

22-14

Given the difficulty of equipping a global fleet of tanker vessels with equipment to utilize shore powering, and the navigational and safety issues associated with barge-based systems at tanker terminals, it is not reasonably foreseeable that installation of onshore and onboard equipment for

connection to shore power or barge-based stack emission capture systems would be utilized as means of compliance. See ISOR, p. ES-30 (“Tanker vessel operators have expressed safety concerns with barge systems and indicate the method of capture and control would be land-based, which may require significant infrastructure improvements to the existing tanker terminals across the state”), p. I-31 (operators “are not prepared to make the vessel side investments because there are far fewer vessels that make regular or frequent calls to California” to justify investment in vessel modifications for shore power”) and p. I-32 (“terminals with narrow channels may not be able to physically fit a barge without blocking navigation in the channel. At many of Northern California’s independent marine terminals, there are also potential constraints resulting from the impacts of tidal flows and from prohibitions on impeding the transit of other vessels in designated shipping lanes (between the supports of an adjacent bridge, for example).” Site-specific navigational and safety concerns were identified at most tanker berths in the berth-by-berth analysis included in ISOR Appendix E. CARB therefore “assumed that tankers would use landside capture and control systems where exhaust gas is captured in a duct from the vessel stack and routed to an emission control system.” Draft EA, p. 22.

22-14  
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As discussed throughout these comments, WSPA is broadly concerned with the feasibility of compliance with the At Berth Regulations. However, on the specific point of identifying the means of compliance for purposes of CEQA analysis, WSPA agrees with and supports CARB’s conclusion that land-based systems will be utilized, rather than barge-based systems or shore powering. Our comments in this letter assume the use of such land-based systems.<sup>11</sup>

### C. CARB’s Timeline Is “Infeasible” as Defined In CEQA

Alternatives considered under CEQA must be reasonable and able to feasibly accomplish basic project objectives, and an EIR is not required to consider alternatives which are infeasible. CEQA Guidelines § 15126.6(a), (c). CEQA defines “feasible” as “capable of being accomplished *in a successful manner within a reasonable period of time*, taking into account economic, environmental, legal, social and technological factors.” CEQA Guidelines § 15364 (emphasis added). Among the factors that may be taken into account when addressing feasibility are site suitability, economic viability, availability of infrastructure and regulatory limitations. CEQA Guidelines § 15126.6(f)(1). Findings regarding infeasibility must be supported by substantial evidence. CEQA Guidelines § 15091(b).

22-15

In this case, it is the proposed project itself which cannot be accomplished in a successful manner within the prescribed period of time. As explained in the comments above, which are incorporated by reference in this CEQA comment, the compliance deadlines for tanker terminals in the proposed At Berth Regulations are infeasible and unreasonable. Given the scale and environmental footprint of work needed to install reasonably foreseeable land-based capture and control systems, the ISOR’s claim that a reasonable period of time is allowed for compliance is not supported by the evidence. On the contrary, based on the evidence discussed above, it is clear that compliance cannot be achieved in a successful manner within a reasonable period of time. Relevant technological factors include the time needed to develop new technology and to address safety issues as discussed above. Legal factors include the time needed for project review and permitting before construction can commence. Environmental factors include the impacts of undertaking major construction projects in sensitive marine and estuary habitats, which

22-16

<sup>11</sup> For the same reasons, Alternative 3 in the Draft EA (p. 168), “Require Barge-based Capture and Control Only Compliance Pathway for Tanker, Ro-Ro, Newly Regulated Reefer, and Container Vessels and Shore Power Only Compliance Pathway for Cruise Vessels” should be rejected as infeasible.

will require additional time to resolve in the CEQA and permitting process. Finally, as discussed below (and again incorporated in this CEQA comment by reference), implementation of the At Berth Regulations will be far more costly and less cost-effective than Staff claims, based on an analysis that systematically underestimates the costs of compliance.

22-16  
cont.

D. The Draft EA Fails to Analyze Information on Potential Impacts which CARB Already Possesses, Abusing the Tiering Provisions of CEQA

The Draft EA fails to fully and fairly disclose reasonably foreseeable adverse environmental impacts associated with implementing the At Berth Regulations. A primary reason for this failure is the Draft EA's over-reliance on a programmatic level of analysis, together with significant and unavoidable findings, to cursorily dispose of many issues. The Draft EA's generic reliance on the programmatic level of review applies to aesthetics, agricultural, construction air emissions, biological resources, cultural resources, geological risk, hazards and hazardous materials, hydrology, mineral resources, noise, traffic and utilities impacts. Indeed, the extensive scope and magnitude of issues that the Draft EA defers to project-level reviews provides further confirmation that completing CEQA review and permitting in time to allow completion of construction by the proposed deadline is a practical impossibility.

22-17

Tiered environmental review is encouraged by CEQA; see Pub. Res. Code § 21093. 17 CCR § 60004(g) authorizes CARB to "tier its environmental analyses using the principles set forth in California Code of Regulations, title 14, section 15152, and other tiering-related provisions in CEQA." Accordingly, CARB has prepared the Draft EA as a programmatic evaluation, which will be followed by more detailed, project-level CEQA review of individual actions undertaken to construct facilities necessary to comply with the rule. These future project-level CEQA reviews will be conducted by cities, counties or other agencies with jurisdiction over the permits and approvals required for the construction projects. Draft EA, pp. 4-5.

Nevertheless, the tiering approach "does not excuse the lead agency from adequately analyzing reasonably foreseeable significant environmental effects of the project and does not justify deferring such analysis to a later tier." CEQA Guidelines § 15152(b). Analysis at later tiers must focus "on the actual issues ripe for decision at each level of environmental review." *Id.* "While proper tiering of environmental review allows an agency to defer analysis of certain details of later phases of long-term linked or complex projects until those phases are up for approval, **CEQA's demand for meaningful information is not satisfied by simply stating information will be provided in the future.**" *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 431 (emphasis added, internal quotations omitted). Yet that is what CARB has done in the Draft EA.

22-18

In virtually every one of the environmental analyses, the Draft EA asserts that impacts anticipated from the reasonably foreseeable means of compliance are "speculative" and repetitively concludes that, at the program level, adverse impacts must be considered "potentially significant and unavoidable" because implementation of corresponding mitigation measures is under the jurisdiction of the local decision makers, not CARB. See, e.g., Draft EA, pp. 26, 31, 35, 41, 52, 63, 66, 71, 80, 96, 100, 104, 106, 112, 117, 119, 129, 131, 132, 136.

22-19

CARB claims that "this Draft EA makes a rigorous effort to evaluate significant adverse impacts and beneficial impacts of the reasonably foreseeable compliance responses that could result from implementation of the Proposed Regulation and contains as much information about those impacts as is currently available, without being unduly speculative." Draft EA, p. 4. On the

22-20

contrary, the Draft EA fails to make such a “rigorous effort” by rejecting as “speculative” all of the detailed information that CARB itself has already placed into the rulemaking record.

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Notwithstanding the uncertainties of project level implementation (which, as discussed above, will push out the project timelines) CARB already has at least some information to provide more in-depth analysis than the Draft EA’s repeated, rote recitations of the programmatic approach. The Draft EA identifies twenty-one projects to install land-based capture and control systems, in six geographic areas as reasonably foreseeable means of compliance with the At Berth Regulations. See Draft EA, p. 22: “Five land-based capture and control systems would be needed in Carquinez, four in Long Beach, five in Los Angeles, four in Richmond, two in Rodeo, and one in Stockton.” While asserting that site-specific analysis would be speculative, CARB develop an analysis of construction emissions scenarios for installation of representative equipment including tanker landside and dockside capture and control systems. Draft EA p. 45 and Attachment B (with an “in depth description” of the four scenarios).

22-21

Moreover, ISOR Appendix E, “CARB Staff Analysis of Potential Emission Reduction Strategies by Port/Terminal/Berth for Crude and Product Tanker Vessels (September 2019)” provides a berth-by-berth analysis containing further details on each of the twenty-one projects and the equipment they involve, including the number of land-based capture and control systems and number of new cranes to be installed per facility Appendix E also notes site-specific space constraints, navigational risks and potential piping routes. As the ISOR (p. 1-8) acknowledges: “Many of these wharves [operated by oil companies] cannot accommodate pollution control equipment without extensive construction (on land and in the water) to support additional weight and demand for power.” For at least two tanker berths, CARB has already identified potential wetland impacts from installing land-based capture and control systems and cranes. See ISOR Appendix E, pp. 3, 5. The Draft EA, Attachment B, develops representative facility scenarios in further detail for purposes of air quality modeling, including the construction equipment, pile driving and deck expansion that would be required (Attachment B, pp. 13-15 and Table B-24). Having analyzed the projects in some detail and already disclosed the project-specific information in the SRIA and representative scenarios in Draft EA Attachment B, CARB cannot now claim that it cannot use this information for analysis of adverse environmental impacts, even at the program level. Actual sites and site-specific equipment have already been evaluated.

22-22

The environmental analysis must take into account a reasonable range of environmental, economic and technical factors, populations and geographic areas, and specific sites. CEQA § 21159(c). By relying on the generic programmatic disclaimer, and dismissing any further analysis and disclosure on the majority of impacts as “speculative” despite the information that CARB has already collected, the Draft EA has failed to do so.

22-23

E. The Record Overstates Benefits and Does Not Support Findings of Overriding Considerations

Having determined that, at the program level of analysis, many impacts are potentially significant and unavoidable due to uncertainty of mitigation at the project level, CARB must adopt findings that the unavoidable significant impacts are acceptable given the anticipated environmental benefits of the At Berth Regulations, referred to as “overriding considerations.” CEQA § 21081, CEQA Guidelines § 15091. However, findings of overriding considerations must be based on substantial evidence. CEQA Guidelines § 15091(b). As discussed in the sections below, and incorporated by reference in this CEQA comment, CARB’s evaluation of the benefits of the At

22-24

Berth Regulations are overstated. For the same reasons, CEQA findings of overriding considerations are not supported by the overstated evaluation of benefits.

In addition, CARB's CEQA regulations provide for consideration of beneficial as well as adverse environmental impacts of its actions in the Draft EA. 17 CCR 60004.2(a)(3). For this purpose, and again for the same reasons, CARB's evaluation of beneficial environmental impacts is overstated.

22-24  
cont.

F. The Draft EA Errs In Finding Less Than Significant Operational Hazard and Safety Impacts to Tanker Vessels

In one of the few exceptions to its generic assumption of potentially significant and unavoidable impacts based on uncertainty of project level mitigation, the Draft EA asserts that construction and operational impacts to vessels associated with hazards and hazardous materials will be less than significant. Draft EA, pp. 101 (Impacts 9.B-1 and 9.B-2), 151-152 (cumulative hazard impact). On the contrary, these are the impacts that are most clearly significant and unavoidable, if the At Berth Regulations are adopted as proposed without waiting for a feasibility study to demonstrate that safe and effective compliance technology exists for oil tankers. Indeed, as the ISOR acknowledges (p. III-22): "Regardless of location, safety studies need to be performed to ensure all safety consideration are met, given that the tanker vessels carry explosive cargos." Prior to such studies, the categorical dismissal of hazard impacts as less than significant at the programmatic level is, at the least, premature.

22-25

The hazard and hazardous materials section of the Draft EA (pp. 94-101) focuses on hazards from spills and hazardous materials use during facility construction and operation. Regarding construction and operational impacts to vessels, the Draft EA (p. 101) notes that vessels already utilize safe operation protocols and that vessels based in the United States must comply with Occupational Safety and Health Administration (OSHA) and U.S. EPA standards. However, safety protocols and standards do not yet exist for operating the new vessel emission control technology to be developed for the At Berth Regulations.

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As discussed above, and documented in Exhibit 2 (Woodbridge Marine letter), compliance with the At Berth Regulations as proposed requires emission capture technology for tanker vessels that does not now exist. As detailed in Exhibit 2, by mandating a shore-based control system before such systems have been developed and proven feasible and safe at scale, the At Berth Regulations create serious safety risks with no immediate solutions yet available, including electrostatic hazard, stack pressure maintenance, safe and secure stack connection and emergency disconnection. As a result, the rule threatens to result in "[i]ncreased risk to the operation and also the terminal and vessel directly, including fire, explosion, loss of life and significant pollution events" and also "[s]ignificantly longer operations which also increases the risk of an accident." Exhibit 2, p. 5. Moreover, with only a nonbinding possibility of future amendment to extend compliance deadlines, the At Berth Regulations do not allow sufficient time to develop safe solutions and certify compliance with safety standards that also must be adapted to apply to the untried new technology. Thus, the Draft EA's claim of less than significant safety impacts for vessels is unsupported and implausible on its face.

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For hazards associated with shore-side installation of capture and control systems (included in Impact 9.A-2), the Draft EA (pp. 96-100) takes its default approach of finding the impact significant and unavoidable, based on uncertainty of mitigation to be determined by the lead agencies that

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review shore-side projects. The Draft EA does include a vague generic statement that accidents can happen but assumes that essentially “the same safety practices would continue to be used”:

“Hazardous materials that may be classified as flammable, corrosive, or reactive are often transported in ocean-going tanker vessels. Accidents that could occur during the transportation of these hazardous materials could include things such as spills, fires, and explosions that could involve terminal equipment or vessels at berth. As such, there is an inherent need for additional safety measures for all tanker vessels visiting California ports and marine terminals.

Under the Proposed Regulation the same activities which occur at California ports and terminals would continue. The primary change would be the requirements to control at berth emissions. CARB staff believes the most likely control option for tanker vessels would be land-based on capture and control systems. Use of capture and control technology would require additional interfaces at ports, which requires safety management due to the transfer of flammable materials from vessels. Use of these interfaces would be similar to activities already occurring at California ports, where there are interfaces for other purposes. It is assumed that the same safety practices would continue to be used, but that use of capture and control technology would result in increased safety management efforts.

This technology would therefore not increase the risk of the release of hazardous materials.”

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cont.

Draft EA, pp. 99-100. It is unclear what conclusion the Draft EA reaches, since it goes on to state:

“Therefore, the requirements of the Proposed Regulation would **not** be expected pose significant risk for the public or the environment” (emphasis added) – but, immediately following, states that: “As such, long-term operational-related effects associated with the Proposed Project to hazards and hazardous materials **could** be potentially significant.” *Id.* (emphasis added).

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Even so, the Draft EA fails to acknowledge that the At Berth Regulations will cause “[i]ncreased risk to the operation and also the terminal and vessel directly, including fire, explosion, loss of life and significant pollution events” and also “[s]ignificantly longer operations which also increases the risk of an accident.” Exhibit 2, p. 5.

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Instead, the Draft EA (p. 100) assumes that “the same safety practices would continue to be used” though with “increased safety management efforts.” By disregarding the risks associated with requiring new and untried technology, the analysis of non-vessel operational hazards posed by the requirements of the At Berth Regulations is also deficient.<sup>12</sup>

22-31

Moreover, to the extent that the Draft EA (pp. 95-96, 100) relies on project-level mitigation to reduce construction and non-vessel operational impacts to less than significant in Mitigation Measures 9.A-2 and 9.A-2 (which calls for implementation of Mitigation Measure 9.A-1), the

22-32

<sup>12</sup> In addition, the tanker landside control system scenario that CARB staff developed for purposes of air pollutant emission calculations describes a hazard risk not mentioned in the Draft EA itself: “Due to the explosive nature of tanker vessel’s cargo, emissions control systems that require a burner should be placed far from cargo.” Draft EA Attachment B, p. 12.

measures lack any performance standards or potential actions that could feasibly achieve performance standards to reduce fire, explosion and other hazard risks associated with capture and control systems for tanker vessels. (MM 9.A-1 addresses only handling and storage of hazardous materials.) Accordingly, Mitigation Measures 9.A-1 and 9.A-2 fail to comply with the requirement for deferring the development of specific details of mitigation. CEQA Guidelines § 15126.4(a)(1)(B).

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cont.

#### G. The Draft EA Erroneously Rejects Impacts to Fire Protection Service as Insignificant

Like the vessel hazard analysis, the public services analysis also diverges from the otherwise conservative approach of treating impacts as potentially significant and unavoidable at the program level, to be addressed at the project level. Instead, the Draft EA (pp. 123-124, and p. 156 for cumulative impacts) concludes that both short-term construction and long-term operational effects of the At Berth Regulations on public services – including fire protection services – would be less than significant. This conclusion is based on the assumption that compliance with the regulations will not require a large new workforce. “Thus, the provisions of public services would be sufficient because [the] Proposed regulation is not anticipated to result in unplanned increases in population levels. As a result, short-term construction-related and long-term operational-related effects associated with the Proposed Regulation on response time for fire protection... would be **less than significant** (emphasis in original). *Id.* However, this exclusive focus on population-based demand for fire protection completely ignores any increased fire and explosion risk to vessels and to wharf and onshore infrastructure attributable the emission capture and control system itself, as documented in the Woodbridge Marine letter, Exhibit 2. Moreover, the Draft EA is internally inconsistent: though fire protection is dismissed as an insignificant issue in the public services analysis, it is recognized as requiring mitigation in the transportation impact analysis. See Mitigation Measure 17.A-2 (Draft EA, p. 131), requiring local lead agencies for implementation projects to “[c]onsult with and implement recommendations from local fire protection services regarding emergency access requirements.” If local lead agencies fail to do so, the Draft EA concludes, the impact would be significant and unavoidable. By the same reasoning, the Draft EA should be revised to acknowledge the impact to fire protection in the public services analysis.

22-33

#### H. The Draft EA Erroneously Ignores Wildfire Risks and Public Safety Power Shutdowns

Another issue on which the Draft EA departs from its otherwise conservative program-level approach and assumptions is wildfire risk. The Draft EA (pp. 95, 100) assumes without presenting evidence that, in every case, equipment would be located in areas without substantial open space and vegetation, and summarily concludes that impacts from increased wildfire risk during equipment construction and operation would be less than significant. This is an unreasonably broad conclusion for a programmatic analysis that does not examine conditions at any specific sites. California’s recent experience of severe and widespread wildfires extending into developed areas, combined with the need to address safety and fire hazard impacts as discussed above and documented in the Woodbridge Marine letter (Exhibit 2), suggest that the potential impact of increasing wildfire risk should not be so summarily dismissed.

22-34

California’s recent wildfires and wildfire prevention efforts have also raised a new concern with the reliability of electrical systems: the prospect of public safety power shutdowns. The Draft EA considers electricity demand, but incorrectly assumes that electric power will always be available for operating emission control systems. The analysis should be revised to include the consequences of power shutdowns and the need for backup systems.

22-35

I. The Draft EA Provides Only cursory Discussion of Impacts to Biological Resources

The Draft EA again falls back on the cursory programmatic approach for impacts to biological resources. Briefly acknowledging that “capture and control devices could require the construction of new pilings and surface area”, the Draft EA concludes that the “potential for adverse construction-related effects related to these activities on biological resources would mainly be limited to pile driving, installation of piping and staging areas associated with facility modifications.” Draft EA, pp. 59-60. The Draft EA notes that construction impacts could temporarily affect special status coastal species (identifying only two species, the California Least Tern and California Brown Pelican); downplays as “unlikely” the adverse turbidity and water quality impacts on subtidal benthic species and communities from dredging activity; and minimizes biological impacts as limited to a few species that occur in industrially developed areas, concluding (without site-specific review) that affected areas are “all highly disturbed and not likely to be supportive of a large range of biological species.” Draft EA, pp. 59-60, 63-64.

22-36

In limiting and downplaying its discussion of biological impacts, the Draft EA virtually disregards the setting in which most or all marine terminals are located, surrounded by estuaries, wetlands and other biologically rich coastal areas. Though the Draft EA names only two bird species, hundreds of species of animals and plants are associated with such habitats throughout California, including many protected species.<sup>13</sup> Migrating and breeding fish and marine mammals pass through the area at specific times of year, unmentioned by the Draft EA, although construction work is often confined to limited periods when the species are not present. For example, pile driving within San Francisco Bay is currently restricted to a period from June 1 and November 30 (“fish windows”) to protect fisheries and accommodate fish breeding seasons. (Prohibition of construction for substantial parts of the year is another factor that contributing to the long timelines for construction completion as shown in Exhibit 6.)

22-37

Indeed, the often lengthy duration of CEQA review and permitting for wharf projects is a function of the close oversight of impacts to coastal species and habitat among resource agencies such as California Coastal Commission, State Lands Commission, California Department of Fish & Wildlife, San Francisco Bay Conservation and Development Commission (“SFBCDC”), Regional Water Quality Control Boards, U.S. Fish and Wildlife Service and National Marine Fisheries Service (see, e.g., Exhibit 4, slide 6). Though landside facilities may be highly disturbed, many vessel berths are at the end of long structures projecting for thousands of feet out into marine and estuarine habitats; see Exhibits 4 and 5. Any baseline disturbance attributable to the presence of the existing structures is limited to the narrow footprints of the structures themselves. For example, many vessel berths operate in coastal areas which, by their nature, are located near endangered species habitat and wetlands. With little or no available deck space for installing new capture and control equipment, structural expansion of decking and new crane and electrical equipment support structures must be built out over undisturbed waterways and wetlands, with piles driven into undisturbed submerged lands. Moreover, some agencies such as SFBCDC treat permanent over-water shading as a significant environmental impact, which should be recognized at the program level since it will have to be addressed by project-level lead or responsible agencies. Space constraints on the existing structures will also require barge-based construction work, which is slower than onshore work, resulting in longer construction impact periods which may extend over multiple seasons due to “fish window” constraints.

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<sup>13</sup> Attachment A to the Draft EA, p. 17 notes that approximately 150 animal and 52 plant special-status species inhabit California coastal areas, wetlands, rivers and vernal pools.

CARB's berth-by-berth assessment already contains some information on biological resource impacts, demonstrating that it would not be infeasible or speculative to provide additional analysis in the Draft EA. For example, for at least two tanker berths, CARB has already identified potential wetland impacts from installing land-based capture and control systems and cranes. See ISOR Appendix E, Crude and Tanker Product Vessels table, pp. 3, 5.

22-39

#### J. The Draft EA Ignores the Potential for Significant Land Use Plan Conflicts

In assessing conflict with land use plans and policies adopted for the purpose of avoiding or mitigating environmental effects, the Draft EA (pp. 107-108) summarily asserts that *no impact* (not just a less than significant impact) will occur. Here, the Draft EA assumes that construction will take place within existing developed areas in or adjacent to port and terminal footprints, where industrial uses are allowable with existing zoning and conditional use permits, or where local land use authorities may grant variances. Yet elsewhere the Draft EA (p. 59) concedes that "capture and control devices could require the construction of new pilings and surface area" extending over the water. Again, the Draft EA ignores the fact that, though landside work may occur in developed and disturbed areas, many vessel berths are at the end of long structures projecting for thousands of feet out into marine and estuarine habitats; see Exhibits 4 and 5. There is no evaluation or even mention of potential conflicts with the policies and provisions in Local Coastal Programs ("LCPs"), General and Specific Plans (including those serving as LCPs), and regional plans such as SFBCDC's Bay Plan. A multitude of environmentally protective provisions and policies in these land use plans, adopted to avoid or mitigate effects on sensitive coastal areas and wetlands, will apply to compliance projects for the At Berth Regulations. Potential inconsistencies cannot be assumed away on a statewide program level, without any analysis of those plans and policies. Accordingly, land use plan conflicts must be considered an additional potentially significant and unavoidable impact which is not disclosed or analyzed in the Draft EA.

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#### K. The Draft EA Fails to Analyze Relevant Cumulative Impacts

The Draft EA must consider cumulative impacts. CEQA Guidelines § 15065, 17 CCR § 60004.2(a)(5). For purposes of cumulative analysis, a lead agency document may choose one of two methods of identifying past, present and reasonably foreseeable future projects whose impacts may combine, together with those of the proposed project, to cause a potentially significant impact. One option is the "list" method, compiling a list of projects in the vicinity of the proposed project or otherwise likely to contribute to impacts together with the proposed project. The other option is the "projections" method, considering the contribution of the proposed project together with projected levels of local or regional growth presented in an adopted planning document, such as a general plan or a regional transportation plan. CEQA Guidelines § 15130. In the Draft EA, CARB has chosen the projections method, relying on projections in a prior Environmental Analysis prepared for the 2016 State Implementation Plan ("SIP") Strategy. Draft EA, p. 139. This approach ignores the fact that compliance for the At Berth Regulations will be projects *at berths*. Rather than comparing to statewide projections developed for purposes of analyzing impacts of air quality improvement measures in the SIP Strategy EA, the Draft EA should have examined cumulative impacts from a project list or projections for projects whose effects could combine with those of this rule. For example, the Draft EA (again relying on the programmatic level of analysis) summarily concludes that cumulative impacts to biological resources may result from implementation of the State SIP Strategy recommended measures together with the At Berth Regulations. See Draft EA, pp. 148-149. The State SIP Strategy's recommended measures could, as the Draft EA notes, increase demand for biofuel feedstock production, affecting areas that support biological resources. But the Draft EA ignores much more

22-41

relevant contributions to cumulative biological resource impacts from coastal zone residential and industrial development that, together with At Berth Regulations compliance projects, would impact wetlands and other sensitive habitats. The Draft EA disregards projections of regional coastal growth, instead applying a narrow, parochial focused on CARB’s air quality jurisdiction which ignores the CEQA mandate to consider the full range of environmental side-effects of the rulemaking.

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cont.

L. The Draft EA Fails to Analyze Reasonable Alternatives

The Draft EA must consider a reasonable range of alternatives to the At Berth Regulations as proposed, which could feasibly attain most of the project objectives but could avoid or substantially lessen significant environmental impacts. CEQA Guidelines § 15126.6, 17 CCR § 60004.2(a)(5). The Draft EA considers a limited set of alternatives, including Alternative 6 which would eliminate tankers from the scope of regulations; Alternative 6 is rejected because it would forego the air quality and GHG benefits to be obtained from regulating tanker emissions. Draft EA, pp. 175-181.

22-42

However, the Draft EA fails to consider or even mention another reasonable and feasible alternative that has been brought to CARB’s attention in the administrative rulemaking process: the “Alternative Proposal for Amendments to At-Berth Regulations” proposed by an industry coalition consisting of the California Association of Port Authorities, Cruise Lines International Association, Pacific Merchant Shipping Association, World Shipping Council and WSPA, by letter dated February 15, 2019 (the “Coalition Alternative”). This is all the more surprising because the Coalition Alternative is considered for non-CEQA purposes as Alternative 3 in the ISOR, pp. X-8 – X-10.

22-43

With this comment, WSPA formally requests that the Coalition Alternative be addressed in the revised final EA as an alternative under CEQA. A lead agency must consider reasonable and feasible alternatives offered in public comments and must explain why an alternative does not satisfy the project’s objectives, does not offer substantial environmental benefits or cannot feasibly be accomplished. *Center for Biological Diversity v. County of San Bernardino* (2010) 185 Cal.App.4th 866, 883.

22-44

As described in the ISOR, the Coalition Alternative would require feasibility and cost effectiveness studies prior to expansion of existing regulatory requirements. “These feasibility studies would identify cost effective emissions control programs based on reasonable implementation deadlines, safety concerns associated with the use of potential emissions control strategies, infrastructure readiness, and technological feasibility.” ISOR, p. X-8. In the ISOR, CARB rejects the Coalition Alternative for non-CEQA purposes, reasoning that it would delay At Berth Rule implementation and the outcome of the infeasibility study is uncertain, thus achieving fewer and less certain reductions in air pollutants and GHG emissions.

22-45

Had the Draft EA considered the Coalition Alternative, presumably it would have reached the same conclusion. However, that conclusion is based on a flawed premise: that the At Berth Rule would actually achieve emission reductions sooner and with greater certainty than the Coalition Alternative. As discussed and demonstrated in WSPA’s comments herein and submitted previously, the deadlines in the At Berth Rule cannot feasibly be met, and the feasibility study is essential for evaluation and development of safe and effective new technology to comply with the rule. The ISOR’s rejection of the Coalition Alternative in comparison to the At Berth Rule is based on a fictitious scenario of compliance timelines that *will not occur*. In considering the Coalition Alternative as a CEQA alternative, the revised final EA should not rely on that flawed premise.

M. CARB Should Utilize Reasonable Objectives in Evaluating Alternatives

When evaluating alternatives under CEQA (including the no project alternative), a lead agency must consider whether the alternatives can feasibly satisfy most of the basic objectives of the project. CEQA Guidelines § 15126.6. However, CEQA prohibits framing objectives so narrowly as to preclude reasonable and feasible alternatives to the proposed project; see *In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings*, 43 Cal. 4th 1143, 1166 (2008) (“a lead agency may not give a project’s purpose an artificially narrow definition”). Here, one of the project objectives included in the Draft EA refers to timing: “Assist in achieving CARB’s proposed strategy to attain health-based federal air quality standards over the next fifteen years as part of nonattainment area Strategy Implementation Plans.” Draft EA, p. 164. To the extent that CARB relies on consistency with that objective, it should not be read to preclude modifying the deadlines in the proposed At Berth Regulations to allow a reasonable and feasible period of time for compliance at tanker terminals.

22-46

Another of the project objectives refers to safety: “Ensure all emission control technologies do not present any safety issues that cannot be addressed with a safety exemption provision.” *Id.* For the reasons discussed in these comments, the proposed project itself contains compliance deadlines that do not satisfy this objective.

22-47

N. The Draft EA Should Be Revised and Recirculated

Correcting the deficiencies discussed in these comments would require the addition of significant new information disclosing new or substantially more severe environmental impacts, thereby triggering recirculation under CEQA Guidelines § 15088.5. Accordingly, CARB must revise and recirculate the Draft EA for additional public disclosure and comment

22-48

**IV. The Emissions Inventory Contains Incorrect Assumptions and Methodology**

A. Staff’s Tanker Emissions Growth Assumptions are Not Realistic and Contradict CARB’s Own Regulatory Objectives Related to Fossil Fuel Use in California

Staff relies on two different sources to model the growth of emissions from tankers. For POLA and POLB, data were based on a report developed by Mercator in 2016 to identify long-term shipping trends and identify the risk of cargo diversion. See Mercator International LLC, San Pedro Bay Long-term Unconstrained Cargo Forecast (July 12, 2016). For the remaining areas, Staff relied on the Freight Analysis Framework (“FAF”) developed by the Center for Transportation Analysis. Both reports present anticipated macroeconomic scenarios that lack sufficient detail to properly and specifically model expected future tanker emissions, because they do not consider any constraints particular to the tanker industry such as vessel draft limits and pipeline connection capacities. Secondly, Staff has applied expected growth in tanker activity across all the baseline 2016 tanker visits. This assumption misses the mark on real trends and even contradicts the stated goals of CARB’s own policies related to fossil fuel (which generally seek to diminish fossil fuel use in California, not grow it). WSPA asks Staff to re-evaluate the results of their analysis and assume more realistic trends in the shipping industry, consistent with real-world data and CARB’s own statewide fossil fuel regulatory policies and goals.

Staff also incorrectly applies inflated growth factors to expected future tanker traffic at POLA and POLB. In an attempt to identify long-term shipping trends and the risks of cargo diversion from POLA and POLB, Staff again relies on the Mercator Report. The Mercator Report forecasts

increases of roughly 50% in exports of **non-crude oil** (identified in the report as “refined products”) between 2015 and 2040. See Mercator Report, pp. 17-18. Importantly, over that same period, the Report also forecasts modest **declines** in both crude oil and non-crude oil imports. *Id.*, pp. 17, 126. In the SRIA, Staff claims that these results support an estimated 57% growth in **all** “activity” at POLA and POLB between 2021 and 2032. See SRIA, p. 31.

Attempting to apply these numbers to anticipated future tanker traffic in California misapplies the Mercator Report and ignores real-world data. Based on 2016 data from the U.S. Energy Information Administration for Petroleum Administration for Defense District (PADD) 5, nearly 77% of all imports to the West Coast are crude oil. Even the Mercator Report reflects that, as recently as 2014, more than 68% of all liquid bulk volume at POLA and POLB was attributable to crude oil imports. See Mercator Report, p. 110. Given that tanker activity at the Ports predominantly represents crude oil imports, the Mercator Report does not support the notion that all tanker “activity” in California will grow by anything approaching 57% through 2032. Indeed, according to the Mercator Report, crude oil imports into POLA and POLB are forecasted to **decline** through 2032 and beyond. See Mercator Report, pp. 117-119.

The result of this incorrect reading of the Mercator Report is a dramatically overestimated growth rate for tanker emissions. Pumping emissions associated with tanker traffic should be generally declining as crude oil imports decline over time, not increasing at the rate Staff has asserted. This incorrect assumption is a fundamental flaw in Staff’s analysis of claimed emissions savings associated with the At Berth Regulations.

#### B. Staff Incorrectly Assumes That No Tier III Vessels Will Be in Service By 2030

As one of its fundamental justifications for the At Berth Regulations, Staff assumes that no marine vessels meeting the International Maritime Organization’s Tier III emissions standards will be calling at California terminals until 2030 at the soonest. Staff Report, App. H (“2019 Update to Inventory for Ocean-Going Vessels at Berth: Methodology and Results”), pp. H-6, H-36 to H-37. Comments submitted to CARB earlier in this rulemaking document that this assumption is incorrect and ignores real-world evidence to the contrary.

For example, Chevron’s Richmond Long Wharf (RLW) acquired two Tier III-equivalent vessels in 2018. See Staff Report, Appx. H, p. H-25. Specifically, Chevron operates two Suezmax-sized tankers that lighter nearly 70% of the Richmond Refinery’s deliveries of crude to RLW. These tankers use superheated steam auxiliary boilers and turbogenerators to generate electricity in low-emission mode, which yield no diesel particulate matter (DPM) and emit NOx emissions lower than those produced by Tier III-qualifying diesel engines (*i.e.*, on the order of 0.78 g/kWh, versus the Tier III 2.31 g/kWh NOx limit for a 900 rpm diesel generator). Chevron expects that fully one-third of Chevron’s fleet will meet the Tier III standards by 2021 – more than nine years before Staff’s assumed first date of Tier III vessel service at California terminals. Chevron anticipates that 55% of vessels visiting RLW will be Tier III compliant by 2030, and 80% will be compliant by 2035 – conclusions consistent with a separate third-party study estimating roughly 50% Tier III vessels visiting RLW by 2030. See Letter dated Feb. 15, 2019 from Henry T. Perea to Cynthia Marvin (attached hereto as Exhibit 8), p. 3 (Figure 1-1)

The available evidence contradicts Staff’s assumption of zero Tier III vessel visits at terminals before 2030. Because Tier III-compliant vessels emit substantially less NOx per kilowatt-hour on average than Staff’s assumed future vessel mix, Staff’s assumption of future NOx emissions at terminals also is at odds with actual real-world experience. Indeed, based on these facts, the At

Berth Regulations would be relevant in meeting targeted emissions reductions for less than 5 years at most, before the influx of Tier III vessels will yield overall fleet NOx reductions that meet or exceed the reductions coming from the At Berth Regulations. Moreover, the types of on-board emission control associated with Tier III compliance would provide emissions reductions throughout the entire Emission Control Area (ECA) (i.e., during vessel transit and maneuvering), while the benefits anticipated by the At Berth Regulations would only accrue while vessels are at berth.<sup>14</sup>

Neither the ISOR nor the At Berth Regulations account for these facts. Were Staff to apply the correct assumptions consistent with real-world data, it would be forced to conclude that the cost-effectiveness of the At Berth Regulations is far less than that claimed in the Staff Report materials. It is also likely that alternatives to the At Berth Regulations would prove to be far more cost-effective in achieving real-world NOx emissions reductions.

### C. Staff Overestimates Pumping Activity of Tankers At Berth at Terminals

Staff's at berth emissions inventory is also unrealistically high because it overestimates actual tanker pumping activity at berth. Specifically, Staff makes the incorrect assumption that tankers that berth at marine terminals have the same activity mode profile as tankers that berth at POLA/POLB (i.e., actively pumping product 85% to 100% of the time they are at berth). See Staff Report, Appx. H, pp. H-21 to H-25. This is contradicted by evidence Chevron submitted to staff concerning real-world experience at Richmond Long Wharf ("RLW"). See Exhibit 8, p. 4. This data shows that vessels at berth (particularly non-Suezmax vessels) actually spend significant periods of time either loading by gravity feed or idling – two modes with lower overall emission rates versus times of active pumping. Thus, rather than simply assuming only two operating modes for tankers at berth – "Discharging" and "Other/Loading" – Staff should gather additional information from the ports and terminals to account for the different emissions occurring during pumping, ballasting and idling/hoteling, and use this information to arrive at a more accurate estimate of actual at berth emissions.

While Staff acknowledges the RLW data, it apparently refuses to accept the data as illustrative of any terminal's operation besides RLW. See Staff Report, Appx. H, pp. H-24, H-25 (separately listing discharging/loading times and resulting boiler effective power for tankers for "Richmond" and for "Rest of CA (based on POLA/POLB)"). Rather, Staff simply assumes that vessels at all other California terminals will have the same effective power loads as vessels calling at POLA/POLB – i.e., pumping 85%-100% of the time. See Staff Report, Appx. H, p. H-21, H-24.

This assumption does not find support in real-world practice. The mix of vessel types and operations calling to service refineries varies. Due to draft limitations, the POLB has California's only deepwater berth that can accept Very Large Crude Carriers (VLCCs) and Ultra Large Crude Carriers (ULCCs), which Staff notes engage in discharge pumping 100% of the time while at berth. In contrast, most of California's other marine terminals cannot host VLCCs and ULCCs, and vessels that do call on the terminals typically spend less of their time at-berth in an active pumping mode. This real-world evidence belies Staff's assumption that the other California's marine terminals see identical vessel types and operations as those found at the POLA/POLB.

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<sup>14</sup> Staff also ignores the effects of other emissions mitigation measures already routinely employed on tankers at berth, including the fact that tankers currently utilize boiler emissions for use as inert gas in cargo tanks, which reduced the risk of explosion of hydrocarbon vapor in those tanks. The use of this boiler gas as a cargo inerting gas serves to reduce boiler emissions by 25%.

Moreover, it appears that there is an error in Staff's adjustment of the emissions inventory to account for the two Chevron Tier III-equivalent ships that started service in 2018. See Staff Report, Appx. H, p. H-25. Staff refers to the vessel class of the two ships as "Seawaymax." This is incorrect; the vessel class introduced was actually Suezmax. Since it appears Staff estimated adjusted effective power incorrectly assuming these two vessels to be Seawaymax, Staff must correct their calculations to properly reflect that the two vessels are Suezmax.

#### D. Staff Overestimates Future Growth of Vessel Visits at Terminals

Staff also continues to assume unrealistically high future vessel traffic growth at California terminals, predicting that tanker visits will grow between 25.4% and 318.2% by 2050. WSPA requests Staff include a section of the inventory report illustrating why growth was applied as it was. First, real-world data simply does not support such extreme predictions in growth at California terminals. For example, actual vessel calls at RLW between 2007 and 2017 experienced net growth of closer to 1% over that ten-year period, with fairly cyclical growth and declines in vessel visits within that period year-to-year. See Exhibit 8, p. 8. Using this data as a guide, total vessel growth rate at RLW by 2050 would be expected to be around 4% in aggregate. This growth assumption is very different than that assumed by Staff and yields a much lower forecast of future growth at the terminals based on real-world data.

Moreover, it appears Staff have not considered the carrying capacity of a tanker when applying the growth factor. Equating growth in tanker vessel visits to growth in total tonnage throughput neglects the fact that different vessels carry a range of different volumes.

- To illustrate this issue, a 400,000-ton increase in freight throughput in a year could represent 1% growth in overall tonnage, but based on vessel DWT, it would be possible for just two Suezmax vessels to carry that additional volume. Applying a 1% growth factor to a baseline number of vessels as Staff has done could yield a higher number than 2 additional vessel visits (for example, for the Richmond Complex, which had 400 tanker visits in 2016, a 1% growth factor would assume four additional tanker trips per year).
- As Staff's proposed methodology is applied over a longer period (e.g., 10 years), the difference between the anticipated number of vessels and actual vessel calls could compound, as Staff continues to ignore the larger carrying capacities of each vessel. In the example of the Richmond Complex, applying Staff's proposed method would yield an estimate of 4,627 vessels needed to physically carry the anticipated volume between 2016 and 2026, rather than 4,510 vessels that would actually be required to physically carry the volume.

For these reasons, Staff's estimates of future terminal growth result in a gross overestimation of likely future baseline emissions at marine terminals.

## V. Staff's Methodology for Estimating Health Impacts is Flawed

This section incorporates comments on technical flaws with the novel methodology utilized in the ISOR, as explained in a memorandum provided by air quality expert Gary Rubenstein of Foulweather Consulting, attached hereto as Exhibit 9.

### A. Staff's Assumption that DPM Health Values Can Be Assigned to Emissions from Marine Engines Operating on MGO, MDO or HFO is Inappropriate and Unfounded

In the Health Analyses document for the At Berth Regulations (Appendix G to the ISOR), Staff assumes that the cancer potency factor ("CPF") and chronic reference exposure level ("REL") for DPM are applicable to the particulate emissions from ocean-going vessel marine engines fueled with marine gas oil ("MGO"), marine diesel oil ("MDO"), and marine heavy fuel oil ("HFO"). See Staff Report, Appx. G, p. 3. This is inappropriate. The original DPM CPF and REL established by CARB were based largely on health effects studies looking at the exposure of railway workers to *locomotive* diesel engine exhaust from 1960s-vintage locomotives. Despite this limitation, Staff now seeks to apply the same CPF and REL to *all* modern compression ignition auxiliary engines using diesel fuel on ocean-going vessels, including those compression ignition engines equipped with diesel oxidation catalysts and diesel particulate filters – both of which have been documented to fundamentally change the chemical nature of DPM.<sup>15</sup>

Instead of extrapolating health-effects data based on 50-year-old technologies and fuels, Staff should assess the health impacts of modern auxiliary engines operated on fuels other than diesel fuel based on speciated composition of the exhaust for these engines, as CARB does in its risk assessments for engines using other fuels (such as gasoline, ethanol, and natural gas). The ISOR provides no explanation as to why Staff rely on such old and inapposite data, when more recent data from modern auxiliary engines is available and potentially more probative.

### B. The Results of the Health Analyses Should be Placed Into Proper Context

In its 2015 Risk Management Guidance, CARB warns that changes to risk assessment methodologies have resulted in increased calculated risk values, even though a facility has not changed its operations in a way that actually negatively affects public health in the real world.

"One significant area of focus is how best to communicate what impact these methodology changes will have on health risk estimates, what those new risk estimates mean, and how best to manage sources and programs in a reasonable and health protective manner. The procedures in the new OEHHA Manual will typically result in a higher estimated cancer risk from a facility even though they [the facility] use control technology and are actually maintaining or reducing its emissions. As a result, it is a challenge to communicate the new information in a way that ensures the public's right to know but does not imply that the facility has changed its operations or emissions in a way that negatively affects public health."<sup>16</sup>

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<sup>15</sup> See, e.g., *Advanced Collaborative Emissions Study (ACES): Lifetime Cancer and Non-Cancer Assessment in Rats Exposed to New- Technology Diesel Exhaust*. Health Effects Institute. Research Report 184. (January 2015)

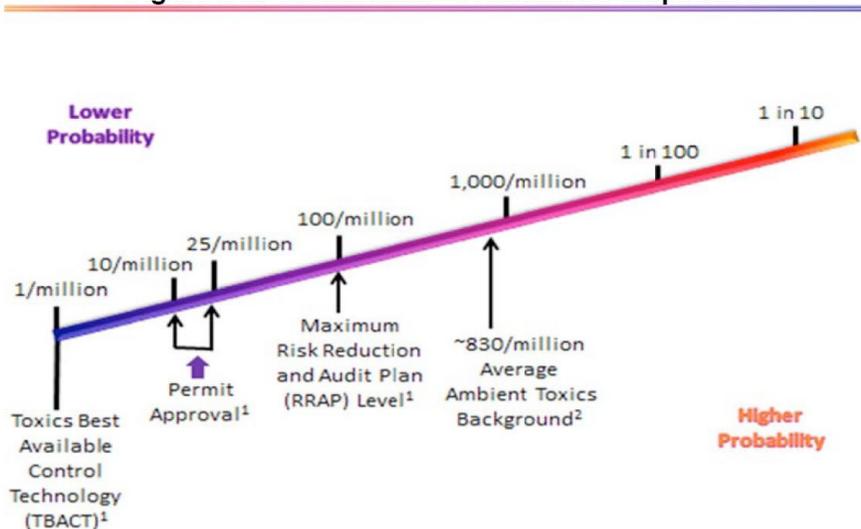
<sup>16</sup> *Risk Management Guidance for Stationary Sources of Air Toxics*, CARB and CAPCOA. July 23, 2015. pp. 2-3. <https://www.arb.ca.gov/toxics/rma/rmgssat.pdf>

The Health Analyses document does not present this background information to help the public understand the implications of the calculated risk values. This tends to mislead the average reader into thinking that the risk associated with vessels at-berth is significantly greater than normal, when the evidence actually supports the conclusion that incremental risks are far lower at the California Ports and terminals than those risks faces by an average individual living in California.

In contrast to the 2015 Risk Management Guidance, in the ISOR Staff concludes that “[e]missions from ocean-going vessels operating at berth are a significant and growing contributor to community air pollution and associated health impacts.” ISOR, p. VI-1. However, nowhere does Staff compare the emissions or potential health impacts attributable to OGVs at-berth with other sources of criteria air pollutants or toxic air contaminants that Californians are exposed to each day. For example, the ISOR indicates that baseline (2016) maximum exposed individual incremental cancer risk (MEIR) attributable to ships at-berth is 74-in-a-million at the Ports of Los Angeles and Long Beach (POLA and POLB), and 16-in-a-million at the Richmond Complex (the Port of Richmond and the Chevron refinery berths). ISOR, p. V-14. While these incremental risks apply to individuals living within a relatively small distance from these two port complexes, CARB estimates that the average individual living in California is exposed to an incremental cancer risk attributable to diesel particulate matter (DPM) of approximately 520-in-a million.<sup>17</sup>

Furthermore, as the following graphic (from CARB’s 2015 Risk Management Guidance) shows, CARB recommends development of a risk reduction plan if calculated risk levels exceed 100-in-a-million.<sup>18</sup> The At Berth Regulations ignore these guidelines by, in effect, imposing a risk reduction plan on a collection of sources (such as a port complex) at much lower levels, when such a plan would not be required for an individual stationary source with the same calculated risk level.

Figure II-2: Health Risk – A Relative Perspective



<sup>17</sup> <https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health> . Accessed 11/7/2019.

<sup>18</sup> *Risk Management Guidance for Stationary Sources of Air Toxics*, CARB and CAPCOA. July 23, 2015. p. 17. <https://www.arb.ca.gov/toxics/rma/rmgssat.pdf>

C. CARB's Claim That The At Berth Regulations Would Avoid \$2.3 Billion in Health Impacts is Not Supported by Sound Science

Staff's Health Analyses (ISOR Appx. G) ascribe a statewide benefit of \$2.245 billion<sup>19</sup> to the avoided adverse health outcomes attributable to the proposed At Berth Regulations. Fully 99.8% of this benefit is claimed to be associated with avoided premature deaths, and 87% of the claimed reduction in avoided premature deaths is associated with reductions in oxides of nitrogen (NOx) emissions. These avoided premature deaths attributable to NOx reductions are, in turn, attributed to the formation of particulate ammonium nitrate in a photochemical reaction that CARB acknowledges occurs well downwind of the emission source (and only after the concentrations have been substantially reduced due to dispersion) – and hence, not in the communities nearest the ports.

Relatively little formation of ammonium nitrate occurs in close proximity to the emission source, where dispersion is relatively low. Formation of ammonium nitrate increases over time (and with distance from the source), as does dispersion. While Staff's analysis is not clearly presented, Staff does not appear to address these factors in calculating reduced ambient concentrations of ammonium nitrate particulates and the associated avoided adverse health outcomes. These factors must be properly accounted for in order to get a true picture of avoided premature deaths.

D. Staff's Assumptions as to Ambient Concentrations of PM<sub>2.5</sub> are Unexplained and Unsupported

In the Health Analyses (ISOR, Appx. G, p. G-15, G-51), Staff indicates that they used the AERMOD model to estimate reductions in ambient concentrations of PM<sub>2.5</sub>. However, AERMOD does not contain algorithms that model the photochemical reactions that convert oxides of nitrogen emissions to secondary ammonium nitrate. While the Health Analyses document is silent as to exactly how Staff calculates the health benefits of NOx emission reductions, it appears (from the discussion at pp. G-53 to G-57) that Staff scaled the modeled PM<sub>2.5</sub> concentrations by the ratio of NOx emissions from sources subject to the proposed rule to modeled PM<sub>2.5</sub> emissions, with the further assumption that most, if not all, of the NOx emissions are converted into secondary ammonium nitrate because “[i]mpacts are assumed to take place over a wide geographic area.” ISOR, Appx. G, p. G-56. If this was, in fact, Staff's assumption, it is inconsistent with both the physical science and with the approach used by both CARB and California air districts to model ambient PM<sub>2.5</sub> concentrations for State Implementation Plan purposes.

Moreover, Staff's assumption regarding the expected reduction in ambient nitrate concentrations attributed to the At Berth Regulations is not based on a methodology consistent with current USEPA guidance. USEPA guidance for addressing secondary nitrate formation in dispersion modeling analyses under the Prevention of Significant Deterioration (PSD) program<sup>20</sup> establishes a two-step process for evaluation:

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<sup>19</sup> CARB's Initial Statement of Reasons asserts that “Total costs for all entities exceeding \$2.2 billion through 2032, with a statewide valuation of avoided health impacts valued around \$2.3 billion.” In fact, the actual values reported in CARB's report are \$2,245,207,000 for avoided health impacts, and \$2,164,319,000 for net costs.

<sup>20</sup> Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier I Demonstration Tool for Ozone and PM<sub>2.5</sub> under the PSD Permitting Program (EPA 454/R-19-003). (April 2019)

- A simple screening tool based on the use of Modeled Emission Rates for Precursors (MERPs); or
- Direct analysis using a photochemical model such as CMAQ.

The fact that USEPA's guidance on this point applies to a specific regulatory program (i.e., the PSD permit program) does not undermine the fundamental science – the methodology is applicable both to individual point sources and to “a group of sources in the area.” The ports assessed in CARB's Health Analysis clearly fall within that second category. However, CARB's analysis of the potential health benefits of NOx emission reductions attributable to the proposed rule is not consistent with either of the two steps EPA recommends.

## **VI. Implementation of the At Berth Regulations Will Be Far More Costly and Less Cost-Effective Than Staff Claims**

As discussed above, California law requires CARB to document the anticipated costs and adverse economic impacts of the At Berth Regulations, and to show that the At Berth Regulations as proposed are cost-effective and “minimize[s] costs and maximize[s] the total benefits to California.” See HSC §§ 38505, 38560, 38562, 39602.5, 43013, 43018; Cal. Gov. Code §§ 11346.3, 11346.5. CARB also must demonstrate that the At Berth Regulations will not force greenhouse gas-producing ship commerce to simply relocate their activities outside California. See HSC §§ 38505(j), 38562.

In addition, under California law CARB must complete a Standardized Regulatory Impact Assessment (“SRIA”) if a proposed regulation will have an estimated economic impact on Californians of over \$50 million. See Cal. Gov. Code § 11346.3(c), 11346.36; 1 CCR §§ 2000(g), 2002. The SRIA must address, at a minimum:

- The creation or elimination of jobs within the state.
- The creation of new businesses or the elimination of existing businesses within the state.
- The competitive advantages or disadvantages for businesses currently doing business within the state.
- The increase or decrease of investment in the state.
- The incentives for innovation in products, materials, or processes.
- The benefits of the regulations, including, but not limited to, benefits to the health, safety, and welfare of California residents, worker safety, and the state's environment and quality of life, among any other benefits identified by the agency.
- Identification of each regulatory alternative for addressing the stated need for the proposed major regulation, including each alternative that was provided by the public or another governmental agency and each alternative that the agency considered; all costs and all benefits of each regulatory alternative considered; and the reasons for rejecting each alternative.
- A description and explanation of:
  - The economic impact method and approach, including the underlying assumptions the agency used and the rationale and basis for those assumptions;
  - The specific categories of individuals and business enterprises who would be affected by the proposed major regulation;
  - The inputs into the assessment of the economic impact;
  - The outputs from the assessment of the economic impact; and
  - The agency's interpretation of the results of the assessment of the economic impact.

Cal. Gov. Code § 11346.3(c)(1); 1 CCR § 2002.

As proposed, the At Berth Regulations would impose significantly greater costs of compliance than the ISOR estimates, with less overall emissions benefit than Staff claims. Moreover, the SRIA for the At Berth Regulations (ISOR, App. C-1) fails to fully address the topics required by law, downplaying or ignoring key adverse impacts the At Berth Regulations are likely to have on the California economy and California residents.

A. Staff Systematically Understates or Ignores Key Categories of Compliance Costs Associated With the At Berth Regulation

While WSPA appreciates that Staff have incorporated many of the additional costs identified in WSPA's May 30, 2019 comment letter to CARB on the At Berth Regulations, WSPA remains concerned that Staff still systematically underestimates the costs of compliance with the At Berth Regulations.

Perhaps most fundamentally, in the absence of a feasibility study, cost conclusions in the ISOR and SRIA are speculative at best, if not totally unfounded. Staff starts with the premise that a shore-based emissions capture and control system will be feasible for use with tankers, yet neither the SRIA nor the ISOR identifies any evidence that such a system has been demonstrated in practice at scale for a tanker, whether that be at a public port or private marine terminal. All subsequent claims of costs, economic and fiscal impacts, benefits and cost savings in the ISOR and SRIA depend on that flawed assumption, and so they themselves are not sufficiently supported. That alone renders Staff's estimates of cost impacts inadequate under the applicable regulations because Staff fails to articulate supportable assumptions, inaccurately identifies the anticipated economic impacts, and undervalues the benefits of alternatives to the proposed regulation.

Moreover, Staff's assumed annual industry growth factors (see SRIA, Appx. C-1, p. 67) are based entirely on the FAF, and do not appear to account for any input from operators on real-world expected growth. The FAF provides a broad national overview of several sectors of freight transportation and is not uniquely designed to forecast specific industry growth between now and 2050 among ports and private marine terminals in California serving the marine vessels at issue. Staff also does not describe what adverse impacts it believes the At Berth Regulations *itself* will have on future industry growth, and the rationale for that assumption.

Staff also significantly underestimates the total and per-unit indirect costs of the At Berth Regulations and overestimates the percentage of those costs that are likely to be passed on to consumers. Staff characterizes indirect costs to consumers as a per-gallon cost equivalent to total annualized compliance costs in 2030 divided by estimated total gallons of gasoline purchased by California consumers in 2030. See Appx. C-1 (SRIA), p. 96. This is based on Staff's assumption that *all* costs imposed by the At Berth Regulations will be passed on to the ultimate consumer. See Appx. C-1 (SRIA), pp. 17, 96. Neither the ISOR nor the SRIA contains any articulated basis for this assumption – and actual experience at the Ports and terminals shows that not all regulatory compliance costs can be passed onto California consumers or represented on a simple per-gallon-of-transported-fuel basis. To the extent that consumers are unwilling to take on additional per-gallon fuel costs associated with this regulation, industry will be forced to absorb those costs, and Staff has done no analysis of what adverse impacts to industry and California's economy could occur as a result of industry having to shoulder these additional costs.

In addition, as discussed above, because estimates of real-world growth at ports and terminals (see Exhibit 8, p. 8 for example of actual vessel call trends between 2007 and 2017) are far lower than the extreme growth predictions advanced by Staff, indirect costs for individuals will be spread over far fewer gallons of throughput in the future than Staff claims, resulting in much higher per-unit indirect costs of the At Berth Regulations. Overstating anticipated future growth at ports and terminals tends to both overstate anticipated future emissions and exaggerate the product throughput over which regulated parties will have to attempt to recoup costs (if possible). The inflated growth estimates also exaggerate the amount of emission reductions Staff claims the At Berth Regulations will achieve. Thus, in both the ISOR and SRIA, Staff systematically inflate promised emissions benefits while understating future direct and indirect compliance costs, meaning that the At Berth Regulations will be far less cost effective than Staff claims.

Finally, it appears Staff has made a number of assumptions in the SRIA based on a 2017 baseline year, yet the emissions inventory consistently uses a baseline year of 2016. Compare SRIA, p. 26, 38-39, 65, 73, 88 & App. C (using 2017 as a baseline year) with ISOR, p. V-2 (noting use of 2016 as baseline year for modeling). The difference in the number of tanker visits between these two years is substantial. Vessel visits in 2016 totaled 1,628; in 2017, vessel visits totaled 1,272. The difference in these totals is significant. WSPA is concerned that by using the 2017 vessel count instead of a 2016 count, Staff may be assuming a lower cost of implementation than would otherwise result from using the 2016 baseline. We recommend that Staff set the Inventory and the SRIA in the same baseline year or explain why it must use different baseline years between the emission inventory and the SRIA.

**B. Staff Fails to Discuss the Potential Negative Impacts of the At Berth Regulations on California Commerce and Competitiveness, or the Potential for Leakage Associated with Cargo Diversion**

Neither the ISOR nor the SRIA discusses the potential for the At Berth Regulations to impede international and interstate commerce into California, which could easily lead to vessel traffic increasingly finding other ports of call outside California. Indeed, Staff in the SRIA all but abandon any effort to quantify adverse impacts to commerce or competitiveness. See Appx. C-1 (SRIA), p. 126 (claiming that, “[t]o date, the available data and research has been insufficient to quantify the impact on the competitive advantage or disadvantage of the Proposed Regulation as it relates to cargo diversion.”)

California law requires Staff to do more than throw up its hands at the prospect of assessing potential adverse impacts to commerce and competitiveness. See 1 CCR 2002 (CARB is mandated to identify and analyze “competitive advantages or disadvantages for businesses currently doing business within the state”). Because real-world direct and indirect compliance costs likely will be significantly higher than Staff’s estimates, more capital costs will be needed for At Berth Regulations compliance (instead of potential upgrades designed to keeping the ports and terminals market-competitive), future development and expansion of California ports and terminals could suffer, operation and transportation costs could increase, and cargo may seek other, less costly points of entry (and indeed, documentation presented to CARB to date shows that such diversion is likely to occur).

Regulated ports and terminals have articulated to Staff throughout this rulemaking process that the At Berth Regulations will substantially increase compliance costs for California ports and

terminals relative to other freight hubs and ports/terminals in other states. The natural tendency of any free market will be to seek out less expensive freight hubs and modes of transport. If marine vessels seek less expensive ports and terminals outside California, the At Berth Regulations will have resulted in greenhouse gas “leakage” (i.e., a reduction in California greenhouse gases at the cost of more-than-offsetting increases in greenhouse gases outside California.) Indeed, if and when marine vessels are diverted, the result would be a net **increase** in GHG emissions because of the greater distance vessels would need to travel to (a) get to a non-California port or terminal, and (b) get the commodity from that new state to the consumer. Neither the ISOR nor the SRIA have accounted for or assessed the potential for these adverse impacts on California commerce, or the potential for “leakage.”

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WSPA believes the Government Code, Health and Safety Code and other California laws and regulations require CARB to revise its current rulemaking timetable to allow for proper preparation and consideration of feasibility, cost effectiveness and timelines. See, e.g., HSC §§ 38560, 39602.5, 39665, 43013; see also Gov. Code § 11346.36 & 1 C.C.R. §§ 2000-2004 (SRIA requirements to assess At Berth Regulations cost impact on public health and safety, fairness and social equity, state’s economy and other criteria). We would request that, at the very least, CARB include in its proposed At Berth Regulations language that allows for a feasibility evaluation study and an appropriate delay in regulatory implementation in the event the feasibility evaluation study concludes that shore-based technologies and/or other elements of the At Berth Regulations are not feasible in the regulatory timeframes provided.

WSPA appreciates this opportunity comment on the Proposed At Berth Regulations. If you have any questions regarding this submittal, please contact me at this office or Tom Umenhofer of my staff at (805) 705-9142 or via email at [tom@wspa.org](mailto:tom@wspa.org).

Sincerely,



cc: Tom Umenhofer – WSPA  
Richard Corey - CARB

**Exhibit 1: WSPA Comment Letter (March 29, 2019)**



Thomas A. Umenhofer, CCM, REPA  
Vice President

March 29, 2019

Ms. Cynthia Marvin  
Chief, Transportation and Toxics Division  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Re: WSPA Comments on CARB Discussion Draft - Control Measure for Ocean-Going Vessels At Berth and At Anchor

Dear Cynthia,

Western States Petroleum Association (WSPA) appreciates this opportunity to provide initial feedback on the California Air Resources Board (CARB) Discussion Draft - Control Measure for Ocean-Going Vessels At Berth and At Anchor, dated February 22, 2019 and the CARB Staff Analysis of Potential Emission Reduction Strategies by Port/Terminal/Berth For (Crude and Product) Tanker Vessels, Dated February 22, 2019. WSPA is providing these comments as part of a continuing effort to provide feedback on the At-Berth At Anchor pre-regulatory process. WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states.

CARB staff recently provided three documents for stakeholder review:

- Discussion Draft - Control Measure for Ocean-Going Vessels At Berth and At Anchor (dated February 22, 2019),
- Updated Tanker Implementation Schedule – For Vessels Above Port/Port Complex and Terminal Thresholds (dated February 19, 2019).
- CARB Staff Analysis of Potential Emission Reduction Strategies by Port/Terminal/Berth for (Crude and Product) Tanker Vessels (dated February 22, 2019).

Provided below is WSPA's feedback on these documents.

### **Discussion Draft - Control Measure for Ocean-Going Vessels At Berth and At Anchor**

#### **I. Provision: every visit must use a CARB-approved emission strategy, with some limited exception**

Table 3 (Compliance Responses for All Vessel Types Where Emissions are Not Controlled as Required During Vessel Visit) identifies compliance responsible parties for vessels and marine terminals. Based on the current status of control options for oil tankers, it is apparent that all oil tankers and tanker marine terminals would fall into one category: "Exception". This is due to the fact that no emission control technology currently identified is feasible for tanker operations. Specifically, the interface between any control strategy (barge-based emission capture, land-

based emission capture or electrification) and a tanker (in addition to the control device itself) have had no certifications and are not endorsed by a class society. Therefore for safety reasons alone (in the absence of class society certifications), the “Exemption” category is appropriate under the safety/emergency circumstance in Table 3.

## **II. Provision: CARB staff will conduct an interim evaluation of the At berth program and report to the Board**

In this conceptual provision, CARB staff will review and report to the CARB Governing Board the status of at berth emission control technologies for Ro-Ros and tankers, progress in installing the land-side infrastructure required to support at berth control systems by 2023. This report to the Governing Board will advise the Governing Board as to whether there is a need to develop any amendments to the regulation.

WSPA agrees with this requirement for a report to the CARB Governing Board. However, the timing presents a significant challenge. Provided the infrastructure required to support the land-based capture system, if technology barriers exist into 2023, the four to six years between the review and compliance date for the southern and northern ports respectively is not sufficient to complete a project, and be in compliance.

WSPA does not believe the timeline should require an entity to design infrastructure for a technology while the technology is still in development. As the ongoing development to enable a capture device to function properly on tankers could change the infrastructure requirements to support the system.

As noted in the Industry Coalition Alternative Proposal<sup>1</sup>, the report must include key elements such as:

- Reporting compliance methodologies and evaluation benchmarks consistent with the current staff proposal for Bulk vessels.
- Feasibility study to identify cost effective emission control programs for all vessel categories based on reasonable implementation deadlines, safety concerns, and technological feasibility.

The feasibility study aspect of the report to the CARB Governing Board should be conducted in cooperation with all industry stakeholders, and be based on data which is made publicly available during study development,

With regard the 2023 reporting date, WSPA believes that subsequent feasibility “check-in” dates with the CARB Governing Board be included (i.e., 2025, 2028, 2031) to assess whether the proposed implementation deadlines remain viable or can be accelerated through additional amendments to the rule.

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<sup>1</sup> Industry Coalition Comment Letter, “Alternative Proposal for Amendments to At-Berth Regulations”, to Cynthia Marvin, CARB, February 15, 2019.

### **Updated Tanker Implementation Schedule**

This updated implementation table for tankers cites 2027 and 2029 as deadlines for the installation of control systems for DPM and NOx at POLA/LB and other marine terminals, respectively. It is understood that the two different dates was an attempt by CARB staff to stage implementation. Given that no technology has been design, demonstrated or certified by an international authoritative body, neither implementation date (2027 or 2029) allows sufficient time for development, design, approval, CEQA review, multiple agency permitting, procurement, construction, and commissioning of any emission reduction system, regardless if the marine terminal is located in a port or other locations.

As specified in the Industry Coalition Alternative Proposal, WSPA supports tankers to report in a similar fashion as bulk fleets along with Ports and Marine Terminal Operators serving currently unregulated fleets. If a date were to be retained in the Tanker Implementation Schedule, the proposed implementation date (subject to re-evaluation) should be no earlier than 10 years following the identification of a feasible technology.

### **CARB Staff Analysis of Potential Emission Reduction Strategies by Port/Terminal/Berth for (Crude and Product) Tanker Vessels**

#### **Barge-Based Emission Control Systems**

The conclusion of the review by CARB for some tanker marine terminals should be able to rely on single or shared barge-based capture and control systems. As WSPA has clearly stated in previous documentation (Enclosure A) provided to CARB staff, there are significant safety concerns with barge-based capture and control systems as a strategy to reduce or eliminate emissions at berth. The following list highlights some significant concerns:

- Docking pilots indicate that environmental conditions (current, wind, etc.) combined with increased vessel activity in the limited maneuvering basin may raise risks (e.g. collision, allision, grounding, line failure, etc.) to higher than acceptable levels.
- The mooring system may not be adequate for handling additional loads created by mooring a barge alongside a tanker at berth. The current barge-based emission control systems operating in California are too small to process tanker boiler emissions. Thus, barge-based systems 3-4 times larger than exist today would need to be designed and constructed. A robust analysis of mooring loads will consequently need to take place.
- Currently available undersized barges have not been tested with large marine boilers.
- There are concerns on how a balanced combustion path will be maintained to prevent dangers like boiler explosions. Boiler manufacturers have indicated that it may be possible to connect a capture and control system **if proper modifications are carried out on board each ship, to include higher capacity blowers and modified control systems**. In practice, third-party internationally traded vessels will not upgrade on board systems for a call on a single port.

- Further, currently available barge-based systems are not built to any government standard relating to capture operations. They have no certifications and are not endorsed by a class society. There is no industry vetting standards for these barges. Until industry safety standards are developed, such vessels are not allowed by responsible operators to come alongside their tankers when combustible liquids are on board.
- Per 2 CCR 2340, a tanker must be able to depart berth within 30 minutes. Whether barges of this size can be safely moved a sufficient distance by tugs in time to allow safe tanker departure in emergency conditions will need to be tested and analyzed.
- The current design uses a crane and connection to the vessel's stack and has no emergency break away coupling. Further, there exists no engineered working safety margin for movement between vessels. All interfaces to tankers must be designed and regulated to a standard. There is no standard available.
- Emergency protocols and associated systems between the barge and tanker need to be developed.

### Shore-Based Emission Control Systems

The conclusion of the review by CARB for some tanker marine terminals should be able to rely on land-based capture and control systems. As WSPA has clearly stated in previous documentation (Enclosure B) provided to CARB staff, there are significant safety concerns with land-based capture and control systems as a strategy to reduce or eliminate emissions at berth. The following list highlights some significant concerns:

- In most if not all cases, two cranes would be required at each berth, to allow vessels to berth port or starboard side to. These cranes would need to be very large to accommodate reach for all vessel designs.
- Similar to barge systems, the shore crane and connection to the vessel's stacks have no emergency break away coupling and no engineered working safety margin for movement between vessels. All interfaces to tankers must be designed and regulated to a standard. There is no standard available.
- As with the barge-based system, there are concerns on how a balanced combustion path will be maintained to prevent dangers like boiler explosions. Boiler manufacturers have indicated that it may be possible to connect a capture and control system **if proper modifications are carried out on board each ship, to include higher capacity blowers and modified control systems**. In practice, third-party internationally traded vessels will not upgrade on board systems for a call on a single port.
- Emergency protocols (and likely systems) between the shore and the tanker need to be developed.

### Shore Power

The CARB Staff Analysis indicates in several instances that sufficient space may be available to accommodate shore power equipment. WSPA has been clear in past communications with

CARB (Enclosure C) on the many limitations and concerns related to electrification of tankers including:

- There are no broad tanker industry standards that exist for safe operation of electrification technology while transferring hazardous cargo.
- International trading tankers are not fit with shore power connections. These internationally regulated vessels will not be compelled to upgrade systems to call on a single port in the world.

### **Recommendation**

Each method (whether barge-based emission capture, land-based emission capture, electrification) poses significant safety concerns, technology limitations, and critical compatibility constraints for tanker vessel applications. Regardless of alternative, the infrastructure requirements for a project at a marine terminal are tremendous, require significant lead time (including environmental review and other resource agency permitting) and will also take many years to design and construct.

WSPA strongly recommends that CARB seriously consider the Industry Coalition Alternative Proposal as it provides a logical and achievable approach to bringing tankers into the regulatory framework.

With regard to these comments and the attachments we have provided, please contact me at (805) 701-9142 or via email at [tom@wspa.org](mailto:tom@wspa.org) if you have any questions.

Sincerely,



Enclosures

Cc: Catherine Reheis-Boyd – WSPA  
Bonnie Soriano – CARB  
Angela Csondes – CARB

## **Proposed CARB At Berth At Anchor Regulation Limitations and Issues Presented by Barge-based Emission Control**

The following points represent dangers and complications identified that would be associated with the operation of a shore-side emissions control system. Regardless of the below points, any consideration of barge-based control mechanisms must operate within the existing system of safeguards and standards associated with the hazards of managing tanker cargoes. It is essential that a complete set of physical and operational standards for this category of technology be developed prior to more detailed discussions surrounding safety, siting, costs, implementation and regulatory parameters.

### **1. Safety**

- a. There are no broad tanker industry standards that exist for safe operation of barge-based emissions control technology while transferring hazardous cargo.
- b. Significant safety concerns must be considered including the risks of attachment to another ship while offloading. Federal anchorage (33 CFR 110.215 (a)(2)(B)(iv)) and CA State Lands Commission (Article 5 §2340 (c)(28)) regulations enforced by the USCG require all tankers moored alongside an oil terminal to be capable of vacating the berth within 30 minutes.
  - i. Significant time may be required to disconnect bonnet, stow bonnet arm, unmoor barge, connect tug, and secure the barge for sea if the vessel must vacate the berth under USCG orders or for the safety of the vessel and crew.
  - ii. Potential for bonnet to ignite due to high exhaust gas temperatures
  - iii. The hulls of the vessels are not flat at the longitudinal stack location – this creates a potential for the bonnet barge to be pinned underneath the vessel and rupture ship's fuel tanks.
  - iv. Barge would sit within the containment boom area required for the transfer of persistent oils. Risk of fire and explosion is high in the event of spill.
- c. Restricted evacuation; barge presents a barrier for vessel egress in case of emergency either on shore-side, the vessel, or on the barge itself. Above referenced regulations to vacate berth within 30 minutes must be complied with.
- d. Safety standards related to any required manual operation of the control system must be considered, especially in relation to immediately dangerous to life or health (IDLH) environments and night-time operation.
- e. As no technology has been proven in practice, the ability to control key connections of the shore-based emissions control to boilers is unknown. This includes the possible inability to adjust for changes in load and while controlled as well as the unknown effect of a control technology on boiler combustion space.
- f. No tanker industry standards exist for safe operation of this technology while transferring hazardous cargo. Regardless of the dangers and complications identified

### **2. Path to Implementation**

- a. Design and permitting will take a significant amount of time and resources and can only be considered following the development of physical and operational industry standards for shore-based control technologies.
- b. Should physical and operational standards be developed and accepted industry-wide, ships vary greatly in physical layout and capabilities that make it difficult to apply to one static barge-based emission control setup.
- c. Third-party staffing for continuous (24 hours per day, 7 days per week) availability of tugs and barges. The implementation of a barge-based control system (whose feasibility for tanker applications has yet to be developed, much less deemed feasible) will require significant

**Proposed CARB At Berth At Anchor Regulation  
Limitations and Issues Presented by Barge-based Emission Control**

resources including training and regulation of systems under standard operational procedures to be developed.

- d. Given that no tanker industry standards exist for safe operation of this technology, industry will require time to examine and develop safe practices if possible.

**3. Siting**

- a. Due to large variety in locations of terminals, barge-based controls are not available for all berths such as in area-restricted ports and within bays that are subject to waves and tides.
  - i. Equipment operating window must be wide to account for motion on both barge and ship. Waves, wind and current limit barge operations alongside a loaded tanker including the potential for collision and damage to barge or ship with a possible subsequent pollution event and/or injury to personnel.
  - ii. There is a probability of increased traffic and spacing concerns due to physical layout of some shore-side setups. Traffic and spacing concerns must be taken into account in development of physical and operational standards for this control technology.

**4. Real Emissions Reductions**

- a. The additional time required for barge connections and disconnections will result in increased vessel port call duration.
  - i. Bonnet barge delays could impact vessels' schedules and force them to wait at anchorage or alongside for 12+ hours when tide and current windows are missed.
  - ii. This would increase hotel load emissions and could result in significant impacts to the logistics relative to supplies and/or products.
- b. Additional emissions due to tug, barge, and control system operation.
- c. Additional emissions (including GHGs) due to tug transit and maneuvering.

**5. Costs**

- a. Retrofitting of ships to be compatible with barge-based controls as well as the implementation of the control technology will be costly.
- b. Costs will be incurred by third party owners and operators of vessels who have the option to take their business elsewhere.
- c. Additional personnel resources as well as training of personnel to operate new systems and interfaces will result in significant costs.

## **Proposed CARB At Berth At Anchor Regulation Limitations and Issues Presented by Shore-Based Emission Control**

The following points represent dangers and complications identified that would be associated with the operation of a shore-side emissions control system. Regardless of the below points, any consideration of shore-side control mechanisms must operate within the existing system of safeguards and standards associated with the hazards of managing tanker cargoes. It is essential that a complete set of physical and operational standards for this category of technology be developed prior to more detailed discussions surrounding safety, siting, costs, implementation and regulatory parameters.

### **1. Safety**

- a. There are no broad tanker industry standards that exist for safe operation of shore-based emissions control technology while transferring hazardous cargo.
- b. The additional time to respond, including the disconnection from power, engine start up, etc. in an emergency is a significant safety concern. Federal anchorage (33 CFR 110.215 (a)(2)(B)(iv)) and CA State Lands Commission (Article 5 §2340 (c)(28)) regulations enforced by the USCG (and included in local fire codes and ISGOTT standards) require all tankers moored alongside an oil terminal to be capable of vacating the berth within 30 minutes.
  - i. Significant time may be required to disconnect bonnet, stow or remove bonnet arm, and remove shore-side equipment.
  - ii. Emergency concerns and speed of vacating berth are increased for tankers due to flammable material on board and safety standards associated with operation within dangerous and hazardous areas.
- c. Third-party owners and operators are not manned with crews and officers properly trained on how to safely operate shore-side control systems and facility operators do not have the legal authority to regulate crews aboard 3<sup>rd</sup> party vessels.
- d. Safety evaluation of capture and control system, including but not limited to fire and explosion risk, must be conducted accounting for the collection, pressurization and transportation of gases in a crowded terminal.
- e. A wide equipment operating window is required to account for vibrations and wind.
- f. Safety standards related to any required manual operation of the control system must be considered, especially in relation to immediately dangerous to life or health (IDLH) environments and night-time operation.
- g. As no technology has been proven in practice, the ability to control key connections of the shore-based emissions control to boilers is unknown. This includes the possible inability to adjust for changes in load and while controlled as well as the unknown effect of a control technology on boiler combustion space.
- h. No tanker industry standards exist for the safe operation of this technology while transferring hazardous cargo.

### **2. Path to Implementation**

- a. Design and permitting will take a significant amount of time and resources and can only be considered following the development of physical and operational industry standards for shore-based control technologies.
- b. Marine Terminals will not commit to this control option until physical and operational standards are developed and accepted industry wide and permits are acquired.
- c. Space and utilities for shore-based systems in ports may be under the ownership and control of the port authorities.

## **Proposed CARB At Berth At Anchor Regulation Limitations and Issues Presented by Shore-Based Emission Control**

- d. Should physical and operational standards be developed and accepted industry-wide, ships vary greatly in physical layout and capabilities, making it difficult to apply shore-based emission controls as shore-side controls must be configured for a specific setup.
  - i. This issue is compounded if all ports and terminals do not choose to implement exactly the same setup.
  - ii. Third-parties operate and own the vast majority of ships calling at California terminals and the retrofit of vessels to hook up to shore-side control is not under the control of any California-based stakeholder
- e. Shore-side set ups vary widely (port based, open water berth, long wharf) causing available options for emissions control to vary greatly between situations.
- f. Given that no broad tanker industry standards exist for safe operation of this technology, industry will require time to examine and develop safe practices if possible.

### **3. Compliance Determination and Regulatory Responsibility**

- a. It is currently unclear how a “compliant visit” will be determined.
- b. Phased control percentage goals currently proposed do not assist in allowing for compliance with proposed implementation timelines as the shore-based control system (which will require a long lead time to develop will yield the same emission control level, regardless of when it is implemented.
- c. If shore-based emissions control is unavailable or incompatible with a vessel, it is currently unclear who will bear the responsibility and possibility of enforcement action.

### **4. Siting and Function (without an interface standard)**

- a. The ability to install shore-based capture and control options may be significantly limited by plot space demands.
  - i. Infrastructure under the authority of ports (not marine terminals or vessel operations)
  - ii. Infrastructure requirements including allocation or procurement of land (the natural consequence of increasing “project” scope) and facility (wharf, port) improvements including (bay in-fill, pile driving, land-use re-designation, etc.)
- b. Additional electrical load to power shore-based control systems is not always available during demand response period times.
- c. The capacity of Booster Pumps may be limited due to a number of factors including: available plot space, length of piping run, elevation change, pipe diameter and rating, pipe material and thickness, type of crude, etc.
- d. Varying setup of ports versus open water berth and long wharf terminals present unique siting issues that are not “one size fits all”.

### **5. Real Emission Reductions**

- a. Booster pumps are driven by electricity or steam and will result in NOx and PM emissions. The quantity of these emissions must be taken into account when evaluating emissions reductions.
- b. Booster pumps can help reduce, but will not eliminate, the amount of fuel burned on a ship.

**Proposed CARB At Berth At Anchor Regulation  
Limitations and Issues Presented by Shore-Based Emission Control**

**6. Costs**

- a.** Shore-based control options require significant up-front investment due to high capital cost of infrastructure development and land costs.
- b.** Costs of port will be passed onto tenants, making calling at California ports cost-prohibitive to international shipping companies.
- c.** Additional personnel resources as well as training of personnel to operate new systems and interfaces will result in significant costs.

## Proposed CARB At Berth At Anchor Regulation Limitations and Issues Presented by Electrification of Tankers

The following points represent dangers and complications identified that would be associated with the operation of an electrification system for tankers. Regardless of the below points, any consideration of electrification systems must operate within the existing system of safeguards and standards associated with the hazards of managing tanker cargoes. It is essential that a complete set of physical and operational standards for this category of technology be developed prior to more detailed discussions surrounding safety, siting, costs, implementation and regulatory parameters.

### 1. Safety

- a. There are no broad tanker industry standards that exist for safe operation of electrification technology while transferring hazardous cargo.
- b. The additional time to respond, including the disconnection from power, engine start up, etc. in an emergency situation is a significant safety concern. Federal anchorage (33 CFR 110.215 (a)(2)(B)(iv)) and CA State Lands Commission (Article 5 §2340 (c)(28)) regulations enforced by the USCG (and included in local fire codes and ISGOTT standards) require all tankers moored alongside an oil terminal to be capable of vacating the berth within 30 minutes.
- c. High voltage electrical connections and equipment required may not be suitable for hazardous zones:
  - i. Hazardous zone concerns are unique to tankers as the same risks associated with cargo do not exist for container vessels or cruise ships.
  - ii. In IMO evaluation of On-shore power supply safety standards, it was determined that there are “no unified technical requirements for high-voltage shore connection systems and no consideration is given to the electrical surge impact of cold ironing on power networks”<sup>1</sup>.
  - iii. International Safety Guide for Oil Tankers and Terminals (ISGOTT) Section 4.4 standards for the management of electrical equipment and installations in dangerous areas must be complied with in the implementation of any electrification system including the ability to isolate electrical equipment should a hazardous situation arise.
- d. Third party owners and operators are not manned with crews and officers properly trained on how to safely operate a “Cold Ironing” or other shore-side electric power systems.
  - i. Safety concerns regarding the expansion of CARB’s OGV rule to include tankers were expressed by Intertanko in 2017 comments to CARB. Intertanko concerns included safety risk associated with electrification of tanker with hydrocarbon cargo and proximity to hydraulic pumps<sup>2</sup>.
- e. IMO safety evaluation of on-shore power determined that while shore-side power systems are grounded electrical systems, power systems for most ships are ungrounded. IMO concluded that without unified isolation, grounding and operational procedures, tanker hookups to shore-side power systems could lead to significant hazards for the power system.<sup>3</sup>

### 2. Path to Implementation

- a. Given that no broad tanker industry standards exist for safe operation of this technology, industry will require time to examine and develop safe practices if possible.

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<sup>1</sup> IMO Maritime Safety Committee. 98<sup>th</sup> session. March 7, 2017. “Work Programme: Proposal for new output to develop safety standards for cold ironing of vessels and guidance on safe operation of On-shore Power Supply (OPS) in port”

<sup>2</sup> Weekly News in Detail: California Air Resources Board intends to expand use of shore power to all ship types. August 17, 2017. Retrieved on October 30, 2018 from <http://www.intertanko.com/News-Desk/Weekly-News/Year-2018/No-33-2018---17-Aug/No-33-2018/#articlegen60408>.

<sup>3</sup> IMO Maritime Safety Committee. 98<sup>th</sup> session. March 7, 2017. “Work Programme: Proposal for new output to develop safety standards for cold ironing of vessels and guidance on safe operation of On-shore Power Supply (OPS) in port”

## **Proposed CARB At Berth At Anchor Regulation Limitations and Issues Presented by Electrification of Tankers**

- b. Third parties own and operate the vast majority of the global tanker fleet and the retrofit of these vessels to utilize shore-side electricity systems is not under the control of California operators or ports. Unique issue to tankers due to global fleet composition.

### **3. Siting**

- a. Existing tanker shore power connections are designed only for shipyard electrification and for hotel sources. The vast majority of tankers are not designed to run pumps off shore power.
- b. Tankers vary greatly in physical layout and capabilities that make it difficult to apply electrification to all ships as often the shore-side is configured for a specific setup.
- c. Unlike cruise ships or container vessels, tankers do not dock at exact same berth point every time – poses issues in siting of electric connections.
- d. Siting limitations due to available plot space, length of electric run, elevation change and others.
- e. Substantial time and cost related to California Environmental Quality Act (CEQA) environmental impact assessment and permitting electrical infrastructure with local and state agencies.

### **4. Real Emission Reductions**

- a. The majority of oil tankers are fitted with steam driven cargo pumps. On these ships, “Cold Ironing” would only offset the house electrical loads.
- b. Electrical losses over long distances to shore would decrease the effectiveness of this option as the unique situation to northern California remote marine terminals that cannot utilize port infrastructure.

### **5. Electricity Demand**

- a. Additional electrical load is not always available during demand response time periods.
- b. Electricity infrastructure at ports will have to be upgraded to meet demand during peak hours, which is not under the control of the vessel owner or the company utilizing the vessel for transport.

### **6. CARB Authority**

- a. In direct conflict with existing safety regulations (see point 1.a.i.).
- b. As demonstrated in *United States v. Locke, Governor of Washington, et al*, state legislation of “tanker personnel equipment and operations would cause inconsistency between the regulatory regime of the US Government and that of an individual State of the US”<sup>4</sup>. The case law presents jurisdictional issues related to California’s ability to regulate equipment for vessels engaged in interstate/international commerce.
- c. Intertanko submitted comments to CARB in 2017 regarding the “possible conflict of responsibilities and liabilities in case of a shore power break during cargo operations which may result in a cargo spill event”<sup>5</sup>.

### **7. Costs**

- a. Space constraints and required distance of electrical runs will result in significant costs to accomplish.

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<sup>4</sup> United States v. Locke, Governor of Washington, et al. March 6, 2000. United States Ninth Circuit Court of Appeals. No 98-1701.

<sup>5</sup> Weekly News in Detail: California Air Resources Board intends to expand use of shore power to all ship types. August 17, 2017. Retrieved on October 30, 2018 from <http://www.intertanko.com/News-Desk/Weekly-News/Year-2018/No-33-2018---17-Aug/No-33-2018/#articleleg60408>.

**Proposed CARB At Berth At Anchor Regulation  
Limitations and Issues Presented by Electrification of Tankers**

- b. Retrofitting of ships will be costly and costs will be incurred by third party owners and operators of vessels who have the option to take their business elsewhere.

**Exhibit 2: Woodbridge Comment Letter (September 19,  
2019)**



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BENICIA, CA 94510  
USA  
PHONE: (925) 687-1234  
sfo@woodbridgemarine.com

19 September 2019

**To whom it may concern.**

Woodbridge Marine Inc is a California based marine consultancy specializing in the safety inspections on oil tanker vessels primarily. The company is made up of personnel that have served as senior officers on oil tankers both internationally and also in the domestic fleet.

We have been asked to comment on the possible effects of the proposed rule governing exhaust gas capture on oil tankers.

Safety and technological challenges

**Section I: Overview of perceived safety issues likely to be encountered through the design and implementation of tanker vessel emission controls.**

1. Whether alongside or ashore, all equipment must be certified as Class I, Div. I intrinsically safe if it is open to the atmosphere. Non-intrinsically safe equipment would need to be housed in enclosed structures.
2. There is a hazard of static electricity generation that could be caused by the exhaust gas capture system and vessel interface. The mishandling of static electricity on oil tankers can and has resulted in catastrophe. While the hazards of static electricity are well known with current technology typically in use on tank vessels. The introduction of new technology vis. a vis. exhaust gas capture has not been studied by the tank ship community and is not well understood at this time. Electrostatic hazards should therefore be studied and mitigation measures determined in order to avoid the possibly catastrophic consequences of an unexpected static discharge. (See ISGOTT Ch. 3 and CENELEC CLC/TR 50404:2003 “Electrostatics – code of practice for the avoidance of hazards due to static electricity”)
3. The technology in use must include a means for emergency disconnection. In order for a tank ship to get underway in a minimum amount of time in an emergency, there should be a means to disconnect the system in a minimal time frame. (Noting that 2 CCR 2340 (c)(28)(A) calls for a tank vessel to be capable of moving away from a berth within 30 minutes.)
4. Oil tankers are required to maintain most cargoes in an inerted atmosphere. The use of inert gas is a key safety measure, and mandated by both U.S. regulations, and international standards. This is typically accomplished through the use of cleaning

exhaust gas and injecting it into the cargo tanks as the cargo is discharged. The inert gas by law must have less than 7% Oxygen by volume. Industry standards (OCIMF) call for 5% max O<sub>2</sub>.

- a. Inert gas for vessels that use steam driven cargo pumps typically utilized exhaust gas from the boilers to produce inert gas. The gas is routed through a scrubber unit prior to being supplied to the cargo tanks. Not all of the gas is necessarily routed through the scrubber, and some of the gas may be released to the atmosphere in order to supply gas at a rate that matches the displacement of the cargo being pumped ashore. The boilers must be operated very carefully with a proper mix of fresh air in the combustion system in order to provide the right amount of Oxygen in the processed exhaust gas. Change of pressure in the exhaust stack would therefore affect this process and could negatively the oxygen content of the exhaust gas.
  - b. Boiler loads are not constant during a cargo discharge. Low loads are typical as cargo is started, with the load changing for tank switches aboard and ashore, during crude oil washing and whilst stripping (final emptying) of cargo tanks. The exhaust gas processing equipment must be able to keep up with the changes in a seamless manner in order to insure that the marine boiler is unaffected.
  - c. The boilers may also be used for cargo heating purposes, which can further affect the exhaust gas recovery process.
  - d. Inert gas can also be created through the use of an inert gas generator. IG generators are typically found on smaller vessels that do not utilize steam driven cargo pumps, and typically include burners and a scrubber unit in one combined installation.
5. The vessel / terminal interface has been intensively studied by OCIMF. The areas documented are cargo connections, mooring and personnel transfer. The use of an exhaust gas processing interface is a new concept, and has yet to be vetted from a safety aspect. Safety information and procedural guides are contained in various OCIMF publications. Chief amongst them are the International Safety Guide for Oil tankers and Terminals 5<sup>th</sup> Ed. (ISGOTT) and Mooring Equipment Guidelines 4<sup>th</sup> Ed. (MEG4). The use of ISGOTT as a basis for tank ship operations in port is recommended by The International Chamber of Shipping and the International Association of Ports and Harbors.
  6. The transport of oils and chemicals in bulk via marine transportation has been de-facto regulated through the Oil Companies International Marine Forum's (OCIMF) SIRE program for over two decades, resulting in the oil tanker industry becoming the safest overall maritime sector. It is our understanding that OCIMF has not been consulted concerning the safety issues that may be encountered through the use of this new technology. Without OCIMF guidance, there is no universal set of safety guidelines available to the tanker industry for the safe use of the proposed equipment.

7. The proposed equipment should be suitable for nearly all tank vessels. It is unlikely that vessels would be modified strictly for use in California, as it is not uncommon for vessels to call once every few years, or even once in their useful life. Most tankers operate in the international spot market, and trade worldwide.
8. Exhaust streams to be accounted for would need to include up to three auxiliary generator engines, along with the possibility for one or two boilers, and / or additional small diesel engines utilized on some vessels with hydraulic cargo pump systems. Auxiliary engines are typically started and stopped as the load changes during the discharge operation.
9. There are two additional unique classes of vessel in the Alaska North Slope crude oil trade that are frequent visitors to California ports, and may require specific additional capabilities.
  - a. The three vessels currently being operated by the Alaska Tanker Company (190 MDWT) utilize a diesel electric plant with four medium speed diesel powered generator engines producing 6.1MW each. Two are typically required for a cargo discharge operation. One of these vessels is currently configured for cold- ironing operations at Marathon's LB No. 121 berth.
  - b. Polar Tankers Inc. operates five vessels (140 MDWT) that utilize a diesel electric system for discharging cargo. The electricity is provided by one of their two main propulsion engines along with auxiliary diesel generator engines capable of producing up to a total 3MW whilst alongside.

## **Section II. Additional issues specific to shore based installations.**

The critical aspect that needs to be reviewed prior to any ruling on adding equipment to tanker terminals is a detailed and thorough feasibility study which would incorporate a very detailed risk assessment to ensure compliance with all international and domestic regulations.

It should be noted that OCIMF has instituted a program of Marine Terminal Inspections (Marine Terminal Information System) on a worldwide basis and they can and do refuse to moor ships to a terminal that does not meet specified standards if they believe it poses a risk to their vessel.

The state also has their own standards governing marine terminals, The Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) establish minimum engineering, inspection and maintenance criteria for all marine oil terminals in California, in order to prevent oil spills and protect public health, safety and the environment. Originally approved by the California Building Standards Commission on January 19, 2005, the MOTEMS were first published on August 10, 2005 and became effective on February 6, 2006. To ensure that the best achievable protection is provided, the Commission continuously updates the MOTEMS regulations through public and transparent rulemakings that allow abundant opportunities for public participation.

These comprehensive standards contain requirements for assessment of the structural, mechanical and electrical systems at marine oil terminals, including, but not limited to:

Audits and inspections, Structural evaluations, Seismic analyses, Berthing and mooring

Geotechnical assessments, Fire protection, Pipelines, Mechanical and electrical equipment  
Electrical systems, LNG terminals

The basic safety issues have been discussed above and below are some specific operational concerns that will need to be addressed:

1. For existing marine oil terminals, all proposed new, substantially modified or re-designed structural, berthing and mooring (including Terminal Operating Limits [TOLs]), fire, piping/pipeline, mechanical or electrical systems or components are also subject to MOTEMS compliant review by the Commission, and shall be MOTEMS compliant prior to use or reuse. “As-built” re-verification may be required.
2. The location of a tanker’s manifold (cargo piping termination) determines the location of a vessel alongside a berth. A shore-based system must therefore be capable of a relatively wide range of longitudinal motion along the berth.
3. Bridge wing to manifold distance range as follows:
  - a. MR 50 MDWT) - 55m
  - b. Panamax (75 MDWT) - 75m
  - c. Aframax (105 MDTW) – 85m
  - d. Suezmax (150 MDWT) 95m
  - e. VLCC (320 MDWT) 120m (Berth LB 121 only).
4. Similarly, the vessel’s draft during discharge will have to be safely taken into account. Drafts can typically change for vessels from fully loaded to empty of cargo (and at “normal” ballast condition) as follows:
  - a. MR – 3.5m
  - b. Panamax – 6.5m.
  - c. Aframax – 7m.
  - d. Suezmax – 9m.
  - e. VLCC – 11m.
5. The full range of tides would need to be accounted for in addition to the above.
6. Unlike typical dry goods and container terminals, tank ship terminals often utilize a relatively short wharf (or “apron”) combined with mooring dolphins. For those terminals, new structures would be required in order to install the equipment. The structures would have to be able to account for the differences in vessel size in order to be able to connect to the different size vessels (as detailed above), and would in most cases be required on both ends of the berth, as vessels could be docked either port or starboard side to the wharf. In addition to the engineering challenges, there would be environmental challenges to ensure wetlands safety.

**Conclusion:**

It is critical that before implementing the proposed rule that industry be allowed to conduct a detailed and thorough feasibility study covering the wide range of terminals in use State wide. This should ensure that the equipment is available and that it would meet the safety requirements to be installed at the marine terminal / vessel interface without creating a hazardous consequence that could result in significantly increasing the risk involved in the transfer operation. This must involve MOTEMS compliance and the possible consequences of moving forward without complete confidence from the primary partners in the transportation of petroleum / chemical and liquefied gas could include any of the following:

1. Increased risk to the operation and also the terminal and vessel directly, including fire, explosion, loss of life and significant pollution events.
2. Regulatory compliance issues.
3. Significantly longer operations which also increases the risk of an accident.
4. Owner / operators deciding the risk to utilize these terminals is unacceptable.

Yours Sincerely



Capt Andrew Lott

President

Woodbridge Marine

**Exhibit 3: WSPA Comment Letter (August 15, 2019)**



**Thomas A. Umenhofer**  
Vice President

August 15, 2019

Ms. Cynthia Marvin  
Division Chief, Transportation and Toxics  
California Air Resources Board  
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sent via e-mail to: [Cynthia.Marvin@arb.ca.gov](mailto:Cynthia.Marvin@arb.ca.gov)

Re: Additional WSPA Comments on CARB Proposed At Berth Regulation Working Draft

Dear Cynthia,

Western States Petroleum Association (WSPA) appreciates the continuing opportunity to provide additional feedback on the California Air Resources Board (CARB) proposed California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 7.5, Sections 93130-93134.14 (At Berth Regulation) Working Draft, dated May 8, 2019. WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states.

This letter follows up on our conversation with you and your staff on July 18, 2019 and provides additional information regarding the need for a comprehensive feasibility evaluation study before any At Berth Regulation is adopted. Enclosed with this letter is a general outline of the contents of such a study and additional information to explain why the current compliance deadlines of 2027 and 2029 on the At Berth Regulation Working Draft are not achievable.

WSPA and many other stakeholders share CARB's strong desire to see regulations that are legally supportable, can be feasibly implemented, and are likely to achieve real-world air quality goals. In our view, the key to meeting these goals is to set a realistic rulemaking schedule to obtain the necessary information, then to work openly with stakeholders and the public to carefully assess and incorporate that information as required to ensure workable regulations. Failure to properly account for the real-world feasibility of the At Berth Regulation, we believe, could lead to adopting requirements that simply cannot be met safely and in a cost-effective manner, or that are impossible to meet at all.

### **Evaluation of the Feasibility of Shore-Based Emission Control for Tankers**

As we discussed with you and CARB staff, WSPA continues to have serious concerns that no version of the At Berth Regulation can succeed without ensuring that it can be technically, feasibly, cost-effectively, and, as important, safely implemented within the timeline that CARB is proposing. To that end, WSPA acknowledges CARB's engagement with stakeholders to date, but believes that it is critical to first conduct a study to evaluate the technical feasibility of the proposed control option (shore-based emission capture and control) for tankers before any compliance date can be set. This is because the technology, as proposed in the regulatory analysis, has never been implemented on tankers; assuming the technology is available when it has not been proven to succeed on a tanker is a flawed approach. There are several technical differences between tankers and cargo vessels, such as managing boiler pressures when exhaust is captured, and

the possibility of vapors from tanker cargo finding their way into the capture system. At a high level, this evaluation study should assess the safety, reliability, operability, and availability of the proposed control option as well as the ability of the proposed control option to meet the regulatory requirements within the proposed timelines.

WSPA believes that participation from CARB, as well as the numerous other regulatory agencies involved in permitting and evaluation of large-scale projects such as those proposed by the At Berth Regulation, is critical for the success of the study. Such participation is especially critical in that, not only are the technical and safety issues important, but the review and permitting timelines of local and state regulatory agencies for projects of this scope are crucial for everyone to understand and factor into any given regulatory time deadline. WSPA is proposing that this effort be undertaken collaboratively between WSPA, CARB, and other local and state permitting agencies with the goal of completing the study within 3 years from the adoption of the At Berth Regulation. Upon completion of the study, WSPA proposes that a detailed evaluation report be produced, and that CARB convene additional public workshops as necessary to adequately address the findings in the report and make any necessary revisions to the proposed Regulation.

To that end, attached is a proposed report outline for an Evaluation of At Berth Shore-Based Emission Control for Tankers at California Ports. This outline provides a basic framework for an evaluation study to assess technical feasibility that we believe will address critical questions that must be answered for the At Berth Regulation to satisfy legal criteria and ultimately accomplish the goals the At Berth Regulation set out to achieve.

The following is a list of critical questions that we believe must be answered, at a minimum, by the study:

- Is the type of shore-based emission control system envisioned by the proposed At Berth Regulation technologically feasible at this time? If not currently feasible, is there a reasonable basis, supported by significant evidence, to expect that such a system will become technologically feasible in the timeframes set forth in the proposed At Berth Regulation for tankers?
- What potential safety, reliability, and operability concerns need to be resolved before the type of shore-based emission control system and vessel interface envisioned by the At Berth Regulation could be installed and operated?
- Do any of the safety, reliability, or operability concerns identified create a significant risk to human health, safety or the environment?
- Can the type of shore-based emission control system envisioned by the At Berth Regulation meet the 80% reduction in NOx, Particulate Matter, and Diesel Particulate Matter required by the At Berth Regulation?
- Can the type of shore-based emission control system envisioned by the At Berth Regulation operate in compliance with all other applicable laws and regulations, including those related to interstate and international commerce?
- Is there room for the type of shore-based emission control system envisioned by the At Berth Regulation within the existing developed footprints of marine terminal facilities? If not, would installation of the systems require new construction in expanded onshore

footprints and/or installation of new facilities on fill or pilings in wetlands, tidelands and/or submerged lands, with significant impacts on coastal onshore and offshore habitat and other sensitive areas and resources? Will new tideland leases or lease amendments from the State Lands Commission be necessary?

- Will modifications to equipment on tankers be required? Boilers and auxiliary engine connections and controls should be considered.
- What potential safety, reliability and operability concerns needs to be addressed by ship owners, manufacturers, classification societies, USCG before such a modification is applied to vessels? How will CARB ensure third party vessels are modified to comply with shore-based emission control system before calling?
- If the type of shore-based emission control system envisioned by the At Berth Regulation can be feasibly built and operated, what timeframes would be required for such construction and operation, considering timeframes required for permitting and approvals by regulatory oversight agencies and local jurisdictions with land use authority, and including delays due to potential litigation?
- If the type of shore-based emission control system envisioned by the proposed regulation can be feasibly built and operated, what would be the costs to the regulated industry?

### **Timeline for Implementation of the At Berth Regulation for Tankers**

Even under ideal conditions, WSPA does not believe that any marine terminal can meet the proposed compliance deadlines of 2027 for the Port of Long Beach (POLB) and Port of Los Angeles (POLA), or 2029 for all other marine terminals where tankers are berthed. Based on information received from WSPA member companies, we believe that the earliest a marine terminal could comply with the proposed regulatory requirements is 2033. Additional time would be needed, at least up to two years, for larger and more complex terminals requiring a compliance date no sooner than 2035 for those facilities due to in-water work window limitations and operational construction constraints.

As was discussed and requested by CARB during our meeting on July 18, 2019, enclosed with this letter are the aggregated results from our member companies showing the estimated timelines to meet compliance with the proposed regulatory requirements. Included in the enclosure is a chart showing how long (as a range) each major step is expected to take and what timeframe (as a range) that each of those steps is expected to occur within. In general, larger and more complex terminals will need more time to complete each step due to the larger scale of the engineering, design and construction effort and because additional time needed to complete each individual step compounds over the life of the project. Also included is a table which describes in more detail what activities are include in each major step.

The major steps for any facility to meet compliance with the proposed regulation are as follows:

- General and Site-specific Feasibility Evaluation Study
- Site-Specific Design
- Engineering
- CEQA Review
- Permitting and Other Approvals

- Contracting
- Construction (Crane, Emission Control System, and Support Systems)
- Commissioning

While there are several factors that drive a longer timeline for facilities than the timeline that CARB has proposed, the single largest factor is that, at present, the technology proposed is untested and unproven as safe for tankers. This means that significantly more work is needed up front to assess the risks and ensure that the project is feasible. If there existed a proven, off-the-shelf technology that was safe for use on tankers and boilers, many of the early steps could be bypassed or the timeline shortened. But that is not the case, as was communicated by vendors during the CARB vendor meeting held on April 16, 2019, as well as in the WSPA comment letter of June 14, 2019.

Based on our conversations with you and CARB staff, WSPA also believes that CARB has underestimated the time it takes to complete many of the steps needed to meet compliance with the proposed regulation. For example, WSPA believes that CARB has significantly underestimated the time it will take a facility to apply for and receive all the required permits for a project of this nature.

At a minimum, facilities will need to receive permits or regulatory and land use approvals from the local air quality control/management district, the California State Lands Commission, the San Francisco Bay Conservation and Development Commission (for northern Californian terminals), the United States Army Corps of Engineers, the local Regional Water Quality Control Board, the California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service (if protected species are affected), the National Marine Fisheries Service (where marine mammals may be present), the United States Coast Guard, building permits and/or coastal development permits from the local city/county, and (if not delegated to the local city/county) coastal development permits from the California Coastal Commission, in addition to going through the California Environmental Quality Act (CEQA) environmental review process prior to receiving any permits and approvals.

Note that, separate from WSPA's timeline, many facilities are also in the process of updating terminals to comply with the Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) -- projects that have been in permitting, design and construction for many years. Due to the large variety of timelines for each terminal, WSPA has not included ongoing and proposed MOTEMS construction projects in our timeline.

While many of the activities can occur in parallel, those that must occur in series often will dictate the timeline. The most basic example of this occurs during permitting and construction. Construction cannot begin until permitting is complete, and permits cannot be issued until the CEQA review is complete. Construction and installation of any equipment on terminal cannot begin until such time that the support structure (foundation) is complete.

The nature of the proposed equipment, weights and locations can result in a terminal having to complete a seismic retrofit, which would extend well beyond the actual footprint of the equipment foundations. As you may recall, during our meeting WSPA members provided examples of how long it has taken to obtain permits and implement construction on marine terminal projects, such as MOTEMS. For one of our member companies, the MOTEMS initial audit was conducted in 2009 and, after design, California State Lands Commission peer review, and CEQA review and

resource agency permitting, construction was able to begin in 2018 – nine years later -- for a project that is much smaller than the size and scope proposed in the At Berth Regulation.

Below are other examples of steps that will hinder further progress on the project until completed:

- For any pilot test of the equipment installed at a port or Marine Terminal, permitting, design and construction will require additional time.
- Detailed engineering cannot begin until the feasibility evaluation study is completed, and the risks associated with the control technology are well understood, to allow for design of appropriate mitigation.
- CEQA review cannot begin until a lead agency is assigned and at least 30-60% of the design is complete, in order to provide an accurate and stable project description as the basis for review.
- Building and other permits are dependent on completing the CEQA analysis and certifying a final Environmental Impact Report (EIR) or Negative Declaration. Many responsible agencies with permit or approval authority will not begin processing applications before the CEQA document is approved.
- Contracting for construction and installation cannot be finalized until the permits and approvals are received; before that time, the conditions under which construction will occur remain yet unknown. Additionally, construction cannot commence until contracting is complete.
- CEQA lead agencies and responsible regulatory agencies may require completion of some mitigation measures before construction commences.
- In some cases, commissioning of individual pieces of equipment can occur in parallel with the construction; however, overall commissioning cannot begin until all construction is completed.
- And of course, no construction or installation can occur without first obtaining applicable permits.

It is important to note that the aggregated timeline that WSPA has attached to this communication is only an estimate. The results of the feasibility evaluation study will be necessary to refine the estimated timeline.

WSPA believes the Government Code, Health and Safety Code and other California laws and regulations require CARB to revise its current rulemaking timetable to allow for proper preparation and consideration of feasibility, cost effectiveness and timelines. See, e.g., Cal. Health & Safety Code §§ 38560, 39602.5, 39665, 43013; see also Gov. Code § 11346.36 & 1 C.C.R. §§ 2000-2004 (SRIA requirements to assess proposed regulation's cost impact on public health and safety, fairness and social equity, state's economy and other criteria). We would request that, at the very least, CARB include in its proposed At Berth Regulation language that allows for a feasibility evaluation study and an appropriate delay in regulatory implementation in the event the feasibility evaluation study concludes that shore-based technologies and/or other elements of the At Berth Regulation are not feasible in the regulatory timeframes provided.

WSPA also believes that the At Berth Regulation should include “off-ramp” scenarios that provide next steps for facilities that demonstrate an inability to implement all the required elements in the default timelines provided under the At Berth Regulation. In summary, WSPA requests that CARB:

1. Incorporate the feasibility evaluation study and the details included in the outline attached into the proposed regulatory language,
2. Include language in the At Berth Regulation that will provide an off-ramp or adjust the compliance deadlines based on the results of the feasibility evaluation study, and
3. Revise the proposed compliance deadlines in the At Beth Regulation to 2033 for typical terminals and 2035 for complex terminals where tankers berth.

WSPA appreciates this opportunity comment on the At Berth Regulation Working Draft. If you have any questions regarding this submittal, please contact me at (805) 705-9142 or via email at [tom@wspa.org](mailto:tom@wspa.org).

Sincerely,



Cc: Catherine Reheis-Boyd – WSPA  
Richard Corey - CARB

# **Evaluation of At Berth Shore-Based Emission Control for Tankers at California Ports Report Outline**

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The evaluation study of Tankers At Berth Shore-Based Emission Control will be documented in a report that reflects the approach taken by California Air Resources Board (CARB) in the development of the document Evaluation of Cold-Ironing Ocean-Going Vessels at California Ports, dated March 2006.

The new study, to be entitled Evaluation of At Berth Shore-Based Emission Control for Tankers at California Ports will contain the following elements:

## Executive Summary

- I. Introduction
- II. General Description of Tankers and Marine Terminals
- III. Tanker Emission Inventory
- IV. Technical, Safety, and Operational Review
- V. Cost-Effectiveness and Economic Impact Review
- VI. Conclusions
- VII. References

An overview of the Sections I through VI is presented below.

## **Introduction**

- Statement of purpose and objectives.
- Identify focus of analysis of the feasibility and cost effectiveness of shore-based emission control for tankers.
- Define shore-based emission control for tankers as capture of NO<sub>x</sub> and PM emissions from boiler and auxiliary engines on tankers pursuant to § 93130.5 and § 93130.7 of CARB At Berth Regulation (currently Working Draft).

## **General Description of Tankers and Marine Terminals**

- Identify unique characteristics of affected ports and marine terminals, while protecting any individual company competitively sensitive or proprietary information.
- Identify tanker classes, frequency of visits, ownership.
- Summarize tanker visit and duration information.

## **Tanker Emission Inventory**

- Summarize updated CARB tanker sector NO<sub>x</sub> and PM emission inventory taking into account the IMO regulations regarding Tier 3 ships and their predicted penetration into California.
- Assess by emission source types for NO<sub>x</sub> and PM emissions.
- Review in context of overall California emission inventory.

**Evaluation of At Berth Shore-Based Emission Control  
for Tankers at California Ports  
Report Outline**

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**Technical, Safety, and Operational Review**

***Methodology***

- Identify regulatory/legal requirements applicable to proposed regulations, including but not limited to:
  - Health & Safety Code (H&SC).
    - Technological and operational feasibility
    - Safety, reliability and effectiveness
    - Necessary to attain Ambient Air Quality Standards
    - Articulate potential adverse health, safety and environmental impacts
    - Show reductions are real, permanent, quantifiable, verifiable and enforceable
  - CEQA.
    - Identification of significant adverse impacts of regulations
    - Identification of reasonably foreseeable compliance alternatives/mitigation
  - U.S. Coast Guard Regulations (33 CFR)
  - PSM Regulations (e.g. 8 CCR 5189.1, 19 CCR 2762, RISO)
  - Marine Oil Terminal Engineering and Maintenance Standards (24 CCR)
- Identify regulatory agencies, local jurisdictions with land use authority, other agencies with permitting or approval authority and certification entities. Include them as stakeholders.
- Set criteria for demonstration of technical and operational acceptability (including consideration of site-specific limitations).
- Set criteria for demonstration of safety acceptability.

***Analysis***

The technical assessment will be prepared consistent with the criteria established through the methodology:

- Determine whether the installation of systems required to comply with the proposed regulation would satisfy or conflict with the safety, reliability, operability and effectiveness of vessels, marine terminals, the emissions control system, and supporting shoreside infrastructure, as required by regulations identified in the Methodology section.
  - Assess the effectiveness, reliability and safety of proposed methods of compliance.
  - Assess ability to attain ambient air quality standards and technological feasibility and adaptability, and potential preemption by federal law.
  - Assess whether the proposed methods of compliance are designed to achieve levels of exposure consistent with no significant adverse health impacts; identify risks of the toxic air contaminants (TACs) at issue and explain how the proposed ATCM will reduce risks; demonstrate the need and appropriate degree of regulation for the

## **Evaluation of At Berth Shore-Based Emission Control for Tankers at California Ports Report Outline**

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- identified TACs; and potential adverse health, safety and/or environmental impacts that may result from implementation.
- Assess reasonable and feasible mitigation measures and alternatives to reduce or avoid significant environmental impacts, identify permitting requirements and timeline for implementation of such mitigation measures and alternatives.
  - If possible, identify applicable design standards that would comply with MOTEMS and other existing regulations that can foster vendor competition.
  - Identify what changes to technology may be necessary to ensure feasibility for use in marine terminal application, safety, and/or operability.
  - Conduct Risk Assessment/HAZOP for a shore-based design.
  - Prepare anticipated timeline from planning through implementation, including timeline for obtaining all permits and approvals and potential litigation delay.
  - Determine where, if any, a physical demonstration is required to validate the safety, reliability, operability, and effectiveness of vessels, marine oil terminals, the emissions control system, or supporting shore-side infrastructure.

### **Cost-Effectiveness and Economic Impact Review**

#### ***Methodology***

- Set economic/cost-effectiveness requirements pursuant to regulatory/legal requirements.
- Identify Standardized Regulatory Impact Assessment (SRIA) Requirements.
- Establish process for collection, de-identifying and aggregating individual company estimated capital, design, construction, CEQA review, permitting, and operational costs.

#### ***Analysis***

- Determine whether systems required by proposed regulation would meet the criteria in the H&SC for cost-effectiveness.
  - Assess cost-effectiveness, relative to reliability and safety of proposed methods of compliance and ensure that the rule will result in a cost-effective combination of control measures.
  - Assess cost-effectiveness, relative to economic and noneconomic costs and public health benefits (including potential impacts on small businesses).
- Assess whether proposed regulation would meet SRIA requirements.
- True-up cost-effectiveness of achievable design and implementation schedule.

**Evaluation of At Berth Shore-Based Emission Control  
for Tankers at California Ports  
Report Outline**

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**Conclusions**

- Summarize findings and recommendations (including need for physical demonstration).

**Evaluation of At Berth Shore-Based Emission Control  
for Tankers at California Ports  
Report Outline**

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**Key Stakeholders including but not necessarily limited to the following:**

- American Bureau of Shipping for class society and can perform HazOps (also involved in Cold Ironing Feasibility Evaluation Study).
- Maritime safety expertise (i.e., DNV GL, Bureau Veritas).
- Marine boiler, engine and exhaust gas cleaning system manufacturers who understand tankers (including but not limited to, Alfa Laval – familiar with ship-side issues, classification areas and largest provider of tanker boilers in the world), SAACKE – boilermaker, GmbH, Harris Pye – boiler retrofit, MAN and Wartsila - propulsion and auxiliary engine manufacturers).
- Emission abatement industry (i.e., existing technology vendors).
- OCIMF (Oil Companies International Marine Forum)
- U.S. Coast Guard
- California State Lands Commission - Marine Environmental Protection Division
- CARB, BAAQMD, SCAQMD, USEPA
- SF Bay Coastal Development Commission (BCDC)
- International Maritime Organization (IMO) - Marine Safety Committee (MSC), Marine Environment Protection Committee (MEPC) and supporting sub-committees
- Federal non-regulatory agencies: U.S. Navy, U.S. Maritime Administration (MARAD)
- University of California - Riverside
- California Maritime Academy
- International Association of Independent Tanker Ownership (INTERTANKO).

**Estimated Timeline - CARB At Berth Regulation  
Shore-Based Emission Control System**

Major Tasks	Estimated Time (Years)	2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030		2031		2032		2033		2034		2035	
		Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10		Year 11		Year 12		Year 13		Year 14		Year 15		Year 16	
		1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H																		
General & Site-Specific Studies	3.5 to 4	■	■	■	■	■	■	■	■																								
Site-Specific Design	3.5 to 5.5						■	■	■	■	■	■	■	■	■	■																	
Engineering	3 to 4.5							■	■	■	■	■	■	■	■	■																	
CEQA Analysis	3 to 5.5								■	■	■	■	■	■	■	■	■	■	■														
Permits	2.5 to 3.5									■	■	■	■	■	■	■	■	■	■	■	■												
Contracting	2.5 to 3.5												■	■	■	■	■	■	■	■	■	■	■										
Crane Construction	3 to 5.5																	■	■	■	■	■	■	■	■	■	■	■	■	■			
Facility Construction	4.5 to 7.5																			■	■	■	■	■	■	■	■	■	■	■	■		
Commissioning	1 to 1.5																												■	■	■		

**Legend**

- Anticipated average time needed to complete each task
- Additional time needed for complex installations to complete the task

**NOTES**

1. The shaded areas of the bar chart which may be longer in duration than the expected time for a task as the start date of a task may vary from installation to installation.
2. The General and Site-Specific Studies are critical to evaluate the feasibility of various elements of compliance requirements to each installation (technological, safety, efficiency, cost-effectiveness etc).
3. The results of General and Site-Specific Studies may necessitate further refinement of the anticipated compliance options and timeline.
4. With unknown permitting timelines and delays, contracting and vendor timelines, the earliest compliance demonstration for most facilities is estimated to not occur before 2033.
5. For complex installations, this date could be further out; there could also be unexpected delays that are beyond operator control.

## Timeline Survey Summary

Major Tasks  (note tasks that can be run concurrently to help determine total lapse time from project design to commissioning)	Additional Information  (provide sufficient information to break down the activity so that it is clear what it includes and its expected duration)	Estimated Years							
		Average	Min	Max	Range (Min to Max)	Range (Average to Max)	Begin Year	End Year (Avg)	End Year (Max)
<b>General &amp; Site-Specific Studies</b>	General Evaluation Study	2.0	2.0	2.0	2.0	2.0	2020	2021	2021
	Site-specific Study including Safety review and possible field test	1.6	0.8	2.0	0.8 - 2	1.6 - 2	2022	2023	2023
<b>Site-Specific Design</b> (preliminary and final, includes assessments on utilities, siting for egress and safety as well as infrastructure)	Front End Engineering Design, Preliminary and Detailed Design, Crane, Scrubber, Electrical Design, Shiplside Modification Design, Determine footprint, electrical calssification and unit supply requirements, Coordinate with engineering, construction and technology companies, Review of utilities and existing infrastructure to support future terminal projects, Requirements for and consideration of MOTEMS.	3.5	1.0	5.5	1 - 5.5	3.5 - 5.5	2022	2025	2027
<b>Engineering</b> (engineering drafts for construction ex. built-for purpose, ship-to-berth variable height for loading and unloading operations, utility and infrastructure details)	Marine analysis of current and future vessels (MOTEMS Review), Detailed engineering calculations for process, energy and structural integrity, Coordination with utility providers that supply electricity, water and natural gas to the facility, Engineering Design Issued for Permit, Engineering Design Issued for Construction, Engage Classification Society to Develop Standards for Shiplside Modifications	2.9	1.8	4.5	1.8 - 4.5	2.9 - 4.5	2023	2026	2027
<b>CEQA Analysis</b> (engineering and site-specific details will be evaluated under CEQA to determine whether additional mitigations are required including preparation of an EIR, public comment periods, hearings, review of the EIR until a final adopted EIR results with specific mitigations for impacts if any)	Initiate Multi-Agency Process, Prepare applications, Initiate EIR, Develop EIR, Develop Mitigation Strategy, Finalize and Approve Mitigation Strategy, Public comment review, possible re-engineering of design to meet public concerns, Re-evaluation of both Site specific design and engineering (as needed), Purchase Mitigation Credits	2.9	1.2	5.5	1.2 - 5.5	2.9 - 5.5	2024	2026	2028
<b>Permits</b> (local, state, federal – CSLC, Bay Conservation and Development Commission, ACOE, CF&W, RWQCB, National Marine Fisheries Service, Air Districts, Port permits includes: preparation, review by agency, approval, development of mitigation plans and other recommendations made by agency.)	Coordination with multiple permitting agencies, at various locations within the state, Includes time for review, comments and any necessary requested changes which may require some re-design and engineering, Submit Environmental Applications, Environmental Applications Approved, Submit Building Applications, Building Applications Approved	2.5	1.1	3.5	1.1 - 3.5	2.5 - 3.5	2025	2027	2029
<b>Contracting</b> (bid process, selection, procurement)	Multiple RFPs (General Engineering, Specialty Engineering, Marine Engineering, Emissions Control Equipment, Pumps/Blowers, Crane and Scrubbers Design and Fabrication, Construction RFPs including general, marine, electrical, crane installation), Contractor vetting and selection, Insurance and procurement of long lead items such as steel, pre-fab materials	2.2	0.6	3.5	0.6 - 3.5	2.2 - 3.5	2026	2028	2030

## Timeline Survey Summary

Major Tasks <small>(note tasks that can be run concurrently to help determine total lapse time from project design to commissioning)</small>	Additional Information <small>(provide sufficient information to break down the activity so that it is clear what it includes and its expected duration)</small>	Estimated Years							
		Average	Min	Max	Range (Min to Max)	Range (Average to Max)	Begin Year	End Year (Avg)	End Year (Max)
<b>Crane Construction / Installation</b>	Install Crane Foundations and Cranes - Consider extensive lead times, Multiple locations, Limited availability of construction equipment, Delays when ships at berth	2.7	0.7	5.5	0.7 - 5.5	2.7 - 5.5	2028	2031	2033
<b>Facility Construction</b> (including deck modifications, pilings, gangway construction, additional/new ducting, piping, , seismic retrofit, new power infrastructure)	Multiple phases of construction at various locations (Limited ability to overlap construction at different locations, constrained by contractor availability and safety oversight and continuation of business, Assumes construction at one facility at a time), Consider extensive lead times, Piling, foundation, civil/structural steel works, electrical upgrades, Fabrication and Transport of Cranes & Scrubber, Procurement of Other Materials, Prep and Demo Work, Install Central Gas Collection System, Scrubbers, Support Systems (Piping/Electrical), Shiplside Modifications, Consider confined construction activity for few months per year (power supply, threatened species protection)	4.5	0.7	7.5	0.7 - 7.5	4.5 - 7.5	2029	2033	2035
<b>Commissioning and Compliance Demonstration</b> (verification of CARB compliance along with other federal and state requirements)	Consider longer commissioning durations for new technology, Commissioning for Terminal Operations and Operator-owned ships, Operator training and oversight, modifications to ensure proper operation to achieve compliance, Multiple agencies would either witness compliance testing or perform their own (CARB, local Air District, etc.)	0.9	0.2	1.5	0.2 - 1.5	0.9 - 1.5	2033	2034	2035

**Exhibit 4: Chevron Presentation: At-Berth Costs Q&A  
(June 10, 2019)**



human energy®

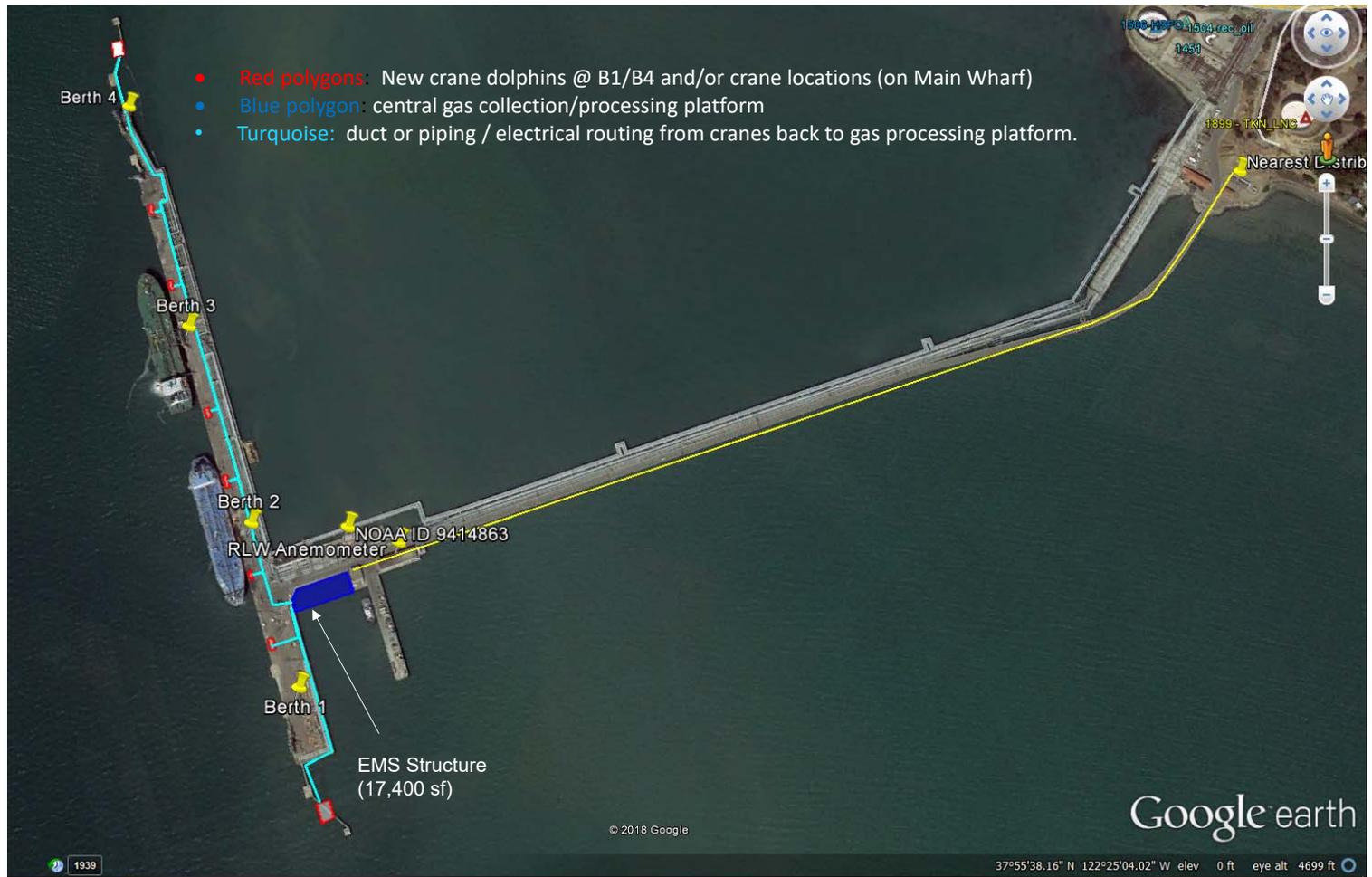
# At-Berth Costs Q&A

2019 June 10

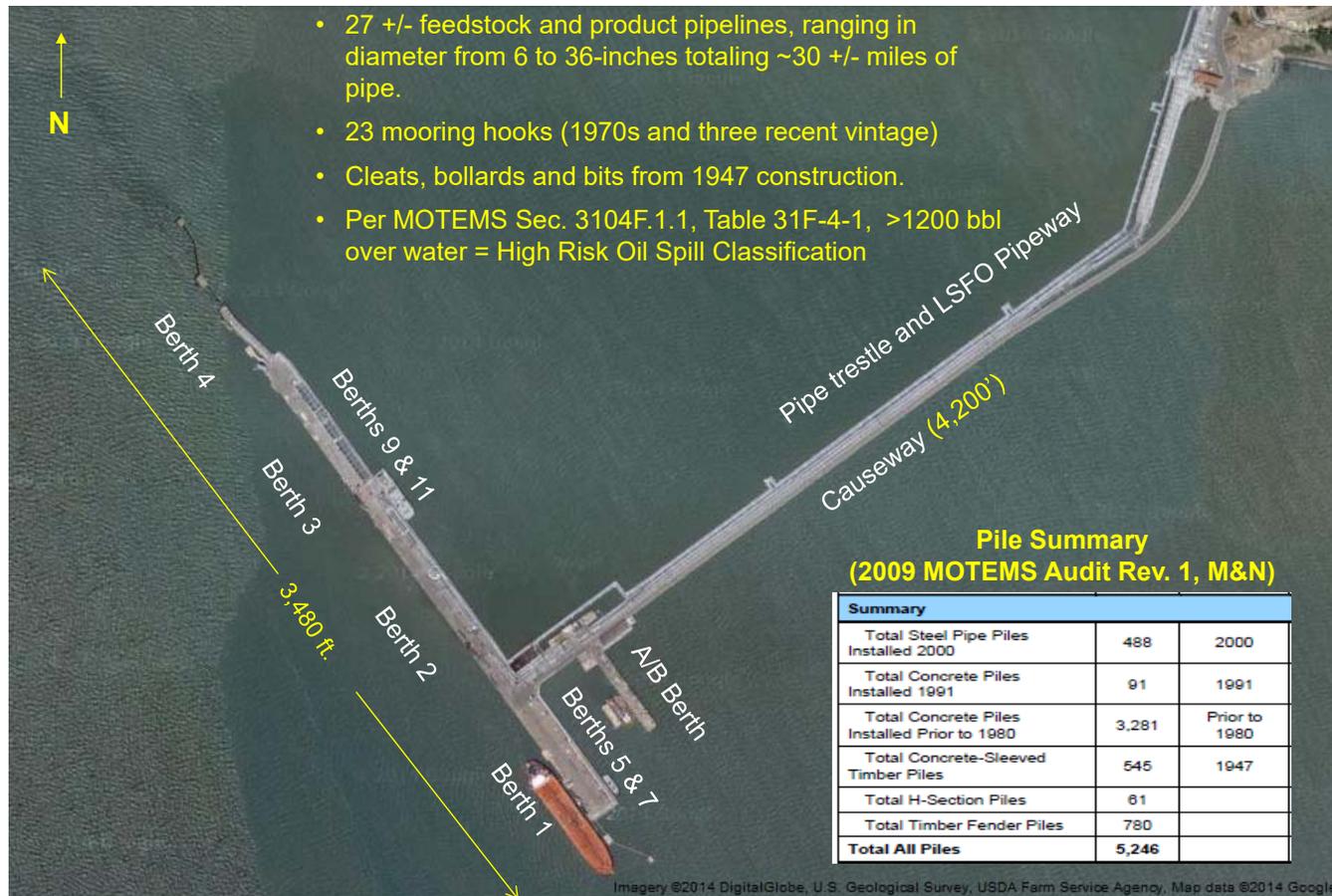
# Overview

## Estimated required infrastructure at Wharf:

- **23,600 ft<sup>2</sup> (0.5 ac)** of new deck/structure.
  - EMS platform
  - B1/B4 crane dolphins (3000 sf)
  - Estimated **~700-800** 24" concrete piles
- **8 new cranes** for stack-based controls.
  - At least 4 piles per crane foundation.
  - Replace decking
  - Relocate piping/under-deck obstructions.
- **4,000-6,000 ft** of new ducting to EMS platform at Main Wharf
  - Pipe supports
  - Conduit supports



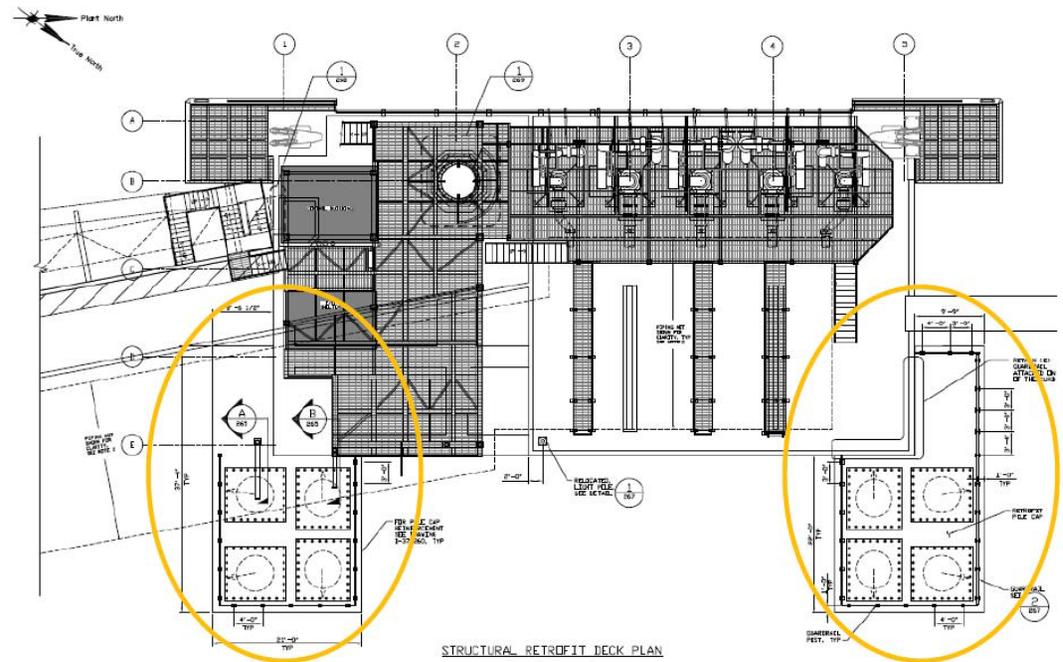
# Richmond Long Wharf Today



# MOT Structural Design driven by MOTEMS



## Berth 4 Seismic Retrofit (8 new 60-in diameter steel batter piles)



© 2014 Chevron

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## RLW Construction for Pile Supported Foundation

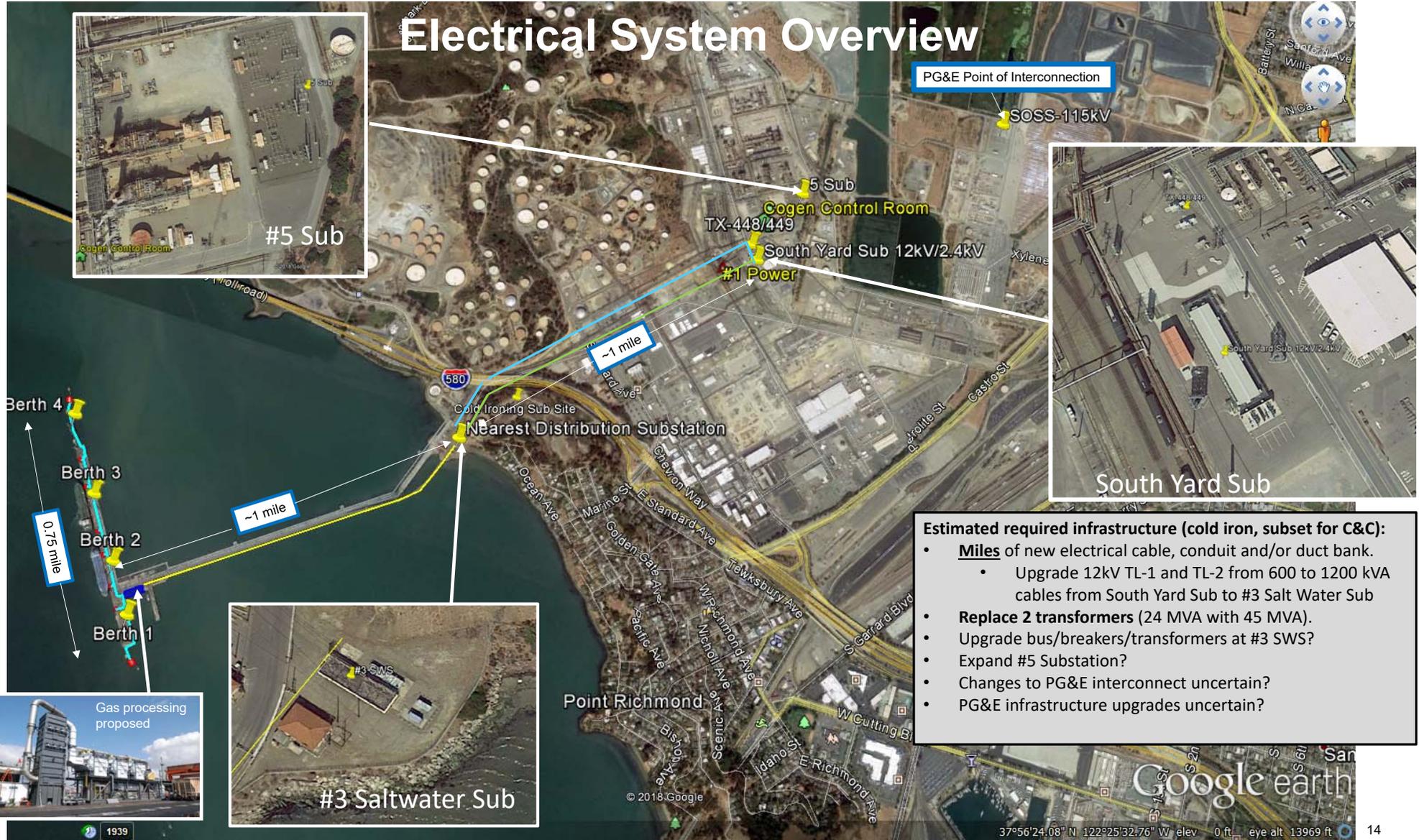
B4 Gangway



# Construction Methods – Driving concrete pile through deck



# Electrical System Overview



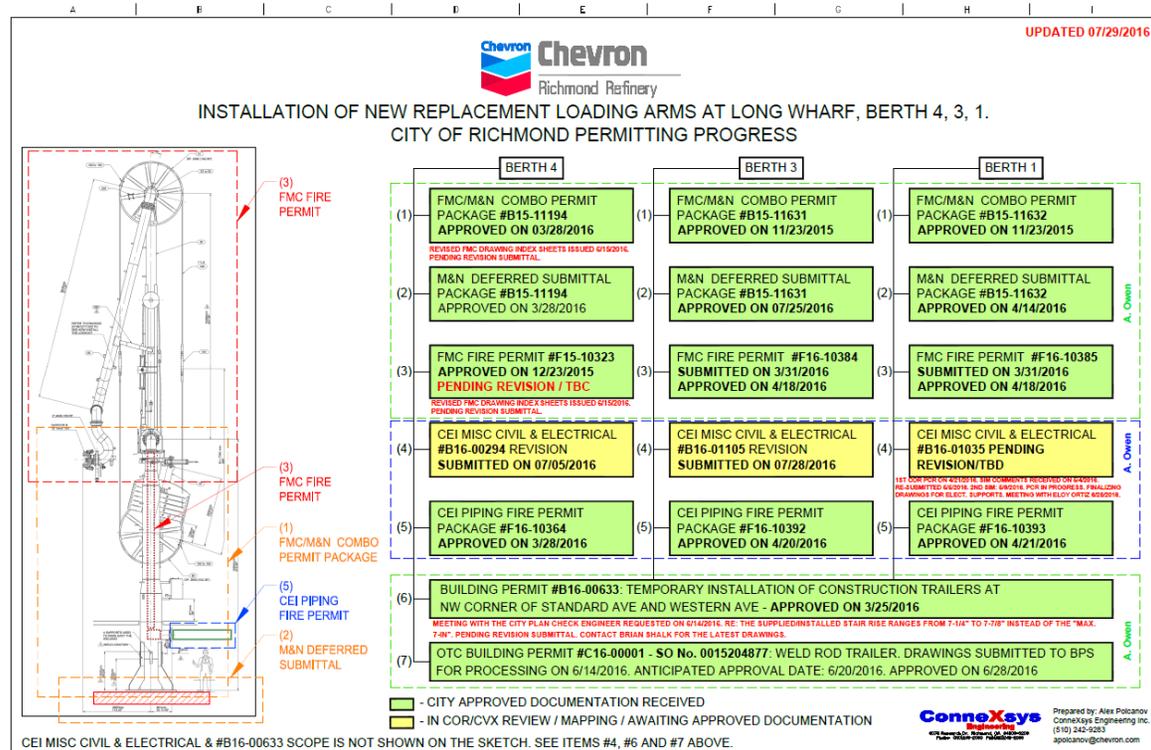
- Estimated required infrastructure (cold iron, subset for C&C):**
- **Miles** of new electrical cable, conduit and/or duct bank.
    - Upgrade 12kV TL-1 and TL-2 from 600 to 1200 kVA cables from South Yard Sub to #3 Salt Water Sub
  - **Replace 2 transformers** (24 MVA with 45 MVA).
  - Upgrade bus/breakers/transformers at #3 SWS?
  - Expand #5 Substation?
  - Changes to PG&E interconnect uncertain?
  - PG&E infrastructure upgrades uncertain?

# PERMIT REQUIREMENTS – WMEP

Agencies with discretionary permits:

Permitting Agency		Anticipated Approvals/Regulatory Requirements
Local	City of Richmond	Ministerial Building Permits in accordance with the California Building Code and City of Richmond Zoning Ordinance
	California State Lands Commission (CEQA lead agency)	Environmental review and project approval pursuant to an existing lease
State	California Department of Fish and Wildlife (CDFW)	California Endangered Species Act Fish Section 2081
	San Francisco Bay Regional Water Quality Control Board (SFBRWQCB)	Clean Water Act Section 401 Water Quality Certification
	San Francisco Bay Conservation and Development Commission (BCDC)	Amendment to Refinery Long Wharf Permit No. M1987.015
Federal	U.S. Army Corps of Engineers (USACE)	Clean Water Act (CWA) Section 404 (under Nationwide Permit No. 3)
	U.S. Fish and Wildlife Service (USFWS)	Section 7 Consultation under federal Endangered Species Act (if necessary)
	National Marine Fisheries Service (NMFS)	Marine Mammal Protection Act – Incidental Harassment Authorization

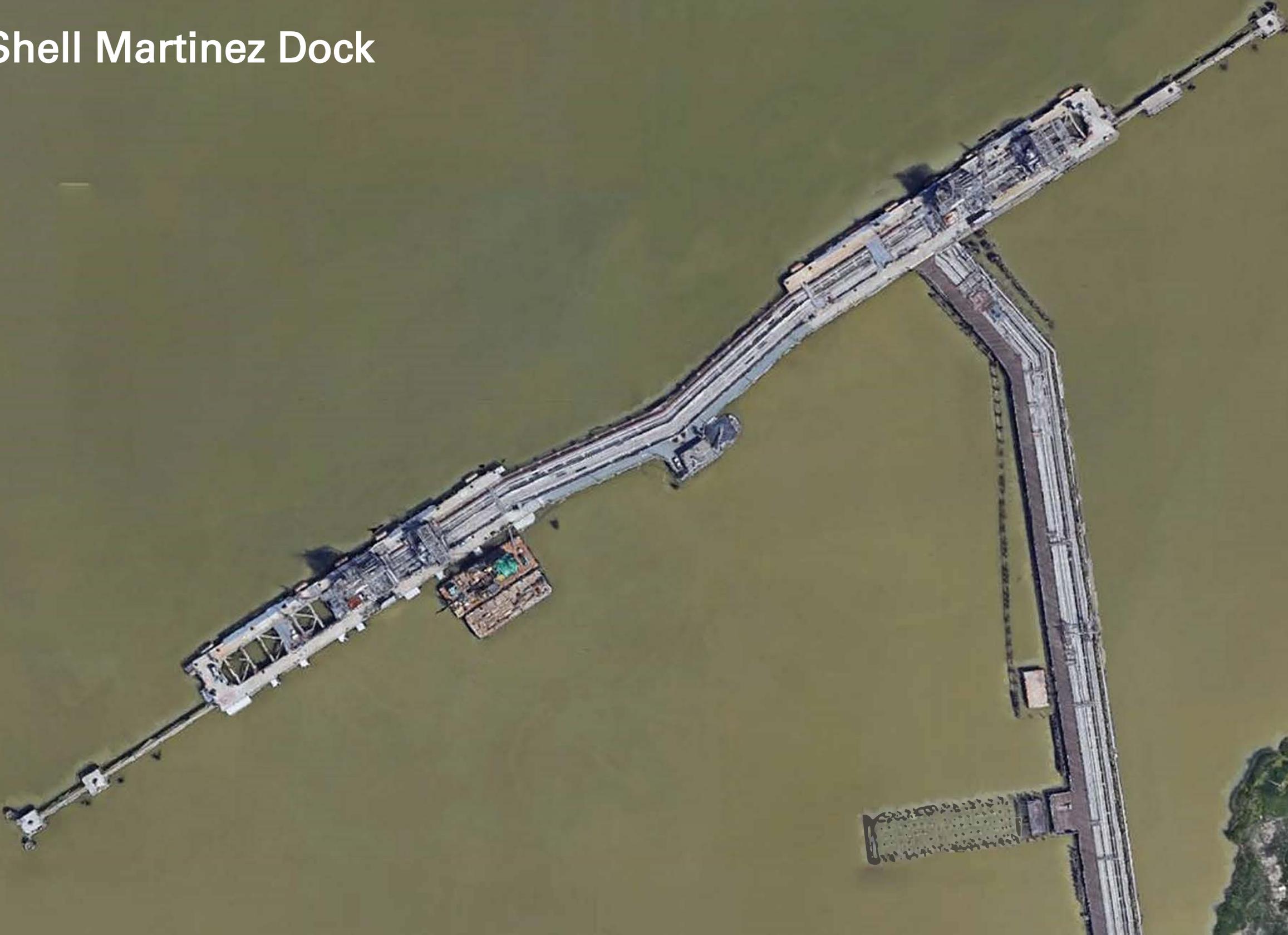
Local ministerial building permits:



Plus mitigation costs for impacts to marine habitat (WMEP): 2017 = ~\$2.5MM/acre (\$250K/0.11ac impact)

## **Exhibit 5: Aerial Photographs of Marine Terminals**

# Shell Martinez Dock



# Martinez – Amorco Wharf



# Martinez – Avon Wharf



# POLB – Terminal 2



Los Angeles Berth 164



Pipelines

Access ramp

Pipelines

Access ramp

Pump house

Pipelines terminal buildings

Pipelines

Truck turning lot

Pipelines

Pipelines Access ramp

Vapor Unit

## **Exhibit 6: Wharf Improvement Project Timelines**

**Timelines for Projects Involving Substantial New Wharf Infrastructure  
Comparable to At Berth Rule Compliance Projects**

**ISOR Reported: Average 5.2 Years, Range 3 - 9 Years<sup>1</sup>**

**Actual: Average 11.6 Years, Range 7 - 15 Years**

<b>Project</b>	<b>Start and Completion Dates and description, as reported in ISOR, pp. III-19 – 21</b>	<b>Actual Timeline with Start and Completion Dates</b>	<b>Timelines Comparison</b>
<p><i>Chevron Richmond Wharf Maintenance and Efficiency Project (WMEP)</i></p>	<p>Project “started from 2014 and is estimated for completion by 2023.... The project’s initial design, permit submittal and approval phase lasted from 2014 to 2017. The construction phase for the one of the berth improvements began in 2018 and estimated for completion by 2022. The construction phase for the other berth improvements began in 2018 and estimated for completion by 2023. There will be a 2 month period after construction for operation evaluation of the new components.”</p>	<p><b>October 2008:</b> Project inception and scope development incorporating MOTEMS audit findings</p> <p><b>January 2010-September 2014:</b> Project design and planning process, including required technical studies</p> <p><b>April 2014:</b> Initial permit applications submitted</p> <p><b>October 2016:</b> Mitigated Negative Declaration (MND)</p> <p><b>June 2017</b> MND Addendum</p> <p><b>July 2017:</b> Permits received from State Lands Commission, San Francisco Bay Conservation and Development Commission, Cal. Dept of Fish &amp; Wildlife, Regional Water Quality Control Board, Army Corps of Engineers, National Marine Fisheries Service</p> <p><b>2018:</b> Construction commenced.</p> <p><b>April 2022:</b> Estimated completion of Berth 4 seismic retrofit</p>	<p><u>CARB:</u> 9 years</p> <p><u>Actual:</u> 15 years if completed on schedule</p>

<sup>1</sup> Project durations reported in the ISOR include two projects – the Chevron Richmond Long Wharf MOTEMS compliance project and Green Omni Terminal ShoreKat Demonstration Project – that were limited to repairs of existing structures and minor equipment installation. Those two projects are excluded from this chart as not properly comparable with the timelines for planning, permitting and construction of substantial new wharf infrastructure to achieve compliance with the At Berth rule, i.e., new cranes and other major equipment installation on new or expanded wharf decking with new supporting piles. If those projects were included, with timelines reported in the ISOR, the average project duration for projects in the ISOR would be 4.6 years, range 3-9 years.

		<p>construction</p> <p><b>February 2023:</b> Estimated completion of Berth 4 fender replacement construction</p> <p><i>Source: Information provided by 10/8 and 10/9/18 emails from K. Boven, Chevron, to N. Light, CARB</i></p>	
<p><i>Port of Richmond IMTT Terminal Wharf Modification Project</i></p>	<p>"Based on the available information, CARB staff assessed that the project started in late 2011 and was completed by early 2015."</p>	<p><b>2008:</b> Project planning initiated</p> <p><b>Fourth quarter 2011:</b> Basis of design and concept layout</p> <p><b>Third quarter 2012 – end of 2013:</b> Permitting</p> <p><b>Second quarter 2014:</b> Construction commenced</p> <p><b>First quarter 2015:</b> Estimated completion of construction from 2014 summary</p> <p><b>October 2015:</b> Actual construction completion</p> <p><i>Source: California State Lands Commission, International-Matex Tank Terminals, IMTT Wharf Modification Project Prevention First 2014 (October 7, 2014) (<a href="https://www.slc.ca.gov/wp-content/uploads/2018/08/PF2014_MOTEMS-IMTT.pdf">https://www.slc.ca.gov/wp-content/uploads/2018/08/PF2014_MOTEMS-IMTT.pdf</a>), updated by N. Lucas, IMTT, personal communication</i></p>	<p><u>CARB:</u> 3.5 years</p> <p><u>Actual:</u> 7 years</p>
<p><i>Berths 167-169 Shell MOTEMS Wharf Improvement Projects (POLA)</i></p>	<p>"The construction for this project began in 2017 and scheduled to be completed in 2020."</p>	<p><b>2010:</b> MOTEMS audit</p> <p><b>July 2015:</b> Notice of Preparation of Environmental Impact Report (EIR)</p> <p><b>March 2018:</b> Draft EIR</p> <p><b>July 2018:</b> Final EIR</p>	<p><u>CARB:</u> 3 years</p> <p><u>Actual:</u> 13 years if completed on schedule</p>

		<p><b>August 2023:</b> Estimated completion of construction from EIR</p> <p>Source: <i>Berths 167-169 [Shell] Marine Oil Terminal Wharf Improvement Project Final EIR (July 2018), p. 1-5</i>  <a href="https://kentico.portoflosangeles.org/getmedia/3a7e6ce5-41ab-4d09-9e6f-c9b2f6d63559/Shell-MOTEMS_FEIR">https://kentico.portoflosangeles.org/getmedia/3a7e6ce5-41ab-4d09-9e6f-c9b2f6d63559/Shell-MOTEMS_FEIR</a></p>	
<p><i>Tesoro Avon Terminal MOTEMS update</i></p>	<p>Not included in ISOR; modifications include construction of new vessel loading/unloading platform and mooring dolphin on new steel pilings, and construction of associated facility structures, electrical, mechanical and piping systems</p>	<p><b>March 2008:</b> MOTEMS audit</p> <p><b>April 2014:</b> EIR Notice of Preparation</p> <p><b>September 2014:</b> Draft EIR</p> <p><b>January 2015:</b> Final EIR</p> <p><b>2016:</b> Estimated completion of construction from EIR</p> <p><b>February 2017:</b> Actual construction completion</p> <p>Source: <i>Tesoro Avon Marine Oil Terminal Lease Consideration Final EIR (Jan. 2015), p. 2-8</i>  <a href="https://www.slc.ca.gov/wp-content/uploads/2018/09/2.0_PD.pdf">https://www.slc.ca.gov/wp-content/uploads/2018/09/2.0_PD.pdf</a>; updated by B. McDonald, Marathon Petroleum, personal communication</p>	<p><u>CARB:</u> Not included in ISOR</p> <p><u>Schedule in CEQA document:</u> 8 years</p> <p><u>Actual:</u> 9 years</p>
<p><i>Berths 238-239 [PBF Energy] Marine Oil Terminal Wharf Improvements Project</i></p>	<p>Not included in ISOR; modifications include construction of new marine platforms and associated mooring and breasting dolphins at both berths</p>	<p><b>2008:</b> MOTEMS audit</p> <p><b>March 2018:</b> Draft MND</p> <p><b>June 2018:</b> Final MND</p> <p><b>March 2020:</b> Estimated completion of construction from MND</p> <p><b>December 2022:</b> Expected completion of construction based on current information</p> <p>Source: <i>Berths 238-239 [PBF Energy] Marine Oil Terminal Wharf Improvements Project, Final Initial Study/Mitigated</i></p>	<p><u>CARB:</u> Not included in ISOR</p> <p><u>Schedule in CEQA document:</u> 12 years</p> <p><u>Actual:</u> 14 years if completed on schedule</p>

11-20-19

		<p><i>Negative Declaration (June 2018), p. 2-10</i> (<a href="https://kenticoportoflosangeles.org/getmedia/4db8b80c-7101-4158-b656-00664f9c04df/PBF_Energy_ISMND_Final">https://kenticoportoflosangeles.org/getmedia/4db8b80c-7101-4158-b656-00664f9c04df/PBF_Energy_ISMND_Final</a>); <i>updated by M. Kajioka, PBF Energy, personal communication</i>)</p>	
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**Exhibit 7: Power Engineering Construction Co. Comment  
Letter (November 6, 2019)**



November 6, 2019

Clerk's Office  
California Air Resources Board (CARB)  
1001 "I" Street  
Sacramento, CA 95814

Subj: Comments on Proposed Control Measure for Ocean-Going Vessels at Berth

To CARB Staff:

I am writing to provide commentary on the proposed timeline for the design, permitting, construction, and testing of an At-Berth Shore Based Emission Control Program for Tankers at California Ports. As an Oakland, CA resident and business owner, I share CARB's desire to implement regulations that achieve real world air quality goals.

My goal in writing is to share my experience as a California marine contractor – specifically as it applies to the lengthy project timelines of most marine projects in California and the reality of how difficult it is to move quickly through the phases of marine work. Marine projects routinely face regulatory hurdles and engineering constraints not found in land-based construction. These hurdles and constraints translate into long program schedules. I believe the timeline being considered for the Proposed Control Measure is unrealistically short and doesn't consider the unique nature of designing, entitling, and constructing over-water structures and facilities.

As background, I am the President and Principle owner of Power Engineering Construction Co. We are a marine contractor based in Alameda, CA. The company has been in business for 33 years and I've been here for 27 of those years. Our business focuses on building and repairing in-water structures. Our slogan is "Engineering Construction near, on, and under the water". We routinely get involved in up-front preconstruction, design, and entitlement of marine structures and systems as part of the service we offer our clients. Our customer base is diverse and includes most major oil companies, a variety of municipal clients including SFPUC, the Port of San Francisco, WETA, and a range of private business owners working along the waterfront. For a small snapshot of projects we've completed throughout California, the attached graphic **(Exhibit A)** shows our recent San Francisco waterfront projects.

The range and breadth of our marine construction experience affords us a unique perspective in how long it takes for a successful project to go from concept to operation. In general, we advise clients to expect a full project timeline of 8-10 years for a standard over-water marine facility; this timeline includes work from concept, through entitlement, to construction and operation.

One can quibble with the durations of individual tasks including site studies, engineering, the CEQA process, contracting, etc. However, empirically, all but the most basic marine construction projects prove to track into an 8 to 10-year timeline. The attached spreadsheet **(Exhibit B)** shows three example projects *outside* of the marine oil terminal industry that



support this assertion. Each of these projects was considered publicly desirable, faced little opposition, and each was managed by a very motivated team. Regardless, each example project followed a decadal life cycle due to the complexity of regulatory review, the challenges of over-water design, and the limitations and work windows imposed during construction.

While the three example projects demonstrate only a small sample size, these projects provide similarities to the work required to implement an At-Berth Emission Capture program. In a sense, the example projects provide a lower bound for the anticipated project duration as none was completed in an active marine terminal. An active marine fuel terminal imposes additional safety and scheduling constraints that generally result in longer construction durations.

Also, the projects selected as examples do not consider one key element of the proposed new regulation: issues surrounding the technical feasibility of an At-Berth Shore Based Emission Control System. The Emission Capture equipment and supporting machinery will add to the overall project timeline through both feasibility testing and extended equipment procurement. The attached spreadsheet (**Exhibit C**) shows a sampling of recent heavy over-water equipment purchases (cranes and fuel loading arms) and demonstrates the additional timeline that may be required. One can assume the required emission control equipment, or the expansion of required electrical infrastructure, will follow a similar (if not longer) procurement cycle to these example purchases.

Overall, I ask the CARB staff to consider proposing on an 8-10 year timeline for design, entitlement, and construction of an At-Berth Emission Control program in California Marine Terminals. This timeline should begin once a feasibility study is completed and appropriate emission control technology is proven to be readily available.

Should you have any questions, please contact me at 415-559-0097.

Sincerely;

**Power Engineering Construction Co.**

A handwritten signature in blue ink, appearing to read "DM", is written over the company name.

David Mik  
President

Enclosed:

Exhibit A – Power Engineering Construction Co. example projects

Exhibit B - examples of three relevant marine project timelines.

Exhibit C - examples of equipment procurement and installation timelines.



- Ferry Building Pier Repairs
- WETA Downtown SF Ferry Terminal Expansion
- Pier 1 Seismic and Structural Upgrade
- Pier 1.5 Water Taxi Dock Design-Build
- Pier 3 Wharf Repairs
- Pier 5 Substructure Strengthening
- Pier 7 Wharf Repairs
- Pier 9 Substructure Repairs
- Pier 15 Water Taxi Dock Design-Build
- Pier 15 & 17 Complete Pier Reconstruction
- Pier 19 Dive Inspection & Repairs
- Pier 23 Dive Inspection & Repairs

Pier 29 Wharf Repairs

Pier 29 & 31.5 Substructure Strengthening

Pier 31 Dive Inspection & Pile Testing

Pier 39 Timber Deck Replacement

Pier 43 Ferry Arch Foundation Improvements

Alcatraz Dive Inspection

Over water Deck Extension to Alioto's

Rock Rip Rap Slope Improvements

China Basin Wharf Reconstruction

South Beach Harbor Marina Float Reconstruction

Pier 38 Below Deck Inspection

Pier 30-32 Inspection & Substructure Repairs

Pier 26 & 28 Inspection & Repairs

Pier 22.5 Emergency Pile Repairs

Pier 22.5 New Floating Fireboat Station 35  
(in progress)

Pier 52 Small Craft Dock Installation

Pier 50 Substructure Repairs

Pier 48 Substructure Repairs

Pier 80 Mooring Install

Pier 70 Pile Load Testing

SFPUC Southwest Ocean Outfall End Gate Replacement

WETA South San Francisco Ferry Terminal Design-Build

Oyster Point Marina Floating Breakwater

Oyster Point Marina Concrete Sheet Pile Wall

PG&E Hunters Point Tunnel Closures

Hyde Street Pier & Piling Repairs

Hyde Street Pier Hercules Berthing Dock

Fort Mason Rock Rip Rap Slope Improvements

# WHERE WE'VE WORKED SAN FRANCISCO WATERFRONT USA

Pier 1 Reconstruction

SF Marina Breakwater Seawall Repair

Chrissy Field Outfall Replacement

Presidio Pier Inspection

SFPUC Baker Street Outfall Repair

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**Heavy Equipment**

**Procurement & Installation Duration**

**Large Container Cranes (source, Shanghai Zhenhua Heavy Industries/ZPMC/Liftech Consultants, Inc.)**

Duration for Standard Cranes:

Average	Min	Max	
33.0	30.0	36.0	

*(for non-standard, add "several quarters" to duration)*

	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Procurement/Vendor Selection	Yellow	Yellow										
Design			Yellow	Yellow								
Fabrication					Yellow	Yellow	Yellow	Yellow				
Delivery									Yellow			
Installation & Testing										Yellow		

*(install duration is for one berth)*

**Conventional Dock Mounted Marine Hydraulic Cranes (source, Rapp Marine NW, LLC - see WETA Central Bay Maintenance Terminal, Chevron RLW Berth 2, etc.)**

Duration for Hydraulic Cranes:

Average	Min	Max	
17.0	15.0	19.0	

	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Procurement/Vendor Selection		Yellow										
Design			Yellow	Yellow								
Fabrication				Yellow	Yellow							
Delivery							Yellow					
Installation & Testing							Yellow					

*(install duration is for one berth)*

**Rotary or Dual Counterweight Fuel Loading Arms (source, FMC/PEC - see Chevron RLW Loading Arm Replacement Project)**

Duration for Fuel Loading Arms:

Average	Min	Max	
23.5	22.0	25.0	

	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Procurement/Vendor Selection	Yellow	Yellow										
Design			Yellow	Yellow								
Fabrication					Yellow	Yellow						
Delivery							Yellow					
Installation & Testing								Yellow				

*(install duration is for one berth)*

## **Exhibit 8: Chevron Comments (February 15, 2019)**



**Henry T. Perea**  
Manager, CA/OR/WA Government Affairs

February 15, 2019

Ms. Cynthia Marvin  
California Air Resources Board  
1001 I Street  
Sacramento, California 95814

via e-mail at [cynthia.marvin@arb.ca.gov](mailto:cynthia.marvin@arb.ca.gov)

**Re: Chevron Comments to Proposed At Berth and At Anchor Regulation Emission Inventory and Preliminary Health Analyses**

Dear Ms. Marvin,

Chevron Products Company and Chevron Shipping Company (collectively, "Chevron") have prepared comments in response to the release of data related to the *DRAFT: 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results and Preliminary Health Analyses: Control Measure for Ocean-Going Vessels (OGV) At Berth and At Anchor ("HRA")*.

After close review of the Inventory, Chevron contends that some of the data and assumptions used when calculating the inventory dramatically overestimate emissions from tankers at Richmond Long Wharf (RLW). Specifically, the areas of major concern are:

- Substantial underestimation of the impact of Tier III tankers which will significantly reduce emissions from vessels at berth as early as 2030.
- Overestimation of activities of tankers at berth, resulting in significantly inflated emissions inventory for tankers.
- Application of highly incompatible data from POLB/POLA to operations at RLW, resulting in a significantly inflated inventory.
- Forecasts of future vessel traffic growth that significantly exceed historical data and Chevron's own forecast for tanker traffic at RLW.
- Potential misinterpretation of the HRA model as currently depicted. Chevron recommends minor changes in the presentation of the HRA data to provide a better representation of the actual situation.

We recognize that CARB has spent considerable time and effort on this analysis, and we offer the following comments in an effort to provide greater accuracy. Chevron looks forward to continuing discussions on how to proactively and practically reduce emissions from our facilities in support of on-going CARB efforts.

## **1. Introduction of Tier III Compliant Vessels prior to 2030**

- Delayed expected introduction of Tier 3 marine engines to 2030 or later, based on a study by Starcrest and Ports of LA/LB

At the core of CARB's proposed regulation is the assumption that there will be zero Tier III-compliant vessels in service before 2030, and consequently, CARB asserts the only mechanism to achieve emission reductions by OGVs is through regulation of OGV at berth emissions. CARB cites a study by Starcrest (2017), which concludes that there will be no Tier III vessels in service in the world's fleet, and Starcrest's study is based on vessels with the potential to call at the Port of Long Beach (POLB) and Port of Los Angeles (POLA).

As a marine terminal, Chevron RLW receives a distinctly different population of tanker vessels than POLA/POLB. In short, marine terminals operations and the vessels that call at them are distinctly different than port operations. In particular, the RLW and other Northern California marine terminals lack the capability to accommodate ULCC and VLCC vessels.

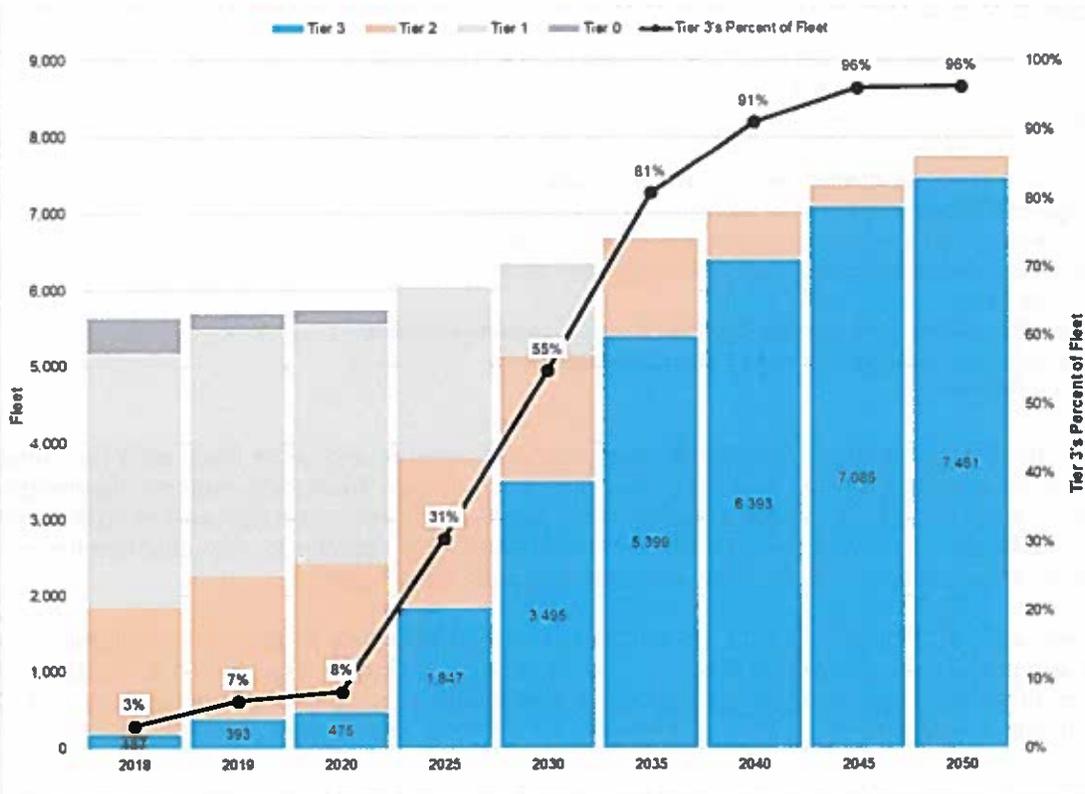
Further, Chevron implements vessel clearance procedures to ensure that all vessels calling at RLW are suitable to fit our fender spacing at berth, and meet our operational, health and safety standards or "OE" standards. Consequently, our vessel vetting criteria effectively prohibits foreign-flagged tankers older than 18 years to call at RLW. There may be other vessel types with a longer useful life up to 25 years, such as chemical carriers that carry only clean refined products, or US-flagged Jones Act vessels. Nevertheless, the vast majority of ships that can call at RLW, and that meet our vessel clearance standards, will be 18 years of age or younger. These age guidelines for vessels calling at marine terminals are common to the industry.

Using an industry vessel database purchased from Clarksons, Chevron Shipping assessed the portion of the world's fleet that has the capability to call RLW. For existing vessels, one can estimate the keel laid date and determine what engine tier level was installed in the ship. As of 2018, 1-2% of the world fleet meets Tier III requirements. In fact, Chevron took delivery of 2 Tier III vessels in 2018, and one third of our total fleet will be Tier III by 2021. This is significant because there are currently more than zero Tier III vessels, indicating large errors in Starcrest's forecast that Tier III tanker vessels will not exist until 2031 at the earliest (Figure 3.8, Starcrest 2017).

More specifically, Chevron built two Suezmax-sized tankers that are used to lighter nearly 70% of Richmond Refinery's crude deliveries to the RLW. These two lightering vessels have keel-laid dates in 2013 but were designed to be able to operate their electrical generation at RLW in low-emission mode by using superheated steam auxiliary boilers and turbogenerators, which do not produce diesel particulate matter (DPM) and have a much lower NOx emissions than Tier III diesel engines. In fact, according to a boiler burner maker, marine boiler NOx emissions are 0.78g/kWh, significantly lower than the Tier III limit for a 900 rpm diesel generator which is 2.31g/kWh [www.volcano.co.jp/english/pdf/Volcano\\_TCS\\_Bulletin\\_004PB.pdf](http://www.volcano.co.jp/english/pdf/Volcano_TCS_Bulletin_004PB.pdf). As of 2018, these vessels, with NOx emissions below Tier III levels, represent a considerable amount of our annual at berth emissions (70% of our crude deliveries are via Suezmax-sized vessels).

Our study concluded that 55% of vessels calling at RLW would be expected to be Tier III compliant by 2030, and 80% of vessels would be Tier III compliant by 2035. In addition to our analysis, an independent 3<sup>rd</sup> party conducted a similar analysis and demonstrated similar results – about 50% of vessels by 2030. With two independent data evaluations, we believe the Starcrest (2017) report is erroneous and calls into question the entire purpose of the proposed at berth regulation. If nearly 80% of vessels calling at Northern California Marine Terminal Complexes owned/operated by major oil companies will be Tier III-compliant by 2035, then this regulation will have less than 5 years of relevance toward achieving its target emission reductions before vessel-side technologies meet or exceed the 80% control factor. Further, on-board emission controls will exceed the magnitude of reductions capable with at berth controls, because on-board controls will benefit the entire Emission Control Area (ECA) during transit and maneuvering. Consequently, the cost-effectiveness of this proposed at berth regulation appears to be very low.

**Figure 1-1: Forecast of percentage of Tier III vessels capable of calling at RLW by year**  
 (Source: Chevron forecast using Clarkson's commercially available fleet database, factoring in vessel clearance procedures)



**Key Assumptions**

- 2018 global fleet data from Clarksons Research
  - Data as of December 2018
- Ships built after 2020 assumed Tier 3
  - 50% assumed Tier 3 in 2019
  - 50% assumed Tier 3 in 2020
- Useful life per industry standards
  - Crude and Product – 18 years
  - Chemical – 25 years
- Fleet growth assumed to be 1% per year

## 2. Vessel Parameters and Activities at Berth

### 3. General Emissions Inventory Methodology and Sources

Broadly, the following steps describe the inventory process, with more detail included later in the report, along with the source data:

1. Vessel broadcasting data along with GIS mapping determines the number of vessel visits for each port in California (grouped by vessel type and vessel size)
2. Vessel broadcasting data also determines the average length of stay for all vessel visits (by vessel type, size and port)
3. Information on average engine effective power (based on the Starcrest Vessel Boarding Program) is combined with vessel visit and duration information
4. Future years are forecasted by applying a growth rate (specific to port, vessel type, and in some cases vessel size) and assuming an equivalent age distribution of vessel visits in the future
5. Compliance data from CARB's Enforcement Divisions is used to determine reduced engine activity time – and therefore reduced emissions – resulting from CARB's At Berth Regulation

The table below (Table 2-1) summarizes the vessel categories and auxiliary and boiler loads as a percentage of pumping load for pumping, loading and idle activities. Using this methodology, Table 2-2 compares the energy used per vessel type for vessels calling at RLW against CARB's calculated energy per vessel type assuming POLA/POLB engine loads, and corresponding emissions. CARB's current methodology appears to over-estimate the at berth emissions at RLW by at least a factor of two or more, depending upon vessel type.

As mentioned previously, VLCCs and ULCCs do not call at marine terminals in Northern California. For the remaining vessel categories, there are distinct differences between the load factors seen in POLA/POLB and those at RLW. In addition to the load factors, the actual activities performed by the vessels calling at RLW and, likely, other marine terminals are significantly different than the way CARB has represented the activities in their calculations.

The largest difference appears to be that CARB's calculation of "Average Engine Effective Power" assumes vessels are pumping 100% of the time that they are at berth, when in fact, at RLW, vessels except Suezmax spend significant amount of their time at berth loading by gravity feed. The pumping rates/discharge rates are generally higher than the gravity-fed loading rates. Vessels are also idle for a substantial period while at berth, when they are neither pumping nor loading. Consequently, the assumption that the vessels are pumping continuously leads to over estimating emissions at berth.

Vessels at berth pump to two primary destinations within Chevron Richmond Refinery:

1. Crude deliveries are pumped directly to low-elevation crude tanks,
2. Non-crude deliveries are pumped to the base of the RLW causeway, where electric booster pumps move delivered products to tanks higher in the refinery tank field.

The non-crude ships discharging feedstocks or blendstocks use only enough energy to push the product from the cargo hold and fill the pipeline, but not to move the product up hill. Using electric pumps in the refinery pump stations is a low-emission means of offloading vessels and distributing product to the refinery tankage.

To achieve a more accurate estimate of actual at berth emissions, CARB should follow the calculation methodology proposed below by ship type to reflect that vessels at berth are performing different activities during their visit, namely pumping to discharge feedstocks, and then loading to take refined product which is at the vessel "idle" or "hoteling" load:

1. [Average Pumping Duration] x [Average Pumping Load] x [Emission Factor] = Pumping Emissions
2. [Average Ballasting Duration] x [Average Ballasting Load] x [Emission Factor] = Ballasting Emissions

3. [Average Hoteling Duration] x [Average Hoteling Load] x [Emission Factor] = Hoteling Emissions
4. Total Vessel at Berth Emissions = [Pumping Emissions] + [Ballasting Emissions] + [Hoteling Emissions]

NOTE: The pumping load is correlated to the pumping rates by vessel type at RLW. The pumping rates at each terminal are unique to the piping and tank configuration, geography and operational constraints of each terminal.

**Table 2-1: RLW Vessel Type, Activities and Associated Loads Represented as % of Pumping Load.**

Vessel Type	Pump Type	Percent of Calls	Average Hotel Time (hrs)	% of Hotel Time			% of Auxiliary Load during pumping			% of Boiler Load during pumping		
				Loading	Discharge	Idle	Loading	Discharge	Idle	Loading	Discharge	Idle
SeaWayMax	Diesel	54%	42.70	43%	37%	20%	70%	100%	55%	100%	100%	100%
	Steam	2%	54.96	64%	0%	36%	100%	100%	80%	100%	100%	100%
PanaMax	Diesel	3%	69.47	0%	75%	25%	55%	100%	36%	100%	100%	100%
	Steam	4%	58.98	9%	59%	32%	100%	100%	64%	45%	100%	45%
AfraMax	Steam	7%	57.37	31%	38%	31%	100%	100%	63%	33%	100%	33%
SuezMax	Steam	30%	28.09	0%	63%	37%	100%	100%	69%	45%	100%	37%
Averages		100%	40.90	27%	46%	27%	82%	100%	60%	77%	100%	74%

**Table 2-2: Emission Inventory Comparison for RLW – Chevron vs. CARB values.**

Vessel Type	Engine Type	Energy Used (kWh)		NOx (tpy)		PM10 (tpy)		PM2.5 (tpy)		DPM (tpy)		SOx (tpy)		CO2eq (tpy)	
		Chevron	ARB	Chevron	ARB	Chevron	ARB	Chevron	ARB	Chevron	ARB	Chevron	ARB	Chevron	ARB
SeaWayMax	Auxiliary	7,088,183	10,003,056	98.84	138.07	2.03	2.01	1.88	1.85	2.03	2.01	3.91	4.68	5,429.0	7,451.4
	Boiler	1,360,426	32,994,774	2.98	72.56	0.21	5.96	0.19	5.49	-	-	0.90	21.33	1,409.5	33,978.7
PanaMax	Auxiliary	1,144,086	1,175,238	15.39	15.81	0.33	0.24	0.30	0.22	0.33	0.71	0.63	0.55	876.3	875.5
	Boiler	1,084,622	6,147,537	2.33	13.52	0.16	1.11	0.15	1.02	-	-	0.70	3.97	1,098.5	6,330.9
AfraMax	Auxiliary	956,242	1,046,180	12.36	13.69	0.27	0.21	0.25	0.19	0.27	0.21	0.53	0.49	732.4	779.3
	Boiler	951,820	7,268,350	1.84	15.98	0.13	1.31	0.12	1.21	-	-	0.55	4.70	867.5	7,485.1
SuezMax	Auxiliary	1,411,786	5,702,957	19.53	69.76	0.40	1.15	0.37	1.05	0.40	1.15	0.78	2.67	1,080.4	4,248.1
	Boiler	6,909,414	13,281,139	11.42	29.21	0.80	2.40	0.74	2.21	-	-	3.43	8.59	5,394.6	13,677.2

Chevron will transmit the underlying data and calculations to CARB as confidential business information, however, the main drivers for the differences are likely due to the following:

- a. Chevron’s estimate is based upon (discharge pumping rate) x (discharge time plus hoteling load) x (hoteling time plus ballasting load) x (ballasting time) because vessels are not continuously pumping, sometimes they are simply idle, and some vessels load via gravity feed from shore tankage for a longer duration than they pump while at berth.
- b. ARB uses same boiler and auxiliary loads for steam and diesel pumpers which were most likely measured (or determined through interviews) on steam pumpers at berth in Starcrest’s Vessel Boarding Program while pumping. Almost all SeawayMax vessels and a large portion of PanaMax vessels that stop at RLW are diesel pumpers.
- c. The ratio of crude versus product carriers is incorrect for SeawayMax and PanaMax vessel types.
- d. Boiler emissions are lower because the vessels are not pumping the entire time at berth.
- e. SuezMax auxiliary engine emissions are lower because of Chevron-owned lightering vessels, which use the boilers and turbogenerators to deliver electricity and account for 70% of refinery crude feedstock deliveries. No DPM is emitted and NOx emissions are lower than Tier III diesel auxiliaries.
- f. For all crude carriers, 25% of boiler exhaust is pumped into cargo tanks as inert gas and not released at berth during discharge. When these vessels lighter with the VLCC in Southern California, they vapor balance with the VLCC ship. The inert gas in the SuezMax vessel is pumped into the VLCC as inert gas.

**Vessel Activity Databases**

San Francisco Marine Exchange is a suitable database and would use assumptions/processes consistent with those employed in South Coast area, but it needs supplemental data from Chevron to estimate at berth activities. Chevron will transmit its operational summary tables as confidential information for at berth activity as an output from our proprietary database.

### 3.1. Base Year Vessel Visits and Time At Berth

The inventory updates for vessel visits and time at berth are based on:

- 2016 IHS-Markit Vessel Registry data for vessels that visited California
- 2016 IHS-Markit at berth times for California
- 2016 South Coast Marine Exchange Arrival and Departure Data

The IHS-Markit data is used for the majority of California territorial waters, and the South Coast Marine Exchange is used specifically for the Ports of LA/LB.

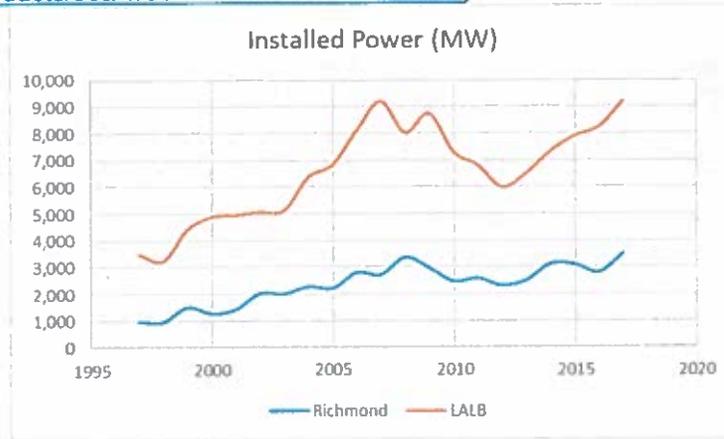
### 3. Comparison of POLA/POLB to RLW

As discussed on January 24, 2019 with CARB, there are significant differences between the vessels calling at POLA/POLB and those calling at RLW. Because of the significant differences in vessel particulars and operations, the data from POLA/POLB cannot be used to accurately represent operations or emissions at RLW and other Northern California marine terminals.

*a. Installed Power*

The installed power (determined from the U.S. Army Corps of Engineers Foreign Vessel Entrances and Clearances data as calls time propulsion power in MW) for vessels calling at POLA/POLB is nearly a factor of 3 greater than RLW.

**Figure 3-1: Installed power comparison between vessels calling at RLW and POLA/POLB 1997-2017**  
 (Source: U.S. Army Corps of Engineers Entrances and Clearances data from 1997 to 2017  
<https://publibrary.planusace.us/#/series/vessel%entrances>) and IHS Sea-Web data on ship characteristics  
<https://ihsmarkit.com/products/sea-web-maritime-reference.html>)



*b. The Vessel Distribution at POLA/POLB is Significantly Different than RLW*

**Table 3-1: Summary comparison of POLA/POLB to RLW vessel characteristics and calls**  
 [Source: 2014 LALB Marine Exchange Data vs. 2016 RLW San Francisco Marine Exchange – previously purchased data sets]

Ship Type	Calls		Percent Steam		Ave Hotel (hrs)	
	LALB	RLW	LALB	RLW	LALB	RLW
SeaWayMax	205	212	9%	3%	39.7	43.0
PanaMax	221	27	77%	63%	51.4	62.9
AfraMax	96	25	100%	100%	62.2	57.4
SuezMax	83	114	100%	100%	82.1	28.1
VLCC	47	0	100%		71.5	
ULCC	12	0	100%		95.6	

The key points to recognize are:

1. Suezmax spend 3 times longer at POLA/POLB than they do at RLW.
2. RLW receives nearly 90% fewer Panamax vessels than POLA/POLB, and nearly 75% fewer Aframax.
3. The percent of vessels with steam auxiliaries is different at POLA/POLB for both SeaWayMax and Panamax.
4. Unlike POLA/POLB, RLW and other Bay Area marine terminals, are not physically configured to accept VLCCs and ULCCs.

#### 4. Freight Analysis Framework (FAF) Forecast for Future Vessel Traffic Growth is Unrealistic

As mentioned during the January 24, 2019 in person meeting, Chevron stated that a 46.5% growth rate by 2050 is not feasible and does not reflect the mass balance and operational constraints that exist for Richmond Refinery.

Any small growth in marine traffic is likely to be in way of product leaving the facility which does not require vessels to pump, so additional at berth emissions would be limited to hotel and ballast water treatment loads, significantly less than pumping loads.

**Table 4-1: Richmond Forecasted Vessel Growth Rates per CARB Emission Inventory (from FAF, 2017), Emission Inventory Appendix C**

Richmond

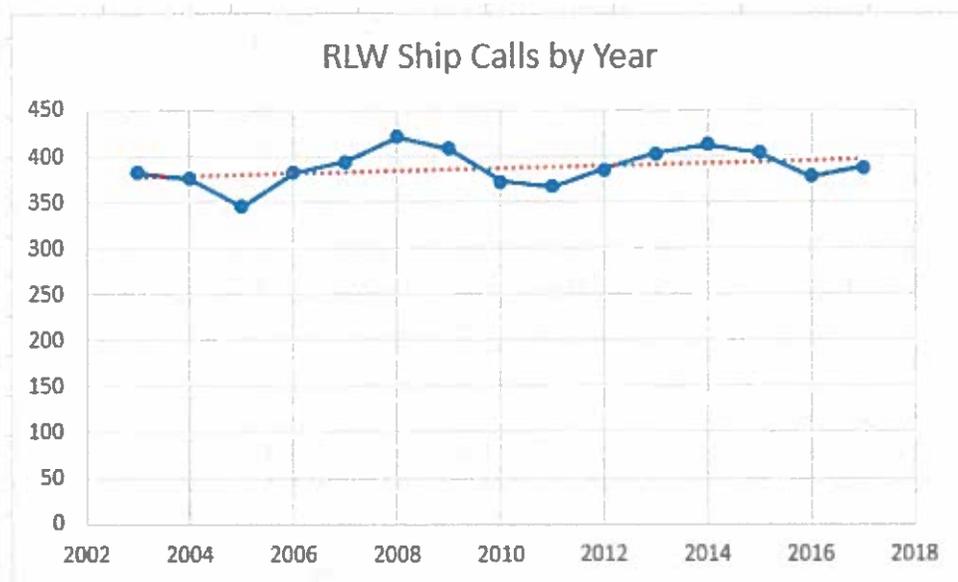
Vessel Type	Vessel Size	2016	2017	2018	2019	2020	2025	2030	2035	2040	2045	2050
Auto		1.000	1.033	1.067	1.103	1.139	1.289	1.458	1.663	1.929	2.192	2.491
Bulk		1.000	1.010	1.021	1.031	1.042	1.164	1.282	1.422	1.618	1.807	2.018
Tanker	Seawaymax	1.000	0.993	0.987	0.980	0.973	1.006	1.077	1.162	1.258	1.357	1.465
Tanker	Panamax	1.000	0.993	0.987	0.980	0.973	1.006	1.077	1.162	1.258	1.357	1.465
Tanker	Aframax	1.000	0.993	0.987	0.980	0.973	1.006	1.077	1.162	1.258	1.357	1.465
Tanker	Suezmax	1.000	0.993	0.987	0.980	0.973	1.006	1.077	1.162	1.258	1.357	1.465

Figure 4-1, below, demonstrates that RLW historical 2007-2017 vessel calls did not escalate continuously, but rather are cyclical, and primarily driven by operational and maintenance activities within the refinery itself.

Consequently, CARB should not rely upon the FAF Report as a future forecast for vessel activity for RLW and the Richmond Refinery. Based on our past 10 years operation, we would not expect greater than 1% growth over a 10-year period. Forecasting it to 2040, that would equate to a vessel growth rate of 1.03 (3% relative to 2016).

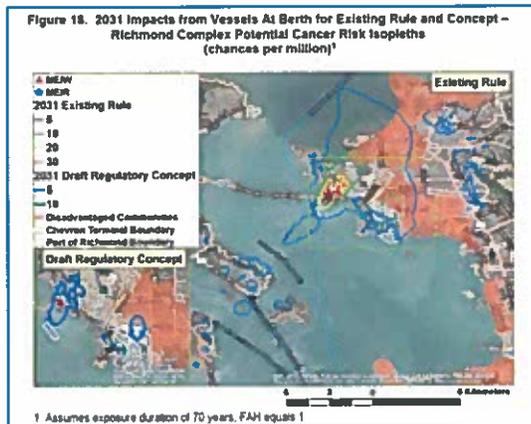
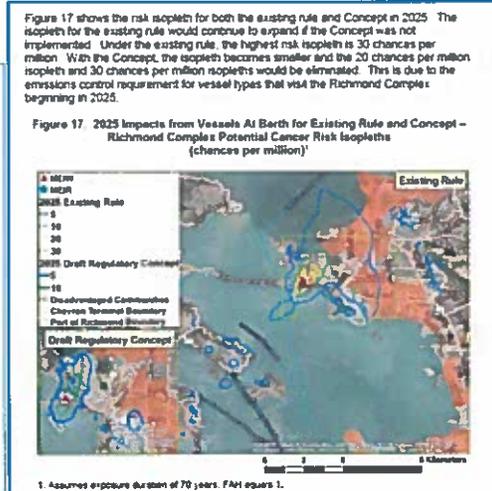
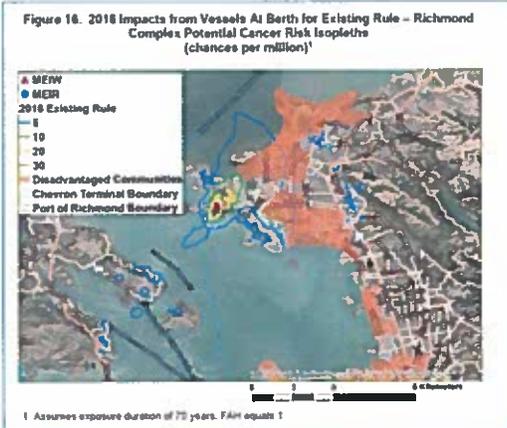
Chevron will transmit the underlying historical vessel call data to CARB as confidential information.

**Figure 4-1: Richmond Actual Vessel Calls By Year, 2007-2017**



## 5. Health Risk Assessment Comments

Although the HRA methodology appears sound, the underlying emissions data inputs are incorrect. This results in incorrect estimates of health risks.



### a. Misrepresentation of Residential Cancer Risk Isoleths

Health Risk Assessment Figures 16 through 18 illustrate the locations of the MEIR (based on a 30-Year exposure duration) and the MEIW (based on a 25-year exposure duration). The isopleth illustrating the extent of the cancer risks are based only on a 70-year exposure duration. This mixed presentation can be misleading to the general public. Using the 70-year exposure duration assumes that all populations would be living in this same location for 70 years. Although the Risk Management Plan Guidance (CAPCOA, 2015) states that for the population-based cancer risk calculations one should use a 70-year exposure duration, it also states that “studies show that a 30-year exposure duration is a reasonable estimate of the 90<sup>th</sup> and 95<sup>th</sup> percentile of residency duration in the population.” A 30-year exposure duration isopleth figure should also be included to represent a more realistic spatial estimate of cancer risk. It is also recommended that separate isopleth figures be added to represent a 9-year exposure period and a 25-year worker exposure duration.

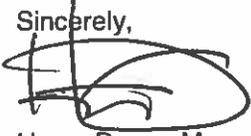
### b. Display the Chevron Industrial Facility Property Boundary

The Chevron property boundary is not delineated on Figures 16 through 18. The Chevron RLW only serves activities for use explicitly by the Richmond Refinery. Chevron recommends that the refinery property boundary

be illustrated on these figures along with the RLW boundary as the RLW is part of the facility itself, which is an industrial facility and does not contain residential receptors. As such, risks should not be calculated within property boundaries of the facility sources.

Chevron appreciates this opportunity to provide comments relating to the CARB At Berth and At Anchor Regulation draft emission inventory and health risk assessment methodologies and results. Separately, we will transmit supporting data as Confidential Business Information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Henry Perea', written over a horizontal line.

Henry Perea, Manager  
CA/OR/WA Government Affairs  
Chevron Corporation

cc:

Chris Brown, Chevron Shipping  
Brian Hubinger, Chevron PGPA

## **Technical Appendix**

*(Supporting data to be transmitted separately as Confidential Business Information)*

## **References:**

CAPCOA, 2015. Risk Management Guidance for Stationary Sources of Air Toxics.

OEHHA, 2015. Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments. Air Toxics Hot Spot Program.

Starcrest, 2014. 2014 Port of LA/LB Vessel Boarding Program – Auxiliary and Boiler engine power

Starcrest, 2017. POLA/POLB Bay Wide Ocean-Going Vessel International Maritime Organization Tier Forecast 2015-2050. San Pedro Bay Ports Clean Air Action Plan.

**Exhibit 9: Memo from Gary Rubenstein to WSPA Re:  
Review of CARB Health Analyses (November 26, 2019)**

November 26, 2019

To: Tom Umenhofer, Vice-President  
Western States Petroleum Association

From: Gary Rubenstein 

Subject: Review of CARB Health Analyses in Support of Proposed Modifications to the At-Berth Regulation

This is in response to your request for a review of the methodology used by the California Air Resources Board (CARB) to calculate the health benefits ascribed to the proposed modifications to CARB's Control Measure for Ocean-Going Vessels at Berth. My review, presented below, is based on CARB's Health Analyses document, which is included as Appendix G to CARB's Staff Report/Initial Statement of Reasons for the rulemaking.<sup>1</sup>

**1. CARB's assumption that DPM health values can be assigned to emissions from marine engines operating on MGO, MDO, or HFO is inappropriate and unfounded.**

At page 3 of the Health Analyses document (Appendix G), CARB assumes that the cancer potency factor (CPF) and chronic reference exposure level (REL) for Diesel Particulate Matter (DPM) are applicable to the particulate emissions from ocean-going vessel marine engines fueled with marine gas oil (MGO), marine diesel oil (MDO) and marine heavy fuel oil (HFO). The original DPM CPF and REL established by CARB were based largely on health effects studies looking at the exposure of railway workers to locomotive Diesel engine exhaust in the 1960s. Despite this limitation, CARB applies the same CPF and REL to all compression ignition engines using Diesel fuel, including those compression ignition engines equipped with Diesel oxidation catalysts and Diesel particulate filters – both of which have been documented to fundamentally change the chemical nature of DPM.<sup>2</sup> In the instant rulemaking, CARB assumes that the same CPF and REL that were developed based on DPM emissions from 1960s vintage locomotives operating on Diesel fuel are now applicable to modern-day Diesel engines operated on demonstrably different fuels (MGO, MDO and HFO) when used in auxiliary engines on ocean going vessels. Instead of continuing to expand the applicability of health-effects data based on 50-year-old technologies and fuels, ARB should assess the health impacts of auxiliary engines operated on fuels other than Diesel fuel based on speciated composition of the exhaust for these engines, as CARB does in its risk assessments for engines using other fuels (such as gasoline, ethanol, and natural gas).

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<sup>1</sup> <https://ww3.arb.ca.gov/regact/2019/ogvatberth2019/appg.pdf>

<sup>2</sup> See, e.g., *Advanced Collaborative Emissions Study (ACES): Lifetime Cancer and Non-Cancer Assessment in Rats Exposed to New- Technology Diesel Exhaust*. Health Effects Institute. Research Report 184. (January 2015)

## 2. The results of the Health Analyses should be properly placed into context.

In ARB's 2015 Risk Management Guidance, ARB warns that changes to risk assessment methodologies have resulted in increased calculated risk values, even though a facility has not changed its operations in a way that negatively affects public health.

“One significant area of focus is how best to communicate what impact these methodology changes will have on health risk estimates, what those new risk estimates mean, and how best to manage sources and programs in a reasonable and health protective manner. The procedures in the new OEHHA Manual will typically result in a higher estimated cancer risk from a facility even though they [the facility] use control technology and are actually maintaining or reducing its emissions. As a result, it is a challenge to communicate the new information in a way that ensures the public's right to know but does not imply that the facility has changed its operations or emissions in a way that negatively affects public health.”<sup>3</sup>

The Health Analyses document does not present this background information to help the public understand the implications of the calculated risk values.

In contrast to the 2015 Risk Management Guidance, at page VI-1 of the Initial Statement of Reasons (ISOR), ARB concludes that “Emissions from ocean-going vessels operating at berth and at anchor are a significant and growing contributor to community air pollution and the associated health impacts.” However, nowhere does ARB compare the emissions, or potential health impacts, attributable to ocean-going vessels (OGVs) at-berth with other sources of criteria air pollutants or toxic air contaminants that Californians are exposed to each day. For example, the PRA indicates that baseline (2020) maximum exposed individual incremental cancer risk (MEIR) attributable to ships at-berth is 54-in-a-million at the Ports of Los Angeles and Long Beach (POLA and POLB), and 14-in-a-million at the Richmond Complex (the Port of Richmond and the Chevron refinery berths). While these incremental risks apply to individuals living within a relatively small distance from these two port complexes, ARB estimates that the average individual living in California is exposed to an incremental cancer risk attributable to diesel particulate matter (DPM) of approximately 520-in-a million.<sup>4</sup>

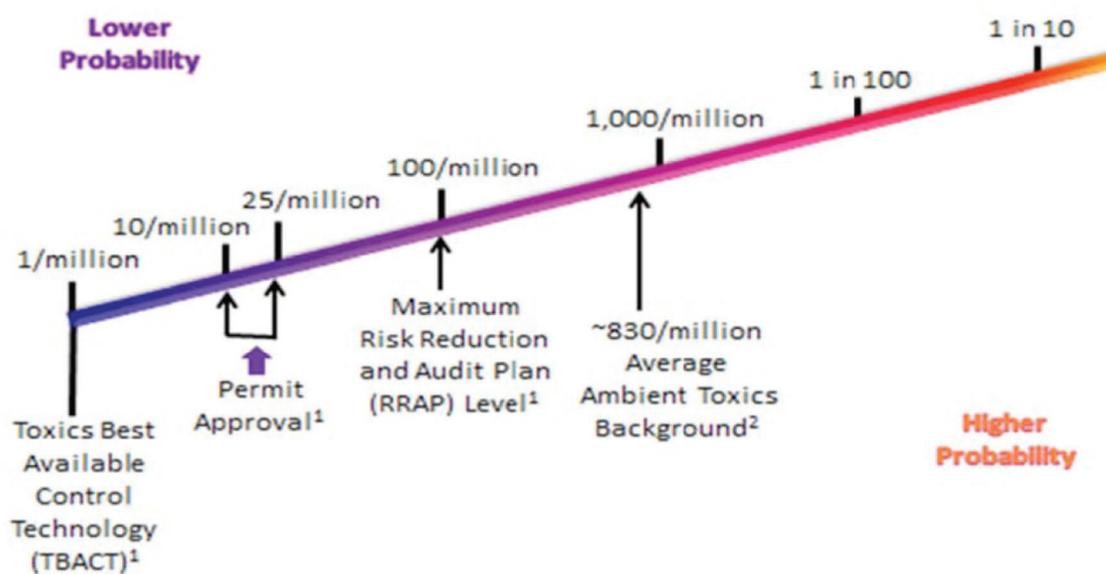
Furthermore, as the following graphic (from ARB's 2015 Risk Management Guidance) shows, ARB recommends development of a risk reduction plan if calculated risk levels exceed 100-in-a-million. The proposed rule amendment is inconsistent with these guidelines in that, in effect, it imposes a risk reduction plan on a collection of sources (such as a port complex) at much lower levels, when such a plan would not be required for an individual stationary source with the same calculated risk level.

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<sup>3</sup> *Risk Management Guidance for Stationary Sources of Air Toxics*, ARB and CAPCOA. July 23, 2015. pp. 2-3. <https://www.arb.ca.gov/toxics/rma/rmgssat.pdf>

<sup>4</sup> <https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health> . Accessed 11/7/2019.

**Figure II-2: Health Risk – A Relative Perspective**



**3. CARB’s assertion that the proposed regulation would avoid “health impacts valued around \$2.3 billion”<sup>5</sup> is not supported by sound science.**

The Health Analyses ascribe a statewide benefit of \$2.245 billion to the avoided adverse health outcomes attributable to the proposed regulatory program. 99.8 percent of this benefit is associated with avoided premature deaths, and 87 percent of the reduction in avoided premature deaths is associated with reductions in oxides of nitrogen (NOx) emissions. These avoided premature deaths attributable to NOx reductions are, in turn, attributed to the formation of particulate ammonium nitrate in a photochemical reaction that ARB acknowledges occurs well downwind of the emission source – and hence not in the communities nearest the ports, and only after the concentrations have been substantially reduced due to dispersion. Relatively little formation of ammonium nitrate occurs in close proximity to the emission source, where dispersion is relatively low. Formation of ammonium nitrate increases over time (and distance from the source), as does dispersion. CARB’s analysis is not clearly presented, however CARB does not appear to address these factors in calculating reduced ambient concentrations of ammonium nitrate particulates and the associated avoided adverse health outcomes.

<sup>5</sup> CARB’s Initial Statement of Rulemaking asserts that “Total costs for all entities exceeding \$2.2 billion through 2032, with a statewide valuation of avoided health impacts valued around \$2.3 billion.” In fact, the actual values reported in CARB’s report are \$2,245,207,000 for avoided health impacts, and \$2,164,319,000 for net costs.

**4. CARB does not explain how they calculated they calculated the health benefits attributed to NO<sub>x</sub> emission reductions in the South Coast Air Basin.**

At p. G-53, CARB indicates that they used the AERMOD model to estimate reductions in ambient concentrations of PM<sub>2.5</sub>. However, AERMOD does not contain algorithms that model the photochemical reactions that convert oxides of nitrogen emissions to secondary ammonium nitrate. While the rulemaking document is silent as to exactly how CARB calculates the health benefits of NO<sub>x</sub> emission reductions, it appears (from the discussion at pp. G-53 to G-57) that CARB scaled the modeled PM<sub>2.5</sub> concentrations by the ratio of NO<sub>x</sub> emissions from sources subject to the proposed rule to modeled PM<sub>2.5</sub> emissions, with the further assumption that most, if not all, of the NO<sub>x</sub> emissions are converted into secondary ammonium nitrate because “[i]mpacts are assumed to take place over a wide geographic area”. If this was, in fact, CARB’s assumption, it is inconsistent with both the physical science and with the approach used by both CARB and California air districts to model ambient PM<sub>2.5</sub> concentrations for State Implementation Plan purposes.

**5. CARB’s assumption regarding the expected reduction in ambient nitrate concentrations attributed to the proposed rule is not based on a methodology consistent with current EPA guidance.**

EPA guidance for addressing secondary nitrate formation in dispersion modeling analyses under the Prevention of Significant Deterioration (PSD) program<sup>6</sup> establishes a two-step process for evaluation:

- A simple screening tool based on the use of Modeled Emission Rates for Precursors (MERPs); or
- Direct analysis using a photochemical model such as CMAQ.

The fact that EPA’s guidance on this point applies to a specific regulatory program (i.e., the PSD permit program) does not undermine the fundamental science – the methodology is applicable both to individual point sources and to “a group of sources in the area”. The ports assessed in CARB’s Health Analysis clearly fall within that second category. However, CARB’s analysis of the potential health benefits of NO<sub>x</sub> emission reductions attributable to the proposed rule is not consistent with either of the two steps EPA recommends.

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<sup>6</sup> Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier I Demonstration Tool for Ozone and PM<sub>2.5</sub> under the PSD Permitting Program (EPA 454/R-19-003). (April 2019)



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December 6, 2019

**Subj: Comments to Initial Statement of Reasons (ISOR) and Proposed At-Berth Regulation**

CARB Staff,

Thank you for the opportunity to comment on the ISOR and the proposed At-Berth Regulation. We appreciate the time and consideration CARB Staff has taken with efforts to propose a regulation that is workable for industry stakeholders.

Carrix is the parent company of SSA Marine and its affiliates. We provide terminal, stevedoring, and other services at California ports. SSA Marine has maintained a long term presence in California since 1982. Rail access for intermodal cargo and a large consumer market has made California a logical destination for a wide variety of products, both within the region, in nearby Western states, and throughout the country. Growth in logistics-based businesses have created a new and diverse source of employment and economic growth for California. As part of our contribution to enhance goods movement, most observers associate our activities as a marine terminal operator delivering quality services for container vessels calling California ports. We also provide important stevedoring and terminal services to vessel operators engaged in the transportation of general cargo and Roll-On, Roll-Off (Ro-Ro) vessels and other services.

SSA Marine is supportive of efforts to reduce emissions within the state and we look forward to continued dialogue with CARB staff to come up with practical, implementable and affordable solutions to meet these goals. However, we do have concerns with the proposed At-Berth Regulation and the many variables and uncertainties associated with what has been proposed. How these regulations adversely affect Ro-Ro vessels is particularly concerning.

CARB staff made a prudent decision to exempt bulk and general cargo vessels based on a significant economic impact versus the amount of emissions captured, and therefore terminals that receive this category of ships are not required to arrange for a CARB approved emission control strategy for their visit.

Our experience is that the cost benefit analysis and margins in the Ro-Ro business are not dissimilar from general cargo vessels, and it is not inconceivable that these unknown variables could have a significant impact and jeopardize our ability to operate.

We urge CARB to also exempt Ro-Ro vessels from proposed alternative at-berth control measures when shore side power capabilities fail to exist.

- We find that the proposed hourly rental rate of a barge-based emission control and capture system to be dubious, particularly since few service providers exists.
- Inasmuch as a monopoly or, at best, an oligopoly will be created by this proposed rule if adopted, the hourly estimates to rent a barge-based system are significantly underestimated.
- We encourage CARB to explore other options that allow it to achieve emissions reductions. It is more likely that harbor emissions will be increased from tugs and other harbor craft, nullifying any measurable gains by including Ro-Ro vessels in the rulemaking.
- The cost effectiveness of CARB's Carl Moyer program limit of \$30K per ton exceeds both the hourly or barge based purchase option proposed by CARB.
- Indeed, it would be far more prudent for CARB to exempt Ro-Ro vessels and capture more emissions from tugs and other harbor craft.
- Most of these harbor assets need to be repowered, and requiring Tier 3 engines is more cost effective and will allow CARB to capture a greater reduction in emissions as compared to Ro-Ro vessels, which amount to approximately one percent of the overall ocean-going vessel emissions in the San Pedro Bay Ports (SPBPs) 2018 inventory.

**Definition of Emergency Event for a Utility:** Notwithstanding the definition, we would like to see further clarification regarding what qualifies as an Emergency Event for power outages due to a failure on the Utility's end. Power outages are not uncommon in the Ports and this may result in a failure to utilize an emissions control strategy. In cases of power outages, would this be considered an exemption and no requirement to use a TIE or a VIE? If TIEs are to be utilized, in the event of a power outage, multiple vessels could be impacted while at berth. Would this result in the need to use multiple TIEs for a single event, or a requirement to pay into the Remediation Fund for the multiple vessels that were impacted by the outage?

**1 Hour Plug/Unplug Requirement:** We appreciate the efforts of CARB staff to fix the limitations of the 3/5 rule, but the new 1- hour requirement also presents additional challenges and potentially eliminates accepted practices under the current regulation.

Adding a restrictive time limitation on both the terminal and vessel operator will result in safety issues surrounding the handling of high voltage power equipment when plugging in a ship. We work in an industry where safety is our top priority, but accidents do happen, most typically when there is an arbitrary standard. For the safety of our people, we cannot place a restrictive 1-hour time limit on vessel plug and un-plugs. We implore CARB staff to address this. We would recommend language along the lines of "as quickly and safely as possible."

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In addition, for those vessel operators who have chosen the lift-on lift-off compliance pathway, this 1-hour time limit would be unachievable in certain situations. For example, if a vessel arrives at berth between shifts (i.e. between 3 AM and 7 AM), labor typically isn't available until 8 AM to load or discharge any containers. In order to meet this 1 hour requirement, additional labor would have to be ordered for the sole purpose of loading an amp box, which is very cost prohibitive, or a vessel would

have to alter its schedule, potentially holding offshore, increasing emissions so as to arrive at times when labor is available.

Due to the limitations of the new 1-hour rule, it appears that the currently accepted amp-box technology that many in the industry have invested in and utilized to meet compliance will potentially be eliminated. We have not seen any data or economic impact analysis that addresses this and feel that this change will further limit industry's pathways towards compliance, not assist with it.

**Terminal Responsibility for Infrastructure Failures:** We feel that in many cases the responsibility for failures in shore power infrastructure might be misdirected to the terminal operator. As an example, the Port of Oakland has recently made it very clear that they (The Port) are the owners of the shore power infrastructure. As such, the Port of Oakland is responsible for maintaining that infrastructure and we as a terminal operator pay significant fees for that maintenance. In the event there is a failure with that infrastructure, the draft language indicates that the terminal would be required to either use a TIE or pay into the remediation fund. If the Port is responsible for maintenance and repairs of the infrastructure, how is it that a terminal operator would be required to pay remediation fees or use a TIE when there is a failure with that infrastructure? Where is the Port's responsibility in this?

**Terminal Operator Requirements for Infrastructure:** The draft language of this section indicates that Terminal Operators are responsible for "equipping their berths with a CARB approved emission control strategy." We strongly disagree with this requirement. In the majority of cases, it is the port that is the landowner and the landlord. Terminal operators are tenants who lease the land from the ports and making significant investments in port infrastructure doesn't make business sense. If we as a company decide to relocate or discontinue operations at a particular location, this infrastructure is not an asset that we can take with us. In some instances, due to the lengthy construction and permitting process it would be necessary to begin infrastructure installation now to comply with upcoming deadlines, not even knowing if we will be at the facility at the time of implementation. We feel that it is the port's responsibility to equip the berths with a CARB approved control strategy. Bringing electricity to a terminal to enable shore power is really providing utilities to the terminal, which is something a landlord is usually required to do, not the tenant. We would recommend changing the wording in section 93130.10(a) to:

(a) Port Infrastructure

*Ports with terminals not excluded due to thresholds found under Section 93130.8(g) Terminal Exceptions, are responsible for providing equipment or necessary infrastructure that will enable a terminal to comply with this Control Measure, unless such equipment or infrastructure is provided by the terminal operator.*

**Additional Terminal Operator Requirements:** The draft regulation suggests that if a vessel is commissioned to connect either port or starboard, it is the terminal operator's obligation to ensure that the vessel is berthed in that direction for all future visits, which places prohibitive operational and safety limitations on terminal operators when berthing vessels. In order to work a vessel safely and efficiently, we as terminal operators find it necessary at times to adjust the berthing direction of a vessel. This restriction would eliminate our professional discretion and ability to do so.

**Excessive Reporting Requirements and Deadlines:** We find the reporting requirements to be excessive, redundant, time restrictive and in some cases unnecessary.

It seems redundant to have each party report the same information: In scenarios where a barge-based system is used it appears that all 3 parties would be reporting very similar information?

The proposed reporting requirements for terminal operators will add additional man hour costs to meet these mandates, especially for our high vessel volume facilities. Additionally, some of the data that is being requested is not information that is typically relayed between vessels and terminals, such as the time the pilot has boarded the vessel. This will require an additional burden to all parties to increase communication and cross-check all information that will be reported. We would recommend streamlining the information and instead of reporting within 7 days of a vessel's departure, to send reports on a monthly or quarterly basis.

### **Summary**

We appreciate this opportunity to submit our comments for the record. We urge you to exempt Ro-Ro vessels from the rulemaking. It is far more preferable, more cost effective, and there's a greater opportunity to capture a comparable level of emissions from harbor craft. Additionally, reporting requirements for unregulated vessels adds increased time and costs and does not seem to provide a practical benefit. Finally, the one-hour plug in requirement is not realistic, the ports need to assume responsibility for infrastructure failures and port infrastructure requirements, and we believe CARB should reconsider some of the excessive reporting requirements proposed in the rulemaking.

December 7, 2019

Ms. Bonnie Soriano  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Transmitted via email

**Subject: COMMENTS ON PROPOSED REGULATION ORDER  
SECTION 2299.3 AIRBORNE TOXIC CONTROL MEASURE FOR AUXILIARY DIESEL ENGINES OPERATED ON  
OCEAN-GOING VESSELS AT BERTH IN A CALIFORNIA PORT  
FROM CRUISE LINES INTERNATIONAL ASSOCIATION (CLIA)**

Dear Ms. Soriano:

Thank you for the opportunity to provide official comments on the proposed At-Berth Draft Regulation and for the additional time to submit the comments. CLIA appreciates the many meetings with you, Richard Corey and your staff to discuss specific issues related to the regulation of concern to the cruise lines and the PMSA industry coalition, as well as the industry coalition alternative emissions reduction proposal still under consideration. CLIA will also be signing on to the PMSA Coalition comment letter on the proposed At-Berth Regulation and agree with their comments. This comment letter outlines the concerns with the proposed At-Berth regulation that are cruise-line specific:

**GENERAL COMMENT:** It is still the position of the cruise lines and other industry coalition vessel operators that this new proposed regulation should not go forward for the existing regulated fleet. Instead, we believe the industry alternatives currently being discussed, along with corrections to the existing rule for currently regulated fleets, should be substituted and CARB should allow the next step in the existing rule to be fully implemented for these existing regulated fleets. This rule -- by providing no CARB-approved alternative compliance option for many vessels including cruise lines, eliminating the existing regulation after 2023 for vessels that make very infrequent calls to California, and eliminating the fleet average compliance option used by the currently regulated vessels successfully since 2014 -- leaves no margin for error and sets up vessels for failure in spite of all reasonable efforts to comply.

**COMMENTS SPECIFIC TO CRUISE VESSELS:**

**P. 9 – (52) “Previously Unregulated Vessels” Definition, Loss of Fleet Average System, and Elimination of “Non-frequent Flier Rule”:** The provision on page 9 in combination with (e) on page 27 will extend the compliance date for non-frequent fliers in currently regulated fleets by two years to 2023, which is appreciated. Unfortunately, this amendment came too late for non-frequent fliers with cruises scheduled in 2020 and 2021, which has already resulted in changed itineraries to avoid calls in California for at least those two years. This is because world cruises and transitioning cruises begin to sell these voyages years in advance, so the companies had to make a decision this summer whether to pull these visits from California ports. The ISOR and SRIA do not properly analyze the possibility of vessel diversions and their economic impact. These infrequent cruise vessel calls are particularly subject to diversion. This is especially true without the existing fleet average compliance system, which could allow the cruise lines to accommodate these non-frequent fliers.

CLIA has brought this issue up many times in the last few years with CARB staff when the non-frequent flier exemption was discussed. This exemption in the current rule allows vessels calling on CA ports for five or fewer visits each year to be exempt from the mandate to install shorepower infrastructure. Note that this decision to pull out of CA port calls for the cruise lines only applies to world and transitioning cruises and other infrequent cruise vessels without shorepower, and that the decision is not just based on the cost of installing shorepower infrastructure on these ships alone. Other major factors for this decision include:

- The fact that out of the hundreds of cruise vessels worldwide, only a limited number continually visit California. The more specialized world and transitioning cruises and cruise vessels may visit California once every two to four years

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and only a few ports each visit, using entirely different cruise ships each time. **(This means that these vessels would be able to use these \$2 million systems only 8 – 16 hours every one or two years.)**

- The required commissioning and maintenance of these systems, particularly if not used regularly.
- Required crew on the ship that are knowledgeable about the systems.
- The inability of cruise vessels to use the only current CARB-approved alternative control strategy, leaving them with a one-shot compliance option.

Finally, without knowing what eventual/potential criteria for non-compliance and violations will eventually be adopted by CARB, cruise lines believe there is just too much uncertainty to keep California ports on their itineraries for these vessels that rarely visit CA. They also have other alternative ports they can use for these itineraries.

It is important for CARB to note that the cruise ships that continually visit California were early adopters of shorepower and have an excellent compliance rate with the existing CA rule – this situation for non-frequent cruises is very specific to those vessels. It is also important to understand, as described above, that the impacts on these vessels of losing the previous exemption involves much more than just the cost of installing the infrastructure on a ship, which currently is about \$2 million per vessel. And, each cancellation of a cruise visit is a direct and major financial hit to the ports the cruises used to visit in exchange for very small emission reductions anticipated by the rule. These vessels account for a very low percentage of vessel visits. The cost to the port and city economies for these cruise visit departures from CA are in the millions each year. These cruise visits provide economic and employment benefits in the amount of between \$500,000 to \$2 million dollars for each single visit.

**P. 32-33 – S. 93130.11 Vessel Incident Events (VIEs) and Terminal Incident Events (TIEs):** Rather than using a fleet average to allow the flexibility that vessels need to deal with normal incidents beyond their control, this rule sets up a complicated and limited number of passes each year through VIEs and TIEs. In (1), it states that CARB, by February 1 of that year, will determine the number of VIEs and TIEs – meaning that almost 10% of the year will have passed before the number of VIEs and TIEs available will be known. What happens during January? The VIEs and TIEs are also provided for just one port, even if vessels call 3 different terminals - for instance in SD-LA/LB-SF - severely limiting their number, availability or usefulness. The VIEs and TIEs system is most punitive to vessels making fewer calls and those without an option to use alternative compliance options. They are also based on the calls occurring in the previous year, leaving new vessels without any options including scouting voyages for companies pursuing or adding new markets in the state. The VIEs and TIEs are then dropped by 2025. As noted, this system is unrealistic and uncertain, leaving ships without knowing if they have incurred a violation or if they are in non-compliance, even if it is the result of something beyond their control. On page 34, in (d), the rule states that VIEs and TIEs can't be traded with other fleets, terminals, or any other entity, taking even more flexibility out of this process.

**P. 14 – S. 93130.4 Limited Exceptions and No Alternative Compliance Option for Cruise Vessels:** This section discusses circumstances when the rule would not apply. This section should also explicitly exempt specific scenarios so vessels would not be in violation or non-compliance of the rule under circumstances that, as a practical matter, cannot be controlled 100% of the time. The fact that there are no existing approved alternative compliance technologies that can be used by the cruise lines leaves cruise vessels at a major disadvantage in attempting to comply with this at berth rule.

**P. 41-44 – S. 93130.15 Remediation Fund Use:** This remediation fund would apply only to vessels that already have complied with the rule by installing on-board shorepower technology, or that are using an alternative if a vessel can use an alternative, for instances beyond the control of the vessel operator. The remediation request must be made and submitted to CARB electronically within 7 calendar days of a vessel's departure, long after the vessel has left the port. Vessels won't know for up to 30 days if such request to use the fund is granted, and ineligible requests to use the remediation fund for a vessel visit will result in that visit being considered non-compliant with this regulation. Why should vessels be in violation or non-compliance of a regulation under the listed scenarios that as a practical matter cannot be controlled 100% of the time - particularly if they will not know their compliance status until they have left port? The reality is that companies will not "plan to be noncompliant" as that would surely subject them to a violation. These issues are of particular concern to cruise vessels because they cannot use the existing approved alternative compliance options.

**P. 43 – Table 4: Remediation Fund Hourly Amount:** This Table outlines the hourly remediation payment beginning in 2021. This table requires extremely high fees, even though shorepower is already installed on the ships. The fee will be assessed on a per hour rate when many of the scenarios cannot be resolved within hours or days, but rather months. This is extremely punitive for an equipment part that just isn't available quickly for instance. Duration of a scenario matters. It is particularly punishing

41-1  
cont.

for cruise lines at \$5,300 per hour for small lines and \$12,000 per hour for larger lines since they have no alternative compliance measure identified by CARB that will work on a cruise ship. At \$12,000 per hour, if an equipment part takes 3 months to obtain, the fee for cruise ships could be in the millions. The methodology for these charges should be revised to be fairer among various vessel types, and longer-term issues should be assessed at lower rates. Without these changes, the remediation fee acts not like a fair alternative emission control option, but rather a major penalty that is usually reserved for willful or intentional violations.

**P. 22-23 – S. 93130.7 (a) Compatible Shorepower Berth Definition for Side of Ship Where Connection is Available:** This section requires vessel operators with commissioned shorepower vessels to plug in to shorepower on each and every visit to a compatible shorepower berth. This section should definitively define a “compatible shore power berth” to mean one that will accommodate the on-board shorepower connection on the side of the ship that the connection is available.

**P. 23 (b) Start Date for Vessel Auxiliary Engine Compliance vs No Timeline for Terminal Shorepower Infrastructure:** This section requires compliance start dates for container and passenger vessels to begin January 1, 2021. However, as explained below, the terminals will not be required to install the infrastructure necessary to be able to accommodate every container and passenger vessel by that specific date, and actually not until years later.

**P. 28 – (b) Visits to Terminals without Shorepower When Alternative Isn’t Feasible:** This section requires that if neither the vessel nor the terminal has shore power, then it is the shared responsibility of both parties to arrange a CARB-approved emission control strategy for this visit. This section should clarify what happens if an alternative doesn’t exist, which is the case for cruise ships, or the alternative is not available, or not feasible. (See also P. 30 discussion below.)

**P. 28 – (c) Visits by Vessels with On-Board Control Strategies:** It isn’t clear what on-board strategies are envisioned. Does this text contemplate exhaust gas cleaning systems? How would the terminal operator assess these on-board options?

**P. 30 – (f) Lack of Alternative for Cruise Vessels During Terminal Shorepower Construction or Repair:** Again, this rule requires the terminal operator to provide an alternative CARB approved emission control strategy for a berth that is unavailable due to construction or repair. What will happen to ships that can’t use alternative control strategies, particularly if TIE’s or VIE’s are not available? If the cruise ships will be charged a very costly remediation fee for each of these instances, it places a significant burden on cruise vessels not faced by other vessel types.

**P. 38-39 – S. 93130.14 Terminal and Port Plans and Interim Evaluation:** This section requires terminal and port plans discussing how the terminal will comply with the requirements for ocean-going vessels visiting each berth. Although CLIA has no objection to these plans specifically, we have a major problem with the timing of these plans and the complete lack of compliance dates for the terminals to actually comply with the components of the plan so that vessels can hook up as intended by the rule. Here is what this section contemplates:

1. Terminal and Port Plans for container and passenger terminals are due July 1, 2021 that will identify how the terminals and ports will provide the electricity and infrastructure to allow vessels to hook up to shorepower or an alternative to meet the requirements of the rule.
2. Although the list of terminal and port plan information includes a “Schedule for implementing equipment” for the terminals and a “schedule for installing equipment and/or any necessary construction projects” for the port plans, there is absolutely no deadline by which that equipment must actually be installed.
3. CARB then has another 90 days after the plans are due to determine any deficiencies in the contents of the plans or making good faith efforts to facilitate the use of a CARB-approved control strategy at each berth, to October 1 of 2021.
4. If CARB does not notify the applicable terminal operator or port of any deficiencies, the plan shall be deemed acceptable on the 90<sup>th</sup> day following submittal, or October 1st of 2021, but there is still no actual date by which implementation must be completed. If the plan, however, does have deficiencies, there is no timeline at all for completion of the plan or actual implementation of the plan.
5. Vessels, however, must actually plug in or use the alternative for each visit to a berth by January 1, 2021. This is a complete disconnect between the timeline for vessels to comply with the rule and the timeline for terminals and ports to actually provide the infrastructure to the vessels to make sure they can plug in.

A set implementation date should be established for the terminals and ports to provide the shorepower infrastructure for each vessel visit and the compliance timeline for the vessels should match that date. Just relying on TIEs if infrastructure at the terminals isn't available will not remedy this issue.

Again, thank you for your consideration of these comments.

Sincerely,



Donald Brown - VP, Maritime Policy  
Cruise Lines International Association



WORLD SHIPPING COUNCIL  
PARTNERS IN TRADE

**World Shipping Council Comments**  
to the  
**California Air Resources Board (CARB)**  
on the  
**Proposed Control Measure for Ocean Going Vessels at Berth**

9 December 2019

The World Shipping Council (WSC) is a non-profit trade association that represents the liner shipping industry, which is comprised primarily of operators of containerships, vehicle carriers, and roll-on/roll-off (ro-ro) vessels. Together, WSC's members operate approximately 90% of the world's liner vessel services. Vessels operated by WSC members make frequent calls in California ports, and WSC's members would be directly and substantially affected by the proposed rule.<sup>1</sup>

Before turning to our detailed comments, we wish to highlight several points. First, WSC and its members have actively encouraged CARB to modify the current at-berth regulatory structure, which imposes essentially all of the regulatory obligations and penalty risk on ocean carriers, to establish clear and appropriate obligations for shore side entities to provide the shore power connection infrastructure that is critical to this regulation and to connect arriving vessels that are subject to the rules. For the rules to function effectively, each party that is needed to play a role in meeting the rule's objectives should be provided with clear and achievable regulatory obligations. We therefore support this proposed rule's inclusion of such obligations on ports, marine terminal operators and on emissions control strategy operators.

Second, as you will see below, WSC has provided detailed comments that are intended to improve and streamline the regulatory system through which CARB has regulated at-berth emissions since the original at-berth rules were promulgated. We have serious concerns, however, with CARB's proposal to both substantially *revise* the current at-berth regulatory system *and expand* the applicability of that system to new classes of vessels, particularly ro-ro vessels, which comprise a large number of discrete vessels, only a small percentage of which make infrequent and very short port calls (on average 14 hours and short as 9 hours) in California. No evidence has been presented or reviewed that demonstrates that a cost-effective pathway

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<sup>1</sup> A full description of the Council and a list of its members are available at [www.worldshipping.org](http://www.worldshipping.org).

exists for controlling ro-ro vessels' auxiliary emissions. Furthermore, CARB's analyses fail to address the major operational, safety and cost issues the proposed "capture and control" systems pose for ro-ro vessels or to account for the emissions generated by these control systems and the tug boats need to maneuver them to and from the vessels. In short, the proposed rule and its supporting analyses fail to provide an adequate explanation and cost-benefit analysis that demonstrate that controlling auxiliary emissions for ro-ro vessels is any more practicable and cost effective than for general cargo ships, which the rule has chosen not to regulate. Instead of expanding the applicability of this rule to new classes of vessels such as ro-ros, we recommend that CARB first consider other, more cost-effective and feasible approaches to achieving further emissions reductions.

Third, we have concerns with CARB's proposed implementation timeline. Substantial additional technical work, planning, approvals and investments in ship and shoreside infrastructure and alternative emissions control strategies will be required to meet the proposed rule's requirements to control at-berth emissions for each regulated vessel call to California. If the CARB Board approves the proposed regulation in April 2020, that would leave 8 months for the industry to try to be prepared to comply with the rule starting on 1 January 2021. The rule already acknowledges that the ports and terminals cannot realistically submit their infrastructure plans within that timeline (their earliest infrastructure plan deadline is 1 July 2021). Equally important, CARB-approved infrastructure expansion plans also requires time for the on-shore infrastructure to be built and permitted. We therefore recommend that the rule be modified so that it takes effect once the port and terminal infrastructure plans have been approved by CARB and the terminals and/or port authorities have built out the infrastructure needed and obtained the necessary permit approvals.

WSC's detailed additional comments and suggestions on CARB's proposed Regulation Order follow for your consideration. Our comments and recommendations are presented in the order that the provisions appear in the proposed Regulation Order. Questions on these comments should be directed to Doug Schneider of the WSC staff at [dschneider@worldshipping.org](mailto:dschneider@worldshipping.org) or +1-202-589-1227.

1. Definitions (Section 93130.2 (b)):

- a. California Approved Emission Control Strategy (CAECS) Operator: We support the inclusion of this new definition and note that it will be essential not only for CARB to approve the types of CAECS technologies, but also the parties that are approved to operate them. This is particularly important given the problems carriers have faced in obtaining reliable and quality services from the existing barge-based capture systems operators.
- b. Ready to Work: We appreciate that this definition was changed to include other government entities that may affect when a vessel is cleared and ready to work. We also recommend that CARB insert in this definition the following after "netting down" and before "United States Coast Guard": "*, the ramp is down and secure (if applicable),*

*required shore side labor technicians are present, and the*". Finally, we wish to note that changing the "Ready to Work" definition does not solve the problems with the proposed 1-hour connection timeline. That issue is discussed in point 4.d.ii of our comments.

2. CARB Approval of Emissions Control Strategy Operators (Section 93130.5): We support CARB approval not only of particular emissions control strategies, but of parties that operate those strategies. CARB approval of emissions control strategy operators is essential under the proposed revised regulations because they would place penalty obligations on operators for failure to meet their responsibilities under the rule. It is therefore essential that CARB formally approve the named operators or companies operating a particular emissions control strategy. We recommend that the text of 93130.5(a) be slightly amended as follows: delete the words "at a port or terminal" from line 2 and replace "it" in line 2 with "that person". The first change will eliminate confusion about the provision's applicability to emissions control strategies that are deployed not from the terminal or port property but from a barge. The second change would make it clear that the emissions control strategy operator must be approved by CARB.
3. Already Approved Strategies (Section 93130.5 (d) (3)): As noted in the comment immediately above, we recommend that CARB affirmatively approve operators of emissions control strategies, not just the technologies used in those strategies. Therefore, if the existing CARB approvals referenced in this sub-section already include approval of the parties operating the strategy, then we have no objection to this provision. If, however, the existing CARB approvals referenced in this sub-section are only for the strategies and would allow any person or company to operate those strategies, then we recommend that this provision be deleted.
4. Vessel Operator Requirements (Section 93130.7):
  - a. General Requirement (Section 93130.7): The "Summary of Responsibilities" section of this rule (Section 93130.17) identifies, with one exception discussed in point 12 of our comments, the particular entity that will be held responsible in circumstances in which auxiliary emissions are not controlled. For example, when a commissioned shore power equipped ship arrives, the terminal/port is responsible for connecting the ship to shore power. This is appropriate. The problem is that Section 93130.7 contains checklist items that a commissioned shore power equipped ship will not be able to complete unless the terminal/port completes its obligations under the rule. Section 93130.7's statement that "Any failure to perform any specific items in this section shall constitute a separate violation..." could thus be used to penalize a shore power equipped ship that cannot complete all of the vessel checklist items in 93130.7(e) because the terminal/port failed to meet its rule obligations.

To correct this misalignment between proposed Sections 93130.7 and the "Summary of Responsibilities" section, we recommend that the second sentence in the opening paragraph of Section 93130.7 be replaced with: *"Any failure to perform any*

*specific items in this section shall constitute a separate violation for each day that the failure occurs, except to the extent a vessel operator cannot perform any requirement due to (1) a terminal and/or port's failure to comply with the portions of this Control Measure that impose requirements upon terminals and/or ports, and/or (2) a CARB Approved Emission Control Strategy Operator's failure to comply with the portions of this Control Measure that impose requirements upon CARB Approved Emission Control Strategy Operators."*

- b. Shore Power Requirements (Section 93130.7 (a)): This provision states that commissioned shore power vessels shall plug in to shore power on each visit to a "compatible" shore power berth. CARB staff indicated in discussions with industry that "compatible" relates only to electrical standards, not to terminal or vessel characteristics such as berth location, space, side of vessel fitted with shore power, or other factors. We therefore recommend that CARB amend this provision by inserting the words "functioning, electrically" before "compatible". We also recommend that reference be made to the technical standards of the international organizations, which are IEC/ISO/IEEE 80005-1/80005-2 and IEC 62613-1.
- c. Applicability to Roll-on/Roll-off (ro-ro) Vessels (Section 93130.7(b)): The rule continues to propose that ro-ro vessels be subject to at-berth emissions controls starting on 1 January 2025. CARB has estimated that the control cost per ton of emissions reduced for ro-ro vessels is \$53,600. We believe that estimate is low, for reasons discussed below. Even using that estimate, however, it is worth noting for comparison that CARB estimated that the control cost per ton of emissions reduced for containerships is \$13,500.

The proposed rule and its supporting analyses have failed to provide an adequate explanation and cost-benefit analysis that demonstrate that controlling auxiliary emissions for ro-ro vessels is any more practicable and cost effective than for general cargo ships, which the rule has chosen not to regulate. It is also worth noting that ro-ro competes with general cargo and some bulk cargo vessels for the transport of construction and agricultural machinery and a lot of "breakbulk" cargo. Imposing requirements on ro-ro would create a market distortion.

When asked what cost-benefit threshold was used to decide which classes of vessels to regulate and which not to regulate, CARB staff reported that there is no threshold and that the decision to regulate ro-ro was based simply on aggregate emissions. There has been no considered analysis of the costs and benefits of regulating ro-ro auxiliary emissions versus the operational realities associated with regulating this class of vessels, which is comprised of a large number of discrete vessels, only a small percentage of which make infrequent and very short port calls (on average 16 hours and short as 8 hours) in California.

Shore power infrastructure for ro-ro vessels is not emerging in California ports or in any other U.S. or international ports where ro-ros call. There are many reasons for this,

including: the fact that ro-ros increasingly operate like tramp vessels and less like liner vessels, making shore-side power infrastructure difficult to set up; that ro-ros would need to go through expensive electrical system retrofits because container-based shore power units (e.g. AMP's) are not a realistic option; and ro-ro's don't typically carry dedicated electricians that container vessels have (to handle reefer units). CARB is therefore basing regulation of ro-ros on the premise that barge-based capture and control equipment is or will become a viable and practicable emissions control option. Experience to date with the two existing barge-based capture and control service providers has demonstrated that those services are often unreliable, are exceedingly costly, and pose substantial operational and safety problems for ro-ros - namely that the systems cannot be used in windy weather, cannot always reach ro-ro stacks (which may be 40 meters laterally and 40 meters above the waterline), and often prevent simultaneous alongside bunkering operations. If ro-ros cannot bunker in port, they may be forced to bunker at anchorages. Neither ro-ro auxiliary emissions at anchor for bunkering nor the additional emissions from tugboats used to move bunkering barges to and from the anchorage have been accounted for in CARB's analyses.

We also note that barge-based capture and control systems need to be moved into position, by tugboats, after the ro-ro has been secured fast to the pier. This consumes a substantial amount of time, which increases the cost of control per hour of emissions because ro-ro calls are already very short. A related factor that has not been adequately considered is the impact of the tug emissions generated to move the barge-based capture and control system to and from the ro-ro vessels and other vessels that may require barge-based emissions control strategies. Typically, a tugboat will use engines two to four times larger than the ro-ro auxiliary engines to be controlled. As a result, emissions from tugboat operations can significantly offset the emissions reductions gained by requiring ro-ro to use capture and control systems during their vessel calls. The capture and control systems also use generators for power that need to be factored into the total impact analysis for regulating ro-ro auxiliary emissions. While CARB staff included the cost of obtaining tug services and capture and control services in the SRIA, CARB staff has not included in to the environmental analysis, ISOR or the emissions inventory the increased emissions that result from controlling emissions using capture and control system emissions and the tugs that support them.

45-1

Another idea that has been proposed to control ro-ro emissions is development of shore-based capture and control systems at the various ro-ro terminals in California. While one land-based system is being trialed, no commissioned land-based systems exist today and we understand that land-based systems would not be a practicable control option at many existing California ro-ro terminals because the piers on which the shore-based control systems would sit could not support the weight of the systems. Furthermore, such systems would obstruct cargo operations as ro-ro stacks are located near the stern where the ramp is located. Ro-ro operators need to be able to stage, maneuver and park cargo all along the quay side. Even if this technology could be built and deployed, the limitations related to use of the systems in inclement weather remain

as does the need to factor in the generator GHG emissions the control systems would produce.

Finally, if ro-ros are diverted – either to concentrated docks within California or to out-of-state alternative ports - due to lack of control technology, access to alternatives, or simply to avoid increased costs, CARB’s analyses needs to analyze the related emissions and costs of the delivery of automobiles by other intermodal methods, principally by rail for long-haul and truck for local distribution. Acknowledging that emissions per ton vary widely by transportation mode, but with ocean going vessels always having the lowest emissions per ton per mile, it is likely that ro-ro vessel diversions would not only have significant economic costs to the state in terms of lost employment and activity but also result in a net increase in emissions.

45-2

For the reasons discussed above, we recommend that CARB not proceed with plans to regulate ro-ro auxiliary emissions in 2025 and instead monitor ro-ro emissions and the ongoing development of technologies that may in the future provide a viable and economically achievable compliance option for these vessels.

d. Vessel Compliance Checklists (Section 93130.7 (e)):

- i. Before Arrival Communications: We recommend that the requirement in § (1) to communicate “in writing” be eliminated from this provision, as it would impose a method of communication that may not be practicable between a vessel operating at sea and a marine terminal. Electronic communication should be encouraged.
- ii. Shore Power Connection Time: § 3(A) would require vessels to begin using shore power or another CAECS within one hour after “Ready to Work”. We have serious concerns about the practicability of such a requirement.

While it may, in rare circumstances, be possible for a vessel arriving from a foreign country to meet this requirement because of the time it may take for U.S. Customs to clear the vessel to work, this will mostly not be the case; a regulatory deadline should not be based on a variable such as how long it will take another agency to clear an arriving vessel. Moreover, there would be no Customs inspections for a large percentage of vessels calls to California because the U.S. Customs inspections occur only on the first vessel arrival from a foreign country.

The question is then, would it be practicable for vessels to connect to shore power within one hour after the vessel is secured to the berth? Based on experience, the answer is no. Establishing shore power connections must be done safely by longshore technicians, who may not be immediately available given their other extensive responsibilities (such as maintaining the cranes). Furthermore, many vessels employ systems that must be lifted on/off that require additional connection time. We understand that safety protocols prohibit crane operators from connecting or

disconnecting vessels to/from shore power while it is raining. We are also concerned that an unreasonably short time limit for connecting high-voltage systems could pose safety risks to the workers making the connections and could result in unnecessary damage to the equipment.

For CARB's consideration, one of our Member lines computed, using vessel call data going back to May 2019, how the proposed connection time would affect that company's compliance rate. Out of 135 vessels calls for this period, 38% of the calls would not have met CARB's proposed 1-hour window for connecting to shore power. We note that 27% of those calls were in Los Angeles, 24% in Long Beach, and 54% in Oakland.

We strongly recommend that CARB amend this provision to require vessels to: "Begin using shore power or another CARB approved emissions control strategy as soon as safely practicable and within 3 hours after "Ready to Work."

- iii. Shore Power Disconnection Time: § 3(B) would require vessels to cease using shore power no sooner than 1 hour before "Pilot on Board". There will be situations in which this is not a practicable disconnection deadline for ocean carriers because of delayed vessel departures due to weather or vessel traffic or if labor unplugs the vessels early due to their own shift schedules. We therefore recommend that the shore power disconnection time be no sooner than 2 hours before "Pilot on Board". We also request clarification regarding what would happen if the pilot shows up later than the scheduled time, causing the vessel to fail to meet this disconnection time.
- iv. Post-Visit Reporting: This provision would require reporting of information for each visit to a California terminal within 7 days of vessel departure. The required visit information includes, among other things, information about whether a vessel uses an exception, if a vessel incident event (VIE) or terminal incident event (TIE) is used for the visit or if a remediation fund payment will be made to cover the visit. It is not realistic to expect vessel operators to be able to report the above visit information in such a short timeframe.

First, the visit information will, for most or all shipping companies, be submitted not by the vessel itself, but by a senior company representative who will collect, review and then submit the information to CARB. One of the reasons for this reporting approach is quality control to ensure that all the required information is properly and consistently presented to CARB. Another reason is the fact that the decision whether to use a VIE, ask the terminal to use a TIE, or to use the remediation fund, is not for the vessel master, but for the company to make since VIEs are allocated based on the company fleets. This process takes time, particularly if there are ongoing negotiations between the shipping company and terminal about whether a VIE or TIE will be used. Weekends, holidays or operational issues affecting the ship's reporting of the data will also slow down this process.

It is also not clear to us why CARB would want the visit information on such short notice and why CARB would want visit information presented in a discrete submission for each visit. We believe that the visit information may, in fact, be more useful to CARB staff if companies submit visit information for all of their vessels (e.g. in a single large spreadsheet) that call California over a fixed period on a quarterly basis. CARB could, for example, require that each company submit visit information no later than 30 or 45 days after the end of each quarter. For example, visit information for all company vessel visits that occurred between 1 January and 31 March would be due to CARB no later than 30 April or 15 May.

We recommend that CARB replace the 7-day visit information reporting requirement with a requirement that visit information be submitted on a quarterly basis (due 30 or 45 days after the last day of the quarter). Given the complexity of the reporting process, CARB staff has supported the idea of establishing a dedicated industry workgroup to focus on reporting requirements for this rule. We recommend that CARB revisit that idea before the rule is finalized.

5. Vessel Visit Exceptions (Section 93130.8): We appreciate that CARB has simplified the vessel visit exception provisions from previous drafts by incorporating safety and emergency events, vessel commissioning, research, vessel incident events (VIE) or terminal incident events (TIE), and remediation fees under the same regulatory category. This makes it clear that all of these categories of events will be treated as exemptions under the rules. We also support CARB's inclusion of a procedure for dealing with situations in which a vessel is unable to complete an at-berth power commissioning visit in a single call to the terminal. This is an important change as unanticipated problems sometimes impact the successful commissioning of a vessel's at berth equipment. We encourage CARB to process commissioning exceptions quickly, so vessel operators do not end up using a VIE for a commissioning that required two vessel calls. Our additional comments on VIEs, TIEs and remediation are provided later in these comments.
6. Terminal Operator Requirements (Section 93130.9): We support CARB's decision to include in this proposed rule clear and appropriate obligations for marine terminals and ports to, among other things, provide the shore side infrastructure to connect ships to at-berth power and to connect commissioned ships in a timely manner when they call. These are functions that commercial ships cannot themselves perform and lack commercial power to require. Including these requirements in the regulation will establish balanced obligations for ships and the terminals they call and will set clear expectations regarding what ports and marine terminals will need to do to fulfill their obligations under the rule.

We recommend that CARB make the following changes to Section 93130.9 to provide additional clarity regarding the terminal operators' responsibilities under this rule:

- Section 93130.9(a)(3): Replace the current text with the following to make it clearer and eliminate confusion about whether a TIE or VIE should be used: *“If the commissioned shore power vessel is berthed in a way that prevents it from connecting to shore power, the terminal shall either: 1) use a TIE, or 2) provide an alternative CARB approved emissions control strategy that is compatible with the vessel.”*
- Section 93130.9(d)(3): Amend the visit reporting deadline for terminals consistent with our recommendations for vessel visit reporting (discussed above in point 5.c.iii of these comments).

7. VIEs and TIEs (Section 93130.11): This section describes how VIEs and TIEs should be allocated.

- a. Fleet-based Allocations: We support the allocation of VIEs based on company vessel fleets. We note, however, that allocating VIEs based on the fleet’s previous year vessel calls to California fails to account for growth in services to California over time. An easy way for CARB to address this would be to set VIEs based on the previous year vessels calls plus a percentage of those calls that accounts for annual growth in the arrival of at-berth regulated vessels.
- b. VIE and TIE Rates: The table on page 33 of the proposed rule indicates that all vessels would be granted VIEs for 5% of their previous year vessel calls. Terminals, on the other hand, would initially be granted TIEs for 15% of the terminal’s annual vessel visits. That allocation would fall to 5% in 2025. We understand based on discussions with CARB staff that the total percentage of visit exceptions (i.e. VIEs plus TIEs) should not exceed 20% because the current at-berth regulations are set to increase to 80% compliance in 2020. While we understand that reasoning, we note that the proposed rule is substantially different from the current rule in that it would require *each* regulated ships’ auxiliary emissions to be controlled, whereas the current rule is based on 80% *fleet* compliance.

We therefore think that the VIE percentage needs to be increased to account for the fact that this proposed rule will require all containerships and refrigerated cargo vessels to use at-berth power when the rule becomes effective. While many of the issues that have previously prevented commissioned vessels from connecting to at-berth power have been shore side infrastructure-related, we anticipate, based on historical compliance data, that more than 5% of vessel fleets will be unable to comply due to onboard equipment problems, the need to rotate vessels into and out of California services for required surveys and dry- dockings, and due to unpredictable commercial demands that may require shipping companies to deploy or phase-in non-commissioned vessels to meet U.S. import and export trade needs. Furthermore, there are only two CAECS currently in operation and they offer services only in the Ports of Los Angeles and Long Beach. The lack of available CAECS reinforces the need to temporarily increase the VIE percentage.

With the above considerations in mind, we recommend that CARB increase the VIE allocation for 2021-2024 to 10 percent per year.

- c. VIE and TIE Expiration: The proposed rule states that VIEs and TIEs would expire on January 31 of the year after they are granted. To address frequently challenging market conditions during the winter months, we recommend that CARB allow companies to carry over any unused TIEs or VIE until June 30 of the year after they were granted.
8. CAECS Operator Requirements (Section 93130.12): We commend CARB for including in this proposed rule responsibilities and requirements for CAECS operators. Since these operators will provide essential emissions control services, it is logical that the operators themselves will be subject to checklist obligations and penalties for failing to meet those obligations under the rule. This is particularly important given the historical problems vessel operators have encountered with CAECS operators who, despite having a confirmed booking and contract with a vessel operator, may not show up on time, may cancel a booking on short notice or may breakdown during control operations. When a vessel or marine terminal contracts for CAECS services, the vessel or marine terminal cannot control whether and when the CAECS operator shows up or provides proper control services.

We therefore recommend that, when a CAECS operator fails to provide contracted emissions control services to a vessel or marine terminal, the compliance burden and any penalties for noncompliance be initiated solely against the CAECS operator. We also recommend that CARB amend the visit reporting deadline for CAECS operators consistent with our recommendations for vessel visit reporting (discussed above in part 5.c.iii of these comments).

WSC also believes, as we have communicated in earlier meetings and comments, that it is important to discourage or restrict the use of alternative control emission control technologies in container ports where the clear objective of the existing rule was to facilitate connections to shore-side power. Encouraging or facilitating further expansion of alternative emission control technologies in container terminals undermines the investments made in retrofitting the container fleet and could lead to an absurd and unfavorable outcome in which shore-power equipped container ships are expected to use alternative emission control technologies that are inefficient, often unreliable, and only available at high cost. In short, expansion of emission capture systems in container terminals and ports undermines existing carrier investments and undermines the rules effectiveness in delivering emission reductions that are achieved through the most cost-effective and efficient pathway.

9. Terminal and Port Plan Requirements (Section 93130.14): WSC strongly supports the provisions that require CARB approval of shore-side infrastructure plans applicable to ports and terminals. This is a critical element of the new rule. How well these obligations are implemented will have a significant impact on the future program and whether the rule delivers the expected air quality benefits. In this context, WSC believes that there would be value in explicitly articulating in the revised rule that plans should include, among other

things: a) appropriate changes to existing infrastructure design (e.g., inadequate electrical sub-station/electrical vault configurations); b) expansion of existing electrical infrastructure in container ports to accommodate future rule requirements to enable 95% of all shore power equipped container ship calls to be accommodated through shore-side power; and c) that approved plans include a realistic timeframe for design and construction consistent with the final regulatory dates promulgated in the final rule.

10. Interim Evaluation of Ro-Ro and Tanker Control Technologies (Section 930130.14(d)): As emphasized in point 5.b of these comments, we think an adequate case has not been made to include ro-ro vessel auxiliary emissions in this regulation. We hope that CARB staff will carefully consider our arguments regarding the operational problems and costs versus benefits of regulating ro-ro vessel auxiliary emissions. Should CARB proceed with plans to regulate ro-ro auxiliary emissions, we think the interim 2023 evaluation control technologies will be critical in understanding if technology solutions that may facilitate operationally practicable controls of ro-ro (and tanker) emissions are commercially available and cost-effective. We also recommend that CARB include in this interim evaluation comprehensive cost-benefit and practicability analyses for controlling ro-ro auxiliary emissions using available technologies.
11. Remediation Fund Use (Section 93130.15): We generally support CARB's proposal to establish a remediation that regulated entities could pay into to offset auxiliary emissions that the regulated entity would have been responsible for under the regulation. We think it is critical that monies paid into the remediation fund be used on projects to reduce in-sector emissions or impacts of those emissions.

We recommend that CARB expand the list of circumstances in which vessel operators may use the remediation fund to include vessels that make infrequent calls to California ports (e.g. less than 3 calls per year). This is a logical regulatory approach for addressing infrequent calling vessels (e.g. vessels rotated in to address increased demand or "extra loaders" brought in to ease port congestion) because it would enable the vessels to have a compliance option if CAECS operators, which have limited operations, are not available or operational for a particular visit.

12. Summary of Responsibilities (Section 93130.17): We generally find the "Summary of Responsibilities" matrix on pages 48-49 to be helpful in defining which party or parties are responsible for what actions under a given scenario. We have two recommended changes to the matrix, as follows:
  - One row of the matrix improperly assigns responsibility to the vessel operator for a situation entirely outside of the vessel operator's control. The last row of the matrix on page 48 suggests that in the case of a CAECS failure, the vessel and the CAECS operator would be held responsible. We note that nowhere else in the matrix is a party held responsible for a circumstance completely outside of its ability to control. An arriving vessel has absolutely no ability to control whether a CAECS system will

work properly. The proper function and maintenance of a CAECS is up the CAECS operator. We therefore recommend that “vessel” be removed from the list of responsible parties when a CAECS has a failure. The CAECS operator must be solely responsible for these situations.

- We recommend that CARB change the statement “No shore power, but has other CAECS” in the “Berth” column of the matrix to: “No shore power available, but has other CAECS”. This change will address situations in which a terminal that is equipped with shore power cannot for one reason or another connect a shore power equipped vessel to power.

13: Compliance Examples: We recommend that CARB consider publishing a list of situations vessel operators (and other parties with responsibilities under the rule) may face, with a discussion of what happens when that situation occurs. For example, it would be helpful if CARB described how vessel operators should deal with the following situations:

- What happens when labor delays prevent a vessel from connecting to shore power?
- What happens when a booked CAECS operator does not show up?
- What are specific examples of circumstances that would qualify for use of the remediation fund (please note our recommendations in point 11 of these comments)?

###



December 6, 2019

Ms. Mary D. Nichols, Board Chair  
Mr. Richard Corey, Executive Officer  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Submitted via docket as directed at <http://www.arb.ca.gov/lispub/comm/bclist.php>  
Also transmitted via email

Cc (email): Heather Arias, Bonnie Soriano, Angela Csondes, Nicole Light

Subject: **Maersk Comments on Proposed Control Measure for Ocean-Going Vessels At Berth and Associated Standardized Regulatory Impact Assessment (SRIA)**, Board item [ogvatberth2019](#)

Dear Board Chair Nichols and Mr. Corey,

Thank you for this opportunity to comment on the Proposed Control Measure for Ocean-Going Vessels At Berth and Associated SRIA and ISOR. We commend staff for the outreach to stakeholders and the clear writing in the ISOR.

We have been engaged with CARB staff during the development of this new approach, in both workshops and meetings and through written comments. Three sets written comments were provided in 2019 (March 8, March 26, and June 10) and my speaker notes for the CARB Board public hearing on Dec. 5, 2019 are attached. Our comments in this document focus primarily on the proposed regulatory language and the processes defined for implementation. We have also provided input to PMSA and the World Shipping Council to incorporate in their comments.

**Structure of these comments:**

1. Executive Summary of comments
2. Maersk's interest in this rule and approach to regulation
3. The current At-berth regulation
4. Comments on the proposed new regulation
5. Recommendations

## 1. Executive summary of comments

The existing At-berth regulation has been an important and successful contributor in the dramatic reduction of shipping-related emissions. It is administratively complex, and CARB issued three Regulatory Advisories (2013, 2015 and 2017) to enable implementation and improve clarity. If this approach is continued in whole or in part in the future, some updating and technical corrections should be considered. A possible productive continuation could include a fleet averaging approach for the currently regulated fleets. Suggested areas for technical corrections are in Table 1.

Currently-regulated vessel fleet operators have developed sophisticated predictive models and expertise to manage this complex requirement and improve operations. Change to a new structure will make these models obsolete while achieving little to no additional environmental benefit vs the fully-implemented 2020 requirements already in place.

The per-vessel/checklist-based concept was initially supported by industry as a way to clarify and streamline the compliance process, address many of the issues in the current rule, establish balanced responsibilities for all participants, and make enforcement simpler. However, as the concept and language developed, the spirit changed from encouraging desired behaviors to a more controlling, punitive approach, which is also complex to administer, provides significantly less flexibility and planning capability, and creates conflict rather than cooperation between regulated entities.

The proposed "per-vessel" rule requires vessels to connect almost all calls starting January 1, 2021, however, the infrastructure to do so is not in place. The proposed regulation calls for Ports' infrastructure plans to be submitted by July 2021, approved by CARB in 90 days (October), and only then start the funding, permitting and construction process. In addition, the envisioned alternative control systems are inadequate in LA/LB and do not exist in any other ports, and barge-based alternatives may not be usable in some locations due to safety concerns.

The proposed language includes positives such as a creative remediation fund (limited in use), and mechanisms to evaluate and approve future technologies. However the proposed rule still does not provide clear mechanisms to deal with significant operational disruptions, redeployments or market shifts. It also creates new technical issues which must be addressed if this approach is to be implemented. For example, the new rule calls for 1-hour connection times on arrival and departure, which is not feasible. We found that 38% of our vessel calls in California between May and October would not have met this requirement. (54% in Oakland). Clearly these technical issues need to be addressed before a rule based on this approach could be effectively implemented.

We recommend that staff work with the currently regulated vessel operators to improve the proposed compliance structure for these fleets – based on the current regulation’s EERO pathway (fleet averaging), the per-vessel approach, or some third alternative. The final direction should ensure at least one clear, feasible, reasonably cost-effective compliance pathway for all the typical variations of this business – including the periodic major disruptions (e.g., the 2015 labor disruptions, and the 2018 surge in extra vessels calls due to the threat of new tariffs in 2019, which resulted in a surge of over 30 additional vessels to CA ports in late 2018, few of which were shore power equipped).

We also recommend that CARB Staff work with Ports and other stakeholders to evaluate whether other reduction projects could provide earlier and more cost-effective ways to achieve the needed reductions.

Finally, only California has experience with shore power. Other ports and governments around the world are looking to California for data and best practices, so we need to get it right.

## **2. Maersk’s interest in this rule and approach to regulation**

Maersk is the global leader in container shipping, operating in 130 countries and employing roughly 76,000 people. We operate about 750 container vessels globally. Each year 45 to 60 of our vessels make over 500 calls in five California ports. These international vessels spend on the order of 5% or less of their operable lifetimes in the waters of any one state or country.

Maersk has long been an environmental leader in shipping. Examples of this environmental leadership include:

- Our voluntary clean fuel initiatives in California started in 2006, and other high-priority ports followed (e.g., Hong Kong, Houston). We are the only shipping line that supported both the California Vessel Fuel Rule and the US EPA’s North American Emissions Control Area proposal.
- Since 2007 we have reduced our fuel consumed and related emissions by 47% on a per container per kilometer basis, through new larger vessels, improved operational and vessel management practices, and retrofits of our existing fleet. Our fuel and CO<sub>2</sub> data are calculated using Clean Cargo methodologies and third-party verified by Lloyd’s Register.
- Our 2018 commitment to Net Zero CO<sub>2</sub> Shipping by 2050 means that we must launch our first carbon neutral vessel by 2030. New fuel, propulsion and technology development initiatives are underway to support this goal.

- We now provide the first carbon-neutral shipping options for customers, and we are partnering with major cargo owners and technology providers to develop future fuels and technologies.
- Maersk's APM Terminals company is now installing hybrid cargo handling equipment in priority ports around the world, including Pier 400 in Los Angeles. This hybrid equipment reduces diesel emissions by well over half and can be converted to fully electric operations as equipment technology, supply of electricity and charging infrastructure become available.

**Maersk's approach to compliance:**

Maersk supports California's clean air and climate goals and strives to meet or exceed all requirements. We have committed time and resources to work with regulators to provide information on operations and capabilities to help their development of regulations that achieve environmental goals, are cost effective, clear and enforceable, and avoid unintended consequences. Our goal is that there will be clear, feasible compliance pathways for all reasonably foreseeable operational modes, which encourage desired behaviors and discourage counterproductive actions. We also support the development of emissions inventories that recognize the full range of efficiency and environmental improvements implemented by fleets, terminals and ports.

Maersk vessels began complying with the California At-berth rule in 2010 using the Equivalent Emissions Reduction Option, which focuses on fleet emissions reductions. This is four years earlier than the 2014 compliance date on the Reduced On-board Generation compliance approach taken by most carriers.

We have been engaged with CARB staff during the development of the proposed rule and ISOR, including numerous meetings, calls and written communications. We have also provided significant input to both PMSA and WSC on their comments, and support most of their industry recommendations. This letter will provide more specifics on a few key issues that we feel are of particular concern.

**3. The Current California At-berth rule**

The existing At-berth Rule and Vessel Fuel Rule have been important and successful contributors in the dramatic reduction of shipping-related emissions near California ports. However, the current rule is administratively complex for both the regulated entities and the Enforcement division and does need technical corrections. The existing structure encourages "spreadsheet exercises" rather than encouraging operational behaviors that minimize emissions. It is also not yet fully implemented.

The existing At-berth Rule established a multi-year phase-in, with the final step scheduled in 2020. On 1/1/2020 the vessel fleet emissions reduction requirements step up from a minimum of 70% to a minimum of 80% emissions reductions.<sup>1</sup> Assuring that fleets achieve the requirements requires that operational targets be set well above the minimum. On the shore side, berths where shore power infrastructure was funded by Proposition 1B have 10% higher requirements, so their requirements step up from 80% to 90%. Achieving these existing requirements means almost all regular calling vessels must be shore-power capable and connect.

In 2-3 years data on the outcome of the fully implemented rule will be available, enabling more thorough assessments.

Table 1: Structural Aspects and Technical Corrections for the Existing At-berth Rule

General structure:

- The existing Equivalent Emissions Reduction compliance pathway (fleet averaging approach to emissions reductions) encourages focus on the largest sources with over-compliance to ensure full compliance. This structure does provide some flexibility to address normal operational variations and challenges, but is complex to manage for both the vessel operators and CARB Enforcement.
- Currently-regulated vessel fleet operators have developed sophisticated predictive models and expertise to manage this complex requirement and improve operation. Change to a new structure will make these models obsolete while achieving little to no additional environmental benefit from these fleets.
- Obligations and penalties should be balanced for all participants responsible for making shore power effective: vessel operators, marine terminals, Ports, and alternative technology providers. This is not currently the case. The key role of labor must also be considered.
- No mechanism is provided to address for major redeployments or business disruptions (e.g., 2015 labor situation, or the 2018 influx of over 30 extra vessels due to the threat of federal tariffs).

Need to clarify use of Regulatory Advisory scenarios and streamline reporting.

- The Regulatory Advisories include several key provisions ("scenarios") essential for effective operation of the Rule, including Commissioning calls, shore-side power unavailability (e.g. infrastructure projects), annual reporting and averaging, research and testing of

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<sup>1</sup> The current first line-last line vessel visit definition results in low calculated reductions since it includes time prior to regulatory clearances and time needed for shore power connection and disconnection. It is not feasible to operate on shore power or an alternative during these times.



alternatives technologies, etc. These issues need to be addressed in any technical corrections.

- Dealing with short calls <30 hours. The emissions reduction calculation structure defined in the existing rule is increasingly challenging with the upcoming 80% reduction requirement. For example, a 10-hour call with 3 hour connect/disconnect time is a 70% reduction.
- Power consumption defaults given in "Table 1" are not accurate for today's vessels, and do not include larger vessels. This can distort emissions calculations.
- Arrival/departure definitions and the connection window were originally not based on actual experience and should be adjusted now that data is available.
- Review and clarify the math to be used for exclusions outside the vessel operator's control. The existing structure penalizes smaller ports and vessel fleet operators making short calls.

The initial concept of a per-vessel/checklist approach was attractive and widely supported as addressing many of the issues in the current rule. However, as the concept, structure and language developed, the spirit changed from encouraging desired behaviors to a more controlling, punitive approach. Particular concerns include these:

1. Compliance Pathway:
  - The rule basis is per-vessel with only a few exemptions. This demands near perfect performance from a mobile source technology that is used only intermittently and must withstand the challenging ocean environment during and between uses.
  - The rule does not provide feasible compliance pathways for some normal operational situations (e.g., major business or economic changes, network redesigns, or the large number of "extra loaders" encountered in late 2018).
2. Control options: Alternatives are very limited in LA/Long Beach, and completely unavailable in other ports. Feasible compliance options need to be available and clearly defined for all ports prior to implementation of a more stringent requirement.
3. Complexity: The proposed rule is also administratively complex and challenging, so is not an improvement vs. the existing rule. The seven-day reporting requirement conflicts with annual allowance of VIEs and TIEs. This adds significant uncertainty and challenge to planning, decision-making and reporting for any non-routine call.
4. Conflict vs. cooperation: The design as now written will lead to conflict between vessel operators, terminals and ports rather than increasing cooperation.



5. Cost: The rule as currently structured increases costs and the risk of non-compliance, particularly at ports with few or no alternatives (assuming payment to the remediation fund is allowed at these locations). This will increase costs per container more at these ports, further disadvantaging these smaller ports.

Examples of practical flaws in the proposed regulatory language:

1. Replaces the current 3-hour engine run time with two one-hour requirements. No data was provided to support this change. (why a 1-hour rule was chosen/feasible).

In October 2019 Maersk analyzed data on 135 vessel calls back to May 7, 2019. We found that 38% of the calls would not have met the proposed 1-hour rule on arrival. (Details: 27% in LA, 34% in Long Beach and 54% in Oakland). Would these visits all have paid mitigation fees (if available and allowed) or been out of compliance?

If 38% of vessels cannot meet a fundamental requirement in the regulation, there is a problem with the feasibility of the regulation. Analysis of engine run times required by size and port are available for discussion with staff.

- Recommendation: Initially require documentation of reasons when the time is exceeded, with no penalty, and review in the proposed 2023 program review to determine statistically feasible times.

2. Currently regulated Vessel fleet operators are required to comply on essentially every vessel call starting 1/1/2021, but infrastructure does not exist to do so. Ports and terminals must submit PLANS by July 2021, and CARB has 90 days to review and approve those plans. Only then can the infrastructure proposal, permitting, funding and construction processes be started.

- Recommendation: Defer implementation of the per-vessel approach until this infrastructure availability is addressed.

3. Reporting is required within 7 days, however VIEs and TIEs are granted annually. This incompatibility in time spans means vessel operators must make decisions with very significant annual cost and operational impacts without knowing the annual impact and without the ability to plan for the full year.
  - The Terminal TIEs may not be available for some needs, and could be provided preferentially to fleets with ownership interests
  - VIEs at 5% mean only 2 calls per year in some small ports

- The VIE structure does not provide a mechanism to address the periodic business changes and disruptions mentioned above.
- Recommendation: Allow adjustment of VIE and TIE visit allocations on an annual basis to enable cost controls and effective planning.

## 5. Recommendations:

1. Ports and government agencies around the world are looking to California as the only place with experience and data. CARB needs to ensure anything published or enacted is accurate, clear and a scalable practice.
2. The proposed rule should not go forward as currently designed. This rule, by requiring near 100% connections for shore power or alternatives, no ability to use an alternative (CAECT) for many vessels including very large cargo and cruise vessels, and no fleet averaging leaves no margin for error and sets up vessel operators for failure in spite of all reasonable efforts to comply.

Instead, we ask that the Agency “hit pause” and re-evaluate options including the following:

- Other port-specific concepts that could achieve greater reductions
- The “Industry alternatives” which include fleet averaging.
- Allowing the currently regulated fleets to continue under the Equivalent Emissions Reduction Option with technical corrections.
- Another clear and simple approach is a fleet averaging approach based solely on the percent of time the fleet is connected. We believe this is consistent with CARB’s inventory approach.

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3. If the proposed rule does move forward as currently structured, the following changes would make it more feasible and practical:
  - a. We ask that the CARB Board direct staff to ensure that any rule changes provide clear feasible pathways for all reasonably foreseeable business events outside the control of the vessel fleet and marine terminal operators.
  - i. Conduct an analysis covering at least the known occurrences encountered in the decade this rule has been on the books (economic and trade disruptions, labor issues impacting productivity, ownership and alliance changes, redeployments, business swings due to carrier bankruptcy, et. al.). Use the results of this analysis to fine-tune the requirements.





not available could this be covered under the original TIE/VIE, or would a second TIE/VIE be required? An unintended consequence could be prolonging repairs by making them at anchorage instead of at berth.

- A similar question applies if a vessel “double calls” – visits one terminal in a port complex and then makes a brief stop in another terminal in the same port (e.g., to load empty containers). Is there a *de minimis* visit?
- Is there a way to address the regulatorily-required 5-year vessel dry dockings? A service with 5 identical vessels will almost certainly include vessels of the same class, with dry dockings bunched rather than being spaced evenly at one per year. For a short rotation service, (e.g., 5 vessels in 5 weeks) such dry dockings may require a replacement vessel for 2 to 3 visits. Replacement vessels with shore power can be difficult to charter and are not available in some sizes. Thus, dry dock replacement could exhaust or exceed all VIEs at each port, leaving no VIEs for extra loaders, redeployments or operational issues. Would remediation fees be an option in this case?
- Similarly, how will a port or terminal operator handle major public works or infrastructure projects, such as the major projects to install infrastructure for electrification of cargo handling equipment and heavy duty over-the-road vehicles? Is the only option to increase the cost of these desirable projects due to remediation fees? Is it clear that remediation fees would be allowed for these uses?

c. Reporting

- i. The Responsible Official must manage data quality and carefully allocate VIEs/TIEs/exemptions for the full fleet on a centralized basis. Thus, individual vessels will not be capable of reporting directly to CARB.
- ii. Due to the high level of expertise and knowledge required for managing VIEs, seven (7) days is not feasible during certain seasons (summer holidays, Christmas, etc.). Negotiation with terminals around use of TIEs vs. VIEs will also require time. In addition, VIE vs. remediation cost management calls for a minimum of 30 calendar days, and a quarterly or annual adjustment period would be more feasible for planning and fleet/cost management.
- iii. We do not yet know what information will need to be reported or how the system will work, and therefore cannot comment specifically on the feasibility, time commitment or individual items to report. This requirement should be made transparent to the regulated community quickly or be revisited when the reporting system design is available.



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- d. Remediation fee: The remediation fee is an interesting and creative mechanism for addressing operational challenges and enabling community air quality improvements. Broad availability of the remediation fee option would help address the flexibility needs identified in both the existing and the proposed rule. As mentioned above, to be most useful, VIEs and remediation fees should be reviewable and adjustable if needed during the time that they are valid. A critical question is when is the Fee payable, how and by whom in each operational scenario?
- e. The severability clause on the last page will leave the rule unbalanced and unworkable if any party is able to successfully challenge their inclusion in the rule. A reversion to some modified version of the existing rule may be more appropriate in this case.
- f. The research exemption needs to be broader to cover testing of new measurement devices (e.g., CEMs), new treatment technologies, fuels, etc. for both ship and shore side.

Again, thank you for this opportunity to comment on the proposed regulatory language and ISOR.

Sincerely,

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## Speaking Points for CARB At-berth Public Hearing

Oakland CA, Dec. 5, 2019

B. Lee Kindberg, Ph.D.

Good Morning. I am Lee Kindberg, Head of Environment & Sustainability for Maersk North America.

Maersk is the world's largest container shipping company and has long been committed to environmental leadership.

- voluntary use of clean fuels in California starting in 2006.
- reduced CO2 by 41% per container moved in the last decade.
- We have committed to zero carbon shipping by 2050 so are working to launch our first zero carbon vessel by 2030.

I've managed our clean fuels and shore power programs from the beginning.

Maersk Exeter arrived in Oakland this morning. She left here in early August -- 16 weeks ago -- and visited Asia, Singapore, Suez and Antwerp before returning.

A weekly sailing on that route takes 16 vessels - all shore power capable at a cost ~\$1M. If we change out vessels that's an additional million each and takes 6 to 9 months.

Current rule:

- Has helped reduce emissions @ ports
- Is complex for us to manage and CARB to enforce, so we have built models and expertise to do so.
- Needs technical corrections – but not necessarily a whole new rule.

We were optimistic that the new rule would streamline compliance and establish responsibilities for all participants.

However, as the proposal evolved the spirit changed, and it became equally complex and even punitive.

The proposal means throwing out our models, SOPs and experience, and starting over – with less flexibility, far less ability to plan, and minimal additional environmental benefit.

- The new rule requires vessels to connect 100% starting 1/1/2019 but the infrastructure to do so just isn't there. Ports' infrastructure plans would be approved by CARB in October that year.

And the envisioned alternative systems just don't exist in most ports.

- There is still no clear mechanism to deal with significant disruptions, redeployments or market shifts.
- Technical issues – e.g. 1-hour connection times –

38% of our vessels calls since May would not have met. (54% here in Oakland)

What would we like to see?

1. Direct staff to pause and work with currently regulated fleets to improve the structure – old or new or a third approach.
2. Ensure at least one clear, feasible, reasonably cost-effective compliance pathway for all the likely variations of this business – including the periodic major disruptions.

2015 labor

2018 tariffs → surge of 34 additional vessels to CA

3. Finally, only California has experience with shore power. Other ports and governments are watching so we need to get it right.

Thank you again for this opportunity to speak. I will also submit written comments by Monday.

December 9, 2019

Submitted via email to [cotb@arb.ca.gov](mailto:cotb@arb.ca.gov) & Submitted via website at  
[https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=oqvatberth2019&comm\\_period=A](https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=oqvatberth2019&comm_period=A)

Chair Mary Nichols  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

Chairperson Nichols:

TraPac, LLC (“TraPac”) appreciates the opportunity to provide comments on the California Air Resources Board’s (“CARB”) Proposed Control Measure for Ocean-Going Vessels at Berth (“At Berth Regulations”), released October 15, 2019, and its accompanying Draft Environmental Analysis (“Draft EA”), released October 1, 2019. TraPac has terminals located in the State of California in Los Angeles and Oakland. The TraPac Los Angeles terminal is an automated container terminal located in the Port of Los Angeles at berths 136 thru 147. TraPac remains the leader in emission reduction with the lowest levels of all terminals in the Port of Los Angeles.

Currently 100% of vessels that call at TraPac Los Angeles use AMP or an equivalent technology to reduce harmful pollutants and greenhouse gases. TraPac has made strategic investments in technology to continue to improve environmental protection. As a company, TraPac looks forward to continuing to work with CARB to reduce emissions in California.

With regard to the proposed regulation, TraPac has comments in the following areas:

**1. The Percentage of Vessels**

TraPac welcomes the proposed increase in the industry requirement to 100% of container vessels. As a terminal already held to this standard and having proven it is achievable with customer co-ordination, we believe this is a good enhancement.

**2. Plug In/Unplug Time.**

We do not agree with the proposed time limit for plug and unplug at one hour each and timed from ready to work after customs clearance to plug in on arrival and then unplug to pilot on board for departure.

51-1

December 9, 2019

Clerk of the Board  
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**RE: PROPOSED CONTROL MEASURE FOR OCEAN-GOING VESSELS AT BERTH**

**Comments of the Pacific Merchant Shipping Association on Initial Statement of Reasons, Environmental Assessment, Standardized Regulatory Impact Analysis, and Supporting Regulatory Documents**

Thank you for the opportunity to comment on the proposed At Berth Regulation. The Pacific Merchant Shipping Association (PMSA) appreciates the opportunity to work with California Air Resources Board (CARB) staff during the course of this regulatory development on behalf of our ocean carrier, marine terminal operator, and other maritime industry member companies.

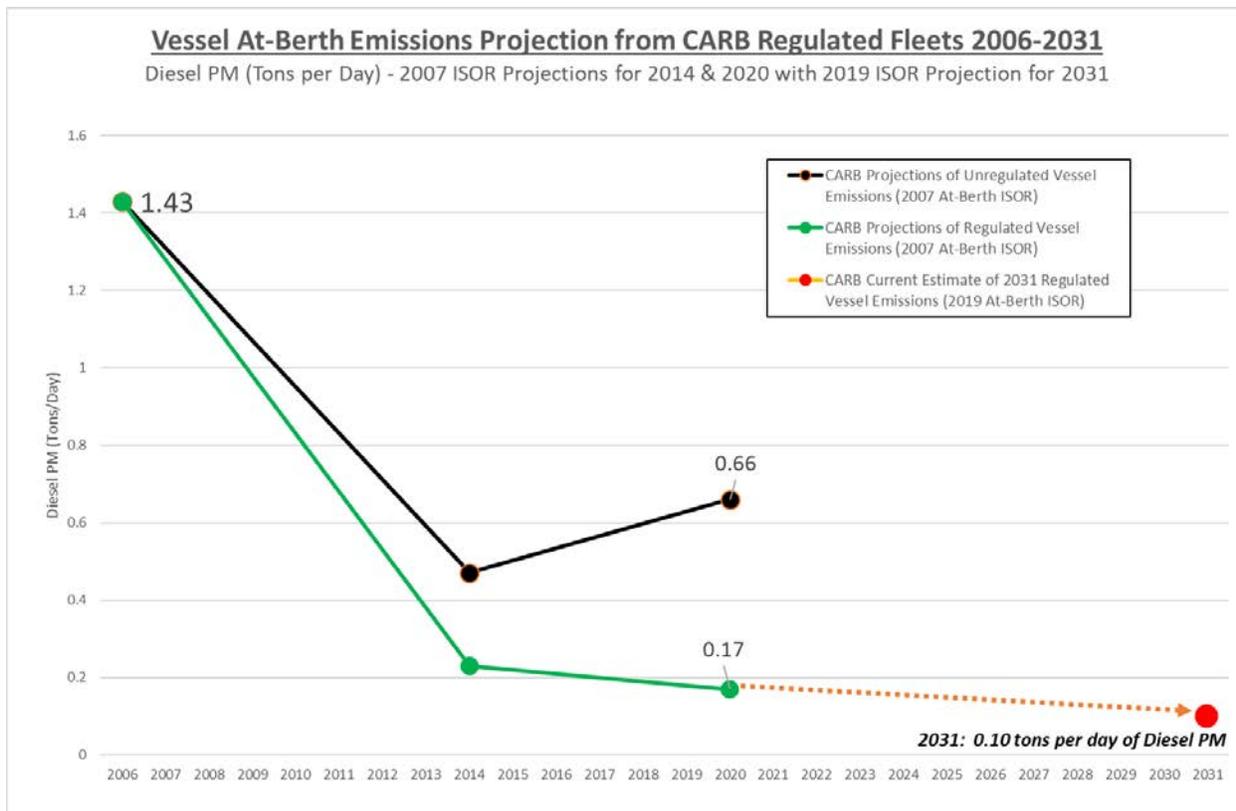
PMSA would like to thank the regulatory program, inventory, enforcement, and executive staff for their availability and professionalism in responding to questions and discussing various aspects of the proposed rule, inventory analysis, and enforcement issues. We look forward to continuing to work on these issues and hope to resolve them satisfactorily prior to the final consideration of the proposed At Berth regulation.

PMSA and its members have very strong reservations and concerns regarding the substance of the new Proposed Control Measure for Ocean-going Vessels At Berth, and believe it would create significant and unnecessary costs for the maritime industry and the state of California and in exchange achieve few air quality benefits. In addition, numerous issues that have been raised by ocean carriers, marine terminal operators, and other maritime stakeholders during the rulemaking process have not been adequately addressed in the Initial Statement of Reasons (ISOR) and supporting documents. As a result, PMSA respectfully submits this comment letter on the proposed regulation.

**Existing Regulation Needs Amendment to Improve Administration and to Codify Current Guideline Outcomes, but It Is Successful at Outperforming and Producing Emissions Reductions Beyond CARB's Own Expectations, Which Does Not Warrant Elimination and Complete Rewrite**

The current At Berth regulation adopted in 2007 is part of an exceptionally effective and successful suite of emissions regulations efforts adopted by CARB as part of the Goods Movement Emission Reduction Plan. Taken together with the other clean fuel rules, which apply to all vessels while at berth and

underway, CARB was targeting an overall emissions reduction from container, cruise, and refrigerated vessels of nearly 88% by 2020 (reduction from 1.43tpd to 0.17tpd DPM) through the full implementation of the current At Berth regulation. (see below chart)



The 2019 ISOR and background materials for the proposed rule projects that not only has the current regulated fleet well outperformed the targets of the current regulated rules, but that by 2031 cumulative container, cruise, and refrigerated vessel emissions are projected to be only 0.1tpd DPM under the current regulations. This is an overall 93% emissions reduction from original levels and an additional 40% DPM emissions reduction beyond the 2020 CARB target – even if NO ADDITIONAL action is taken to expand or change the current regulation.

PMSA and industry members are not however advocating for the CARB Board to take no action on this rule – to the contrary, we have been actively advocating for amendments to the existing regulation to address administrative and compliance management issues for many years. In chief, we are asking for a rule which codifies the operational results, if not the terms themselves, of the many Advisories and guidance documents which currently help assist both regulated companies and the CARB enforcement staff work together to avoid unintended violations of the existing rule for vessels that are equipped and plugging in to the full extent of real world practicalities. PMSA in that vein shares the Board’s goal of

achieving 100% compliance for regulated vessel fleets at California's ports, and asks for consideration of amendments to the existing rule to make it work better, not to end it and throw it out.

Given the overall success of the current regulation at reducing emissions in excess of CARB's targeted 2020 goals and by an additional 40% through 2031 (and as noted below, that emissions outperformance number will grow even larger upon correction of the CARB emissions inventory methodology which predicts larger than reasonable growth in future vessel emission), we are perplexed by the CARB justifications for concluding that the current rule is a failure that needs to be replaced with more draconian measures for the existing regulated fleets.

The ISOR omits a specific comparison of the performance of the current regulation against 2007 projections. It also constructs a narrative of need which refuses to bifurcate currently regulated fleet emissions from fleet emissions not currently regulated, and which then makes sweeping generalizations about ocean-going vessel emissions which confuse the purpose and scope of both the existing regulation and the proposed regulation even further (ES-7 – ES-13). This narrative refuses to answer the unasked question in the ISOR: "Why is CARB proposing to eliminate the current successful regulation for container, cruise, and refrigerated vessels and to instead punish these fleets which are currently projected to outperform the 2020 regulatory baseline by 40% in 2031?"

#### **Technical Analyses Regarding the Proposed Measure**

After release of the ISOR and initiation of the formal public review period, PMSA commissioned two technical analyses of the proposed control measure: (1) a review of the ISOR and proposed control measure, generally; and, (2) an evaluation of the emissions benefit and cost-effectiveness of controlling Ro/Ro vessels under the proposed regulation.

PMSA has attached those two analyses here as part of our comment letter. *Technical Analysis: California Air Resources Board's Proposed Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port*, December 2019, is included as Attachment A. *CARB At-Berth Regulation Cost Effectiveness Analysis for Auto Carriers and RoRo Ships at Port of Long Beach & Port of Los Angeles*, December 2019, is included here as Attachment B. The analyses, in their entirety, are submitted as part of PMSA's comments on the ISOR and its supporting documentation and they are incorporated by reference herein. To the extent that the issues raised therein are not already otherwise addressed in this comment letter, PMSA requests that each of the issues raised in both Analyses be addressed and responded to formally.

#### **Industry Coalition Comments on the Proposed Measure SRIA**

After release of CARB's Standardized Regulatory Impact Assessment (SRIA) and prior to the initiation of the formal rulemaking process, PMSA along with the California Association of Port Authorities (CAPA), Cruise Lines International Association (CLIA), Western States Petroleum Association (WSPA), and World Shipping Council (WSC) submitted extensive comments to the Department of Finance regarding outstanding issues and questions regarding the SRIA and economic considerations regarding the development of the Proposed At Berth Control Measure.

PMSA has attached that letter, SRIA – Air Resources Board, Proposed Control Measure for Ocean-Going Vessels At Berth, August 26, 2019, with enclosures here as Attachment C. As part of our comment letter on the ISOR, we incorporate by reference here all of the observations made in our SRIA filing and, to the extent that the issues raised therein are not already otherwise addressed in this comment letter, PMSA requests that each of the issues raised in the SRIA comment letter be addressed and responded to formally in response to their inclusion here.

**Industry Coalition Proposed Alternative**

In response to CARB solicitations for proposed alternatives to the initial proposed versions of the amendments to the current At Berth regulation, as required by SRIA, an Industry Coalition of PMSA, CAPA, CLIA, WSPA, and WSC submitted a construct for a Proposed Alternative for consideration by CARB program staff. PMSA has attached that Alternative submission, Alternative Proposal for Amendments to At-Berth Regulations, February 15, 2019, with enclosures here as Attachment D (see also Attachment C). As part of this comment letter, PMSA incorporates by reference here the comments of the industry coalition proposed alternative.

CARB staff never responded to the Industry Coalition Proposed Alternative. CARB staff also failed to include the Industry Coalition Proposed Alternative in the SRIA – in fact, the SRIA history of the development of the rule does not even mention that any industry Alternative was even produced or shared with the CARB staff.

PMSA hereby requests that each of the issues raised in the Industry Coalition Proposed Alternative be addressed and responded to formally in response to their inclusion here.

**Prior Unaddressed PMSA Comment Letters**

PMSA has been engaged, and in fact pursued, amendments to the At-Berth rule for many years. During discussions with CARB staff and through workshops, PMSA has raised issues that have been formalized in a series of comment letters on the current At-Berth rule. Unfortunately, many of the issues raised by these letters have not been adequately addressed in the ISOR. Accordingly, that history of correspondence is attached to this comment letter as part of the supporting documentation of the industry coalition letter to the Department of Finance regarding the draft Standardized Regulatory Impact Assessment (see Attachment C).

To the extent that they have not already been otherwise addressed in this comment letter, PMSA requests that each of the issues raised in those letters, ranging from proposed alternatives to cost concerns and beyond, be addressed and responded to formally as part of CARB’s regulatory process.

**PMSA Alternatives Not Analyzed**

As discussed in attached letters (see Attachment C), the ISOR fails to consider multiple additional alternatives submitted by PMSA. In 2017, PMSA submitted three possible alternatives at the request of CARB staff to consider. Those alternatives were never considered, analyzed, or discussed with

52-1

52-2

stakeholders by CARB staff. The alternatives include a fleet average approach that can achieve equivalent or even greater emission reductions than the proposed alternative. The alternatives also provide clearer lines of responsibility and eliminate the proposed byzantine VIE/TIE regulatory structure. CARB staff should evaluate the proposed alternatives and work with industry stakeholders to develop a structure that does not promote noncompliance.

52-2  
cont.

#### **Inconsistency with SIP Commitments and Plans**

A key purpose for the Proposed Regulation is CARB’s commitment under the State Implementation Plan (SIP) to amend the At-Berth regulation. The SIP strategy calls for a regulation that generates 2 tons per day (tpd) of NOx by 2031; however, the Proposed Regulation analyzed in the Environmental Assessment (EA) achieves 5.9 tpd, nearly triple what is necessary.

However, when analyzing the alternatives, the EA compares air quality benefits to the Proposed Regulation (5.9 tpd) rather than the stated project purpose (2 tpd), dismissing alternatives that might have achieved lesser – but still adequate – reductions.

Such inconsistencies are significant in the context of the actual language of the Mobile Source Strategy as included in the adoption of the 2016 SIP in March 2017. The ISOR correctly identifies (at II-7) that the “proposed measure directs CARB staff to consider increasing reductions by including additional vessel fleets, types, and operations,” however the ISOR’s claim that there is SIP direction that this was to be accomplished by “redevelopment of the Existing Regulation” with respect to the existing regulated fleet is a complete fabrication. No such redevelopment or replacement or other evisceration of the current regulation is mentioned or contemplated in the SIP.

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Contrary to the claim that a complete elimination and replacement of the existing rule was consistent with the SIP, the ISOR correctly identifies the policy context for these changes: with respect to the preliminary CARB-staff produced Sustainable Freight Pathways document these were measures which “included amending the Existing Regulation” (II-6); in the ultimately adopted Sustainable Freight Action Plan implementing Executive Order B-32-15, amendments are directed to the Board in order to consider “strengthening the Existing Regulation” (II-7); and, concurrently with the adoption of the SIP in March 2017, the direction given to CARB staff was not to create new rule, but instead “to consider changes to the Existing Regulation” (II-8).

PMSA implores CARB to act only in a manner which is consistent with the adopted SIP strategy emissions targets and its adopted SIP Mobile Source Strategy and related regulatory policies.

#### **Inconsistency with GHG Goals and Plans**

The proposed regulation is also inconsistent with California’s greenhouse gas (GHG) goals. The proposed rule will increase GHG emissions in the Ro/Ro fleet by 50% (see Starcrest analysis attached). This is an enormous increase in emissions that is contradictory to the California goals. This increase would be achieved for only a 40% reduction in criteria and toxic pollutant emissions. The regulatory uncertainty associated with the rule also has the potential to significantly increase the use of barge-

52-4

based systems by the existing regulated fleet in order to ensure compliance can be met. Every additional use of the barge-based equipment will significantly increase GHG emissions.

Curiously, while the ISOR mentions the adoption of the AB 32 Scoping Plan and the general goals of the adoption of SB 32 (II-6), the ISOR completely omits any reference to the fact that consideration of the feasibility and expansion of the existing At Berth regulation is included as a provision of the SB 32 Scoping Plan. This omission is material because, just as with the SIP measures referenced above, the newly proposed measure is inconsistent with the SB 32 Scoping Plan’s description of future consideration of amendments to the current regulation: it does not direct any additional emissions reductions from the existing fleet, does not direct a rewrite or elimination of the current rule or fleet averaging, and it supports the conclusion that the expansion of the current rule to new fleets should occur consistent with the completion of feasibility studies.

52-4  
cont.

#### **Inconsistency with AB 617 Goals and Plans**

The ISOR also mischaracterizes the relationship between the At Berth regulation and AB 617 and omits the inconsistencies with respect to the application of the proposed regulation and port communities. While it is true that the concept of the expansion of the At Berth regulation to potential new vessel fleets is a component of the AB 617 Blueprint, like the SB 32 Scoping Plan and SIP Mobile Source Measures and Sustainable Freight Action Plan, the ISOR materially omits the actual direction included in the AB 617 Blueprint, and therefore misstates the relationship between the At Berth policy and AB 617.

More importantly, while the ISOR points out that the rule is intended to help reduce emissions in priority neighborhoods, in several of these communities such as Barrio Logan in San Diego and Oxnard in Ventura County, the proposed Rule would actually result in short-term increases in DPM emissions according to current CARB emissions inventory results. (see “DPM Inventory,” [https://ww3.arb.ca.gov/ports/shorepower/atberth\\_ogv\\_port\\_specific\\_emissions.xlsx](https://ww3.arb.ca.gov/ports/shorepower/atberth_ogv_port_specific_emissions.xlsx))

52-5

Moreover, as a rule adopted in 2007 and as of January 1, 2020 fully phased-in well before any actual implementation of any of the actual community plans under AB 617 – indeed only one Plan, in West Oakland, has been approved by the Board – the ISOR’s characterization of the At Berth regulation as “one of the new statewide regulatory measures that is included under the CAPP to help reduce air pollution in impacted communities” (II-8) is a vast overstatement. Certainly the expansion of the rule to new fleets could be considered a new regulatory measure, but as an existing rule and with respect to currently regulated fleets this is certainly not a new regulatory measure and as there are few additional at berth vessel emissions to capture there is very little additional pollution to reduce.

#### **Regulatory Structure**

PMSA is concerned that CARB is continuing to propose a single regulatory structure to control emissions from multiple disparate vessel types. When the original At-Berth Regulation was adopted in 2007, CARB acknowledged the differences in vessels types and consciously adopted a rule framework that segregates by vessel type. Given the disparities in vessel type, berthing time, emissions, frequency of visits, and technical hurdles, this was an appropriate and proper decision. The same disparities which

existed at the time of the current rule promulgation persist and continue at the present time. Moreover, the currently regulated fleets and their Port and marine terminal partners were estimated by CARB to have needed to invest approximately \$1.8 billion in shore power infrastructure under the current rule on the basis of this bifurcation of ocean-going vessel fleets.

The new proposed regulatory framework proposes a single structure for the regulation of disparate vessel types despite the persistence of the same disparities which existed at the time of the initial rulemaking.

Under the existing rule, container, cruise, and refrigerated vessels have been able to successfully comply through a fleet average approach that encourages long-term planning and incentivizes overcompliance in order to manage trade uncertainty. Carriers voluntarily over comply in order to preserve flexibility to accommodate trade surges (as seen in last year's extra loaders – see prior comment letters attached), vessel redeployments, or unexpected equipment repair/maintenance. The proposed structure would eliminate any incentive to over comply and encourage carriers and terminals to exhaust available Vessel Incident Event (VIE)/Terminal Incent Event (TIE) allowances to reduce cost.

CARB should maintain a fleet average approach for the existing regulated fleet in order to ensure its continued success and consider the creation of a separate regulatory structure for any expansion fleets.

The preservation of the existing regulatory structure for currently regulated fleets and consideration of a new regulation for expansion to new fleets can be achieved in a manner which does not impact any projected emissions reductions. It is simply an acknowledgment of the original bifurcation by CARB of vessel fleets over a decade ago and the continued investments and emissions reductions progress made by the currently regulated fleets in expectation of the durability and continuation of the current regulatory program for the foreseeable future.

PMSA respectfully requests that the Proposed At Berth Control Measure be bifurcated into one set of amendments for the existing fleet regulations and another entirely new regulation which is exclusively applicable to expansion fleets.

#### **Rule Requirements are Unachievable**

CARB staff have designed a rule that can be quantitatively determined to be impossible to comply with. The attached two Starcrest Analyses demonstrate that the proposed structure including the use of VIEs and TIEs will leave ocean carriers and terminal operators without compliance mechanisms for known circumstances under the proposed regulation.

The evaluation does not include unknown but anticipated circumstances like maintenance, equipment failures, required equipment inspections, vessel redeployments, and extra loaders, nor possible unknown and unanticipated events. As a result, the anticipated degree of noncompliance is likely to be substantially higher. These issues would be substantially avoided by preservation of a fleet average compliance mechanism when paired with an effective vessel compliance checklist.

It is inappropriate that CARB design a regulatory program where noncompliance is a rule feature. At the very least, the number of VIEs/TIEs should be increased to cover all known circumstances with a margin to cover anticipated issues (e.g., equipment maintenance, extra loaders) and/or the significant expansion of circumstances associated with eligibility for participation in a (properly priced) remediation fee program. More appropriately, the proposed rule should be restructured on a vessel fleet average approach, which can achieve greater emissions reductions.

### **Regulatory Timeline**

The timeline proposed in the regulation is unachievable, particularly for the existing regulated fleet. In many cases CARB identifies additional improvements that must be completed in order to meet compliance obligations. In other instances, CARB identifies infrastructure inadequacies but fails to include them in their analysis or consideration of improvements that are necessary to achieve compliance under the regulation.

These issues are addressed in more detail in the Technical Analysis conducted by Starcrest Consulting Group attached to this letter. However, in all circumstances, it is impossible to deploy the necessary infrastructure within the seven to nine months that would be available from the adoption of the regulation. As Starcrest documents, the lead time for this infrastructure is measured in years, not months.

The timeline is so compressed as to produce some absurd and unrealistic results. For example, the plans for how terminals will meet the infrastructure needs for providing shore power to container, cruise, and refrigerated vessels are due six months after terminals must comply with the regulatory requirements. CARB has another three months to review the plans. As a result, the plans for ensuring compliance may not be approved for nine months after compliance is required. If the regulatory paper exercise cannot be completed before the compliance deadline, how can all the necessary infrastructure and alternative control technology that CARB identifies (though underestimates – see Starcrest analysis) be deployed by the compliance deadline in 2021?

### **US EPA Waiver Requirements Also Render 2021 Implementation Impossible**

One of the primary reasons to amend the current rule (as opposed to creating an entirely new regulation in its stead) is to maintain the effectiveness of the existing regulation which already has a waiver from the United States Environmental Protection Agency (USEPA) granted under §209(e)(2) of the Clean Air Act in 2011. CARB sought and was granted the waiver from US EPA as the existing At Berth regulations implement emissions standards applicable to the running of auxiliary engines while at berth in California's ports. (76 FR 77515) This waiver was granted after previous auxiliary engine emissions standards were determined to be unenforceable by ARB without the prior issuance of a US EPA §209(e)(2) waiver. See *Pacific Merchant Shipping Association v. Goldstene*, 517 F.3d 1108 (9th Cir., 2008).

While contesting the waiver at the time, PMSA now believes that given the tremendous investment in the existing emissions reductions infrastructure on vessels, and on shore by ocean carriers, marine terminals, and ports under the existing waiver, that the preservation of the current regulatory structure is in the best interests of both the currently regulated vessel fleets and ARB.

Preservation of the current rule and existing waiver maintains the clear and unambiguous legal status of the existing emissions standards under the current law, avoids any disputes over the authority of ARB to enforce emissions standards on vessels at berth upon the new effective date for new amendments, and takes advantage of the existing waiver in order to foster continued national standardization of shore power rules for vessels which have made a substantial investment in the retrofits necessary to comply.

By contrast, the proposed rulemaking abandons the current rule and the current waiver, and instead promulgates a new emissions standard rule for not just the newly proposed regulated vessel categories but also for existing regulated vessel categories, ports, and marine terminals. This potentially leaves California in a position where all of its regulations for vessels at berth, including specifically any newly promulgated emissions standards, are legally unenforceable without the provision of a new waiver. Such a waiver request from CARB might not even be properly before the US EPA for consideration by January 1, 2021, and it certainly is not reasonable to expect that one would be granted in that time period.

PMSA views the elimination of the current rule and existing waiver as an unnecessary complication that should be studiously avoided. We would instead ask that ARB keep the current rule for the currently regulated fleets and make amendments to this existing rule which are either consistent with the existing waiver or which could be addressed with US EPA within the context of the existing waiver via future amendment.

If for no other reason than to maintain legal clarity and consistency within the at berth program, CARB should take every step possible to ensure that the existing US EPA waiver remains in place and controls the lawful extent of CARB enforcement until a new waiver is granted.

**Proposed Rule's Indirect Source Approach to Mobile Source Emissions is Misplaced and Unnecessary**

CARB and PMSA have agreed in the past that state attempts to create indirect source rules for mobile sources can be legally problematic. An indirect source rule is a regulation which assigns a liability and responsibility to a facility to reduce indirect mobile source emissions which that facility does not control, when the mobile source can be directly regulated to reduce emissions through a traditional emissions standard, engine standard, or other in-use standard.

We are concerned that many of these hallmarks are present in the proposed control measure when they were successfully avoided in the current regulation. While we appreciate that this new measure's provisions are at least in part an attempt by CARB staff to be responsive to the concerns of several of PMSA's ocean carrier members regarding the need for shared responsibility with ports and marine terminals, we believe that such the provision of shared responsibility for the success of the current

regulated fleets can be best addressed through amendments that provide for both parties to be responsible for those situations exclusively under their own control. Ports and marine terminals at present are responsible for the provision of shoreside power infrastructure and operational support and manning under the current rule, and that will not change under the proposed rule. These entities can be held accountable for such responsibilities in a new set of amendments to the current rule, but they cannot be held liable for an emissions standard violation by an off-road engine on a vessel over which they have no control.

Assigning a vessel's emissions standard liability to a port or marine terminal must be avoided. The creation of third party liability for vessel emissions for a terminal is just as misplaced as trying to hold a vessel operator responsible for the quality of the workmanship performed by a port in installing a power substation or a marine terminal operator not timely ordering the labor to plug-in a vessel once at berth. These should all be treated as independent bases of responsibility and given independent measures of reporting and review.

In many respects this highlights further the fact that ports are really not a good fit with a traditional view of how indirect sources should be regulated. The main purpose of a port and marine terminal is to provide a location where various parts of the intermodal supply chain can come and transact business and interchange equipment, but that interchange is the business activity which is the purpose of the marine terminal, not the operations of the truck, train, or vessel used to get the equipment to the terminal. Once that container is interchanged and on the premises at the terminal, the cargo handling equipment there is the responsibility of the marine terminal – and subject to direct regulation by CARB, rendering any need for an indirect source regulation unnecessary.

**Application of Remediation Pathways Must Be Applicable to Numerous Conditions and Consistent With Actual Costs of Remediation**

PMSA supports the application of a concept of a remediation fund compliance pathway and the flexibility that such alternative forms of compliance may represent in this and other rulemakings, generally. However, we are concerned that the application of the remediation fund alternative as proposed presents a fee of an arbitrary amount well in excess of the actual value of the remediation sought, is punitive in nature, and represents an excessive duplication of compliance costs for those already in compliance with the rule.

In addition, we believe that if a proposed rule is going to be based solely on a per vessel per visit basis, as opposed to a fleet based average, that such pathways should be provided to vessels on a much broader scale, with increased certainty as to award, and given a prospective value based on a rationalized approximation of marginal costs to avoid duplication of costs of compliance.

The ISOR provides in Table ES-3 (reference to §93130.15 (f), "Table 4") that various vessel types pay various remediation payment amounts in the circumstance of Terminal Equipment repairs, Vessel Equipment repairs, operational delays of a control strategy, or in the case of a terminal construction project. Please identify both the basis for a cost of equivalent emissions reductions claim with respect

to the rate of dollars per gram of emissions, and which emissions, per hour per vessel type, the nature of the equivalency with which these rates are set, and the relative values when applied to vessel engine sizes for various classes of vessels.

We note with some irony that by grouping these values by vessel type that CARB staff is proposing a method of compliance based on some presumptive average emissions rate per vessel type and then applying it fleet wide, thereby basing compliance for this section on a fleet averaging basis. If this is the correct methodology, please confirm.

In addition, we are concerned with the punitive nature of these remediation pathways as proposed. If one presumes, for example, that the average rate of auxiliary engine emissions (DPM) is 0.18 g/kWh and the average power of a vessel's auxiliary engines running at berth is 1,100kW, then the total amount of emissions per hour are approximately 198g DPM. There are 907,185 grams per ton, so 198g DPM is 0.0002 tons DPM. At the present Remediation Fund rate of \$1,900 per hour, ***the effective rate of Remediation Fund compliance is \$8,705,310 per ton DPM.***

While the ISOR explains that these amounts are “based on the cost of securing equivalent emissions reductions” (ES-34) there is no obvious justification or supporting data for this conclusion.

If these amounts were based on the actual cost of securing equivalent emissions reductions, and one was to use the general cost-effectiveness limits set at \$30,000 per weighted ton of emissions reduction from the Carl Moyer program, ***the Remediation Fund rate should be approximately \$120 per hour.*** A Remediation Fund rate of \$120 is 6.3% of the proposed rate of \$1,900 per hour, therefore the current Remediation Fund rate is 93.7% higher than the accepted standard cost of securing equivalent emissions reductions. We can only conclude that the proposed remediation rate is not only wholly arbitrary but it is also punitive.

In addition, one additional consideration for a remediation rate that we believe is necessary to make the rate fair and reasonable is to subtract the existing and already incurred costs of compliance from any additional remediation fund rate so as to avoid the imposition of a duplicative compliance methodology on any one vessel. We agree with the ISOR's description of this provision as providing “another pathway for compliance that addresses circumstances where vessels or terminal operators who have already made an investment in a control technology and may not be able to reduce emissions from a vessel's visit for a limited period of time, such as construction projects, terminal and/or vessel equipment repairs, or delays in connecting to an emissions control strategy.” (ISOR, IV-91- IV-92)

The Remediation Fund rate should reflect this justification as well, such that the cost of participating in the Remediation Fund as an Alternative Pathway is appropriately limited to the marginal costs of the vessel or terminal over-and-above both the baseline investment made in its regular control technology and the incremental cost of the limited event, such as the equipment repair or cost of hiring an alternative control provider, per call. By discounting the Remediation rate against an established baseline of costs per call for both the original investment in compliance and for the additional costs

invested in the additional compliance required by equipment repair or infrastructure construction, the Remediation Fund will ultimately be fair to the vessel or terminal attempting to comply in good faith by limiting the amount charged only to the marginal additional cost of compliance necessary.

**Request for CARB to Clarify and Confirm Application of Proposed Fine Structure Consistent With Health & Safety Code Limitations on Penalties for Violations of Air Toxics Control Regulations**

§93130.18(b) of the proposed regulation regarding Violations states that “any failure” shall constitute a single violation “for each day that a vessel operates without using a CARB approved emission control strategy” and (c) provides the same for violations of the “recordkeeping or reporting requirements” as a “separate violation of this section for each day.” Given the various descriptions of potential violations are in various other time-blocks, for example the one-hour connection window, or other various potential violations may constitute a violation of checklist reporting and a substantive non-compliance, please clarify the application of this violation provision.

Is the fine or penalty based on the provision of one checklist per call or would a checklist with multiple missed criteria result in multiple fines for the same one day of non-compliance activity such that each checklist item is considered a separate violation?

Please confirm that the language of a separate violation “for each day” means that the amount of a fine is limited in a manner consistent with the penalties sections of the Health and Safety Code which are codified as “not to exceed” a certain amount “for each day in which the violation occurs.” If so, please conform the language of the proposed rule such that violations per vessel per call are not cumulative for the same call in the same day. For example, if a vessel is out of compliance with a checklist item for a call in port that lasts for 10 hours between 9 am and 7 pm on one calendar day, that shall be considered only one event and the fine would be less than or equal to the statutory maximum for that entire call.

We also note that there seems to be a typo in §93130.18 (a) which should be corrected or clarified. PMSA presumes that the reference to Health and Safety Code §39764 is intended to be a reference to Health and Safety Code §39674.

**Inclusion of Ro/Ro Vessels Not Supported**

The proposal to include Ro/Ro vessels is not supported by the evidence. PMSA has commissioned a review of Ro/Ros by Starcrest Consulting Group (see report, Attachment B) that reveals the deep and fundamental flaws in the analysis supporting the inclusion of Ro/Ros within the expanded regulation. Broadly, the issues lie in two broad areas: the presumed emissions benefit and cost analysis.

The emissions benefit presented in the ISOR are overstated. It is expected that Ro/Ro vessels will use alternative control technologies that will result in excess emissions due to tug and bunkering activity. Every use of a barge-based system will require up to six tugboat moves. Those moves would occur only because of the Proposed Regulation resulting in significant emissions when compared to emissions the regulation seeks to control. The analysis presented by Starcrest conclusively shows that once these factors are taken into account, the emissions benefit is reduced to a net benefit of only 40%. Potentially

worse, GHG emissions increase by 50%. If properly accounted for, these emissions would reduce the cost-effectiveness of such systems.

These emissions have not been included in the assessment or accounted for in either the emissions benefit analysis, cost-effectiveness analysis, SRIA, health risk analysis, or incidences per ton analysis. These additional emissions cause cost-effectiveness values to rise, reduce mass emissions benefits, and reduce health benefits. These emissions are significant compared to the source and directly undercut the analyses presented in the ISOR.

The second area of concern is cost. The ISOR presents a cost of \$900 per hour for alternative control strategies based on an anonymous conversation. The analysis presented by Starcrest includes actual redacted invoices that show the cost is substantially more. Because every \$100 per hour change in the cost of alternative control technologies can swing the cost-effectiveness analysis by more than \$12,000 per weighted ton, it is critical that the proper value be used.

Actual invoices show multiple different rates, but also show minimum charges and mobilization/demobilization costs. When considering all costs, the effective rate presented in the available invoices range from \$1,100 to \$1,522 per hour. This results in a substantially higher cost-effectiveness approaching \$200,000 per weighted ton. For comparison, the acceptable Carl Moyer cost-effectiveness threshold for non-zero-emission technologies is \$30,000 per weighted ton making Ro/Ros some of the most expensive emission reductions possible.

Finally, CARB staff have never supported their decision to include Ro/Ro vessels and exclude general cargo vessels. While we agree that like Ro/Ro vessels, it is exceptionally likely that general cargo vessels would not be cost-effective to control or would result in excess emissions from other sources, CARB staff has not disclosed their calculations or specific logic with respect to the potential cost-effectiveness of general cargo vessels. Much of the same logic for exemption would apply to Ro/Ro vessels. The disparate handling of these vessel cases could shift some cargo for construction and agricultural machinery to move from Ro/Ro vessels to general cargo vessels since both vessel types can provide the necessary service.

For all these reasons, CARB should remove Ro/Ro vessels from the proposed regulation until emission reductions can be cost-effectively achieved in a manner that does not result in increased GHG emissions and limited criteria and toxic pollutant benefit.

### **Emissions Inventory**

The emissions inventory for At-Berth emissions raises serious issues with the way it presents the emissions projected under the existing rule and the benefits of the proposed rule. As can be seen in the Starcrest Analysis, the emissions inventory does not accurately estimate the future emission reductions under the proposed rule. Under publicly available data from the ports, approximately 95% of vessel visits are subject to the existing rule. The emissions inventory assumed that only 77% of vessel hours are subject to the existing rule in the Port of Los Angeles and only 74% in the Port of Oakland. The result

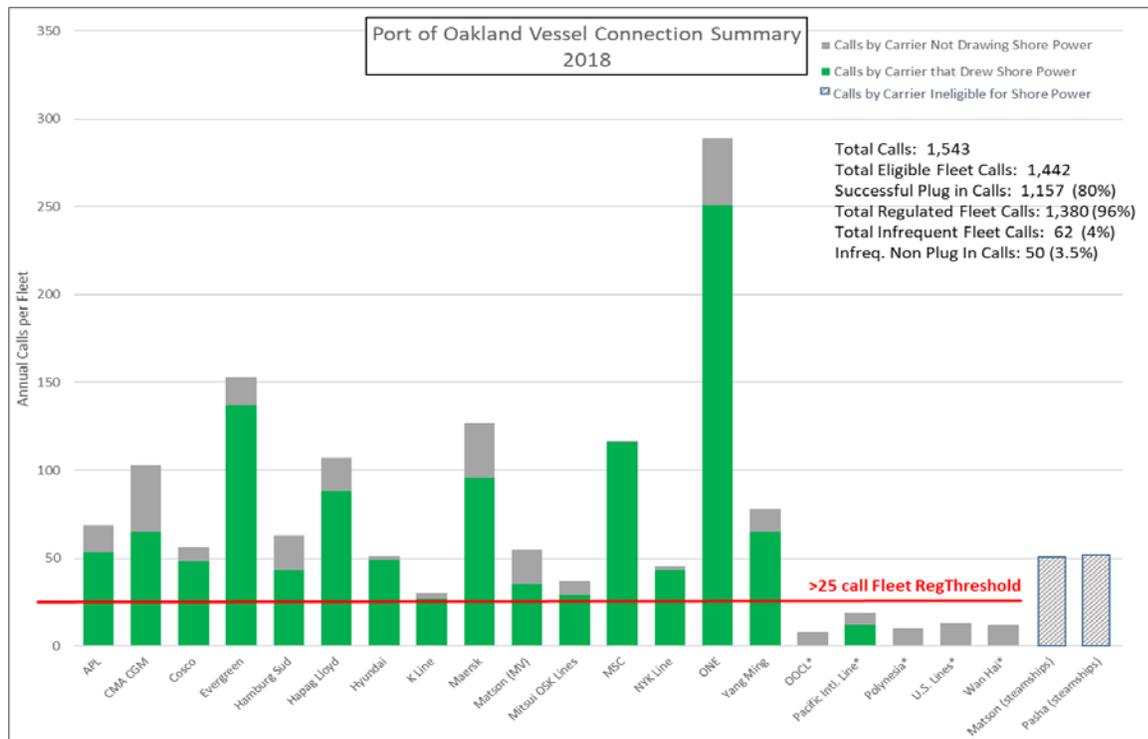
of this underestimation is twofold. First, the emissions benefit under the current rule is significantly underestimated. Second, the emissions benefit of the proposed rule is grossly overestimated.

In fact, the net benefit of the proposed rule for the existing regulated fleet is largely illusory. The rule moves from 80% fleet emission reduction to an 80 % individual vessel approach. The rule largely sacrifices flexibility for the existing regulated fleet in return for no meaningful emissions benefit.

The presentation also understates the benefits of the existing rule and overstates the benefit of the proposed rule for the existing regulated fleet by not including the benefits associated with Proposition 1B for shore power infrastructure. Proposition 1B provided funding to Ports and marine terminals for shore power infrastructure in return for contractual commitments that the emissions reductions from vessels calling on those facilities would exceed the requirements of the existing At-Berth Regulation. As a result, many of the emissions benefits attributable to the existing rule under the emissions inventory are largely attributable to vessels already captured under the existing rule but not accounted for, as described previously, and the Proposition 1B contractual commitments. Without properly accounting for these two major elements, the CARB staff analysis provides an inaccurate presentation of emissions benefits of the proposed rule from the existing regulated fleet.

The inventory analysis also does not model the existing rule's requirement that a vessel capable of connecting to shore power must do so. Again, if the at-berth inventory model did so, it would attribute more emission reductions to the existing regulation and fewer emissions benefits to the proposed rule impacting the results of subsequent supporting analyses, such as health risk, cost-effectiveness, and overall levels of emissions reductions.

To illustrate the limited availability of additional emissions to seek to control from existing regulated fleets as well as from emissions from current vessels connecting to shore power which are under the current fleet threshold, consider the 2018 vessel visits at the Port of Oakland – the Port which plugged in the most vessels in California (and in the entire world) that year – below:



In 2018, the scope of non-regulated vessel calls represented only 4% of total calls of non-steamship container vessels. And, after accounting for those vessels which also plugged in, the remaining potential scope of additional capturable vessel emissions left to address through potential rule expansion is further reduced to only 39 vessel calls out of 1,442 total calls, or 3.5%. Control of these emissions at an 80% control factor and application of some percentage of TIEs/VIEs (as these are the smaller, non-equipped vessels) are exceptionally small. PMSA has estimated that these calls represent a grand total of additional emissions to capture of only about 340 lbs/year DPM, or approximately 0.0005 tpd.

With regard to the expansion fleet, the inventory analysis overstates the benefits of the proposed rule by ignoring offsetting emissions from tug and bunkering activity as described in the Starcrest Analysis. The attached Ro/Ro analysis demonstrates that effectiveness of the rule is reduced to a 40% emissions reduction for pollutants while increasing GHG emissions by 50%. These emissions impacts are attributable to known, unavoidable consequences of the proposed regulation: increased tug activity and at-anchorage fuel bunkering. Whether you consider the net impact to be an increase in excess emissions or a decrease in the net benefit, the impact is the same to reduce cost effectiveness, reduce risk reduction, reduce benefits described in the Incidences per Ton analysis, and reduce the cost to benefit ratio. The ISOR does not properly account for any of these foreseeable outcomes in these analyses.

### **Cost/Health Benefit Analysis Deeply Flawed**

Taken together, the flawed cost analysis with regard to alternative control technologies and flawed emissions analysis results in a flawed cost analysis. As the Starcrest analysis lays out, CARB has calculated the total cost of this regulation as \$2.164 billion with \$2.245 billion in health care benefits, which amounts to a thin margin of only \$81 million. A more realistic hourly rate for barge-based control systems, based on actual invoices rather than anonymous conversations, alone would add \$231 million to the costs of the Proposed Regulation for a total cost of \$2.4 billion, exceeding the health benefits. If the emissions analysis properly accounted for excess emissions in its calculation of health benefits the cost/benefit analysis would swing even more negative.

In fact, the Starcrest Analysis reveals that CARB is using two inconsistent data sets, particularly in regard to the existing regulated fleet. One set for analyzing the cost of the rule appears to minimize the additional infrastructure and vessel retrofits necessary to comply with the proposed regulation. The other set appears to maximize the number vessels not subject to the rule, increasing the emissions benefit of the proposed regulation. Both of these circumstances cannot be true. Even worse, when the two sets are brought together to compare the total regulatory costs to the value of the health benefits, the discrepancy is magnified. A consistent data set should be used throughout the ISOR and its supporting documents. Please confirm if the data set used to determine costs is the same data set used to evaluate emissions.

### **Methodology for the Introduction of Marine Terminal and Port Responsibility Is Counterproductive, Costly, and Unnecessary**

The universal experience at all of California's seaports under the current rule is that the berths with the highest levels of compliance are operating with existing shared responsibility by contract between ports and terminals with ocean carriers, not by regulatory requirement assigning specific costs or liability amongst the parties. The current regulation and complementary incentive programs provide that the marketplace shall drive Ports and marine terminals to provide an effective set of infrastructure facilities and safe, competent, reliable labor shoreside in order to allow oceangoing vessels to be compliant with the current regulation. The current numbers demonstrate that this model is not only effective at delivering compliance, but it effectively generates over-compliance.

While there are gaps in the provision of shoreside power at certain berths, and some recurring crowding or repositioning issues exist, the number of vessel calls which are impacted by these issues has proven to be very small. For example, year to date in 2019 at the Port of Oakland, "timing and crowding" issues only impacted 1.6% of all vessel calls. In some instances, the best remedy for these types of issues may be an investment in additional new substations and vaults or cable-reel systems when safe and available for use. To that end, CARB holds the purse for any number of funds for which at berth investments are eligible, but it remains to be seen if CARB would want to prioritize these types of multi-million dollar investments to try and capture emissions from an additional 19 vessel calls out of 1,175.

PMSA believes that there is a role for enhanced marine terminal and port responsibility on a check-list basis, but that such responsibility should be limited only to circumstances within the control of the port

or marine terminal, and should avoid the hallmarks of an Indirect Source Regulation. The parallel corollary to this is, of course, that a vessel should also only be held liable for the circumstances under the control of the vessel. The proposal is set up in a manner which creates unnecessary and counterproductive conflict and competing interests between marine terminals and vessels, will result in enforcement conflicts, disputes over the proper uses of TIEs and VIEs, and yield unnecessary and costly divergences in interests between customer and service provider. None of these changes improves emissions or air quality outcomes – all of them create new commercial complications, costs, and uncertainty that should be studiously avoided.

### **Specific Regulatory Language Issues**

The proposed regulation also contains a number of problematic elements that make implementation difficult and will subject entities to non-compliance risks even when taking all reasonable steps possible to comply.

#### **Distributed Generation**

The proposed regulation includes restrictions on “Distributed Generation” that are problematic starting with the definition. Distributed generation is defined as power produced near the place of use. In industrial areas like ports that could refer to power plants sharing a fence line. The definition also does not include any element of control. If a terminal ends up using distributed generation, even if better defined, because their port authority or utility distributes the power to the terminal facility, the terminal operator likely has no ability to modify that. Additionally, if CARB envisions distributed energy as an alternative control technology, there should be no difference between the emission limits set for distributed generation over other alternative control technologies, apart from already existing CARB and local air district rules for permitting such distributed power. There is no logical basis to prefer similar emission profiles from alternative control technologies over distributed generation systems.

#### **Approved Emission Control Strategies**

The requirements identified under Section 93130.5 are potentially self-defeating in allowing additional control technologies to supplement shore power for rule compliance. The proposal envisions emission control systems operating interchangeably across different vessels, hopefully lowering capital costs. However, the rule establishes different allowable emission rates depending on vessel type ensuring that such systems cannot be used interchangeably. This requirement alone would drive up the number of units necessary and therefore costs and was not analyzed by CARB staff.

Potentially worse, CARB grants an effective five-year monopoly to the two existing alternative control strategies allowing them to continue to operate under existing Executive Orders (EO), while subjecting any competitor for the first five years to more stringent and costly requirements. It is also unclear whether existing alternative control technology suppliers would be allowed to build additional, identical equipment and be subject to the same five-year advantage or that advantage is only limited to extant equipment. In other situations, CARB provides the EO to the equipment type, not to individual pieces of equipment.

One of the requirements that CARB demands for alternative control technologies is a warranty. Similar to other air quality programs, warranties ensure long-term emission reductions. However, a warranty is only as good as the financial assets behind the company offering the warranty. CARB should require a demonstration of the financial wherewithal to provide a 10-year warranty or require a performance bond to ensure that warranty obligations can be made.

The provisions for emissions testing upon selling or leasing an approved emission control system are unnecessarily burdensome. The proposed regulation already includes a requirement for annual source testing. It is unclear why additional testing is necessary if the equipment changes ownership or leaseholder. Such a requirement would also discourage short-term leasing options as it would add costs every time the system is leased to a new user.

Regarding the annual emissions testing, the proposed regulation is unclear as to which entity is responsible for conducting the emissions testing: the manufacturer, warranty provider, owner, lessee, or operator.

#### Opacity Requirement

The proposed rule establishes an opacity limit for vessels at anchorage. Such a requirement conflicts with established International Maritime Organization (IMO) and USEPA emissions standards for vessels. USEPA rules preempt state and local emissions standards for oceangoing vessels. While not quantified as a typical numerical standard but a limit based on Ringelmann values, an opacity limit is clearly an engine emissions standard for an operating vessel – even if that operation is at anchorage. Such standards should be promulgated for new engines and done so through existing IMO/USEPA framework. Accordingly, CARB should eliminate the proposed emissions standard from the regulation.

#### One-Hour Connection Requirement

CARB staff proposes a one-hour limit on the connect and disconnect times for shore power. Such a requirement is arbitrary and capricious and not based on any evidence that it is safe or feasible. As we have said in previous letters, the existing rule permits multiple connection strategies, some of which will require more than one hour. More importantly, the shore power connection process requires individual people to manhandle heavy, high-voltage equipment and energize that equipment – sometimes in adverse weather conditions. Under no circumstances should that work be performed under a stopwatch. In addition, there is no need for the stopwatch. The labor crew on the scene will make the best determination, keeping in mind safety, of how to handle the connection process. The labor crew is there for the purpose of making the shore power connection and there would be no interest on their part to delay it. Finally, the one-hour requirement would likely be ineffective because any exceedance of the one-hour requirement would likely result in a safety exemption being sought, as having labor move faster handling high voltage equipment would be fundamentally unsafe.

One PMSA member, Maersk, had the ability to analyze shore power connection data using the parameters of the proposed connection requirement on 135 vessel calls back to May 7, 2019. Maersk determined that 38% of the calls would not have met the proposed 1-hour rule on arrival (27% in LA,

34% in Long Beach, and 54% in Oakland). CARB staff has provided no basis on which it can be assumed that connection times can be consistently and safely accelerated. In fact, no data is available from CARB justifying the one-hour connection window.

PMSA recommends that one-hour limit be replaced with a checklist approach. CARB has never identified an instance when labor was available that a vessel was not connected to shore power in a timely manner. All discussions regarding the connection process have not been about how fast people work, but verifiable steps were taken by responsible parties: did the terminal order labor? is the vessel-shore power capable? did the port authority send staff to energize the connection? As we have argued in past comment letters, these items can be successfully determined through a checklist approach without putting labor at risk with a stopwatch for handling heavy, high-voltage equipment.

#### VIEs/TIEs

The VIE/TIE structure proposed in the draft regulation is extraordinarily problematic and compounds problems in the existing regulation. One of the primary shortcomings of the existing regulation is that it unintentionally holds regulated parties responsible for outcomes outside their control. So far, industry and CARB staff have successfully managed this shortcoming. The proposed regulation does not solve this issue; instead it formalizes it.

One example of this is impacted schedules. For example, the Port of Oakland is very busy, with more vessel calls than either the Port of Los Angeles or Port of Long Beach. A vessel's time at berth is, however, much shorter in Oakland with a typical duration of less than 24 hours. It can be reasonably expected that a terminal in Oakland will plan to berth a vessel in a way that it will be able to connect to shore power. However, if a vessel is delayed by 24 or 48 hours, another vessel is likely to be at that same berth during its scheduled time. The terminal operator has two choices, move the vessel to anchorage to wait for that berth to become available or serve the vessel at an available berth where it may or may not be able to connect to shore power. If it is unable to connect to shore power directly, there are no alternatives. CARB has determined that alternative control strategies are not viable in Oakland and the proposed cable reel management systems has not been deemed safe for use (see prior attached comment letters). The proposed regulation holds the terminal responsible for the vessel's late arrival if the vessel is unable to connect, thus incentivizing the terminal to put the vessel to anchorage and resulting in a net increase in emissions. This is an absurd outcome if a terminal has taken the necessary steps to schedule and plan for vessels to connect to shore power.

The proposed rule even holds the terminal operator responsible for selecting alternative control technologies for vessels. A terminal operator cannot reasonably exercise proper engineering judgement to determine the suitability and compatibility of an emissions control system for a vessel. What would happen if a terminal operator selects a CARB-certified emissions control system, but a vessel operator does not allow it to be connected due to concerns of compatibility with the vessel? Even the regulation acknowledges that the terminal may not be compatible with the vessel's needed emission control strategy. Only the vessel operator can determine the suitability of alternative control technologies for vessels they control.

The proposed regulation even engenders disputes between ocean carriers and terminal operators. When no one is at fault, how will CARB resolve the dispute? Because the proposed regulation still attempts to hold a terminal or ocean carrier responsible for actions outside their control, disputes will invariably arise. What dispute resolution process will CARB put in place? How will it adjudicate the use of VIEs/TIEs when ocean carriers and terminals do not agree on fault? What will be the timeline for such a process?

A greater flaw in the VIE/TIE scheme is the fact, as demonstrated in the Starcrest analysis, that there are insufficient VIEs/TIEs available to ensure compliance for known issues identified by CARB. As discussed earlier, VIEs/TIEs will be needed to for unknown and unexpected changes in trade, vessel deployments or equipment failures and maintenance. This can only be corrected by greatly increasing the number of VIEs/TIEs, at the cost of reduced emissions reduction. A fleet average approach would avoid all of this.

Rather than holding parties responsible for issues outside their control, a checklist approach that establishes clear lines of responsibility should be used to manage compliance. Such an approach was detailed in an alternative submitted (and attached) by PMSA in 2017. Any approach that holds a party responsible for actions the party cannot reasonably control is likely to be unenforceable.

Other limitations of the VIEs/TIEs scheme are that it creates market problems. New entrants to the California market would have no VIEs/TIEs under the proposed scheme creating a significant barrier to entry. There have been several new entrants to the transpacific container market in the past few years. Under the proposed regulation, it would be almost impossible for them to enter the California market and grow their business due to the uncertainty new markets bring. Other issues include companies going bankrupt (which, again, has recently happened) that results in competitors attempting to claim that business, but would be virtually impossible without an increase in VIEs/TIEs to match that unexpected growth opportunity.

#### Commissioning

The proposed regulation imposes requirements on the vessel operator to seek approval, presumably ahead of time, for a vessel commissioning that requires more than one visit or instances where the terminal requires the vessel to be recommissioned. First, the language should recognize that it is often the port authority that imposes commissioning requirements and not the terminal. Second, an ocean carrier should not be held liable or required to seek CARB approval for imposed commissioning requirements. The ocean carrier has no ability to determine the extent of commissioning or the frequency imposed by a port authority. If CARB wishes to regulate commissioning, it should do so on the responsible party, which is not the ocean carrier. At most, the requirement should be revised to provide a notification to CARB within a specified period, but the ocean carrier's compliance should not be at stake as a result of another party's safety protocols.

The proposed regulation also places unnecessary burdens on terminal operators. The proposed rule requires that if a vessel is commissioned at a terminal in a given orientation (i.e., starboard or port) that

the terminal may never change operations in a way that would require vessels to berth in a different manner. Terminals must have the ability to modify operations, which can include changing berthing requirements. It is unnecessary for the rule to preclude this. These are commercial and safety decisions that should be left between the terminal operator and ocean carrier. Terminal operators have incentives not to alienate their customers and ocean carriers have multiple terminal options to serve their needs. CARB should not restrict the ability to modify their operations, possibly to the needs of a different ocean carrier.

#### Reporting Requirements

Reporting requirements should not be duplicative and data collection should only be sought from the responsible party that produces the data. The proposed regulation has requirements for both terminal operators and ocean carriers to provide the exact same information. In other instances, CARB does not seek information from the responsible party. In some instances, port authorities will have control over power consumption data, and in other instances terminals will have control over power consumption data, yet CARB assigns specific reporting requirements for this to only one party, thereby imposing a burden that some terminal operators may not be capable of fulfilling. CARB should simplify the reporting requirements to reduce redundancy and ensure that the party that actually generates the data is the party responsible for reporting.

Other reporting requirements include items that are irrelevant to the monitoring of rule compliance. CARB already has an OGV Fuel Rule in place to control and monitor fuel usage in oceangoing vessels within California waters. The proposed regulation needlessly adds reporting requirements that can be obtained through that rule's requirements without adding a permanent, redundant regulatory burden within this rule structure. The fuel reporting aspects of this rule should be eliminated.

Terminal plan reporting includes a requirement to list each berth with geographic boundary coordinates. Berths are not so precisely defined. As discussed in the Starcrest analysis, what constitutes a berth is dependent on the vessels that call a terminal. As the Starcrest analysis points out, the CARB assessment assumes a static world where vessel sizes do not change, and this reporting requirement reflects that. This reporting requirement should be eliminated and CARB should update the ISOR consistent with the attached analysis.

In completing all this reporting, the rule provides only seven days for reports to be submitted to CARB. This is too short a timeframe to consistently prepare reporting. CARB should increase the reporting period to 45 days. CARB staff should also work with industry in its development of the proposed online reporting tool. In order to ensure success, the functionality of the online reporting tool should be consistent with industry standard reporting practices.

#### Alternative Control Technology Provider Responsibilities

CARB staff have proposed a complex rule that imposes both certification and warranty requirements with multiple emissions standards for alternative control technologies that could be used in place of shore power. Yet the rule places the burden of equipment failure on the vessel and/or terminal

operator. The rule does not establish any VIE/TIE restrictions on alternative control technology operators. CARB-certified and -warranted technology operators should be held to the same punitive standards as terminal operators and ocean carriers.

### **Reporting Requirements for General Cargo and Bulk Vessels**

The reporting requirements for general cargo and bulk vessels add a real, quantifiable burden to bulk and general cargo vessel operators, but do not advance any emissions reduction program in California. The State should not impose costly reporting requirements for the sole sake of collecting more information, particularly when there is no planned use for that data. If CARB identifies a future need for such data, it is readily available through alternative sources such as marine exchanges or port authorities. There are even existing regulatory tools in place like the OGV fuel rule that CARB can use to obtain vessel information and ensure significant emission reductions. There is no reasonable basis to place a permanent, costly reporting burden for no measurable or identified benefit.

CARB staff should also be aware that aspects of the rule do not make sense for bulk vessels. For example, while the ready-to-work definition may be appropriate for container vessels, the definition is not appropriate for bulk and general cargo vessels. This is a further reason why the reporting requirements for bulk vessels are burdensome, even if such vessels are exempt from the emission reduction portions of the rule.

Ultimately, increased liability and uncertainty for bulk vessels will only harm California exports, particularly California agriculture that is dependent on bulk vessels to cost-effectively move their products to foreign markets.

### **Vessel Diversion Is Not Analyzed for Either Its Economic or Environmental Impacts**

The ISOR and SRIA do not properly analyze the possibility of vessel diversions and their economic and environmental impacts. The costs of the rule are not limited to on site infrastructure and labor, ship retrofits or electricity rates, but they also include the value of lost business to local port communities and increased GHGs which occur when vessels are diverted away from the US West Coast.

Already the proposed rule has resulted in cancelled cruise calls to California ports based on prior proposals and the current proposal is only likely to continue that trend. The rule creates a level of uncertainty that vessel operators will find difficult to manage. For cruise and container vessels already frequently calling on California ports, compliance has and will continue to be a success story. But not all vessels call California regularly, much less frequently, which is exactly why CARB built the fleet-size thresholds into the current at berth regulation. The first effects of the elimination of the fleet rule and the fleet-size thresholds are being seen in the cruise industry, where passage is booked much earlier than for freight. As a result, cruise vessels are the “canary in the coal mine” of what can be expected across the maritime industry. Cruise calls that are part of world voyages or transitioning /repositioning voyages (i.e., extremely infrequent California port callers) have already been cancelled for 2020 and 2021. Based on current activity this is expected to impact 19 calls annually (12 in San Francisco, 6 in Los

Angeles and 1 in San Diego), resulting in tens of millions of dollars of economic impact to local communities.

The ISOR and SRIA should evaluate these impacts that have now occurred – they are not speculative – as a result of the proposed regulation and can be expected to broaden to other parts of the maritime industry as ocean carriers avoid California ports due to an inability to plan for rule compliance because of a lack of alternative control strategies and a demonstrated insufficiency of VIEs/TIEs. The simplest approach to address this issue of vessel diversion to return the proposed rule to a fleet average approach with an exception for fleets that have few California calls.

Likewise, with respect to diversion in the container industry, the ISOR should evaluate the global GHG increases and impacts which will occur with diversion of vessels away from the US West Coast. With the substitution of an every-vessel, every-call standard rather than a fleet average. CARB is well aware of and helped to affirm the methodology for the study commissioned by PMSA in 2017 which evaluated GHG impacts associated with container vessel diversions away from California's ports.  
<http://www.pmsaship.com/pdfs/PMSA%20carbon%20comparison%20context%20piece.pdf>

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**Relative Cost-Effectiveness Comparisons Between Existing Regulation and Proposed Regulation Are Missing from the ISOR to Help Assess the Need for Elimination and Replacement of Current Rules**

The ISOR completely omits cost-effectiveness comparisons between the current regulation as applied to container, cruise and refrigerated vessels with the additional costs of the newly proposed regulation. We believe that this is a significant omission given the \$400+ million price tag for the currently regulated fleets when compared to the relatively minuscule scale of remaining at berth emissions subject to control.

Further frustrating efforts at potential comparison, the ISOR for the current rule did not use in 2007 a weighted cost-effectiveness methodology, but the 2019 proposed rule ISOR does use a weighted cost-effectiveness. So a casual comparison of the two ISORs for these rules do not yield an apples-to-apples or oranges-to-oranges basis for evaluation. If one were to look at these two ISORs on their face, as apples-to-oranges, the public might conclude that the current regulation is much less cost-effective than the proposed regulation at reducing emissions from container and cruise vessels, even though the proposed regulations reduce only a very small amount of emissions in comparison to the existing rules.

PMSA has attempted to do an apples-to-apples cost-effectiveness comparison of the two rules. Utilizing the 2007 methodology, which is unweighted and instead assigns half costs to NOx control and half costs to DPM control to acknowledge the dual purposes of and effects of the rule. By our estimation the cost-effectiveness of the current regulation for container vessels calling at the Port of Oakland is roughly 10x more costly under the proposed rule than under the existing regulation. See Attachment E.

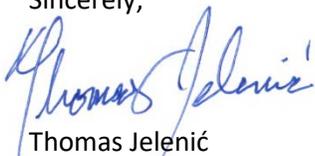
PMSA respectfully requests that CARB perform new cost-effectiveness calculations for all Ports, fleets, and sources utilizing the same methodology as the 2007 ISOR, to yield an apples-to-apples comparison, or reperform all 2007 cost-effectiveness data to the 2019 ISOR methodology, to yield an oranges-to-

oranges comparison, in order to effectively allow the public and Board to see the actual cost-effectiveness levels of the proposed regulation.

**Conclusion**

PMSA looks forward to continuing to work with CARB staff to improve the current proposal and to work on making discrete, effective, and surgical amendments to the existing at berth regulations through amendment, rather than deleting them off the books and starting entirely fresh with a brand new rule. As an industry which has invested billions of dollars in cleaning the air in California with tremendous success, we want to continue to partner with CARB to protect our investment in clean air, to improve existing compliance methodologies under the current regulation, and to continue to make progress towards the most cost-effective emissions reductions possible which achieve the best public health outcomes. The current proposal does not represent these goals, but we hope to have a regulation before the Board for its consideration which has our support which does result in the achievement of these common goals that we share.

Sincerely,



Thomas Jelenić  
Vice President

**Attachments**

- Attachment A: Technical Analysis: California Air Resources Board's Proposed Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port, December 2019
- Attachment B: CARB At-Berth Regulation Cost Effectiveness Analysis for Auto Carriers and RoRo Ships at Port of Long Beach & Port of Los Angeles, December 2019
- Attachment C: SRIA – Air Resources Board, Proposed Control Measure for Ocean-Going Vessels At Berth, August 26, 2019
- Attachment D: Alternative Proposal for Amendments to At-Berth Regulations, February 15, 2019
- Attachment E: Port of Oakland Cost-Effectiveness Comparison

Attachment A:  
Starcrest Consulting Group  
Technical Analysis: California Air Resources Board's  
Proposed Airborne Toxic Control Measure for Auxiliary  
Diesel Engines Operated on Ocean-Going Vessels At Berth  
in a California Port  
December 2019

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*Technical Analysis:  
California Air Resources Board's Proposed  
Airborne Toxic Control Measure for Auxiliary  
Diesel Engines Operated on Ocean-Going Vessels At  
Berth in a California Port*

**Prepared for Pacific Merchant Shipping Association  
December 2019**



 Prepared by:  
STARCREST CONSULTING GROUP, LLC

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ATTACHMENT A: INVOICES FOR BARGE-BASED CONTROL SYSTEMS

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## **1.0 INTRODUCTION**

The California Air Resources Board (CARB) has proposed amending its regulation, “Airborne Toxic Control Measures for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port,” otherwise known as the “At-Berth Rule.” In October 2019, CARB released several documents to support the proposed regulation, including the proposed regulatory language, emissions calculations, the Initial Statement of Reasons (ISOR) and the Statewide Regulatory Impact Assessment (SRIA), among others.

The proposed regulation is intended, according to CARB, to address implementation issues with the existing at-berth regulation and to secure additional emission reductions from new vessel types. Vessels and terminals must use a CARB-approved control strategy to comply, which includes shore power or CARB-certified barge- and land-based control systems. CARB states the total cost of this regulation is \$2.164 billion with \$2.245 billion in health care benefits.

The proposed regulation includes the following elements:

- 100% control requirement beginning in 2021 for all container, reefer and cruise fleets with no exceptions for small fleets (previously unregulated fleets have until 2023 to comply);
- 100% control requirement beginning in 2025 for Ro-Ro and 2027 for tanker vessels in San Pedro Bay, 2029 for all other tankers
- 1 hour to begin emissions control from the time the vessel is “Ready to Work.”
- Exceptions for safety events and commissioning as well as Terminal Incident Events (TIEs) and Vessel Incident Events (VIEs); TIEs are limited to 15% of a terminal’s calls until 2024, then 5% of calls, and VIEs are limited to 5% of a vessel fleet’s calls indefinitely.
- Payments into a remediation fund

## **1.1 Project Goals**

PMSA retained Starcrest Consulting Group to conduct a technical analysis to validate CARB’s technical assumptions; and, where assumptions cannot be validated, identify alternative assumptions supported by publicly available data and industry sources; and to analyze the impact of these revised assumptions on the regulation’s outcomes. This analysis examines CARB’s assumptions in the following areas:

- Technology
- Operations (Including Timeline)
- Infrastructure
- Cost
- Emissions
- Environmental Impacts

This report presents conclusions that may differ from those presented in the October documents released by CARB; our conclusions could change if CARB subsequently provides further clarification or new information.

## **1.2 About Starcrest Consulting Group, LLC**

This technical analysis was prepared by Starcrest Consulting Group, LLC. Starcrest is dedicated to providing high quality technical, policy, and programmatic services in the field of air quality specifically as it relates to seaports and the maritime industry. Formed in 1997, Starcrest offers its unique perspective in resolving port- and maritime-related air quality and carbon emission issues by applying our extensive project experience and diverse professional backgrounds. Starcrest has conducted 50 port-related emissions inventories nationwide since 1997. It is widely considered an international expert in calculating, assessing, and identifying emissions associated with shipping.

## 2.0 DATA INCONSISTENCIES

This report relies primarily on data from CARB’s own documents: ISOR, SRIA, Berth Analysis, Draft Environmental Assessment (Draft EA), Cost Analysis Workbook, and Emissions Inventory Spreadsheet. In some cases, this report uses information from publicly available documents, such as the emissions inventories from Port of Los Angeles and Port of Long Beach, and information provided by industry sources to Pacific Merchant Shipping Association.

Of note, we found several inconsistencies within CARB’s documents, as noted below:

**Vessel Visits and Newly Regulated Visits:** In the cost analysis, CARB presents one set of numbers for total container/reefer vessel visits and newly regulated container/reefer visits; in the ISOR Table III-6, another set of numbers is used, as seen in Table 1. Additionally, CARB uses still another set of numbers to estimate emissions, assuming that roughly 25% of container/reefer at-berth hours are currently unregulated and will become newly regulated under the proposed regulation. The issues associated with these numbers, namely the inconsistency of these data with other publicly accessible datasets, is described in Section 0. All of these numbers vary significantly and using one set of numbers over the others will change the impacts. If the dataset used for the emissions analysis is correct, a large percentage of the fleet is currently unregulated and the proposed regulation will significantly increase emission reductions; however, this also means that a large number of vessels will need to control emissions at berth, driving up costs. If the dataset used for the cost analysis is correct, and most of the fleet is already regulated, the costs will be lower, but the emissions benefit also will decrease. CARB needs to clarify which numbers it used and remain consistent throughout all analyses.

**Table 1: Data Inconsistencies in Annual Container/Reefer Vessel Visits and Newly Regulated Visits**

Port	Cost Analysis		Table III-6	
	All Annual Vessel Visits	B. Newly Regulated Annual Vessel Visits - Unadjusted	All Annual Vessel Visits Proposed Regulation	New Visits with Control Requirements
Los Angeles	1029	123	1039	80
Long Beach	909	89	854	45
Oakland	1597	191	1481	127
San Diego	52	0	51	0
Hueneme	155	0	108	0
<b>Total</b>	<b>3742</b>	<b>403</b>	<b>3533</b>	<b>252</b>

**Unique Vessels Needing Shore Power Retrofits:** In the ISOR, CARB states that roughly 36 container/reefer/cruise vessels are in fleets not subject to the existing at-berth regulation and would require shore-power equipment retrofits (ISOR, III-11); however, in the Cost Analysis Workbook, CARB assumes that 57 additional unique container/reefer vessels and 26 additional cruise vessels would install shore-power equipment due to the new regulation (tab: “Berths, Terminals, Vessels”). It is possible the delta between these two numbers (47) represents the number of vessels in currently regulated fleets that would require retrofit, but it is not clear. CARB should clarify its estimates.

**Harbor Craft Emissions:** Barge-based control systems require tugboats to move them into position. CARB analyzes these emissions in the Draft EA but does not appear to have included these emissions in the ISOR regulatory analysis.

52-8

**Vessel Growth:** CARB acknowledges the increase in vessel size and activity when calculating emissions, at least for POLA and POLB, but does not factor this assumption into the berth analysis.

**Wharf Improvements at RoRo Terminals:** In the Draft EA, CARB assumes wharf improvements and electrical infrastructure upgrades when evaluating the construction emissions associated with land-side control systems at RoRo terminals; however, CARB does not assume these improvements for the cost analysis.

52-9

Where possible, we tried to reconcile these inconsistencies with other datasets or to parse out the numbers used in CARB’s analyses; however, CARB’s use of various datasets and numbers across multiple documents made it difficult to determine the exact metric used for a particular outcome, which in turn made it difficult to assess the real impact of the proposed regulation.

Should CARB clarify these inconsistencies, our conclusions may change.

### 3.0 TECHNOLOGY ASSUMPTIONS

Implementation of the proposed regulation is highly dependent on the development of new technologies to control at-berth emissions, particularly for RoRo and tanker vessels. By necessity, CARB makes a number of assumptions about these as-yet-developed technologies; several assumptions could benefit from additional justification, as described below.

- **Certified land-based capture and control systems do not exist today.** Compliance for RoRo terminals is predicated on the development of certified land-based capture and control systems, which do not exist today. CARB references a single “prototype” unit at the Port of Los Angeles (ISOR, I-33). Although CARB states the various component parts already exist, these components have not been integrated or marinized for use in the harsh port environment. Additionally, these control systems must be able to reach RoRo vessels of various sizes and configurations, which has not been evaluated, nor have such systems been tested in different terminal operating configurations; some RoRo terminals use the entire wharf for staging, maneuvering, and parking cargo, leaving little room for control systems. Technology developers will need to design, construct, test, and certify these new systems in a 5-year window; today’s barge-based systems took nearly 10 years to complete this path.
- **Grid-neutral barge-based control systems may require batteries or fuel cells, which will make these systems larger and heavier than today’s generation.** No new control system will be approved unless it is grid-neutral, and even the existing grandfathered systems will need to be grid-neutral by 2025. Technology developers may design for this requirement using batteries or fuel cells (ISOR, ES-26). These power systems may result in larger barges that pose a more significant navigational hazard, forcing some terminals to shift toward land-based systems, which is not contemplated in the regulatory analysis.
  - **Charging Infrastructure:** CARB has not accounted for the potential need to recharge battery-powered systems when not in use. The barge-based systems will need wharf space with electrical outlets, and these costs are not reflected in the analysis.
  - **Renewable Fuels:** Should CARB assume that renewable fuels will sufficiently meet the grid-neutral requirement, CARB should provide an assessment of the availability of renewable diesel or renewable natural gas with the technical specifications required for marine engines and include renewable fuel infrastructure in the cost analysis and implementation timeline.
- **CARB assumes control systems at RoRo terminals will be similar in size and scope to the existing land-based and barge-based control systems.** CARB should further evaluate the significant technological and infrastructure modifications that will be necessary to make today’s systems grid-neutral by 2025. CARB projects these technologies will shift to grid-tied electric, battery- or fuel-cell powered to meet this requirement (ISOR, I-33), or transition to renewable fuels, but neither the cost analysis nor timeline reflects this assumption.

- **CARB cites cable-reel management systems as a potential solution with limited evidence.** Although CARB references cable-reel systems to potentially enhance shore-power access (ISOR, III-12), the Berth Analysis identifies that nearly every existing cable-reel system has not or cannot be used due to design flaws, wharf restrictions, or other operational constraints. Additionally, these systems have not been certified to longshore labor requirements or international shore-power standards. Absent additional technology development and wharf improvements, cable-reel systems may not provide additional compliance options.

#### 4.0 OPERATIONAL AND TIMELINE ASSUMPTIONS

The proposed regulation includes elements that may not reflect operational realities or feasible implementation timelines. Where possible, CARB may want to clarify the rationale behind the elements noted below, particularly where other data conflict.

- **Access to shared barge-based systems assumes on-time vessel arrivals and departures and harbor craft availability, which may not always occur.** Vessels are often delayed due to weather or other scheduling conflicts. Additionally, tugs may not be available to deploy a barge-based system when needed, especially if a vessel is delayed. If a vessel is planning to use a barge-based control system for compliance and is then delayed, that control system may not be available for use. The unpredictable nature of vessel schedules could force operators to use VIEs or pay into the remediation fund despite full efforts to comply, or it may force terminal operators and ports to invest in back-up systems, which are not accounted for in the cost analysis.
- **CARB imposes a 1-hour connection timeframe for shore power, which could pose safety issues.** CARB has not provided justification for the selection of a one-hour timeframe to connect and disconnect shore power. For San Pedro Bay Ports, in 2017 and 2018, the average connect and disconnect time for container vessels was between 5 and 5.5 hours with a median time of roughly 3 hours. Table 2 shows the general statistics of auxiliary engine “on” time in 2018. It should be noted that the engine “on” time included in the table is from the time the vessel arrived at berth including the time it took for events such as positioning, first time commissioning or Customs clearance.

52-10

**Table 2: Port of Los Angeles and Port of Long Beach Auxiliary Engine “On” Time – 2018**

Port	Average Time hours	Median Time hours
POLA	5.55	3.27
POLB	5.04	2.6

Note: These data are informational from the Ports emissions inventories and should not be used to assess shore power compliance.

- **Shore power is the only compliance option for Port of Oakland.** Due to navigational constraints, CARB assumes any vessel visiting Oakland must use shore power, even if the vessel visits only once a year (SRIA, 73). This situation seems to conflict with CARB's stated goal of allowing flexibility for ports and operators to devise tailored compliance solutions. Additionally, CARB should evaluate the cost-effectiveness of shore power for this port, given the unique constraints.
  
- **At the outset, there may be a shortage of TIEs/VIEs owing to known infrastructure deficiencies and infrequent vessel visits not likely to retrofit for shore power.** Although CARB allows fleets and terminals to use TIEs/VIEs or potentially pay into the remediation fund if a vessel cannot connect to shore power, there are some terminals and container/reefer fleets projected to exhaust these exceptions at the outset, as shown in Table 3. These exceptions owe to the known infrastructure deficiencies at some terminals, which could limit shore power access, and to the infrequent callers unlikely to install shore-power equipment. Of note, the following information was taken from CARB's Berth Analysis, which represents CARB staff's research; Starcrest has not independently validated this information, and terminal operators may have different information not reflected in CARB's Berth Analysis and thus not known to Starcrest.
  - **Known Infrastructure Deficiencies:** In the Berth Analysis, CARB notes that several terminals do not have sufficient shore-power infrastructure at the berth. In Long Beach, G235 has a shore-power installation built for a very specific vessel type, which is not compatible with all vessels, and Pier G may need to use TIEs for these 25 calls. At Pier T, the berth can only provide shore power to 3 ships at once, resulting in the potential for TIE usage. In Los Angeles and Oakland, CARB has identified the need for 5 new vaults total; until these vaults are constructed, it is likely these terminals will need to use TIEs. In total, 412 visits are at risk of using TIEs early on due to limited shore-power infrastructure, yet these terminals only have 253 TIEs to use.
  - **Infrequent Callers.** CARB has calculated the number of infrequent callers unlikely to install vessel-side shore power equipment (less than 3 calls annually in Long Beach and Los Angeles and less than 4 calls annually for all other ports; all vessels calling Oakland are assumed to install shore power).<sup>1</sup> These calls will need to use VIEs, or a barge-based control system, which as discussed in Comment 0.□, may not be available right away. As shown in Table 3, at many terminals, there is projected to be a shortage of VIEs.<sup>2</sup>

Of note, for the terminals and fleets projected to face a shortage of TIEs/VIEs, this analysis assumes perfect compliance on all other calls, which is unlikely to occur. Thus, this analysis may understate the shortages. Indeed, some fleets, such as those calling Pier E in Long Beach, are already close to the VIE limit (4 allowable VIEs, 3 visits unlikely to install equipment), and other exception events could quickly force these fleets over the threshold.

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<sup>1</sup> Standardized Regulatory Impact Assessment, page 73.

<sup>2</sup> We are calculating TIEs and VIEs in the same manner as CARB – as a straight percentage of number of calls. We recognize the actual number of VIEs may vary depending on how the fleets organize themselves at each port.

**Table 3: Projected TIE and VIE Usage at the Start of the Regulation**

Port	Container/ Reefer Visits	No. of Vessels Able to Use			Known Deficiencies	Vessel Visits At Risk of Not Being Able to Access Shore Power	Allowable TIEs	Shortage of TIEs	Visits from Infrequent Vessels Not Likely to Install	Allowable VIEs	Shortage of VIEs
		No. of Berths	Shore Power Concurrently	Shore Power							
Hueneme	155	3	3	None	0	23	No	0	8	N/A	
Long Beach - Pier A	225	3	3	None	0	34	No	14	11	Yes	
Long Beach - Pier C	82	2	2	None	0	12	No	0	4	No	
Long Beach - Pier E	83	3	3	None	0	12	No	3	4	No	
				G235 has limited shore power for a specific vessel							
Long Beach - Pier G	146	3	2	type.	25	22	Yes	2	7	No	
Long Beach - Pier J	138	4	4	None	0	21	No	11	7	Yes	
				Can only plug in 3 ships at a							
Long Beach - Pier T	235	4	3	time.	58	35	Yes	4	12	No	
Los Angeles - APM	202	5	5	None	0	30	No	3	10	No	
Los Angeles - Everport	142	2	2	None	0	21	No	2	7	No	
Los Angeles - Fenix	132	4	4	None	0	20	No	10	7	Yes	
Los Angeles - TraPac	99	3	3	None	0	15	No	1	5	No	
				2 additional vaults							
Los Angeles - WBCT	233	4	4	needed.	115	35	Yes	3	12	No	
Los Angeles - Yusen	221	3	3	None	0	33	No	2	11	No	
Oakland - Everport	153	2	2	None	0	23	No	N/A	8	N/A	
Oakland - Matsun	107	3	3	None	0	16	No	N/A	5	N/A	
				3 additional vaults							
Oakland - OICT	1072	5	5	vaults needed	214.4	161	Yes	N/A	54	N/A	
Oakland - TraPac	265	2	2	None	0	40	No	N/A	13	N/A	
				Can only plug in 1 ship at a time. No overlap days							
San Diego	52	3	1	in 2017.	0	8	No	0	3	No	
<b>TOTAL</b>	<b>3742</b>	<b>58</b>	<b>54</b>		<b>412</b>	<b>561</b>	<b>4 terminals</b>	<b>55</b>	<b>187</b>	<b>3 fleets</b>	

\*CARB notes it needs to confirm how many vessels can plug in at same time at POLA Yusen and Fenix; for this analysis, assumed all berths have shore power.

Information Sources:

Container/Reefer Visits = CARB Berth Analysis

No. of Berths = CARB Berth Analysis

No. of Vessels Able to Use Power Concurrently = CARB Berth Analysis

Known Deficiencies = CARB Berth Analysis

Vessel Visits at Risk of Not Being Able to Access Shore Power = Calculated; number of visits to the berth that has a deficiency, or where number of visits to the deficient berth is not specified, total terminal visits/number of active berths

Allowable TIEs = Calculation; 15% of terminal visits

Shortage of TIEs = Calculation; Yes = number of vessel visits at risk of not being able to access shore power > allowable TIEs

Visits from Infrequent Vessels Not Likely to Install Shore Power = CARB Berth Analysis

Allowable VIEs = Calculation; 5% of total terminal visits

Shortage of VIEs = Calculation; Yes = number of visits from infrequent vessels not likely to install shore power > allowable VIEs

Assumptions and Notes

Scenarios represent 2021-2024 timeframe. Assume infrastructure deficiencies are remedied by 2024, and there would be no change in VIE percentages.

Assumes failure to provide shore power infrastructure is terminal responsibility (TIE).

Assumes failure to retrofit for shore power is vessel responsibility (VIE).

Vessels at risk of not using shore power could also use a barge-based control system.

- **The January 1, 2021, implementation timeline for container/reefer vessels in fleets currently subject to the regulation will not provide sufficient time for infrastructure buildout, control-system development and vessel retrofits.** For fleets subject to the current regulation, new requirements for 100% shore power begin January 1, 2021. Assuming passage of the regulation in May 2020, this timeline leaves roughly 8 months to meet the additional requirements. CARB has identified a number of infrastructure, control system, and vessel equipment improvements that would need to occur for 100% compliance, or else these vessels/terminals would need to use TIEs/VIEs or pay into the remediation fund. As shown in Table 4, these various improvements are likely to run past the January 1, 2021, deadline.
- **New Shore Power Vaults:** CARB identified the need for 5 new shore-power vaults statewide to improve the connection rate. CARB assumes 4 months to construct a new vault (Draft EA); however, this estimate omits design, permitting, and procurement and understates construction time. Vault installation projects take closer to 31 months, including design, procurement, and construction, according to publicly available documents describing actual projects of this scope.<sup>3</sup>
  - **New Shore Power Berth:** The Port of San Francisco requires a new shore power berth to accommodate cruise vessels. These projects take roughly 4 years based on publicly available data for projects of similar scope.<sup>4</sup>
  - **New Barge-Based Control System:** CARB identified the need for 1 additional barge-based control system in Long Beach/Los Angeles for infrequent container/reefer callers. CARB estimates it takes at least 2 years for construction of these systems (ISOR).
  - **Vessel Retrofits:** CARB identified that 57 container vessels and 26 cruise vessels (total of 83) would need to be retrofitted for shore power (Cost Analysis Workbook). It is unclear how many of these vessels are in fleets currently subject to the regulation; however, in the ISOR, CARB states that 36 unique vessels without shore power are in fleets not subject to the existing rule (III-11), suggesting that 47 vessels (83-36=47) are in currently regulated fleets and would need to be retrofitted for shore power by January 1, 2021. This conclusion could change should CARB clarify its numbers. CARB allots an extra 2 years for unregulated fleets to install shore power on their vessels, indicating a 2-year retrofit timeframe.

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<sup>3</sup> Port of Long Beach Harbor Commission Agenda, November 26, 2018: Modification of Existing Shore Power Vault at Pier T. Indicates that design takes 13-15 months, procurement and contracting takes 10 months, construction takes 10 months.

<sup>4</sup> Port of Long Beach Harbor Commission Agenda, April 12, 2010: Award of Design Contract for New Shore Power Berth at Pier A; Port of Long Beach Harbor Commission Agenda, May 14, 2012: Award of Construction Contract for New Shore Power Berths, demonstrating construction completion by December 31, 2013 for a total of 4 years, including design, procurement, construction, and testing.

These timelines suggest there could be a significant delay in the ability of currently regulated fleets to meet 100% compliance by January 1, 2021. During this delay, fleets and terminals can use TIEs, VIEs, or pay into the remediation fund. Alternative control systems will not be an option, as these systems also must be developed and are not feasible in all ports. Additionally, for some terminals and fleets, TIEs or VIEs may be quickly exhausted, as discussed in Comment 0.□.

**Table 4: Projected Completion Dates to Meet 100% Compliance, Currently Regulated Fleet**

Activity	Quantity Needed	Completion Date
Shore Power Infrastructure - Vaults	5	December 2023
Shore Power Infrastructure - Berths	1	May 2024
Barge-Based Control System Construction	1	May 2022
Vessel Retrofits	47	May 2022
<b>At-Berth Regulation Effective for Current Fleets</b>		<b>January 1, 2021</b>

Parameters:

The time to construct a shore power vault is roughly 31 months.

The time to construct a shore power berth is 4 years, including design and procurement.

The time to retrofit a vessel is 2 years.

The time to construct a barge-based system is 2 years.

Start date is May 1, 2020.

- **The berth analysis reveals that a number of RoRo visits will remain uncontrolled and not accounted for with TIEs/VIEs due to overlapping vessel berthing.** CARB does not assume one control system for each RoRo berth but rather a mix of dedicated and shared control systems as well as some berths with no control system at all. As a result, some vessel visits will not be controlled because, as noted in the Berth Analysis, many visits occur at the same time and thus will not have access to a control system. Additionally, there will not be enough TIEs or VIEs to cover all of these exceptions (see Table 5). Note, terminals and vessels will need to use their TIEs/VIEs for other unforeseen events, such as routine equipment maintenance or inspections. As a result, this table understates the shortages.
- - To ensure 100% coverage, the state needs at least 17 control systems, not 9, as shown in Table 5, which significantly increases costs and the implementation timeline.
  - Or, CARB could assume that some visits, particularly at Port of Hueneme, will be out of compliance at the start of the regulation; such visits should be deducted from the emissions benefits and/or included in the remediation fund costs.

**Table 5: Uncontrolled RoRo Vessel Visits and Control System Quantities for 100% Coverage**

Port	Ro-Ro Visits	CARB Assumption: Number of Control Systems Needed	1 Berth In Use (# of days)	2 Berths in Use (# of days)	3 Berths in Use (# of days)	Uncontrolled Visits	Allowable TIEs or VIEs (2021-2024)	Allowable TIEs or VIEs (2025+)	Shortage of TIEs/VIEs	Number of Control Systems Needed for Full Coverage
Carquinez	122	1 (barge)	105	3	0	3	6	6	No	2
Hueneme - Wharf 1	19	none <sup>1</sup>	19	0	0	19	1	1	Yes	1
Hueneme - Wharf 2	212	1 (land)	213	31	2	33	32	11	Yes	3
Hueneme - Wharf 3	9	none <sup>2</sup>	9	0	0	9	0	0	Yes	1
Long Beach - Cooper T.	47	1 (barge)	98	15	0	15	5	5	Yes	2
Long Beach - Crescent	60									
Long Beach - Toyota	104	1 (land)	104	0	0	0	16	5	No	1
Los Angeles	94	1 (barge)	128	2	0	2	5	5	No	2
Richmond	71	1 (barge)	71	0	0	0	4	4	No	1
San Diego - Berths 2, 4, 5	201	1 (barge)	177	73	7	80	38	13	Yes	3
San Diego - Berths 10,11	52	1 (land)								
San Francisco	26	1 (barge)	26	0	0	0	1	1	No	1
<b>Total</b>	<b>1017</b>	<b>9</b>	<b>950</b>	<b>124</b>	<b>9</b>	<b>161</b>	<b>108</b>	<b>51</b>		<b>17</b>

<sup>1</sup> CARB states this berth is outfitted with shore power; unclear if ro-ros would use shore power.

<sup>2</sup> CARB proposes operational changes to avoid berthing vessels here.

<sup>3</sup> It is not clear which berths have overlapping visits; the uncontrolled visits could range from as little as 7 to as high as 80.

Assumptions

One day of overlapping berth usage equates to one uncontrolled visit. It may be only a portion of the visit is uncontrolled, but there is no way to know.

Where the assumed control system is land-based, assume TIE. Where barge-based, assume VIE. Where no control system proposed, assume VIE.

TIEs allowable 2021-2024 = 15% of visits; TIEs allowable 2025+= 5%.

A control system can service only one vessel at a time.

Where CARB has not identified a control strategy, all of those visits are uncontrolled.

## 5.0 INFRASTRUCTURE

In order to estimate the costs and implementation timeline of the proposed regulation, CARB made assumptions about the likely compliance path for each regulated port. These scenarios are found in the Berth Analysis, which is the basis of the cost analysis; as a result, erroneous assumptions or omissions in the Berth Analysis can have significant impacts on the projected costs and timeline of this proposed regulation. The following assumptions could benefit from additional justification, particularly where contrary data exist.

- **The berth analysis assumes no change in vessel size or operating conditions over the next 12 years.** The berth analysis assumes that shore power infrastructure suitable for today's fleet will be suitable for the 2032 fleet. As the ISOR indicates, since 2014, Ports have had to make significant investments in new shore power vaults and in some cases have lost berths entirely due to the rapid increase in vessel size between the adoption of the original at-berth regulation and implementation. This trend is expected to continue. CARB's berth analysis is based on an average container vessel size of 4,000 to 13,000 TEU in Los Angeles/Long Beach. By 2030, the Mercator report projects an average size of 10,000 to 16,000 TEU ships. Ports will need to modify and potentially add new shore power infrastructure to account for these changes, which should be reflected in CARB's analysis.
  
- **Information contained in the berth analysis does not always support CARB's conclusions.** In the following instances, CARB does not account for information that pointed to the need for additional or different infrastructure; thus, it is unclear how CARB arrived at its projected compliance scenarios:
  - **Long Beach:** CARB staff noted that Berth G235 has limited shore-power infrastructure designed for a specific vessel type and berthing position. Still, CARB concludes this berth requires no additional infrastructure.
  - **San Diego:** Only one cruise vessel can plug in at any given time. Although CARB notes that two vessels are berthed concurrently 13 days of the year, CARB does not assume additional shore-power infrastructure here.
  - **Carquinez:** The terminal operator notes that land-side and barge-based control systems may not be feasible due to cargo movement constraints and strong currents; however, CARB cites information from harbor pilots, who did not have concerns about a barge-based system if properly designed. Amid these conflicting accounts, CARB agreed with the harbor pilots to conclude that a barge-based system would be feasible rather than taking a more conservative approach.
  - **Hueneme:** CARB assumes the RoRo terminal will use existing shore power installations at Wharf 1, even though CARB acknowledges the inherent challenges of shore power for RoRo vessels (ISOR, III-15).
  - **Hueneme:** CARB assumes no infrastructure at Wharf 3 to control the RoRo vessels, instead proposing "operational changes" to berth these vessels elsewhere.

- **Visual assessments of a wharf are not an accurate measure of what is feasible at a given terminal.** At several ports, CARB relies on Google Maps and its own staff's visual assessments to determine the likely compliance scenario. For example, in Long Beach, CARB assumes a land-based control system at Toyota based on looking at maps of the wharf, and in San Diego, CARB concludes that barge-based systems “look to fit...with no navigational concerns” at many berths. The accuracy of this approach has not been verified. Additionally, this approach does not consider the contractual constraints that may exist at a given terminal; for example, at some terminals, the operator may not have preferential berth access or must vacate the berth at the request of the lease holder, which may prevent development of a land-side control system.
  
- **Due to the inexperience with barge-based control systems, it may be inappropriate to rely on the opinions of harbor pilots.** Only two barge-based control systems exist, both operating in the same port complex. Harbor pilots in other ports are largely unfamiliar with the existing systems and have no familiarity with the systems yet to be developed. Without more data, it is difficult for pilots to know the true impact on navigational access.
  
- **CARB has not accounted for supportive infrastructure, including berth space, for barge-based control systems.** Barge-based control systems must be safely berthed while not in use and will require wharf space for repairs, testing, and exchange of personnel. Many ports do not have vacant wharf space for the significant projected increase in barges, as many as 7 barge-based systems in Los Angeles/Long Beach (2 existing units, 1 new system for container ships, and 4 new systems projected for full coverage of RoRo visits).

## 6.0 COST ASSUMPTIONS

CARB has calculated a total cost of the proposed regulation as \$2.164 billion, as articulated in the Standard Regulatory Impact Assessment (SRIA) with data inputs provided in the Cost Analysis Spreadsheet.

- **CARB has underestimated the hourly costs for barge-based capture and control systems.** CARB assumes \$900 an hour for barge-based capture and control systems. This cost is based on an anonymous quote from one technology vendor to CARB; however, actual invoices provided by shipping lines indicate much higher rates (Attachment A). In addition to straight hourly rates as high as \$1,100, these invoices point to additional charges and vendor-imposed 24-hour minimums, which effectively raises the hourly rate on short calls. At these higher rates, using CARB's assumption of a 20-hour average RoRo call statewide, the cost for a visit is as much as \$28,440, far higher than the \$18,000 CARB would assume (see **Error! Reference source not found.**). Additionally, at the highest effective rate, the total cost of the proposed regulation for RoRos (not assuming growth) is \$231 million compared to CARB's assumption of \$128 million, assuming a 20-hour at-berth average.<sup>5</sup> Further, in a separate study of barge-based control system costs at the Port of Long Beach and Port of Los Angeles, Starcrest found even higher hourly rates based on a 17-hour at-berth time, which is the average in San Pedro Bay.<sup>6</sup> This study suggests that per-hour costs will be even higher for some fleets and ports with shorter calls.

**Table 6: RoRo Control Costs With Varied Hourly Rates**

Statewide Average - 20-Hr Call		
Hourly Rate	Total Cost – RoRo Visit	Rate Source (assumes/indicated all inclusive)
\$900	\$18,000	CARB SRIA Excel - "Cost Input Tab"
\$1,080	\$21,600	\$900/hr for 20 hr call (avg.), includes 24-hr min. charge (Receipt #4)
\$1,100	\$22,000	Receipt #2, Attachment A
\$1,208	\$24,160	Receipt #1, Attachment A
\$1,320	\$26,400	\$1,100/hr for 20 hr call (avg.), includes 24-hr min. charge
\$1,422	\$28,440	Receipt #3
San Pedro Bay Ports Average - 17-Hr Call		
Hourly Rate	Total Cost - RoRo Visit	Rate Source (assumes/indicated all inclusive)
\$900	\$15,300	CARB SRIA Excel - "Cost Input Tab"
\$1,100	\$18,700	Receipt #2, Attachment A
\$1,208	\$20,536	Receipt #1, Attachment A
\$1,270	\$21,600	\$900/hr for 17 hr call (avg.), includes 24-hr min. charge (Receipt #4)
\$1,422	\$24,174	Receipt #3
\$1,552	\$26,400	\$1,100/hr for 17 hr call (avg.), includes 24-hr min. charge

<sup>5</sup> Assumes 100% control of the 1,017 annual RoRo visits at \$28,440 a visit for 8 years.

<sup>6</sup> "CARB At -Berth Regulation Cost Effectiveness Analysis for Auto Carriers and RoRo Ships at Port of Long Beach & Port of Los Angeles," December 2019.

- **The CARB cost analysis assumes no wharf upgrades for land-based capture and control systems at RoRo terminals.** Across documents, CARB presents various assumptions for whether RoRo terminals would require wharf upgrades to support land-based control systems. CARB should clarify its assumptions.
- **Contrary Data:** CARB assumes RoRo terminals will not require wharf improvements for land-based capture and control systems (ISOR, IX-11); however, in Attachment B of the Draft Environmental Assessment (Air Quality Calculations), CARB calculates construction-related emissions from land-based control systems assuming these systems will tie into the grid and require wharf improvements and electrical infrastructure.
  - **Need for Electric Infrastructure:** Land-based capture and control systems are going to be built for the 2025 standard of grid-neutrality, which means they are likely to be powered by electricity to take advantage of fuel cost savings.
  - **Lack of Electrical Infrastructure:** Of note, RoRo terminals do not have a large amount of existing electrical equipment at the wharf, as noted by CARB (ISOR, page III-14). As a result, there are likely to be substantial electrical improvements needed to support land-based capture and control systems at RoRo terminals, including bringing additional power down to the terminals, which has been proven to be extremely expensive and time consuming to date, totaling tens of millions of dollars in San Pedro Bay alone.
  - **Structural Improvements:** Additionally, wharves are likely to need additional structural support to carry the weight of such systems, as CARB notes here for RoRo terminals: “Land-side systems may require some wharf infrastructure improvements due to the weight of the system (around 120,000 pounds) if existing wharf infrastructure is not adequate” (ISOR, III-16). The CARB-funded demonstration of a land-based control system at the Pasha Terminal points to the need for wharf strengthening at RoRo terminals. Land-based control systems will require large cranes to reach the ship stacks, and even at the Pasha terminal, which was designed for heavy on- and off-loading cranes, the Port of Los Angeles required a special permit to ensure the ShoreKat system did not damage the dock. Most RoRo terminals do not use cranes and are thus unlikely to have sufficient wharf support for this additional weight. Despite this evidence, CARB does not account for wharf improvements in the cost analysis or timeline. CARB assumes more than \$50 million in wharf upgrades per berth for tanker-terminal land-based systems; RoRo terminals will likely incur similar costs.
- **CARB assumes no labor costs for operating land-based capture and control systems.** Similar to shore power, terminals are likely to use longshore labor to connect land-based capture and control systems. That has been the case at the Pasha terminal in Los Angeles, which is demonstrating the state’s only land-based control system for non-container vessels and has seen a net labor increase as a result of its operation. For land-based systems at tanker terminals, CARB assumes \$1 million annually per berth (Cost Analysis Workbook). There is no reason to believe RoRo terminals would be any different. Thus, at minimum, CARB should assume \$1 million per berth annually for the 3 RoRo land-based control systems included in the Berth Analysis, which equates to an additional \$24 million over the 8-year regulatory analysis period.

- **The non-annualized costs of this regulation point to a significant, concentrated expense in three 1-year periods, which may not be feasible for the industry.** In 2020, the industry will incur nearly \$170 million in costs; in 2024, the industry will incur nearly \$580 million in costs; and in 2026, the industry will incur \$1.1 billion in costs. Contrary to CARB's methodology, previous at-berth projects, including shore power, were not financed over time but rather were incurred as one-time expenses partially offset with public subsidies (e.g., Proposition 1B, Carl Moyer Program, grants for barge-based systems).
- - As the Department of Finance notes, considering the costs as one-time expenses in a given year rather than annualized costs dramatically changes the impacts. CARB cites two example ports – Port of Long Beach and Port of Hueneme. Using annualized costs, CARB asserts the proposed regulation would amount to 5% of Long Beach's annual operating revenues and 2% of Hueneme's annual operating revenues. But when considering the years in which most costs would incur (2026 for Long Beach and 2024 for Hueneme), the proposed regulation would amount to 23% of Long Beach's operating revenue and 15% of Hueneme's operating revenues in that year.
- **CARB does not account for the capital costs of barge-based capture and control systems.** For purposes of the cost analysis, CARB assumes a \$900 per hour rate for vessel operators to use these systems; however, in the direct cost analysis, CARB omits the capital costs of developing these systems (\$4.9 million according to CARB's estimates), which are borne by some entity – either the technology developers, terminals, or ports. These costs should be factored into the direct cost analysis.
- - To date, no at-berth capture and control system has been privately funded; all of the existing systems have received significant public subsidy. CARB should evaluate the lack of private investment for these systems, which could be a major impediment to implementation.
  - Additionally, CARB should analyze the capital costs of 14 barge-based units (not 6), which represents the number of barge-based systems needed for full coverage.
- **CARB assumes cargo growth factors can address uncertainty.** CARB acknowledges a significant amount of uncertainty in implementing this proposed regulation. Rather than refining the assumptions to minimize uncertainty, CARB applies the growth factors for vessel activity to all costs in an attempt to account for potential changes in vessel size, technology platforms, vessel at-berth duration, and terminal operations. This approach assumes a 1-to-1 relationship between costs and vessel activity, which has not been established, and overlooks the fact that costs are unlikely to increase gradually over time but rather accrue as large, one-time expenses.

- **CARB assumes no vessels will pay into the remediation fund as a result of vessel control equipment repair for container/reefer, cruise, or RoRo vessel types.** CARB did not provide a basis for why vessels would not undergo equipment repair necessitating remediation payments (SRIA, costanalysisworkbook.xlsx). In fact, as seen in Comment 0□, some fleets will exhaust their VIEs at the outset of the regulation and need to pay into the remediation fund. CARB should assume some level of vessel payments into the remediation fund; the current omission understates the remediation cost.
  
- **CARB has not forecasted the statewide increase in energy use (or costs) resulting from electric- or battery-powered capture and control systems.** Using CARB's estimates, more than 30 barge-based and land-based control systems will be needed to comply with the regulation. The land-based systems are almost certain to tie into the grid (as noted in the draft EA), and the barge-based systems may similarly turn to electricity given the limited availability of renewable fuels. These systems will require designated charging locations. CARB has not projected the increased energy usage or costs associated with these systems.

52-11

## 7.0 EMISSIONS ASSUMPTIONS AND FORECASTING

CARB has projected significant emission reductions from the proposed regulation compared to the existing regulation; however, some of CARB's shore-power data conflicts with other publicly available data, and in other cases, CARB has overlooked potential emission sources that might lead to lower-than-expected reductions under the proposed regulation, as described below.

- **In 2021, under the Proposed Regulation, CARB projects changes in the emissions from currently regulated container/reefer and cruise vessels even though there should be no significant difference between the Existing and Proposed Regulation for these vessel types.** CARB should provide further explanation for the significant changes in emissions in 2021 (for most ports, there are fewer emissions, but for other ports, there are more emissions), as shown in CARB's OGV Emissions Spreadsheet, as the publicly available data suggest there should not be any significant change. First, most vessel visits are already covered under the Existing Regulation. Based on publicly available 2018 data for Los Angeles<sup>7</sup> and Oakland,<sup>8</sup> 98% of the Los Angeles calls and 96% of the Oakland calls are from vessel operators covered under the current regulation and subject to the 80% reduction requirements for at-berth auxiliary engine power because they made at least 25 calls in 2018.<sup>9</sup> Second, the Proposed Regulation is comparable to the Existing Regulation for currently regulated fleets given the availability of TIEs, VIEs, and exceptions in the early years, equivalent to 20% of calls. As stated by CARB: "If all TIEs/VIEs are used by both terminals and vessels in these four years, the Proposed Regulation would capture no less than 80 percent of the visits, which aligns with the Existing Regulation at full implementation in 2020" (ISOR, III-31). Thus, the increased emission reductions attributed to the Proposed Regulation over the Existing Regulation as calculated by CARB need further justification. Similarly, CARB should explain the increase in emissions from the Proposed Regulation over the Existing Regulation for the ports of Hueneme and San Diego.
- **CARB understates the at-berth hours subject to the Existing Regulation, which in turn, overstates the projected emission reductions under the Proposed Regulation.** According to CARB's OGV Emissions Inventory, there are roughly 104,000 at-berth hours in Los Angeles and Long Beach covered by the Existing Regulation (based on CARB enforcement data) compared to 136,000 total at-berth hours (based on State Lands data); in other words, according to CARB, only 77% of at-berth activity in Los Angeles/Long Beach is subject to the Existing Regulation, which conflicts with the publicly reported data described in Comment 0□, showing coverage rates nearing 100%. Similarly, CARB's OGV Emissions Inventory assumes only 74% of at-berth activity at Port of Oakland is subject to the Existing Regulation, which conflicts with the publicly reported data described in Comment 7.1, showing

52-12

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<sup>7</sup> Port of Los Angeles, 2018 AMP Summary, <https://kentico.portoflosangeles.org/getmedia/a4f6e02e-5df6-4f68-8a3c-1e6b2c099dd3/AMP-Containership-01-01-2018-to-12-31-2018>

<sup>8</sup> Port of Oakland 2018 Shore Power Usage, [https://www.oaklandseaport.com/wp-content/uploads/2019/11/2019-10\\_Oakland-shorepower.pdf](https://www.oaklandseaport.com/wp-content/uploads/2019/11/2019-10_Oakland-shorepower.pdf)

<sup>9</sup> The 80% at-berth auxiliary engine power requirement may be closer to 90% due to the 10% additional shore power requirements for Proposition 1B-funded berths.

coverage rates nearing 100%. This difference will significantly understate the benefits of the Existing Regulation, and, as carried forward through the forecast methodology, significantly overstate the benefits of the Proposed Regulation. CARB should consider the data described in Comment 7.1 and reassess its assumptions about vessel hours subject to the Existing Regulation.

- **The overall compliance rate under the existing regulation is unclear.** From looking at “Table 20: Percent of Time on Shore Power by Year” (H-41), it is unclear what CARB assumed as the overall compliance rate in 2020 and 2030 under the existing regulation. Also, it is not clear whether Table 20 accounts for additional shore power usage (beyond 80%) for Proposition 1B-funded berths. CARB should confirm that for the existing rule, the analysis assumes that container and cruise vessels are meeting the 80% at-berth shore power requirement in 2020 and 90% requirement for Proposition 1B berths.
  - Additionally, CARB should clarify why there appears to be an increase in the percentage of time using shore power between 2020 and 2030 under the existing rule when the regulation stops at 80% in 2020.
  - CARB should clarify why the overall compliance rate for cruise ships at POLA and POLB is 54% in 2020 as well as in 2030.
  - Additionally, CARB should clarify whether it took into account the difference in average at-berth time between container/reefer/cruise vessels covered under the existing regulation versus those vessels not covered. Per Table H-20, small container vessels have a lower compliance rate under the existing regulation, and these vessels have a lower average time at berth compared to larger vessels. Depending upon the assumption of what container size vessels are covered under the proposed regulation that are in addition to those covered under the existing regulation, the emissions benefit of the Proposed Regulation will vary. A table similar to Table 20 showing compliance rate by vessel type and size will help understand how CARB estimated emissions reduction or increases due to the Proposed Regulation.
  
- **The projected compliance rate for 2030 does not look accurate, particularly for large container vessels; CARB should clarify its assumptions.** In 2030, under the existing regulation, CARB assumes less than 50% shore power compliance for POLA and POLB container vessels size 13000 TEU through 18000 TEU (14000 TEU is an exception). For Container 16K, 0% compliance is assumed in 2030. According to tables on H-71 and H-72, these vessel types have the highest growth rates and yet they are assumed to comply 0% under the existing regulation. CARB needs to clearly articulate how it calculated the compliance rate assumption for future years. Although it could be due to CARB’s at-berth shore power time forecast methodology, a lower percentages of at-berth shore power time for larger vessels is not realistic because these are newer vessels operated by vessel operators making 25 or more calls and more likely to be equipped with shore power capability. The benefit of the Proposed Regulation could be overestimated because larger vessels tend to stay longer at-berth.

- **CARB needs to provide the overall compliance rate under the proposed regulation in the same format as provided in Table 20 for the existing regulation. CARB should clarify the inputs used in the “atberth\_OGV\_port\_specific\_emissions” spreadsheet, specifically the following:**
  - For each year, what is the compliance rate by vessel type assumed for the existing and proposed rule?
  - For each year, by vessel type, what percent of vessel calls was assumed to meet the 20 visits per terminal threshold and are not subject to proposed regulation?
  - What percent of calls by vessel type and vessel size were assumed for TIE/VIE?
  - In 2021, why is there an increase in POLA at-berth cruise emissions with proposed rule?
  
- **CARB should evaluate the emission reductions and cost-effectiveness of the Proposed Regulation for auto carriers and RoRo ships.** Starcrest conducted a detailed emission-reduction evaluation for CARB’s Proposed Regulation for auto carriers and RoRo ships at Los Angeles and Long Beach using actual data from both ports’ 2018 emissions inventories. Key findings:
  - Reduction of PM (including PM10, PM2.5, and DPM) and NOx emissions in the 36%-40% range could be achieved from auto carrier and RoRo vessel control, but emissions of other pollutants (CO2e, SOx and CO) are estimated to increase in the range of 28% to 151% due to emissions from increased bunkering activities at anchorage and supporting activities such as tugs and generators needed to operate barge-based systems.
  - Cost effectiveness (CE) calculations resulted in cost effectiveness between \$115k and \$200k for the barge rental scenario (varies based on effective hourly rate) and \$54,987 for the scenario that includes the purchase of four barge-based systems to serve 100% of calls made to POLA and POLB. Both scenarios are far less cost effective than CARB’s Carl Moyer Program (CMP), which has an upper CE limit of \$30,000 per weighted ton of emissions reduced.
    - It is noted that the CMP also allows for a second tier CE limit for the higher cost of advanced/emerging technology projects; this second tier CE limit is \$100k per weighted ton. The \$100k/ton limit is only applied to the small increment between today’s technology and the advanced technology level, which in practice is zero-emission or near-zero emissions (i.e., 90% cleaner than current technology). Since barge-based systems are not using technology that is 90% cleaner than today’s clean-up technology, these systems should be evaluated at the \$30k/weighted ton CE limit.
  - Currently most of the auto carrier and RoRo ships bunker while operating at berth. If rental barges are utilized during at-berth operations, bunkering will most likely take place at anchorage, resulting in emissions increases at anchorage. In addition to emissions increases due to use of harbor crafts to move barges and generators used on the barges, CARB should address the displacement of at-berth RoRo bunkering and associated emissions.

- **CARB does not account for efficiency changes in the growth analysis.** As stated in Appendix H, updated inventory, “CARB staff do not assume any vessel practice changes or system efficiency changes in the growth analysis except for POLA and POLB as discussed in section 4.2. Therefore, if tonnage increases 35 percent over 20 years for a vessel type in a specific region, the total activity from that vessel type was modeled as increasing 35 percent over the same period” (H-29). Applying growth factors without taking into account efficiencies will overestimate future at-berth emissions and thus overstate the emissions benefit of the proposed regulation.
- **CARB did not account for changes in vessel size over time for most ports.** CARB states: “This change in container vessel sizes was included for POLA and POLB as they were the only ports included in the study. Other ports may see a shift over time but could be limited by berth size and channel depth, port space and capacity, and other limiting factors. Any shifts in vessel sizes for other ports will be reviewed in future inventories” (H-32). Nearly all vessels calling San Pedro Bay also call the Port of Oakland; thus, the POLA and POLB container forecast by size will also apply to the Port of Oakland forecast and should be contemplated in the analysis. CARB could validate this approach by comparing the Port of Oakland liner service schedule to the POLA and POLB schedules.
- **CARB should include a table showing statewide NOx emissions by vessel and engine type.** In Figure 10, CARB displays “2016 Statewide At-Berth PM 2.5 Emission by Vessel and Engine Type” (H-46). A similar figure should be added for NOx, showing the magnitude of boilers NOx emissions reduced from tankers.
- **CARB should conduct a comprehensive GHG analysis related to barge-based control systems that includes the totality of GHG emissions, from the vessel and barge-based control system itself to the likely shift in bunkering activities.** First, vessels will continue to burn fuel and emit GHGs while connected to the system; these emissions must be taken into account. Second, barge-based systems will require a fuel source; even if this fuel source is grid-neutral, it may result in additional emissions not contemplated in CARB’s current analysis. Third, barge-based systems will require harbor craft to move them into place, and these harbor craft will emit GHGs that must be included. Lastly, vessels that use barge-based systems may not be able to bunker at berth. These vessels will need to make additional trips to anchorage for bunkering; these emissions should be included in the analysis. Lastly, CARB should include power plant emissions owing to the switch to grid-based electricity. Only after including all of these parameters and likely impacts can CARB determine the net effect on GHG emissions. 52-13
- - Additionally, by 2025, there is a requirement for grid-neutral control systems; however, GHG emissions increase for tankers and RoRos in 2027 and 2031. CARB should clarify the reason for the emissions increase. 52-14

## 8.0 DRAFT ENVIRONMENTAL ASSESSMENT

The following comments refer to the Draft Environmental Assessment and compliance with the California Environmental Quality Act.

- **The Proposed Regulation exceeds the emission reductions necessary under the State Implementation Plan.** A key purpose for the Proposed Regulation is CARB's commitment under the State Implementation Plan (SIP) to amend the at-berth regulation. The SIP strategy calls for a regulation that generates 2 tpd of NO<sub>x</sub> by 2031; however, the Proposed Regulation analyzed in the EA achieves 5.9 tpd, nearly double what is necessary. 52-15
  - When analyzing the Alternatives, the EA compares air quality benefits to the Proposed Regulation (5.9 tpd) rather than the stated project purpose (2 tpd), dismissing alternatives that might have achieved lesser – but still adequate – reductions. 52-16
- **CARB should analyze the emissions associated with constructing a new shore power berth at the Port of San Francisco.** CARB states there is uncertainty in the way San Francisco may proceed with the construction and thus deems these emissions “too speculative for evaluation” (EA, 24); however, emissions associated with shore-power berth construction can be estimated from the dozens of such projects already completed statewide and in a similar manner as CARB estimated emissions associated with shore power vault construction. This project is a “reasonably foreseeable compliance response” for the Port of San Francisco as it is included in the Berth Analysis, cost analysis, and based on information from the port, and as such should be analyzed. 52-17
- **Construction emissions exceed significance thresholds in the Bay Area Air Quality Management District.** CARB presents criteria pollutant and greenhouse gas emissions on a per-vault and per-control system basis in each air quality district to demonstrate this regulation will not exceed significance thresholds. CARB states: “While it is possible multiple installations could occur within a given district, it is not reasonably foreseeable at this time whether such installations would occur, specifically where they would occur, or whether they would overlap in time” (EA, 45). However, in order to meet the compliance deadlines, it is almost certain that multiple installations will occur concurrently. When considering all of the land-based tanker systems that must be constructed in the BAAQMD (11 units), the Proposed Regulation exceeds significance thresholds for NO<sub>x</sub> and GHGs, which is not reflected in the Draft EA and should be disclosed<sup>10</sup>: 52-18

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<sup>10</sup> Note, emissions do not include construction of new shore power berth in San Francisco.

**Table 7: Cumulative Construction Emissions in Bay Area Air Quality Management District, CY 2021+**

<b>Inputs</b>	<b>ROG/VOC ppd</b>	<b>NO<sub>x</sub> ppd</b>	<b>PM<sub>10</sub> ppd</b>	<b>PM<sub>2.5</sub> ppd</b>	<b>GHG (MT/Year)</b>
Unmitigated construction emissions - landside tanker*	4	36	2	2	447
Number of units needed - BAAQMD	11	11	11	11	11
<b>Total</b>	<b>44</b>	<b>396</b>	<b>22</b>	<b>22</b>	<b>4917</b>
Threshold	54	54	82	54	1100
<b>Exceeded?</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>Yes</b>

\*Source: CARB Draft Environmental Assessment

- **CARB should analyze the impacts in the geographic location in which they are expected to occur.** CARB states: “Conducting a berth-by-berth emissions analysis for the hundreds of berths in California would provide information that could be misleading, should a different berth-by-berth scenario come to fruition” (EA, 91); however, the general location of these emissions and other impacts (i.e., by air district or city) is reasonably foreseeable. The compliance measures can only take place in the ports subject to the regulation. The locations, compliance options, and regulatory timeline are known and well-established. 52-19
  
- **CARB should analyze energy impacts by utility or region.** CARB evaluates energy demand on a statewide basis, finding that at full implementation in 2031, shore power will consume the equivalent of 0.001% of the grid’s total power capacity (EA, 75); however, because the energy demand is concentrated in only a few key locations (seaports, primarily Long Beach/Los Angeles and Bay Area), a more refined analysis should consider the energy demand impacts in those known, reasonably foreseeable locations. 52-20
  
- **CARB should analyze energy demand increases resulting from capture and control systems.** CARB states, “Some capture and control systems may be powered by electricity, but it is expected the additional electricity needed would be minimal” (EA, 74). In Attachment B of the Draft EA, however, CARB assumes significant electrical infrastructure is needed to develop and install land-based capture and control systems for RoRos and tankers. This is the likely scenario given the need for such systems to be grid-neutral. 52-21
  
- **CARB assumes capture and control systems would have no impact on utilities.** CARB states: “Shore-side and barge-based capture and control systems would be powered by clean diesel and would not be connected to public utility infrastructure” (EA, 134). This assertion conflicts with other references in the EA showing significant electrical infrastructure required for land-based control systems, specifically in Attachment B. 52-22

- **CARB should analyze vessel-traffic impacts associated with barge-based control systems.** As noted throughout the ISOR and Berth Analysis, barge-based control systems can impose navigational hazards in waterways. In Long Beach/Los Angeles alone, CARB assumes 5 total barge-based capture and control systems (2 existing units, plus 3 additional units for container vessels and RoRos, although an additional 2 systems are likely to be needed for full compliance, for a total of 7 units). These systems are likely to operate concurrently and may increase traffic in narrow waterways. CARB should acknowledge and analyze these impacts.
  
- **CARB has not demonstrated sufficient engagement of the utilities.** Of the 232 outreach meetings listed in Appendix F of the regulatory documents, only 3 meetings involved utilities, and 2 meetings included the same utility (San Diego Gas & Electric). This proposed regulation is certain to require a significant investment in electrical infrastructure by 2025 to power grid-neutral land-based capture and control systems and to charge battery-powered barge-based capture and control systems.

52-23

## **9.0 IMPLICATIONS OF ALTERNATIVE ASSUMPTIONS**

By necessity, CARB has made a number of assumptions about the proposed regulation, its emissions benefits, and cost impacts. These assumptions were likely based on CARB's best information at the time. However, small changes in these assumptions can result in dramatically different projected outcomes. Below, we list a few key assumptions that, if updated to reflect more accurate data or other equally reasonable interpretations of the data, would lead to vastly different results. Of note, none of the costs have been annualized or adjusted for growth.

### **Labor Costs for RoRo Land-Based Control Systems:**

If CARB were to include labor to operate land-based control systems at RoRo terminals, it would add \$24 million to the Proposed Regulation (Comment 0.□).

### **Capital Costs for Barge-Based Control Systems:**

If CARB were to include capital costs for barge-based control systems, at CARB's assumption of \$4.9 million per barge and 6 barges needed, it would add another \$29.4 million to the Proposed Regulation. If we were to assume a more realistic number of 14 barge-based systems to ensure full coverage (assuming 3 terminals use land-based systems as projected by CARB), the cost would be \$68.6 million (Comment 0.□).

### **Hourly Rates for Barge-Based Systems:**

If CARB were to assume a higher hourly rate for barge-based control systems, specifically \$1,422 an hour, which is consistent with actual invoices, it would add another \$231 million to the Proposed Regulation for all RoRo calls (Comment 0.□).

### **Projected Emission Reductions:**

If CARB were to adjust its assumptions about the number of at-berth hours covered by the Existing Regulation in alignment with publicly reported data from major seaports, the Proposed Regulation would result in far fewer emission reductions than currently projected (Section 0).

### **Cost-Effectiveness:**

If CARB were to modify any of the cost assumptions noted above and/or adjust its emissions estimates, the cost-effectiveness of the Proposed Regulation could swing dramatically. As it stands now, CARB has calculated the total cost of this regulation as \$2.164 billion with \$2.245 billion in health care benefits, which is a thin margin of error. A more realistic hourly rate for barge-based control systems alone would add \$231 million to the costs of the Proposed Regulation for a total cost of \$2.4 billion, exceeding the health benefits.

**ATTACHMENT A: INVOICES FOR BARGE-BASED CONTROL SYSTEMS**

**Receipt Excerpt #1:**

AMECS Emission Control Services Invoice	
Bill To	Invoice# [REDACTED] Invoice Date [REDACTED] Amount \$ <b>145,519.00</b>
Wire To	Advanced Environmental Group LLC 230-234 East C Street Wilmington, CA 90744
Visit Summary	
Record# [REDACTED] Company [REDACTED] Location [REDACTED]	Visit Date [REDACTED] Vessel [REDACTED] IMO/Call Sign [REDACTED]
Visit Data	
Vessel First Line (estimate)	[REDACTED]
Barge Arrival	[REDACTED]
Barge First Line	[REDACTED]
Connection Time (start control)	[REDACTED]
Actual Disconnect Time (stop control)	[REDACTED]
Barge Last Line	[REDACTED]
Barge Secured at Home Berth	[REDACTED]
Mobilization Start	[REDACTED]
Mobilization End	[REDACTED]
Service Hours	120.42
<b>SubTotal</b>	<b>120.42</b>
Total Hours Billed	120.42
Hourly Rate	\$ 1,100.00
<b>Emission Control Services Total (120.42 * 1100)</b>	<b>\$ 132,462.00</b>
Other: HOLIDAY RATE - [REDACTED] 330.00 * 24	\$ 7,920.00
Other: System connection delays - hourly rate applies per contract	
Other: [REDACTED] = 4.67 hours	\$ 5,137.00
<b>Total Additional Charges/Credits</b>	<b>\$ 13,057.00</b>
<b>Total Amount Due</b>	<b>\$ 145,519.00</b>
Terms	NET 15. Due By [REDACTED] Interest on past due amounts will be charged at a rate of 1.5% per month.
	
Generated: [REDACTED]	Effective Rate: Total Cost/Vessel Stay = \$145,519 / 120.42 = \$1,208/hour

**Receipt Excerpt #2:**

AMECS Emission Control Services Invoice			
Bill To		Invoice#	
		Invoice Date	
		Amount \$	<b>87,450.00</b>
Wire To	Advanced Environmental Group LLC 230-234 East C Street Wilmington, CA 90744		
Visit Summary			
Record#		Visit Date	
Company		Vessel	
Location		IMO/Call Sign	
Visit Data			
Vessel First Line (estimate)			
Barge Arrival			
Barge First Line			
Connection Time (start control)			
Actual Disconnect Time (stop control)			
Barge Last Line			
Barge Secured at Home Berth			
Mobilization Start			
Mobilization End			
Service Hours			79.50
<b>SubTotal</b>			<b>79.50</b>
			-
Total Hours Billed			79.50
Hourly Rate		\$	1,100.00
<b>Emission Control Services Total (79.5 * 1100)</b>		<b>\$</b>	<b>87,450.00</b>
		\$	-
Other:		\$	-
Other:		\$	-
<b>Total Additional Charges/Credits</b>		<b>\$</b>	<b>-</b>
<b>Total Amount Due</b>		<b>\$</b>	<b>87,450.00</b>
Terms	NET 15. Due By		Interest on past due amounts will be charged at a rate of 1.5% per month.
		Effective Rate: Total Cost/Vessel Stay = \$87,450/79.50 = \$1,100/hour	
Generated:			

Receipt Excerpt #3:

AMECS Emission Control Services Invoice	
Bill To: [REDACTED]	Invoice# [REDACTED] Invoice Date [REDACTED] 2019 Amount \$ 19,200.00
Wire To: Advanced Environmental Group LLC 230-234 East C Street Wilmington, CA 90744	Chase Bank - Bank Contact [REDACTED] [REDACTED]
Visit Summary	
Record# [REDACTED] Company [REDACTED] Location [REDACTED]	Visit Date [REDACTED] 2019 Vessel [REDACTED] IMO/Call Sign [REDACTED]
Visit Data	
Vessel First Line (estimate)	[REDACTED] /2019 14:30
Barge Arrival	[REDACTED] 2019 17:50
Barge First Line	[REDACTED] 2019 18:15
Connection Time (start control)	[REDACTED] 2019 19:01
Actual Disconnect Time (stop control)	[REDACTED] 2019 03:01
Barge Last Line	[REDACTED] 2019 03:16
Barge Secured at Home Berth	[REDACTED] 2019 04:55
Mobilization Start	[REDACTED] /2019 15:30
Mobilization End	[REDACTED] /2019 05:00
Mobilization/Demobilization Hours	4.00
Service Hours: [REDACTED] 19 15:30 [REDACTED] 19 09:00	13.50
<b>SubTotal</b>	<b>17.50</b>
Total Hours Billed	17.50
Hourly Rate	\$ 800.00
Emission Control Services Total (17.5 * 800)	\$ 14,000.00
Note: Minimum Charge of 24 hours 800* 6.5	\$ 5,200.00
Other:	\$ -
Total Additional Charges/Credits	\$ 5,200.00
<b>Total Amount Due</b>	<b>\$ 19,200.00</b>
Terms NET 15. Due By [REDACTED] /2019	Interest on past due amounts will be charged at a rate of 1.5% per month.
	
Generated: [REDACTED]	HRLY Charge - <u>\$1422</u>

NOTE: Short Stay Vst.  
VSL STAY: 13.5 HRS  
Tug (all out): 4.0 HRS  
Min charge: 24 HRS  
Effective Hourly Charge \$19,200 / 13.5 hrs = \$1422.22

**Receipt Excerpt #4:**

HOURLY CHARGE	\$900 USD per hour. The Hourly Charge is inclusive of all tug services and/or other 3rd party services required for mobilizing, de-mobilizing, and positioning System to Customer's vessel. Notwithstanding the above, any and all charges for "Spacer Barges," "Fenders" and/or supplemental 3rd party crew boats are not included in the Hourly Charge and will be passed through to Customer at the actual cost to Operator + 20%. Additional charges may only be added upon written authorization by Customer. In the event Terminal may require a Spacer Barge between the <b>VENDOR</b> and Vessel.
EMISSION CONTROL SERVICE CHARGES	Service hours will be charged from the beginning of <b>VENDOR</b> mobilization to the end of <b>VENDOR</b> demobilization. <b>Customer understands that Operator has a minimum charge of twenty-four (24) hours per vessel.</b>

At an hourly rate of \$900, applied across the minimum 24 hour billing requirement, the total cost is  $24 \times \$900 / 17 \text{ hours (avg. call time)} = \$1,270$  effective hourly rate.

Attachment B:  
Starcrest Consulting Group  
CARB At-Berth Regulation Cost Effectiveness Analysis  
for Auto Carriers and RoRo Ships  
at Port of Long Beach & Port of Los Angeles  
December 2019

*CARB At-Berth Regulation Cost Effectiveness Analysis  
for Auto Carriers and RoRo Ships at Port of Long Beach  
& Port of Los Angeles*



*December 2019*



## **CARB AT-BERTH REGULATION COST EFFECTIVENESS ANALYSIS FOR AUTO CARRIERS AND RORO SHIPS AT PORT OF LONG BEACH & PORT OF LOS ANGELES**

Starcrest developed an emission reduction evaluation for CARB's proposed amendments to the at-berth regulation for Auto Carrier and RoRo ships at the Port of Long Beach (POLB) and the Port of Los Angeles (POLA), also referred to as the San Pedro Bay Ports (SPBP). Using this evaluation, Starcrest developed an Excel calculation tool (the Auto/RoRo Tool) to assess the emission reductions and cost-effectiveness of the proposed amendments for these vessels based on the SPBP 2018 Annual Emissions Inventories and Carl Moyer Program methodology. Based on this assessment, the cost of the proposed amendments as they relate to Auto Carrier and RoRo ships at the SPBPs is significant compared to other emission-reduction projects with similar benefits, and alternative more cost-effective emission reduction approaches should be explored.

The Auto/RoRo Tool currently utilizes the SPBP 2018 Annual Emissions Inventories for the emissions reduction analysis and the cost assumptions/information provided in Standardized Regulatory Impact Assessment (SRIA) for CARB's Proposed Control Measure for Ocean-Going Vessels at Berth released on August 20, 2019, for the cost effectiveness analysis. This tool was designed with flexibility to allow input modifications to explore alternative cost inputs. Two financing approaches are included in the tool: (1) hourly rental of barge-based emission capture and control (C&C) systems, and (2) capital investment of four barge-based C&C systems dedicated to treat Auto Carrier and RoRo ships. The need for four (4) barge-based systems to control 100 percent of calls was established by an evaluation of 2018 calls from these vessel types. This evaluation is included as a worksheet in the Auto/RoRo Tool.

### **Project Goals**

- Estimate emission reductions that may be achieved by barge-based C&C systems applied to the auto carrier and RoRo vessels calling at the SPBP.
- Assess cost effectiveness (CE) for barge-based treatment options to meet the requirements of the proposed amendments.
- Estimate the portion of auto carrier/RoRo at-berth emissions to all at-berth emissions in both mass and percent.
- Estimate the portion of auto carrier/RoRo at-berth emissions to all OGV emissions in both mass and percent.

### **Key Assumptions**

- This review assumes that 100 percent of calls are treated by a barge-based C&C system (based on an evaluation of 2018 calls from these vessel types in the SPBP).
- Barge-based emission C&C systems will control 80% of NO<sub>x</sub>, ROG and DPM emissions.

## Key Findings

Reduction of PM (including PM<sub>10</sub>, PM<sub>2.5</sub>, and DPM) and NO<sub>x</sub> emissions in the 36%-40% range could be achieved from auto carrier and RoRo vessel control, but emissions of other pollutants (CO<sub>2e</sub>, SO<sub>x</sub> and CO) are estimated to increase in the range of 28% to 151% due to emissions from increased bunkering activities at anchorage and supporting activities such as tugs and generators needed to operate barge-based C&C systems. A summary of the proposed regulation's emission reduction benefits, based on the auto carrier and RoRo calls made at SPBP in 2018, is provided in Table A1 (tons per year (tpy)) and Table A2 (tons per day (tpd)). Negative numbers indicate increased emissions.

**Table A1: Reductions from Barge-Based at-Berth Capture and Control, tpy**

Port	PM <sub>10</sub> tpy	PM <sub>2.5</sub> tpy	DPM tpy	NO <sub>x</sub> tpy	SO <sub>x</sub> tpy	HC tpy	CO tpy	CO <sub>2e</sub> mt/yr
<b>Emission Reductions (or increases)</b>								
POLB	0.40	0.38	0.38	19.61	-0.66	-0.73	-5.04	-1,615
POLA	0.22	0.20	0.18	8.98	-0.37	-0.43	-3.30	-1,005
<b>Total</b>	<b>0.62</b>	<b>0.58</b>	<b>0.56</b>	<b>28.59</b>	<b>-1.03</b>	<b>-1.15</b>	<b>-8.33</b>	<b>-2,620</b>
<b>Percent Reduction (or increase)</b>								
POLB	36%	36%	38%	40%	-28%	-44%	-113%	-49%
POLA	39%	38%	39%	40%	-35%	-52%	-151%	-53%
<b>Total</b>	<b>37%</b>	<b>37%</b>	<b>38%</b>	<b>40%</b>	<b>-30%</b>	<b>-47%</b>	<b>-125%</b>	<b>-50%</b>

**Table A2: Reductions from Barge-Based at-Berth Capture and Control, tpd**

Port	PM10 tpd	PM2.5 tpd	DPM tpd	NOx tpd	SOx tpd	HC tpd	CO tpd	CO <sub>2e</sub> mt/yr
<b>Emission Reductions (or increases)</b>								
POLB	0.0011	0.0010	0.0010	0.0537	-0.0018	-0.0020	-0.0138	-4.4
POLA	0.0006	0.0006	0.0005	0.0246	-0.0010	-0.0012	-0.0090	-2.8
<b>Total</b>	<b>0.0017</b>	<b>0.0016</b>	<b>0.0015</b>	<b>0.0783</b>	<b>-0.0028</b>	<b>-0.0032</b>	<b>-0.0228</b>	<b>-7.2</b>
<b>Percent Reduction (or increase)</b>								
POLB	36%	36%	38%	40%	-28%	-44%	-113%	-49%
POLA	39%	38%	39%	40%	-35%	-52%	-151%	-53%
<b>Total</b>	<b>37%</b>	<b>37%</b>	<b>38%</b>	<b>40%</b>	<b>-30%</b>	<b>-47%</b>	<b>-125%</b>	<b>-50%</b>

To place these reductions in context, Tables B1 (tpy) and B2 (tpd) summarize the 2018 SPBP auto carrier and RoRo emissions at berth, all OGVs at berth, and all OGVs in all modes (at berth, maneuvering, transit). The tables also show the percentages that the auto carrier and RoRo emissions make up of all OGV emissions at berth and of the entire 2018 OGV inventory. **Overall, auto carrier and RoRo at berth emissions made up approximately one percent (1%) of all OGV emissions in the SPBPs' 2018 inventory or between 2% to 4.5 % of all at-berth emissions.**

**Table B1: Auto Carriers and RoRo At-berth Emissions Contribution in CY 2018, tpy**

Port	Vessel Type	PM tpy	PM2.5 tpy	DPM tpy	NOx tpy	SOx tpy	HC tpy	CO tpy	CO2e mt/y
SPBP	Auto and RoRo at Berth	1.7	1.6	1.4	69.9	3.4	2.4	6.5	5,001
SPBP	All vessels at Berth	60.1	56.3	31.4	1894.8	169.7	72.7	188.7	264,414
SPBP	All vessels	142.0	133.0	106.1	7078.5	323.3	270.9	590.3	503,286
SPBP	Percent of all OGV at Berth	2.8%	2.8%	4.5%	3.7%	2.0%	3.3%	3.5%	1.9%
SPBP	Percent of all OGV	1.2%	1.2%	1.3%	1.0%	1.0%	0.9%	1.1%	1.0%

**Table B2: Auto Carriers and RoRo At-berth Emissions Contribution in CY 2018, tpd**

Port	Vessel Type	PM10 tpd	PM2.5 tpd	DPM tpd	NOx tpd	SOx tpd	HC tpd	CO tpd	CO2e mt/d
SPBP	Auto and RoRo at Berth	0.0045	0.0043	0.0039	0.1916	0.0092	0.0066	0.0179	14
SPBP	All vessels at Berth	0.1648	0.1543	0.0861	5.1914	0.4649	0.1993	0.5170	724
SPBP	All vessels	0.3891	0.3642	0.2907	19.3931	0.8857	0.7421	1.6172	1,379
SPBP	Percent of all OGV at Berth	2.8%	2.8%	4.5%	3.7%	2.0%	3.3%	3.5%	1.9%
SPBP	Percent of all OGV	1.2%	1.2%	1.3%	1.0%	1.0%	0.9%	1.1%	1.0%

A utilization analysis evaluated how many auto carrier or RoRo vessels were at berth in one of the ports during each day of 2018. A maximum of four concurrent calls took place on five days during the year, and three concurrent calls took place on 12 days. This indicates that four barge-based C&C systems would have been needed to accommodate all SPBP auto carrier and RoRo calls in 2018 and would be needed going forward assuming 2018 was representative of future call frequency at these two ports. Because three or four concurrent calls occur so infrequently, the C&C barge fleet would be utilized about 19 percent of the time.

Cost effectiveness (CE) calculations, discussed below, result in cost effectiveness between \$115k and \$200k for the barge rental scenario (varies based on effective hourly rate) and \$54,987 for the scenario that includes the purchase of four barge-based C&C systems to serve 100% of calls made to SPBP. **Both scenarios are far less cost effective than CARB's Carl Moyer Program (CMP), which has an upper CE limit of \$30,000 per weighted ton of emissions reduced.**

It should be noted that the CMP also allows for a second tier CE limit for the higher cost of advanced/emerging technology projects; this second tier CE limit is \$100k per weighted ton. The \$100k/ton limit is only applied to the small increment between today's technology and the advanced technology level, which in practice is zero-emission or near-zero emission (i.e., 90% cleaner than current technology). Since barge-based C&C systems are not using technology that is 90% cleaner than today's clean-up technology, these systems should be evaluated at the \$30k/weighted ton CE limit.

## **Emissions Assessment**

The key elements and the sources of information included in the emissions reduction evaluation include:

- OGV at-berth emissions for auxiliary and boiler engines are based on auto carrier and RoRo vessels that visited POLA and POLB in 2018 and are consistent with both Ports' 2018 annual emissions inventory. The average at-berth hours and emissions (in grams per hour) by port, by terminal and by anchorage are shown in Tables 1 and 2 of the Auto/RoRo Tool under the tab "2018 Data Summary".
- The frequency of auto carrier and RoRo calls per day in 2018 was analyzed and it was determined that four dedicated barges would be required to treat emissions for the entire auto carrier and RoRo fleet arriving at SPBP. Importantly, four barges would have been needed to ensure ALL calls were serviced in 2018, but for a large percentage of the year, most of the barges would have been idle because four (4) vessels were in port simultaneously on only five days. In addition, more than four vessels may call simultaneously in future years so having four barges available would not guarantee full coverage. This analysis is provided in the Auto/RoRo Tool on the "Utilization" tab.
- The emissions analysis scenario assumes that the use of a barge system would require additional emission-producing activities that would reduce the overall effectiveness of the system. These activities include the following:
  - **Additional trips from harbor craft (HC)** as follows:
    1. HC home base to barge home base
    2. Barge home base to terminal
    3. HC home base
    4. HC home base to terminal
    5. Terminal to barge home base
    6. Barge home base to HC home base
  - **Harbor craft idling time** during this process. The average emissions in g/hr for assist tugs and the average time per trip are shown in Tables 3 and 5 of the Auto/RoRo Tool under tab "2018 Data Summary." These values are based on SPBP 2018 EI data.
  - **Two small generator sets** to provide electrical power to the system. It was assumed that the generator sets will be similar to those used by the Alternative Maritime Emission Control System (AMECS) barge currently being operated at the SPBP ports. Table 4 of the Auto/RoRo Tool under tab "2018 Data Summary" shows the emission factors in g/hr for these generators.
  - **Additional time at anchorages for bunkering.** Currently most of the auto carrier and RoRo ships bunker while operating at berth. If C&C barges are utilized during at-berth operations, bunkering will most likely take place at anchorage resulting in increases in emissions at anchorage.

Control efficiencies of 80% for PM/DPM and NO<sub>x</sub> were assumed, based on CARB's SRIA. It was assumed that barge system will treat auxiliary as well boiler engines exhaust.

**Cost Effectiveness Assessment**

The CE assessment is based on CARB’s CMP methodology. This methodology combines the annual emission reductions in terms of “weighted emission reductions,” or WER, in tons per year (tpy) as follows:

$$\text{WER} = \text{NO}_x + \text{ROG}^1 + (20 * \text{PM}_{2.5}^2)$$

The WER is applied to the project cost, which is annualized by multiplying by the capital recovery factor (CRF), which is based on a discount rate and the project life. Cost-effectiveness is calculated under the CMP as follows:

$$\text{CE (tpy)} = \text{Project Cost (\$)} * \text{CRF} / \text{WER (tpy)}$$

Below is a summary of the two scenarios included in the Auto/RoRo tool, based on CARB’s SRIA:

- **Hourly Rental:** As determined in the “Emissions Summary” worksheet of the Auto/RoRo tool and based on 2018 SPBP EI data, a total of 4,934 hours per year of RoRo operation would need to be treated by the rented barge-based C&C systems to fully comply with the proposed regulation.

In the Auto/RoRo tool, hourly rate is a variable to determine CE at different hourly rates for the estimated emissions reductions. Attachment A provides excerpts of four actual C&C service transactions that demonstrate the effective hourly rate is greater than CARB’s assumption of \$900 an hour. Two invoices in attachment A show that the vendor required a 24-hour minimum usage time, which effectively raises the hourly rate if the barge system is used for anything less. The CE at each of the four hourly rates documented in Attachment A, as well as both CARB’s \$900 assumption and our application of the 24-hour minimum to the lowest hourly rate that we could document, \$1,100, is provided below in Table C.

**Table C: Cost Effectiveness at Different Hourly Rates**

Hourly Rate	Cost-Effectiveness (\$/weighted ton)	Rate Source (assumes/indicated all inclusive)
\$900	\$115,707	CARB SRIA Excel - "Cost Input Tab"
\$1,100	\$141,419	Receipt #2, Attachment A
\$1,208	\$155,304	Receipt #1, Attachment A
\$1,270	\$163,275	\$900/hr for 17 hr call (avg.), includes 24-hr min. charge (Receipt #4)
\$1,422	\$182,816	Receipt #3
\$1,552	\$199,530	\$1,100/hr for 17 hr call (avg.), includes 24-hr min. charge

<sup>1</sup> CMP uses ROG for CE evaluation. Since EI tracks HC, not ROG, HC is converted to ROG using this formula: ROG = HC \* 1.26639, per 2017 CMP Guidelines, CARB

<sup>2</sup> PM<sub>2.5</sub> is used in this CE evaluation to be consistent with CARB’s methodology.

Using CARB's assumption of a \$900/hr rental rate, the CE to reduce the estimated 38.76 weighted tons per year (discount rate of 1%, project life of 1 year), is estimated as \$115,707 per weighted ton. Note that at the rate of \$900 per hour for 4,934 hours/year, a total annual investment of \$4.4M would be required to reduce 38.76 weighted tons of emissions (as calculated by CMP as WER) per year from Auto carrier/RoRo vessels (based on 2018 data).

As shown in Table C, the CE of the hourly rental scenario is highly sensitive to the effective hourly rental rate, which fluctuates for each transaction based on how the billing is structured for each client. For each \$100 over the estimated rental rate of \$900/hr, the project CE increases by \$12,856/weighted ton. For an average 17-hour call serviced at a rate of \$1,100/hr, the effective rate is \$1,552/hr to account for the 24-hour minimum charge, which results in a CE of nearly \$200,000 per weighted ton.

As documented in Attachment A, C&C system pricing depends on a key factor that drives the hourly cost higher. The vendor requirement to apply a 24-hour minimum charge skews costs higher than those based on CARB's assumed hourly rate (\$900/hr) for all vessels with calls less than 24 hours. Note that the average call length in 2018 across Auto carrier/RoRo vessels is approximately 17 hours – the need to pay for these additional hours that were not used will drive the hourly rental service costs higher than projected by CARB.

- Purchase and Operate: As determined by the Utilization analysis (see Utilization tab), for the 2018 calls by RoRo/Auto carriers, a total of four (4) barge-based C&C systems would be required to cover all SPBP calls. There are limited data on the capital cost to purchase and operate barge-based C&C systems.
  - In the SRIA, CARB assumes<sup>3</sup> the capital cost to purchase a barge-based system is \$4.9 million. While not provided for barge-based C&C systems, CARB estimates the land-based C&C system operating costs as follows: annual maintenance cost of \$17,500 and an hourly operating rate of \$100. No additional terminal labor costs were included, an assumption that merits further review. Using these values over a 20-year project life and a 5% discount rate (CARB's assumptions) the CE of purchasing and operating four units is estimated as \$54,987 per ton, nearly double CARB's CMP limit of \$30k per ton.
  - However, the only publicly available documentation of a barge-based C&C system is the Bay Area Air Quality Management District (BAAQMD) contract with Advanced Environmental Group, LLC for a project to design, build and operate a barge-based C&C system in Benicia. The total project cost is \$8.844M. At this total project cost, assuming that this cost includes operation pursuant to contract requirements, the CE exceeds \$73,012 per ton, well beyond the CMP limit of \$30k per ton.

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<sup>3</sup> CARB SRIA, page 80, <https://ww3.arb.ca.gov/regact/2019/ogvatberth2019/appc-1.pdf>

**Discussion Based on Data and Assumptions Currently Included in the Auto/RoRo tool**

- CARB uses the CMP cost effectiveness methodology to evaluate the CE of the proposed amendment. While this methodology accounts for the increase in hydrocarbon (and therefore ROG) emissions, it does not take into consideration the increase in CO<sub>2</sub>e, SO<sub>x</sub> and CO. The regulatory amendment should address associated increases in other pollutants.
- CARB estimates that just nine C&C systems would be needed statewide (seven of them barge-based), but 2018 call frequency analysis indicates four of these systems would need to be assigned to the Ports of Los Angeles and Long Beach to assure full compliance.
- Based on SPBP EI 2018 EI data, and a conservative estimate of 80% reduction in NO<sub>x</sub> and DPM emissions from Barge based C&C, it is estimated that 100% compliance with CARB's proposed amendments to the at-berth regulation would result in the reduction of approximately 38.76 weighted tpy.
- These reductions come at a very significant cost. As discussed above, the CE of the proposed amendments far exceeds the CMP CE limit of \$30k/weighted ton. Under the CMP, emission reductions are achieved at far better CE levels. For example, repowering harbor craft such as tug, work and crew+supply boats (from Tier 2 to Tier 3) is far more cost-effective than including auto carriers and RoRo vessels under this proposed regulatory amendment. Specifically, at a one-time cost of about \$800k-\$900k, a tugboat repower will reduce from 4 to 15 weighted tpy of emissions<sup>4</sup> at a 10-year CE that ranges from \$9k - \$25k per weighted ton. This investment is well below the CMP CE limit of \$30k/ton.

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<sup>4</sup> This range is a function of engine horsepower, annual hours of operation, vessel type etc.



Attachment A

Receipt Excerpt #1:

AMECS Emission Control Services Invoice	
Bill To	Invoice#
	Invoice Date
	Amount \$ <b>145,519.00</b>
Wire To	Advanced Environmental Group LLC 230-234 East C Street Wilmington, CA 90744
Visit Summary	
Record#	Visit Date
Company	Vessel
Location	IMO/Call Sign
Visit Data	
Vessel First Line (estimate)	
Barge Arrival	
Barge First Line	
Connection Time (start control)	
Actual Disconnect Time (stop control)	
Barge Last Line	
Barge Secured at Home Berth	
Mobilization Start	
Mobilization End	
Service Hours	120.42
<b>SubTotal</b>	<b>120.42</b>
Total Hours Billed	120.42
Hourly Rate	\$ 1,100.00
<b>Emission Control Services Total (120.42 * 1100)</b>	<b>\$ 132,462.00</b>
Other: HOLIDAY RATE - 330.00 * 24	\$ 7,920.00
Other: System connection delays - hourly rate applies per contract	
Other: = 4.67 hours	\$ 5,137.00
<b>Total Additional Charges/Credits</b>	<b>\$ 13,057.00</b>
<b>Total Amount Due</b>	<b>\$ 145,519.00</b>
Terms	NET 15. Due By Interest on past due amounts will be charged at a rate of 1.5% per month.
	
Generated:	<div style="border: 1px solid black; padding: 5px; display: inline-block;">                     Effective Rate:                      Total Cost/Vessel Stay                      =\$145,519/120.42                      =\$1,208/hour                 </div>

Receipt Excerpt #2:

AMECS Emission Control Services Invoice			
Bill To		Invoice#	
		Invoice Date	
		Amount \$	<b>87,450.00</b>
Wire To	Advanced Environmental Group LLC 230-234 East C Street Wilmington, CA 90744		
Visit Summary			
Record#		Visit Date	
Company		Vessel	
Location		IMO/Call Sign	
Visit Data			
Vessel First Line (estimate)			
Barge Arrival			
Barge First Line			
Connection Time (start control)			
Actual Disconnect Time (stop control)			
Barge Last Line			
Barge Secured at Home Berth			
Mobilization Start			
Mobilization End			
Service Hours			79.50
<b>SubTotal</b>			<b>79.50</b>
Total Hours Billed			79.50
Hourly Rate		\$	1,100.00
<b>Emission Control Services Total (79.5 * 1100)</b>		<b>\$</b>	<b>87,450.00</b>
		\$	-
Other:		\$	-
Other:		\$	-
<b>Total Additional Charges/Credits</b>		<b>\$</b>	<b>-</b>
<b>Total Amount Due</b>		<b>\$</b>	<b>87,450.00</b>
Terms	NET 15, Due By	Interest on past due amounts will be charged at a rate of 1.5% per month.	
		Effective Rate: Total Cost/Vessel Stay = \$87,450/79.50 = \$1,100/hour	
Generated:			

Receipt Excerpt #3:

AMECS Emission Control Services Invoice			
Bill To		Invoice#	
		Invoice Date	2019
		Amount \$	19,200.00
Wire To	Advanced Environmental Group LLC 230-234 East C Street Wilmington, CA 90744	Chase Bank - Bank Contact	
Visit Summary			
Record#		Visit Date	2019
Company		Vessel	
Location		IMO/Call Sign	
Visit Data			
Vessel First Line (estimate)			/2019 14:30
Barge Arrival			2019 17:50
Barge First Line			2019 18:15
Connection Time (start control)			2019 19:01
Actual Disconnect Time (stop control)			2019 03:01
Barge Last Line			2019 03:16
Barge Secured at Home Berth			2019 04:55
Mobilization Start			2019 15:30
Mobilization End			2019 05:00
Mobilization/Demobilization Hours			4.00
Service Hours	[REDACTED] 19 15:30 [REDACTED] 19 05:00		13.50
<b>SubTotal</b>			<b>17.50</b>
Total Hours Billed			17.50
Hourly Rate		\$	800.00
Emission Control Services Total (17.5 * 800)		\$	14,000.00
Note: Minimum Charge of 24 hours .800* 6.5		\$	5,200.00
Other:		\$	-
Total Additional Charges/Credits		\$	5,200.00
<b>Total Amount Due</b>		<b>\$</b>	<b>19,200.00</b>
Terms	NET 15. Due By [REDACTED] /2019	Interest on past due amounts will be charged at a rate of 1.5% per month.	
		HRLY Charge <u>\$1422</u>	

Generated: [REDACTED]

NOTE: Short Stay Vst.  
 VSL STAY: 13.5 HRS  
 Tug Callout: 4.0 HRS  
 Min charge: 24 HRS  
 Effective Hourly Charge: \$19,200 / 13.5 hrs = \$1422.22

Receipt Excerpt #4:

HOURLY CHARGE	\$900 USD per hour. The Hourly Charge is inclusive of all tug services and/or other 3rd party services required for mobilizing, de-mobilizing, and positioning System to Customer's vessel. Notwithstanding the above, any and all charges for "Spacer Barges," "Fenders" and/or supplemental 3rd party crew boats are not included in the Hourly Charge and will be passed through to Customer at the actual cost to Operator + 20%. Additional charges may only be added upon written authorization by Customer. In the event Terminal may require a Spacer Barge between the <b>VENDOR</b> and Vessel.
EMISSION CONTROL SERVICE CHARGES	Service hours will be charged from the beginning of <b>VENDOR</b> mobilization to the end of <b>VENDOR</b> demobilization. Customer understands that Operator has a minimum charge of twenty-four (24) hours per vessel.

At an hourly rate of \$900, applied across the minimum 24 hour billing requirement, the total cost is  $24 \times \$900$  / 17 hours (avg. call time) = \$1,270 effective hourly rate.

San Pedro Bay Ports  
 At-Berth Auto and RoRo Cost-Effectiveness Analysis  
 CY 2018 Data Summary  
 04 October 2019  
 DRAFT

Table 1  
 CY 2018

Port / Location	Vessel type	Average Berth hrs/Call
<b>POLB</b>		
Terminal	Auto Carrier	15
Anchorage	Auto Carrier	18
<b>POLA</b>		
Terminal	Auto Carrier	16
Terminal	RoRo	36
Anchorage	Auto Carrier	45
Anchorage	RoRo	5

Table 2

OGV Emissions CY 2018			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
			g/hr														
			PM	PM2.5	DPM	NOx	SOx	HC	CO	CH4	CO2	N2O	CO2e				
<b>POLB</b>																	
Terminal	Auto Carrier	Aux	321	302	321	15,259	573	503	1,385	10	863,331	37	874,513				
Terminal	Auto Carrier	Auxiliary Boiler	45	42	0	646	200	33	65	1	301,594	25	308,945				
Anchorage	Auto Carrier	Aux	145	137	145	6,965	260	228	628	5	391,338	17	396,407				
Anchorage	Auto Carrier	Auxiliary Boiler	49	46	0	710	219	36	72	1	331,316	27	339,391				
<b>POLA</b>																	
Terminal	Auto Carrier	Aux	201	186	201	9,612	256	327	900	7	560,928	24	568,193				
Terminal	Auto Carrier	Auxiliary Boiler	44	41	0	664	142	34	67	1	309,929	25	317,483				
Terminal	RoRo	Aux	192	180	192	7,907	342	300	826	6	515,111	22	521,782				
Terminal	RoRo	Auxiliary Boiler	35	33	0	511	158	26	52	1	238,669	19	244,486				
Anchorage	Auto Carrier	Aux	148	139	148	7041	225	238	653	5	407429	17	412,706				
Anchorage	Auto Carrier	Auxiliary Boiler	43	40	0	633	156	32	64	1	295361	24	302,560				
Anchorage	RoRo	Aux	111	104	111	4569	198	174	477	3	297680	13	301,536				
Anchorage	RoRo	Auxiliary Boiler	34	32	0	495	153	25	50	1	231297	19	236,935				

Table 3

Assist Tug Boat Emissions CY 2018			g/hr	PM	PM2.5	DPM	NOx	SOx	HC	CO	CH4	CO2	N2O	CO2e
POLB			73	67	73	2,101	2	229	1,540	4	189,138	9	191,775	
POLA			73	67	73	2,103	2	229	1,542	4	189,138	9	191,775	
<b>SPBP Average</b>			73	67	73	2,102	2	229	1,541	4	189,138	9	191,775	

Table 4

Emission Control System			g/hr	PM	PM2.5	DPM	NOx	SOx	HC	CO	CH4	CO2	N2O	CO2e
AMECS Gen Set			0.4	0.4	0.4	16	11	27	422	8	109,099	3	110,314	

Table 5

Tug Boat Distance and Time Calculation			
Sub Trip	From	To	Time in hr
1	HC Home Base	Barge Home Base	0.66
2	Barge Home Base	Terminal	0.66
3	Terminal	HC Home Base	0.66
4	HC Home Base	Terminal	0.66
5	Terminal	Barge Home Base	0.66
6	Barge Home Base	HC Home Base	0.66
7	Harbor Craft Wait	Harbor Craft Wait	1.00
<b>Total</b>			<b>5.0</b>

1 short ton      907,180      grams  
 1 mt              1,000,000      grams



Scenario		Vessel scenario										OGV emissions after control by BCC									
C Control	Barge					PM	PM <sub>2.5</sub>	DPM	NOx	SOx	HC	CO	CO <sub>2</sub> e	PM	PM <sub>2.5</sub>	DPM	NOx	SOx	HC	CO	CO <sub>2</sub> e
	# of BCC	io-control	Controlled	Uncontr.	Control																
Y/N	Calls	Hr/Call	Hrs	Hr	%	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF
Y	83	3	996	249	80%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.159	0.149	0.159	7.539	0.786	0.691	1.900	1,089
Y	62	3	744	186	80%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.118	0.111	0.118	5.631	0.587	0.516	1.419	813
Y	41	3	492	123	80%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.078	0.074	0.078	3.724	0.388	0.341	0.939	538
Y	83	3	996	249	80%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.022	0.021	0.000	0.319	0.274	0.045	0.090	385
Y	62	3	744	186	80%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.016	0.015	0.000	0.238	0.205	0.034	0.067	287
Y	41	3	492	123	80%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.011	0.010	0.000	0.158	0.135	0.022	0.044	190
N	12	0	0	216	0%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.035	0.033	0.035	1.658	0.062	0.054	0.149	86
N	12	0	0	216	0%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.012	0.011	0.000	0.169	0.052	0.009	0.017	73
Y	71	3	923	213	81%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.088	0.082	0.088	4.213	0.321	0.410	1.126	712
Y	0	3	0	0	0%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
Y	0	3	0	0	0%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
Y	2.0	3	66	6	92%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.004	0.004	0.004	0.167	0.027	0.024	0.066	41
Y	25	3	825	75	92%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.051	0.048	0.051	2.092	0.339	0.298	0.820	518
Y	1	3	33	3	92%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.002	0.002	0.002	0.084	0.014	0.012	0.033	21
Y	71	3	923	213	81%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.019	0.018	0.000	0.291	0.178	0.042	0.084	361
Y	0	3	0	0	0%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
Y	0	3	0	0	0%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
Y	2	3	66	6	92%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.001	0.001	0.000	0.011	0.013	0.002	0.004	18
Y	25	3	825	75	92%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.009	0.009	0.000	0.135	0.157	0.026	0.051	220
Y	1	3	33	3	92%	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	0.000	0.000	0.000	0.005	0.006	0.001	0.002	9
N	4	0	0	180	0%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.029	0.021	0.022	0.907	0.039	0.034	0.095	54
N	1	0	0	5	0%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.001	0.001	0.001	0.025	0.001	0.001	0.003	2
N	4	0	0	180	0%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.008	0.006	0.000	0.098	0.030	0.005	0.010	43
N	1	0	0	5	0%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.000	0.000	0.000	0.003	0.001	0.000	0.000	1







San Pedro Bay Ports  
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 CY 2018 Emission Summary  
 22 October 2019  
 DRAFT

Table A1: Reductions from Barge Based at-Berth Capture and Control, tpy

Port	PM <sub>10</sub> tpy	PM <sub>2.5</sub> tpy	DPM tpy	NO <sub>x</sub> tpy	SO <sub>x</sub> tpy	HC tpy	CO tpy	CO <sub>2e</sub> mt/yr	Barge Op hrs
<b>Emission Reductions (or increases)</b>									
POLB	0.40	0.38	0.38	19.61	-0.66	-0.73	-5.04	-1,615	2,790
POLA	0.22	0.20	0.18	8.98	-0.37	-0.43	-3.30	-1,005	2,144
<b>Total</b>	<b>0.62</b>	<b>0.58</b>	<b>0.56</b>	<b>28.59</b>	<b>-1.03</b>	<b>-1.15</b>	<b>-8.33</b>	<b>-2,620</b>	<b>4,934</b>
<b>Percent Reduction (or increase)</b>									
POLB	36%	36%	38%	40%	-28%	-44%	-113%	-49%	
POLA	39%	38%	39%	40%	-35%	-52%	-151%	-53%	
<b>Total</b>	<b>37%</b>	<b>37%</b>	<b>38%</b>	<b>40%</b>	<b>-30%</b>	<b>-47%</b>	<b>-125%</b>	<b>-50%</b>	

Negative indicates a net increase in emissions

Table A2: Reductions from Barge Based at-Berth Capture and Control, tpd

Port	PM <sub>10</sub> tpd	PM <sub>2.5</sub> tpd	DPM tpd	NO <sub>x</sub> tpd	SO <sub>x</sub> tpd	HC tpd	CO tpd	CO <sub>2e</sub> mt/yr
<b>Emission Reductions (or increases)</b>								
POLB	0.0011	0.0010	0.0010	0.0537	-0.0018	-0.0020	-0.0138	-4.4
POLA	0.0006	0.0006	0.0005	0.0246	-0.0010	-0.0012	-0.0090	-2.8
<b>Total</b>	<b>0.0017</b>	<b>0.0016</b>	<b>0.0015</b>	<b>0.0783</b>	<b>-0.0028</b>	<b>-0.0032</b>	<b>-0.0228</b>	<b>-7.2</b>
<b>Percent Reduction (or increase)</b>								
POLB	36%	36%	38%	40%	-28%	-44%	-113%	-49%
POLA	39%	38%	39%	40%	-35%	-52%	-151%	-53%
<b>Total</b>	<b>37%</b>	<b>37%</b>	<b>38%</b>	<b>40%</b>	<b>-30%</b>	<b>-47%</b>	<b>-125%</b>	<b>-50%</b>

Negative indicates a net increase in emissions

**Table B1: Auto Carriers and RoRo at-berth Emissions Contribution in CY 2018 in tpy**

Port	Vessel Type	PM tpy	PM2.5 tpy	DPM tpy	NOx tpy	SOx tpy	HC tpy	CO tpy	CO2e mt/y
SPBP	Auto and RoRo at Berth	1.7	1.6	1.4	69.9	3.4	2.4	6.5	5,001
SPBP	All vessels at Berth	60.1	56.3	31.4	1894.8	169.7	72.7	188.7	264,414
SPBP	All vessels	142.0	133.0	106.1	7078.5	323.3	270.9	590.3	503,286
SPBP	Percent of all OGV at Berth	2.8%	2.8%	4.5%	3.7%	2.0%	3.3%	3.5%	1.9%
SPBP	Percent of all OGV	1.2%	1.2%	1.3%	1.0%	1.0%	0.9%	1.1%	1.0%

**Table B2: Auto Carriers and RoRo at-berth Emissions Contribution in CY 2018 in tpd**

Port	Vessel Type	PM10 tpd	PM2.5 tpd	DPM tpd	NOx tpd	SOx tpd	HC tpd	CO tpd	CO2e mt/d
SPBP	Auto and RoRo at Berth	0.0045	0.0043	0.0039	0.1916	0.0092	0.0066	0.0179	14
SPBP	All vessels at Berth	0.1648	0.1543	0.0861	5.1914	0.4649	0.1993	0.5170	724
SPBP	All vessels	0.3891	0.3642	0.2907	19.3931	0.8857	0.7421	1.6172	1,379
SPBP	Percent of all OGV at Berth	2.8%	2.8%	4.5%	3.7%	2.0%	3.3%	3.5%	1.9%
SPBP	Percent of all OGV	1.2%	1.2%	1.3%	1.0%	1.0%	0.9%	1.1%	1.0%

Blue font/blue background:	inputs on this sheet that can be changed based on assumptions
Black font/yellow background:	inputs on this sheet that are linked from this sheet or other sheets in this workbook
Red font/white background:	calculations performed on this sheet

Assumptions	Description	Notes
are in BLUE		
<b>EMISSIONS REDUCTION/INCREASE PER YEAR</b>		
0.58	change in PM2.5 emissions	
28.59	change in NOx emissions	
-1.15	change in HC emissions	Negative change means emissions increase.
-1.460	change in ROG emissions	ROG = HC * 1.26639, per 2017 CMP Guidelines, CARB
20	PM weighting factor	per CMP: weighted emissions = (20*DPM) + ROG + NOX reductions in tpy
38.76	weighted redux, tpy	
4,934	total hours / year	Hrs of vessel operation per year cleaned up by the barge C&C technology.

Case #1: Hourly Rental		
1%	discount rate	
1	project life	
1.01	Capital Recovery Factor (CRF)	
\$900	hourly rental rate	per CARB excel - "Cost Input Tab" (assumes all inclusive)
\$4,440,600	total cost/yr to operate the system across total cleanup hours	
\$115,707	annualized cost effectiveness, based on project life and discount rate	
Hourly Rate	Cost-Effectiveness	Rate Source (assumes/indicated all inclusive)
\$900	\$115,707	CARB SRIA Excel - "Cost Input Tab"
\$1,100	\$141,419	Receipt #2
\$1,208	\$155,304	Receipt #1
\$1,270	\$163,275	\$900/hr for 17 hr call, includes 24-hr min. charge (Receipt #4)
\$1,422	\$182,816	Receipt #3
\$1,552	\$199,530	\$1,100/hr for 17 hr call, includes 24-hr min. charge

Case #2: Purchase Barge-Based C&C System(s)		
4	number of barge-based C&C systems to serve both ports	
38.76	tpy, weighted redux, tpy	
4,934	total hours / year	Hrs of vessel operation per year cleaned up by the barge C&C technology.
<b>Capital Costs</b>		
\$4,900,000	barge-based C&C system - estimated capital cost	
5%	discount rate	ARB uses 5% and 20-yr life for the land-based system.
20	project life	
0.08	Capital Recovery Factor (CRF)	
\$1,568,000	Annualized Capital Cost	
<b>Operating Costs</b>		
\$17,500	Ann'l Maint. Cost per Barge, \$ / hr	Per CARB SRIA excel - Assume each barge maint is needed, not a f(hours)
\$70,000	Total Annual Maint. Cost, \$/yr	Assumes same \$/yr per system.
\$0	Labor Cost, \$ / hr	ARB assumes this is zero. Need to vet this.
\$0	Annual Operating Cost, \$ / yr	Applied to total hours, independent of # of barges.
\$100	Hourly Operating Cost, \$ / hr	Per CARB SRIA excel - cost inputs (consumables, etc., not labor)
\$493,400	Annual Operating Cost, \$ / yr	Applied to total hours, independent of # of barges.
\$563,400	Annual Operating Cost, \$ / yr for all systems (cell A34)	
<b>Cost-Effectiveness</b>		
\$2,131,400	Annualized capital cost plus operating cost (\$/yr)	
\$54,987	Cost-effectiveness (\$/ton)	

from CMP 2017 Guidelines : [https://ww3.arb.ca.gov/msprog/moyer/guidelines/2017gl/2017\\_cmp\\_gl\\_volume\\_1.pdf](https://ww3.arb.ca.gov/msprog/moyer/guidelines/2017gl/2017_cmp_gl_volume_1.pdf)

- ① Emission factors are based on zero-mile rates contained in EMFAC 2014.
- ② Deterioration Rate per 10,000 miles.
- ③ All model year 2007 and newer engines with Family Emission Limits (FEL) from 0.21 g/bhp-hr to 0.50 g/bhp-hr NOx must use different emission factors from those listed for model years 2010 and newer engines certified to 0.20 g/bhp-hr NOx standards. FEL emission factors are based on EMFAC factors for model year 2010-2012 engines that include weighted averaging of 0.5, 0.35, and 0.20 g/bhp-hr NOx standards based on sales.
- ④ Deterioration rates for 2013+ engines incorporate use of on-board diagnostic system.
- ⑤ Factors for 2010+ engines are reduced values of 2013 factors by 50 percent, 75 percent, and 90 percent to correspond with 0.10 g/bhp-hr NOx, 0.05 g/bhp-hr NOx, and 0.02 g/bhp-hr NOx optional low NOx standards.
- ⑥ Factors for 2006 or older engines are for unfiltered trucks.

06/20/2017 D - 1 EMISSIONS TABLES

Context
CMP CE to bring old tech up to current standards: \$30k / weighted ton
CMP CE to bring tech that meets current standards to advanced tech (ZE / NZE): \$100k / weighted ton

San Pedro Bay Ports  
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 Barge Utilization Evaluation  
 04 October 2019  
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Number of RoRo and Auto Carrier calls to both ports (LA/LB) combined. Note: a call is defined as an Arrival to berth or a Shift to berth from Anc.

Concurrent calls	2018 days	% of days	
0	173	47%	1,460 barge days per year
1	130	36%	<-- longest stretch with no calls: once at 6 days
2	45	12%	130 barge days with 1 vessel
3	12	3%	90 barge days with 2 vessels
4	5	1%	36 barge days with 3 vessels
	365		20 barge days with 4 vessels
			276 (billable) barge days per year

oc_datetime	num_calls
2018-01-01	1
2018-01-02	1
2018-01-03	2
2018-01-04	3
2018-01-05	1
2018-01-06	0
2018-01-07	0
2018-01-08	0
2018-01-09	2
2018-01-10	0
2018-01-11	1
2018-01-12	1
2018-01-13	0
2018-01-14	0
2018-01-15	2
2018-01-16	0
2018-01-17	1
2018-01-18	0
2018-01-19	0
2018-01-20	0
2018-01-21	1
2018-01-22	1
2018-01-23	0
2018-01-24	0
2018-01-25	2
2018-01-26	0
2018-01-27	1
2018-01-28	0
2018-01-29	2
2018-01-30	0
2018-01-31	0
2018-02-01	1
2018-02-02	2
2018-02-03	0
2018-02-04	1
2018-02-05	2
2018-02-06	1
2018-02-07	1
2018-02-08	1

4 barges (needed to accommodate busiest days)
19% billable barge days % of total barge days
90% billable days basis of hourly rate (assumption)
4.8 hourly rate multiplier to account for low utilization

2018-02-09	0
2018-02-10	0
2018-02-11	0
2018-02-12	3
2018-02-13	0
2018-02-14	0
2018-02-15	2
2018-02-16	0
2018-02-17	0
2018-02-18	2
2018-02-19	2
2018-02-20	2
2018-02-21	0
2018-02-22	1
2018-02-23	1
2018-02-24	1
2018-02-25	0
2018-02-26	1
2018-02-27	1
2018-02-28	0
2018-03-01	0
2018-03-02	0
2018-03-03	1
2018-03-04	0
2018-03-05	1
2018-03-06	1
2018-03-07	1
2018-03-08	2
2018-03-09	1
2018-03-10	0
2018-03-11	0
2018-03-12	4
2018-03-13	0
2018-03-14	1
2018-03-15	1
2018-03-16	0
2018-03-17	0
2018-03-18	2
2018-03-19	0
2018-03-20	1
2018-03-21	2
2018-03-22	1
2018-03-23	2
2018-03-24	1
2018-03-25	0
2018-03-26	1
2018-03-27	0
2018-03-28	1
2018-03-29	0
2018-03-30	0
2018-03-31	2
2018-04-01	0
2018-04-02	1
2018-04-03	1
2018-04-04	2
2018-04-05	2
2018-04-06	0
2018-04-07	0

2018-04-08	3
2018-04-09	2
2018-04-10	0
2018-04-11	0
2018-04-12	0
2018-04-13	0
2018-04-14	0
2018-04-15	3
2018-04-16	0
2018-04-17	0
2018-04-18	1
2018-04-19	0
2018-04-20	1
2018-04-21	0
2018-04-22	1
2018-04-23	4
2018-04-24	1
2018-04-25	1
2018-04-26	2
2018-04-27	1
2018-04-28	1
2018-04-29	0
2018-04-30	0
2018-05-01	0
2018-05-02	2
2018-05-03	0
2018-05-04	1
2018-05-05	0
2018-05-06	1
2018-05-07	2
2018-05-08	1
2018-05-09	1
2018-05-10	0
2018-05-11	1
2018-05-12	0
2018-05-13	0
2018-05-14	1
2018-05-15	1
2018-05-16	0
2018-05-17	0
2018-05-18	0
2018-05-19	0
2018-05-20	0
2018-05-21	3
2018-05-22	1
2018-05-23	1
2018-05-24	0
2018-05-25	0
2018-05-26	0
2018-05-27	0
2018-05-28	0
2018-05-29	0
2018-05-30	2
2018-05-31	0
2018-06-01	1
2018-06-02	0
2018-06-03	1
2018-06-04	1

2018-06-05	1
2018-06-06	0
2018-06-07	2
2018-06-08	0
2018-06-09	1
2018-06-10	1
2018-06-11	0
2018-06-12	1
2018-06-13	0
2018-06-14	1
2018-06-15	1
2018-06-16	1
2018-06-17	1
2018-06-18	2
2018-06-19	1
2018-06-20	1
2018-06-21	1
2018-06-22	1
2018-06-23	0
2018-06-24	0
2018-06-25	1
2018-06-26	0
2018-06-27	1
2018-06-28	1
2018-06-29	0
2018-06-30	0
2018-07-01	1
2018-07-02	3
2018-07-03	1
2018-07-04	1
2018-07-05	0
2018-07-06	1
2018-07-07	0
2018-07-08	0
2018-07-09	0
2018-07-10	1
2018-07-11	1
2018-07-12	0
2018-07-13	0
2018-07-14	0
2018-07-15	1
2018-07-16	3
2018-07-17	1
2018-07-18	1
2018-07-19	1
2018-07-20	0
2018-07-21	0
2018-07-22	0
2018-07-23	0
2018-07-24	1
2018-07-25	0
2018-07-26	2
2018-07-27	1
2018-07-28	0
2018-07-29	0
2018-07-30	2
2018-07-31	1
2018-08-01	0

2018-08-02	2
2018-08-03	2
2018-08-04	0
2018-08-05	0
2018-08-06	3
2018-08-07	1
2018-08-08	0
2018-08-09	0
2018-08-10	0
2018-08-11	0
2018-08-12	1
2018-08-13	2
2018-08-14	0
2018-08-15	1
2018-08-16	1
2018-08-17	0
2018-08-18	0
2018-08-19	1
2018-08-20	0
2018-08-21	0
2018-08-22	0
2018-08-23	0
2018-08-24	2
2018-08-25	1
2018-08-26	1
2018-08-27	1
2018-08-28	0
2018-08-29	0
2018-08-30	1
2018-08-31	1
2018-09-01	1
2018-09-02	0
2018-09-03	0
2018-09-04	2
2018-09-05	0
2018-09-06	0
2018-09-07	1
2018-09-08	1
2018-09-09	0
2018-09-10	0
2018-09-11	1
2018-09-12	1
2018-09-13	3
2018-09-14	1
2018-09-15	0
2018-09-16	0
2018-09-17	1
2018-09-18	0
2018-09-19	2
2018-09-20	1
2018-09-21	1
2018-09-22	0
2018-09-23	2
2018-09-24	1
2018-09-25	1
2018-09-26	0
2018-09-27	0
2018-09-28	0

2018-09-29	0
2018-09-30	1
2018-10-01	0
2018-10-02	4
2018-10-03	2
2018-10-04	0
2018-10-05	0
2018-10-06	0
2018-10-07	0
2018-10-08	4
2018-10-09	0
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2018-10-15	1
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2018-10-17	0
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2018-11-07	0
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2018-12-25	0
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2018-12-27	0
2018-12-28	2
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2018-12-30	1
2018-12-31	1

San Pedro Bay Ports  
 At-Berth Auto and RoRo Emissions Contribution  
 CY 2018 Data  
 04 October 2019  
 DRAFT

SPBP Table B for the document

Port	Vessel Type	PM <sub>10</sub> tpy	PM <sub>2.5</sub> tpy	DPM tpy	NO <sub>x</sub> tpy	SO <sub>x</sub> tpy	HC tpy	CO tpy	CO <sub>2e</sub> mt/yr
SPBP	Auto and RoRo at Berth	1.7	1.6	1.4	70	3.4	2.4	6.5	5,001
SPBP	All vessels at Berth	60.1	56.3	31.4	1,895	169.7	72.7	188.7	264,414
SPBP	All vessels	142.0	133.0	106.1	7,078	323.3	270.9	590.3	503,286
SPBP	Percent of all OGV at Berth	2.8%	2.8%	4.5%	3.7%	2.0%	3.3%	3.5%	1.9%
SPBP	Percent of all OGV	1.2%	1.2%	1.3%	1.0%	1.0%	0.9%	1.1%	1.0%

Port	Vessel Type	Mode	PM	PM <sub>2.5</sub>	DPM	NO <sub>x</sub>	SO <sub>x</sub>	HC	CO	CO <sub>2e</sub>	Units
POLA	Auto and RoRo	at-berth	0.6	0.5	0.5	22.5	1.1	0.8	2.2	1,799	tons
POLA	All	at-berth	24.3	22.6	12.8	766.9	58.8	30.7	82.2	109,452	tons
POLA	All	All	57.0	52.9	42.7	2909.4	110.0	119.5	249.5	205,486	tons
POLA	Auto &RoRo vs All OGV	at-berth	2.3%	2.3%	3.7%	2.9%	1.8%	2.7%	2.7%	1.6%	%
POLA	Auto &RoRo vs All OGV	All	1.0%	1.0%	1.1%	0.8%	1.0%	0.7%	0.9%	0.9%	%
POLB	Auto	at-berth	1.1	1.0	1.0	47.4	2.3	1.6	4.3	3,202	tons
POLB	All	at-berth	35.9	33.8	18.6	1127.9	110.8	42.1	106.5	154,962	tons
POLB	All	All	85.0	80.0	63.4	4169.1	213.2	151.4	340.8	297,800	tons
POLB	Auto &RoRo vs All OGV	at-berth	3.0%	3.0%	5.1%	4.2%	2.1%	3.8%	4.1%	2.1%	%
POLB	Auto &RoRo vs All OGV	All	1.3%	1.3%	1.5%	1.1%	1.1%	1.1%	1.3%	1.1%	%

Hourly Rate	Cost-Effectiveness (\$/weighted ton)	Rate Source (assumes/indicated all inclusive)
\$900	\$115,707	CARB SRIA Excel - "Cost Input Tab"
\$1,100	\$141,419	Receipt #2, Attachment A
\$1,208	\$155,304	Receipt #1, Attachment A
\$1,270	\$163,275	\$900/hr for 17 hr call (avg.), includes 24-hr min. charge (Receipt #4)
\$1,422	\$182,816	Receipt #3
\$1,552	\$199,530	\$1,100/hr for 17 hr call (avg.), includes 24-hr min. charge

Attachment C:  
SRIA – Air Resources Board, Proposed Control  
Measure for Ocean-Going Vessels At Berth  
August 26, 2019



August 26, 2019

Irene Asmundson, Chief Economist  
Department of Finance  
State Capitol  
Sacramento, CA 95814  
Delivered via email to: [majorregulations@dof.ca.gov](mailto:majorregulations@dof.ca.gov)

**Re: SRIA – Air Resources Board, Proposed Control Measure for Ocean-Going Vessels At Berth**

Dear Ms. Asmundson:

The Department of Finance has received a Standardized Regulatory Impact Assessment (SRIA) from the California Air Resources Board (CARB) for its Proposed Control Measure for Ocean-Going Vessels At Berth (“Proposed Regulation”). We submit these comments for your consideration during the review of the SRIA for this Proposed Regulation.

Over the past several years, the California Association of Port Authorities (CAPA), Cruise Lines International Association (CLIA), Pacific Merchant Shipping Association (PMSA), Western States Petroleum Association (WSPA), and World Shipping Council (WSC) (collectively, “Coalition”) have been actively engaged with CARB staff on the development and assessment of amendments to existing regulations which exist for the regulation of emissions from vessels at berth and the possibility of a new set of regulations for additional vessel fleets.

In reviewing the SRIA for the Proposed Regulation, the Coalition’s assessment is that it is lacking much of the analysis mandated by the SRIA regulations, and many of the conclusions are not accurate because they are based on flawed methodologies and flawed data on costs, emissions, and health benefits. Furthermore, in the absence of a feasibility evaluation study demonstrating that the required emissions controls are actually achievable and cost-effective at scale for the terminals proposed to be regulated, the conclusions of the SRIA are speculative at best.

The Department of Finance should review the SRIA with comments below and those attached and return the SRIA to CARB with a request that it be revised to accurately reflect the impacts of the Proposed Regulation and resubmitted before proceeding with their formal rulemaking.

The Coalition is attaching letters previously submitted by the Coalition or its members that address issues required to be discussed in the SRIA. The letters address the range of issues to be covered in the SRIA, including, but not limited to, cost assumptions, emissions benefit assumptions, labor issues, policy consistency, and proposed alternatives. This cover letter will briefly summarize these and other issues relevant to the SRIA that have been addressed in these letters and those issues covered in public workshops, industry workshops, and numerous conversations with CARB staff.

**Regulatory History and Policy Setting**

The CARB Proposed Regulation is intended to address two separate classes of ocean-going vessels under one new At Berth rule: fleets of vessels which are already covered by existing CARB at berth regulations (container, cruise, and refrigerated vessels) and vessels which were previously excluded by CARB from inclusion in the existing at berth regulations (breakbulk, bulk, tanker, and roll-on/roll-off vessels). In addition to the existing regulations on at berth engines, CARB, US EPA, and the IMO have adopted clean fuel rules which apply to nearly all standard vessel operating types. The state has also awarded to various seaports Proposition 1B grants for vessels at berth where emissions reductions are required to be reduced beyond and in excess of the existing regulatory baselines for ocean-going vessels.

The existing regulatory environment is already producing exceptional levels of emissions reductions from all vessel types. For instance, under clean fuel rules overall vessel emissions are down roughly 70% across all fleets. With those fleets which are further subject to the existing at berth regulation and Proposition 1B performance criteria, CARB staff has projected that total emissions reductions from currently regulated fleets will be at 96%.

Given that existing regulations already provide significant emissions reductions, CARB's Statement of Need in the SRIA (pg. 28) is inadequate. This is especially true because all current and relevant policy-setting documents previously adopted by CARB that address the reduction of emissions from vessels at berth acknowledge these existing rules and limit the nature of an expansion to exploring the viability of additional technology which may offer the potential of new fleet controls and minor amendments to fix compliance for existing fleets.

The SRIA claims that the Proposed Regulation is necessary to achieve the state's goals in multiple contexts, but the Proposed Regulation is inconsistent with those plans and policies. The Proposed Regulation goes beyond these existing enunciated policy aims or specific emissions reductions needed to achieve Clean Air Act, GHG, or community benefit targets already established. For example:

- The SRIA asserts that the goals of this Regulation are necessary to meet NOx reductions standards in impacted areas (pg. 28, 34, 37), however the Proposed Regulation is not part of the State Implementation Plan, is not part of any localized Air Quality Management Plan, does not represent specific emissions reductions targets to meet under the Clean Air Act, and is inconsistent with the policy statement regarding vessel at berth provisions that were adopted by the CARB Board in the Mobile Source Strategy and adopted in the California Sustainable Freight Action Plan.
- The SRIA references that this is intended to implement emissions reductions under SB 32 (pg. 28-29, 34-35, 38), but the Proposed Regulation is also inconsistent with the few at berth provisions in the SB 32 Scoping Plan.
- The SRIA also asserts the need to reduce specific community emissions in part based on AB 617 (pg. 37), but the Proposed Regulation is once again inconsistent with the recently-adopted AB 617 Blueprint.

### **Cost Analysis**

The SRIA is deficient in that it systematically understates the anticipated costs of complying with the At Berth Regulation. For example, the Ports of Long Beach and Los Angeles have substantial experience with the deployment of shore power infrastructure and alternative control strategies. Together, the two ports have installed more shore power infrastructure than the rest of the world combined. Additionally, the two ports are the only California ports that have experience testing and deploying alternative at berth control technologies at the scale required by the Proposed Regulation.

In response to the proposed regulatory language the two ports prepared detailed assessments of the additional costs that would be required if the Proposed Regulation were implemented. (see “Port of Los Angeles and Port of Long Beach Comments on February 22-23 Workshops for the “Control Measure for Ocean Going Vessels Operating At Berth and At Anchor”, May 20, 2019”). The Ports conservatively estimated the total costs between the two Ports at nearly \$300 million just for their portion of capital costs required to maximize vessel participation under the Proposed Regulation. (pg. 3, “In summary, the POLB and POLA estimates approximately \$106 million and \$147-\$193 million respectively for additional electrical infrastructure. *These estimates are rough orders of magnitude, with many exclusions and limitations, so the actual cost could be much higher.*”)

The comment letters are included in the Appendices as back-up documentation of the real-world engineering costs the ports have actually incurred in deploying existing at berth technologies as a basis for their estimates. For instance, in Appendix B, the Port of Long Beach’s extensive engineering review concluded that \$106 million in additional costs were necessary in order to maximize electrification of its waterfront.

The SRIA unfortunately does not consider the POLA and POLB assessment. CARB’s assessment simply assumes no additional infrastructure costs, citing to no evidentiary support, even though that is not consistent with the evidence and data in the record. For example, with respect to the Port of Long Beach (SRIA, pg. 99-100):

“Staff has assumed no additional shore power capital projects would be required at POLB to meet the incremental increase of visits controlled with shore power under the Proposed Regulation. This is because the shore power infrastructure needed to meet the Existing Regulation’s 80 percent requirement in 2020 and Proposition 1B’s additional 10 percent requirement would provide sufficient shore power capacity to meet the requirements of the Proposed Regulation.”

With respect to cost analyses as applied to other fleets, port complexes, and alternative technologies and alternative compliance methodologies, the assumptions used are also suspect and rely on weak or non-existent data. For instance, with respect to the barge-based alternative compliance systems proposed, the SRIA assumes that the cost is a bare \$900 per hour. It appears that this estimate is based solely on phone conversations with a potential vendor of this technology. However, this methodology and estimate was contested by regulated parties who provided both specific billing and cost evidence to the contrary, in addition to methodological concerns including the lack of accounting for capital costs, standby costs, tug costs, variability of access up and down the coast, and unclear use of average costs across large fleet and geographic discrepancies.

### **Growth and Jobs**

The statewide weighted compound annual growth factors used to estimate port growth are simply unrealistic and do not track the data that CARB staff had compiled on their own, much less the actual growth rates on the ground. The SRIA creates a presumption that growth factors would be scaled to growth in cargo and at Annual Industry Growth Factors starting in 2019 for Container, Cruise and Ro-Ro vessels on Table C2 (pg 67) of 8% and 7.5%. These are unrealistic approximations of continuous growth in cargo and of growth in vessels.

These numbers are not compared with the internal analysis provided by CARB staff for the ports of Long Beach and Los Angeles based on the ports' specific forecast, or with the Port of Hueneme, which are identified individually. CARB staff had the same opportunity to do so for the Port of Oakland but chose not to. Instead, CARB staff selected a compound growth rate for the Port of Oakland of 5% based on federal freight statistics that are NOT specific to the Port of Oakland.

This number is not supported by the facts. Looking historically, since 2007, when the original At Berth rule was adopted, the compound growth rate has been 0.59%. The number CARB has selected to use is nearly 10 times greater. Alternatively, CARB could have selected the Port of Oakland forecast which the BCDC Bay Area Seaport Forecast estimated at 2.2% or less than half the CARB estimate.

In either case, the SRIA's use of exaggerated growth rates has the effect of overestimating future emissions which in turn overstates future emission benefits, and significantly overstates the cost-effectiveness of the Proposed Regulation.

Additionally, the SRIA does not discuss potential negative impacts on growth or interstate/international commerce at the Ports and private terminals that may result from the extremely high costs of compliance and resulting cargo diversion (discussed further below). If real-world compliance costs end up being several times higher than CARB's underestimates, future development and expansion of the Ports and terminals could suffer, operations and transportation costs could increase, and cargo may seek other, less costly ports of entry (and indeed, documentation presented to CARB to date shows that such diversion is likely to occur). We are concerned that the SRIA omits any discussion of these risks or their potential impacts on the flow of commerce in and out of the ports and terminals.

In addition, the draft SRIA understates the potential negative impacts on jobs that could accompany the burdens discussed above. Consideration of the creation or elimination of jobs in the draft SRIA appears to be limited only to those construction jobs created by the requirement to install emission control systems and retrofit ports and terminals. The SRIA then minimizes the impact of anticipated lost jobs by pointing out that it will be small (0.01%) compared to the entire California economy. What the SRIA ignores is the potential impact of lost business or industry jobs associated with the extremely high costs of compliance for stakeholders, and/or potential loss of commerce due to cargo diversion. As stakeholders have pointed out to CARB, these impacts are likely to be significant and felt deeply, particularly to the thousands of Californians who rely on the business of the Ports and terminals for their livelihood. These impacts are real. They must be fully assessed and should not be minimized or dismissed by a simple comparison to the statewide economy at large.

**Proposition 1B**

The SRIA fails to account for the benefits of the emissions reductions that will result from the investment of Proposition 1B bonds and attributes Proposition 1B emission reductions to the proposed rule. Under Proposition 1B, the State made investments in shore power infrastructure that will ensure shore power emission reductions exceed the emission reductions required by the current At Berth rule. In funding the project, CARB determined that the emission reductions were real, surplus, quantifiable, and enforceable.

The SRIA, however, contains no accounting of those emission reductions. CARB acknowledges the fact that Proposition 1B infrastructure provides emissions benefits (see comments above), but has refused to quantify the emissions benefits or specify how grant compliance will be achieved. By failing to include the benefits of the Proposition 1B investment, the SRIA attributes the benefits to the proposed rule, overestimating future benefits and cost-effectiveness.

**Emissions Benefits**

The SRIA analysis also understates the documented emissions benefits resulting from the existing rule. The existing rule requires that if a vessel is capable of connecting to shore power it must do so. As a result, the current rule requires overcompliance. CARB staff have repeatedly acknowledged that under the existing rule, fleets must over comply to meet the 80% emission reduction requirement in 2020. No attempt to model this overcompliance has been made. Future emission benefits would be lower and the Proposed Regulation would not be cost-effective.

This trend is amplified by the time at berth for modern containerships, particularly in San Pedro Bay. Looking at the Port of Los Angeles' 2017 Emissions Inventory, the average time at berth for all containerships is 58 hours. Assuming the full three-hour allowance for connect and disconnect is taken under the current rule, the average vessel at the Port of Los Angeles would be connected for 55 hours out of 58 hours. Put another way, the average vessel would achieve a 94% emission reduction under the existing rule. Instead, by contrast, the forecast assumes without evidentiary support that after full implementation emission reductions will amount to only 65% for the ports of Long Beach and Los Angeles, with some vessel categories actually decreasing emission reductions as the existing rule tightens.

By minimizing the benefits of the existing rule, the SRIA overestimates future emissions, overestimates future emission reductions from the proposed rule, resulting in an unreasonable emission cost-effectiveness.

**Safety and Reliability**

The SRIA also does not discuss (and largely dismisses) the potential safety and reliability issues associated with land-based emissions control systems, and the additional costs that may be borne by regulated facilities to mitigate those concerns. Again, this is an area in which Coalition member WSPA and others have articulated serious concerns to CARB – concerns which further underline the need for a feasibility study. Without first conducting a feasibility study to determine if the proposed control systems can be safely and reliably operated at scale and under real-world conditions, the proposed At Berth Regulation risks creating unintended dangers that would need to be addressed or mitigated by regulated ports and terminals. The SRIA contains no discussion or analysis of the potential impacts of these issues.

### **Analysis of Harbor Craft Emissions**

As discussed above, the SRIA cost-effectiveness conclusions depend on overestimations of the emission reductions predicted to be achieved under the Proposed Regulation versus the existing baseline. Unfortunately, they also depend on ignoring emissions increases likely to result from the Proposed Regulation. For example, the Proposed Regulation envisions expanded use of barge-based emission control systems. The use of barge-based systems requires the use of tugboats. Typically, tugboats use engines several times the size of the auxiliary engine the regulation seeks to control. Stakeholders have repeatedly pointed out that no information has been provided about the increased emissions that will result from increased harbor craft use.

During workshops, CARB staff has assured stakeholders that these emissions have been examined and an analysis would be presented. Unfortunately, however, tug emissions and costs are not reflected in the SRIA.

Every use of a barge-based system will require up to six tugboat moves. Those moves would occur only because of the Proposed Regulation resulting in significant emissions when compared to emissions the regulation seeks to control. In some areas, like the San Francisco Bay, a three-hour tugboat transit may be required. These emissions have not been included in the assessment or accounted for in the SRIA. These additional emissions cause cost-effectiveness values to rise, reduce mass emissions benefits, and reduce health benefits. These emissions are significant compared to the source and directly undercut the Incidences per Ton (IPT) analysis presented in the SRIA.

If the regulation results in emissions increases that offset emissions benefits, those emission increases should be deducted from the claimed health benefits presented in the SRIA. Given how small changes in the emissions benefit produce enormous changes in the cost of health outcomes, the IPT analysis needs to be reworked. *None of the benefits assessed in the SRIA are accurate without inclusion of offsetting harbor craft emission increases.*

### **No Analysis of Industry Alternatives Presented for Purposes of SRIA Analysis**

The CARB SRIA notes that at industry work group meetings “staff specifically requested stakeholders to submit proposed regulatory alternatives for the economic analysis” and “staff again requested suggestions for regulatory alternatives” and “solicited alternatives for this SRIA” at its meetings in 2018 (pg. 43).

In February, the Coalition submitted a formal Alternative proposal in response to the solicitation of an industry alternative from the CARB program staff. This was in addition to at least four different alternatives which were presented to CARB staff for consideration prior to the formal solicitation by individual coalition members after previous workshops in 2017.

The SRIA does not acknowledge or analyze any of the alternatives submitted. Indeed, the SRIA’s section on Public Engagement all but implies that in response to its requests for alternatives that none were received. This is not accurate.

Instead of analyzing the Coalition Alternative proposal, or the other submitted industry alternatives, only theoretical alternatives developed internally were considered (pg. 128-147), those were incorrectly analyzed (see comments regarding Harbor Craft and Ro/Ros), and summarily dismissed.

If CARB had evaluated the alternatives presented in the comment letters, we believe it could have found some of them to be superior to the Proposed Regulation, in that some or all of these alternatives would avoid unnecessary safety risks, reliability concerns, excessive costs, implementation delays and operational inefficiencies associated with mandating the potentially infeasible control strategies required by the Proposed Regulation.

The SRIA must be re-tuned in order to acknowledge the multiple alternatives that industry stakeholders have submitted through this ongoing process. The SRIA must then analyze and weigh those alternatives in a comprehensive manner, taking into account the issues raised in this letter and prior correspondence.

### **Economic Analysis Flawed**

The CARB SRIA examines the impact of the regulation on the cost of a TEU, cost of a vehicle, or cost on a gallon of gas, but the proper analysis would examine the impact on the cost of transportation, not the impact relative to the value of the item being ultimately transported.

The impacted parties provide transportation services on a diverse array of economic activities which range from agricultural exports, to petroleum distribution, to automobile import and export, to tourism. As a result, by not examining the impact to the cost of transportation, CARB staff failed to accurately account for the economic impacts to the industries regulated. These costs are concentrated at seaports, but the CARB SRIA analysis looks only at the downstream distribution of costs across the entire supply chain. This is improper.

While CARB considered costs on a macro average per TEU as a measure of economic activity, CARB did not analyze California competitiveness on a macro average as a measure of competitiveness, which is a required step in a SRIA analysis. If CARB had done this, it would have found that this regulation will exacerbate an existing cargo diversion trend in the containerized cargo sector. California's container ports have been steadily losing market share for a decade due to reasons like increased cost and increased regulatory burden. California ports have lost approximately 20% market share over the last decade, that lost market share represents lost jobs, lost economic activity, and lost tax revenue. A proper analysis would compare increased cost against alternative transportation options, namely other port gateways.

The overwhelming majority of containerized cargoes entering California ports are discretionary intermodal and ultimately destined for use outside of California. As a result, other gateways are competitive on a cost-basis against California ports. The SRIA did not examine any of these potential and foreseeable economic impacts. In addition, cargo diversion also has dramatic environmental impacts discussed below.

The approach that CARB staff has taken would be the equivalent of assessing the cost of a taxi ride against the net worth of the passenger rather than against other transportation options like public transit or a personal vehicle. Unless the SRIA examines the economic impact on the service being provided, transportation, the SRIA cannot seriously examine the economic impacts.

We would also note that the per TEU metrics used in the CARB SRIA also seem to be focused exclusively on impacts to containerized imports and not to California's exports. This makes it difficult to fairly assess impacts to California agriculture and manufacturing sectors with respect to downstream impacts of this rule and is incompatible with the baseline requirements of the SRIA guidelines which require full competitiveness analyses on imports and exports.

In order to clearly demonstrate the actual costs and benefits, the SRIA must be revised to demonstrate comparative analyses applied on a port-by-port basis and on a vessel-type basis within each port.

### **Selective Analysis Distorts Conclusions**

The analysis contained in the SRIA relies on selective analysis to achieve predetermined outcomes. As described in other sections, the analysis ignores the emissions benefits of Proposition 1B, the impact of harbor craft and bunkering operations, and the emissions benefit of the existing regulation that occurs as a result of the requirement that vessels capable of shore power must connect. But the analysis also does this at the macro level as well. In choosing to aggregate some analysis and segregating the analysis in others, the SRIA analysis hides the true cost and true benefits that would occur at the local level. For example, most benefits are analyzed on a statewide basis. The Port of Hueneme is not comparable to the San Pedro Bay ports in size, impact, or resources. Yet, the SRIA does not analyze the benefits or impacts to a port like Hueneme.

The difference between ports make the benefits of the Proposed Regulation extraordinarily disproportionate. Relying on average growth factors or state-wide cost-effectiveness masks the regulations effects in places like the Port of San Diego or Benicia. A port-by-port analysis would reveal if some ports could be excluded from the regulation while maintaining emission reductions. It is impossible to make that determination without that level of analysis. Similarly, an analysis that examined the benefits and costs of the Proposed Regulation on the different vessel types (i.e., current regulated fleet, tankers, Ro/Ros, and bulk), would reveal what vessel types could be cost-effectively controlled at each port. None of that crucial information on impacts, benefits, or costs are included in the SRIA.

### **Container Vessel Diversion and Related Economic and Greenhouse Gas Impacts Not Analyzed**

As discussed above, CARB staff has been presented data documenting cargo diversion from California ports over the past decade. Regulations that increase cost and compliance uncertainty will also increase cargo diversion. With cargo diversion ultimately comes vessel rerouting, and CARB has not addressed diversion in its analysis.

PMSA has submitted data to CARB showing that when vessels reroute or are diverted from California ports it results in significant increases of greenhouse gas emissions. On average, these GHG emissions will increase 22%. None of these offsetting emission increases have been analyzed in the SRIA, even though such market competitiveness is a specific component of SRIA analysis.

### **Cruise Ship Diversion and Related Economic Impacts Not Analyzed**

In addition to failing to analyze cargo diversion, CARB staff did not analyze lost economic benefits as a result of cruise ships avoiding California ports. Due to the nature of cruise ships, alternative control technologies are not a feasible compliance strategy, making shore power the only compliance option.

Vessels that regularly visit California ports are retrofitted for shore power. But other cruise vessels may call a California port as part of a repositioning move; these vessels would not be equipped for shore power. To the degree that these vessels are forced to avoid California ports there will be significant economic impact that has not been analyzed. For instance, each Port of San Diego turn around cruise call generates almost \$2 million. A single stop of a transiting cruise ship generates nearly \$600,000 for the San Diego region. In 2017, the Port had 88 cruise calls, generating a total of \$46 million in direct economic output and 460 direct jobs. The SRIA should properly analyze these economic impacts.

**Analysis and Alternative Consideration of Ro/Ros Costs vs Benefits Is Incomplete**

The Coalition continues to believe that if the costs of controlling Ro/Ro at berth emissions using shore based or barge based control technologies are adequately assessed and compared to the very short time Ro/Ros are at berth, CARB would reach the conclusion not to regulate Ro/Ro auxiliary emissions in the expanded at berth regulation.

Ro/Ros have incredibly short times at berth, as little as 9 hours and on average less than 14 hours at the Port of Long Beach. Individual Ro/Ro vessels also operate similarly to tramp bulk vessels in that they make inconsistent and often infrequent port calls to California. Since Ro/Ros would be unable to use installed shore-power equipment in other ports, CARB has considered the use of shore and barge-based emissions capture devices for Ro/Ro visits. These options also pose problems. Ro/Ros sometimes use older, shared berths that may not be adequate for land-based emission control systems. Barge-based emission control systems pose operational problems because they impact a Ro/Ro's ability to take on a bunkering barge and some Ro/Ro stack configurations may not be accommodated by a barge-based emissions control technology.

The use of barge-based systems results in additional GHG emissions from the barge-based system itself and increased criteria and toxic emissions from the tugboat required to position the barge. Typically, a tugboat will use engines two to four times larger than the target auxiliary engines to be controlled. As a result, any tugboat activity can significantly offset emissions from Ro/Ro vessel calls.

CARB staff has not taken these offsetting emissions into account. The SRIA includes an alternative analysis that excludes Ro/Ros from the Proposed Regulation. By not taking tugboat emissions into account, emissions that would only occur as a result of the Proposed Regulation, the alternative analysis does not accurately report the impact of the exclusion of Ro/Ro vessels. A significant number of Ro/Ro vessels bunker at berth. But the analysis does not consider the impact on bunkering operations for Ro/Ro vessels and the increase in emissions that will occur as a result of bunkering taking place at anchorage instead of at berth, as described below.

If Ro/Ros are diverted – either to concentrated docks within the state or to out-of-state alternative ports - due to lack of technology, access to alternatives, or simply to avoid increased costs, CARB's SRIA needs to analyze the related emissions and costs of the delivery of automobiles by other intermodal methods, principally by rail for long-haul and truck for local distribution. Acknowledging that GHG emissions per ton vary widely by transportation mode, but with ocean going vessels always having the lowest emissions per ton per mile, it is likely that Ro/Ro vessel diversions will not only have significant economic costs to the state in terms of lost employment and activity but also increased criteria pollutants and GHG emissions from the use of alternative transportation for vehicle delivery.

**No Consideration of the Impact on Bunkering**

The San Pedro Bay ports are among the busiest bunkering ports. Vessels not even destined for San Pedro Bay will take advantage of the port complex to bunker. As result, many vessels that do visit San Pedro Bay will take on bunker while at berth. It is an efficient and safe way for a vessel to refuel within the protection of the harbor.

As mentioned, the Proposed Regulation envisions significantly increased use of barge-based emission control systems. The use of the barge-based system prevents a vessel from bunkering at berth. As a result, a vessel needing bunker will need to move to anchorage after discharging the vessel in order to receive fuel. While at anchorage, auxiliary engines will run uncontrolled. These emissions would not have occurred in the absence of the Proposed Regulation. For vessels like large containerships, the time bunkering at anchorage would be a portion of the time at berth, resulting in net emission reductions but less than if shore power was used. For a vessel with short visits like small containerships or especially Ro/Ro vessels, the entire emissions reduction of a barge-based system can be fully offset by the time spent at anchorage. This would result in a net increase of emissions from the tugboat and excess GHG emissions from the barge-based system itself.

None of the offsetting impacts from bunkering activities were analyzed as part of the SRIA. These activities directly impact the claimed emissions benefits, the claimed health outcomes, and the claimed cost-effectiveness. The alternative would be a net decrease in bunkering activity in San Pedro Bay and other California ports which would have an enormous economic impact, which was also not analyzed.

**Analysis of Exclusion of Bulk and General Cargo Vessels Is Missing**

The SRIA fails to include the analysis and methodology used to determine (correctly) that the application of this rule with respect to bulk and general cargo vessel fleets would not be cost-effective and should be avoided. All industry stakeholders have asked for this analysis and methodology to be included in order for the assumptions and conclusions applied to this specific fleet to be revealed and then compared to its potential application to other fleets, including the other currently non-regulated Ro-Ro and Tanker fleets.

Since the SRIA does not explain what the cost per ton of emissions reduced threshold is for determining whether a vessel class should or should not be covered by the at berth requirements it is impossible to discern how and by what standard of application CARB has decided to leave bulk and general cargo vessels out of the expanded list of regulated vessels but has proposed to keep Ro/Ro vessels and tankers on this expanded list. What threshold and other factors did CARB consider to justify these decisions?

Given the very similar fleet dynamics, economics and costs of compliance, and infrastructure challenges, it is likely that the same methodologies, and potentially the same conclusions, would reveal that the expansion of the rule is as similarly problematic for other non-regulated fleets as it was for bulk and breakbulk vessel fleets.

The SRIA continues the silence around this fundamental analysis, and it is conspicuous by its absence.

**Conclusion**

We would respectfully request that the SRIA for the “Proposed Control Measures for Ocean Going Vessels At Berth” be returned to CARB as facially inadequate and inconsistent with the requirements of the SRIA statutes and Department of Finance regulations. We would further request that the Department of Finance direct CARB to not resubmit any SRIA on this subject without first working with industry to address its Alternative proposals, fully analyzing all competitiveness and import/export impacts, and acknowledging and analyzing all facts and evidence of existing costs submitted for the record and any additional costs identified by the industry stakeholders in future processes.

Thank you for your attention to these very complex matters on the very short SRIA timeline within which you are provided. We appreciate the continued dialogue with state policymakers on these important subjects.

Sincerely,

***California Association of Port Authorities  
Pacific Merchant Shipping Association  
World Shipping Council***

***Cruise Lines International Association  
Western States Petroleum Association***

**Attachments:**

*In reverse chronological order*

WSPA Comments on CARB Proposed At Berth Regulation Working Draft, August 15, 2019

Port of Los Angeles and Port of Long Beach Comments on May 14 & 16, 2019 Workshops for the “Control Measure for Ocean-Going Vessels Operating At-Berth and At Anchor”, July 1, 2019

Comments on Proposed At-Berth Amendment Regulatory Concept, June 14, 2019

Comments on At-Berth Draft Regulation Order - 5/8 2019 Version, June 13, 2019

Port of Oakland Comments on May 10, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents, June 10, 2019

Preliminary Comments on Proposed At-Berth Amendments Cost Analysis, May 29, 2019

Port of Los Angeles and Port of Long Beach Comments on February 22-23 Workshops for the “Control Measure for Ocean Going Vessels Operating At Berth and At Anchor”, May 20, 2019

Comments on Revised Draft Regulatory Concept, April 10, 2019

Industry Coalition Alternative Proposal for Amendments to At-Berth Regulations, February 15, 2019

Port of Los Angeles and Port of Long Beach Comments on Proposed Draft Regulatory Language, “Control Measure for Ocean-Going Vessels Operating At Berth and At Anchor”, February 6, 2019

Comments on Preliminary At-Berth Cost Analyses Presented at “Workgroup Meetings to Discuss Costs of Proposed Amendments to the Ocean-Going Vessel At-Berth Regulation”, September 14, 2018

PMSA Comments on CARB Proposed At-Berth Regulation Amendment Workshop, October 9, 2017

PMSA Comments on CARB Proposed At-Berth Regulation Amendment Concepts, August 4, 2017

WSPA Comments on CARB Proposed At Berth Regulation  
Working Draft, August 15, 2019



**Thomas A. Umenhofer**  
Vice President

August 15, 2019

Ms. Cynthia Marvin  
Division Chief, Transportation and Toxics  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

sent via e-mail to: [Cynthia.Marvin@arb.ca.gov](mailto:Cynthia.Marvin@arb.ca.gov)

Re: Additional WSPA Comments on CARB Proposed At Berth Regulation Working Draft

Dear Cynthia,

Western States Petroleum Association (WSPA) appreciates the continuing opportunity to provide additional feedback on the California Air Resources Board (CARB) proposed California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 7.5, Sections 93130-93134.14 (At Berth Regulation) Working Draft, dated May 8, 2019. WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states.

This letter follows up on our conversation with you and your staff on July 18, 2019 and provides additional information regarding the need for a comprehensive feasibility evaluation study before any At Berth Regulation is adopted. Enclosed with this letter is a general outline of the contents of such a study and additional information to explain why the current compliance deadlines of 2027 and 2029 on the At Berth Regulation Working Draft are not achievable.

WSPA and many other stakeholders share CARB's strong desire to see regulations that are legally supportable, can be feasibly implemented, and are likely to achieve real-world air quality goals. In our view, the key to meeting these goals is to set a realistic rulemaking schedule to obtain the necessary information, then to work openly with stakeholders and the public to carefully assess and incorporate that information as required to ensure workable regulations. Failure to properly account for the real-world feasibility of the At Berth Regulation, we believe, could lead to adopting requirements that simply cannot be met safely and in a cost-effective manner, or that are impossible to meet at all.

### **Evaluation of the Feasibility of Shore-Based Emission Control for Tankers**

As we discussed with you and CARB staff, WSPA continues to have serious concerns that no version of the At Berth Regulation can succeed without ensuring that it can be technically, feasibly, cost-effectively, and, as important, safely implemented within the timeline that CARB is proposing. To that end, WSPA acknowledges CARB's engagement with stakeholders to date, but believes that it is critical to first conduct a study to evaluate the technical feasibility of the proposed control option (shore-based emission capture and control) for tankers before any compliance date can be set. This is because the technology, as proposed in the regulatory analysis, has never been implemented on tankers; assuming the technology is available when it has not been proven to succeed on a tanker is a flawed approach. There are several technical differences between tankers and cargo vessels, such as managing boiler pressures when exhaust is captured, and

the possibility of vapors from tanker cargo finding their way into the capture system. At a high level, this evaluation study should assess the safety, reliability, operability, and availability of the proposed control option as well as the ability of the proposed control option to meet the regulatory requirements within the proposed timelines.

WSPA believes that participation from CARB, as well as the numerous other regulatory agencies involved in permitting and evaluation of large-scale projects such as those proposed by the At Berth Regulation, is critical for the success of the study. Such participation is especially critical in that, not only are the technical and safety issues important, but the review and permitting timelines of local and state regulatory agencies for projects of this scope are crucial for everyone to understand and factor into any given regulatory time deadline. WSPA is proposing that this effort be undertaken collaboratively between WSPA, CARB, and other local and state permitting agencies with the goal of completing the study within 3 years from the adoption of the At Berth Regulation. Upon completion of the study, WSPA proposes that a detailed evaluation report be produced, and that CARB convene additional public workshops as necessary to adequately address the findings in the report and make any necessary revisions to the proposed Regulation.

To that end, attached is a proposed report outline for an Evaluation of At Berth Shore-Based Emission Control for Tankers at California Ports. This outline provides a basic framework for an evaluation study to assess technical feasibility that we believe will address critical questions that must be answered for the At Berth Regulation to satisfy legal criteria and ultimately accomplish the goals the At Berth Regulation set out to achieve.

The following is a list of critical questions that we believe must be answered, at a minimum, by the study:

- Is the type of shore-based emission control system envisioned by the proposed At Berth Regulation technologically feasible at this time? If not currently feasible, is there a reasonable basis, supported by significant evidence, to expect that such a system will become technologically feasible in the timeframes set forth in the proposed At Berth Regulation for tankers?
- What potential safety, reliability, and operability concerns need to be resolved before the type of shore-based emission control system and vessel interface envisioned by the At Berth Regulation could be installed and operated?
- Do any of the safety, reliability, or operability concerns identified create a significant risk to human health, safety or the environment?
- Can the type of shore-based emission control system envisioned by the At Berth Regulation meet the 80% reduction in NOx, Particulate Matter, and Diesel Particulate Matter required by the At Berth Regulation?
- Can the type of shore-based emission control system envisioned by the At Berth Regulation operate in compliance with all other applicable laws and regulations, including those related to interstate and international commerce?
- Is there room for the type of shore-based emission control system envisioned by the At Berth Regulation within the existing developed footprints of marine terminal facilities? If not, would installation of the systems require new construction in expanded onshore

footprints and/or installation of new facilities on fill or pilings in wetlands, tidelands and/or submerged lands, with significant impacts on coastal onshore and offshore habitat and other sensitive areas and resources? Will new tideland leases or lease amendments from the State Lands Commission be necessary?

- Will modifications to equipment on tankers be required? Boilers and auxiliary engine connections and controls should be considered.
- What potential safety, reliability and operability concerns needs to be addressed by ship owners, manufacturers, classification societies, USCG before such a modification is applied to vessels? How will CARB ensure third party vessels are modified to comply with shore-based emission control system before calling?
- If the type of shore-based emission control system envisioned by the At Berth Regulation can be feasibly built and operated, what timeframes would be required for such construction and operation, considering timeframes required for permitting and approvals by regulatory oversight agencies and local jurisdictions with land use authority, and including delays due to potential litigation?
- If the type of shore-based emission control system envisioned by the proposed regulation can be feasibly built and operated, what would be the costs to the regulated industry?

### **Timeline for Implementation of the At Berth Regulation for Tankers**

Even under ideal conditions, WSPA does not believe that any marine terminal can meet the proposed compliance deadlines of 2027 for the Port of Long Beach (POLB) and Port of Los Angeles (POLA), or 2029 for all other marine terminals where tankers are berthed. Based on information received from WSPA member companies, we believe that the earliest a marine terminal could comply with the proposed regulatory requirements is 2033. Additional time would be needed, at least up to two years, for larger and more complex terminals requiring a compliance date no sooner than 2035 for those facilities due to in-water work window limitations and operational construction constraints.

As was discussed and requested by CARB during our meeting on July 18, 2019, enclosed with this letter are the aggregated results from our member companies showing the estimated timelines to meet compliance with the proposed regulatory requirements. Included in the enclosure is a chart showing how long (as a range) each major step is expected to take and what timeframe (as a range) that each of those steps is expected to occur within. In general, larger and more complex terminals will need more time to complete each step due to the larger scale of the engineering, design and construction effort and because additional time needed to complete each individual step compounds over the life of the project. Also included is a table which describes in more detail what activities are include in each major step.

The major steps for any facility to meet compliance with the proposed regulation are as follows:

- General and Site-specific Feasibility Evaluation Study
- Site-Specific Design
- Engineering
- CEQA Review
- Permitting and Other Approvals

- Contracting
- Construction (Crane, Emission Control System, and Support Systems)
- Commissioning

While there are several factors that drive a longer timeline for facilities than the timeline that CARB has proposed, the single largest factor is that, at present, the technology proposed is untested and unproven as safe for tankers. This means that significantly more work is needed up front to assess the risks and ensure that the project is feasible. If there existed a proven, off-the-shelf technology that was safe for use on tankers and boilers, many of the early steps could be bypassed or the timeline shortened. But that is not the case, as was communicated by vendors during the CARB vendor meeting held on April 16, 2019, as well as in the WSPA comment letter of June 14, 2019.

Based on our conversations with you and CARB staff, WSPA also believes that CARB has underestimated the time it takes to complete many of the steps needed to meet compliance with the proposed regulation. For example, WSPA believes that CARB has significantly underestimated the time it will take a facility to apply for and receive all the required permits for a project of this nature.

At a minimum, facilities will need to receive permits or regulatory and land use approvals from the local air quality control/management district, the California State Lands Commission, the San Francisco Bay Conservation and Development Commission (for northern Californian terminals), the United States Army Corps of Engineers, the local Regional Water Quality Control Board, the California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service (if protected species are affected), the National Marine Fisheries Service (where marine mammals may be present), the United States Coast Guard, building permits and/or coastal development permits from the local city/county, and (if not delegated to the local city/county) coastal development permits from the California Coastal Commission, in addition to going through the California Environmental Quality Act (CEQA) environmental review process prior to receiving any permits and approvals.

Note that, separate from WSPA's timeline, many facilities are also in the process of updating terminals to comply with the Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) -- projects that have been in permitting, design and construction for many years. Due to the large variety of timelines for each terminal, WSPA has not included ongoing and proposed MOTEMS construction projects in our timeline.

While many of the activities can occur in parallel, those that must occur in series often will dictate the timeline. The most basic example of this occurs during permitting and construction. Construction cannot begin until permitting is complete, and permits cannot be issued until the CEQA review is complete. Construction and installation of any equipment on terminal cannot begin until such time that the support structure (foundation) is complete.

The nature of the proposed equipment, weights and locations can result in a terminal having to complete a seismic retrofit, which would extend well beyond the actual footprint of the equipment foundations. As you may recall, during our meeting WSPA members provided examples of how long it has taken to obtain permits and implement construction on marine terminal projects, such as MOTEMS. For one of our member companies, the MOTEMS initial audit was conducted in 2009 and, after design, California State Lands Commission peer review, and CEQA review and

resource agency permitting, construction was able to begin in 2018 – nine years later -- for a project that is much smaller than the size and scope proposed in the At Berth Regulation.

Below are other examples of steps that will hinder further progress on the project until completed:

- For any pilot test of the equipment installed at a port or Marine Terminal, permitting, design and construction will require additional time.
- Detailed engineering cannot begin until the feasibility evaluation study is completed, and the risks associated with the control technology are well understood, to allow for design of appropriate mitigation.
- CEQA review cannot begin until a lead agency is assigned and at least 30-60% of the design is complete, in order to provide an accurate and stable project description as the basis for review.
- Building and other permits are dependent on completing the CEQA analysis and certifying a final Environmental Impact Report (EIR) or Negative Declaration. Many responsible agencies with permit or approval authority will not begin processing applications before the CEQA document is approved.
- Contracting for construction and installation cannot be finalized until the permits and approvals are received; before that time, the conditions under which construction will occur remain yet unknown. Additionally, construction cannot commence until contracting is complete.
- CEQA lead agencies and responsible regulatory agencies may require completion of some mitigation measures before construction commences.
- In some cases, commissioning of individual pieces of equipment can occur in parallel with the construction; however, overall commissioning cannot begin until all construction is completed.
- And of course, no construction or installation can occur without first obtaining applicable permits.

It is important to note that the aggregated timeline that WSPA has attached to this communication is only an estimate. The results of the feasibility evaluation study will be necessary to refine the estimated timeline.

WSPA believes the Government Code, Health and Safety Code and other California laws and regulations require CARB to revise its current rulemaking timetable to allow for proper preparation and consideration of feasibility, cost effectiveness and timelines. See, e.g., Cal. Health & Safety Code §§ 38560, 39602.5, 39665, 43013; see *also* Gov. Code § 11346.36 & 1 C.C.R. §§ 2000-2004 (SRIA requirements to assess proposed regulation's cost impact on public health and safety, fairness and social equity, state's economy and other criteria). We would request that, at the very least, CARB include in its proposed At Berth Regulation language that allows for a feasibility evaluation study and an appropriate delay in regulatory implementation in the event the feasibility evaluation study concludes that shore-based technologies and/or other elements of the At Berth Regulation are not feasible in the regulatory timeframes provided.

WSPA also believes that the At Berth Regulation should include “off-ramp” scenarios that provide next steps for facilities that demonstrate an inability to implement all the required elements in the default timelines provided under the At Berth Regulation. In summary, WSPA requests that CARB:

1. Incorporate the feasibility evaluation study and the details included in the outline attached into the proposed regulatory language,
2. Include language in the At Berth Regulation that will provide an off-ramp or adjust the compliance deadlines based on the results of the feasibility evaluation study, and
3. Revise the proposed compliance deadlines in the At Beth Regulation to 2033 for typical terminals and 2035 for complex terminals where tankers berth.

WSPA appreciates this opportunity comment on the At Berth Regulation Working Draft. If you have any questions regarding this submittal, please contact me at (805) 705-9142 or via email at [tom@wspa.org](mailto:tom@wspa.org).

Sincerely,



Cc: Catherine Reheis-Boyd – WSPA  
Richard Corey - CARB

# **Evaluation of At Berth Shore-Based Emission Control for Tankers at California Ports Report Outline**

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The evaluation study of Tankers At Berth Shore-Based Emission Control will be documented in a report that reflects the approach taken by California Air Resources Board (CARB) in the development of the document Evaluation of Cold-Ironing Ocean-Going Vessels at California Ports, dated March 2006.

The new study, to be entitled Evaluation of At Berth Shore-Based Emission Control for Tankers at California Ports will contain the following elements:

## Executive Summary

- I. Introduction
- II. General Description of Tankers and Marine Terminals
- III. Tanker Emission Inventory
- IV. Technical, Safety, and Operational Review
- V. Cost-Effectiveness and Economic Impact Review
- VI. Conclusions
- VII. References

An overview of the Sections I through VI is presented below.

## **Introduction**

- Statement of purpose and objectives.
- Identify focus of analysis of the feasibility and cost effectiveness of shore-based emission control for tankers.
- Define shore-based emission control for tankers as capture of NO<sub>x</sub> and PM emissions from boiler and auxiliary engines on tankers pursuant to § 93130.5 and § 93130.7 of CARB At Berth Regulation (currently Working Draft).

## **General Description of Tankers and Marine Terminals**

- Identify unique characteristics of affected ports and marine terminals, while protecting any individual company competitively sensitive or proprietary information.
- Identify tanker classes, frequency of visits, ownership.
- Summarize tanker visit and duration information.

## **Tanker Emission Inventory**

- Summarize updated CARB tanker sector NO<sub>x</sub> and PM emission inventory taking into account the IMO regulations regarding Tier 3 ships and their predicted penetration into California.
- Assess by emission source types for NO<sub>x</sub> and PM emissions.
- Review in context of overall California emission inventory.

**Evaluation of At Berth Shore-Based Emission Control  
for Tankers at California Ports  
Report Outline**

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**Technical, Safety, and Operational Review**

***Methodology***

- Identify regulatory/legal requirements applicable to proposed regulations, including but not limited to:
  - Health & Safety Code (H&SC).
    - Technological and operational feasibility
    - Safety, reliability and effectiveness
    - Necessary to attain Ambient Air Quality Standards
    - Articulate potential adverse health, safety and environmental impacts
    - Show reductions are real, permanent, quantifiable, verifiable and enforceable
  - CEQA.
    - Identification of significant adverse impacts of regulations
    - Identification of reasonably foreseeable compliance alternatives/mitigation
  - U.S. Coast Guard Regulations (33 CFR)
  - PSM Regulations (e.g. 8 CCR 5189.1, 19 CCR 2762, RISO)
  - Marine Oil Terminal Engineering and Maintenance Standards (24 CCR)
- Identify regulatory agencies, local jurisdictions with land use authority, other agencies with permitting or approval authority and certification entities. Include them as stakeholders.
- Set criteria for demonstration of technical and operational acceptability (including consideration of site-specific limitations).
- Set criteria for demonstration of safety acceptability.

***Analysis***

The technical assessment will be prepared consistent with the criteria established through the methodology:

- Determine whether the installation of systems required to comply with the proposed regulation would satisfy or conflict with the safety, reliability, operability and effectiveness of vessels, marine terminals, the emissions control system, and supporting shoreside infrastructure, as required by regulations identified in the Methodology section.
  - Assess the effectiveness, reliability and safety of proposed methods of compliance.
  - Assess ability to attain ambient air quality standards and technological feasibility and adaptability, and potential preemption by federal law.
  - Assess whether the proposed methods of compliance are designed to achieve levels of exposure consistent with no significant adverse health impacts; identify risks of the toxic air contaminants (TACs) at issue and explain how the proposed ATCM will reduce risks; demonstrate the need and appropriate degree of regulation for the

## **Evaluation of At Berth Shore-Based Emission Control for Tankers at California Ports Report Outline**

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- identified TACs; and potential adverse health, safety and/or environmental impacts that may result from implementation.
- Assess reasonable and feasible mitigation measures and alternatives to reduce or avoid significant environmental impacts, identify permitting requirements and timeline for implementation of such mitigation measures and alternatives.
  - If possible, identify applicable design standards that would comply with MOTEMS and other existing regulations that can foster vendor competition.
  - Identify what changes to technology may be necessary to ensure feasibility for use in marine terminal application, safety, and/or operability.
  - Conduct Risk Assessment/HAZOP for a shore-based design.
  - Prepare anticipated timeline from planning through implementation, including timeline for obtaining all permits and approvals and potential litigation delay.
  - Determine where, if any, a physical demonstration is required to validate the safety, reliability, operability, and effectiveness of vessels, marine oil terminals, the emissions control system, or supporting shore-side infrastructure.

### **Cost-Effectiveness and Economic Impact Review**

#### ***Methodology***

- Set economic/cost-effectiveness requirements pursuant to regulatory/legal requirements.
- Identify Standardized Regulatory Impact Assessment (SRIA) Requirements.
- Establish process for collection, de-identifying and aggregating individual company estimated capital, design, construction, CEQA review, permitting, and operational costs.

#### ***Analysis***

- Determine whether systems required by proposed regulation would meet the criteria in the H&SC for cost-effectiveness.
  - Assess cost-effectiveness, relative to reliability and safety of proposed methods of compliance and ensure that the rule will result in a cost-effective combination of control measures.
  - Assess cost-effectiveness, relative to economic and noneconomic costs and public health benefits (including potential impacts on small businesses).
- Assess whether proposed regulation would meet SRIA requirements.
- True-up cost-effectiveness of achievable design and implementation schedule.

**Evaluation of At Berth Shore-Based Emission Control  
for Tankers at California Ports  
Report Outline**

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**Conclusions**

- Summarize findings and recommendations (including need for physical demonstration).

**Evaluation of At Berth Shore-Based Emission Control  
for Tankers at California Ports  
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**Key Stakeholders including but not necessarily limited to the following:**

- American Bureau of Shipping for class society and can perform HazOps (also involved in Cold Ironing Feasibility Evaluation Study).
- Maritime safety expertise (i.e., DNV GL, Bureau Veritas).
- Marine boiler, engine and exhaust gas cleaning system manufacturers who understand tankers (including but not limited to, Alfa Laval – familiar with ship-side issues, classification areas and largest provider of tanker boilers in the world), SAACKE – boilermaker, GmbH, Harris Pye – boiler retrofit, MAN and Wartsila - propulsion and auxiliary engine manufacturers).
- Emission abatement industry (i.e., existing technology vendors).
- OCIMF (Oil Companies International Marine Forum)
- U.S. Coast Guard
- California State Lands Commission - Marine Environmental Protection Division
- CARB, BAAQMD, SCAQMD, USEPA
- SF Bay Coastal Development Commission (BCDC)
- International Maritime Organization (IMO) - Marine Safety Committee (MSC), Marine Environment Protection Committee (MEPC) and supporting sub-committees
- Federal non-regulatory agencies: U.S. Navy, U.S. Maritime Administration (MARAD)
- University of California - Riverside
- California Maritime Academy
- International Association of Independent Tanker Ownership (INTERTANKO).

**Estimated Timeline - CARB At Berth Regulation  
Shore-Based Emission Control System**

Major Tasks	Estimated Time (Years)	2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030		2031		2032		2033		2034		2035	
		Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10		Year 11		Year 12		Year 13		Year 14		Year 15		Year 16	
		1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H																		
General & Site-Specific Studies	3.5 to 4	■	■	■	■	■	■	■	■																								
Site-Specific Design	3.5 to 5.5					■	■	■	■	■	■	■	■	■	■	■																	
Engineering	3 to 4.5							■	■	■	■	■	■	■	■	■																	
CEQA Analysis	3 to 5.5									■	■	■	■	■	■	■	■	■	■														
Permits	2.5 to 3.5											■	■	■	■	■	■	■	■	■	■	■											
Contracting	2.5 to 3.5													■	■	■	■	■	■	■	■	■	■										
Crane Construction	3 to 5.5																	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Facility Construction	4.5 to 7.5																			■	■	■	■	■	■	■	■	■	■	■	■	■	
Commissioning	1 to 1.5																													■	■	■	

**Legend**

- Anticipated average time needed to complete each task
- Additional time needed for complex installations to complete the task

**NOTES**

1. The shaded areas of the bar chart which may be longer in duration than the expected time for a task as the start date of a task may vary from installation to installation.
2. The General and Site-Specific Studies are critical to evaluate the feasibility of various elements of compliance requirements to each installation (technological, safety, efficiency, cost-effectiveness etc).
3. The results of General and Site-Specific Studies may necessitate further refinement of the anticipated compliance options and timeline.
4. With unknown permitting timelines and delays, contracting and vendor timelines, the earliest compliance demonstration for most facilities is estimated to not occur before 2033.
5. For complex installations, this date could be further out; there could also be unexpected delays that are beyond operator control.

## Timeline Survey Summary

Major Tasks  (note tasks that can be run concurrently to help determine total lapse time from project design to commissioning)	Additional Information  (provide sufficient information to break down the activity so that it is clear what it includes and its expected duration)	Estimated Years							
		Average	Min	Max	Range (Min to Max)	Range (Average to Max)	Begin Year	End Year (Avg)	End Year (Max)
<b>General &amp; Site-Specific Studies</b>	General Evaluation Study	2.0	2.0	2.0	2.0	2.0	2020	2021	2021
	Site-specific Study including Safety review and possible field test	1.6	0.8	2.0	0.8 - 2	1.6 - 2	2022	2023	2023
<b>Site-Specific Design</b> (preliminary and final, includes assessments on utilities, siting for egress and safety as well as infrastructure)	Front End Engineering Design, Preliminary and Detailed Design, Crane, Scrubber, Electrical Design, Shiplside Modification Design, Determine footprint, electrical calssification and unit supply requirements, Coordinate with engineering, construction and technology companies, Review of utilities and existing infrastructure to support future terminal projects, Requirements for and consideration of MOTEMS.	3.5	1.0	5.5	1 - 5.5	3.5 - 5.5	2022	2025	2027
<b>Engineering</b> (engineering drafts for construction ex. built-for purpose, ship-to-berth variable height for loading and unloading operations, utility and infrastructure details)	Marine analysis of current and future vessels (MOTEMS Review), Detailed engineering calculations for process, energy and structural integrity, Coordination with utility providers that supply electricity, water and natural gas to the facility, Engineering Design Issued for Permit, Engineering Design Issued for Construction, Engage Classification Society to Develop Standards for Shiplside Modifications	2.9	1.8	4.5	1.8 - 4.5	2.9 - 4.5	2023	2026	2027
<b>CEQA Analysis</b> (engineering and site-specific details will be evaluated under CEQA to determine whether additional mitigations are required including preparation of an EIR, public comment periods, hearings, review of the EIR until a final adopted EIR results with specific mitigations for impacts if any)	Initiate Multi-Agency Process, Prepare applications, Initiate EIR, Develop EIR, Develop Mitigation Strategy, Finalize and Approve Mitigation Strategy, Public comment review, possible re-engineering of design to meet public concerns, Re-evaluation of both Site specific design and engineering (as needed), Purchase Mitigation Credits	2.9	1.2	5.5	1.2 - 5.5	2.9 - 5.5	2024	2026	2028
<b>Permits</b> (local, state, federal – CSLC, Bay Conservation and Development Commission, ACOE, CF&W, RWQCB, National Marine Fisheries Service, Air Districts, Port permits includes: preparation, review by agency, approval, development of mitigation plans and other recommendations made by agency.)	Coordination with multiple permitting agencies, at various locations within the state, Includes time for review, comments and any necessary requested changes which may require some re-design and engineering, Submit Environmental Applications, Environmental Applications Approved, Submit Building Applications, Building Applications Approved	2.5	1.1	3.5	1.1 - 3.5	2.5 - 3.5	2025	2027	2029
<b>Contracting</b> (bid process, selection, procurement)	Multiple RFPs (General Engineering, Specialty Engineering, Marine Engineering, Emissions Control Equipment, Pumps/Blowers, Crane and Scrubbers Design and Fabrication, Construction RFPs including general, marine, electrical, crane installation), Contractor vetting and selection, Insurance and procurement of long lead items such as steel, pre-fab materials	2.2	0.6	3.5	0.6 - 3.5	2.2 - 3.5	2026	2028	2030

## Timeline Survey Summary

Major Tasks <small>(note tasks that can be run concurrently to help determine total lapse time from project design to commissioning)</small>	Additional Information <small>(provide sufficient information to break down the activity so that it is clear what it includes and its expected duration)</small>	Estimated Years							
		Average	Min	Max	Range (Min to Max)	Range (Average to Max)	Begin Year	End Year (Avg)	End Year (Max)
<b>Crane Construction / Installation</b>	Install Crane Foundations and Cranes - Consider extensive lead times, Multiple locations, Limited availability of construction equipment, Delays when ships at berth	2.7	0.7	5.5	0.7 - 5.5	2.7 - 5.5	2028	2031	2033
<b>Facility Construction</b> (including deck modifications, pilings, gangway construction, additional/new ducting, piping, , seismic retrofit, new power infrastructure)	Multiple phases of construction at various locations (Limited ability to overlap construction at different locations, constrained by contractor availability and safety oversight and continuation of business, Assumes construction at one facility at a time), Consider extensive lead times, Piling, foundation, civil/structural steel works, electrical upgrades, Fabrication and Transport of Cranes & Scrubber, Procurement of Other Materials, Prep and Demo Work, Install Central Gas Collection System, Scrubbers, Support Systems (Piping/Electrical), Shiplside Modifications, Consider confined construction activity for few months per year (power supply, threatened species protection)	4.5	0.7	7.5	0.7 - 7.5	4.5 - 7.5	2029	2033	2035
<b>Commissioning and Compliance Demonstration</b> (verification of CARB compliance along with other federal and state requirements)	Consider longer commissioning durations for new technology, Commissioning for Terminal Operations and Operator-owned ships, Operator training and oversight, modifications to ensure proper operation to achieve compliance, Multiple agencies would either witness compliance testing or perform their own (CARB, local Air District, etc.)	0.9	0.2	1.5	0.2 - 1.5	0.9 - 1.5	2033	2034	2035

Port of Los Angeles and Port of Long Beach Comments on  
May 14 & 16, 2019 Workshops for the “Control Measure  
for Ocean-Going Vessels Operating At-Berth and At  
Anchor”, July 1, 2019

# SAN PEDRO BAY PORTS CLEAN AIR ACTION PLAN

July 1, 2019

Bonnie Soriano  
Chief, Freight Activity Branch  
California Air Resources Board  
1001 "I" Street  
Sacramento, CA 95814

**SUBJECT: PORT OF LOS ANGELES AND PORT OF LONG BEACH COMMENTS ON MAY 14 & 16, 2019 WORKSHOPS FOR THE "CONTROL MEASURE FOR OCEAN-GOING VESSELS OPERATING AT BERTH AND AT ANCHOR"**

Dear Ms. Soriano:

The ports of Los Angeles and Port of Long Beach (Ports) appreciate this opportunity to provide comments on the concepts and draft regulation language presented at the California Air Resources Board's (CARB) May 14 and 16, 2019 workshops regarding the "Control Measure for Ocean-Going Vessels Operating At Berth and At Anchor."

We want to thank CARB for continuing to work with the Ports and our tenants during this regulatory development process to obtain the best available data and to craft a regulation that achieves significant public health benefits. The Ports continue to appreciate the open dialog with CARB staff to discuss the regulatory concepts and share our comments and concerns.

The purpose of this comment letter is to respond to the May 8, 2019 version of the Draft Regulation Order provided at the May workshops. In Appendix A, CARB will find specific information relative to Port of Los Angeles.

The following summarizes the Ports' comments regarding the regulatory concepts presented at the May 2019 workshops:

- **The Proposed Implementation Timelines Are Still Too Aggressive** – In the May 8, 2019 draft regulation, container terminals are still required to control ship emissions for every



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visit by 2021, with 10% flexibility split evenly between Terminal Incident Exception (TIEs) and Vessel Incident Exception (VIEs), by 2021, with further reduction to 6% flexibility split between TIEs and VIEs for 2022 and beyond. This timeline is unreasonable. While the TIEs and VIEs provide some flexibility for terminals and vessels to avoid compliance action for a limited number of unforeseen circumstances that result in a vessel not being able to plug in, that flexibility does not avoid the need for infrastructure to be installed to allow for access to shore power for 100% of all calls. Given the anticipated schedule for finalization of the proposed regulation, there will be less than a year from adoption to when this implementation requirement comes into effect, which does not allow for any of the necessary shore power improvements to be constructed.

If CARB hopes terminals and fleets will opt for shore power, a greenhouse gas reduction strategy, to meet their increased compliance requirements rather than the alternative emission control devices, which are known to increase greenhouse gases, this timeline does not allow for that compliance path to materialize for at least several years. The Ports have provided documentation in their previous letter dated May 20, 2019 that shore power projects take 5 years on average to complete. In addition, there are still considerable feasibility concerns regarding the ability of terminal operators, and/or third party vendors to develop and deploy alternative emission control devices on a stringent time line of one year.

The Ports are encouraged that CARB plans to have an interim evaluation in 2023 for tankers and Ro-Ros, but this evaluation should not replace a technical feasibility assessment to better inform this regulation, as described below. We also believe more than one evaluation maybe necessary. We ask that a feasibility assessment be updated in 2025 and beyond to evaluate the state of the technology and industry's ability to comply with the regulation. The Port of Los Angeles has specific concerns for tanker terminals as detailed in Appendix A.

- **A Technology Feasibility Assessment Process Is Needed** – The Ports continue to urge CARB to develop a technology feasibility assessment of the alternative At Berth technologies, which would look at the state of technological development and their readiness to be deployed in the marketplace to support efforts to achieve public health benefits. The berth analysis developed by CARB should not be misconstrued as a technical document at the level of detail upon which regulation should be formed. It is an aggregation of terminal operator and harbor pilot opinions (no data), and Google Maps research, and is not founded upon any engineering assessment of the infrastructure required at the terminals. Further, there are challenges associated with the technologies upon which this regulation depends which, by all appearances, are too costly, technologically and operationally infeasible in some cases, and/or unsafe to use.

In addition, this necessary feasibility assessment should include an evaluation of: (i) state of technology and deployment readiness for both shore power and alternative emission control devices; (ii) the requisite timeline to design, build, test, and deploy shore power and alternative control technologies for each California port to achieve at minimum 95% compliance, and identification of any associated constraints such as wharf space; (iii) safety and navigation of harbor waters space due to applications of new technologies for unregulated vessel types; (iv) number and types of alternative control technologies, which would be needed at each California port; (v) the cost of the various types of technologies and availability of incentives to encourage early demonstration of such technologies; and importantly, (vi) the appropriate remediation fee to encourage investment in ship- and shore-side infrastructure and alternative emission control devices, while not driving business out of California.

- **All Terminals Should Be Required to Submit Terminal Plans** – The proposed regulation language allows terminals to have the ports submit plans on their behalf. The Ports should not be responsible for the submission of each terminal's plans on their terminal operators' behalf. All terminals should submit their own terminal plans. Ports do not have control over the financial and operational decisions terminals will have to make in order to comply with the regulation, and Ports cannot be liable for terminal infrastructure deployment under the new rule. In addition, if the terminal operator intends to install the shore power infrastructure themselves, they should be required to provide the elements outlined in the proposed port plan requirements rather than the Port.

In the past, the Ports have supported shore power deployment by providing the design, bid, build, and services. In some cases, the investment was recouped through terminal leases. This was a service to our terminals, particularly for the initial installations under the original 2007 shore power regulation, but is not necessarily the path forward given the Ports' current capital project commitments and the extensive electrical infrastructure required to achieve the zero emission goals of the Clean Air Action Plan (CAAP) at the terminals.

If the Ports are still required to submit port plans in the proposed regulation update, then the terminal plan deadlines must be set at least six months prior to port plan deadlines to allow the Ports sufficient time to review the submitted terminal plans, negotiate lease terms with their terminals, and compile the necessary information CARB has requested for the Ports to submit port plans. There is no guarantee that agreements will be reached in time to meet the timeline for this part of the proposed regulation. Many of these leases have several years remaining and terminals may be reluctant to renegotiate lease terms, especially for strategies that have no CARB certification.

If terminals determine they need to construct more infrastructure, project initiation will not commence until the proposed At Berth Regulation goes into effect. It is unrealistic to

expect terminals or the ports to have design or schedules for equipment installation completed by June 2020. The earliest date according to CARB’s timeline for project initiation is January 2020, assuming terminals do not use the first six months to evaluate their best compliance option. Given that project initiation, consultant selection for design, preliminary design, CEQA approval, and final design can take 23-30 months, it does not make sense to anticipate a schedule and estimation of the electrical infrastructure required at a terminal in just six months. If the terminals/Ports submitted plans solely based on preliminary design, which is a vastly premature estimate of project scope and timeline, it would take 11-15 months. This challenge once again points to the impossibility of meeting the 2021 timeline with shore power, the most mature, emission-efficient, technological solution.

- **Exceptions to Delays in Port Plan Schedules** – If ports are still required to submit port plans, then CARB should provide exceptions to any possible enforcement action if port plan schedules are not met. The port plans can only provide an estimated schedule of installing equipment and/or necessary construction projects. Delays can and will happen outside of the control of the Ports. For example, delays due to permitting, equipment acquisition, environmental assessment, and other events that may cause schedules to not be met should be given exemptions to enforcement action in this regulation. It is unfair to hold the Ports liable for mobile source operators’ actions and emissions outside of our direct control.
- **Specifics on Remediation Fund** – The Ports request that CARB revise the fees for payment into the remediation fund for longer-term outages due to construction projects or repairs. CARB has set remediation fee costs as shown below in Table XVIII of the “Control Measure for Ocean-Going Vessels At Berth Cost Analysis Inputs and Assumptions for Standardized Regulatory Impact Assessment.”

**Table XVIII. Remediation Fee Costs**

Data Input	Value			Basis
Hourly remediation fee for terminal and for vessel, for each vessel type	Vessel Type	Vessel Hourly Fee	Terminal Hourly Fee	Staff analysis using Carl Moyer formula to calculate average emissions in tons per hour by vessel category. Product and crude tanker values were averaged for cost estimation purposes, however the fee would be dependent on the vessel type. Note that these values are estimates based on current Staff analyses at the time this document was prepared, and do not necessarily represent the exact fees that would apply.
	Container/ Reefer	\$2,395	\$2,395	
	Cruise	\$12,879	\$12,879	
	Auto/Ro-Ro	\$1,515	\$1,515	
	Product Tankers	\$1,783	\$1,783	
Crude Tankers	\$9,873	\$9,873		
Which terminals would offer the remediation fee as an option?	All (100%)			Staff assumes that all terminals would offer the remediation fee as an option.

CARB has set the remediation fee cost at an unreasonable level for long term construction projects. Appendix A gives an example of how the remediation fees using Table XVIII would have more than doubled the cost of a recent Port of Los Angeles construction project,

which increased shore power capabilities, by upgrading electrical infrastructure at their World Cruise Center. If terminals decide that their strategy to meet this regulation is to install more shore power infrastructure, then similar situations are likely.

The Ports are also concerned that unforeseen repairs that may take several months or more could occur. In these types of prolonged incidences, the remediation fund fees set per hour will become so prohibitively high that terminals may have to shut down or turn away vessels during the repair. Ports again encourage CARB to conduct a feasibility study that would help set the rates for the remediation fund and determine the state of alternative emission control technology.

There are currently a total of two certified alternative emissions control systems in use at this time, and those systems are only certified for use on container vessels. The Ports are uncertain in how many, if any, additional systems will be deployed in the next few years. This limited number of options makes it difficult for terminals or shipping lines to secure exclusive service of these systems, which would mean most construction or repairs would cause the payment of large fines pursuant to the remediation fee fund.

The Ports encourage CARB staff to set up the remediation funds for use specifically in technology research, development, demonstration, and deployment of emissions reduction technologies specific to ocean going vessels rather than for general emission reduction use. As stated in our previous letters, in order to accelerate the development and deployment of shore power and alternative control options, including infrastructure for non-container terminals and vessels, the Ports request that CARB prioritize funding as they did for the currently regulated fleet through Proposition 1B in 2006. The remediation fund can be better utilized to accelerate emission reductions from this under-represented category.

- **Compliance May Hinder CAAP Efforts** – Lastly, the Ports remain concerned that the cost to comply with CARB’s proposed Rule will affect our ability to meet the goals under the 2017 CAAP Update given the significant upfront costs of an At Berth Infrastructure Program. The costs shown in the May presentation were annualized, but much of the costs will be upfront rather than spread over the ten years. CARB staff has also assumed that minimal infrastructure changes will be needed to meet the regulation. Our joint letters to CARB have included cost estimates that we feel are representative of the infrastructure costs that would be necessary to meet compliance and fulfill the Ports’ obligations as currently written in this draft regulation. CARB has not included any of these costs in their revisions, even with the provision of invoices and information directly from the Port of Long Beach financial system.

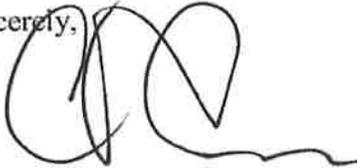
In addition, Port staff resources are limited. The staff that are currently designing the zero-emission terminal infrastructure for technology demonstration projects, and future full-scale deployments are the same staff members who would be responsible for designing the

infrastructure to support the new At Berth Regulation. This underscores the need for prioritizing programs and funding, as described above and in previous letters, in order to determine how to most effectively allocate our resources to participate in the development and implementation of CARB's regulatory program.

The Ports thank CARB staff for hosting additional workshops, engaging with us directly, and their consideration of the comments contained in this letter as well as in the attached Appendix.

We look forward to continuing to meet with CARB staff in the future to further discuss the proposed amendments to the At Berth Regulation. Please feel free contact us with any questions or concerns regarding this letter.

Sincerely,



CHRISTOPHER CANNON  
Director of Environmental Management  
Port of Los Angeles



MATTHEW ARMS  
Acting Director of Environmental Affairs  
and Planning  
Port of Long Beach

Attachment

cc: CARB, Cynthia Marvin ([Cynthia.Marvin@arb.ca.gov](mailto:Cynthia.Marvin@arb.ca.gov))  
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*Commissioner*

Anthony Pirozzi, Jr.  
*Commissioner*

Edward R. Renwick  
*Commissioner*

Eugene D. Seroka

*Executive Director*

## APPENDIX A Port of Los Angeles Response to CARB At Berth Regulation Berth Draft Regulation (version May 8, 2019)

The Port of Los Angeles (POLA or Port) appreciates this opportunity to provide more detailed comments on the California Air Resources Board (CARB) draft regulation “Control Measure for Ocean-going Vessels At Berth” (version May 8, 2019). The Port has some concerns regarding tankers and the remediation fees.

### Tankers

POLA had provided specific information about our tanker terminals in our previous joint letter with Port of Long Beach on May 20, 2019. Many of our tanker terminals are being redesigned to meet California State Lands Commission (CSLC) Chapter 31.F 2016 California Building Code, Title 24, Part 2, Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) requirement. MOTEMS is a comprehensive set of codes and standards for analysis, design, inspection/maintenance, and operation of existing and new marine oil terminals in the State of California. MOTEMS requirements will ensure better resistance to earthquakes, protect the public and the environment, and reduce the potential of an oil spill, while maintaining the operation and viability of the marine oil facility.

The new terminal designs will limit the number of emission control strategies that our tanker terminals will be able to utilize. A majority of the new designs do not leave any space for a land-side alternative emission control technology strategy. There is also no shore power infrastructure in the design drawings at this time, nor have there been any discussion from our tanker terminals to install shore power. Finally, as stated in POLA’s appendix in the joint letter to CARB on May 20, 2019, there are various areas throughout the Port where navigation of the waterways would preclude the use of a barge-based system.

Two of our terminals have completed their environmental document and design (Shell and PBF). Construction will soon begin at these terminals and is unlikely to be halted due to this regulation to redesign the terminals. CSLC would be averse to any delays to these construction projects as they are meant to protect the public and the environment. Other terminals currently working on their environmental documents and designs are also unlikely to redesign their terminals for CARB’s At Berth regulation as there is currently no CARB certified emission control technology for tankers. The terminals would not be able

to wait for the technology to become available in order to design their terminals as they already need to meet MOTEM standards.

The Port stresses the need for CARB to conduct a feasibility assessment to better inform this regulation, especially for tankers due the many variables and restrictions associated with this industry.

Remediation Fund

CARB has set remediation fees in Table XVIII of the “Control Measure for Ocean-Going Vessels At Berth Cost Analysis Inputs and Assumptions for Standardized Regulatory Impact Assessment,” that would be used for construction and repair projects.

**Table XVIII. Remediation Fee Costs**

Data Input	Value			Basis
Hourly remediation fee for terminal and for vessel, for each vessel type	Vessel Type	Vessel Hourly Fee	Terminal Hourly Fee	Staff analysis using Carl Moyer formula to calculate average emissions in tons per hour by vessel category. Product and crude tanker values were averaged for cost estimation purposes, however the fee would be dependent on the vessel type. Note that these values are estimates based on current Staff analyses at the time this document was prepared, and do not necessarily represent the exact fees that would apply.
	Container/ Reefer	\$2,395	\$2,395	
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	Product Tankers	\$1,783	\$1,783	
Crude Tankers	\$9,873	\$9,873		
Which terminals would offer the remediation fee as an option?	All (100%)			Staff assumes that all terminals would offer the remediation fee as an option.

POLA owns and maintains shore power infrastructure at our terminals. Construction and repairs to shore power infrastructure are conducted through the Port. We are concerned that the mechanism used to determine the amount paid to the remediation fund is unreasonable for long construction or repair projects. There are instances where unforeseen repairs may take longer than a few months due to the need to order equipment, coordinate times for terminal shutdown during repairs, or other issues that may come up. The current scheme for calculating payment to the remediation fund is based on an hourly basis per a call. For extended periods where shore power will not be accessible, the cost will be extraordinarily high for industry or the Port as shown in the example provided below.

The Port recently upgraded our World Cruise Center to allow for 11 kV and 6.6 kV shore power connections for cruise vessels. This construction required a new transformer at the Cruise Center. The goal of the construction was to provide enough power for the large cruise ships to plug into shore power at POLA. The construction occurred from June 30, 2017 through April 23, 2018, and during the electrical upgrade no visiting cruise vessels were able connect to shore power. Alternative shore power was not an option either since there are no CARB-certified alternative emission control technologies for cruise vessels. The total number of hours for cruise vessels berthed at the World Cruise Center during the construction was 1,056.55 hours. Based on the hourly fee for cruise in Table XVIII, the hypothetical remediation fee for this construction project would have cost \$13,607,307 (1,056.55 hour x \$12,879/hour). The total cost of the electrical upgrade itself

was about \$11 million. This hypothetical remediation fee would have more than doubled the cost of this construction project that took less than a year to complete.

Since there are currently only two CARB-certified alternative emission control systems available at the Ports of Los Angeles and Long Beach, for long periods of construction or repair, there is uncertainty with respect to the availability of these systems in the future. In cases where a system cannot be secured, the remediation fee compliance mechanism would have to be utilized. As shown in our example above, the fee could increase to amounts that are not sustainable to industry or the Port. In our previous and current comment letters, the Ports request that CARB conduct a feasibility assessment. This will help determine the rate for the remediation fund as the current remediation fee costs will be too high for these prolonged instances of shore power construction or repair.

Comments on Proposed At-Berth Amendment  
Regulatory Concept, June 14, 2019



June 14, 2019

Bonnie Soriano  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

**Subject: Comments on Proposed At-Berth Amendment Regulatory Concept**

Dear Ms. Soriano:

Thank you for the opportunity to provide comments on the revised regulatory concept for the At-Berth Regulation Amendments. The industry coalition appreciates that California Air Resources Board (CARB) staff has continued to revise the regulatory concepts in response to comments provided and looks forward to continuing this dialogue with the CARB staff.

Due to the workshop schedules and time constraints, each of the associations of this industry coalition and their members reserve the right to revise and expand the questions and comments contained herein. Some initial comments and questions on the regulatory concept follow.

**No Response on Industry Proposal**

Earlier this year, an industry-sponsored proposal for amending and expanding the At-Berth Regulation was sent to CARB staff for consideration. That alternative proposal establishes a path forward to increase compliance and continue to ensure further emission reductions from vessels while at-berth in California ports. The Proposal includes measures to ensure compliance and emissions reductions consistent with current CARB emissions goals, expand investments in port infrastructure, and increase vessel compliance.

Unfortunately, the industry coalition has not been provided any feedback on the proposal that has been submitted. No comments have been provided and no concerns raised. The industry coalition strongly believes that the proposal produces the emission reduction benefits that CARB staff is seeking while providing a regulatory framework that meets the dynamic needs of the industry. As a result, the industry coalition renews our request that CARB staff consider the alternative proposal and discuss the proposal through a collaborative process.

**Regulatory Proposal Imposes an Indirect Source Rule**

The industry coalition remains strongly opposed to any regulatory framework that establishes an indirect source rule. By creating regulatory liability on one party for the actions or emissions of another party, the regulatory concept creates an impossible regulatory burden. It is important that any regulatory framework only hold entities responsible for actions or emissions under their direct control.

Clear lines of responsibilities are the only way an amended At-Berth Rule can be successful and avoid the failures of the existing rule.

### **Proposed Schedule is Unrealistic**

The proposed compliance schedule is unrealistic to achieve for the existing regulated fleet. Under the current rule, implementation was phased in beginning with 50% in 2014, increasing to 70% in 2017, and allowing three years for the industry to improve compliance by 10% to 80% in 2020. From the time the final rule becomes effective to January 2021, there will be less than a single year to increase compliance by 20%. Staff has argued that this is achievable because nearly the entire fleet will need to be retrofitted to achieve the 2020 requirements and that there are significant emission reductions to be gained through the requirement. But these two positions are incompatible with each other; only one can be true. Because the existing rule has a requirement that all equipped vessels must use shore power, either the vessel fleet needs additional retrofitting to meet the proposed requirements resulting in additional emission reductions or the fleet is already equipped to meet the proposed requirements in which case few additional emission reductions can be achieved.

In either case, the certainty that the proposed rule requires means that either additional shoreside infrastructure or alternative control options will be necessary. The less than one-year timeframe from the time the rule becomes effective until January 2021 is unrealistic. The ports of Long Beach and Los Angeles have submitted two extensive letters discussing the additional infrastructure necessary to come into compliance with the proposed regulation. In short, years of additional preparation is necessary. The proposed rule must reflect this reality.

For tankers, CARB has established a schedule that a primary manufacturer of emissions control equipment has told CARB staff is unrealistic. In an apparent effort to force the short circuit of the technology development timeframe, the proposed regulatory concept has established unrealistic goals for developing new technology for the tanker industry.

Equally important, there is insufficient time to prepare terminal and port plans. From the effective date of the rule, until June 2020, will leave less than six months' time to prepare appropriate plans. Terminals and ports will need to coordinate on the development of any plan in order for the plan to be credible. In order to complete the plans, port and terminal operators will likely need to retain outside consulting services. Any such work will be subject to a public contracting process. An port that does not have such services available through on-call contracts would be subject to the State-mandated process to retain outside expert consulting services, which will likely take nearly the entire six months available: preparing a request for proposals, solicitation, proposal review and selection, and contracting. It has been estimated that the design work alone will take 12 months.

From plans through every aspect of implementation, CARB staff has established an unrealistic timeline for implementation that will be impossible to successfully complete.

**Proposal Continues to Hold Regulated Entities Responsible for Actions Outside Their Control**

The proposed rule continues to be plagued by fundamental problems in its framework. Key among those problems (and with the existing rule) is the rule's attempt to hold one party responsible for the failure of another party or for issues outside the control of any party. As the industry has repeatedly raised time and again, there are multiple parties that are responsible for ensuring a successful shore power connection. While key among the parties are the ocean carrier and terminal operator, an incomplete list of other independent parties involved in the process include utilities, union labor, which is independently responsible for dispatching labor, port authorities that at some ports dispatch labor to energize connections, pilots who determine when a vessel is ready to sail, and tug boat operators. Despite repeated discussions on these issues, the CARB proposal holds terminals and carriers responsible for the possible failures of these other parties.

Far worse, the proposed rule continues to hold marine terminals and ocean carriers responsible for issues completely outside their control. At large terminals, berth space is assigned based on a planned schedule. Those berth assignments allow the terminal to provide shore power and the vessel the ability to reach the shore power connection point. Unfortunately, schedules can be impacted by weather, prior port delays, labor issues, extra loaders, or a host of other issues. However, in the base case, the ocean carrier arrived ready to connect and the terminal assigned space ready to connect the vessel. Impacts such as weather delays (or any issue outside the direct control of the parties) that result in an inability to make a shore power connection should not result in either party being held responsible. While the concept of Terminal Incident Exceptions (TIEs) and Vessel Incident Exceptions (VIEs) may prove useful in a final regulatory framework, the concept should not be used as a bandage for areas that the proposed concept holds regulated parties responsible for issues outside their control.

**VIEs/TIEs**

As mentioned previously, VIEs/TIEs may prove useful in the regulatory framework. Unfortunately, the current proposal uses VIEs/TIEs to hold carriers and terminals responsible for actions outside their control. As an example, a carrier would need to expend a VIE when a CARB-sanctioned alternative control technology fails. The ocean carrier relies on CARB to verify alternative control technology as the carrier does not have the flexibility to use non-CARB sanctioned equipment. The ocean carrier should not be held responsible for third-party operator equipment failure, nor should they be required to "remediate" any impact through the fees. Any mitigation should be the responsibility of the third-party provider, after all that is the service they are providing.

A similar problem may likely be dispute resolution. When there is a failure to connect shore power, there may be disagreement between terminal operators, ports, and ocean carriers as to the cause. If the parties cannot come to agreement to cause, how will such disputes be resolved. The mechanisms associated with the use of VIEs/TIEs engender finger-pointing. This is due in part to the fact that the regulatory framework continues to hold parties responsible for actions outside their control (as described above). It is also due to the fact that there may not be clear cut answers in all situations. A focus on clear lines of responsibility, as proposed in the industry alternative, as opposed to an attempt

to micromanage all possible circumstances would avoid these problems inherent in the proposed structure.

Also concerning is that CARB is proposing no VIEs for new fleets entering the market. Without a doubt that will put new entrants at a significant disadvantage. New fleets are seen entering markets throughout California. Those fleets should be granted the opportunity to compete with existing fleets on an equal playing field. In the same vein, existing fleets serving California markets would be at a competitive disadvantage if it chose to make a significant expansion within an existing market. If two different fleets serving California offered the same level of service in a given year but one fleet had fewer calls in the prior year, the fleet with fewer calls would be at a measurable competitive disadvantage even though the two fleets were now offering the same level of service. The same scenario is equally applicable for terminal operators. For either new services or expanded services, the allocation of VIEs/TIEs should not create such distortions that favor dominant incumbents over others.

Another concern regarding VIEs/TIEs is the requirement of reporting prior to vessel departure. In some cases, that would give responsible parties less than 10 hours to complete the reporting requirements. In other cases, it may simply be impossible because the cause of a failed connection may not be known immediately. In general, the reporting requirements of the proposal cannot rely on the assumption that the port, terminal, and vessel operators have perfect knowledge. As has been demonstrated multiple times, circumstances outside the control of any of the parties can arise and will leave the responsible parties working to identify all the necessary details to provide a complete report to CARB. At a minimum, responsible parties should have seven days to complete reporting, which would allow time for internal review of the reports.

The declining availability of VIEs/TIEs does not seem to consider the impact of aging equipment over time. Today, the shore power equipment is still relatively new. As it continues to age in a harsh marine environment, equipment failures and the need for repairs/replacements will increase, not decrease. CARB staff should evaluate the foreseeable impact of equipment aging on the need for VIEs/TIEs and propose a VIEs/TIEs schedule that reflects that need. Separate from aging equipment is the fact that many vessels that have been retrofit are approaching their mandatory five-year drydocking. There will be difficulty in finding shore power-capable charter vessels for a short-term substitution. The proposed rule should account for this within the allocation of VIEs/TIEs. In addition, vessels should not be automatically prohibited from remediation fees when a vessel is not shore power-capable as it is not always possible to secure shore power-capable vessels for short-term charters.

#### **One-Hour Connection Window Unnecessary, Unachievable, and Unsafe**

CARB staff has arbitrarily added a one-hour connection requirement to the checklist requirements of the proposed rule. There is no basis for this time limit and there has been no demonstration that it can be done safely for all the connection configurations that are **permitted** under the existing rule. The existing rule permits multiple connection strategies, some of which will require more than one hour. It would be harmful, after five years of experience with existing systems to require vessels to retrofit existing shore power-capable vessels to allow a new connection procedure. Doing so, will take existing shore power-

capable ships out of service for retrofit, decreasing emission reductions in order to save minutes during the connection time.

Ultimately, the shore power connection process requires individual people to manhandle heavy, high-voltage equipment and energize that equipment. Under no circumstances should that work be performed under a stopwatch. In addition, there is no need for the stopwatch. The labor crew on the scene will make the best determination, keeping in mind safety, of how to handle the connection process. The labor crew is there for the purpose of making the shore power connection and there would be no interest on their part to delay it. Finally, the one-hour requirement would likely be ineffective because any exceedance of the one-hour requirement would likely result in a safety exemption being sought, as having labor move faster handling high voltage equipment would be fundamentally unsafe.

#### **Alternative Control Technologies**

The proposed language states that “[p]rior to entering into any agreement or contract, vessel operators or terminal operators shall follow due diligence in selecting third party control operators.” It is unclear what this language requires. CARB is the sole determiner of whether a technology is verified or not. In addition, ocean carriers and terminal operators are not experts on CARB-certified control technology and would need to rely on the word of the CARB-certified third-party operator that the operator can provide the needed service. If such language remains in the regulation, the onus should be on the third-party operator to seek vessel operating parameters and certify that they are capable providing service consistent with the CARB Executive Order verifying their technology.

In addition, the proposed regulatory concept relies on a number of assumptions regarding the availability of additional alternative control technology options. It is impossible for sufficient additional alternative control technology options to be available by January 2021 in order to support the increased connection requirements proposed for the existing regulated fleet. In addition, no technologies currently exist that can serve the needs of cruise ships or the proposed expansion fleets of tankers and roll-on/roll-off vessels. CARB staff is aware of the limitations of the currently available control technology providers. In addition, CARB staff has heard directly from the manufacturers of the emissions control technology that the horizon for developing control technology is well beyond the proposed compliance dates for the tankers and roll-on/roll-off vessels. CARB is betting the compliance of an entire industry on technology that has not been proven sufficiently reliable over the past five years.

Even more troubling, in regard to greenhouse gases (GHG), CARB has defined an approved emissions control strategy as one that is “grid-neutral, emitting no more carbon emissions than if the strategy were powered by the California grid for the year that the technology is granted an Executive Order.” Currently, no alternative control technology can meet this standard today. As a result, upon the effective date of the proposed rule, no alternative control technology will be

available. The language also implies that Executive Orders will only be granted on an annual basis. A temporary Executive Order will create uncertainty about the future availability of alternative control systems. It is unlikely that any company will be able to plan not knowing what the following year's GHG standard for an alternative control technology will be and whether a given technology will be granted an Executive Order.

#### **Vessel Commissioning Should Not Have Limitations**

All vessel commissioning should be fully exempt from the provisions of the rule. The purpose of vessel commissioning is to identify problems that **cannot** be identified earlier. If all issues could be resolved with certainty before vessel arrival, there would be no need for commissioning. Commissioning is necessary to protect both the vessel's shore power infrastructure and the shoreside infrastructure, preserving both for long-term successful use. Commissioning is also a function of the technology's high-voltage nature not malfeasance on the part of the port, carrier, or terminal. It should be recognized as a necessary part of supporting this regulation.

#### **Vessel Shore Power Equipment**

Shore power connections are located in proximity to electrical panels, therefore, cruise ships and cargo ships currently in the regulation are **not** typically equipped to connect from both Port and Starboard side. The industry coalition opposes a provision in the draft regulatory language that could be used to require a vessel to have shore power equipment on both the starboard and port side of a vessel. The current practice of assigning berths to accommodate the location of vessel shore power connections is manageable by industry and essential for maximizing utilization of shore power.

#### **Expanded Exemptions Are Necessary**

The exemptions provided in the proposed regulation are too narrow and do not envision the multiple areas that other government agencies have competing requirements. Often, ocean carriers or terminal operators are required to perform actions at the direction of a government agency that would prevent a shore power connection. Just one example of this might be U.S. Coast Guard testing of auxiliary engines. The regulation should include a broad exemption for actions ordered by a government agency that prevents a shore power connection. Again, TIEs/VIEs should not be necessary for issues that arise outside the control of the regulated parties, whether caused by events like nature or at the direction of governmental agencies.

#### **Ocean-going Vessel Opacity Requirement**

The industry coalition opposes the inclusion of an opacity requirement for ocean-going vessels at anchorage. Establishing such a standard infringes upon the exclusive jurisdiction of the International Maritime Organization and the international engine standards established by treaty through MARPOL Annex VI to which the United States is a party. CARB does not have the jurisdiction or authority to implement such requirements. Finally, it is inappropriate to include such a requirement in an At-Berth Rule. There has been no demonstration of need, no estimation of benefit, and no cost to implement. Basic questions on enforceability have not been discussed such as how enforcement would occur or

even how an inspector would distinguish smoke from steam. Such a requirement needs its own rule with evaluation of impacts, benefits, and costs.

### **Physical Constraints**

CARB has defined a “Physical Constraint” as an avoidable barrier that the U.S. Coast Guard has, in writing, made a safety determination that prevents the use of a CARB approved control strategy. Has CARB affirmatively established that the U.S. Coast Guard is willing to provide such letters? Government agencies are often reluctant to prospectively provide an opinion on a set of circumstances and may only provide consultative guidance. Since the definition relies upon the action of another government agency, it is incumbent upon CARB to affirmatively establish that the U.S. Coast Guard will provide such documentation.

### **Reactive Organic Gases**

In the latest draft regulatory proposal, control for Reactive Organic Gases (ROG) has been added. This is the first time ROG has been included as a targeted pollutant within the At-Berth Regulation. It does not appear that any of the normal supporting information that addresses the need to control specific emissions has been prepared. That leaves industry stakeholders with multiple questions regarding the need and feasibility of the proposal. What is the demonstrated need to control this pollutant? What are the benefits of the control? How will control equipment be impacted by the need for control? What is the cost-effectiveness of control for ROGs? Neither of the currently approved alternative control systems are verified to control ROG. Upon the amended rule coming into effect, the existing alternative control systems will no longer meet the regulation’s requirement, eliminating the systems as a viable option. What is the potential impact of the inclusion of ROG on the availability and viability of alternative control systems?

### **Emergency Events**

The definition of an Emergency Event has been unreasonably limited to utility related issues. The definition of an Emergency Event, in regard to both vessel and terminal operators, should preserve the judgement of the operator to identify an emergency and take appropriate steps to protect people and property.

### **California Voyage**

The draft regulatory language includes a definition for a California Voyage that could cause confusion with the term visit. The industry coalition recommends that definition be modified to state: “‘California Voyage’ means a vessel trip to the West Coast of North America that includes one or more vessel calls to California ports or marine terminals.” In the revisions to the proposed regulatory language, the use of the term “California Voyage” has been dropped from the regulation. The regulation should use the term to make clear that any corrective action that is needed would be required for a subsequent California Voyage. Otherwise, shifts within a single port or visits to a subsequent California port during the same California Voyage may be subject to penalty before corrective action is possible.

### **Necessary Infrastructure**

Within the section on Terminal and Port Plans, the draft regulatory language includes a concept of “necessary infrastructure”. What does this mean? How is it measured? How will it be enforced?

### **Impact of Harbor Craft Emissions**

The draft regulatory language includes many instances where increased tug activity will be necessary, sometimes significant increases. However, there is no analyses of the impact of these emissions or how the emissions reduce the effectiveness of the rule.

In one example, four tug movements would be required for the placement (two movements) and removal (two movements) of a barge-based alternative control system for a Ro/Ro vessel. Main tug engines are significantly larger than auxiliary engines on a Ro/Ro vessel. Given the short visit of Ro/Ro vessels, typically 10 hours, the tug emissions will significantly erode the benefit of the control system, increase greenhouse gas emissions, and reduce the cost-effectiveness of the effort. CARB staff has not shown the impact of these tug emissions for Ro/Ro or any other vessel category. Before proceeding, the analyses should be re-run to determine what emissions benefit remains after the impact of tug emissions.

In another example, there could be significant impact from the requirement that vessel be relocated to a shore power capable berth if one becomes available. Depending on the remaining time of the vessel call, the combined excess emissions from delaying the vessel through the move and the tug emissions to support the move, may exceed any benefit resulting in a net increase in emissions. While terminal operators have taken steps to relocate vessels to ensure the use of shore power whenever possible, a blanket requirement may result in negative as well as positive outcomes. The proposed language should reflect this reality or be removed from the regulation.

### **Notification for Malfunction**

The proposed regulatory language includes a “Notification for Malfunction” section. The section is indicative of the many fundamental problems with the proposed regulatory language. The proposed Notification language is typical for stationary sources. However, the draft rule proposes to impose operational controls on a mobile source. The application of stationary source approaches to emissions control is inappropriate and unworkable. The entire section should be removed from the draft.

### **Regulatory Language Ambiguities**

The draft regulatory language contains several ambiguities in the Ocean-going Vessel Requirements, Terminal Operator Requirements, and the Terminal and Port Plans sections. Due to the regulatory construction it is not always clear what categories are subject to what requirements. This is often due to placement of requirements for vessels or terminals in a parallel structure to the applicability of provisions to vessels and terminals in a given section. Instead, the regulatory language should place requirements in a subsection to applicability. Throughout these sections, the regulatory language should be revised to make clear the relationship between requirements and applicability.

**Severability**

The proposed regulation contains a severability clause. The proposed regulatory framework is very complex. That complexity has given rise to many unanswered questions regarding implementation and enforcement. Should any portion of the rule be rendered inoperable, the remaining rule would likely be unworkable. As a result, the rule should not contain a severability clause.

**ATB Classification**

With the proposed expansion of the At-Berth Rule, Articulated Tug-Barges (ATBs) may now fall under both the At-Berth Regulation and Harbor Craft Regulation. It is likely that this was an unintended consequence resulting from the peculiarities of how the rules were separately constructed. CARB staff should revisit the rule construction with regard to ATBs to ensure that the vessels are not captured under both rules.

**Conclusion**

The industry coalition appreciates the opportunity to submit these comments and looks forward to continuing to work with CARB staff on the development of amendments to the At-Berth Regulation.

Sincerely,

***California Association of Port Authorities  
Pacific Merchant Shipping Association***

***Cruise Lines International Association  
Western States Petroleum Association***

Comments on At-Berth Draft Regulation Order - 5/8 2019  
Version, June 13, 2019

June 13, 2019

Ms. Bonnie Soriano  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Transmitted via email

**Subject: Comments on At-Berth Draft Regulation Order - 5/8 2019 Version**

Dear Ms. Soriano:

Thank you for the opportunity to comment on the most recent draft At-Berth Draft Regulation and for the additional time to submit the comments. CLIA also appreciates the meeting with you and your staff to discuss specific issues related to the regulation of concern to the cruise lines. CLIA will be signing on to the PMSA Coalition comment letter and agree with their comments. This letter reiterates the concerns (outlined below) with the At-Berth draft regulation that CLIA brought to your attention at the meeting that are cruise-line specific:

- **THE REGULATIONS SHOULD CONTINUE THE EXISTING NON-FREQUENT FLIER EXEMPTION FOR CRUISE SHIPS:** CLIA remains concerned that the draft regulation is so rigid with every vessel, every call and mitigation of every emission at 100% that it will impact the cruise markets in California. This could result in world and transitioning cruises which cannot justify the millions of dollars to add shorepower equipment on vessels that visit California only a few times per year, to skip California ports, causing major financial impacts for those ports. CLIA requests that CARB reinstate the non-frequent flier exemption for cruise ships making four or fewer visits per year. CLIA is willing to discuss other potential options to the non-frequent flier exemption such as a major expansion of the types of situations that would qualify to pay a mitigation fee to offset emissions and avoid violations, if the fees are reasonable and based on the emissions of the vessels.
- **CRUISE LINES WILL NOT “PLAN TO BE NONCOMPLIANT” AND CANNOT USE EXISTING ALTERNATIVE COMPLIANCE OPTIONS:** The reality is that companies will not “plan to be noncompliant” and be subject to a violation should these issues with non-frequent fliers not be resolved. These issues are of particular concern to cruise vessels because they cannot use the existing approved alternative compliance options.
- **VIES WILL NOT ADEQUATELY COVER NON-FREQUENT FLIERS OR CRUISE FLEETS ENTERING MARKETS IN CALIFORNIA:** The VIEs (Vessel Incident Exceptions) as structured are not adequate to ensure that all non-frequent fliers can avoid violation should they come into California. The calculations that CARB will use to determine the number of VIEs available to a fleet will particularly disadvantage smaller fleets which will not be able to receive in some cases any VIEs, and the VIEs would be non-existent for vessels that did not call on California in the previous year, including scouting voyages for companies pursuing or adding new markets in the state. The CARB decision to treat the Ports of Long Beach and Los Angeles as separate ports is also a major impediment to the usefulness of VIEs for non-frequent fliers or for any other purpose for which the VIEs are allowed to be used.

- **THE REGULATIONS SHOULD CLARIFY THAT THE DEFINITION OF “COMPATIBLE” AND “COMPATIBILITY” DO NOT REQUIRE INSTALLATION OF SHOREPOWER ON THE SECOND SIDE OF THE SHIP:** Ships should not be required to have shorepower equipment on both sides of the ship -- nor should ships already in compliance with the current regulation to be shorepower-capable be penalized or required to pay a mitigation fee should a berth not be available that can connect to the shorepower already installed on the ship on a specific side. Shorepower connections are located in proximity to electrical panels and cannot easily cross over the bow of the ship. The current practice of assigning berths to accommodate the location of vessel shorepower connections is financially and logistically manageable by industry and is essential for maximizing utilization of shorepower equipment required only in California. (Pages 18, 20 and 26).
- **THE USE OF THE RELEVANT ISO STANDARD FOR SHORE POWER INFRASTRUCTURE SHOULD BE REQUIRED IN THE REGULATIONS:** The regulation should be updated to require terminals and ports to meet the international standard agreed to by the International Maritime Organization consistent with ISO/IEC/IEEE 80005-1, for shorepower infrastructure to be considered compliant with the regulation.
- **A TYPO SHOULD BE FIXED RELATED TO “READY TO WORK” AND “VISIT”:** The following definitions appear to have a typo that should be corrected:  
(44) “Ready to Work” means that the vessel is tied to the berth, the gangway has been lowered with netting down, and **U.S. Coast Guard** and U.S. Customs and Border Protection have cleared the vessel.  
(66) “Visit” means the time period when the vessel is “Ready to Work”. The visit begins once the vessel is tied to the berth with gangway down and netting secured and has been cleared by U.S. Customs and Border Protection. The visit ends when “Pilot on Board.”  
As noted in the above definitions, the USCG is listed under “Ready to Work.” However, the USCG is not listed under “Visit.” The USCG should be deleted from the “Ready to Work” definition since they do not actually clear the vessel upon arrival (this is what CBP does).

Again, thank you for your consideration of these comments.

Sincerely,



Donald Brown  
VP, Maritime Policy  
Cruise Lines International Association

cc: Angela Csondes

Port of Oakland Comments on May 10, 2019, Draft  
Proposed Control Measure for Ocean-Going Vessels  
At Berth and Supporting Documents, June 10, 2019



June 10, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on May 10, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the rulemaking materials posted May 10, 2019, for the Proposed Control Measure for Ocean-Going Vessels At Berth (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. On May 10, 2019, CARB posted the revised text of the Proposed Control Measure, and provided, as supporting documents, the presentation from the May 14 and May 16, 2019 public workshops, Cost Inputs and Assumptions in PDF format, and Cost Estimates in Excel format.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGVs”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting detailed information from marine terminal operators. The Port posts shore power usage statistics, reasons for equipped vessels not plugging in, and cost information on our shore power website: <https://www.oaklandseaport.com/development-programs/shore-power/>. In 2018, 75% of all calls to the Port drew shore power.

Public comments on the Proposed Control Measure are due to CARB June 10, 2019. Port staff understand CARB will then finalize the regulatory language and prepare an Initial Statement of

Reasons (“ISOR”) to release on October 18, 2019, with public comment on the ISOR closing on December 2, 2019. The CARB Governing Board is scheduled to hear the Proposed Control Measure on December 5, 2019. Do CARB staff intend to respond to public comment on the ISOR? Three days does not leave time for meaningful CARB response to public comment or public review of subsequent changes to the Proposed Control Measure. Port staff suggest a minimum of 14 days for CARB staff to review and respond to public comment, and for the public to review any changes, before the Proposed Control Measure can be heard.

The Proposed Control Measure includes the concept of an Incident Exemption, which is new since CARB published its draft Proposed Control Measure in August 2018. Vessel fleets would be granted Vessel Incident Exemptions (VIEs) and terminals would be granted Terminal Incident Exemptions (TIEs). Starting in 2021 for container ships and terminals, VIEs and TIEs would be granted at levels of 5% of the previous calendar year’s calls. CARB stated at the May 14, 2019, public workshop that the expected plug-in level for the container fleet is 90% in 2021.

Port staff submit the following comments and questions, divided into the topic areas of the draft regulatory text of the Proposed Control Measure, the presentation from the May 14, 2019 and May 16, 2019 public workshops, and the Cost Inputs and Assumptions in PDF format.

### **Comments and Questions on the Draft Regulatory Text of the Proposed Control Measure**

1. Port staff request clarification on the definition of “necessary infrastructure...that will enable a terminal to comply with this Control Measure” in Section 93130.10(b) of the Proposed Control Measure and what, in this context, “subject to verification by [CARB] enforcement staff” means. From Table XI Berth and Terminal Counts, Anticipated Infrastructure Needs, and Unique Vessels of the CARB Cost Inputs and Assumptions in PDF format, it appears that CARB believes that three new shore power vaults “would be installed in response to the Draft Regulation [Proposed Control Measure]...” at the Port. Accordingly Port staff request documentation supporting CARB staff’s berth-by-berth infrastructure analysis and determination that three new shore power vaults would be required at the Port in response to the Proposed Control Measure.
2. Regarding the Terminal and Port Plans required for Container terminals in Section 93130.11 of the Proposed Control Measure, the deadline of June 1, 2020 does not allow for sufficient time after the anticipated adoption of the Proposed Control Measure for ports and terminals to submit plans. Port staff object to the text in Section 93130.11(a) that “[a]s an alternative, Ports may submit plans for their terminal operators.” Ports should not be expected to submit plans for terminal operators. In addition, the statement in Section 93130.10(b) of the Proposed Control Measure that “Ports should use terminal plans as [the] basis for developing port plans” seems to indicate that the deadline for Port Plans should be adjusted to come after the deadline for Terminal Plans.
3. The definition of “Fleet” in Section 93130.2(b)(22) of the Proposed Control Measure does not explain how fleets will be established. What will CARB require at the beginning

of each compliance year to establish fleets? Will this be part of the online Freight Regulations Reporting System (“FRRS”) mentioned in the presentation from the May 14, 2019 and May 16, 2019 public workshops?

Port staff request an initial accommodation for new fleets entering the California market. New entrants should be given an opportunity to estimate the coming year’s ship calls and estimate the number of VIEs to be awarded for the coming year.

The definition of Fleet and the requirements for VIEs also need to be responsive to changes in the shipping industry, for example when businesses merge or alliances change. Likewise, CARB should clarify what provisions will accommodate changes in the terminal industry, such as new terminals or changes in ownership, in the allocation of TIEs.

4. Port staff have two comments regarding vessel commissioning. Port staff request that vessel commissioning events that do not successfully connect to shore power as discussed in Section 93130.7(f)(2) of the Proposed Control Measure be considered eligible for exceptions under the regulation. The commissioning attempt shows that the goal was to reduce emissions through shore power and as such an Exception should be available to operators in this situation. Port staff conduct each vessel commissioning (with the exception of those at the Matson Terminal) to ensure the safety of the vessel, terminal, and workforce. Vessel commissioning is an invaluable safety procedure and should not be penalized under the Proposed Control Measure.

Port staff request that the definition of “Vessel Commissioning” in Section 93130.2(b)(61) of the Proposed Control Measure be expanded to include the case in which the port authority is the commissioning agent, as is the case at the Port of Oakland. Likewise, in Section 93130.7(d)(1) (“If applicable, commission vessel as required by terminal operator”), Section 93130.8(a)(4) (“It is the terminal operator’s responsibility to commission vessels equipped with shore power”), and Section 93130.8(d)(1) (“If applicable, commission vessel for use of shore power”), the commissioning requirement should be determined by the port authority or the terminal operator.

5. The reduction in VIEs and TIEs for Container, Reefer, and Passenger vessels from 5% each to 3% each discussed in Sections 93130.7(g)(1)(A)(ii) and 93130.8(h)(1)(A)(ii) of the Proposed Control Measure serves to increase the usage of the Remediation Fund [Section 93130.12(a)] in and after 2023. Port staff request further information from CARB on when and where the Remediation Fund will be deployed, given that CARB anticipates zero-emissions regulation on trucks, transport refrigeration units, forklifts, and cargo-handling equipment in the time frame of enhanced usage of the Remediation Fund, making those categories ineligible for incentive-funded emissions reductions.

6. The allotted VIEs and TIEs for vessels other than Container, Reefer, and Passenger vessels in Sections 93130.7(g)(1)(A) and 93130.8(h)(1)(A) of the Proposed Control Measure reduce from 5% to 3% after only one year. Port staff note that at the advent of the ATCM, the requirement was 50% of all calls in the first year. An initial expectation of 90% usage does not accommodate the fact that the Proposed Control Measure is the first-of-its-kind requirement for Ro-Ro and Tanker vessels in the world, and the technologies and equipment required do not exist at this time and have not been tested.
7. Regarding the Remediation Fund described in Section 93130.12 of the Proposed Control Measure, what is the procedure and timeline for CARB to approve a public entity to manage the funds generated at the Port?
8. Port staff request clarification from CARB of what constitutes a failure to achieve “full emission reductions” as referenced in Section 93130.12(a)(3) of the Proposed Control Measure, regarding when the Remediation Fund may be used.
9. In response to the suggestion in Section 93130.8(a)(2) of the Proposed Control Measure that a terminal operator should be responsible to interrupt a vessel call to shift the vessel to a berth with shore power if no berth was previously available, Port staff request CARB prepare and share an analysis of harbor craft emissions associated with such a shift at each port. Second to OGV, harbor craft are the second-highest emitting sources of emissions in the Port’s 2017 Emissions Inventory. Given the short duration of the average vessel call to the Port, the suggestion to call additional harbor craft to reduce the remaining hours of an OGV call’s auxiliary emissions could lead to increased overall emissions.
10. Likewise, Port staff question if the suggestion in Section 93130.8(a)(3) of the Proposed Control Measure that a terminal operator should be responsible to provide an alternative CARB-approved emission control strategy if a commissioned shore power vessel is berthed such that it cannot connect to shore power is necessary. CARB’s own analysis in the Cost Inputs and Assumptions in PDF format, Table XI, declares that no barge-based capture and control system is anticipated for the Port.
11. Port staff note that the “power meter readings at the time of shore power connection and disconnection” requested in Section 93130.8(e)(2)(C) of the Proposed Control Measure are typically not available within 7 calendar days of a vessel’s departure, as anticipated by CARB. Power meter readings at the Port are typically available at the close of the calendar month and not sooner.
12. In Section 93130.1 of the Proposed Control Measure, the stated intent of the Proposed Control Measure is “to ensure that operators of ocean-going vessels reduce emissions using a California Air Resources Board (CARB) approved emission control strategy to reduce PM, NOx, and ROG emissions at berth without increasing overall GHG emissions from this Control Measure...” How will CARB monitor GHG emissions after

implementation of the Proposed Control Measure and what is the GHG emissions baseline?

### **Comments and Questions on the presentation from the May 14, 2019 and May 16, 2019 public workshops**

13. On Slide 4 of the presentation for the May 14, 2019 and May 16, 2019, public workshops, CARB staff show OGV at-berth emissions for the entire state. Port staff request to see these emissions totals further tabulated both by port or marine terminal and by vessel type. This is especially important as, per Section 93130.7(g)(2) of the Proposed Control Measure, VIEs are specific to the Fleet-Port pairing they are granted to.
14. On Slides 5 and 29 of the presentation for the May 14, 2019 and May 16, 2019 public workshops, CARB staff show a table of cost effectiveness for this rulemaking. The Port provides specific comments on the cost estimates below. Port staff request to see the total cost estimates and cost effectiveness estimates further tabulated both by port and by vessel type.

### **Comments and Questions on the Cost Inputs and Assumptions in PDF format**

15. In Table V. Auxiliary Engine Effective Power Values, CARB states that it is relying on “the same power values cited in Table 7 of the emission inventory methodology <https://ww3.arb.ca.gov/msei/ordiesel/draft2019ogvinv.pdf>. Values used in cost analysis for container/reefer and tanker vessels are calculated as one kW-average per vessel type, weighted by average vessel kW at each port/terminal and vessel visits to each port/terminal.”

As noted in the Port’s February 15, 2019 letter to CARB regarding the emissions inventory, the emissions inventory relies on the assumption that container vessel effective power is a function of vessel size bin. Will this assumption in the emissions inventory be modified to align with the cost estimate?

16. In Table VI. Duration of Emission Control at Berth, CARB shows that it is estimating statewide emissions reductions based on average duration of emission control at berth per vessel visit. The Port requests an emissions and cost analysis specific to each port or marine terminal and each vessel type. The stated average Container/Reefer duration of emission control at berth of 38.8 hours is about twice the average time for shore power connections at the Port. The difference between Port data and the average shows that the statewide average is not meaningful for the Port, and the conclusions of the averaging analysis may not apply to the Port.
17. Table VIII. Electricity and Fuel Cost Inputs and the associated Cost Estimates in Excel format show that CARB expects 100% of any Low Carbon Fuel Standard (“LCFS”) credits would be reinvested into shore power. It is not guaranteed that the credits would

all be reinvested into shore power. What assumptions did CARB staff make in projecting the LCFS credit value through 2032?

18. Related to the duration of emission control at berth in Table VI, Port staff would like to reiterate that shore power usage at the Port is billed based on hours of use, not kWh drawn. This affects the assumptions in Table VIII. Electricity and Fuel Cost Inputs, as well. While the cost of Pacific Gas & Electric electricity is relevant to the Matson Terminal and the overall discussion of electricity costs, the Port is the utility serving shore power at all but the Matson Terminal.
19. The growth assumptions in Table IX. Growth Factors overestimate actual TEU growth for the Port between 2016 and 2018 and continue to use a 3.9% compound annual TEU growth rate between 2018 and 2032. Port staff request that in addition to this high estimate of TEU growth, CARB prepare an estimate of emissions using a realistic growth estimate. For reference, the Port's CAGR between 2008 and 2018 was 0.4%. Port staff understand that the growth estimates CARB is using for emissions and costs for the Port will align with the vessel fleet projections (such as larger vessels each year) that are being used for the Ports of Long Beach and Los Angeles.
20. Port staff note that the cost of compliance with the existing At-Berth Regulation is high and requires frequent vessel retrofits. In 2018, the Port commissioned or re-commissioned nearly 100 vessels, or about 25% of the ever-commissioned vessel list. The ongoing costs of retrofitting vessels when the line rotation changes, maintaining vessel equipment, and commissioning vessels with the current At-Berth Regulation apply equally to comply with the Proposed Control Measure and should be included in the cost estimates as they are real and necessary costs of compliance with the Proposed Control Measure. The Proposed Control Measure is not additive and incremental to the At-Berth Regulation, but rather a replacement and as such the entire cost to comply with the Proposed Control Measure needs to be factored into the cost effectiveness.

## **Closing**

Port staff appreciate the opportunity to review the Proposed Control Measure and attend the public workshop on May 14, 2019. We look forward to working with CARB on refinements to improve the Proposed Control Measure, emissions inventory, and associated analyses.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,



Colleen Liang, Port Environmental Supervisor, for

**Richard Sinkoff**

Director of Environmental Programs and Planning

Enclosures: January 15, 2019 Port letter to ARB re: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

February 15, 2019 Port letter to ARB re: Comments on *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor



January 31, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the Preliminary Draft HRA posted November 5, 2018, for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. CARB posted the text of the Proposed Control Measure on August 31, 2018. The November 5, 2018, Preliminary Draft HRA and associated air dispersion modeling files that CARB released December 14, 2018, were prepared in support of the Proposed Control Measure.

The Preliminary Health Analyses document contains two types of assessment, 1) an HRA using air dispersion modeling and impacts estimation guidance from the California Environmental Protection Agency Office of Environmental Health Hazard Assessment (“OEHHA”) and 2) an Incidents per Ton (“IPT”) analysis.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGV”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting

detailed information from marine terminal operators and posting that information on the Port's web site for public information purposes.<sup>1</sup>

**The key input to the Preliminary Draft HRA is the estimated emissions from vessels at berth, which are not yet final. Emissions estimates need to be final and the Preliminary Draft HRA updated before the Preliminary Draft HRA results can be used.**

CARB conducted two HRAs addressing only the Ports of Long Beach and Los Angeles together and the Richmond Complex. CARB's use of AERMOD and the 2015 OEHHA Risk Assessment Guidelines for HRAs represents current best practices. However, the robustness of the findings is limited by the emissions estimates. Emissions estimates are typically completed before the HRA but in this case are open for public comment and discussion through the end of February 2019, at which point they may be refined.

The air dispersion model AERMOD, which CARB selected for the Preliminary Draft HRA is the preferred model from the US Environmental Protection Agency. Required inputs to AERMOD include meteorological data, emissions information for each pollutant considered, and exhaust parameters for release points. Of these inputs, the estimated emissions are key, since emissions have a direct linear relationship with the estimated ambient concentrations and health impacts from each source.

On November 5, 2018, CARB posted the Preliminary Draft HRA. CARB then posted a hard-coded spreadsheet of "Draft At Berth Emissions Estimates" used in the Preliminary Draft HRA on November 9, 2018, and air dispersion modeling files in mid-December with a public comment period for the Preliminary Draft HRA closing January 31, 2019.

CARB also posted the "Draft: 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results"—for the emissions that were entered into the Preliminary Draft HRA—on January 16, 2019, with a separate public comment period for the emissions methodology and results closing February 16, 2019.

Without greater understanding of the emissions used as data inputs to the air dispersion model and risk estimation calculations, the utility of the Preliminary Draft HRA is limited. Port staff are reviewing the emissions methodology released on January 16, 2019, and are comparing it with the spreadsheet posted November 9, 2018. Port staff look forward to discussing the emissions with CARB staff at the public workshop CARB scheduled for February 26, 2019. After that, Port staff anticipate the need for a revised HRA for the Proposed Control Measure that relies on emissions that have been reviewed and understood by all parties.

The AERMOD input and output files and risk estimation databases CARB provided on December 14, 2018, appear to carry out the methodology discussed in the Draft Preliminary HRA, but further review is not warranted until emissions are finalized. In addition to the

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<sup>1</sup> <https://www.oaklandseaport.com/development-programs/shore-power/>

wharfinger information provided by the Port to CARB annually as required by grant funding obligations, Port staff are happy to work with CARB staff to refine assumptions made in the emissions estimates.

**The role of the Preliminary Draft HRA posted November 5, 2018, in rulemaking for the Proposed Control Measure is not clear.**

The Proposed Control Measure is not an ATCM, in fact its stated purpose is to reduce NO<sub>x</sub>, PM, and GHG but not the toxic air contaminant DPM—which is the focus of the Preliminary Draft HRA. The inclusion of an HRA for any of the ports in California is therefore not a fundamental driver of the Proposed Control Measure (leaving the CARB Governing Board direction, Mobile Source Strategy, and Sustainable Freight Action Plan as drivers). Thus, any reductions in risk shown in the Preliminary Draft HRA are purely informational. Indeed, CARB’s elimination of the At-Berth Regulation ATCM by focusing on a Proposed Control Measure for NO<sub>x</sub> and PM but not DPM seems to imply that no further risk reductions are required.

The Preliminary Health Analyses report announces that the risk reductions of the Proposed Control Measure are “significant,” a term defined in the California Environmental Quality Act (“CEQA”) and used in CARB’s Certified Regulatory Program, but not defined in the CARB rulemaking process. While CARB staff present the percentage of reduction in risk of the Proposed Control Measure over the current At-Berth Regulation, the total residual risk should be compared to that of other source categories to prioritize the need for the Proposed Control Measure.

**Health impacts from Criteria Air Pollutants are managed through SIP Planning, which does not require a new Proposed Control Measure for the container fleet.**

PM<sub>2.5</sub> is a criteria air pollutant, not a toxic air contaminant, and the California Ambient Air Quality Standards (“CAAQS”) and National Ambient Air Quality Standards (“NAAQS”) are the appropriate health-protective standards for PM<sub>2.5</sub>. Regional ambient air concentrations of PM<sub>2.5</sub> are managed to levels below the CAAQS and NAAQS through SIP planning. Even so, CARB’s Mobile Source Strategy calls for an evaluation of emissions reductions from currently unregulated fleets, not the already regulated container fleet which calls Oakland. Thus, SIP planning for PM<sub>2.5</sub> attainment does not mandate an amended At-Berth Regulation to reduce statewide emissions through an “every vessel, every visit” control strategy like CARB staff have proposed.

**The Incidents Per Ton (“IPT”) methodology presented for PM<sub>2.5</sub>, a criteria air pollutant, is not a cost effectiveness metric.**

The IPT methodology provides information on health effects assuming ambient PM<sub>2.5</sub> concentration is the sole contributor to adverse health effects, with a direct linear relationship. The IPT methodology is not, however, part of a cost-effectiveness evaluation. CARB released a “Preliminary Cost Information” document in August 2018 as part of this rulemaking effort,

which relies on the same assumptions as the emissions inventory (which, as discussed above, may need refinement). The preliminary costs data evaluated total costs of the Proposed Control Measure, but not cost effectiveness of proposed measures calculated in terms of cost per ton of emissions removed. CARB has also not yet prepared a socio-economic impact analysis of the proposed rule.

**Closing**

Port staff are interested in working with CARB to improve the current ATCM focused on DPM to allow for 100% compliance. We look forward to seeing enhanced supporting documentation for the CARB emissions estimates and a revised HRA and cost effectiveness analysis once the emissions are updated.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Richard Sinkoff", with a stylized flourish at the end.

Richard Sinkoff  
Director of Environmental Programs and Planning



February 15, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* posted January 15, 2019, for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. CARB posted the text of the Proposed Control Measure on August 31, 2018. The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* was prepared in support of the Proposed Control Measure.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGVs”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting detailed information from marine terminal operators and posting that information on the Port’s website for public information purposes.<sup>1</sup>

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<sup>1</sup> <https://www.oaklandseaport.com/development-programs/shore-power/>

The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* document includes emissions from California ports and CARB-defined Marine Terminal Complexes (“MTCs”). The emissions for 2016 are tabulated in Appendix B, while emissions for other years are only represented graphically in figures in the document and in tables published by CARB on November 9, 2018.

Comments on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* are due to CARB February 15, 2019. CARB will then host a public workshop to discuss the emissions on February 26, 2019. After that, Port staff anticipate the need for a revised emissions inventory for the Proposed Control Measure that responds to public comments. The Port provides wharfinger information to CARB annually as required by grant funding obligations. In addition, Port staff request that CARB staff work with the Port to refine assumptions made in the emissions estimates.

Given the scheduling of the public workshop after the public comment period has closed, this letter includes comments and questions that may best be addressed in the workshop. Thus, the Port is providing a list of comments and questions on the draft emissions inventory and topics for discussion at the February 26 public workshop.

**Comments and Questions on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results***

1. Why was 2016 selected as the baseline calendar year for the emissions inventory? Does CARB plan to conduct in-depth emissions inventories for 2017 and 2018?
2. Table 4 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* shows vessel visit counts to California ports and MTCs in 2016 only. However, current trends are for fewer calls by larger vessels for a given amount of containerized cargo. The discussion on page 25 of the draft clarifies that “vessel practice changes” are not considered, even as the total number of calls is dropping in real time. Since 2013, total annual calls to the Port have been decreasing. Container cargo throughput is thus decoupled from vessel call activity. CARB should expand the vessel growth forecasting for the baseline scenario to include the effects of larger vessels and fewer calls for the same amount of containerized cargo.
3. Table 7 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* relies on the assumption that for all ports and MTCs, container vessel effective power will match that of the Ports of Los Angeles and Long Beach in 2016. The effective power does not appear to be a function of vessel size bin, so the level of detail with which the effective power is classified by CARB-defined size bin is not appropriate. In addition, given the variation between data from the Port of Los Angeles and the Port of Long Beach within the same CARB-defined size bin, the data may not be meaningful when averaged by CARB-defined size bin. CARB should use an average effective power for container vessels regardless of size.

4. The growth rates in the Freight Analysis Framework (“FAF”) for ports and MTCs outside of the San Pedro Bay are at odds with current trends. The FAF assumption for container cargo at the Port of Oakland is a 5% year-over-year growth rate between 2016 and 2020. Actual growth rates between 2016 and 2018 have not kept pace, with current Oakland planning documents estimating about half the FAF compound annual growth rate.<sup>2</sup> CARB should adjust the FAF growth forecasting for the baseline scenario to align with actual trends.
5. Page 27 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* discusses statistical significance in the context of the emission forecasting. If CARB staff have conducted an uncertainties analysis, it should be included in the methodology and results document.
6. Table 15 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* does not treat all ports and vessel types equally when assuming “Projected 2020 and Later Time on Shorepower,” without justifying the differences. For instance, CARB assumes container vessels at the Port of Hueneme spend 80% of their time on shore power after 2020, while CARB assumes at the Ports of Los Angeles and Long Beach container vessels spend only 65% of their time on shore power. Impossibly, CARB-defined size bins 7, 9, and 12 container vessels at the Port of Oakland are assumed to spend 100% of their time at berth on shore power.<sup>3</sup> Port staff request further justification for and synchronization of the assumptions for “Projected 2020 and Later Time on Shorepower.”
7. In the discussion of the “static age distribution model” versus a survival and turnover model, CARB staff do not consider the abnormally high number of OGV keels laid in 2015. How did CARB decide that the spike in keels laid in 2015 was not material to estimating NOx emissions through 2050?
8. CARB should revise its assumption that sulfur content in fuel is 0.1% based on the results of enforcement analyses of in-use fuel sulfur. The sulfur content of in-use fuel as sampled by the CARB enforcement team in calendar years 2017 and 2018 is lower than 0.1% by 30% and almost 50%, respectively, presenting information that actual emissions are lower than those estimated by CARB. (As stated on page 12, information from CARB’s enforcement team is already used to determine reduced emissions from reduced engine activity time.)

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<sup>2</sup> <https://www.portfoakland.com/community/environmental-stewardship/maritime-air-quality-improvement-plan/>

<sup>3</sup> Vessels arriving at berth need time to tie lines and lower gangways before they can connect shore power and likewise vessels need time to disconnect from shore power when leaving the berth. With these bookends on each vessel call, a vessel cannot be plugged into shore power for 100% of the time at berth.

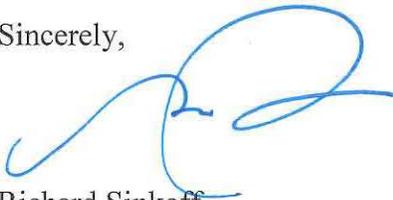
9. CARB should elaborate in the text on the Particulate Matter (“PM”) emission factor for Marine Gas Oil (“MGO”) at 0.1% sulfur. The 2007 Initial Statement of Reasons for At-Berth Regulation rulemaking used a value of 0.25 g/kW-hr for 0.1% S MGO. The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* uses a PM emission factor of 0.18 g/kW-hr for the same fuel. The root source for OGV auxiliary engine emission factors is stated in both cases as the 2002 Entec study, with no description of why two different values of PM emission factors are used for the same fuel.
10. Please add References to the Table of Contents and to the document (Sources of emission factor information are only included at the end of Appendix A).
11. On page 42, should the last sentence read “it excludes emissions from boilers,” not “it excludes emissions from auxiliary engines”?

### Closing

Port staff look forward to working with CARB to support the updated emissions inventories referred to in the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* after the workshop on February 26.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,



Richard Sinkoff  
Director of Environmental Programs and Planning

Preliminary Comments on Proposed At-Berth  
Amendments Cost Analysis, May 29, 2019



WSPA



WORLD SHIPPING COUNCIL  
PARTNERS IN AMERICA'S TRADE



May 29, 2019

Bonnie Soriano  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

**Subject: Preliminary Comments on Proposed At-Berth Amendments Cost Analysis**

Dear Ms. Soriano:

Thank you for the opportunity to provide preliminary comments on the cost analysis, inputs, and assumptions prepared for the revised regulatory concept for the At-Berth Regulation Amendments. The industry coalition appreciates that California Air Resources Board (CARB) staff has continued to revise the regulatory concepts in response to comments provided, and we look forward to continuing this dialogue with the CARB staff.

However, these comments represent only preliminary questions and reactions. The workshops introducing the cost analysis and revised concepts were scheduled in conflict with MEPC and the TRB Marine Board, so key vessel stakeholders were unable to attend and hear the presentations. And, in any event, two weeks, including a major holiday weekend, between the latest release of data concerning costs and the comment deadline gives stakeholders insufficient time to review and prepare substantive comments. We would request an allowance of additional time for the industry coalition to coordinate, review, and prepare data in response to the analysis provided. **Accordingly, the industry coalition requests that CARB staff continue to accept comments on the revised cost analysis through June 21, 2019.**

Due to the workshop schedules and time constraints, each of the associations of this industry coalition and their members reserve the right to revise and expand the questions and comments contained herein. Some initial comments and questions on the Cost Analysis follow:

**Costs for Existing Fleet Are Not Addressed**

The proposed rule dramatically re-writes the existing rule for the existing regulated fleet, but the Cost Analysis focuses only on a small number of currently unregulated vessels and an even smaller residual delta of landside costs associated with the currently unregulated fleet alone.

Given the lack of analysis of these costs, it is not possible to assess the scope, scale, and costs of the proposed rule's new operational requirements, duplication of compliance by existing fleets, shoreside

and alternative control technology infrastructure, and the impacts on the cost estimate of other new concepts. What is the CARB staff's justification for only including costs for newly regulated vessels in this cost analysis when the latest revision of the proposed rule imposes costs on all currently regulated vessels?

#### **Checklist – 1-Hour Connect Requirement**

While the new time allotted for connecting vessels to shore power is measured from a more reasonable "ready to work" time, one hour is not an adequate time for connections to be made, particularly for vessels that use cable reel management systems that have to be lifted on and off using a crane. We note that the cost analysis has not been updated to assess the cost impact for the proposed change in the connection times. Given the number of fleets that rely on "lift-on/lift-off" strategy, where is the analysis of the added cost of this provision for the existing fleet?

#### **Vessel Shore Power Equipment**

Shore power connections are located in proximity to electrical panels, therefore, cruise ships and cargo ships currently in the regulation are **not** typically equipped to connect from both Port and Starboard side. The current practice of assigning berths to accommodate the location of vessel shore power connections is essential for maximizing utilization of shore power. The draft regulatory language could be used to require that a vessel have shore power equipment on both the starboard and port side of a vessel, but most vessels in the current regulated fleet are not equipped with shore power equipment on both sides. Retrofitting ships to connect on both sides would double the cost of new retrofits, create new expenses for vessels in the currently regulated fleets, and be very difficult, since cabling would need to cross plumbing, electrical and communications lines. Why are the added cost of adding new shore power equipment to the existing regulated fleet, which will run into the tens if not hundreds of millions of dollars, not included in the cost assessment?

The cost analysis assumes that only a single barge-based capture and control systems is required for San Pedro Bay. It appears that this assumption was made for service to the currently unregulated fleet, given that there are already occurrences that the existing two systems in San Pedro Bay today are overbooked. In order to be ready for a more stringent regulatory framework which requires redundancy of control in the future, why aren't the costs of the many more new barges which would be needed to meet existing demand from the currently regulated fleet evaluated? Relatedly, why is there a cost associated with only one alternative control system predicted for LA/LB but none in other ports?

#### **Thresholds for Regulating New Vessels**

While the cost estimates include costs for controlling emissions from new classes of vessels, the estimates provide no information on CARB's threshold, on a cost per ton of emissions reduced basis, for including Ro-Ro and tanker vessels and excluding general cargo vessels from the expanded rules.

#### **Ignores Costs Associated with the Dynamic Nature of Shipping**

In addition, the analysis does not appear to account for disruptions that regularly occur in international trade (for various reasons) that would result in ships not normally serving California, and therefore not

retrofitted for shore power, arriving in California ports. At the end of the last year, San Pedro Bay had 34 “extra loaders”, previously unscheduled vessel calls. What cost analysis is associated with having the necessary number of emission controls systems that would need to be evaluated for these circumstances? The fact that the cause was a one-off event should not discount the need for additional control systems as required by the proposal. While the causes of extra loaders being deployed are typically one-off, the result of extra loaders responding to such events is a regular occurrence. As a result, how are these costs anticipated and accounted for?

### **Costs of Alternative Controls Underestimated**

Not even accounting for dynamic events in shipping like “extra loaders”, the most recent analysis by the ports of Long Beach and Los Angeles in their letter to CARB on May 20, 2019, estimate that the San Pedro Bay alone would need 26 barge-based capture and control systems to meet the level of control required by the proposal, which at that time considered 5% TIE allowance. How does CARB account for the difference between its conclusion and that of the ports of Long Beach and Los Angeles?

In addition to concerns regarding the number for alternative control systems, the cost per control system is underestimated. The cost analysis has a capital cost for a barge-based system at less than \$5,000,000. However, the most recent example of funding for similar equipment is the Bay Area Air Quality Management District award of funding for a barge-based system at a cost of \$8.8 million<sup>1</sup>. This is consistent with previous funding efforts in the past. Each system is a unique build and there are no economies of scale that can be expected. The CARB analysis relies on “[c]laimed confidential data obtained from industry sources that requested non-attribution”. However, there is public data available based on public funding for existing systems. Why does CARB rely on confidential data when publicly available data can be obtained?

The costs of barge-based alternative control technologies do not appear to account that under the CARB staff proposal additional barges would be necessary to meet peak demand, but that more alternative systems would result in lower utilization rates. Lower utilization rates can only be accounted for with a higher hourly rate. The ports of Long Beach and Los Angeles provide a discussion of this effect in their May 20, 2019 letter. Why does the analysis not appear to account for system utilization impacting hourly costs of barge-based systems?

### **Demand Charges Do Not Appear to Be Accounted**

The cost analysis does not appear to account for electricity demand charges and only accounts for the average delivered cost of electricity. Shore power results in spikes in electricity demand. Utilities charge for that uneven electrical demand through a cost commonly termed a “demand charge.” Given the high demand of shore power compared to a facility’s base electrical demand, demand charges can impact the cost of electricity delivered during times when shore power is not in use. This will result in an overall increase in the cost of electricity. This happens only because of the need for shore power and demand charges should be reflected in the cost impact of the proposed regulation. This impact will be

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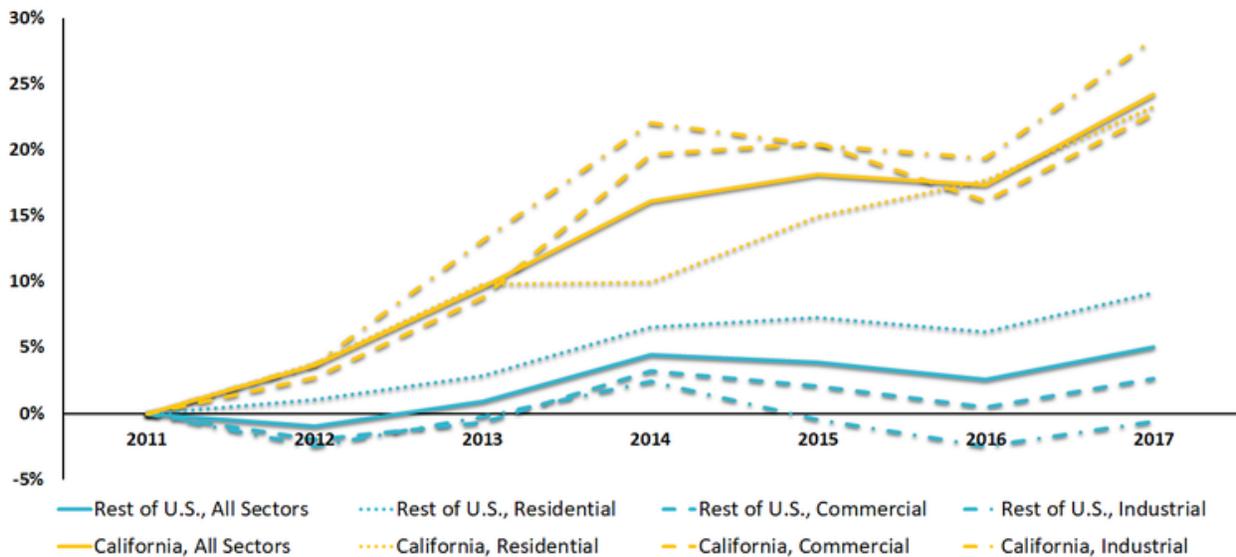
<sup>1</sup> [http://www.baaqmd.gov/~media/files/strategic-incentives/goods-movement-docs/other-equipment/g14gmbs1\\_ships-at-berth\\_rankedlist\\_gmerp-draft-pdf.pdf?la=en](http://www.baaqmd.gov/~media/files/strategic-incentives/goods-movement-docs/other-equipment/g14gmbs1_ships-at-berth_rankedlist_gmerp-draft-pdf.pdf?la=en)

most pronounced at marine terminals that have generally low electricity needs like auto terminals. Also, added facilities charges, assessed by a utility when electrical infrastructure is added, also does not appear to be included in the cost assessment. What accounting exists in the cost analysis for electricity demand charges?

**Wrongly Assume Electricity Costs Will Not Increase**

The cost analysis appears to assume that California electricity rates will remain flat through 2032. That analysis ignores that California has some of the fastest accelerating electricity rates in the nation. In fact, for the period 2011-2017 California industrial electricity rates increased nearly 30% (see chart below). Since then, the California Legislature has imposed additional requirements for California’s renewable portfolio that will by most accounts ensure an increase in costs. Is there a basis for the assumption that electricity rates will not increase for a decade?

**Change in Electricity Retail Prices: California vs. Rest of U.S., 2011 to 2017**



Electricity price data from U.S. Energy Information Agency. Price for "Rest of U.S." calculated by removing California electricity sales volumes and revenues from U.S. total. Data for 2017 is through November 2017, the most recent month available as of Feb. 8th, 2018.



**Labor Costs**

The cost analysis makes the following statement for land-based capture and control systems, “[C] According to Tri-Mer statements at 4/16/19 CARB meeting, no additional labor would be required to run capture-and-control system”. This statement is problematic for multiple reasons. First, Tri-Mer does not employ labor on marine terminals and has no knowledge of the requirements of negotiated labor contracts. Second, CARB staff is fully aware that the level of manning of similar demonstration equipment as part of the Pasha Omni-Terminal Demonstration is the subject of discussions with the labor union. Third, CARB staff is also fully aware that labor considerations are part of the deployment sensitivities and limitations on other compliance methodologies, including certain cable-reel systems.

Lastly, it is just simply unrealistic that there would be no labor costs associated with any component to any application of any equipment on the waterfront no matter what. Given that there is no clear reason why there would be no added labor costs for such equipment, which metrics for labor costs will be included?

### **Maintenance Costs**

Concern has been raised that all the costs submitted as part of CARB staff's surveys are not fully reflected in the assumptions document. For instance, Maintenance costs for shore power maintenance infrastructure show an average cost of \$24,285 with a range of \$4,000 to \$44,571. However, it is understood that maintenance cost data has been submitted to CARB that exceeds the stated range in the assumptions document. How can stakeholders be confident that their data was incorporated into the analysis?

### **Planning Costs**

Planning costs appear to be underestimated. The proposed regulation requires significant changes for both the existing regulated and unregulated fleets. Even prior to conducting design planning, ocean carriers, terminal operators, and ports will have to do detailed preliminary planning to determine the most effective compliance mechanisms. Those decisions will be necessary to support planning submittals to CARB. Why has CARB accounted for \$10,000 per plan or less when prior experience indicates that coordinated pre-planning between ports and terminals can cost millions?

### **Cost Analysis Uses Confusing Cost-effectiveness Criteria**

The ISOR for the current regulation estimated cost-effectiveness values by attributing roughly half of the rules benefits to NO<sub>x</sub> emissions reductions and half to PM emissions reductions. In that ISOR, it was concluded that the "cost-effectiveness values using that method are \$6,400 per ton of NO<sub>x</sub> reduced and \$345,000 per ton of PM reduced." The preliminary estimates of the cost-effectiveness for this rule are weighted and considered together rather than segregated and evaluated. These conclusions are apples and oranges between the current rule and the proposed rule and don't allow for an evaluation of the costs of controls for achieving completely separate emissions goals. For instance, if this is a DPM control rule, versus a NO<sub>x</sub> control rule, or a GHG control rule, the relative cost-effectiveness of this versus pursuing other types of regulatory efforts is impossible to manage using a weighted cost-effectiveness factor. Moreover, it predicts fantastically large and unrealistic expectations for DPM emissions reductions, given that the weighting in the Moyer process is NO<sub>x</sub> based at 20x PM<sub>2.5</sub>. Will CARB evaluate NO<sub>x</sub>, PM and GHG emissions cost-effectiveness separately and provide a true benchmark against the cost-effectiveness of the current rules?

### **Ports of Los Angeles and Long Beach Analysis**

During the May workshop, CARB staff revealed that the detailed analysis prepared by the ports of Long Beach and Los Angeles submitted in their letter dated February 6, 2019, was discounted in favor of conversations with terminal operators. The ports of Long Beach and Los Angeles and other port authorities throughout the State were responsible for installing existing shore power infrastructure and are well-placed to understand the needs and limitations of existing infrastructure. It is also understood

based on comments from the workshop that responses provided from the terminal operators were anecdotal and provided without the benefit of the most recent regulatory concept language. What aspects of the LA/LB analysis did CARB discount in developing its cost analysis?

**Growth Overestimated**

The cost and cost-effectiveness analysis rely on overly optimistic growth trends. This overestimated growth increases future emissions and reductions making the proposed concept appear more cost-effective than it is. In addition, growth in vessels does not match growth in cargo volumes. As vessels grow larger, more cargo can be handled without increasing the number of vessel calls. In fact, the number of vessel calls has declined over time due to this phenomenon. Why doesn't the analysis provide a more realistic lower bound to growth and properly reflect declining vessel calls?

**Opportunity Cost of the Novel Regulatory Structure**

The concept of a VIE is a new concept. Based on comments by CARB staff at the May workshops, VIEs would be granted to fleets based on the number of calls to a California port in the prior year. CARB staff confirmed that fleets not previously calling California ports would be ineligible to receive VIEs. This would appear to block new entrants from serving California ports by making them uncompetitive to fleets that have access to VIEs, particularly for vessels that may not have access to alternative controls like cruise ships. How has CARB assessed these opportunity costs to California marine terminals, ports, and the California economy due to this novel regulatory structure?

Sincerely,

***California Association of Port Authorities  
Pacific Merchant Shipping Association  
World Shipping Council***

***Cruise Lines International Association  
Western States Petroleum Association***

Port of Los Angeles and Port of Long Beach Comments on  
February 22-23 Workshops for the “Control Measure for  
Ocean Going Vessels Operating At Berth and At Anchor”,  
May 20, 2019

# SAN PEDRO BAY PORTS CLEAN AIR ACTION PLAN

May 20, 2019

Bonnie Soriano  
Chief, Freight Activity Branch  
California Air Resources Board  
1001 "I" Street  
Sacramento, CA 95814

**SUBJECT: PORT OF LOS ANGELES AND PORT OF LONG BEACH COMMENTS ON FEBRUARY 22-23 2019 WORKSHOPS FOR THE "CONTROL MEASURE FOR OCEAN-GOING VESSELS OPERATING AT BERTH AND AT ANCHOR"**

Dear Ms. Soriano:

The Port of Long Beach and Port of Los Angeles (Ports) appreciate this opportunity to provide comments on the concepts and berth analyses presented at the California Air Resources Board (CARB) February 22-23, 2019 workshops regarding the, "Control Measure for Ocean-Going Vessels Operating At Berth and At Anchor".

We want to thank CARB for continuing to work with the Ports and our tenants during this regulatory process to obtain the best available data and to craft a regulation which achieves significant public health benefits.

The purpose of this comment letter is to respond to the Regulatory Concepts and Berth Analyses provided at the February workshops. In the appendices, CARB will find specific information and data relative to each Port.

The following summarizes the Ports' comments regarding the regulatory concepts presented at the February 2019 workshops:

- **We agree that 100% compliance cannot be met by vessels in any category**– We want to thank CARB staff for adjusting the concepts to reflect the impossible goal of 100% compliance. It remains unclear whether or not terminals and vessel operators can meet the new minimum of 95% compliance. We urge CARB to produce a feasibility assessment to better inform this regulation, described below.
- **The Proposed Implementation Timelines are Still Too Aggressive** – In the updated concepts, container terminals are still required to control ship emissions for every visit, with 5% flexibility for Terminal Incident Events (TIEs), by 2021. This timeline is unreasonable based on lack of infrastructure needed to support such a high level of plug-in so quickly. In addition, there is considerable doubt regarding the ability of terminal operators, and/or third party vendors to develop and deploy a sufficient number of alternative emission control devices on a stringent time line of one year.
- **A Technology Feasibility Assessment Process Is Needed** – The Ports still urge CARB to develop a technology feasibility assessment, which would look at the state of technology development and its readiness to be deployed in the marketplace to support efforts to achieve public health benefits. Through conversations with stakeholders, it is clear there are challenges associated with the technologies upon which this regulation depends that may be too costly, technologically and operationally infeasible in some cases, or unsafe to use. For example, the Los Angeles/Long Beach Harbor Safety Committee has many substantial concerns regarding the use of barge-based emission capture systems for tankers.

This feasibility assessment should include an evaluation of: (i) state of technology for both shore power and alternative emission control devices and deployment readiness (ii) the requisite timeline for design, build, testing, and deployment of shore power and alternative control technologies for each California port to achieve at minimum 95% compliance, and identification of any associated constraints such as wharf space (iii) safety and navigation of harbor waters space due to applications of new technologies for unregulated vessel types (iv) number and types of alternative control technologies, which would be needed at each California port (v) and the cost of the various types of technologies and availability of incentives to encourage early demonstration of such technologies.

As stated in our previous letter, in order to accelerate the development and deployment of shore power and alternative control options, including infrastructure, for non-container terminals and vessels, the Ports would like to see CARB prioritize funding as they did for the currently regulated fleet through Proposition 1B in 2006. CARB has not prioritized funding for shore power in their latest Cap-and-Trade Auction Proceeds Third Investment Plan, posted in January 2019. We urge CARB to work cross-divisionally on finding opportunities to invest in the nascent technology required for tankers and RoRos.

- **The Berth-Level Analyses report too few ship calls, and do not accurately reflect the infrastructure needed at each port**— CARB provided berth—level analyses of the infrastructure which will be required for each terminal to meet the new proposed concepts at the February 2019 workshops. These analyses are founded upon Google Maps research, interviews with port tenants, and discussion with piloting companies. The analysis is not based on any engineering assessment of what it would take to expand shore power or to accommodate alternative capture and control technologies. Unfortunately, none of the analysis provided by POLB related to container terminal infrastructure was included in this berth-level analysis either. Subsequently to the February workshops, the POLB has updated and refined its estimate. The analysis utilizes costs from previous shore power projects, states the design requirements a terminal would need to maximize plug-in while ships are at-berth, and uses these metrics to quantify the anticipated costs to maximize connection at POLB container terminals. In this letter, POLB has provided more granular detail around the basis of the cost estimates, photographs which demarcate the existing shore power infrastructure, and improved vessel call data from the 2017 Wharfinger Report in Appendix B. In the Ports' previous letter to CARB POLA engineering staff had agreed with the POLB engineering analysis. Subsequently, POLA developed their own assessment of the infrastructure they will need, the associated cost and timeline, and additional edits to the CARB Berth-Level Analyses, which are included in Appendix A. In summary, the POLB and POLA estimates approximately \$106 million and \$147-\$193 million respectively for additional electrical infrastructure. These estimates are rough orders of magnitude, with many exclusions and limitations, so the actual cost could be much higher. We are hopeful CARB will utilize this information, particularly in a feasibility assessment, as it is the most informed reflection of the current infrastructure at the POLA/POLB terminals today. The feasibility assessment should go into greater depth than the calculations provided herein.

CARB's Berth-Level Analyses as written today are not founded upon the requisite design and engineering expertise, and should therefore, not be used today to quantify the costs of

the newly proposed concepts. These costs can be more adequately captured through the process of a feasibility assessment.

- **Compliance may hinder CAAP efforts** – Lastly, the Ports are still concerned the cost of these proposed concepts will hinder the ability to meet their goals under the 2017 CAAP Update given the significant upfront costs of an At-Berth Infrastructure Program. In addition, the staff who are currently designing the near-zero and zero-emission terminal infrastructure for technology demonstration projects, and future full-scale deployments are the same staff members who would be responsible for designing the infrastructure to support the new At-Berth Regulation. This underscores the need for prioritizing programs and funding, as described in the Feasibility Assessment bullet above, in order to determine how to most effectively allocate our resources to participate in the development of your regulatory program.

The Ports thank CARB staff for hosting additional workshops, engaging with us directly, and their consideration of the comments contained in this letter as well as in the attached appendices.

We look forward to meeting with the CARB in the future to further discuss the proposed amendments to the At-Berth Regulation. Please feel free contact us with any questions or concerns regarding this letter.

Sincerely,



CHRISTOPHER CANNON  
Director of Environmental Management  
Port of Los Angeles



MATTHEW ARMS  
Acting Director of Environmental Affairs  
and Planning  
Port of Long Beach

Attachments: Appendix A, Appendix B

CC: CARB – Cynthia Marvin ([Cynthia.Marvin@arb.ca.gov](mailto:Cynthia.Marvin@arb.ca.gov))  
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Eric Garcetti

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Jaime L. Lee  
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Diane L. Middleton  
*Commissioner*

Lucia Moreno-Linares  
*Commissioner*

Anthony Pirozzi, Jr.  
*Commissioner*

Edward R. Renwick  
*Commissioner*

Eugene D. Seroka

*Executive Director*

## APPENDIX A

### Port of Los Angeles

#### Response to CARB At Berth Regulation Berth Analysis Matrices

The Port of Los Angeles (POLA or Port) appreciates this opportunity to provide more detailed comments on the California Air Resources Board (CARB) Berth Analysis Matrices presented on February 22, 2019. Below are our comments on the various "CARB Staff Analysis of Potential Emission Reduction Strategies" for POLA.

#### Container and Refrigerated Cargo (Reefer) Vessels

POLA would like to reiterate that the timeline for container terminals is still too aggressive. The specific reasons why the deadline to meet 2021 is listed below. The container shipping industry is going through tremendous changes including the consolidation of shipping lines and the emergence of new alliances, resulting in larger ships calling to POLA. The shore power vaults at the Port were designed for the average vessel size calling to POLA in the early 2000's, which were 10,000 to 12,000 TEU vessels. The vessels calling to POLA now are closer to 14,000 to 16,000 TEU. From our latest 2017 POLA Emissions Inventory, NOx emissions reduced from ocean-going vessels from 3,204 tons per year in 2016 to 3,061 tons per year, which is a 4% reduction in NOx. The number of TEUS increased by 5% from 2016 to 2017 (8,856,783 TEU vs. 9,343,193 TEU), but the number of container ship calls decreased by 8% from 2016 to 2017 (1,251 vs. 1,154). Our EI reports have shown that these larger container vessels have improved efficiency and helped to reduce emissions at POLA.

Unfortunately, the larger ships calling a terminal can limit the berth availability of shore power especially when multiple ships call the same terminal as the shore power cables are not lining up with the vault containing the shore power outlet. Cable management extension systems (cable reels) allow a vessel to plug into shore power without having the vessel's cables to be directly aligned to the vault. The cable reels currently available for purchase are 8 feet wide and the wharfs at five out of our seven container terminals only have 4-5 feet of space.

Fenix Marine Services and APM Terminals have a "vendor lane" which runs between the ship to shore cranes and the edge of the wharf, providing the necessary clearance to place a cable reel. At the moment, a narrower cable reel system is being designed for use on terminals without a vendor lane. However, there is currently no prototype and the system will require structural modifications to the wharf, the extent of which are unknown at this time. The cost for this narrower system is also unknown at this time. The current

cable reel system is estimated to cost \$550,000. If a narrower system cannot be designed, then the wharfs will need to be extended.

Extending wharfs creates a host of issues. The Army Core of Engineers will not allow the wharfs at POLA to be extended any further into the water, as there would not be enough space to navigate the vessels in the water. This means that the wharfs have to be extended on the landside. The cranes and the cranes' rail management would need to be pushed back. Moving all the cranes back requires the crane arms to be extended in order to reach a vessel's cargo. Assuming funding is procured for the construction at a terminal, it would take at least 18 months to design the construction, 18-24 months for environmental assessment, 6 months to go to bid, and then 18 months to build. The total estimated time per a project would be 60 to 66 months or 5 to 5.5 years on average, but it may take longer as each terminal is unique. The estimated cost to extend one container berth could be between \$35-40 million. In addition to all the construction, the terminal would not be able use of their berth during the construction. The terminal would be operating at a decreased capacity and would be losing revenue during the construction and diverting cargo to other ports outside of California.

The Port preliminary responsibilities as indicated by CARB is to *"install and maintain any necessary emissions control infrastructure and/or equipment needed for compliance with the regulation that is outside of a terminal's contractual ability to provide."* In order to meet our responsibility outlined by CARB, POLA engineering staff has estimated that a vault would be needed every 200 feet apart per a berth with at least one 100-foot mobile cable reel at every berth. This is the same assessment as Port of Long Beach engineers had determined in the Ports' first joint letter to CARB. This would be a total of six vaults per a berth. The cost per a new vault is estimated to be \$500,000. The cost to provide the necessary power to the terminals is approximately \$2.5 million (\$2 million for electrical equipment and \$500,000 for installation). For purposes of POLA engineering assessment the cost of the cable reel system is estimated at \$550,000 based on the currently available system. The cost for a narrower system for five of our terminals could be higher as the actual cost is unknown at this time.

Table 1 summarizes POLA engineering staff evaluation of just electrical infrastructure and costs for POLA to meet the Port's obligation under the current draft language for existing container terminal berths.

Table 1: POLA Container Terminal Electrical Infrastructure Evaluation

Tenant	Berth	# Existing Vaults	# New Vaults Needed	Total Cost of New Vaults	Cost of Equipment	Cost of Cable Reel	Total Overall Cost
WBCT - China Shipping	100	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
	102	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
WBCT – Yang Ming	121	2	4	\$2,000,000	\$2,500,000	\$550,000	\$5,050,000
	126	2	4	\$2,000,000	\$2,500,000	\$550,000	\$5,050,000
TraPac	136	2	4	\$2,000,000	\$2,500,000	\$550,000	\$5,050,000
	139	2	4	\$2,000,000	\$2,500,000	\$550,000	\$5,050,000
Yusen Terminals Inc.	212	2	4	\$2,000,000	\$2,500,000	\$550,000	\$5,050,000
	216	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
Everport <sup>1</sup>	220	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
	228	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
Fenix Marine Services	230	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
	302	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
	303	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
	304	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
APM Terminals	305	3	3	\$1,500,000	\$2,500,000	\$550,000	\$4,550,000
	401	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
	402	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
	403	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
	404	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
	405	4	2	\$1,000,000	\$2,500,000	\$550,000	\$4,050,000
					Subtotal =		\$95,600,000
					20% Contingency =		\$19,120,000
					Subtotal =		\$14,720,000
					28% Soft Cost (Engineering & Construction) =		\$32,121,600
					<b>Total Cost =</b>		<b>\$146,841,600</b>

<sup>1</sup> As of 2019 there are only two vaults each at Berths 228 & 230. Two additional vaults at each berth have already been designed and construction is scheduled to begin within the next 18 months. This cost assessment only added two more vaults to Berths 228 & 230 in order to meet the Port's obligations estimated to be six vaults per a berth.

Table 2 summarizes POLA engineering staff evaluation of just electrical infrastructure and costs for POLA to meet the Port's obligation under the current draft language for berths that may be used as container terminals in the future.

Table 2: Future POLA Container Terminal Electrical Infrastructure Evaluation

Tenant	Berth	# Existing Vaults	# New Vaults Needed	Total Cost of New Vaults	Cost of Equipment	Cost of Cable Reel	Total Overall Cost
Fenix Marine Services	306	0	6	\$3,000,000	\$6,000,000	\$550,000	\$9,550,000
Unknown	206	0	6	\$3,000,000	\$7,000,000	\$550,000	\$10,550,000
Pasha	174	0	6	\$3,000,000	\$7,000,000	\$550,000	\$10,550,000
				Subtotal =			\$30,650,000
				20% Contingency =			\$6,130,000
				Subtotal =			\$36,780,000
				28% Soft Cost (Engineering & Construction) =			\$10,298,400
				<b>Total Cost =</b>			<b>\$47,078,400</b>

Grand Total = \$193,920,000 for only electrical infrastructure costs.

As shown, the estimated cost for the Port to meet our obligations for our container terminals would be \$147-\$193 million. Similar to wharf extensions, the estimated time from start to finish for installing this infrastructure would be approximately 5-5.5 years per a project. Even if the Port could procure this funding and start working on providing electrical infrastructure at all our terminals instantly, the soonest that this undertaking would be completed is 2024-2025, well beyond CARB's proposed deadline of 2021. POLA does not have the resources to undertake that many projects at the same time, so some terminals' electrical infrastructure would not be completed before 2025.

Landside shore power electrical infrastructure life cycle appears to be 15-20 years with required updates, annual maintenance, and frequent cleaning of the equipment during this period. Currently Port staff costs are about \$500,000 a year for maintenance and about \$125,000 a year for recordkeeping for a total annual cost of approximately \$625,000. This cost is so far for the currently regulated fleet of container, reefers, and cruise vessels. With the increased infrastructure, the staff cost for maintenance would increase to approximately \$866,000 and recordkeeping would be around \$135,000 for an estimated total staff cost of over \$1 million.

Shipside infrastructure appears to have a much lower life cycle. Conversations with various shipping lines have found that the shipside electrical infrastructure life cycle is about five years with equipment needing to be fully replaced in the fifth year. The cost to install shore power onto container and reefer vessels is estimated to be \$750,000 to \$1 million. This five-year cost for shipping lines may cause them to see the alternative at berth emissions control technology as a more attractive option than having to invest close to \$1 million every five years for shore power. This would be counterproductive to the regulation as shore power has been shown to have higher emissions reduction rate than use of the alternative emission control systems.

As for alternative emission control systems, there are currently only two certified barge based systems operating at both POLA and Port of Long Beach for container vessels. A land-based system is still being demonstrated at this time. There is serious doubt that more of these systems can be developed and deployed by 2021. The two San Pedro Bay Ports had solicited proposals for alternative emission control systems for ocean going vessels in 2018 as part of our Technology Advancement Program. In January 2019, the two Ports did not award any of the proposals as none met the requirements for the solicitation satisfactorily. This highlights the need for a CARB feasibility assessment on these technologies and their use at each California port.

### Passenger Vessels

POLA has on average about 110 cruise vessels call to our World Cruise Center on an annual basis. The assessment CARB has for passenger vessels is lower than our average number. POLA asks that CARB adjust the assessment with our annual average number of cruise vessels.

As cruise vessels increase in size, the amount of power drawn by these larger cruise vessels increase as well. The World Cruise Center underwent electrical upgrade construction to allow cruise vessels to draw 6.6 KV and 11 KV of power when at berth from June 2017 to April 2018. This upgrade took about three years to complete from initial planning to completion of the construction. Cruise vessels could not plug into both berths during the construction period. No new vaults were added to the berths for this upgrade. The cost of the upgrade was about \$11 million. Table 3 lists the number of vaults currently at the World Cruise Center.

Table 3: POLA World Cruise Center Electrical Infrastructure

World Cruise Center (Berths 90-93)	# of Vaults	Power Provided
Berth 92	2	11 kV (2)
Berth 93A	4	6.6 kV (2); 11 kV (2)

After the electrical upgrade, the Port has seen an increase in the use of shore power by cruise vessels that call to our World Cruise Center. POLA Engineers have determined that Berth 92 would need an additional two vaults and a cable reel system to ensure the Port meets our infrastructure obligations per the current draft regulation. The cable reel for the cruise vessel is estimated to cost more than one for containers, as it will need to be able to operate at both 6.6 kV and 11 kV. Table 4 is an estimate of the cost for the added electrical infrastructure at Berth 92.

Table 4: Estimated Additional Infrastructure Cost at Berth 92

Berth	# of Existing Vaults	# New Vaults Needed	Total Cost of New Vaults	Cost of Equipment	Cost of Cable Reel	Total Overall Cost
92	2	2	\$1,400,000	\$5,000,000	\$1,000,000	\$7,400,000
20% Contingency =						\$1,480,000
Subtotal =						\$8,880,000
28% Soft Cost (Engineering & Construction) =						\$2,486,400
Total Cost =						<b>\$11,366,400</b>

The cost to install shore power onto a cruise vessel is estimated to be between \$1 to \$1.5 million. The cost of maintaining and recordkeeping for Port staff was included in the container/refer section above. Construction for this project would probably take between 3-5 years.

#### Auto/Ro-Ro Vessels

POLA only has one automotive terminal, Wilenius Wilhelmsen Solutions (WWS) Vehicle Services America (Berths 195-199). Automotive carriers/Ro-Ros mainly call to berths 197-199. Table 5 shows vessel activity at WWS for the last 3 years.

Table 5: Vessel Activity at WWS 2016-2018

Berth #	# Auto & Ro-Ro Calls 2016	# Auto & Ro-Ro Calls 2017	# Auto & Ro-Ro Calls 2018
195	0	0	0
196	0	0	0
197	4	4	0
198	80	101	71
199	20	17	2
Total =	104	122	73

As shown by Table 5, the number of calls to WWS vary year by year. There is no real set average as the number of vessels is dependent on the market demand for automotive vehicles. Very few of the vessels calling are what CARB would define as “frequent” visitors (calling to the terminal four or more times in a calendar year) from year to year. A vessel may be in the string for a couple years, and then pulled from rotation if there is not enough demand or it is sent to a different string. For example, the “Pearl Ace” had five calls to WWS in 2016, one call in 2017, and no calls in 2018. Another example is the “Viking Sea.” The “Viking Sea” had called WWS six times in 2016, three calls in 2017, and no calls in 2018.

Due to the infrequency of the automotive and Ro-Ro vessels to the Port, it is unlikely that the automotive shipping lines will invest the time and money to install shore power onboard their vessels. However, POLA engineers have calculated the cost of installing the necessary infrastructure for shore power at WWS if our tenant and the shipping lines it serves decides to use shore power, see Table 6. POLA assumes only one berth would require electrical infrastructure installed. Estimated time of completion is again approximately five years. The cost of these vaults are estimated to be slightly less at \$400,000 per a vault due to the lower power needs of these types of vessels.

Table 6: POLA Engineering Electrical Infrastructure Costs at WWS

Terminal	# New Vaults Needed	Total Cost of New Vaults	Cost of Equipment	Cost of Cable Reel	Total Overall Cost
WWS (Berths 195-199)	4	\$1,600,000	\$9,000,000	\$500,000	\$11,100,000
20% Contingency =					\$2,220,000
Subtotal =					\$13,320,000
28% Soft Cost (Engineering & Construction) =					\$3,729,600
Total Cost =					<b>\$17,049,600</b>

This leaves the use of an alternative emissions capture and control system. Currently there is no certified alternative emissions capture and control system for automotive or

Ro-Ro vessels. As stated in the joint cover letter, POLA believes a feasibility study of this technology's utilization, including potential increased greenhouse gas emissions generated by this technology, is needed.

Port Engineers have determined the berths at WWS would likely be structurally sound enough to hold the weight of a land-based control system. In addition, there is likely enough room on the dock for a land-based control system. This is solely based on the currently demonstrating land-based control system at our Pasha terminal. As there is currently no certified system for use on automotive/Ro-Ro vessels, this assessment may change in the future if a land-based system is significantly different from the current land-based system being tested on Pasha's container steamships. The current cost to build the land-based system at Pasha is approximately \$5 million. This does not include any labor or maintenance costs. These costs are hard to determine at this time, as there are still negotiations on the type of labor that will be used to operate and maintain the equipment.

POLA Port Pilots have determined it would be best to avoid a barge-based system for vessels that call to WWS. Ro-Ro vessels fuel when calling to WWS via a bunker barge. For safety reasons, the current barge-based system cannot be connected to a container vessel when the container vessel is fueling or bunkering. Similar safety concerns would prevent barge-based systems to connect to an automotive/Ro-Ro vessel when the vessel is fueling or bunkering. Automotive/Ro-Ro vessels are at WWS for less than 24 hours. A disconnected barge system may not have enough time to reconnect to the vessel before it is ready for departure.

On rare occasions, there are two vessels dock at WWS at the same time. When that happens, Port Pilots sometimes are required to sail a vessel around the one forward of the departing vessel. The Port Pilots require the offshore side of the forward vessel to be clear of any obstructions. A barge-based system connected to the forward vessel would have to be disconnected and moved in order for the Port Pilots to move the other vessel. Again, there may not be enough time for a disconnected barge system to reconnect to the vessel prior to its departure.

### Tanker Vessels

The CARB Tanker Berth Analysis listed six liquid bulk terminals. POLA currently has seven liquid bulk terminals. Kinder Morgan is expected to leave Berths 118-119 by 2024. Table 7 is a list of POLA liquid bulk terminals with vessel calls for the last three years.

Table 7: Vessel Activity at POLA Liquid Bulk Terminals 2016-2018

Terminal	Berths	# Tanker Calls 2016	# Tanker Calls 2017	# Tanker Calls 2018
Kinder Morgan	Berths 118-119	38	34	37
NuStar Energy LP	Berth 163	4	6	13
PBF Energy	Berths 238-240C	30	46	33
Phillips 66	Berths 148-151	30	49	41
Shell Oil Products	Berths 167-169	45	60	34
Valero	Berths 164	28	40	27
Vopak Terminals	Berths 187-190	111	118	111

Wharfs for tanker terminals are currently being redesigned to meet California State Lands Commission requirements, Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS). The new terminal design will be a pier that goes out into the water. The platform at the end of the pier will be only large enough to hold the necessary equipment for pumping tanker product in/out of the tanker. The tanker will be moored by tying up at nearby dolphin moors. POLA has already provided an example engineering drawing of the new terminal design in prior communications with CARB. There would not be any space to place shore power or a land based alternative system on these new piers.

Below is a list of future plans for the marine oil terminals at POLA.

- Berth 118-119 – Kinder Morgan Terminal – Berths are scheduled for demolition in the next few years.
- Berths 148-149 – Phillips 66 Terminal – This berth will cease operations as a marine oil terminal when the new berth at 150-151 is completed
- Berths 150-151 – Phillips 66 Terminal – This berth will be demolished and reconstructed as a typical modern marine oil terminal, with a minimal unloading platform and independent mooring and berthing dolphins connected by catwalks. A land-based emissions capture system will not be feasible. A barge-mounted emissions capture system could be used, but may be difficult due to the terminal's location on one of the main turning basins for the Port. The tenant will be required to conduct a feasibility study for a barge-based system as a condition of their environmental document, which is currently underway.
- Berth 163 – Nustar Terminal – This berth will be demolished and reconstructed as a typical modern marine oil terminal, with a minimal unloading platform and independent mooring and berthing dolphins connected by catwalks. A land-based emissions capture system will not be feasible. A barge-mounted emissions capture system could be used, and would be largely free of impacts from large passing vessels. The tenant will be required to conduct a feasibility study for a

barge-based system as a condition of their environmental document, which is currently underway.

- Berth 164 – Valero Terminal – This berth will be demolished and reconstructed as a typical modern marine oil terminal, with a minimal unloading platform and independent mooring and berthing dolphins connected by catwalks. A land-based emissions capture system will not be feasible. A barge-mounted emissions capture system could be used, but would be impacted by the narrow channel and vessels entering and exiting Berth 163. The tenant will be required to conduct a feasibility study for a barge-based system as a condition of their environmental document, which is currently underway.
- Berths 167-169 – Shell Terminal – This berth will be demolished and reconstructed as a typical modern marine oil terminal, with a minimal unloading platform and independent mooring and berthing dolphins connected by catwalks the tenant is required to conduct a feasibility study for a barge-based system as a condition of their environmental document, which is complete.

As was stated in our email to CARB dated on March 8, 2019, our Port Pilots had determined that if the barge-based system is employed at Shell Berth 167 for a panamax size vessel (228M x 32M) or larger and there is a bulk vessel at Berths 154-155, access to the northern berths in the slip (Berths 165, 164, 163, & 161) will be restricted. Tugs and barges may be able to get by; however, if a barge-based system is also placed alongside a vessel at Berths 154-155 or the tanker at Berths 167-169 then access to the northern berths may not be adequate for a ship to pass.

This would be a hindrance to three of our tenants' terminal operations past Shell: US Borax (Berth 165) that does dry bulk, Valero (Berth 164) that does tanker operations, and Nustar (Berth 163) that does tanker operations. This gives other terminals that would not be effected by this restriction an economic competitive edge over these terminals. In addition, our Construction and Maintenance (C&M) division is located at Berth 161. C&M does maintenance of the docks and wharfs for the Port and could be hindered as well. Our C&M division needs to have unrestricted access to enter and leave Berth 161 to conduct any emergency repairs that may arise at any time at the Port.

- Berths 187-189 – Vopak Terminal – This terminal consists of a full width, full length wharf that will be upgraded to comply with MOTEMS standards instead of being reconstructed. The tenant has chosen this option, and will be performing the design and construction themselves, in order to minimize impacts to ongoing operations. However, the existing timber wharf has deteriorated vertical load carrying capacity, which will not be fully restored by the planned upgrade. Upgrading the capacity of the wharf to HS-20 (highway) capacity would cost approximately \$8.8 million. This cost estimate is based on the restoration of a very

similar wharf at Berths 196-199 that was completed in 2018. The project cost for this wharf, including contingency, was approximately \$5,300 per lineal feet. The wharf at Berths 187-189 is approximately 1660 lineal feet. The tenant is required to conduct a feasibility study for a capture and control system as a condition of their environmental document, which has not yet commenced.

POLA Port Pilots have determined that if a barge based system is placed alongside a panamax or larger size tanker at Vopak Berth 189 it will restrict ship access to Berth 187 for the duration of the vessel's stay alongside Berth 189. Tug and barge traffic will be able to continue; however, there will not be enough room in the slip (Slip #5) for a ship of any size to access Berth 187. This would limit Vopak's operational capability and lower its economic competitiveness with other tanker terminals.

- Berths 238-239 – PBF Terminal – This berth will be demolished and reconstructed as a typical modern marine oil terminal, with a minimal unloading platform and independent mooring and berthing dolphins connected by catwalks. A barge-mounted emissions capture system is feasible, as the terminal is on the wide Main Channel of the Port. The tenant is required to conduct a feasibility study for a barge-based system as a condition of their environmental document, which is complete.

We again stress the need for a CARB technology feasibility assessment on the state of alternative emission control technology. POLA is requiring our marine oil terminals to conduct feasibility studies on the use of alternative emission control systems. However, these feasibility studies will be terminal specific and could not be used by other terminals to determine the feasibility of the technology for their purposes.

An email from CARB staff dated March 28, 2019 requested information on the cost estimate and duration for routing the tanker vessel auxiliary engine and boiler emissions to a land based emissions control system. This question should be asked to the tanker ship manufacturers and the alternative emissions control system companies. The Port does not have expertise in this field. We are unable to provide a cost estimate, but we can provide CARB with general information about what this project could entail.

Many of the tanker vessels that call to POLA would not be defined by CARB as a "frequent" visitor (calling to the terminal four or more times in a calendar year). Due to this infrequency, it is unlikely that shipping lines with tankers would spend the time and money to change an existing tanker's exhaust system to be able to be treated in this fashion. If a shipping line did decide to undergo this type of project, the tanker would have to be taken out of service and dry docked. The Port does not have the knowledge to provide an estimate of how long the retrofitting would take. It would be more cost effective to design and build a new tanker to have this feature rather than try to retrofit an existing tanker.

The Port thank CARB staff for the consideration of our comments. We look forward to meeting with the CARB in the future to further discuss the proposed amendments to the At-Berth Regulation.

**APPENDIX B**  
**Port of Long Beach**  
**Response to CARB's February 22-23<sup>rd</sup>, 2019 Workshops and**  
**Additional Cost Estimate Detail**

**Background**

February 22-23<sup>rd</sup>, 2019, the California Air Resources Board (CARB) held workshops for the Control Measure for Ocean Going Vessels At Berth and At Anchor Regulation (At-Berth Regulation). In the newly proposed regulatory concepts, CARB would require control of auxiliary engine emissions from container, passenger, and refrigerated cargo vessels for every vessel visit to the Port of Long Beach beginning in 2021. Each terminal would have an allocated number of acceptable Terminal Incident Events (TIEs) to provide flexibility. These TIEs equate to 5% of total container vessel visits received during the previous year. Roll-on roll-off (RoRo) vessels will need to reduce auxiliary engine emissions for every vessel visit beginning January 1, 2025, with TIEs flexibility, calculated as 10% of the vessel calls of the previous year. Beginning January 1, 2027, acceptable TIEs for RoRos drop to 5%. Tanker vessels must control auxiliary engine emissions through a CARB approved technology beginning January 1, 2027, with the equivalent TIEs allocation calculation as the RoRos (10% of the previous year's calls). In 2029, tanker acceptable TIEs will drop to 5%. Tanker vessels with steam driven product pumps are no longer required to reduce their tanker auxiliary boiler emissions. Lastly, CARB provided stakeholders with berth analyses of the necessary infrastructure for each vessel type to meet these proposed requirements.

**About This Response**

The Port of Long Beach (Port) is providing supplementary information per CARB request on the estimates provided in the joint comment letter the Ports of Los Angeles and Long Beach, "Potential Strategies and Costs to Address the At-Berth Regulation", submitted on February 6<sup>th</sup>, 2019. Importantly, these cost estimates were developed using data from previous shore power installations, such as progress payments, bid analyses, and maps of the shore power infrastructure at the container terminals. Those documents are provided in the attachments to this appendix. The attachments also provide vessel call data as reported in the 2017 Wharfinger Reports to better inform the berth analyses CARB distributed at the February workshops. The estimated hours of control required and operational costs for both container and non-container vessels visits should alternative compliance strategies such as barge and land-based emission control technologies be utilized has been revised. Lastly, this appendix provides documentation of the costs associated with the Prop 1B shore power installations – specifically at Piers A, G, T, and G. Under the Prop 1B program, the Port was required to tease out hard costs from the progress payments. These hard costs have been provided to help inform future CARB analyses of infrastructure costs. It's important to note that these costs are in 2012 dollars, and future estimates should account for escalation.

**Shore Power Outlets Calculation & Locations**

The proposed concepts explained in the February 2019 workshops are written in such a way that terminals would need to make a reasonable effort to control emissions for every vessel visit. The Port would like to highlight that terminals would not plan a compliance strategy, which meets a

95% control criteria, as TIEs can occur due to reasons out of their control. They would plan to meet 100% emission control while ships are at berth, knowing unforeseen circumstances will hinder their success, hopefully, within the 5% threshold.

To maximize shore power connection at the container terminals, Port staff established design criteria, which requires shore power outlets (SPOs) every 200 feet, combined with a 100-foot cable reel system. This design criteria was used to calculate the minimum number of SPOs required at each pier. As demonstrated in Table 1, staff divided the wharf length for each berth by 200 feet, providing the optimal number of SPOs given 200-foot spacing. Staff then subtracted the existing number of SPOs at each berth to determine the additional shore power outlets required.

Table 1.

Location	Existing SPOs	Number of Berths	Length of Wharf (ft)	SPO @200'	Additional SPOs required for 200' spacing given current infrastructure	Number of Cable Reel Management Systems Required
Pier A Berths A88-A96	9	3	3556	18	9	3
Pier C SSA Terminals	8	2	1797	9	1	2
Pier E	15	3	4369	22	7	3
Pier G						
Berth G232	5	2	1337	7	2	2
Berth G236	6	2	1290	6	0	2
Berths G234, G235	1	1	1243	6	5	1
Pier J						
Berth J245-J247	9	2	2019	10	1	2
Berth J266-J270	11	3	2694	13	2	3
Pier T	11	4	5022	25	14	4
Total	75	22			42	22

The total count of functional SPOs today is 75, however, Pier E will be installing 5 SPOs as part of Phase 3 of the Middle Harbor Project at Long Beach Container Terminal. These SPOs are included in the Pier E calculation above. SPOs which have been abandoned or de-energized are not included in the calculation in Table 1. As far as cable-reel management systems, staff made an assumption that each berth would require one, 100-foot cable reel management system. Because the Port has 22 berths, it is assumed 22 cable reel management systems are required.

### Cost Estimates & Timeline

The updated estimate for all six piers is approximately \$107 million. To prepare this estimate, Port staff analyzed three previous shore power installation projects at Pier A, Pier J, and Pier T,

initiated in 2012, in order to develop a combined average cost per shore power outlet (SPO). Staff calculated the average SPO cost at each pier using progress payment documentation and tracked staff hours specific to these projects, and then averaged the average SPO cost of each project in order to get the combined average SPO cost. The total cost estimate is based on the average SPO cost multiplied by the number of new SPOs in Table 1, plus one cable reel per berth. The narrative describing the average SPO cost calculation is provided in ATTACHMENT A, Supporting Documentation for Container Terminal Cost Estimates.

The timeline to complete each pier is approximately 5.25 to 5.75 years, which includes 15 to 18 months to do preliminary design and environmental clearances, 15 to 18 months for design, 7 months for bid and award of a construction contract, and 26 months for construction and commissioning.

### **Exclusions and Limitations**

The various existing wharves were built at different times and have different configurations and structural limitations. Wharf modifications may be necessary to accommodate the density of SPOs, which is not included in the cost estimate.

The estimated total number of additional SPOs does not account for the exact location of the current SPOs, so additional SPOs may be necessary to meet the functional requirement.

Many wharves do not have sufficient space at the edge of the wharf to accommodate the current cable reel design. It is unclear if a narrow cable reel can be designed to fit the specific space constraints at each pier, and wharf modifications may still be necessary to be able to safely use cable reel in the narrow space. If that is not possible, more extensive wharf modifications would be required. The cost estimate does not include any wharf modifications to accommodate the cable reel, and assumes a narrow cable reel is roughly the same cost as the current design.

The combined average cost per SPO does not include transformer costs nor any contingency. Staff removed the transformer costs from the bids on the previous SPO projects used to calculate the average SPO cost, making an assumption each container terminal has enough power today. If any terminal requires additional power, the total cost for additional shore power at the Port could increase on the scale of millions of dollars.

POLB resources, both money and staff, are finite, and the POLB is in the midst of a significant capital improvement program. There is not sufficient staff to complete all piers simultaneously within the existing capital program, and there may not be financial capacity to accommodate all of the additional capital expense within the timeframe. Therefore, it is highly likely some of the piers would take longer to complete, resulting in additional cost escalation not included in the current estimate.

### **Updated Alternative Emission Control Hours**

The Port has updated the additional emission control time required if container, passenger, refrigerated cargo, RoRo, and tanker ships must control emissions for every visit. Updates

include refined detail on which berths received Prop 1B funding, and thus are subject to higher shore power connection requirements earlier and consideration of the minimum and maximum number of additional applicable ships that will require emission control technology on a given day. The findings utilize the 2017 Ports of Los Angeles and Long Beach Emissions Inventory data and are as follows:

- 1) There will need to be at least 26 barge-based systems online in the San Pedro Bay to meet the 2029 requirements (95% of calls must be controlled with an exception of 5% TIEs for all regulated ship types) - assuming vessel traffic remains at 2017 levels. At the Port of Long Beach, the maximum number of applicable ships that are not using shore power is 14 per day, the average is 8, and the minimum is 2 ships. In 2017, 147 days occurred where the number of barges needed if the proposed regulation were in place exceeded the average. Looking at the San Pedro Bay Complex, the average number of applicable ships which would require a barge-based system is 15 per day, with a maximum of 26, and a minimum of 4 ships per day. The Ports would be required to have 26 barge-based systems to meet the requisite emission control requirement from ships on a peak day.
- 2) An additional 40k-52k hours per year of emissions will need to be controlled via alternative capture and control technology to meet the every vessel, every visit requirement for the proposed ship types.<sup>12</sup>
- 4) To keep a fleet of at least 26 barges “viable” the operational cost per hour will have to double to at least \$2,000 per hour. This is due to the costs associated with both active and inactive barges. The operational cost is estimated to be \$81-\$105 million dollars per year<sup>3</sup>.

These estimates assume that a barge-based system will be used for ships, which do not utilize shore power. It is, however, more likely that tankers will strongly consider land-based systems. Given the Port has not demonstrated land-based alternative control technologies for the proposed vessel types, and the potential steep costs associated with a land-based device (wharf upgrades, increased power consumption, etc.) the Port decided assuming the use of the barge-based system provides a more conservative estimate of the costs associated with this regulation. It is also important to note that accommodating a fleet of 26 barge-based emission capture and control systems would require significant berthing space at both ports, which have limited wharf availability.

Attachment A - Supporting Documentation for Container Terminal Shore Power Infrastructure Cost Estimates

Attachment B – Prop 1B Shore Power Infrastructure Costs

Attachment C – Maps of Container Terminal Shore Power Infrastructure

Attachment D – Port of Long Beach Vessel Visits by Berth

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<sup>1</sup> The lower additional emission control hours reflect a scenario in which all currently unregulated ship calls which will be subject to the new At-Berth Regulation are controlled via barge-based systems and all currently controlled ship-types are handled by additional shore power infrastructure. The higher emission control value reflects a scenario in which all currently unregulated and regulated ship types will be controlled by a barge-based system, and no additional shore power infrastructure will be installed.

<sup>2</sup>These estimates assume a requirement of 1.5 hours per arrival and departure for connecting and disconnecting times where there will be no emission reductions.

<sup>3</sup> This cost does not include costs related to barge movements, anchorages, lay berths, etc.

**ATTACHMENT A**  
**Supporting Documentation for**  
**Container Terminal Shore Power Infrastructure Cost Estimates**

Average Cost per Shore Power Outlet (SPO) Calculation Narrative

- Staff used the actual contract bid and change order prices from three separate Port construction contracts to install SPOs in 2012. The contracts were for Pier J, Pier T, and Pier A.
- For each contract, the cost of providing and installing transformers was deducted from the total contract amount. This assumes that if SPOs are added in the future, there is already adequate capacity at the terminals for additional SPOs. Therefore, the cost of transformers should not be included in the average cost of future SPOs. If there is not adequate capacity, the cost per SPO would increase.
- The cost of installing SPOs includes all design, permit, and management costs (as referred to as soft costs). The costs for each project are tracked in the City's cost accounting system (also known as FAMIS or EZFAMIS). The EZFAMIS report for each project was run to acquire the soft costs for each project.
- The total project cost (construction contract plus soft costs, less transformer costs) was then escalated using 2.5% per year from the construction contract award date (2012) to the midpoint of earliest possible future SPO construction contract award (2022).
  - The earliest possible future SPO construction contract date is based on a January 1, 2020 regulation start date, and includes the time necessary to do design, bid, and award.
  - If the regulation date is pushed out, the cost per SPO would increase to reflect the additional cost escalation.
  - The 2.5% is a relatively low average cost escalation, and is much lower than what we have seen in the local market the last 2-3 years. The average cost per SPO would increase if the cost escalation is higher than 2.5%.
- The escalated total project cost was then divided by the number of SPOs installed, providing an average escalated cost per SPO per project.
- We averaged the combination of each projects' average cost per SPO to get the combined average cost per SPO in 2022 of \$2,272,609.

Pier J Shore to Ship Power Project

- The work under the Pier J project included retrofitting of four berths of the existing north wharfs (J245-J247) and south wharfs (J266-J270), including the installation of twenty (20) shore power outlet vaults on the wharf face, all associated conduit, electrical cables and connections, and four electrical substations to supply power to each individual berth. (SPO location Exhibit attached)
- The original construction contract amount awarded to Helix Electric Inc. was \$25,200,000 (Analysis of Bids Exhibit dated February 7, 2012 attached)
- Transformer costs are from Bid Items 22, 23, 24, and 25 (Progress Payment#27) and are excluded from the SPO cost calculations.
- Project soft cost included planning, design and construction management costs (EZFAMIS Report of Work Order HA1316) and are incorporated in the SPO cost calculation.

- Costs related to SCE work to bring the power to Pier J, installation of 66KV Substation and Site Preparation for the substation (Griffith Contract) is excluded from the cost calculations (SCE related cost items were highlighted in orange in the attached EZFAMIS Report).
- Average cost per SPO is calculated based on 20 SPO Vaults.

Pier T Shore to Ship Power Project

- The work under the Pier T project included retrofitting four berths of the existing south wharfs (T132-T140), including the installation of eleven (11) shore power outlet vaults on the wharf face, all associated conduit, electrical cables and connections, and four electrical substations to supply power to each individual berth. (SPO location Exhibit attached).
- The original construction contract amount awarded to The Ryan Company is \$20,559,112 (Analysis of Bids Exhibit dated February 14, 2012 attached)
- Transformer costs are from Bid Items 18, 19, 20, and 21 (Progress Payment#19) and were not included in this calculation.
- Project soft costs included planning, design and construction management costs (EZFAMIS Report of Work Order HA1317 attached)
- Costs related to SCE work is excluded from the cost calculations.
- Average cost per SPO is calculated based on 11 SPO Vaults.

Pier A Shore to Ship Power Project

- The work under the Pier A project included retrofitting of four berths of the existing south wharfs (A88-A96), the installation of nine (9) shore power outlet vaults on the wharf face, all associated conduit, electrical cables and connections, and two electrical substations to supply power to each individual berth. Substation A provides power to Berth A94-96 and Substation B provides power to berths (A88-A90) and (A92-A94), respectively. (SPO location Exhibit attached)
- The original construction contract amount awarded to Schimmick Construction Company is \$11,513,850 (Analysis of Bids Exhibit dated January 31, 2012 attached)
- Transformer costs are from Bid Items 20, 21 and 22 (Progress Payment#15 attached)
- Project soft cost included planning, design and construction management costs (EZFAMIS Report of Work Order HA1314 attached)
- Costs related to SCE work is excluded from the cost calculations.
- Average cost per SPO is calculated based on 9 SPO Vaults.

Summary of the Average SPO Costs (2022)

	<b>Average \$/SPO (2022)</b>
<b>Pier J</b>	\$ 2,221,185.36
<b>Pier T</b>	\$ 2,303,100.04
<b>Pier A</b>	\$ 2,293,541.56
<b>Combined Average Cost Per SPO</b>	<b>\$ 2,272,608.98</b>

The cost of the 100-foot cable reel management system is expected to be \$500,000 each. The Port estimated that each berth would require one 100-foot cable reel management system. Today there are 22 berths. The estimated total cost for cable reel management systems \$11,000,000.

Cost Estimate for Six Piers to Install Additional Required SPOs  
 $\$2,272,608.98 \times 42 \text{ SPOs} + \$11,000,000 = \mathbf{\$106,449,577.16}$ .



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit**  
**at Pier J, Berths J245-J247 and J266-J270**

NO. HD-S2341

DATE OPENED: February 7, 2012

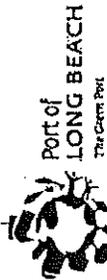
ITEM	ESTIMATED QUANTITIES	RATE	AMOUNT	SHAMMICK CONSTRUCTION COMPANY 8201 Edgewater Drive Oakland, CA 94618 Phone: (949) 333-1500 Fax: (949) 333-1510	SULY-MILLER CONTRACTING COMPANY 135 E. State College Blvd #400 Brea, CA 92821 Phone: (714) 576-9600 Fax: (714) 448-8775	THE RYAN COMPANY 15 Commerce Way Noron, MA 02766 Phone: (508) 743-2500 Fax: (508) 743-2540	GRIFFIN/ROSENDIN JV 12200 Bloomfield Avenue Santa Fe Springs, CA 90670 Phone: (562) 829-1128 Fax: (562) 864-7938
ITEM NO. 1 - Progress Scheduling: Furnish all labor, materials, tools, equipment, and incidentals necessary to prepare, furnish, update, revise and maintain the cost and resource loaded scheduling... for the lump sum price (minimum amount of \$25,000) of.	Lump Sum	100,000.00	100,000.00	25,000.00	33,460.00	138,415.00	25,000.00
ITEM NO. 2 - Site Specific Safety Plan: Furnish all labor, materials, tools, equipment, and incidentals necessary to develop, submit, implement and maintain a Site Specific Safety Plan, including... for the lump sum price (minimum amount of \$30,000) of.	Lump Sum	150,000.00	150,000.00	30,000.00	35,535.00	107,658.00	30,000.00
ITEM NO. 3 - Furnish and Place Temporary K-Rail and Chain Link Fence: Furnish all labor, materials, tools, equipment, and incidentals necessary to furnish, place, move, relocate, store, remove and dispose of temporary K-Rail... for the lump sum price of.	Lump Sum	1,400,000.00	1,400,000.00	600,000.00	686,711.00	661,212.00	1,500,000.00
ITEM NO. 4 - Mobilization/Demobilization: Furnish all labor, materials, tools, equipment, and incidentals necessary for Mobilization and Demobilization as specified and shown for the lump sum price (fixed amount of \$1,200) of.	Lump Sum	1,200,000.00	1,200,000.00	1,200,000.00	1,200,000.00	1,200,000.00	1,200,000.00
ITEM NO. 5 - Maintain Demobilization/Remobilization: Furnish all labor, materials, tools, equipment and incidentals necessary to temporarily demobilize from the above-wharf work area, including temporary... for the unit price per each combined event of.	Unit Price	9,000.00	135,000.00	1,000.00	3,554.00	5,775.15	4,380.00
<b>TOTAL:</b>							
<b>CERTIFIED CHECK OR BOND:</b>							

Helix Electric, Inc.  
LOWEST RESPONSIBLE BIDDER

483309/Exp. 1/130/2013  
LICENSE NUMBER

\$25,200,000.00  
AMOUNT

*[Signature]*  
AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit**  
**at Pier J, Berths J245-J247 and J286-J270**

NO. HD-S2341

DATE OPENED: February 7, 2012

ITEM	ESTIMATED QUANTITIES	Helix Electric, Inc.		Shinnick Construction Company		Subj-Miller Contracting Company		The Ryan Company		Griffith/Rosenfeld JV	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 6 - Storm Water Pollution Prevention Plans (SWPPP) Development and Compliance: Furnish all labor, materials, tools, equipment, and incidentals necessary to develop, provide, monitor... for the lump sum price (minimum amount of \$150,000) of -	Lump Sum	300,000.00	300,000.00	150,000.00	150,000.00	289,553.00	289,553.00	184,554.00	184,554.00	150,000.00	150,000.00
ITEM NO. 7 - City Ordinance Construction Waste Management Plan: Furnish all labor, material, tools, equipment, logistics, forms, and incidentals necessary... (exclusive of the maximum \$50,000 deposit) for the lump sum price (minimum amount of \$5,000) of -	Lump Sum	10,000.00	10,000.00	5,000.00	5,000.00	6,186.00	6,186.00	6,275.00	6,275.00	5,000.00	5,000.00
ITEM NO. 8 - Soil Handling and Disposal, Non-Hazardous Waste: Furnish all labor, materials, tools, equipment, and incidentals necessary to design, place, maintain, move, and remove excavation shoring adequate for worker... for the lump sum price (minimum amount of \$30,000) of -	Unit Price	12.00	100,800.00	12.00	100,800.00	21.00	176,400.00	40.97	344,148.00	7.90	66,360.00
ITEM NO. 9 - Shoring for Excavations: Furnish all labor, materials, tools, equipment, and incidentals necessary to design, place, maintain, move, and remove excavation shoring adequate for worker... for the lump sum price (minimum amount of \$30,000) of -	Lump Sum	150,000.00	150,000.00	300,000.00	300,000.00	105,445.00	105,445.00	106,862.00	106,862.00	150,000.00	150,000.00
ITEM NO. 10 - Import Soil: Furnish all labor, materials, tools, equipment, and incidentals necessary to test, certify, load, transport, stockpile, place... approximately six thousand eight hundred ten (6,810) tons... for the unit price per ton of -	Unit Price	25.00	177,050.00	42.00	286,020.00	40.30	274,443.00	14.55	99,153.60	36.00	245,160.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

AUTHORIZED SIGNATURE

\$25,200,000.00  
 AMOUNT

483309/EXP.11/30/2013  
 LICENSE NUMBER

Helix Electric, Inc.  
 LOWEST RESPONSIBLE BIDDER



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit at Pier J, Berths J246-J247 and J266-J270**

NO. HD-S2141

DATE OPENED: February 7, 2012

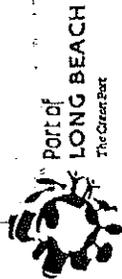
ITEM	ESTIMATED QUANTITIES	Helix Electric, Inc.		Shimnick Construction Company		Sully-Miller Contracting Company		The Ryan Company		Griffith/Rosardin JV	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 11 - 3/4-inch Crushed Rock: Furnish all labor, materials, tools, equipment, and incidentals necessary to load, transport, stockpile, place, compact and grade approximately two thousand five hundred (2,500) tons... for the unit price per ton of.	Unit Price	25.00	62,500.00	40.00	100,000.00	50.20	125,500.00	25.50	63,750.00	27.00	67,500.00
ITEM NO. 12 - Disposal of Non-Hazardous Waste: Furnish all labor, materials, tools, equipment, and incidentals necessary to profile, load, transport... approximately thirteen thousand four hundred (13,400) tons... for the unit price per ton of.	Unit Price	10.00	134,000.00	45.00	603,000.00	25.75	398,450.00	45.80	613,720.00	42.50	569,500.00
ITEM NO. 13 - Crushed Miscellaneous Base from Port Crusher Site: Furnish all labor, materials, tools, equipment, and incidentals necessary to load, weigh... approximately five thousand six hundred eighty (5,680) tons... for the unit price per ton of.	Unit Price	40.00	227,200.00	18.00	102,240.00	37.50	213,000.00	24.10	135,888.00	30.80	174,944.00
ITEM NO. 14 - Furnish and Place Pavement Stripings: Furnish all labor, materials, tools, equipment, and incidentals necessary to furnish and place 4-inch wide pavement striping complete as specified, for the unit price per linear foot of.	Unit Price	2.00	12,000.00	1.00	6,000.00	0.85	5,160.00	1.21	7,280.00	0.80	4,800.00
ITEM NO. 15 - Furnish and Place Pavement Markings: Furnish all labor, materials, tools, equipment, and incidentals necessary to furnish and place pavement markings, complete as specified, for the unit price per square foot of.	Unit Price	6.00	36,000.00	3.00	18,000.00	2.55	15,480.00	3.02	18,120.00	2.40	14,400.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

AUTHORIZED SIGNATURE

**\$25,200,000.00**  
 AMOUNT

433309/EXP.11/30/2013  
 LICENSE NUMBER

Helix Electric, Inc.  
 LOWEST RESPONSIBLE BIDDER



# ANALYSIS OF BIDS

## CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit**  
**at Pier J, Berths J245-J247 and J266-J270**

NO. HD-S2341

DATE OPENED: February 7, 2012

ITEM	ESTIMATED QUANTITIES		Helix Electric, Inc.		Shimmick Construction Company		Sully-Miller Contracting Company		The Ryan Company		Griffith/Rosenfeld JV	
	ITEM NO.	DESCRIPTION	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 16 -	Furnish and Place Chain Link Fence and Gates; Furnish all labor, materials, tools, equipment, and incidentals necessary to furnish and place permanent chain link fence and gates including all footings, chain...	Lump Sum	60,000.00	60,000.00	35,000.00	35,000.00	292,631.00	292,631.00	72,300.00	72,300.00	35,000.00	35,000.00
ITEM NO. 17 -	Steel Guard Posts; Furnish all labor, materials, tools, equipment, and incidentals necessary to furnish and install ninety-five (95) steel guard posts, fixed and removable, including concrete footings...	Unit Price	1,400.00	133,000.00	1,200.00	114,000.00	1,785.00	165,575.00	1,566.35	148,803.25	1,470.00	139,650.00
ITEM NO. 18 -	Shore Power Outlet Vaults for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, materials, equipment, and incidentals necessary to perform demolition and construction of shore to ship power...	Lump Sum	400,000.00	400,000.00	550,000.00	550,000.00	815,045.00	815,045.00	248,506.00	248,506.00	845,000.00	845,000.00
ITEM NO. 19 -	Shore Power Outlet Vaults for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, materials, equipment, and incidentals necessary to perform demolition and construction of shore to ship power...	Lump Sum	500,000.00	500,000.00	450,000.00	450,000.00	496,426.00	496,426.00	95,546.00	95,546.00	516,000.00	516,000.00
ITEM NO. 20 -	Shore Power Outlet Vaults for Berth J268 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, materials, equipment, and incidentals necessary to perform demolition and construction of shore to...	Lump Sum	580,000.00	580,000.00	750,000.00	750,000.00	969,828.00	969,828.00	283,187.00	283,187.00	750,000.00	750,000.00
<b>TOTAL:</b>												
<b>CERTIFIED CHECK OR BOND:</b>												

483309/EXP.11/30/2013  
 LICENSE NUMBER

\$25,200,000.00  
 AMOUNT

Helix Electric, Inc.  
 LOWEST RESPONSIBLE BIDDER

*[Signature]*  
 AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit**  
at Pier J, Berths J245-J247 and J266-J270

NO. HD-S2341

DATE OPENED: February 7, 2012

ITEM	ESTIMATED QUANTITIES	Helix Electric, Inc.		Shimnick Construction Company		Sully-Miller Contracting Company		The Ryan Company		Griffith/Rosendin JV	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 21 - Shore Power Output Units for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, materials, equipment, and incidentals necessary to perform demolition and construction of shore to ship power... for the lump sum price of -	Lump Sum	550,000.00	550,000.00	500,000.00	500,000.00	681,001.00	681,001.00	218,699.00	218,699.00	630,000.00	630,000.00
ITEM NO. 22 - Transformer(s) for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the transformer(s) as part of a complete system... for the lump sum price of -	Lump Sum	600,000.00	600,000.00	600,000.00	600,000.00	617,070.00	617,070.00	641,584.00	641,584.00	595,348.00	595,348.00
ITEM NO. 23 - Transformer(s) for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the transformer(s) as part of a complete system... for the lump sum price of -	Lump Sum	600,000.00	600,000.00	600,000.00	600,000.00	617,070.00	617,070.00	641,584.00	641,584.00	595,348.00	595,348.00
ITEM NO. 24 - Transformer(s) for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, materials, equipment, and incidentals required to furnish, install, and test the transformer(s) as part of a... for the lump sum price of -	Lump Sum	600,000.00	600,000.00	600,000.00	600,000.00	617,070.00	617,070.00	641,584.00	641,584.00	595,348.00	595,348.00
ITEM NO. 25 - Transformer for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the transformer(s) as part of a complete... for the lump sum price of -	Lump Sum	600,000.00	600,000.00	600,000.00	600,000.00	617,070.00	617,070.00	641,584.00	641,584.00	595,348.00	595,348.00
<b>TOTAL:</b>											

*[Signature]*  
AUTHORIZED SIGNATURE

\$25,200,000.00  
AMOUNT

483309/Exp.11/30/2013  
LICENSE NUMBER

Helix Electric, Inc.  
LOWEST RESPONSIBLE BIDDER



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit**  
at Pier J, Berths J245-J247 and J266-J270

NO. HD-S2341

DATE OPENED: February 7, 2012

ITEM	Helix Electric, Inc. 8250 Camino Santa Fe #A San Diego, CA 92121 Phone: (618) 535-0505 Fax: (618) 535-0738		Shimnick Construction Company 8201 Edgewater Drive Oakland, CA 92618 Phone: (949) 333-1500 Fax: (949) 333-1510		Suby-Miller Contracting Company 135 E. State College Blvd #400 Brea, CA 92821 Phone: (714) 578-9800 Fax: (714) 449-8775		The Ryan Company 115 Commerce Way North, MA 02766 Phone: (508) 742-2500 Fax: (508) 742-2540		Griffith/Rosendin JV 12200 Bloomfield Avenue Santa Fe Springs, CA 90670 Phone: (562) 929-1128 Fax: (562) 864-7938	
	ESTIMATED QUANTITIES	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE
ITEM NO. 26 - Switchgear Assembly(s) for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the switchgear assembly as part of a... for the lump sum price of -	Lump Sum	1,112,440.00	1,112,440.00	1,950,000.00	2,257,118.00	2,257,118.00	1,983,333.00	1,983,333.00	1,803,184.00	1,803,184.00
ITEM NO. 27 - Switchgear Assembly(s) for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the switchgear assembly as part of a complete... for the lump sum price of -	Lump Sum	1,000,000.00	1,000,000.00	2,000,000.00	2,180,872.00	2,180,872.00	1,983,333.00	1,983,333.00	1,839,885.00	1,839,885.00
ITEM NO. 28 - Switchgear Assembly(s) for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the switchgear assembly as... for the lump sum price of -	Lump Sum	2,000,000.00	2,000,000.00	2,000,000.00	2,313,947.00	2,313,947.00	1,983,333.00	1,983,333.00	1,852,170.00	1,852,170.00
ITEM NO. 29 - Switchgear Assembly(s) for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the switchgear assembly as part of a... for the lump sum price of -	Lump Sum	2,200,000.00	2,200,000.00	2,190,000.00	2,380,942.00	2,380,942.00	1,983,333.00	1,983,333.00	2,028,687.00	2,028,687.00
ITEM NO. 30 - Curbank and Raceways for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals required to furnish, install and test the subcabling and raceways as part of a... for the lump sum price of -	Lump Sum	1,500,000.00	1,500,000.00	2,000,000.00	1,014,160.00	1,014,160.00	1,146,620.00	1,146,620.00	1,150,000.00	1,150,000.00
<b>TOTAL:</b>										
<b>CERTIFIED CHECK OR BOND:</b>										

4833091EXP.11/30/2013  
LICENSE NUMBER

\$25,200,000.00  
AMOUNT

Helix Electric, Inc.  
LOWEST RESPONSIBLE BIDDER

*[Signature]*  
AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR:** Shore to Ship Power Retrofit at Pier J, Berths J245-J247 and J286-J270

NO. HD-S23341

DATE OPENED: February 7, 2012

ITEM	ESTIMATED QUANTITIES	Helix Electric, Inc.		Shumlick Construction Company		Sully-Hiller Contracting Company		The Ryeh Company		Griffith/Rosendin JV	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 31 - Ductbank and Raceways for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the ductbanks and raceways as part of a complete... for the lump sum price of -	Lump Sum	1,500,000.00	1,500,000.00	1,000,000.00	1,000,000.00	814,440.00	814,440.00	928,874.00	928,874.00	1,150,000.00	1,150,000.00
ITEM NO. 32 - Ductbank and Raceways for Berth J269 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the ductbanks and raceways as... for the lump sum price of -	Lump Sum	2,000,000.00	2,000,000.00	1,800,000.00	1,800,000.00	1,278,178.00	1,278,178.00	1,835,453.00	1,835,453.00	1,320,000.00	1,320,000.00
ITEM NO. 33 - Ductbank and Raceways for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the ductbanks and raceways as part of... for the lump sum price of -	Lump Sum	1,500,000.00	1,500,000.00	1,300,000.00	1,300,000.00	1,175,073.00	1,175,073.00	1,066,532.00	1,066,532.00	1,330,000.00	1,330,000.00
ITEM NO. 34 - Conductors for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the conductor(s) as part of a complete system as... for the lump sum price of -	Lump Sum	400,000.00	400,000.00	550,000.00	550,000.00	637,918.00	637,918.00	556,501.00	556,501.00	604,784.00	604,784.00
ITEM NO. 35 - Conductors for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the conductor(s) as part of a complete system as specified... for the lump sum price of -	Lump Sum	200,000.00	200,000.00	400,000.00	400,000.00	451,610.00	451,610.00	400,827.00	400,827.00	457,211.00	457,211.00
<b>TOTAL:</b>											

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AUTHORIZED SIGNATURE

483309/EXP-11/30/2013  
LICENSE NUMBER

525,200,000.00  
AMOUNT

Helix Electric, Inc.  
LOWEST RESPONSIBLE BIDDER



**ANALYSIS OF BIDS  
CITY OF LONG BEACH, HARBOR DEPARTMENT**

DATE OPENED: February 7, 2012

NO. HD-S2341

SPECIFICATIONS FOR: Shore to Ship Power Retrofit at Pier J, Berths J245-J247 and J266-J270

ITEM	ESTIMATED QUANTITIES	Helix Electric, Inc.		Shimmitz Construction Company		Sully-Miller Contracting Company		The Ryan Company		Griffith/Rosenblin JV	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 35 - Conductors for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the conductor(s) as part of a complete... for the lump sum price of.	Lump Sum	500,000.00	500,000.00	800,000.00	800,000.00	887,968.00	887,968.00	813,159.00	813,159.00	756,811.00	756,811.00
ITEM NO. 37 - Conductors for Berth J270 (SPO 15, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the conductor(s) as part of a complete system... for the lump sum price of.	Lump Sum	400,000.00	400,000.00	650,000.00	650,000.00	852,670.00	852,670.00	788,446.00	788,446.00	631,085.00	631,085.00
ITEM NO. 38 - SPO Assemblies for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the SPO assemblies as part of a complete system... for the lump sum price of.	Lump Sum	150,000.00	150,000.00	175,000.00	175,000.00	138,722.00	138,722.00	442,719.00	442,719.00	390,978.00	390,978.00
ITEM NO. 39 - SPO Assemblies for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the SPO assemblies as part of a complete system... for the lump sum price of.	Lump Sum	100,000.00	100,000.00	175,000.00	175,000.00	173,403.00	173,403.00	354,175.00	354,175.00	475,401.00	475,401.00
ITEM NO. 40 - SPO Assemblies for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the SPO assemblies as part of a... for the lump sum price of.	Lump Sum	170,000.00	170,000.00	175,000.00	175,000.00	208,083.00	208,083.00	531,262.00	531,262.00	559,717.00	559,717.00
<b>TOTAL:</b>											

483303/Exp-11/02/2013  
LICENSE NUMBER

\$25,200,000.00  
AMOUNT

Helix Electric, Inc.  
LOWEST RESPONSIBLE BIDDER

*[Signature]*  
AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit**  
**at Pier J, Berths J245-J247 and J266-J270**

NO. HD-S2341

DATE OPENED: February 7, 2012

ITEM	ESTIMATED QUANTITIES	Helix Electric, Inc.		Shimick Construction Company		Sully-Miller Contracting Company		The Ryan Company		Griffith/Rosenfeld JV	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 41 - SPO Assemblies for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the SPO assemblies as part of a complete... for the lump sum price of -	Lump Sum	150,000.00	150,000.00	175,000.00	175,000.00	173,403.00	173,403.00	442,719.00	442,719.00	475,401.00	475,401.00
ITEM NO. 42 - All Other Electrical Work for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals required to furnish, install, and test all other electrical work for Berth... for the lump sum price of -	Lump Sum	150,000.00	150,000.00	300,000.00	300,000.00	197,569.00	197,569.00	127,695.00	127,695.00	1.00	1.00
ITEM NO. 43 - All Other Electrical Work for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, material, equipment, and incidentals required to furnish, install, and test all other electrical work for Berth J247 as... for the lump sum price of -	Lump Sum	150,000.00	150,000.00	250,000.00	250,000.00	167,008.00	167,008.00	220,414.00	220,414.00	1.00	1.00
ITEM NO. 44 - All Other Electrical Work for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, material, equipment, and incidentals required to furnish, install, and test all other electrical work... for the lump sum price of -	Lump Sum	150,000.00	150,000.00	275,000.00	275,000.00	195,201.00	195,201.00	247,649.00	247,649.00	1.00	1.00
ITEM NO. 45 - All Other Electrical Work for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals required to furnish, install, and test all other electrical work for... for the lump sum price of -	Lump Sum	150,000.00	150,000.00	250,000.00	250,000.00	167,008.00	167,008.00	127,695.00	127,695.00	1.00	1.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

Helix Electric, Inc.  
LOWEST RESPONSIBLE BIDDER

483309/EXP-11/30/2013  
LICENSE NUMBER

\$25,200,000.00  
AMOUNT

*[Signature]*  
AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit** at Pier J, Berths J245-J247 and J266-J270  
 NO. HD-S2341 DATE OPENED: February 7, 2012

ITEM	ESTIMATED QUANTITIES	RATE	AMOUNT	SHIMMICK CONSTRUCTION COMPANY 8201 Edgewater Drive Oakland, CA 92618 Phone: (949) 333-1500 Fax: (949) 333-1510	SULLY-MILLER CONTRACTING COMPANY 135 E. State College Blvd #400 Brea, CA 92821 Phone: (714) 578-9650 Fax: (714) 448-8775	THE RYAN COMPANY 15 Commerce Way Norton, MA 02765 Phone: (508) 742-2500 Fax: (508) 742-2540	GRIFFITH ROSENBLIN JV 12200 Bloomfield Avenue Santa Fe Springs, CA 90670 Phone: (562) 929-1128 Fax: (562) 884-7938
ITEM NO. 46 - All Other Work: Furnish all labor, materials, tools, equipment, and incidentals necessary to perform all other work not included in the other Bid items as indicated in Paragraph SC-22 of the Special Conditions for the lump sum price of -	Lump Sum	200,000.00	200,000.00	0	530,999.00	3,142,993.00	4,310,000.00
ITEM NO. 47 - Bonded Contractor Overhead: Furnish all labor, material, tools, equipment, and incidentals necessary to complete the work beyond the initial Contract Time due to Excusable Compensable Delays as indicated... for the unit price per day of -	Unit Price	1,000.00	60,000.00	1,500.00	144.00	3,137.70	188,292.00
ITEM NO. 48 - Standby Time: Period of time during which work is interrupted and the Contractor shall hold Contractor's labor personnel and equipment in a state of readiness as indicated in Paragraph SC-30 of the... for the unit price per man hour of -	Unit Price	60.00	240,000.00	60.00	172.00	80.50	322,000.00
ITEM NO. 49 - Commissioning for Berths J245-J247: Furnish all labor, materials, tools, equipment, and incidentals necessary to commission Berths J245-J247 complete as specified in Section 18998 "Commissioning" for the unit price per man hour of -	Unit Price	200.00	200,000.00	400.00	358.00	132.54	132,540.00
ITEM NO. 50 - Commissioning for Berths J266-J270: Furnish all labor, materials, tools, equipment, and incidentals necessary to commission Berths J266-J270 complete as specified in Section 16998 "Commissioning" for the unit price per man hour of -	Unit Price	200.00	200,000.00	400.00	358.00	132.54	132,540.00
<b>TOTAL:</b>			\$25,200,000.00	\$25,485,050.00	\$21,891,451.00	\$25,290,225.10	\$31,335,185.00
<b>CERTIFIED CHECK OR BOND:</b>			10% Bond	10% Bond	10% Bond	10% Bond	10% Bond

Helix Electric, Inc.  
 483309/EXP.11/30/2013  
 LICENSE NUMBER  
 \$25,200,000.00  
 AMOUNT  
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**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit**  
at Pier J, Berths J245-J247 and J266-J270

NO. HD-S2341

DATE OPENED: February 7, 2012

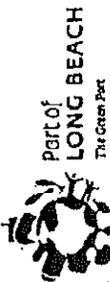
ITEM	ESTIMATED QUANTITIES	Dynalectric		Comet Electric, Inc.					
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 1 - Progress Schedules: Furnish all labor, materials, tools, equipment, and incidentals necessary to prepare, furnish, update, revise and maintain the cost and resource loaded scheduling... for the lump sum price (minimum amount of \$25,000) of -	Lump Sum	192,500.00	192,500.00	99,324.00	99,324.00				
ITEM NO. 2 - Site Specific Safety Plan: Furnish all labor, materials, tools, equipment, and incidentals necessary to develop, submit, implement and maintain a Site Specific Safety Plan, including... for the lump sum price (minimum amount of \$30,000) of -	Lump Sum	34,000.00	34,000.00	33,350.00	33,350.00				
ITEM NO. 3 - Furnish and Place Temporary K-Rail and Chain Link Fence: Furnish all labor, materials, tools, equipment, and incidentals necessary to furnish, place, move, relocate, store, remove and dispose of temporary K-Rail... for the lump sum price of -	Lump Sum	309,500.00	309,500.00	77,770.00	77,770.00				
ITEM NO. 4 - Mobilization/Demobilization: Furnish all labor, materials, tools, equipment, and incidentals necessary for Mobilization and Demobilization as specified and allow for the lump sum price (based amount of \$1,200) of -	Lump Sum	1,200,000.00	1,200,000.00	1,200,000.00	1,200,000.00				
ITEM NO. 5 - Warm Demobilization/Remobilization: Furnish all labor, materials, tools, equipment and incidentals necessary to temporarily demobilize from the above-what work area, including temporary... for the unit price per each combined event of -	Unit Price	5,000.00	75,000.00	15,000.00	225,000.00				
<b>TOTAL:</b>									

*[Signature]*  
AUTHORIZED SIGNATURE

\$25,200,000.00  
AMOUNT

483309/Exp.11/30/2013  
LICENSE NUMBER

Helix Electric, Inc.  
LOWEST RESPONSIBLE BIDDER



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

DATE OPENED: February 7, 2012

NO. HD-S3341

SPECIFICATIONS FOR: Shore to Ship Power Retrofit  
at Pier J, Berths J245-J247 and J265-J270

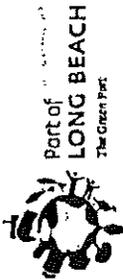
ITEM	ESTIMATED QUANTITIES	Dynalectric		Comet Electric, Inc.					
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 8 - Storm Water Pollution Prevention Plan(s) (SWPPP) Development and Compliance: Furnish all labor, materials, tools, equipment, and incidentals necessary to develop, provide, monitor... for the lump sum price (minimum amount of \$150,000) of -	Lump Sum	316,300.00	316,300.00	166,650.00	166,650.00				
ITEM NO. 7 - City Ordinance Construction Waste Management Plan: Furnish all labor, material, tools, equipment, logistics, forms, and incidentals necessary... (exclusive of the maximum \$50,000 deposit) for the lump sum price (minimum amount of \$5,000) of -	Lump Sum	6,700.00	5,700.00	72,215.00	72,215.00				
ITEM NO. 3 - Soil Handling and Disposal/Non-Hazardous Waste: Furnish all labor, materials, tools, equipment, and incidentals necessary to excavate, stockpile... approximately seventeen-thousand six-hundred (17,600) tons... for the unit price per ton of -	Unit Price	28.15	236,460.00	29.33	237,872.00				
ITEM NO. 9 - Shoring for Excavation: Furnish all labor, materials, tools, equipment, and incidentals necessary to design, place, maintain, move, and remove excavation shoring adequate for worker... for the lump sum price (minimum amount of \$30,000) of -	Lump Sum	287,000.00	287,000.00	122,390.00	122,390.00				
ITEM NO. 10 - Impact Soil: Furnish all labor, materials, tools, equipment, and incidentals necessary to test, certify, load, transport, stockpile, place... approximately six thousand eight hundred ten (6,810) tons... for the unit price per ton of -	Unit Price	42.78	291,331.80	45.33	308,697.30				
<b>TOTAL:</b>									

*[Signature]*  
AUTHORIZED SIGNATURE

525,200,000.00  
AMOUNT

483309/Exp.11/30/2013  
LICENSE NUMBER

Helix Electric, Inc.  
LOWEST RESPONSIBLE BIDDER



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit**  
at Pier J, Berths J245-J247 and J266-J270

NO. HD-S2341

DATE OPENED: February 7, 2012

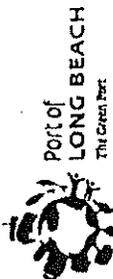
ITEM	ESTIMATED QUANTITIES		Dynalectric		Comet Electric, Inc.		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT						
ITEM NO. 11 - 3/4-inch Crushed Rock: Furnish all labor, materials, tools, equipment, and incidentals necessary to load, transport, stockpile, place, compact and grade approximately two thousand five hundred (2,500) tons... for the unit price per ton of -	Unit Price	225,150.00	90.06	20,280.00	28.33	70,825.00						
ITEM NO. 12 - Disposal of Non-Hazardous Waste: Furnish all labor, materials, tools, equipment, and incidentals necessary to profile, load, transport... approximately thirteen thousand four hundred (13,400) tons... for the unit price per ton of -	Unit Price	1,252,632.00	93.48	176,976.80	65.73	885,782.00						
ITEM NO. 13 - Crushed Miscellaneous Base from Port Crusher Site: Furnish all labor, materials, tools, equipment, and incidentals necessary to load, weigh... approximately five thousand six hundred eighty (5,680) tons... for the unit price per ton of -	Unit Price	176,976.80	31.51	20,280.00	47.60	270,368.00						
ITEM NO. 14 - Furnish and Place Pavement Stripping: Furnish all labor, materials, tools, equipment, and incidentals necessary to furnish and place 4-inch wide pavement stripping complete as specified, for the unit price per linear foot of -	Unit Price	20,280.00	3.38	27,000.00	0.57	3,420.00						
ITEM NO. 15 - Furnish and Place Pavement Markings: Furnish all labor, materials, tools, equipment, and incidentals necessary to furnish and place pavement markings, complete as specified, for the unit price per square foot of -	Unit Price	27,000.00	4.50	19,860.00	3.31	19,860.00						
<b>TOTAL:</b>												
<b>CERTIFIED CHECK OR BOND:</b>												

**Helix Electric, Inc.**  
LOWEST RESPONSIBLE BIDDER

483309/Exp.11/30/2013  
LICENSE NUMBER

\$25,200,000.00  
AMOUNT

*[Signature]*  
AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

DATE OPENED: February 7, 2012

NO. HD-S2341

SPECIFICATIONS FOR: Shores to Ship Power Retrofit  
at Pier J, Berths J245-J247 and J266-J270

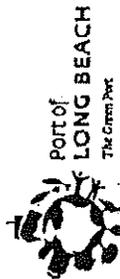
ITEM	ESTIMATED QUANTITIES		Dynalectric		Comet Electric, Inc.					
	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 18 - Furnish and Place Chain Link Fence and Gates; Furnish all labor, materials, tools, equipment, and incidentals necessary to furnish and place permanent chain link fence and gates including all footings, chain... for the lump sum price of -										
		Lump Sum	29,720.00	29,720.00	31,413.00	31,413.00				
ITEM NO. 17 - Steel Guard Posts; Furnish all labor, materials, tools, equipment, and incidentals necessary to furnish and install ninety-five (95) steel guard posts, fixed and removable, including concrete footings... for the unit price per each of -		Unit Price	1,687.47	160,309.65	1,784.82	169,557.90				
ITEM NO. 18 - Shore Power Outlet Vaults for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals necessary to perform demolition and construction of shore to ship power... for the lump sum price of -		Lump Sum	557,250.00	557,250.00	875,322.00	875,322.00				
ITEM NO. 19 - Shore Power Outlet Vaults for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, material, equipment, and incidentals necessary to perform demolition and construction of shore to ship power... for the lump sum price of -		Lump Sum	467,200.00	467,200.00	704,410.00	704,410.00				
ITEM NO. 20 - Shore Power Outlet Vaults for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, material, equipment, and incidentals necessary to perform demolition and construction of shore to... for the lump sum price of -		Lump Sum	666,700.00	666,700.00	1,187,501.00	1,187,501.00				
<b>TOTAL:</b>										
<b>CERTIFIED CHECK OR BOND:</b>										

*[Signature]*  
AUTHORIZED SIGNATURE

\$25,200,000.00  
AMOUNT

483309/EXP.11/30/2013  
LICENSE NUMBER

Heitz Electric, Inc.  
LOWEST RESPONSIBLE BIDDER



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit at Pier J, Berths J245-J247 and J266-J270**

NC. HD-S2341

DATE OPENED: February 7, 2012

ITEM	ESTIMATED QUANTITIES	Dynalectric		Comet Electric, Inc.		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
		RATE	AMOUNT	RATE	AMOUNT						
ITEM NO. 21 - Shore Power Outlet Units for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals necessary to perform demolition and construction of shore to ship power... for the lump sum price of -	Lump Sum	580,000.00	580,000.00	994,741.00	994,741.00						
ITEM NO. 22 - Transformer(s) for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the transformer(s) as part of a complete system... for the lump sum price of -	Lump Sum	650,000.00	650,000.00	630,000.00	630,000.00						
ITEM NO. 23 - Transformer(s) for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the transformer(s) as part of a complete system... for the lump sum price of -	Lump Sum	650,000.00	650,000.00	630,000.00	630,000.00						
ITEM NO. 24 - Transformer(s) for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the transformer(s) as part of a... for the lump sum price of -	Lump Sum	650,000.00	650,000.00	630,000.00	630,000.00						
ITEM NO. 25 - Transformer(s) for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the transformer(s) as part of a complete... for the lump sum price of -	Lump Sum	650,000.00	650,000.00	630,000.00	630,000.00						
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BONDS:</b>											

AUTHORIZED SIGNATURE

525,200,000.00  
 AMOUNT

483309/EXP.11/30/2013  
 LICENSE NUMBER

Helix Electric, Inc.  
 LOWEST RESPONSIBLE BIDDER



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

NO. HD-S2341

DATE OPENED: February 7, 2012

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit**  
**at Pier J, Berths J245-J247 and J265-J270**

ITEM	ESTIMATED QUANTITIES	Dynalectric		Comel Electric, Inc.		Gomel Electric, Inc.	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 26 - Switchgear Assembly(s) for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the switchgear assembly as part of a... for the lump sum price of -	Lump Sum	1,992,000.00	1,992,000.00	2,150,000.00	2,150,000.00	2,150,000.00	2,150,000.00
ITEM NO. 27 - Switchgear Assembly(s) for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the switchgear assembly as part of a complete... for the lump sum price of -	Lump Sum	2,032,000.00	2,032,000.00	2,169,000.00	2,169,000.00	2,169,000.00	2,169,000.00
ITEM NO. 28 - Switchgear Assembly(s) for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the switchgear assembly as... for the lump sum price of -	Lump Sum	2,045,300.00	2,045,300.00	2,244,000.00	2,244,000.00	2,244,000.00	2,244,000.00
ITEM NO. 29 - Switchgear Assembly(s) for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the switchgear assembly as part of a... for the lump sum price of -	Lump Sum	2,235,400.00	2,235,400.00	2,519,000.00	2,519,000.00	2,519,000.00	2,519,000.00
ITEM NO. 30 - Ductbank and Raceways for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals required to furnish, install and test the ductbanks and raceways as part of a... for the lump sum price of -	Lump Sum	1,920,500.00	1,920,500.00	1,929,000.00	1,929,000.00	1,929,000.00	1,929,000.00
<b>TOTAL:</b>							
<b>CERTIFIED CHECK OR BOND:</b>							

\$25,200,000.00  
AMOUNT

4833091Exp.11/30/2013  
LICENSE NUMBER

Helix Electric, Inc.  
LOWEST RESPONSIBLE BIDDER

*[Signature]*  
AUTHORIZED SIGNATURE



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

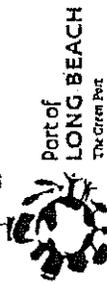
**SPECIFICATIONS FOR: Shore to Ship Power Retrofit  
at Pier J, Berths J245-J247 and J266-J270**

NO. HD-S2341

DATE OPENED: February 7, 2012

ITEM	ESTIMATED QUANTITIES	Dynalistic		Cornel Electric, Inc.		Dynametric		Cornel Electric, Inc.	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 31 - Ductbank and Raceways for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9): Provide all labor, material, equipment, and incidentals required to furnish, install, and test the ductbanks and raceways as part of a complete... for the lump sum price of -	Lump Sum	774,500.00	774,500.00	1,723,000.00	1,723,000.00	1,723,000.00	1,723,000.00		
ITEM NO. 32 - Ductbank and Raceways for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15): Provide all labor, material, equipment, and incidentals required to furnish, install, and test the ductbanks and raceways as... for the lump sum price of -	Lump Sum	2,857,600.00	2,857,600.00	3,008,000.00	3,008,000.00	3,008,000.00	3,008,000.00		
ITEM NO. 33 - Ductbank and Raceways for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20): Provide all labor, material, equipment, and incidentals required to furnish, install, and test the ductbanks and raceways as part of... for the lump sum price of -	Lump Sum	1,234,500.00	1,234,500.00	2,897,000.00	2,897,000.00	2,897,000.00	2,897,000.00		
ITEM NO. 34 - Conductors for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5): Provide all labor, material, equipment, and incidentals required to furnish, install, and test the conductor(s) as part of a complete system as... for the lump sum price of -	Lump Sum	619,250.00	619,250.00	627,000.00	627,000.00	627,000.00	627,000.00		
ITEM NO. 35 - Conductors for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9): Provide all labor, material, equipment, and incidentals required to furnish, install, and test the conductor(s) as part of a complete system as specified... for the lump sum price of -	Lump Sum	371,200.00	371,200.00	460,000.00	460,000.00	460,000.00	460,000.00		
<b>TOTAL:</b>									

Helix Electric, Inc.  
 LOWEST RESPONSIBLE BIDDER  
 483309/EXP-11/30/2013  
 LICENSE NUMBER  
 \$25,200,000.00  
 AMOUNT  
 AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS  
CITY OF LONG BEACH, HARBOR DEPARTMENT**

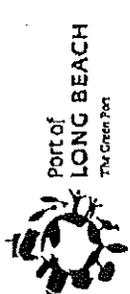
**SPECIFICATIONS FOR:** Shore to Ship Power Retrofit  
at Pier J, Berths J245-J247 and J266-J270

NO. HD-S2341

DATE OPENED: February 7, 2012

ITEM	ESTIMATED QUANTITIES	Dynaslectric		Comet Electric, Inc.		Comet Electric, Inc.		Comet Electric, Inc.		Comet Electric, Inc.	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 38 - Conductors for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the conductor(s) as part of a complete... for the lump sum price of -	Lump Sum	766,400.00	766,400.00	977,000.00	977,000.00	977,000.00	977,000.00				
ITEM NO. 37 - Conductors for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the conductor(s) as part of a complete system... for the lump sum price of -	Lump Sum	633,725.00	633,725.00	822,000.00	822,000.00	822,000.00	822,000.00				
ITEM NO. 36 - SPO Assemblies for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the SPO assemblies as part of a complete system... for the lump sum price of -	Lump Sum	168,200.00	168,200.00	638,000.00	638,000.00	638,000.00	638,000.00				
ITEM NO. 35 - SPO Assemblies for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the SPO assemblies as part of a complete system... for the lump sum price of -	Lump Sum	150,600.00	150,600.00	392,000.00	392,000.00	392,000.00	392,000.00				
ITEM NO. 40 - SPO Assemblies for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the SPO assemblies as part of a... for the lump sum price of -	Lump Sum	230,800.00	230,800.00	586,000.00	586,000.00	586,000.00	586,000.00				
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**Helix Electric, Inc.**  
 LOWEST RESPONSIBLE BIDDER  
 483309/EXP.11/30/2013  
 LICENSE NUMBER  
 \$25,200,000.00  
 AMOUNT  
 AUTHORIZED SIGNATURE

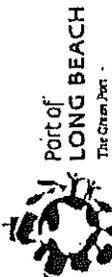


**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shora to Ship Power Retrofit**  
at Pier J, Berths J245-J247 and J266-J270  
NO. HD-S2341 DATE OPENED: February 7, 2012

ITEM	ESTIMATED QUANTITIES	Dynalectric		Cornel Electric, Inc.		Helix Electric, Inc.	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 41 - SPO Assemblies for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals required to furnish, install, and test the SPO assemblies as part of a complete... for the lump sum price of -	Lump Sum	192,400.00	192,400.00	489,000.00	489,000.00		
ITEM NO. 42 - All Other Electrical Work for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5); Provide all labor, material, equipment, and incidentals required to furnish, install, and test all other electrical work for Berth... for the lump sum price of -	Lump Sum	265,250.00	265,250.00	162,000.00	162,000.00		
ITEM NO. 43 - All Other Electrical Work for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9); Provide all labor, material, equipment, and incidentals required to furnish, install, and test all other electrical work for Berth J247 as... for the lump sum price of -	Lump Sum	151,050.00	151,050.00	162,000.00	162,000.00		
ITEM NO. 44 - All Other Electrical Work for Berth J266 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15); Provide all labor, material, equipment, and incidentals required to furnish, install, and test all other electrical work... for the lump sum price of -	Lump Sum	183,000.00	183,000.00	154,000.00	154,000.00		
ITEM NO. 45 - All Other Electrical Work for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20); Provide all labor, material, equipment, and incidentals required to furnish, install, and test all other electrical work for... for the lump sum price of -	Lump Sum	158,000.00	158,000.00	176,000.00	176,000.00		
<b>TOTAL:</b>							

**Helix Electric, Inc.**  
 LOWEST RESPONSIBLE BIDDER  
 483309/EXP.11/30/2013  
 LICENSE NUMBER  
 \$25,200,000.00  
 AMOUNT  
 AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

NO. HD-S2341 DATE OPENED: February 7, 2012

NO. HD-S2341

**SPECIFICATIONS FOR: Shore to Ship Power Retrofit**  
**at Pier J, Berths J245-J247 and J266-J270**

ITEM	ESTIMATED QUANTITIES	DYNALACRIC		COMET ELECTRIC, INC.		HELIIX ELECTRIC, INC.	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 46 - All Other Work: Furnish all labor, materials, tools, equipment, and incidentals necessary to perform all other work not included in the other Bid Items as indicated in Paragraph SC-22 of the Special Conditions for the lump sum price of -	Lump Sum	2,928,804.00	2,928,804.00	12,533.00	12,533.00	12,533.00	12,533.00
ITEM NO. 47 - Extended Contractor Overhead: Furnish all labor, material, tools, equipment, and incidentals necessary to complete the work beyond the initial Contract Time due to Excusable Compensable Delays as indicated, ... for the unit price per day of -	Unit Price	1,126.67	67,600.20	6,743.00	404,580.00		
ITEM NO. 48 - Standby Time: Period of time during which work is interrupted and the Contractor shall hold Contractor's labor personnel and equipment in a state of readiness as indicated in Paragraph SC-30 of the ... for the unit price per man hour of -	Unit Price	306.79	1,227,160.00	800.00	3,200,000.00		
ITEM NO. 49 - Commissioning for Berths J245-J247: Furnish all labor, materials, tools, equipment, and incidentals necessary to commission Berths J245-J247 complete as specified in Section 16989 "Commissioning" for the unit price per man hour of -	Unit Price	268.50	268,500.00	269.00	269,000.00		
ITEM NO. 50 - Commissioning for Berths J266-J270: Furnish all labor, materials, tools, equipment, and incidentals necessary to commission Berths J266-J270 complete as specified in Section 16989 "Commissioning" for the unit price per man hour of -	Unit Price	268.50	268,500.00	269.00	269,000.00		
<b>TOTAL:</b>							
<b>CERTIFIED CHECK OR BOND:</b>		\$31,295,249.45		\$38,170,851.20			
		10% Bond		10% Bond			

**LOWEST RESPONSIBLE BIDDER**  
 Helix Electric, Inc.  
 483309/EXP.11/30/2013  
 LICENSE NUMBER  
 \$25,200,000.00  
 AMOUNT  
 AUTHORIZED SIGNATURE

RECEIVED  
P.O.L.B. FINANCE  
15 APR 22 AM 11:23  
ACCTS PAYABLE

COPIES

Progress Payment No. 27  
Period Ending: 4/15/2015  
PAYMENT DUJE: 5/5/15  
Specification: HD-S2341 - Shore to Ship Power Retrofit at Pier J, Berths J245-J247 and J266 - J270.  
Contractor: Helix Electric, Inc.

LBHD Contract No: HD-7972 Original Bid Amt: \$25,200,000

Item No.	Item	Unit	Est. Qty.	Unit Price	Bid Amount	Qty This Month	J245 \$ Amount This Month	J247 \$ Amount This Month	J266 \$ Amount This Month	J270 \$ Amount This Month	Previous Qty or %	Total % of Item Comp	TOTAL Amount to Date
TOTALS	TOTAL CHANGE ORDERS			\$ 1,057,667.75	25,200,000.00	0%	\$ 3,407.00	\$ 3,407.00	\$ 43,592.73	\$ 43,592.73	99.67%	100.00%	\$ 26,303,766.75
NEW CONTRACT AMOUNT 26,303,766.75													

THIS IS TO CERTIFY THAT FUNDS ARE APPROVED BY BOARD OF HARBOR COMMISSIONERS.

M/S *Deepen Upadhyay* 4/17/15  
GM Initials Project Manager

*Suzanne C. Pleda* 4/9/15  
Date  
Suzanne C. Pleda, P.E.  
Director of Construction Management

Gross Earnings:	\$ 26,303,766.75
Previous Payments:	\$ 26,129,694.69
Previous Retention:	\$ (80,672.61)
Earned This Period:	\$ 83,699.45
Less Retention: E	\$ (4,659.97)
AMOUNT DUE THIS ESTIMATE:	\$ 89,259.48

DPHA15003141  
DPHA15003145 *eeoww*

EPO No.	INDEX CODE	PROJ	PROJ DET	Amount	Retention	Pay Amount
RPHA15002074	HAC1310	HAC1310	112341	\$ 93,996.48	\$ (4,659.97)	\$ 89,259.48

RECEIVED BY DEEPEEN UPADHYAY  
ON 4/16/15.

Progress Payment No. Z7  
 Period Ending: 1/15/2015  
 PAYMENT DUE: 5/6/15  
 Specification: HD-23241 - Shore to Ship Power Retrofit at Pier J, Berths J245-J247 and J266 - J270.  
 Contractor: Holix Electric, Inc.

LHD Contract No: HD-7872

Original Bid Amt: \$25,200,000

Item No.	Item	Unit	Ext. Qty.	Unit Price	Bid Amount	Qty This Month	J245 \$ Amount This Month	J247 \$ Amount This Month	J266 \$ Amount This Month	J270 \$ Amount This Month	Previous City er %	Total % of Item Comp	\$ TOTAL Amount to Date
1	Progress Schedules	Lump Sum	1	100,000.00	100,000.00	0%	-	-	-	-	100%	100%	100,000.00
2	Six Specific Safety Plan	Lump Sum	1	150,000.00	150,000.00	0%	-	-	-	-	100%	100%	150,000.00
3	Furnish and Place Temporary K-Rail and Chain Link Fence	Lump Sum	1	1,400,000.00	1,400,000.00	0%	-	-	-	-	100%	100%	1,400,000.00
4	Mobilization/Demobilization	Lump Sum	1	1,200,000.00	1,200,000.00	0%	-	-	-	-	100%	100%	1,200,000.00
5	Interim Demobilization/Remobilization	Unit Price	15	9,000.00	135,000.00	0%	-	-	-	-	100%	100%	135,000.00
6	Shore Water Pollution Prevention Plan(s) (SPP) Development and Compliance	Lump Sum	1	300,000.00	300,000.00	0%	-	-	-	-	100%	100%	300,000.00
7	City Ordinance Construction Waste Separation Plan	Lump Sum	1	10,000.00	10,000.00	0%	-	-	-	-	100%	100%	10,000.00
8	Soil Handling and Disposal, Non-Hazardous Waste	Unit Price	8,400	12.00	100,800.00	-	-	-	-	-	100%	100%	100,800.00
9	Shoring for Excavations	Lump Sum	1	150,000.00	150,000.00	0%	-	-	-	-	100%	100%	150,000.00
10	Import Soil	Unit Price	6,810	26.00	177,060.00	-	-	-	-	-	100%	100%	177,060.00
11	3/4-inch Crushed Rock	Unit Price	2,500	25.00	62,500.00	-	-	-	-	-	100%	100%	62,500.00
12	Disposal of Non-Hazardous Waste	Unit Price	13,400	10.00	134,000.00	-	-	-	-	-	100%	100%	134,000.00
13	Crusher-Size	Unit Price	5,680	40.00	227,200.00	-	-	-	-	-	100%	100%	227,200.00
14	Furnish and Place Pavement Striping	Unit Price	600	2.00	1,200.00	-	-	-	-	-	100%	100%	1,200.00
15	Furnish and Place Pavement Markings	Unit Price	600	6.00	3,600.00	-	-	-	-	-	100%	100%	3,600.00
16	Furnish and Place Chain Link Fence and Gates	Lump Sum	1	60,000.00	60,000.00	0%	-	-	-	-	100%	100%	60,000.00
17	Steel Guard Posts	Unit Price	95	1,400.00	133,000.00	-	-	-	-	-	100%	100%	133,000.00
18	Shore Power Outlet Vaults for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5)	Lump Sum	1	400,000.00	400,000.00	0%	-	-	-	-	100%	100%	400,000.00
19	Shore Power Outlet Vaults for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9)	Lump Sum	1	500,000.00	500,000.00	0%	-	-	-	-	100%	100%	500,000.00
20	Shore Power Outlet Vaults for Berth J256 (SPO 10, SPO 11, SPO 12, SPO 13, SPO 14, SPO 15)	Lump Sum	1	560,000.00	560,000.00	0%	-	-	-	-	100%	100%	560,000.00
21	Shore Power Outlet Vaults for Berth J270 (SPO 16, SPO 17, SPO 18, SPO 19, SPO 20)	Lump Sum	1	560,000.00	560,000.00	0%	-	-	-	-	100%	100%	560,000.00
22	Transformer(s) for Berth J245 (SPO 1, SPO 2, SPO 3, SPO 4, SPO 5)	Lump Sum	1	600,000.00	600,000.00	0%	-	-	-	-	100%	100%	600,000.00
23	Transformer(s) for Berth J247 (SPO 6, SPO 7, SPO 8, SPO 9)	Lump Sum	1	600,000.00	600,000.00	0%	-	-	-	-	100%	100%	600,000.00

Progress Payment No. 27  
 Period Ending: 1/15/2015  
 PAYMENT DUE: 5/6/15  
 Specification: HD-S2441 - Shore to Ship Power Retrofit at Pier J, Berths J245-J247 and J266 - J270.  
 Contractor: Helix Electric, Inc.

LBHD Contract No: HD-7972  
 Original Bid Amt: \$25,200,000

Item No.	Item	Unit	Est. Qty.	Unit Price	Bid Amount	Qty This Month	J245 \$ Amount This Month	J247 \$ Amount This Month	J266 \$ Amount This Month	J270 \$ Amount This Month	Previous Qty or %	Total % of Item Comp	\$ Amount to Date
24	Transformer(s) for Berth J266 (SFO 10, SFO 11, SFO 12, SFO 13, SFO 14, SFO 15)	Lump Sum	1	600,000.00	600,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	600,000.00
25	Transformers for Berth J270 (SFO 16, SFO 17, SFO 18, SFO 19, SFO 20)	Lump Sum	1	600,000.00	600,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	600,000.00
26	Switchgear Assembly(s) for Berth J245 (SFO 1, SFO 2, SFO 3, SFO 4, SFO 5)	Lump Sum	1	1,112,440.00	1,112,440.00	0%	N/A	N/A	N/A	N/A	100%	100%	1,112,440.00
27	Switchgear Assembly(s) for Berth J247 (SFO 6, SFO 7, SFO 8, SFO 9)	Lump Sum	1	1,000,000.00	1,000,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	1,000,000.00
28	Switchgear Assembly(s) for Berth J266 (SFO 10, SFO 11, SFO 12, SFO 13, SFO 14, SFO 15)	Lump Sum	1	2,000,000.00	2,000,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	2,000,000.00
29	Switchgear Assembly(s) for Berth J270 (SFO 16, SFO 17, SFO 18, SFO 19, SFO 20)	Lump Sum	1	2,200,000.00	2,200,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	2,200,000.00
30	Ductbank and Raceways for Berth J245 (SFO 1, SFO 2, SFO 3, SFO 4, SFO 5)	Lump Sum	1	1,500,000.00	1,500,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	1,500,000.00
31	Ductbank and Raceways for Berth J247 (SFO 6, SFO 7, SFO 8, SFO 9)	Lump Sum	1	1,500,000.00	1,500,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	1,500,000.00
32	Ductbank and Raceways for Berth J266 (SFO 10, SFO 11, SFO 12, SFO 13, SFO 14, SFO 15)	Lump Sum	1	2,000,000.00	2,000,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	2,000,000.00
33	Ductbank and Raceways for Berth J270 (SFO 16, SFO 17, SFO 18, SFO 19, SFO 20)	Lump Sum	1	1,500,000.00	1,500,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	1,500,000.00
34	Conductors for Berth J245 (SFO 1, SFO 2, SFO 3, SFO 4, SFO 5)	Lump Sum	1	400,000.00	400,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	400,000.00
35	Conductors for Berth J247 (SFO 6, SFO 7, SFO 8, SFO 9)	Lump Sum	1	200,000.00	200,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	200,000.00
36	Conductors for Berth J266 (SFO 10, SFO 11, SFO 12, SFO 13, SFO 14, SFO 15)	Lump Sum	1	500,000.00	500,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	500,000.00
37	Conductors for Berth J270 (SFO 16, SFO 17, SFO 18, SFO 19, SFO 20)	Lump Sum	1	400,000.00	400,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	400,000.00
38	SFO Assemblies for Berth J245 (SFO 1, SFO 2, SFO 3, SFO 4, SFO 5)	Lump Sum	1	100,000.00	100,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	100,000.00
39	SFO Assemblies for Berth J247 (SFO 6, SFO 7, SFO 8, SFO 9)	Lump Sum	1	100,000.00	100,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	100,000.00
40	SFO Assemblies for Berth J266 (SFO 10, SFO 11, SFO 12, SFO 13, SFO 14, SFO 15)	Lump Sum	1	170,000.00	170,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	170,000.00
41	SFO Assemblies for Berth J270 (SFO 16, SFO 17, SFO 18, SFO 19, SFO 20)	Lump Sum	1	150,000.00	150,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	150,000.00
42	All Other Electrical Work for Berth J245 (SFO 1, SFO 2, SFO 3, SFO 4, SFO 5)	Lump Sum	1	150,000.00	150,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	150,000.00
43	All Other Electrical Work for Berth J247 (SFO 6, SFO 7, SFO 8, SFO 9)	Lump Sum	1	150,000.00	150,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	150,000.00
44	All Other Electrical Work for Berth J266 (SFO 10, SFO 11, SFO 12, SFO 13, SFO 14, SFO 15)	Lump Sum	1	150,000.00	150,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	150,000.00
45	All Other Electrical Work for Berth J270 (SFO 16, SFO 17, SFO 18, SFO 19, SFO 20)	Lump Sum	1	150,000.00	150,000.00	0%	N/A	N/A	N/A	N/A	100%	100%	150,000.00

Progress Payment No. 27  
 Period Ending: 1/15/2015  
 PAYMENT DUE: 6/6/15  
 Specification: HD-S2341 - Shore to Ship Power Retrofit at Pier J, Berths J245-J247 and J266 - J270.  
 Contractor: Halix Electric, Inc.

LBHD Contract No: HD-7972  
 Original Bid Amt: \$25,200,000

Item No.	Item	Unit	Est. Qty.	Unit Price	Bid Amount	Qty This Month	J245 \$ Amount This Month	J247 \$ Amount This Month	J266 \$ Amount This Month	J270 \$ Amount This Month	Previous Qty or %	Total % of Item Comp	TOYAL Amount to Date
46	All Other Work	Lump Sum	1	200,000.00	200,000.00	0%	-	-	-	-	100%	100%	200,000.00
47	Extended Contractor Overhead	Unit Price	60	1,000.00	60,000.00	-	-	-	-	-	100%	100%	60,000.00
48	Standby Time	Unit Price	4000	50.00	200,000.00	-	-	-	-	-	100%	100%	200,000.00
49	Commissioning for Berths J245-J247	Unit Price	1000	200.00	200,000.00	-	88,850.00	88,850.00	N/A	N/A	100%	100%	200,000.00
50	Commissioning for Berths J266-J270	Unit Price	1000	200.00	200,000.00	84.3	N/A	N/A	84,300.00	84,300.00	100%	100%	200,000.00
	CHANGE ORDER #1 - TIME EXT												
	CHANGE ORDER #2- R14A - ACCELERATION	Lump Sum	1	80,000.00	-	0%	-	-	-	-	100%	100%	80,000.00
	CHANGE ORDER #2 - SCE GROUNDING	Lump Sum	1	10,427.00	-	0%	-	-	-	-	100%	100%	10,427.00
	CHANGE ORDER #3	Lump Sum	1	61,497.00	-	0%	-	-	-	-	100%	100%	61,497.00
	CHANGE ORDER #4	Lump Sum	1	1,371,884.00	-	0%	-	-	-	-	100%	100%	1,371,884.00
	CHANGE ORDER #5	Lump Sum	1	(11,053.00)	-	0%	-	-	-	-	100%	100%	(11,053.00)
	CHANGE ORDER #5	Lump Sum	1	75,000.00	-	0%	-	-	-	-	100%	100%	75,000.00
	CHANGE ORDER #7	Lump Sum	1	86,932.00	-	0%	N/A	N/A	-	-	100%	100%	86,932.00
	CHANGE ORDER #8	Lump Sum	1	56,147.00	-	0%	-	-	N/A	N/A	100%	100%	56,147.00
	CHANGE ORDER #9	Lump Sum	1	56,147.00	-	0%	-	-	-	-	100%	100%	56,147.00
	CHANGE ORDER #10	Lump Sum	1	57,179.00	-	0%	-	-	-	-	100%	100%	57,179.00
	CHANGE ORDER #11	Lump Sum	1	24,752.00	-	0%	-	-	-	-	100%	100%	24,752.00
	CHANGE ORDER #12	Lump Sum	1	1,821,113.00	-	5%	-	-	-40,185.73	40,185.73	95%	100%	1,821,113.06
	CHANGE ORDER #13	Lump Sum	1	(38,959.25)	-	0%	-	-	-	-	100%	100%	(38,959.25)
	CHANGE ORDER #14	Lump Sum	1	(92,672.00)	-	100%	(92,672.00)	(92,672.00)	(92,672.00)	(92,672.00)	100%	100%	(92,672.00)

Project & Grant Revenue/Expenditure Financial Summary

Criteria: As of = 3/21/2019 (47% of Year: Elapsed)

Vendor	Title	ITD Adjusted Budget	Month-To-Date Actual Activity	Quarter-To-Date Actual Activity	ITD Actual	Encumbrance Incl Pre-Encumb	ITD Adjusted Budget - Actuals	ITD % Actuals to Adjusted Budget
Project HA1316 - CLOSED- NCK-PIER J 243-270 SHORE TO SHIP								
1B2341 -- 1B2341/ENV PLANNING/SHORE TO SHIP PWR								
V046804	(None)	755.27	0.00	0.00	239.31	0.00	515.96	31.7%
V046804	SOUTH COAST AIR QUALITY MANAGEMENT	0.00	0.00	0.00	515.96	0.00	(515.96)	0.0%
Total Project Detail 1B2341/ENV PLANNING/SHORE TO SHIP PWR								
		755.27	0.00	0.00	755.27	0.00	0.00	100.0%
1C2341 -- 1C2341/DESIGN/SHORE TO SHIP POWER								
Total Project Detail 1C2341/DESIGN/SHORE TO SHIP POWER								
		5,780,229.59	0.00	0.00	597,829.78	0.00	5,182,399.81	10.3%
V051095	AMERICAN REPROGRAPHICS COMPANY	0.00	0.00	0.00	4,141.89	0.00	(4,141.89)	0.0%
V054954	BIGGS CARDOSA ASSOCIATES INC	0.00	0.00	0.00	50,735.00	0.00	(50,735.00)	0.0%
V054863	C BELOW INC	0.00	0.00	0.00	5,500.00	0.00	(5,500.00)	0.0%
V005746	CADSTAR INC	0.00	0.00	0.00	6,820.00	0.00	(6,820.00)	0.0%
V047448	EASTERN GROUJ PUBLICATION INC	0.00	0.00	0.00	1,168.50	0.00	(1,168.50)	0.0%
V046782	JOHNSON-FRANK & ASSOC INC	0.00	0.00	0.00	26,604.56	0.00	(26,604.56)	0.0%
V041706	KPFF CONSULTING ENGINEERS	0.00	0.00	0.00	97,429.59	0.00	(97,429.59)	0.0%
V021514	LONG BEACH PUBLISHING COMPANY	0.00	0.00	0.00	2,945.70	0.00	(2,945.70)	0.0%
V002113	LONG BEACH TIMES NEWSPAPER INC	0.00	0.00	0.00	4,286.08	0.00	(4,286.08)	0.0%
V030466	OUR WEEKLY LLC	0.00	0.00	0.00	1,000.00	0.00	(1,000.00)	0.0%
V023229	P2S INC	0.00	0.00	0.00	4,306,690.08	0.00	(4,306,690.08)	0.0%
V012651	PIRNIIE, MALCOLM INC	0.00	0.00	0.00	72,104.52	0.00	(72,104.52)	0.0%
V025943	SAF-R-DIG UTILITY SURVEYS, INC	0.00	0.00	0.00	37,823.08	0.00	(37,823.08)	0.0%
V049271	TMAD TAYLOR & GAINES ENGINEERS	0.00	0.00	0.00	106,154.00	0.00	(106,154.00)	0.0%
V045513	URS CORPORATION	0.00	0.00	0.00	461,953.91	0.00	(461,953.91)	0.0%
		5,780,229.59	0.00	0.00	5,783,186.69	0.00	(2,957.10)	100.1%
1H2341 -- FUNDING FOR S.C.E.								
Total Project Detail 1C2341/DESIGN/SHORE TO SHIP POWER								
		43,829,507.56	0.00	0.00	1,788,774.28	0.00	42,160,733.28	4.0%
V051085	AMERICAN REPROGRAPHICS COMPANY	0.00	0.00	0.00	23,325.95	0.00	(23,325.95)	0.0%
V035088	ARCADIS US INC	0.00	0.00	0.00	1,015.00	0.00	(1,015.00)	0.0%
V054954	BIGGS CARDOSA ASSOCIATES INC	0.00	0.00	0.00	7,000.00	0.00	(7,000.00)	0.0%
V046257	BUBALO, STEVE CONSTRUCTION COMPANY	0.00	0.00	0.00	77,220.84	0.00	(77,220.84)	0.0%
V050028	COMPUTER 1 PRODUCTS OF AMERICA INC	0.00	0.00	0.00	4,087.90	0.00	(4,087.90)	0.0%
V060783	CRISP ENTERPRISES	0.00	0.00	0.00	81.75	0.00	(81.75)	0.0%
V042936	CUTTING EDGE CONCRETE SERVICES INC	0.00	0.00	0.00	1,598.94	0.00	(1,598.94)	0.0%
V037752	D WOOLLEY & ASSOCIATES INC	0.00	0.00	0.00	9,577.50	0.00	(9,577.50)	0.0%
V044431	EDISON/ESI	0.00	0.00	0.00	7,490,000.00	0.00	(7,490,000.00)	0.0%
V024035	GRIFFITH COMPANY	0.00	0.00	0.00	6516,058.52	0.00	(6,516,058.52)	0.0%
V024652	HELIX ELECTRIC INC	0.00	0.00	0.00	28,303,766.78	0.00	(28,303,766.78)	0.0%
V006703	IMPREST - HA ADMIN O&G ACCT	0.00	0.00	0.00	138.84	0.00	(138.84)	0.0%
V062479	KGEI CONSTRUCTION INC	0.00	0.00	0.00	90,000.00	0.00	(90,000.00)	0.0%
V025942	KOURY ENGINEERING & TESTING INC	0.00	0.00	0.00	180,342.50	0.00	(180,342.50)	0.0%
V024652	LOVCO CONSTRUCTION INC	0.00	0.00	0.00	227.69	0.00	(227.69)	0.0%
V053486	NETWORK INTEGRATION COMPANY PARTNERS	0.00	0.00	0.00	372.14	0.00	(372.14)	0.0%
V025229	P2S INC	0.00	0.00	0.00	1,061,424.53	0.00	(1,061,424.53)	0.0%
V039001	PACIFIC EH&S SERVICES INC	0.00	0.00	0.00	30,293.78	0.00	(30,293.78)	0.0%

Criteria: Revenue/Expenditure = E; Project = HA1316; Project Detail = 90

Project & Grant Revenue/Expenditure Financial Summary

Criteria: As Of = 3/21/2019 (47% of Year Elapsed)

Vendor	Title	ITD Adjusted Budget	Month-To-Date Actual Activity	Quarter-To-Date Actual Activity	ITD Actual	Encumbrance Incl Pre-Encumb	ITD Adjusted Budget - Actuals	ITD % Actuals to Adjusted Budget
Project HA1316 - CLOSED- NOK-PIER J 249-270 SHORE TO SHIP								
1H2341 -	FUNDING FOR S.C.E.							
V053798	PACIFIC PRODUCTS & SERVICES INC	0.00	0.00	0.00	1,075.06	0.00	(1,075.06)	0.0%
V048468	PC SPECIALISTS INC	0.00	0.00	0.00	4,804.59	0.00	(4,804.59)	0.0%
V021557	SHI INTERNATIONAL CORPORATION	0.00	0.00	0.00	222.08	0.00	(222.08)	0.0%
V026541	SIMPLUS MANAGEMENT COMPANY, LLC	0.00	0.00	0.00	52,852.80	0.00	(52,852.80)	0.0%
V044553	SMITH EMERY CORP	0.00	0.00	0.00	1,923.40	0.00	(1,923.40)	0.0%
V046804	SOUTH COAST AIR QUALITY MANAGEMENT	0.00	0.00	0.00	1,058.94	0.00	(1,058.94)	0.0%
V044555	SOUTHERN CALIFORNIA EDISON COMPANY	0.00	0.00	0.00	1,500,000.00	0.00	(1,500,000.00)	0.0%
V045074	TWINING INC	0.00	0.00	0.00	5,527.50	0.00	(5,527.50)	0.0%
V043513	URS CORPORATION	0.00	0.00	0.00	4,893.75	0.00	(4,893.75)	0.0%
V047884	VANIR CONSTRUCTION MANAGEMENT INC	0.00	0.00	0.00	2,788,885.09	0.00	(2,788,885.09)	0.0%
V012285	WSP USA INC	0.00	0.00	0.00	3,062.50	0.00	(3,062.50)	0.0%
Total Project Detail FUNDING FOR S.C.E.		43,929,507.56	0.00	0.00	43,929,612.75	0.00	(105.19)	100.0%
Total Project HA1316		49,710,492.42	0.00	0.00	49,713,554.71	0.00	(3,062.29)	100.0%
Total		49,710,492.42	0.00	0.00	49,713,554.71	0.00	(3,062.29)	100.0%



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR:** Shore to Ship Power Project  
at Pier T, Berths T132-T140

NO. HD-S2348

DATE OPENED: February 14, 2012

ITEM	ESTIMATED QUANTITIES	The Ryan Company		Minako dba Minco Construction		Valutini Corp dba Royal Electric		KDC, Inc. dba Dynaelectric		Sully-Miller Contracting Company	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 1 - Mobilization and Demobilization: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to perform mobilization and demobilization, as shown and specified (including, but... for the lump sum price of -	Lump Sum	1,161,050.43	1,161,050.43	70,000.00	70,000.00	320,000.00	320,000.00	600,000.00	600,000.00	663,864.00	663,864.00
ITEM NO. 2 - Excavation Support Systems: Per Section 6707 of the California Labor Code, furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide bracing... for the lump sum price of (not less than \$10,000)	Lump Sum	18,240.49	18,240.49	15,000.00	15,000.00	52,000.00	52,000.00	11,000.00	11,000.00	106,001.00	106,001.00
ITEM NO. 3 - SWPPP Development and Compliance: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to develop the Stormwater Pollution Prevention Plan and... for the lump sum price of (not less than \$10,000)	Lump Sum	16,772.86	16,772.86	50,000.00	50,000.00	68,000.00	68,000.00	60,000.00	60,000.00	12,878.00	12,878.00
ITEM NO. 4 - Demolition of Chain Link Fence and Gates, Bollards, and Paving: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to remove existing 6-foot chain link fence and... for the lump sum price of -	Lump Sum	33,632.23	33,632.23	177,000.00	177,000.00	56,000.00	56,000.00	487,000.00	487,000.00	179,589.00	179,589.00
ITEM NO. 5 - Soil Handling and Disposal, Non-Hazardous Waste: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to handle and dispose of approximately the estimated... for the unit price per ton of -	Unit Price	40.26	106,085.10	50.00	131,750.00	48.00	126,480.00	83.61	220,312.35	28.60	75,361.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

774898/Exp. 02/28/2014  
LICENSE NUMBER

The Ryan Company  
LOWEST RESPONSIBLE BIDDER

\$20,559,112.22  
AMOUNT

AUTHORIZED SIGNATURE



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier 1, Berths T132-T140**

**NO. HD-S2348**

**DATE OPENED: February 14, 2012**

ITEM	ESTIMATED QUANTITIES		The Ryan Company 15 Commerce Way Norton, MA 02766 Phone: (508) 742-2500 Fax: (508) 742-2540		Mitsko dba Minco Construction 522 E. Airline Way Gardena, CA 90248 Phone: (310) 516-8100 Fax: (310) 516-7404		Velluti Corp dba Royal Electric 8481 Caribide Ct Sacramento, CA 95828 Phone: (916) 226-2100 Fax: (916) 226-2150		KDC, Inc. dba Dynalectric 4462 Corporate Center Drive Los Alamitos, CA 90720 Phone: (714) 828-7000 Fax: (714) 484-2384		Sully-Miller Contracting Company 135 S. State College Blvd #400 Brea, CA 92821 Phone: (714) 578-9600 Fax: (714) 449-8775	
	ESTIMATED QUANTITIES	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	
ITEM NO. 6 - Soil Handling and Reuse, Fill Material: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to handle and dispose as backfill approximately the... for the unit price per cubic yard of -	Unit Price	22.36	136,843.20	50.00	306,000.00	44.00	289,280.00	45.66	279,439.20	45.20	276,624.00	
ITEM NO. 7 - Import Material: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to load, haul, place and compact as backfill approximately the estimated quantity of import... for the unit price per ton of -	Unit Price	15.66	9,396.00	20.00	12,000.00	29.00	17,400.00	38.51	23,106.00	39.16	23,486.00	
ITEM NO. 8 - 8-Foot Chain Link Fence with Barbed Wire: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to furnish and install approximately the estimated quantity of... for unit price per linear foot of -	Unit Price	44.73	33,547.50	100.00	75,000.00	50.00	37,500.00	55.01	41,257.50	49.20	36,900.00	
ITEM NO. 9 - Chain Link Single Gate with Barbed Wire: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide and install approximately the estimated quantity of chain... for the unit price per each of -	Unit Price	670.92	7,390.12	1,000.00	11,000.00	930.00	10,230.00	990.16	10,891.98	1,455.00	16,005.00	
ITEM NO. 10 - Chain Link Double Gates with Barbed Wire: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide and install approximately the estimated quantity of chain... for the unit price per each of -	Unit Price	1,677.29	6,709.16	1,000.00	4,000.00	2,130.00	8,520.00	2,750.50	11,002.00	2,909.00	11,636.00	
<b>TOTAL:</b>												
<b>CERTIFIED CHECK OR BOND:</b>												

**774698/Exp. 02/28/2014**  
LICENSE NUMBER

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AMOUNT

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LOWEST RESPONSIBLE BIDDER

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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier I, Berths T132-T140**

**NO. HD-S2348**

**DATE OPENED: February 14, 2012**

ITEM	ESTIMATED QUANTITIES	The Ryan Company 15 Commerce Way Norton, MA 02766 Phone: (508) 742-2500 Fax: (508) 742-2540		Minako dba Minco Construction 522 E. Airline Way Gardena, CA 90248 Phone: (310) 516-8100 Fax: (310) 516-7404		Vellutini Corp dba Royal Electric 8481 Caribide Ct Sacramento, CA 95828 Phone: (916) 226-2100 Fax: (916) 226-2150		KDC, Inc. dba Dynalectric 4462 Corporate Center Drive Los Alamitos, CA 90720 Phone: (714) 828-7000 Fax: (714) 484-2384		Sully-Miller Contracting Company 135 S. State College Blvd #400 Brea, CA 92821 Phone: (714) 578-9600 Fax: (714) 449-8775	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 11 - Pipe Bollards, 12-inch: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide and install approximately the estimated quantity of 12-inch diameter pipe... for the unit price per each of -	Unit Price	1,341.83	183,830.71	1,770.00	242,490.00	1,570.00	215,090.00	2,090.31	286,372.47	2,338.00	320,306.00
ITEM NO. 12 - Removable Pipe Bollards, 12-inch: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide and install approximately the estimated quantity of 12-inch... for the unit price per each of -	Unit Price	1,677.29	41,932.25	3,700.00	92,500.00	1,410.00	35,250.00	3,502.52	87,563.00	3,435.00	85,875.00
ITEM NO. 13 - Shallow Pipe Bollards, 12-inch: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide and install approximately the estimated quantity of 12-inch... for the unit price per each of -	Unit Price	1,341.83	42,938.56	1,770.00	56,640.00	1,570.00	50,240.00	3,190.47	102,095.04	3,172.00	101,504.00
ITEM NO. 14 - New Pavement Striping and Markings: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to install new paint striping and markings, complete as shown and specified and... for the lump sum price of -	Lump Sum	8,386.43	8,386.43	7,000.00	7,000.00	6,600.00	6,600.00	14,000.00	14,000.00	9,133.00	3,133.00
ITEM NO. 15 - Replacement of Existing Pavement Striping: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to replace approximately the estimated quantity of existing... for the unit price per linear foot of -	Unit Price	0.95	3,325.00	1.00	3,500.00	0.85	2,975.00	1.10	3,850.00	0.73	2,555.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

DATE OPENED: February 14, 2012

NO. HD-S2348

**SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier T, Berths T132-T140**

ITEM	ESTIMATED QUANTITIES	The Ryan Company		Minako dba Minco Construction		Veiluni Corp dba Royal Electric		KDC, Inc. dba Dynalectric		Sully-Miller Contracting Company	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 16 - Removal of Existing Pavement Striping: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to replace and remove approximately the estimated quantity of... for the unit price per linear foot of -	Unit Price	9.51	1,141.20	10.00	1,200.00	8.90	1,066.00	55.01	6,601.20	16.80	2,016.00
ITEM NO. 17 - Relocation of Water Lines and Power/Telephone/Water ("PTW") Vaults: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to relocate water lines and PTW vaults... for the lump sum price of -	Lump Sum	26,836.58	26,836.58	70,000.00	70,000.00	76,000.00	76,000.00	48,000.00	48,000.00	81,692.00	81,692.00
ITEM NO. 18 - Transformers (for Berth 140 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1) medium... for the lump sum price of -	Lump Sum	709,593.23	709,593.23	677,000.00	677,000.00	680,000.00	680,000.00	694,000.00	694,000.00	728,653.00	728,653.00
ITEM NO. 19 - Transformers (for Berth 138 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1) medium... for the lump sum price of -	Lump Sum	709,593.23	709,593.23	677,000.00	677,000.00	680,000.00	680,000.00	694,000.00	694,000.00	728,653.00	728,653.00
ITEM NO. 20 - Transformers (for Berth 136 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1) medium... for the lump sum price of -	Lump Sum	709,593.23	709,593.23	677,000.00	677,000.00	680,000.00	680,000.00	694,000.00	694,000.00	728,653.00	728,653.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**The Ryan Company**  
 774698/Exp. 02/28/2014  
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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier T, Berths T132-T140**

NO. HD-S2348

DATE OPENED: February 14, 2012

ITEM	ESTIMATED QUANTITIES	The Ryan Company		Minako dba Minco Construction		Vellutini Corp dba Royal Electric		KDC, Inc. dba Dynalectric		Sully-Miller Contracting Company	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 21 - Transformers (for Berth 132-134 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1)... for the lump sum price of -	Lump Sum	709,593.23	709,593.23	677,000.00	677,000.00	680,000.00	680,000.00	694,000.00	694,000.00	728,653.00	728,653.00
ITEM NO. 22 - Switchgear Assembly(s) (for Berth 140 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect two (2)... for the lump sum price of -	Lump Sum	3,939,255.79	3,939,255.79	3,777,000.00	3,777,000.00	4,125,000.00	4,125,000.00	3,876,000.00	3,876,000.00	3,975,075.00	3,975,075.00
ITEM NO. 23 - Switchgear Assembly(s) (for Berth 136 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1)... for the lump sum price of -	Lump Sum	1,921,221.76	1,921,221.76	2,077,700.00	2,077,700.00	1,830,000.00	1,830,000.00	1,890,000.00	1,890,000.00	2,019,779.00	2,019,779.00
ITEM NO. 24 - Switchgear Assembly(s) (for Berth 136 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1)... for the lump sum price of -	Lump Sum	1,779,834.87	1,779,834.87	1,777,000.00	1,777,000.00	1,894,000.00	1,894,000.00	1,750,000.00	1,750,000.00	1,851,000.00	1,851,000.00
ITEM NO. 25 - Switchgear Assembly(s) (for Berth 132-134 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one... for the lump sum price of -	Lump Sum	2,105,417.86	2,105,417.86	2,100,000.00	2,100,000.00	2,007,000.00	2,007,000.00	2,073,220.00	2,073,220.00	2,202,840.00	2,202,840.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

DATE OPENED: February 14, 2012

NO. HD-S2348

SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier T, Berths T132-T140

ITEM	ESTIMATED QUANTITIES	The Ryan Company		Minako dba Minco Construction		Velluti Corp dba Royal Electric		KDC, Inc. dba Dynalectric		Sully-Miller Contracting Company	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 26 - Ductbanks and Raceways (for Berth 140 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct a complete and functioning... for the lump sum price of -	Lump Sum	349,501.65	349,501.65	717,000.00	717,000.00	645,000.00	645,000.00	621,000.00	621,000.00	491,569.00	491,569.00
ITEM NO. 27 - Ductbanks and Raceways (for Berth 138 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct a complete and functioning... for the lump sum price of -	Lump Sum	599,461.62	599,461.62	337,000.00	337,000.00	710,000.00	710,000.00	590,000.00	590,000.00	707,185.00	707,185.00
ITEM NO. 28 - Ductbanks and Raceways (for Berth 136 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct a complete and functioning... for the lump sum price of -	Lump Sum	394,105.50	394,105.50	437,000.00	437,000.00	492,000.00	492,000.00	471,000.00	471,000.00	532,209.00	532,209.00
ITEM NO. 29 - Ductbanks and Raceways (for Berth 132-134 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct a complete and... for the lump sum price of -	Lump Sum	765,573.51	765,573.51	737,000.00	737,000.00	833,000.00	833,000.00	845,621.00	845,621.00	999,980.00	999,980.00
ITEM NO. 30 - Conductors (for Berth 140 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect all conductors and... for the lump sum price of -	Lump Sum	413,138.96	413,138.96	277,000.00	277,000.00	1,312,000.00	1,312,000.00	1,045,000.00	1,045,000.00	769,437.00	769,437.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier T, Berths T132-T140**

NO. HD-S2348

DATE OPENED: February 14, 2012

ITEM	ESTIMATED QUANTITIES	The Ryan Company		Minako dba Minco Construction		Vellutini Corp dba Royal Electric		KDC, Inc. dba Dynalectric		Sully-Miller Contracting Company	
		RATE	-AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 31 - Conductors (for Berth 138 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect all conductors and... for the lump sum price of -	Lump Sum	518,338.89	518,338.89	777,000.00	777,000.00	324,000.00	324,000.00	450,000.00	450,000.00	378,954.00	378,954.00
ITEM NO. 32 - Conductors (for Berth 136 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect all conductors and... for the lump sum price of -	Lump Sum	471,591.80	471,591.80	277,000.00	277,000.00	247,000.00	247,000.00	300,000.00	300,000.00	555,850.00	555,850.00
ITEM NO. 33 - Conductors (for Berth 132-134 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect all conductors... for the lump sum price of -	Lump Sum	692,948.22	692,948.22	277,000.00	277,000.00	507,000.00	507,000.00	610,000.00	610,000.00	708,920.00	708,920.00
ITEM NO. 34 - SPO Receptacles (for Berth 140 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to perform demolition and construction of two... for the lump sum price of -	Lump Sum	226,959.75	226,959.75	477,000.00	477,000.00	238,000.00	238,000.00	300,000.00	300,000.00	191,099.00	191,099.00
ITEM NO. 35 - SPO Receptacles (for Berth 138 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to perform demolition and construction of three... for the lump sum price of -	Lump Sum	340,439.63	340,439.63	637,000.00	637,000.00	355,000.00	355,000.00	475,000.00	475,000.00	317,068.00	317,068.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

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**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shore to Ship Power Project**  
**at Pier T, Berths T132-T140**

NO. HD-S2348

DATE OPENED: February 14, 2012

ITEM	ESTIMATED QUANTITIES	The Ryan Company		Minako dba Minco Construction		Veilutini Corp dba Royal Electric		KDC, Inc. dba Dynalectric		Sully-Miller Contracting Company	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 36 - SFO Receptacles (for Berth 136 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to perform demolition and construction of two... for the lump sum price of -	Lump Sum	226,959.75	226,959.75	477,000.00	477,000.00	238,000.00	238,000.00	300,000.00	300,000.00	191,099.00	191,099.00
ITEM NO. 37 - SFO Receptacles (for Berth 132-134 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to perform demolition and construction of... for the lump sum price of -	Lump Sum	453,919.50	453,919.50	877,000.00	877,000.00	475,000.00	475,000.00	550,000.00	550,000.00	443,067.00	443,067.00
ITEM NO. 38 - All Other Electrical Work (for Berth 140 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct reinforced concrete... for the lump sum price of -	Lump Sum	86,714.11	86,714.11	177,000.00	177,000.00	313,000.00	313,000.00	200,000.00	200,000.00	100,715.00	100,715.00
ITEM NO. 39 - All Other Electrical Work (for Berth 138 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct reinforced concrete... for the lump sum price of -	Lump Sum	81,156.80	81,156.80	77,000.00	77,000.00	76,000.00	76,000.00	102,002.00	102,002.00	50,865.00	50,865.00
ITEM NO. 40 - All Other Electrical Work (for Berth 136 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct reinforced concrete... for the lump sum price of -	Lump Sum	79,665.13	79,665.13	77,000.00	77,000.00	77,000.00	77,000.00	95,000.00	95,000.00	48,770.00	48,770.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier T, Berths T132-T140**

**NO. HD-S2348**

**DATE OPENED: February 14, 2012**

ITEM	ESTIMATED QUANTITIES	The Ryan Company		Minako dba Mince Construction		Vellutini Corn dba Royal Electric		KDC, Inc. dba Dynalectric		Sully-Miller Contracting Company	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 41 - All Other Electrical Work (for Berth 132-134 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct reinforced concrete... for the lump sum price of -	Lump Sum	89,190.97	89,190.97	137,000.00	137,000.00	82,000.00	92,000.00	130,000.00	130,000.00	45,652.00	45,652.00
ITEM NO. 42 - Paving at Switchgear MTS4 and MTS5 and at SSP Substations: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct paving at the Switchgear MTS4 and MTS5... for the lump sum price of -	Lump Sum	135,862.43	135,862.43	177,000.00	177,000.00	94,000.00	94,000.00	135,000.00	135,000.00	201,168.00	201,168.00
ITEM NO. 43 - Standby Time: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide approximately the estimated hours of standby time for crew, land-based equipment and... for the unit price per hour of -	Unit Price	377.42	37,742.00	250.00	25,000.00	1,400.00	140,000.00	750.00	75,000.00	1,334.00	133,400.00
ITEM NO. 44 - Scheduling: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to develop and update all schedules, complete as specified and as directed... for the lump sum price of (not less than \$20,000) -	Lump Sum	22,363.82	22,363.82	77,000.00	77,000.00	156,000.00	166,000.00	35,000.00	35,000.00	20,923.00	20,923.00
ITEM NO. 45 - Ship Commissioning: Furnish all labor, materials, equipment, tools, transportation and personnel necessary to provide approximately the estimated crew hours for ship commissioning for work in all phases... for the unit price per crew hour of -	Unit Price	767.63	101,327.16	250.00	33,000.00	235.00	31,020.00	227.27	29,999.64	722.00	95,304.00
<b>TOTAL:</b>											
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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

SPECIFICATIONS FOR: Shore to Ship Power Project at Pier T, Berths T132-T140

NO. HD-S2348      DATE OPENED: February 14, 2012

ITEM	ESTIMATED QUANTITIES		Shimmick Construction Company		Helix Electric		Griffith/Comet JV		RATE	AMOUNT	RATE	AMOUNT
	ESTIMATED QUANTITIES	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE				
ITEM NO. 1 - Mobilization and Demobilization: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to perform mobilization and demobilization, as shown and specified (including, but... for the lump sum price of -	Lump Sum	300,000.00	300,000.00	1,253,000.00	1,253,000.00	1,068,000.00	1,068,000.00					
ITEM NO. 2 - Excavation Support Systems: Per Section 6707 of the California Labor Code, furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide bracing... for the lump sum price of (not less than \$10,000)	Lump Sum	150,000.00	150,000.00	70,000.00	70,000.00	350,000.00	350,000.00					
ITEM NO. 3 - SWPPP Development and Compliance: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to develop the Stormwater Pollution Prevention Plan and... for the lump sum price of (not less than \$10,000)	Lump Sum	10,000.00	10,000.00	50,000.00	50,000.00	12,000.00	12,000.00					
ITEM NO. 4 - Demolition of Chain Link Fence and Gates, Bollards, and Paving: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to remove existing 8-foot chain link fence and... for the lump sum price of -	Lump Sum	100,000.00	100,000.00	150,000.00	150,000.00	112,000.00	112,000.00					
ITEM NO. 5 - Soil Handling and Disposal, Non-Hazardous Waste: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to handle and dispose of approximately the estimated... for the unit price per ton of -	Unit Price	50.00	131,750.00	42.00	110,670.00	75.00	197,625.00					
<b>TOTAL:</b>												
<b>CERTIFIED CHECK OR BOND:</b>												

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## ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

NO. HD-S2348

SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier T, Berths T132-T140

DATE OPENED: February 14, 2012

ITEM	ESTIMATED QUANTITIES	Shimick Construction Company		Helix Electric		Griffith/Comnet JV		TOTAL	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 6 - Soil Handling and Reuse, Fill Material: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to handle and dispose as backfill approximately the... for the unit price per cubic yard of -	Unit Price	35.00	214,200.00	5.00	30,600.00	25.00	153,000.00		
ITEM NO. 7 - Import Material: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to load, haul, place and compact as backfill approximately the estimated quantity of import... for the unit price per ton of -	Unit Price	35.00	21,000.00	48.00	28,800.00	35.00	21,000.00		
ITEM NO. 8 - 8-Foot Chain Link Fence with Barbed Wire: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to furnish and install approximately the estimated quantity of... for unit price per linear foot of -	Unit Price	50.00	37,500.00	55.00	41,250.00	56.00	42,000.00		
ITEM NO. 9 - Chain Link Single Gate with Barbed Wire: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide and install approximately the estimated quantity of chain... for the unit price per each of -	Unit Price	1,000.00	11,000.00	1,050.00	11,550.00	1,300.00	14,300.00		
ITEM NO. 10 - Chain Link Double Gates with Barbed Wire: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide and install approximately the estimated quantity of chain... for the unit price per each of -	Unit Price	2,500.00	10,000.00	2,300.00	9,200.00	2,300.00	9,200.00		
<b>TOTAL:</b>									
<b>CERTIFIED CHECK OR BOND:</b>									

774698/Exp. 02/28/2014  
LICENSE NUMBER

\$20,559,112.22  
AMOUNT

The Ryan Company  
LOWEST RESPONSIBLE BIDDER

AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shore to Ship Power Project**  
**at Pier T, Berths T132-T140**

**NO. HD-S2348**

**DATE OPENED: February 14, 2012**

ITEM	SHIMMICK CONSTRUCTION COMPANY		HELIX ELECTRIC		GRIFFITH/COMET JV					
	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 11 - Pipe Bollards, 12-inch. Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide and install approximately the estimated quantity of 12-inch diameter pipe... for the unit price per each of -	2,500.00	342,500.00	1,900.00	260,300.00	2,200.00	301,400.00				
ITEM NO. 12 - Removable Pipe Bollards, 12-Inch: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide and install approximately the estimated quantity of 12-inch... for the unit price per each of -	4,000.00	100,000.00	2,800.00	70,000.00	3,250.00	81,250.00				
ITEM NO. 13 - Shallow Pipe Bollards, 12-inch. Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide and install approximately the estimated quantity of 12-inch... for the unit price per each of -	2,500.00	80,000.00	3,000.00	96,000.00	3,560.00	117,120.00				
ITEM NO. 14 - New Pavement Striping and Markings: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to install new paint striping and markings, complete as shown and specified and... for the lump sum price of -	6,500.00	6,500.00	7,000.00	7,000.00	5,230.00	5,230.00				
ITEM NO. 15 - Replacement of Existing Pavement Striping: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to replace approximately the estimated quantity of existing... for the unit price per linear foot of -	1.00	3,500.00	2.00	7,000.00	1.10	3,850.00				
<b>TOTAL:</b>										
<b>CERTIFIED CHECK OR BOND:</b>										

**774698/Exp. 02/28/2014**  
LICENSE NUMBER

**\$20,559,112.22**  
AMOUNT

**The Ryan Company**  
LOWEST RESPONSIBLE BIDDER

AUTHORIZED SIGNATURE



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

NO. HD-S2348 DATE OPENED: February 14, 2012

**SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier T, Berths T132-T140**

ITEM	ESTIMATED QUANTITIES	Shimmick Construction Company		Helix Electric		Griffith/Comet JV		RATE	AMOUNT
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT		
ITEM NO. 16 - Removal of Existing Pavement Striping: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to replace and remove approximately the estimated quantity of... for the unit price per linear foot of -	Unit Price	10.00	1,200.00	14.00	1,680.00	35.00	4,200.00		
ITEM NO. 17 - Relocation of Water Lines and Power/Telephone/Water ("PTW") Vaults: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to relocate water lines and PTW vaults... for the lump sum price of -	Lump Sum	100,000.00	100,000.00	100,000.00	100,000.00	300,000.00	300,000.00		
ITEM NO. 18 - Transformers for Berth 140 as noted in Special Condition SC-25: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1) medium... for the lump sum price of -	Lump Sum	625,000.00	625,000.00	640,000.00	640,000.00	715,585.00	715,585.00		
ITEM NO. 19 - Transformers for Berth 138 as noted in Special Condition SC-25: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1) medium... for the lump sum price of -	Lump Sum	625,000.00	625,000.00	640,000.00	640,000.00	715,585.00	715,585.00		
ITEM NO. 20 - Transformers for Berth 136 as noted in Special Condition SC-25: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1) medium... for the lump sum price of -	Lump Sum	625,000.00	625,000.00	640,000.00	640,000.00	715,585.00	715,585.00		
<b>TOTAL:</b>									

**The Ryan Company**  
 LOWEST RESPONSIBLE BIDDER  
 LICENSE NUMBER 774698/Exp. 02/28/2014 AMOUNT \$20,559,112.22 AUTHORIZED SIGNATURE \_\_\_\_\_



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier T, Berths T132-T140**

**NO. HD-S2348**

**DATE OPENED: February 14, 2012**

ITEM	ESTIMATED QUANTITIES		Shimnick Construction Company 8201 Edgewater Drive #202 Oakland, CA 94612 Phone: (949) 333-1500 Fax: (949) 333-1510		Helix Electric 8250 Camino Santa Fe #A San Diego, CA 92121 Phone: (858) 535-0505 Fax: (858) 535-0738		Griffith/Comet JV 12200 Bloomfield Avenue Santa Fe Springs, CA 90670 Phone: (562) 929-1128 Fax: (562) 864-7938		AMOUNT	AMOUNT	AMOUNT	
			RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 21 - Transformers (for Berth 132-134 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1).... for the lump sum price of -	Lump Sum		625,000.00	625,000.00	640,000.00	640,000.00	715,585.00	715,585.00				
ITEM NO. 22 - Switchgear Assembly(s) (for Berth 140 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect two (2).... for the lump sum price of -	Lump Sum		3,250,000.00	3,250,000.00	3,600,000.00	3,600,000.00	4,036,100.00	4,036,100.00				
ITEM NO. 23 - Switchgear Assembly(s) (for Berth 138 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1).... for the lump sum price of -	Lump Sum		1,750,000.00	1,750,000.00	1,800,000.00	1,800,000.00	1,938,685.00	1,938,685.00				
ITEM NO. 24 - Switchgear Assembly(s) (for Berth 136 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one (1).... for the lump sum price of -	Lump Sum		1,650,000.00	1,650,000.00	1,700,000.00	1,700,000.00	1,783,458.00	1,783,458.00				
ITEM NO. 25 - Switchgear Assembly(s) (for Berth 132-134 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect one.... for the lump sum price of -	Lump Sum		1,950,000.00	1,950,000.00	1,900,000.00	1,900,000.00	2,130,242.00	2,130,242.00				
<b>TOTAL:</b>												
<b>CERTIFIED CHECK OR BOND:</b>												

**774698/Exp. 02/28/2014**  
LICENSE NUMBER

**The Ryan Company**  
LOWEST RESPONSIBLE BIDDER

**\$20,559,112.22**  
AMOUNT

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# ANALYSIS OF BIDS

## CITY OF LONG BEACH, HARBOR DEPARTMENT

NO. HD-S2348

SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier T, Berths T132-T140

DATE OPENED: February 14, 2012

ITEM	ESTIMATED QUANTITIES	Shimick Construction Company		Helix Electric		Griffith/Comet JV		RATE	AMOUNT
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT		
ITEM NO. 26 - Ductbanks and Raceways (for Berth 140 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct a complete and functioning... for the lump sum price of -	Lump Sum	700,000.00	700,000.00	847,000.00	847,000.00	750,000.00	750,000.00		
ITEM NO. 27 - Ductbanks and Raceways (for Berth 138 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct a complete and functioning... for the lump sum price of -	Lump Sum	700,000.00	700,000.00	1,346,000.00	1,346,000.00	890,000.00	890,000.00		
ITEM NO. 28 - Ductbanks and Raceways (for Berth 136 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct a complete and functioning... for the lump sum price of -	Lump Sum	600,000.00	600,000.00	1,195,000.00	1,195,000.00	550,000.00	550,000.00		
ITEM NO. 29 - Ductbanks and Raceways (for Berth 132-134 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct a complete and... for the lump sum price of -	Lump Sum	1,050,000.00	1,050,000.00	2,092,000.00	2,092,000.00	1,165,000.00	1,165,000.00		
ITEM NO. 30 - Conductors (for Berth 140 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect all conductors and... for the lump sum price of -	Lump Sum	600,000.00	600,000.00	300,000.00	300,000.00	1,286,952.00	1,286,952.00		
<b>TOTAL:</b>									

**The Ryan Company**  
 LOWEST RESPONSIBLE BIDDER  
 LICENSE NUMBER **774698/Exp. 02/28/2014**  
 AMOUNT **\$20,559,112.22**  
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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

SPECIFICATIONS FOR: Shore to Ship Power Project at Pier T, Berths T132-T140

NO. HD-S2348

DATE OPENED: February 14, 2012

ITEM	ESTIMATED QUANTITIES	Shimmick Construction Company		Helix Electric		Griffith/Comet JV		RATE	AMOUNT
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT		
ITEM NO. 31 - Conductors (for Berth 138 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect all conductors and... for the lump sum price of -	Lump Sum	650,000.00	650,000.00	400,000.00	400,000.00	449,167.00	449,167.00		
ITEM NO. 32 - Conductors (for Berth 138 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect all conductors and... for the lump sum price of -	Lump Sum	400,000.00	400,000.00	300,000.00	300,000.00	369,902.00	369,902.00		
ITEM NO. 33 - Conductors (for Berth 132-134 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide, install and connect all conductors... for the lump sum price of -	Lump Sum	1,025,000.00	1,025,000.00	500,000.00	500,000.00	790,446.00	790,446.00		
ITEM NO. 34 - SPO Receptacles (for Berth 140 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to perform demolition and construction of two... for the lump sum price of -	Lump Sum	350,000.00	350,000.00	180,000.00	180,000.00	320,714.00	320,714.00		
ITEM NO. 35 - SPO Receptacles (for Berth 138 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to perform demolition and construction of three... for the lump sum price of -	Lump Sum	450,000.00	450,000.00	270,000.00	270,000.00	489,653.00	489,653.00		
<b>TOTAL:</b>									
<b>CERTIFIED CHECK OR BOND:</b>									

774698/Exp. 02/28/2014  
LICENSE NUMBER

The Ryan Company  
LOWEST RESPONSIBLE BIDDER

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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier T, Berths T132-T140**

NO. HD-S2348

DATE OPENED: February 14, 2012

ITEM	ESTIMATED QUANTITIES	SHIMMICK CONSTRUCTION COMPANY		HELIIX ELECTRIC		GRIFFITH/COMET JV					
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 36 - SPO Receptacles (for Berth 136 as noted in Special Conditions SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to perform demolition and construction of two... for the lump sum price of -	Lump Sum	350,000.00	350,000.00	180,000.00	180,000.00	322,894.00	322,894.00				
ITEM NO. 37 - SPO Receptacles (for Berth 132-134 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to perform demolition and construction of... for the lump sum price of -	Lump Sum	525,000.00	525,000.00	360,000.00	360,000.00	646,189.00	646,189.00				
ITEM NO. 38 - All Other Electrical Work (for Berth 140 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct reinforced concrete... for the lump sum price of -	Lump Sum	400,000.00	400,000.00	300,000.00	300,000.00	80,000.00	80,000.00				
ITEM NO. 39 - All Other Electrical Work (for Berth 138 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct reinforced concrete... for the lump sum price of -	Lump Sum	350,000.00	350,000.00	333,000.00	333,000.00	50,000.00	50,000.00				
ITEM NO. 40 - All Other Electrical Work (for Berth 136 as noted in Special Condition SC-25); Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct reinforced concrete... for the lump sum price of -	Lump Sum	350,000.00	350,000.00	328,000.00	328,000.00	52,000.00	52,000.00				
<b>TOTAL:</b>											

774698/Exp. 02/28/2014  
LICENSE NUMBER

\$20,559,112.22  
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The Ryan Company  
LOWEST RESPONSIBLE BIDDER

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**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Shore to Ship Power Project  
at Pier T, Berths T132-T140**

**NO. HD-S2348**

**DATE OPENED: February 14, 2012**

ITEM	ESTIMATED QUANTITIES		Shimick Construction Company 8201 Edgewater Drive #202 Oakland, CA 94612 Phone: (949) 333-1500 Fax: (949) 333-1510		Helix Electric 8260 Camino Santa Fe #A San Diego, CA 92121 Phone: (858) 535-0505 Fax: (858) 535-0738		Griffith/Comet, LV 12200 Bloomfield Avenue Santa Fe Springs, CA 90670 Phone: (562) 929-1128 Fax: (562) 864-7838		AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
			RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	
ITEM NO. 41 - All Other Electrical Work (for Berth 132-134 as noted in Special Condition SC-25): Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct reinforced concrete... for the lump sum price of -	Lump Sum		600,000.00	600,000.00	396,000.00	396,000.00	80,000.00	80,000.00							
ITEM NO. 42 - Paving at Switchgear MTS4 and MTS5 and at SSP Substations: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to construct paving at the Switchgear MTS4 and MTS5... for the lump sum price of -	Lump Sum		100,000.00	100,000.00	20,000.00	20,000.00	250,000.00	250,000.00							
ITEM NO. 43 - Standby Time: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to provide approximately the estimated hours of standby time for crew, land-based equipment and... for the unit price per hour of -	Unit Price		350.00	35,000.00	500.00	50,000.00	200.00	20,000.00							
ITEM NO. 44 - Scheduling: Furnish all labor, materials, power, equipment, tools, transportation and supervision necessary to develop and update all schedules, complete as specified and as directed... for the lump sum price of (not less than \$20,000) -	Lump Sum		20,000.00	20,000.00	40,000.00	40,000.00	20,000.00	20,000.00							
ITEM NO. 45 - Ship Commissioning: Furnish all labor, materials, equipment, tools, transportation and personnel necessary to provide approximately the estimated crew hours for ship commissioning for work in all phases... for the unit price per crew hour of -	Unit Price		315.00	41,580.00	900.00	118,800.00	272.50	35,970.00							
<b>TOTAL:</b>															
<b>CERTIFIED CHECK OR BOND:</b>															

**774698/Exp. 02/28/2014**  
LICENSE NUMBER

**\$20,559,112.22**  
AMOUNT

**The Ryan Company**  
LOWEST RESPONSIBLE BIDDER

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Progress Payment No. 19  
 Period Ending : 11/30/14  
 PAYMENT DUE: 3/3/2015  
 Specification: HD-S2348 Shore to Ship Power Project at Pier T, Berths 132-140  
 Contractor: The Ryan Company

LBHD Contract No: HD-7928  
 Original Bid Amt: \$20,559,112.22

Item No.	Item	Unit	Esc Qty.	Unit Price	Bid Amount	Qty This Month	T140 \$ Amount This Month	T138 \$ Amount This Month	T132 \$ Amount This Month	Previous Qty or %	Total % of Item Comp	TOTAL \$ Amount to Date
1	Mobilization and Demobilization	Lump Sum	1	1,161,050.43	1,161,050.43	-	-	-	-	100%	100%	1,161,050.43
2	Excavation Support Systems	Lump Sum	1	18,240.49	18,240.49	0%	-	0	0	100%	100%	18,240.49
3	SWPPP Development and Compliance	Lump Sum	1	16,772.86	16,772.86	-	0	0	0	100%	100%	16,772.86
4	Demolition of Chain Link Fence and Gates, Bollards, and Paving	Lump Sum	1	33,632.23	33,632.23	0.00%	-	-	-	100%	100%	33,632.23
5	Soil Handling and Disposal, Non-Hazardous Waste	Unit Price	2,635	40.26	106,085.10	-	-	-	-	6,430.43	244%	258,889.12
6	Soil Handling and Reuse, Fill Material	Unit Price	8,120	22.36	136,843.20	-	-	-	-	2,265.00	37%	50,645.40
7	Import Material	Unit Price	600	15.66	9,396.00	-	-	-	-	0%	0%	-
8	8-Foot Chain Link Fence with Barbed Wire	Unit Price	750	44.73	33,547.50	-	-	-	-	100%	100%	33,547.50
9	Chain Link Single Gate with Barbed Wire	Unit Price	11	670.92	7,380.12	-	0	0	0	100%	100%	7,380.12
10	Chain Link Double Gates with Barbed Wire	Unit Price	4	1,677.29	6,709.16	-	0	0	0	100%	100%	6,709.16
11	Pipe Bollards, 12-Inch	Unit Price	137	1,341.83	183,830.71	-	-	-	-	100%	100%	183,830.71
12	Removable Pipe Bollards, 12-Inch	Unit Price	25	1,677.29	41,932.25	-	-	-	-	100%	100%	41,932.25
13	Shallow Pipe Bollards, 12-Inch	Unit Price	32	1,341.83	42,938.56	-	-	-	-	100%	100%	42,938.56
14	New Pavement Striping and Markings	Lump Sum	1	8,386.43	8,386.43	0%	0	0	0	100%	20%	8,386.43
15	Replacement of Existing Pavement Striping	Unit Price	3500	0.95	3,325.00	-	-	-	-	7,665.00	219%	7,281.75
16	Removal of Existing Pavement Striping	Unit Price	120	9.51	1,141.20	-	-	-	-	-	-	-
17	Relocation of Water Lines and Power/Telephone/Water ("PTW") Vaults	Lump Sum	1	26,836.58	26,836.58	0.00%	0	0	0	100%	100%	26,836.58
18	Transformers for Berth 140 as noted in Special Condition SC-25	Lump Sum	1	709,593.23	709,593.23	-	-	N/A	N/A	100%	100%	709,593.23
19	Transformers for Berth 138 as noted in Special Condition SC-25	Lump Sum	1	709,593.23	709,593.23	0%	N/A	N/A	N/A	100%	100%	709,593.23
20	Transformers for Berth 136 as noted in Special Condition SC-25	Lump Sum	1	709,593.23	709,593.23	0%	N/A	N/A	N/A	100%	100%	709,593.23
21	Transformers for Berth 132-134 as noted in Special Condition SC-25	Lump Sum	1	709,593.23	709,593.23	0%	N/A	N/A	N/A	100%	100%	709,593.23
22	Switchgear Assembly(s) for Berth 140 as noted in Special Condition SC-25	Lump Sum	1	3,939,255.79	3,939,255.79	-	-	N/A	N/A	100%	100%	3,939,255.79
23	Switchgear Assembly(s) for Berth 138 as noted in Special Condition SC-25	Lump Sum	1	1,921,221.76	1,921,221.76	-	-	N/A	N/A	100%	100%	1,921,221.76
24	Switchgear Assembly(s) for Berth 136 as noted in Special Condition SC-25	Lump Sum	1	1,779,834.87	1,779,834.87	0%	N/A	N/A	N/A	100%	100%	1,779,834.87
25	Switchgear Assembly(s) for Berth 132-134 as noted in Special Condition SC-25	Lump Sum	1	2,105,417.86	2,105,417.86	0%	N/A	N/A	N/A	100%	100%	2,105,417.86
26	Ductbanks and Raceways for Berth 140 as noted in Special Condition SC-25	Lump Sum	1	349,501.65	349,501.65	0%	-	N/A	N/A	100%	100%	349,501.65

Progress Payment No. 19  
 Period Ending : 11/30/14  
 PAYMENT DUE: 3/31/2015  
 Specification: HD-S2348 Shore to Ship Power Project at Pier T, Berths 132-140  
 Contractor: The Ryan Company

LBHD Contract No: HD-7928  
 Original Bid Amt: \$20,559,112.22

Item No.	Item	Unit	Est. Qty.	Unit Price	Bid Amount	Qty This Month	T140 \$ Amount This Month	T138 \$ Amount This Month	T135 \$ Amount This Month	T132 \$ Amount This Month	Previous Qty or %	Total % of Item Comp	TOTAL \$ Amount to Date
27	Ductbanks and Raceways (for Berth 138 as noted in Special Condition SC-25)	Lump Sum	1	599,461.62	599,461.62	0%	N/A	-	N/A	N/A	100%	100%	599,461.62
28	Ductbanks and Raceways (for Berth 136 as noted in Special Condition SC-25)	Lump Sum	1	394,105.50	394,105.50	0%	N/A	N/A	-	N/A	100%	100%	394,105.50
29	Ductbanks and Raceways (for Berth 132-134 as noted in Special Condition SC-25)	Lump Sum	1	765,573.51	765,573.51	0%	N/A	N/A	N/A	-	100%	100%	765,573.51
30	Conductors (for Berth 140 as noted in Special Condition SC-25)	Lump Sum	1	413,138.96	413,138.96	0%	-	N/A	N/A	N/A	100%	100%	413,138.96
31	Conductors (for Berth 138 as noted in Special Condition SC-25)	Lump Sum	1	518,338.89	518,338.89	0%	N/A	-	N/A	N/A	100%	100%	518,338.89
32	Conductors (for Berth 136 as noted in Special Condition SC-25)	Lump Sum	1	471,591.80	471,591.80	0%	N/A	N/A	-	N/A	100%	100%	471,591.80
33	Conductors (for Berth 132-134 as noted in Special Condition SC-25)	Lump Sum	1	692,948.22	692,948.22	0%	N/A	N/A	N/A	-	100%	100%	692,948.22
34	SPO Receptacles (for Berth 140 as noted in Special Condition SC-25)	Lump Sum	1	226,959.75	226,959.75	0%	-	N/A	N/A	N/A	100%	100%	226,959.75
35	SPO Receptacles (for Berth 138 as noted in Special Condition SC-25)	Lump Sum	1	340,439.63	340,439.63	0%	N/A	-	N/A	N/A	100%	100%	340,439.63
36	SPO Receptacles (for Berth 136 as noted in Special Condition SC-25)	Lump Sum	1	226,959.75	226,959.75	0%	N/A	-	N/A	N/A	100%	100%	226,959.75
37	SPO Receptacles (for Berth 132-134 as noted in Special Condition SC-25)	Lump Sum	1	453,919.50	453,919.50	0%	-	N/A	N/A	-	100%	100%	453,919.50
38	All Other Electrical Work (for Berth 140 as noted in Special Condition SC-25)	Lump Sum	1	86,714.11	86,714.11	0%	-	N/A	N/A	N/A	100%	100%	86,714.11
39	All Other Electrical Work (for Berth 138 as noted in Special Condition SC-25)	Lump Sum	1	81,156.80	81,156.80	0%	N/A	-	N/A	N/A	100%	100%	81,156.80
40	All Other Electrical Work (for Berth 136 as noted in Special Condition SC-25)	Lump Sum	1	79,665.13	79,665.13	0%	N/A	-	-	-	100%	100%	79,665.13
41	All Other Electrical Work (for Berth 132-134 as noted in Special Condition SC-25)	Lump Sum	1	89,190.97	89,190.97	0%	-	N/A	N/A	-	100%	100%	89,190.97
42	Paving at Switchgear MTS4 and MTS5 and at SSP Substations	Lump Sum	1	135,862.43	135,862.43	0%	-	0	-	-	100%	100%	135,862.43
43	Standby Time	Unit Price	100	377.42	37,742.00	46.34	-	9,123.10	9,123.10	-	48%	96%	36,362.37
44	Scheduling	Lump Sum	1	22,363.82	22,363.82	0%	-	-	-	-	100%	100%	22,363.82
45	Ship Commissioning	Unit Price	132	767.63	101,327.16	-	-	-	-	16143.63	25%	41%	41,475.42
46	Power for Acceptance Testing	Allowance	1	50,000.00	50,000.00	0%	-	-	-	-	18.00%	18%	9,000.00
CO1	CHANGE ORDER #1	Lump Sum	1	2,160,000.00	-	0%	-	-	-	-	100%	100%	2,160,000.00
CO2	CHANGE ORDER #2	Lump Sum	1	38,008.63	-	-	-	-	-	-	100%	100%	38,008.63
CO3	CHANGE ORDER #3	Lump Sum	1	(2,155.00)	-	-	-	-	-	-	100%	100%	(2,155.00)
CO4	CHANGE ORDER #4	Lump Sum	1	26,737.00	-	-	-	-	-	-	100%	100%	26,737.00
CO5	CHANGE ORDER #5	Lump Sum	1	2,290,790.00	53,400.33	38%	767,776.70	57,235.47	-	-	61.65%	100%	2,290,790.00
CO6	CHANGE ORDER #6	Lump Sum	1	4,949.00	-	0%	-	-	-	-	100.00%	100%	4,949.00

Progress Payment No. 19  
 Period Ending : 11/30/14  
**PAYMENT DUE: 3/3/2015**  
 Specification: HD-S2348 Shore to Ship Power Project at Pier T, Berths 132-140  
 Contractor: The Ryan Company

LBHD Contract No: HD-7928  
 Original Bid Amt: \$20,559,112.22

Item	Unit	Est. Qty.	Unit Price	Bid Amount	Qty This Month	T140 \$ Amount This Month	T138 \$ Amount This Month	T136 \$ Amount This Month	T132 \$ Amount This Month	Total % of Item Comp	TOTAL \$ Amount to Date
CHANGE ORDER #7	Lump Sum	1	70,000.00		100%	17,500.00	17,500.00	17,500.00	17,500.00	100%	70,000.00
			4,588,329.63								
				20,559,112.22	4%	785,276.70	80,023.43	83,858.58	33,643.63	96%	\$ 25,105,236.25
<b>NEW CONTRACT AMOUNT</b>				25,147,441.85							

**SIGN HERE**

**TOTAL \$**

**SIGN HERE** **SIGN HERE**

*George Gordon*  
 CM Initials  
 George Gordon  
 Project Mgr  
 Date: 2/24/15

Suzanne C. Plezia, P.E.  
 Director of Construction  
 Date

BPO No.	INDEX CODE	PROJ	PROJ DET	Subobject Code
BPHA12000127	HACDCMCN	HA1317	1H2348	210009

Gross Earnings:	\$ 25,105,236.25
Previous Payments:	\$ 23,906,498.34
Previous Retention:	\$ (72,220.53)
<b>STOP NOTICE HARDY &amp; HARPER INC. \$23,750 + 25%</b>	\$ (29,687.50)
<b>STOP NOTICE HAMPTON TEDDER TECHNICAL SERVICES, INC. \$91,221.02 + 25%</b>	\$ (114,027.51)
Earned This Period:	\$ 982,808.35
Less Retention: ESCROW #2	\$ (49,140.12)
<b>STOP NOTICE ROBERTSON'S</b>	\$ (2,357.49)
<b>STOP NOTICE ABC RESOURCES INC</b>	\$ (10,000.00)
<b>\$8,000.00 + 25%</b>	\$ 921,304.75
<b>AMOUNT DUE THIS ESTIMATE:</b>	

**Project & Grant Revenue/Expenditure Financial Summary**

Criteria: As Of = 3/26/2019 (48% of Year Elapsed)

Project Detail	Title	ITD Adjusted Budget	Month-To-Date Actual Activity	Quarter-To-Date Actual Activity	ITD Actual	Encumbrance incl Pre-Encumb	ITD Adjusted Budget - Actuals	% Actuals to Adjusted Budget
<b>Revenue</b>								
Project HA1314 - CLOSED-PIERA SHORE TO SHP PWR RETROFIT								
1H2342	CONSTRUCTION, PROGRAM-WIDE	0.00	0.00	0.00	6,207,535.72		(6,207,535.72)	0.0%
Total Project HA1314		0.00	0.00	0.00	6,207,535.72		(6,207,535.72)	0.0%
Project HA1317 - CLS-PIER T,T132-T140 SHORE TO SHIP POWER								
1H2348	1H2348/CONST/ELECTRICAL INFRA	0.00	0.00	0.00	10,000,000.00		(10,000,000.00)	0.0%
Total Project HA1317		0.00	0.00	0.00	10,000,000.00		(10,000,000.00)	0.0%
Total		0.00	0.00	0.00	16,207,535.72		(16,207,535.72)	0.0%
Total Revenue		0.00	0.00	0.00	16,207,535.72		(16,207,535.72)	0.0%
<b>Expenditures</b>								
Project HA1314 - CLOSED-PIERA SHORE TO SHP PWR RETROFIT								
1B2342	ENVIRONMENTAL, PROGRAM-WIDE	76,955.40	0.00	0.00	76,955.40		0.00	100.0%
1C2342	DESIGN, PROGRAM-WIDE	2,313,600.40	0.00	0.00	2,313,600.40		0.00	100.0%
1H2342	CONSTRUCTION, PROGRAM-WIDE	18,162,985.63	0.00	0.00	18,163,251.75		(266.12)	100.0%
Total Project HA1314		18,553,541.43	0.00	0.00	18,553,807.55		(266.12)	100.0%
Project HA1317 - CLS-PIER T,T132-T140 SHORE TO SHIP POWER								
1B2348	1B2348/PERMITTING/ELECTRICAL INFRASTRUCTURE	291,851.12	0.00	0.00	291,851.12		0.00	100.0%
1C2348	1C2348/DESIGN/ELECTRICAL INFRASTRUCTURE	4,709,456.06	0.00	0.00	4,709,456.06		0.00	100.0%
1H2348	1H2348/CONST/ELECTRICAL INFRA	29,415,926.69	0.00	0.00	29,416,226.51		(301.82)	100.0%
Total Project HA1317		34,417,233.87	0.00	0.00	34,417,533.69		(301.82)	100.0%
Total		52,970,775.30	0.00	0.00	52,971,343.24		(567.94)	100.0%
Total Expenditures		52,970,775.30	0.00	0.00	52,971,343.24		(567.94)	100.0%



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit  
at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	SHIMMICK CONSTRUCTION COMPANY		KDC, Inc. dba Dynalectric		GRIFFIN/NEUBAUER JV		MINAKO AMERICA CORPORATION		SULLY-MILLER CONTRACTING COMPANY	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 1 - Mobilization and Demobilization: Furnish all labor, materials, tools, equipment, incidentals and supervision necessary to perform... as specified and shown for the lump sum price (of which only 50% may be applied to mobilization) of -	Lump Sum	130,000.00	130,000.00	100,000.00	100,000.00	670,000.00	670,000.00	377,000.00	377,000.00	1,250,000.00	1,250,000.00
ITEM NO. 2 - Site Specific Safety Plan: Provide and implement an approved Site Specific Safety Plan for the lump sum price of -	Lump Sum	15,000.00	15,000.00	10,000.00	10,000.00	10,000.00	10,000.00	17,000.00	17,000.00	22,106.00	22,106.00
ITEM NO. 3 - Asphalt Concrete Pavement Demolition: Provide all labor, equipment, materials and incidentals necessary to perform demolition, removal and disposal of existing asphalt pavement and... as shown and specified for the lump sum price of -	Lump Sum	150,000.00	150,000.00	105,000.00	105,000.00	100,000.00	100,000.00	107,000.00	107,000.00	201,857.00	201,857.00
ITEM NO. 4 - Soil Handling and Disposal of Surplus Soil: Provide all labor, equipment, materials and incidentals necessary to stockpile... approximately one thousand one hundred (1,100) tons... as specified and shown for the unit price per ton of -	Unit Price	10.00	11,000.00	33.00	36,300.00	19.50	21,450.00	33.64	37,004.00	66.82	73,502.00
ITEM NO. 5 - Soil Handling and Disposal of Non-Hazardous Waste: Provide all labor, equipment, materials and incidentals necessary to... approximately six hundred fifty (650) tons of Non-Hazardous... as specified and shown for the unit price per ton of -	Unit Price	80.00	52,000.00	71.00	46,150.00	58.00	37,700.00	56.92	35,998.00	78.34	50,921.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**Shimmick Construction Company**  
LOWEST RESPONSIBLE BIDDER

594575/Exp. 05/31/2012  
LICENSE NUMBER

\$11,513,850.00  
AMOUNT

AUTHORIZED SIGNATURE



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

**NO. HD-S2342A**

**DATE OPENED: January 31, 2012**

ITEM	SHIMMICK CONSTRUCTION COMPANY		KDC, Inc. dba Dynatecric		Griffith/Neubauer JV		Minaiko America Corporation		Sully-Miller Contracting Company		
	ESTIMATED QUANTITIES	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 6 - Port Furnished Crushed Miscellaneous Base: Provide all labor, equipment, materials and incidentals necessary to mix, load... approximately two thousand six hundred fifty (2,650) tons... as specified and shown for the unit price per ton of -	Unit Price	15.00	39,750.00	42.00	111,300.00	40.00	106,000.00	40.38	107,007.00	34.14	90,471.00
ITEM NO. 7 - Asphalt Concrete Pavement: Provide all labor, equipment, materials and incidentals necessary to construct approximately two thousand five hundred fifty (2,550) tons of asphalt... as specified and shown for the unit price per ton of -	Unit Price	85.00	226,950.00	213.00	543,150.00	108.00	275,400.00	108.63	277,006.50	118.60	302,430.00
ITEM NO. 8 - 8-Foot Chain Link Fence with Barbed Wire: Provide all labor, material, equipment and incidentals... approx four hundred eighty (480) linear feet of 6-foot chain link... as specified and shown for the unit price per linear foot of -	Unit Price	40.00	19,200.00	71.00	34,080.00	41.00	19,680.00	77.09	37,003.20	44.70	21,456.00
ITEM NO. 9 - Chain Link Gates: Provide all labor, material, equipment and incidentals necessary to furnish and install all chain link gates as specified and shown for the lump sum price of -	Lump Sum	15,000.00	15,000.00	10,000.00	10,000.00	14,200.00	14,200.00	17,000.00	17,000.00	10,301.00	10,301.00
ITEM NO. 10 - Pipe Bollards, 12-inch: Provide all labor, equipment, materials and incidentals necessary to furnish, install, and coat fifty seven (57) 12-inch diameter pipe bollards, as specified and shown for the unit price per each of -	Unit Price	1,200.00	68,400.00	1,700.00	96,900.00	1,320.00	75,240.00	1,877.20	107,000.40	1,707.00	97,299.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**Shimmick Construction Company**  
LOWEST RESPONSIBLE BIDDER

**594575/Exp. 05/31/2012**  
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**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal

NO. HD-S2342A      DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES		Shimmick Construction Company		KDC, Inc. dba Dynalectic		Griffith/Neubauer JV		Minako America Corporation		Sully-Miller Contracting Company	
			RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 11 - Bid Item Removed: Bid item removed per Addendum No. 1 issued January 4, 2012.												
ITEM NO. 12 - Repair of Existing Striping: Provide all labor, equipment, materials and incidentals necessary to repair approximately three thousand eight hundred (3,800) linear feet of... as specified and required for the unit price per linear foot of -	Lump Sum	0	0	0	0	0	0	0	0	0	0	0
ITEM NO. 13 - Repair of Existing Pavement Markings: Provide all labor, equipment, materials and incidentals necessary to repair approximately one hundred fifty five (155) existing markings, as specified and required for the unit price per each of -	Unit Price	1.00	3,800.00	2.50	9,500.00	1.15	4,370.00	1.85	7,030.00	1.12	4,266.00	
ITEM NO. 14 - Shore Power Outlet Vaults for Berth 90 (SPO 7, SPO 8 & SPO 9): Provide all labor, material, equipment and incidentals necessary to perform demolition and construction of shore to ship... as specified and shown for the lump sum price of -	Unit Price	50.00	7,750.00	142.00	22,010.00	46.00	7,130.00	109.68	17,000.40	45.00	6,975.00	
ITEM NO. 15 - Shore Power Outlet Vaults for Berth 92 (SPO 4, SPO 5 & SPO 6): Provide all labor, material, equipment and incidentals necessary to perform demolition and construction of shore to ship... as specified and shown for the lump sum price of -	Lump Sum	250,000.00	250,000.00	365,000.00	365,000.00	340,000.00	340,000.00	377,000.00	377,000.00	343,615.00	343,615.00	
<b>TOTAL:</b>	Lump Sum	250,000.00	250,000.00	365,000.00	365,000.00	340,000.00	340,000.00	377,000.00	377,000.00	343,615.00	343,615.00	
<b>CERTIFIED CHECK OR BOND:</b>												

Shimmick Construction Company  
LOWEST RESPONSIBLE BIDDER

594575/Exp. 05/31/2012      \$11,513,850.00

LICENSE NUMBER      AMOUNT

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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit  
at Pier A Container Terminal**

**NO. HD-S2342A**

**DATE OPENED: January 31, 2012**

ITEM	ESTIMATED QUANTITIES		SHIMMICK CONSTRUCTION COMPANY		KDC, Inc. dba Dynalectric		GRIFFITH/NEUBAUER JV		MINAKO AMERICA CORPORATION		SULLY-MILLER CONTRACTING COMPANY		
	DESCRIPTION	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 16 - Shore Power/Outlet Vaults for Berth 94 (SPO 1, SPO 2 & SPO 3): Provide all labor, material, equipment and incidentals necessary to perform demolition and construction of shore to ship... as specified and shown for the lump sum price of -	Lump Sum	250,000.00	250,000.00	365,000.00	365,000.00	340,000.00	340,000.00	377,000.00	377,000.00	343,615.00	343,615.00		
ITEM NO. 17 - Cut-Off Wall Plug/Penetrations: Provide all labor, material, equipment and incidentals necessary to perform demolition, coring and construction of four (4) cut-off wall plug... as specified and shown for the unit price per each of -	Unit Price	7,000.00	28,000.00	6,000.00	24,000.00	5,400.00	21,600.00	4,250.00	17,000.00	9,300.00	37,200.00		
ITEM NO. 18 - SPO "Dry Run" Cable Connection Support: Provide all labor, materials, tools, equipment and incidentals necessary to support approximately four (4) ship-side "dry"... as specified and directed by the Engineer for the unit price per each of -	Unit Price	3,000.00	12,000.00	1,500.00	6,000.00	2,160.00	8,720.00	1,750.00	7,000.00				
ITEM NO. 19 - Ship Testing and Commissioning: Provide all labor, materials, tools, equipment and incidentals necessary to support approximately four (4) ship-side commissioning... as specified and directed by the Engineer for the unit price per each of -	Unit Price	15,000.00	60,000.00	17,500.00	70,000.00	20,437.50	81,750.00	17,500.00	70,000.00	18,392.00	73,568.00		
ITEM NO. 20 - Transformer for Berth 90: Provide all labor, material, equipment, and incidentals required to furnish, install, test and commission the transformer(s) as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	650,000.00	650,000.00	600,000.00	600,000.00	654,000.00	654,000.00	477,000.00	477,000.00	599,962.00	599,962.00		
<b>TOTAL:</b>													
<b>CERTIFIED CHECK OR BOND:</b>													

**594575/Exp. 05/31/2012**  
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**\$11,513,650.00**  
AMOUNT

**Shimmick Construction Company**  
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**ANALYSIS OF BIDS  
CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit  
at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	SHIMMICK CONSTRUCTION COMPANY		KDC, Inc. dba Dynalectic		GRIFFITH/NEUBAUER, JV		MINAKO AMERICA CORPORATION		SULLY-MILLER CONTRACTING COMPANY	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 21 - Transformer for Berth 92: Provide all labor, material, equipment, and incidentals required to furnish, install, test and commission the transformer(s) as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	650,000.00	650,000.00	600,000.00	600,000.00	654,000.00	654,000.00	477,000.00	477,000.00	599,982.00	599,982.00
ITEM NO. 22 - Transformer for Berth 94: Provide all labor, material, equipment, and incidentals required to furnish, install, test and commission the transformer(s) as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	650,000.00	650,000.00	600,000.00	600,000.00	654,000.00	654,000.00	477,000.00	477,000.00	599,982.00	599,982.00
ITEM NO. 23 - Switchgear Assembly for Berth 90: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the switchgear assembly as part of a complete... as specified and shown for the lump sum price of -	Lump Sum	1,750,000.00	1,750,000.00	1,690,000.00	1,690,000.00	1,744,000.00	1,744,000.00	1,777,000.00	1,777,000.00	1,562,989.00	1,562,989.00
ITEM NO. 24 - Switchgear Assembly for Berth 92: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the switchgear assembly as part of a complete... as specified and shown for the lump sum price of -	Lump Sum	1,475,000.00	1,475,000.00	1,510,000.00	1,510,000.00	1,417,000.00	1,417,000.00	1,777,000.00	1,777,000.00	1,448,485.00	1,448,485.00
ITEM NO. 25 - Switchgear Assembly for Berth 94: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the switchgear assembly as part of a complete... as specified and shown for the lump sum price of -	Lump Sum	1,500,000.00	1,500,000.00	1,600,000.00	1,600,000.00	1,471,500.00	1,471,500.00	1,377,000.00	1,377,000.00	1,489,022.00	1,489,022.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**Shimmick Construction Company**  
LOWEST RESPONSIBLE BIDDER

594575/Exp. 05/31/2012  
LICENSE NUMBER

\$11,513,850.00  
AMOUNT

AUTHORIZED SIGNATURE



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

DATE OPENED: January 31, 2012

NO. HD-S2342A

SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit  
at Pier A Container Terminal

ITEM	ESTIMATED QUANTITIES	SHIMMICK CONSTRUCTION COMPANY		KDC, Inc. dba Dynalectric		GRIFFITH/NEUBAUER JV		MINAKO AMERICA CORPORATION		SULLY-MILLER CONTRACTING COMPANY	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 26 - Ductbanks and Raceways for Berth 90: Provide all labor, material, equipment and incidentals required to furnish and install the ductbanks and raceways as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	500,000.00	500,000.00	581,000.00	581,000.00	435,000.00	435,000.00	577,000.00	577,000.00	384,754.00	384,754.00
ITEM NO. 27 - Ductbanks and Raceways for Berth 92: Provide all labor, material, equipment and incidentals required to furnish and install the ductbanks and raceways as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	450,000.00	450,000.00	537,000.00	537,000.00	435,000.00	435,000.00	577,000.00	577,000.00	374,855.00	374,855.00
ITEM NO. 28 - Ductbanks and Raceways for Berth 94: Provide all labor, material, equipment and incidentals required to furnish and install the ductbanks and raceways as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	325,000.00	325,000.00	436,000.00	436,000.00	355,000.00	355,000.00	477,000.00	477,000.00	342,606.00	342,606.00
ITEM NO. 29 - Conductors for Berth 90: Provide all labor, material, equipment and incidentals required to furnish, install and test the conductors as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	300,000.00	300,000.00	250,000.00	250,000.00	332,450.00	332,450.00	377,000.00	377,000.00	331,972.00	331,972.00
ITEM NO. 30 - Conductors for Berth 92: Provide all labor, material, equipment and incidentals required to furnish, install and test the conductors as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	300,000.00	300,000.00	260,000.00	260,000.00	332,450.00	332,450.00	277,000.00	277,000.00	345,359.00	345,359.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

594575/Exp. 05/31/2012  
LICENSE NUMBER

\$11,513,850.00  
AMOUNT

Shimmick Construction Company  
LOWEST RESPONSIBLE BIDDER

AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit  
at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	SHIMMICK CONSTRUCTION COMPANY		KDC, Inc. dba Dynalectric		GRIFFITH/NEUBAUER JV		MINAKO AMERICA CORPORATION		SULLY-MILLER CONTRACTING COMPANY	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 31 - Conductors for Berth 94: Provide all labor, material, equipment and incidentals required to furnish, install and test the conductors as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	325,000.00	325,000.00	180,000.00	180,000.00	332,450.00	332,450.00	377,000.00	377,000.00	400,643.00	400,643.00
ITEM NO. 32 - SPO Receptacles for Berth 90: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the SPO receptacles as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	100,000.00	100,000.00	110,000.00	110,000.00	88,000.00	88,000.00	177,000.00	177,000.00	108,398.00	108,398.00
ITEM NO. 33 - SPO Receptacles for Berth 92: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the SPO receptacles as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	100,000.00	100,000.00	110,000.00	110,000.00	88,000.00	88,000.00	177,000.00	177,000.00	108,158.00	108,158.00
ITEM NO. 34 - SPO Receptacles for Berth 94: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the SPO receptacles as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	100,000.00	100,000.00	110,000.00	110,000.00	88,000.00	88,000.00	177,000.00	177,000.00	108,158.00	108,158.00
ITEM NO. 35 - All Other Electrical Work for Berth 90: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission all other electrical work for Berth 90 as specified and shown for the lump sum price of -	Lump Sum	475,000.00	475,000.00	230,750.00	230,750.00	456,000.00	456,000.00	177,000.00	177,000.00	433,504.00	433,504.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**Shimmick Construction Company**  
LOWEST RESPONSIBLE BIDDER

594575/Exp. 05/31/2012  
LICENSE NUMBER

\$11,513,850.00  
AMOUNT

AUTHORIZED SIGNATURE



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

DATE OPENED: January 31, 2012

NO. HD-S2342A

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

ITEM	ESTIMATED QUANTITIES	Shimmick Construction Company 3201 Edgewater Drive #202 Oakland, Ca 94612 Phone: (949) 333-1500 Fax: (949) 333-1510		KDC, Inc. dba Dynalectric 4462 Corporate Center Drive Los Alamitos, CA 90720 Phone: (714) 828-7000 Fax: (714) 484-2385		Griffith/Neubauer JV 12200 Bloomfield Avenue Santa Fe Springs, CA 90670 Phone: (562) 929-1128 Fax: (562) 864-7938		Minako America Corporation 522 E. Airline Way Gardena, CA 90248 Phone: (310) 516-8100 Fax: (310) 516-7404		Sully-Miller Contracting Company 135 S. State College Blvd #400 Erea, CA 92821 Phone: (714) 578-9600 Fax: (714) 449-8775	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 36 - All Other Electrical Work for Berth 92: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission all other electrical work for Berth 92 ... as specified and shown for the lump sum price of -	Lump Sum	70,000.00	70,000.00	100,000.00	100,000.00	107,000.00	107,000.00	177,000.00	177,000.00	47,341.00	47,341.00
ITEM NO. 37 - All Other Electrical Work for Berth 94: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission all other electrical work for Berth 94 ... as specified and shown for the lump sum price of -	Lump Sum	105,000.00	105,000.00	150,000.00	150,000.00	126,000.00	126,000.00	177,000.00	177,000.00	50,750.00	50,750.00
ITEM NO. 38 - Allowance for Load Bank Test Energy Usage: Provide all labor, materials, tools, equipment and incidentals necessary to reimburse the Tenant for energy... The limits and use of the Allowance shall be solely as directed by the Engineer -	Allowance	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00
ITEM NO. 39 - Stand-by Time: Provide all labor, equipment, materials and incidentals necessary to provide approximately twenty-five (25) hours of stand-by time for personnel and equipment, including, but not limited to ... for the unit price per hour of -	Unit Price	1,000.00	25,000.00	720.00	18,000.00	2,100.00	52,500.00	680.00	17,000.00	1,268.00	31,700.00
ITEM NO. 40 - Environmental Protection Plan (E.P.P) Compliance: Provide all labor, equipment, materials and incidentals necessary to develop Environmental Protection Plan, including SWPPP (see Appendix... as specified and shown for the lump sum price of -	Lump Sum	20,000.00	20,000.00	72,000.00	72,000.00	34,500.00	34,500.00	77,000.00	77,000.00	22,106.00	22,106.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

594575/Exp. 05/31/2012  
LICENSE NUMBER

Shimmick Construction Company  
LOWEST RESPONSIBLE BIDDER

\$11,513,850.00  
AMOUNT

AUTHORIZED SIGNATURE





# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**  
**NO. HD-S2342A**  
**DATE OPENED: January 31, 2012**

ITEM	Cupertino Electric, Inc.		Veilutini Corp dba Royal Electric		Comet Electric		The Ryan Company		Marathon Construction Company		
	ESTIMATED QUANTITIES	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 1 - Mobilization and Demobilization: Furnish all labor, materials, tools, equipment, incidentals and supervision necessary to perform... as specified and shown for the lump sum price (of which only 50% may be applied to mobilization) of -	Lump Sum	150,000.00	150,000.00	150,000.00	651,217.00	651,217.00	1,472,000.00	1,472,000.00	511,322.00	511,322.00	511,322.00
ITEM NO. 2 - Site Specific Safety Plan: Provide and implement an approved Site Specific Safety Plan for the lump sum price of -	Lump Sum	50,000.00	60,000.00	50,000.00	175,982.00	175,982.00	12,000.00	12,000.00	15,000.00	15,000.00	15,000.00
ITEM NO. 3 - Asphalt Concrete Pavement Demolition: Provide all labor, equipment, materials and incidentals necessary to perform demolition, removal and disposal of existing asphalt pavement and... as shown and specified for the lump sum price of -	Lump Sum	113,156.00	113,156.00	101,000.00	351,965.00	351,965.00	54,000.00	54,000.00	215,000.00	215,000.00	215,000.00
ITEM NO. 4 - Soil Handling and Disposal of Surplus Soil: Provide all labor, equipment, materials and incidentals necessary to stockpile... approximately one thousand one hundred (1,100) tons... as specified and shown for the unit price per ton of -	Unit Price	34.91	38,401.00	20.10	44.00	48,400.00	66.30	72,930.00	40.00	44,000.00	44,000.00
ITEM NO. 5 - Soil Handling and Disposal of Non-Hazardous Waste: Provide all labor, equipment, materials and incidentals necessary to... approximately six hundred fifty (650) tons of Non-Hazardous... as specified and shown for the unit price per ton of -	Unit Price	53.00	34,450.00	110.00	57.00	37,050.00	42.20	27,430.00	75.00	48,750.00	48,750.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**Shimmick Construction Company**  
 LOWEST RESPONSIBLE BIDDER  
**594575/Exp. 05/31/2012**  
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**\$11,513,850.00**  
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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit  
at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	Cupertino Electric, Inc.		Veitutti Corp dba Royal Electric		Comet Electric		The Ryan Company		Marathon Construction Company	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 6 - Port Furnished Crushed Miscellaneous Base: Provide all labor, equipment, materials and incidentals necessary to mix, load... approximately two thousand six hundred fifty (2,650) tons... as specified and shown for the unit price per ton of -	Unit Price	42.00	111,300.00	42.00	111,300.00	42.00	111,300.00	36.15	95,797.50	40.00	106,000.00
ITEM NO. 7 - Asphalt Concrete Pavement: Provide all labor, equipment, materials and incidentals necessary to construct approximately two thousand five hundred fifty (2,550) tons of asphalt... as specified and shown for the unit price per ton of -	Unit Price	204.50	521,475.00	124.00	316,200.00	106.00	270,300.00	112.00	285,600.00	130.00	331,500.00
ITEM NO. 8 - 8-Foot Chain Link Fence with Barbed Wire: Provide all labor, material, equipment and incidentals... approx four hundred eighty (480) linear feet of 8-foot chain link... as specified and shown for the unit price per linear foot of -	Unit Price	77.00	36,960.00	42.00	20,160.00	36.00	17,280.00	41.00	19,660.00	50.00	24,000.00
ITEM NO. 9 - Chain Link Gates: Provide all labor, material, equipment and incidentals necessary to furnish and install all chain link gates as specified and shown for the lump sum price of -	Lump Sum	11,436.00	11,436.00	14,600.00	14,600.00	12,318.00	12,318.00	3,455.00	3,455.00	15,000.00	15,000.00
ITEM NO. 10 - Pipe Bollards, 12-inch: Provide all labor, equipment, materials and incidentals necessary to furnish, install, and coat fifty seven (57) 12-inch diameter pipe bollards, as specified and shown for the unit price per each of -	Unit Price	1,800.00	102,600.00	1,360.00	77,520.00	1,161.00	66,177.00	1,579.00	90,005.00	2,000.00	114,000.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

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# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	Cupertino Electric, Inc.		Veilutini Corp dba Royal Electric		Comet Electric		The Ryan Company		Marathon Construction Company		
	ESTIMATED QUANTITIES	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 11 - Bid Item Removed: Bid item removed per Addendum No. 1 issued January 4, 2012.											
ITEM NO. 12 - Repair of Existing Striping: Provide all labor, equipment, materials and incidentals necessary to repair approximately three thousand eight hundred (3,800) linear feet of... as specified and required for the unit price per linear foot of -	Lump Sum	0	0	0	0	0	0	0	0	0	0
ITEM NO. 13 - Repair of Existing Pavement Markings: Provide all labor, equipment, materials and incidentals necessary to repair approximately one hundred fifty five (155) existing markings, as specified and required for the unit price per each of -	Unit Price	2.40	9,120.00	3.40	12,920.00	2.25	8,550.00	3.65	13,870.00	2.00	7,600.00
ITEM NO. 14 - Shore Power Outlet Vaults for Berth 90 (SPO 7, SPO 8 & SPO 9): Provide all labor, material, equipment and incidentals necessary to perform demolition and construction of shore to ship... as specified and shown for the lump sum price of -	Unit Price	120.00	18,600.00	90.00	13,950.00	315.00	48,825.00	18.10	2,805.50	71.00	11,005.00
ITEM NO. 15 - Shore Power Outlet Vaults for Berth 92 (SPO 4, SPO 5 & SPO 6): Provide all labor, material, equipment and incidentals necessary to perform demolition and construction of shore to ship... as specified and shown for the lump sum price of -	Lump Sum	463,458.00	463,458.00	353,666.00	353,666.00	389,124.00	389,124.00	232,000.00	232,000.00	600,000.00	600,000.00
<b>TOTAL:</b>	Lump Sum	463,458.00	463,458.00	353,666.00	353,666.00	389,124.00	389,124.00	142,000.00	142,000.00	600,000.00	600,000.00

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**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Pier A, Berths A85-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	Cupertino Electric, Inc.		Velutini Corp dba Royal Electric		Comet Electric		The Ryan Company		Marathon Construction Company	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 16 - Shore Power Outlet Vaults for Berth 94 (SPO 1, SPO 2 & SPO 3): Provide all labor, material, equipment and incidentals necessary to perform demolition and construction of shore to ship... as specified and shown for the lump sum price of -	Lump Sum	463,458.00	463,458.00	353,666.00	353,666.00	389,124.00	389,124.00	142,000.00	142,000.00	600,000.00	600,000.00
ITEM NO. 17 - Cut-Off Wall Plug/Penetrations: Provide all labor, material, equipment and incidentals necessary to perform demolition, coring and construction of four (4) cut-off wall plug... as specified and shown for the unit price per each of -	Unit Price	7,223.00	28,892.00	6,200.00	24,800.00	4,180.00	16,720.00	14,500.00	58,000.00	12,000.00	48,000.00
ITEM NO. 18 - SPO "Dry Run" Cable Connection Support: Provide all labor, materials, tools, equipment and incidentals necessary to support approximately four (4) ship-side "dry..." as specified and directed by the Engineer for the unit price per each of -	Unit Price	621.00	2,484.00	640.00	2,560.00	519.00	2,076.00	775.00	3,100.00	1,400.00	5,600.00
ITEM NO. 19 - Ship Testing and Commissioning: Provide all labor, materials, tools, equipment and incidentals necessary to support approximately four (4) ship-side commissioning... as specified and directed by the Engineer for the unit price per each of -	Unit Price	17,915.00	71,660.00	14,000.00	58,000.00	9,754.00	45,016.00	61,400.00	245,600.00	20,000.00	80,000.00
ITEM NO. 20 - Transformer for Berth 90: Provide all labor, material, equipment, and incidentals required to furnish, install, test and commission the transformer(s) as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	625,700.00	625,700.00	609,000.00	609,000.00	1,208,972.00	1,208,972.00	662,000.00	662,000.00	740,000.00	740,000.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**Shimnick Construction Company**  
LOWEST RESPONSIBLE BIDDER

594575/Exp. 05/31/2012  
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**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

DATE OPENED: January 31, 2012

NO. HD-S2342A

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

ITEM	Cupertino Electric, Inc.		Vellirini Corp dba Royal Electric		Comet Electric		The Ryan Company		Marathon Construction Company		
	ESTIMATED QUANTITIES	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 21 - Transformer for Berth 92: Provide all labor, material, equipment, and incidentals required to furnish, install, test and commission the transformer(s) as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	625,700.00	625,700.00	609,000.00	609,000.00	1,211,997.00	1,211,997.00	662,000.00	662,000.00	665,000.00	665,000.00
ITEM NO. 22 - Transformer for Berth 94: Provide all labor, material, equipment, and incidentals required to furnish, install, test and commission the transformer(s) as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	625,700.00	625,700.00	609,000.00	609,000.00	1,215,296.00	1,215,296.00	662,000.00	662,000.00	710,000.00	710,000.00
ITEM NO. 23 - Switchgear Assembly for Berth 90: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the switchgear assembly as part of a complete... as specified and shown for the lump sum price of -	Lump Sum	1,648,325.00	1,648,325.00	1,655,000.00	1,655,000.00	1,232,346.00	1,232,346.00	2,008,000.00	2,008,000.00	1,790,000.00	1,790,000.00
ITEM NO. 24 - Switchgear Assembly for Berth 92: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the switchgear assembly as part of a complete... as specified and shown for the lump sum price of -	Lump Sum	1,384,637.00	1,384,637.00	1,396,000.00	1,396,000.00	1,232,346.00	1,232,346.00	1,475,000.00	1,475,000.00	1,600,000.00	1,600,000.00
ITEM NO. 25 - Switchgear Assembly for Berth 94: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the switchgear assembly as part of a complete... as specified and shown for the lump sum price of -	Lump Sum	1,418,089.00	1,418,089.00	1,439,000.00	1,439,000.00	1,237,462.00	1,237,462.00	1,507,000.00	1,507,000.00	1,635,000.00	1,635,000.00
<b>TOTAL:</b>											

**Shimmick Construction Company**      **594575/Exp. 05/31/2012**      **\$11,513,850.00**  
 LOWEST RESPONSIBLE BIDDER      LICENSE NUMBER      AMOUNT      AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS  
CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit  
at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	Cupertino Electric, Inc.		Veilluni Corp dba Royal Electric		Comet Electric		The Ryan Company		Marathon Construction Company	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 26 - Ductbanks and Raceways for Berth 90: Provide all labor, material, equipment and incidentals required to furnish and install the ductbanks and raceways as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	762,606.00	762,606.00	750,000.00	750,000.00	507,835.00	507,835.00	578,000.00	578,000.00	745,000.00	745,000.00
ITEM NO. 27 - Ductbanks and Raceways for Berth 92: Provide all labor, material, equipment and incidentals required to furnish and install the ductbanks and raceways as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	678,099.00	678,099.00	576,000.00	576,000.00	505,482.00	505,482.00	449,000.00	449,000.00	660,000.00	660,000.00
ITEM NO. 28 - Ductbanks and Raceways for Berth 94: Provide all labor, material, equipment and incidentals required to furnish and install the ductbanks and raceways as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	559,890.00	559,890.00	443,000.00	443,000.00	473,340.00	473,340.00	353,000.00	353,000.00	540,000.00	540,000.00
ITEM NO. 29 - Conductors for Berth 90: Provide all labor, material, equipment and incidentals required to furnish, install and test the conductors as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	376,811.00	376,811.00	372,000.00	372,000.00	318,573.00	318,573.00	374,000.00	374,000.00	340,000.00	340,000.00
ITEM NO. 30 - Conductors for Berth 92: Provide all labor, material, equipment and incidentals required to furnish, install and test the conductors as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	381,578.00	381,578.00	369,000.00	369,000.00	304,540.00	304,540.00	425,000.00	425,000.00	310,000.00	310,000.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**Shimmick Construction Company**  
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**ANALYSIS OF BIDS  
CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

**NO. HD-S2342A**

**DATE OPENED: January 31, 2012**

ITEM	ESTIMATED QUANTITIES	Cupertino Electric, Inc.		Vellutini Corp dba Royal Electric		Comet Electric		The Ryan Company		Marathon Construction Company	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 31 - Conductors for Berth 94; Provide all labor, material, equipment and incidentals required to furnish, install and test the conductors as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	385,757.00	385,757.00	431,000.00	431,000.00	359,649.00	359,649.00	336,000.00	336,000.00	340,000.00	340,000.00
ITEM NO. 32 - SPO Receptacles for Berth 90; Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the SPO receptacles as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	114,664.00	114,664.00	102,000.00	102,000.00	243,810.00	243,810.00	257,000.00	257,000.00	160,000.00	160,000.00
ITEM NO. 33 - SPO Receptacles for Berth 92; Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the SPO receptacles as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	114,664.00	114,664.00	102,000.00	102,000.00	269,943.00	269,943.00	257,000.00	257,000.00	160,000.00	160,000.00
ITEM NO. 34 - SPO Receptacles for Berth 94; Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the SPO receptacles as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	117,737.00	117,737.00	102,000.00	102,000.00	243,880.00	243,880.00	257,000.00	257,000.00	160,000.00	160,000.00
ITEM NO. 35 - All Other Electrical Work for Berth 90; Provide all labor, material, equipment and incidentals required to furnish, install, test and commission all other electrical work for Berth 90 as specified and shown for the lump sum price of -	Lump Sum	204,842.00	204,842.00	883,000.00	883,000.00	128,770.00	128,770.00	510,000.00	510,000.00	525,000.00	525,000.00
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

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**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES		Cupertino Electric, Inc.		Vellutini Corp dba Royal Electric		Comet Electric		The Ryan Company		Marathon Construction Company	
	ITEM NO.	DESCRIPTION	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
36	All Other Electrical Work for Berth 92: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission all other electrical work for Berth 92 ... as specified and shown for the lump sum price of -	Lump Sum	108,225.00	108,225.00	91,000.00	91,000.00	51,957.00	51,957.00	272,000.00	272,000.00	68,000.00	68,000.00
37	All Other Electrical Work for Berth 94: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission all other electrical work for Berth 94 ... as specified and shown for the lump sum price of -	Lump Sum	130,900.00	130,900.00	84,000.00	84,000.00	59,268.00	59,268.00	155,000.00	155,000.00	100,000.00	100,000.00
38	Allowance for Load Bank Test Energy Usage: Provide all labor, materials, tools, equipment and incidentals necessary to reimburse the Tenant for energy... The limits and use of the Allowance shall be solely as directed by the Engineer -	Allowance	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00
39	Stand-by Time: Provide all labor, equipment, materials and incidentals necessary to provide approximately twenty-five (25) hours of stand-by time for personnel and equipment, including, but not limited to ... for the unit price per hour of -	Unit Price	725.00	16,125.00	1,350.00	33,750.00	855.00	21,375.00	760.00	19,000.00	1,000.00	25,000.00
40	Environmental Protection Plan (E.P.P) Compliance: Provide all labor, equipment, materials and incidentals necessary to develop Environmental Protection Plan, including SWPPP (see Appendix... as specified and shown for the lump sum price of -	Lump Sum	77,042.00	77,042.00	53,000.00	53,000.00	70,394.00	70,394.00	25,000.00	25,000.00	50,000.00	50,000.00
<b>TOTAL:</b>												
<b>CERTIFIED CHECK OR BOND:</b>												

**Shimmick Construction Company**  
LOWEST RESPONSIBLE BIDDER

594575/Exp. 05/31/2012  
LICENSE NUMBER

\$11,513,850.00  
AMOUNT

AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

**NO. HD-S2342A**

**DATE OPENED: January 31, 2012**

ITEM	ESTIMATED QUANTITIES	Cupertino Electric, Inc.		Vellutini Corp dba Royal Electric		Comet Electric		The Ryan Company		Marathon Construction Company	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 41 - Schedule: Provide all labor, equipment, materials and incidentals necessary to develop and update all schedules complete as specified for the lump sum price of -	Lump Sum	50,000.00	50,000.00	163,000.00	163,000.00	35,196.00	35,196.00	80,000.00	80,000.00	250,000.00	250,000.00
TOTAL:		\$13,159,999.00		\$13,007,366.00		\$13,962,989.00		\$14,345,271.00		\$14,999,777.00	
CERTIFIED CHECK OR BOND:		10% Bond		10% Bond		10% Bond		10% Bond		10% Bond	

**Shirmick Construction Company**  
LOWEST RESPONSIBLE BIDDER

**594575/Exp. 05/31/2012**  
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**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal

NO. HD-S2342A      DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	NON-RESPONSIVE		NON-RESPONSIVE		NON-RESPONSIVE		NON-RESPONSIVE		NON-RESPONSIVE	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
Steiny and Company 221 N. Ardmore Ave Los Angeles, CA 90004 Phone: (213) 341-2149 Fax: (213) 382-0812											
ITEM NO. 1 - Mobilization and Demobilization: Furnish all labor, materials, tools, equipment, incidentals and supervision necessary to perform... as specified and shown for the lump sum price (of which only 50% may be applied to mobilization) of -	Lump Sum	300,000.00	300,000.00								
ITEM NO. 2 - Site Specific Safety Plan: Provide and implement an approved Site Specific Safety Plan for the lump sum price of -	Lump Sum	10,000.00	10,000.00								
ITEM NO. 3 - Asphalt Concrete Pavement Demolition: Provide all labor, equipment, materials and incidentals necessary to perform demolition, removal and disposal of existing asphalt pavement and... as shown and specified for the lump sum price of -	Lump Sum	126,206.00	126,206.00								
ITEM NO. 4 - Soil Handling and Disposal of Surplus Soil: Provide all labor, equipment, materials and incidentals necessary to stockpile... approximately one thousand one hundred (1,100) tons... as specified and shown for the unit price per ton of -	Unit Price	38.94	42,834.00								
ITEM NO. 5 - Soil Handling and Disposal of Non-Hazardous Waste: Provide all labor, equipment, materials and incidentals necessary to... approximately six hundred fifty (650) tons of Non-Hazardous... as specified and shown for the unit price per ton of -	Unit Price	59.08	36,402.00								
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**Shimmick Construction Company**  
 LOWEST RESPONSIBLE BIDDER

594575/Exp. 05/31/2012  
 LICENSE NUMBER

\$11,513,850.00  
 AMOUNT

AUTHORIZED SIGNATURE



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	AMOUNT		RATE		AMOUNT		RATE		AMOUNT	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
<p>Steiny and Company 221 N. Ardmore Ave Los Angeles, CA 90004 Phone: (213) 341-2149 Fax: (213) 382-0612</p>											
<b>NON-RESPONSIVE</b>											
ITEM NO. 6 - Port Furnished Crushed Miscellaneous Base: Provide all labor, equipment, materials and incidentals necessary to mix, load, ... approximately two thousand six hundred fifty (2,650) tons... as specified and shown for the unit price per ton of -	Unit Price	47.00	124,550.00								
ITEM NO. 7 - Asphalt Concrete Pavement: Provide all labor, equipment, materials and incidentals necessary to construct approximately two thousand five hundred fifty (2,550) tons of asphalt... as specified and shown for the unit price per ton of -	Unit Price	230.00	586,500.00								
ITEM NO. 8 - 8-Foot Chain Link Fence with Barbed Wire: Provide all labor, material, equipment and incidentals... approx four hundred eighty (480) linear feet of 8-foot chain link... as specified and shown for the unit price per linear foot of -	Unit Price	86.00	41,280.00								
ITEM NO. 9 - Chain Link Gates: Provide all labor, material, equipment and incidentals necessary to furnish and install all chain link gates as specified and shown for the lump sum price of -	Lump Sum	12,754.00	12,754.00								
ITEM NO. 10 - Pipe Bollards, 12-inch: Provide all labor, equipment, materials and incidentals necessary to furnish, install, and coat fifty seven (57) 12-inch diameter pipe bollards, as specified and shown for the unit price per each of -	Unit Price	2,014.00	114,798.00								
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

594575/Exp. 05/31/2012  
LICENSE NUMBER

\$11,513,850.00  
AMOUNT

AUTHORIZED SIGNATURE

Shimmick Construction Company  
LOWEST RESPONSIBLE BIDDER



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit  
at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	NON-RESPONSIVE									
		RATE	AMOUNT		RATE	AMOUNT		RATE	AMOUNT		
<b>Steiny and Company</b> 221 N. Ardmore Ave Los Angeles, CA 90004 Phone: (213) 341-2149 Fax: (213) 382-0612											
ITEM NO. 11 - Bid Item Removed: Bid Item removed per Addendum No. 1 issued January 4, 2012.	Lump Sum	0	0								
ITEM NO. 12 - Repair of Existing Striping: Provide all labor, equipment, materials and incidentals necessary to repair approximately three thousand eight hundred (3,800) linear feet of... as specified and required for the unit price per linear foot of -	Unit Price	269.00	1,022,200.00								
ITEM NO. 13 - Repair of Existing Pavement Markings: Provide all labor, equipment, materials and incidentals necessary to repair approximately one hundred fifty five (155) existing markings, as specified and required for the unit price per each of -	Unit Price	134.25	20,808.75								
ITEM NO. 14 - Shore Power Outlet Vaults for Berth 90 (SPO 7, SPO 8 & SPO 9): Provide all labor, material, equipment and incidentals necessary to perform demolition and construction of shore to ship... as specified and shown for the lump sum price of -	Lump Sum	516,911.00	516,911.00								
ITEM NO. 15 - Shore Power Outlet Vaults for Berth 92 (SPO 4, SPO 5 & SPO 6): Provide all labor, material, equipment and incidentals necessary to perform demolition and construction of shore to ship... as specified and shown for the lump sum price of -	Lump Sum	516,911.00	516,911.00								
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**Shimmick Construction Company**  
LOWEST RESPONSIBLE BIDDER

594575/Exp. 05/31/2012  
LICENSE NUMBER

\$11,513,850.00  
AMOUNT

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**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	NON-RESPONSIVE			NON-RESPONSIVE			NON-RESPONSIVE			NON-RESPONSIVE		
		RATE	AMOUNT		RATE	AMOUNT		RATE	AMOUNT		RATE	AMOUNT	
ITEM NO. 16 - Shore Power Outlet Vaults for Berth 94 (SPO 1, SPO 2 & SPO 3): Provide all labor, material, equipment and incidentals necessary to perform demolition and construction of shore to ship... as specified and shown for the lump sum price of -	Lump Sum	516,911.00	516,911.00										
ITEM NO. 17 - Cut-Off Wall Plug/Penetrations: Provide all labor, material, equipment and incidentals necessary to perform demolition, coring and construction of four (4) cut-off wall plug... as specified and shown for the unit price per each of -	Unit Price	8,055.05	32,220.20										
ITEM NO. 18 - SPO "Dry Run" Cable Connection Support: Provide all labor, materials, tools, equipment and incidentals necessary to support approximately four (4) ship-side "dry"... as specified and directed by the Engineer for the unit price per each of -	Unit Price	1,250.00	5,000.00										
ITEM NO. 19 - Ship Testing and Commissioning: Provide all labor, materials, tools, equipment and incidentals necessary to support approximately four (4) ship-side commissioning... as specified and directed by the Engineer for the unit price per each of -	Unit Price	17,796.05	71,184.20										
ITEM NO. 20 - Transformer for Berth 90: Provide all labor, material, equipment, and incidentals required to furnish, install, test and commission the transformer(s) as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	707,440.00	707,440.00										
<b>TOTAL:</b>													
<b>CERTIFIED CHECK OR BOND:</b>													

Steiny and Company  
221 N. Ardmore Ave  
Los Angeles, CA 90004  
Phone: (213) 341-2149  
Fax: (213) 382-0512

594575/Exp. 05/31/2012  
LICENSE NUMBER

\$11,513,850.00  
AMOUNT

SHIMMICK CONSTRUCTION COMPANY  
LOWEST RESPONSIBLE BIDDER

AUTHORIZED SIGNATURE





**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	NON-RESPONSIVE		NON-RESPONSIVE		NON-RESPONSIVE		NON-RESPONSIVE		NON-RESPONSIVE	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
ITEM NO. 26 - Ductbanks and Raceways for Berth 90: Provide all labor, material, equipment and incidentals required to furnish and install the ductbanks and raceways as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	727,666.00	727,666.00								
ITEM NO. 27 - Ductbanks and Raceways for Berth 92: Provide all labor, material, equipment and incidentals required to furnish and install the ductbanks and raceways as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	777,400.00	777,400.00								
ITEM NO. 28 - Ductbanks and Raceways for Berth 94: Provide all labor, material, equipment and incidentals required to furnish and install the ductbanks and raceways as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	569,505.00	569,505.00								
ITEM NO. 29 - Conductors for Berth 90: Provide all labor, material, equipment and incidentals required to furnish, install and test the conductors as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	407,685.00	407,685.00								
ITEM NO. 30 - Conductors for Berth 92: Provide all labor, material, equipment and incidentals required to furnish, install and test the conductors as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	570,934.00	570,934.00								
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

Steiny and Company  
221 N. Ardmore Ave  
Los Angeles, CA 90004  
Phone: (213) 341-2149  
Fax: (213) 382-0612

NON-RESPONSIVE

**Shimmick Construction Company**  
LOWEST RESPONSIBLE BIDDER

594575/Exp. 05/31/2012  
LICENSE NUMBER

\$11,513,850.00  
AMOUNT

AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

NO. HD-S2342A

DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	NON-RESPONSIVE		NON-RESPONSIVE		NON-RESPONSIVE		NON-RESPONSIVE		NON-RESPONSIVE	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
Steiny and Company 221 N. Ardmore Ave Los Angeles, CA 90004 Phone: (213) 341-2149 Fax: (213) 382-0612											
ITEM NO. 31 - Conductors for Berth 94: Provide all labor, material, equipment and incidentals required to furnish, install and test the conductors as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	347,513.00	347,513.00								
ITEM NO. 32 - SPO Receptacles for Berth 90: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the SPO receptacles as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	259,726.00	259,726.00								
ITEM NO. 33 - SPO Receptacles for Berth 92: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the SPO receptacles as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	259,726.00	259,726.00								
ITEM NO. 34 - SPO Receptacles for Berth 94: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission the SPO receptacles as part of a complete system as specified and shown for the lump sum price of -	Lump Sum	259,726.00	259,726.00								
ITEM NO. 35 - All Other Electrical Work for Berth 90: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission all other electrical work for Berth 90 ... as specified and shown for the lump sum price of -	Lump Sum	660,975.00	660,975.00								
<b>TOTAL:</b>											
<b>CERTIFIED CHECK OR BOND:</b>											

**Shimmick Construction Company**  
LOWEST RESPONSIBLE BIDDER

594575/Exp. 05/31/2012  
LICENSE NUMBER

\$11,513,850.00  
AMOUNT

AUTHORIZED SIGNATURE



**ANALYSIS OF BIDS**  
**CITY OF LONG BEACH, HARBOR DEPARTMENT**

NO. HD-S2342A

DATE OPENED: January 31, 2012

**SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal**

ITEM	ESTIMATED QUANTITIES	NON-RESPONSIVE		AMOUNT		RATE		AMOUNT		RATE		AMOUNT	
		RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT		
<p>Slenny and Company 221 N. Ardmore Ave Los Angeles, CA 90004 Phone: (213) 341-2149 Fax: (213) 382-0612</p>													
ITEM NO. 36 - All Other Electrical Work for Berth 92: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission all other electrical work for Berth 92 ... as specified and shown for the lump sum price of -	Lump Sum	153,354.00	153,354.00										
ITEM NO. 37 - All Other Electrical Work for Berth 94: Provide all labor, material, equipment and incidentals required to furnish, install, test and commission all other electrical work for Berth 94 ... as specified and shown for the lump sum price of -	Lump Sum	223,576.00	223,576.00										
ITEM NO. 38 - Allowance for Load Bank Test Energy Usage: Provide all labor, materials, tools, equipment and incidentals necessary to reimburse the Tenant for energy... The limits and use of the Allowance shall be solely as directed by the Engineer -	Allowance	50,000.00	50,000.00										
ITEM NO. 39 - Stand-by Time: Provide all labor, equipment, materials and incidentals necessary to provide approximately twenty-five (25) hours of stand-by time for personnel and equipment, including, but not limited to... for the unit price per hour of -	Unit Price	805.52	20,138.00										
ITEM NO. 40 - Environmental Protection Plan (E.P.P.) Compliance: Provide all labor, equipment, materials and incidentals necessary to develop Environmental Protection Plan, including SWPPP (see Appendix... as specified and shown for the lump sum price of -	Lump Sum	75,928.00	75,928.00										
<b>TOTAL:</b>													
<b>CERTIFIED CHECK OR BOND:</b>													

**Shimmick Construction Company**      **594575/Exp. 05/31/2012**      **\$11,513,850.00**  
**LOWEST RESPONSIBLE BIDDER**      **LICENSE NUMBER**      **AMOUNT**  
 \_\_\_\_\_  
 AUTHORIZED SIGNATURE



# ANALYSIS OF BIDS CITY OF LONG BEACH, HARBOR DEPARTMENT

SPECIFICATIONS FOR: Pier A, Berths A88-A96, Shore to Ship Power Retrofit at Pier A Container Terminal

NO. HD-S2342A      DATE OPENED: January 31, 2012

ITEM	ESTIMATED QUANTITIES	STEINY AND COMPANY		AMOUNT		RATE		AMOUNT		RATE		AMOUNT	
		221 N. Ardmore Ave Los Angeles, CA 90004 Phone: (213) 341-2149 Fax: (213) 382-0612	NON-RESPONSIVE	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT		
ITEM NO. 41 - Schedule: Provide all labor, equipment, materials and incidentals necessary to develop and update all schedules complete as specified for the lump sum price of -	Lump Sum		20,000.00	20,000.00									
<b>TOTAL:</b>													
CERTIFIED CHECK OR BOND:			\$16,355,204.15										
			10% Bond										

**Shimmick Construction Company**  
 LOWEST RESPONSIBLE BIDDER      **594575/Exp. 05/31/2012**  
 LICENSE NUMBER      **\$11,513,850.00**  
 AMOUNT      AUTHORIZED SIGNATURE

Progress Payment No. 15

Period Ending: OCTOBER 1 THRU NOVEMBER 13, 2014

**PAYMENT DUE : 12-14-14**

Specification: HD-S2342A Shore to Ship Retrofit at Pier A, Berths A88-A96

Contractor: Shimmick Construction Company

LBHD Contract No: HD-7912  
Original Bid Amt:

\$11,513,850

Item No.	Item	Unit	Est. Qty.	Unit Price	Bid Amount	Qty This Month	A90 \$ Amount This Month	A92 \$ Amount This Month	A94 \$ Amount This Month	Previous Qty or %	% of Item Comp	TOTAL \$ Amount to Date
1	Mobilization and Demobilization	Lump Sum	1	130,000.00	130,000.00	0%	-	-	-	100%	100%	130,000.00
2	Site Specific Safety Plan	Lump Sum	1	15,000.00	15,000.00	0%	-	-	-	100%	100%	15,000.00
3	Asphalt Concrete Pavement Demolition	Lump Sum	1	150,000.00	150,000.00	0%	-	-	-	100%	100%	150,000.00
4	Soil Handling and Disposal of Surplus Soil	Tons	1100	10.00	11,000.00	-	-	-	-	862.43	78%	8,624.30
5	Soil Handling and Disposal of Non-Hazardous Waste	Tons	650	80.00	52,000.00	-	-	-	-	2,000.56	308%	160,044.64
6	Port Furnished Crushed Miscellaneous Base	Tons	2,650	15.00	39,750.00	-	-	-	-	2,137.65	81%	32,064.75
7	Asphalt Concrete Pavement	Tons	2,550	89.00	226,950.00	-	-	-	-	2,291.07	90%	203,905.23
8	8-Foot Chain Link Fence with Barbed Wire	LF	480	40.00	19,200.00	-	-	-	-	480.00	100%	19,200.00
9	Chain Link Gates	Lump Sum	1	15,000.00	15,000.00	0%	-	-	-	100%	100%	15,000.00
10	Pipe Bollards, 12-inch	Each	57	1,200.00	68,400.00	-	-	-	-	60.00	105%	72,000.00
11	Bid Item Removed	-	1	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	Repair of Existing Striping	LF	3,800	1.00	3,800.00	-	-	-	-	5,747.00	151%	5,747.00
13	Repair of Existing Pavement Markings	Each	155	50.00	7,750.00	-	-	-	-	148.00	95%	7,400.00
14	Shore Power Outlet Vaults for Berth 90 (SPO 7, SPO 8 & SPO 9)	Lump Sum	1	250,000.00	250,000.00	0%	-	N/A	N/A	100%	100%	250,000.00
15	Shore Power Outlet Vaults for Berth 92 (SPO 4, SPO 5 & SPO 6)	Lump Sum	1	250,000.00	250,000.00	0%	N/A	-	N/A	100%	100%	250,000.00
16	Shore Power Outlet Vaults for Berth 94 (SPO 1, SPO 2 & SPO 3)	Lump Sum	1	250,000.00	250,000.00	0%	N/A	N/A	-	100%	100%	250,000.00
17	Cut-Off Wall Plug/Penestrations	Each	4	7,000.00	28,000.00	-	-	-	-	4.00	100%	28,000.00
18	SPO "Dry Run" Cable Connection Support	Each	4	3,000.00	12,000.00	-	-	-	-	2.00	50%	6,000.00
19	Ship Testing and Commissioning	Each	4	15,000.00	60,000.00	-	-	-	-	3.00	75%	45,000.00
20	Transformer for Berth 90	Lump Sum	1	650,000.00	650,000.00	0.00%	-	N/A	N/A	100%	100%	650,000.00
21	Transformer for Berth 92	Lump Sum	1	650,000.00	650,000.00	0.00%	-	N/A	N/A	100%	100%	650,000.00
22	Transformer for Berth 94	Lump Sum	1	650,000.00	650,000.00	0.00%	-	N/A	-	100%	100%	650,000.00
23	Switchgear Assembly for Berth 90	Lump Sum	1	1,750,000.00	1,750,000.00	0.00%	-	N/A	N/A	100%	100%	1,750,000.00
24	Switchgear Assembly for Berth 92	Lump Sum	1	1,475,000.00	1,475,000.00	0.00%	N/A	-	N/A	100%	100%	1,475,000.00
25	Switchgear Assembly for Berth 94	Lump Sum	1	1,500,000.00	1,500,000.00	0.00%	N/A	N/A	N/A	100%	100%	1,500,000.00
26	Ductbanks and Raceways for Berth 90	Lump Sum	1	500,000.00	500,000.00	0%	-	N/A	N/A	100%	100%	500,022.00

Progress Payment No. 15  
 Period Ending: OCTOBER 1 THRU NOVEMBER 13, 2014  
**PAYMENT DUE : 12-14-14**  
 Specification: HD-S2342A Shore to Ship Retrofit at Pier A, Berths A88-A96  
 Contractor: Shimmick Construction Company

LBHD Contract No: HD-7912  
 Original Bid Amt: \$11,513,850

Item No.	Item	Unit	Est. Qty.	Unit Price	Bid Amount	Qty This Month	A80 \$ Amount This Month	A92 \$ Amount This Month	A94 \$ Amount This Month	Previous Qty or %	% of Item Comp	TOTAL Amount to Date
27	Ductbanks and Raceways for Berth 92	Lump Sum	1	450,000.00	450,000.00	0%	N/A	-	N/A	100%	100%	450,000.00
28	Ductbanks and Raceways for Berth 94	Lump Sum	1	325,000.00	325,000.00	0%	N/A	N/A	-	100%	100%	325,000.00
29	Conductors for Berth 90	Lump Sum	1	300,000.00	300,000.00	0%	-	N/A	N/A	100%	100%	300,000.00
30	Conductors for Berth 92	Lump Sum	1	300,000.00	300,000.00	0%	N/A	-	N/A	100%	100%	300,000.00
31	Conductors for Berth 94	Lump Sum	1	325,000.00	325,000.00	0%	N/A	N/A	-	100%	100%	325,000.00
32	SPO Receptacles for Berth 90	Lump Sum	1	100,000.00	100,000.00	0%	-	N/A	N/A	100%	100%	100,000.00
33	SPO Receptacles for Berth 92	Lump Sum	1	100,000.00	100,000.00	0%	N/A	-	N/A	100%	100%	100,000.00
34	SPO Receptacles for Berth 94	Lump Sum	1	100,000.00	100,000.00	0%	N/A	N/A	-	100%	100%	100,000.00
35	All Other Electrical Work for Berth 90	Lump Sum	1	475,000.00	475,000.00	0%	-	N/A	N/A	100%	100%	475,000.00
36	All Other Electrical Work for Berth 92	Lump Sum	1	70,000.00	70,000.00	0%	N/A	-	N/A	100%	100%	70,000.00
37	All Other Electrical Work for Berth 94	Lump Sum	1	105,000.00	105,000.00	0%	N/A	-	N/A	100%	100%	105,000.00
38	Allowance for Load Bank Test Energy Usage	Allowance	1	50,000.00	50,000.00	-	0	0	0	1%	1%	707.61
39	Stand-by Time	Hour	25	1,000.00	25,000.00	-	-	-	-	5	20%	5,000.00
40	Environmental Protection Plan (E.P.P) Compliance	Lump Sum	1	20,000.00	20,000.00	0%	-	-	-	100%	100%	20,000.00
41	Schedule	Lump Sum	1	5,000.00	5,000.00	0%	0	0	0	100%	100%	5,000.00
	<b>CHANGE ORDERS</b>											
	CHANGE ORDER #1	Lump Sum	1	2,660.13		0%	-	-	-	100%	100%	2,660.13
	CHANGE ORDER #2 - WORK											
	CHANGE ORDER #3L	Lump Sum	1	185,000.00		0%	-	-	-	100%	100%	185,000.00
	CHANGE ORDER #4	L	1	10,230.67			-	-	-	100%	100%	10,230.67
	CHANGE ORDER #5	Lump Sum	1	36,737.84			-	-	-	100%	100%	36,737.84
	CHANGE ORDER #6	Lump Sum	1	251,913.40			83,971.13	83,971.13	83,971.14	0%	100%	251,913.40
TOTALS				488,542.04	11,513,850.00	2.19%	\$ 83,971.13	\$ 83,971.13	\$ 83,971.14	97.82%	100%	\$ 11,992,257.57
	<b>NEW CONTRACT AMOUNT</b>			<b>12,002,392.04</b>								

Progress Payment No. 15  
 Period Ending: OCTOBER 1 THRU NOVEMBER 13, 2014  
**PAYMENT DUE : 12-14-14**  
 Specification: HD-S2342A Shore to Ship Retrofit at Pier A, Berths A88-A96  
 Contractor Shimmiick Construction Company

LBHD Contract No: HD-7912  
 Original Bid Amt: \$11,513,850

Item No.	Item	Unit	Est. Qty.	Unit Price	Bid Amount	Qty This Month	A90 \$ Amount This Month	A92 \$ Amount This Month	A94 \$ Amount This Month	Previous Qty or %	% of Item Comp	TOTAL \$ Amount to Date
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**SIGN HERE**



*Victor Sagredo*  
 Victor Sagredo  
 Project Manager

12/4/14  
 Date

**INITIAL HERE**



**SIGN HERE**



Suzanne C. Plezia P.E.  
 Director of Construction Management

Date

Gross Earnings:	\$ 11,992,257.57
Previous Payments:	\$ 11,670,247.87
Previous Retention:	\$ (70,096.32)
Earned This Period:	\$ 251,913.40
STOP NOTICE R J NOBLE \$13,310.88+25%	\$ (16,638.60)
Less Retention: E	\$ -
RELEASE STOP NOTICE R J NOBLE \$13,310.88+25%	\$ 16,638.60
AMOUNT DUE THIS ESTIMATE:	\$ 251,913.40

BFO No.	INDEX CODE	PROJ	PROJ DET	Subject Code
BPFA12000126	HACDCMCN	HA1314	1H2342A	210009

**ATTACHMENT B**  
**Prop 1B Shore Power Infrastructure Costs**

**Costs Accrued Per Berth - Pier A**

Contract Cost Category Description	Contract Cost Category No.	Corresponding Bid Item No.	Progress Payment No.													TOTAL TO DATE		
			1	2	3	4	5	6	7	8	9	10	11	12	13			
Mobilization and Demobilization	1	1	\$21,666.00															\$21,666.00
Chain-Link Fence and Gates	2	8, 9	\$43,333.33															\$43,333.33
Pipe Ballards	3	10	\$22,800.00															\$22,800.00
Pavement (including striping)	4	3, 7, 12, 13	\$79,500.00															\$79,500.00
Relocation of utilities	5	n/a	\$0.00															\$0.00
Transformers	6	22	\$650,000.00															\$650,000.00
Switchgear assembly(s)	7	25	\$1,500,000.00															\$1,500,000.00
Ductbanks and raceways	8	28	\$325,000.00															\$325,000.00
Conductors	9	31	\$100,000.00															\$100,000.00
SPO raceways	10	34	\$250,000.00															\$250,000.00
SPO vaults	11	15	\$700,000.00															\$700,000.00
All other electrical work	12	16	\$200,000.00															\$200,000.00
Commissioning and testing	13	38	\$1,400,000.00															\$1,400,000.00
Demolition	14	n/a	\$0.00															\$0.00
Soil, excavation, fill and waste handling	15	4, 5, 6	\$34,250.00															\$34,250.00
Other costs*	16	2, 3, 4, 17, 18	\$51,666.67															\$51,666.67
<b>Change Order #1</b>																		\$0.00
<b>Change Order #2</b>																		\$0.00
<b>Change Order #3</b>																		\$0.00
<b>Total Berth Cost</b>			\$4,337,950	\$467,654.10	\$33,745.24	\$219,403.23	\$385,647.32	\$697,706.58	\$372,716.57	\$1,459,418.11	\$43,548.11	\$43,548.11	\$39,018.11	\$194,171.11	\$194,171.11	\$547,848.11	\$126,680.30	\$4,351,848.13

Contract Cost Category Description	Contract Cost Category No.	Corresponding Bid Item No.	Progress Payment No.													TOTAL TO DATE		
			1	2	3	4	5	6	7	8	9	10	11	12	13			
Mobilization and Demobilization	1	1	\$21,666.00															\$21,666.00
Chain-Link Fence and Gates	2	8, 9	\$43,333.33															\$43,333.33
Pipe Ballards	3	10	\$22,800.00															\$22,800.00
Pavement (including striping)	4	3, 7, 12, 13	\$79,500.00															\$79,500.00
Relocation of utilities	5	n/a	\$0.00															\$0.00
Transformers	6	22	\$650,000.00															\$650,000.00
Switchgear assembly(s)	7	25	\$1,475,000.00															\$1,475,000.00
Ductbanks and raceways	8	27	\$450,000.00															\$450,000.00
Conductors	9	30	\$300,000.00															\$300,000.00
SPO raceways	10	33	\$100,000.00															\$100,000.00
SPO vaults	11	15	\$250,000.00															\$250,000.00
All other electrical work	12	16	\$700,000.00															\$700,000.00
Commissioning and testing	13	38	\$2,000,000.00															\$2,000,000.00
Demolition	14	n/a	\$50,000.00															\$50,000.00
Soil, excavation, fill and waste handling	15	4, 5, 6	\$34,250.00															\$34,250.00
Other costs*	16	2, 3, 4, 17, 18	\$51,666.67															\$51,666.67
<b>Change Order #1</b>																		\$0.00
<b>Change Order #2</b>																		\$0.00
<b>Change Order #3</b>																		\$0.00
<b>Total Berth Cost</b>			\$4,607,950	\$30,046.00	\$4,628.33	\$101,628.33	\$274,428.33	\$589,828.33	\$4,678.13	\$1,286,678.13	\$48,117.76	\$229,899.33	\$31,155.63	\$167,381.33	\$478,688.33	\$33,301.52	\$371,318.68	

Contract Cost Category Description	Contract Cost Category No.	Corresponding Bid Item No.	Progress Payment No.													TOTAL TO DATE		
			1	2	3	4	5	6	7	8	9	10	11	12	13			
Mobilization and Demobilization	1	1	\$21,666.00															\$21,666.00
Chain-Link Fence and Gates	2	8, 9	\$43,333.33															\$43,333.33
Pipe Ballards	3	10	\$22,800.00															\$22,800.00
Pavement (including striping)	4	3, 7, 12, 13	\$79,500.00															\$79,500.00
Relocation of utilities	5	n/a	\$0.00															\$0.00
Transformers	6	22	\$650,000.00															\$650,000.00
Switchgear assembly(s)	7	25	\$1,500,000.00															\$1,500,000.00
Ductbanks and raceways	8	28	\$325,000.00															\$325,000.00
Conductors	9	31	\$100,000.00															\$100,000.00
SPO raceways	10	34	\$250,000.00															\$250,000.00
SPO vaults	11	15	\$700,000.00															\$700,000.00
All other electrical work	12	16	\$200,000.00															\$200,000.00
Commissioning and testing	13	38	\$1,400,000.00															\$1,400,000.00
Demolition	14	n/a	\$0.00															\$0.00
Soil, excavation, fill and waste handling	15	4, 5, 6	\$34,250.00															\$34,250.00
Other costs*	16	2, 3, 4, 17, 18	\$51,666.67															\$51,666.67
<b>Change Order #1</b>																		\$0.00
<b>Change Order #2</b>																		\$0.00
<b>Change Order #3</b>																		\$0.00
<b>Total Berth Cost</b>			\$4,607,950	\$30,046.00	\$4,628.33	\$101,628.33	\$274,428.33	\$589,828.33	\$4,678.13	\$1,286,678.13	\$48,117.76	\$229,899.33	\$31,155.63	\$167,381.33	\$478,688.33	\$33,301.52	\$371,318.68	

Other costs*	1, 2, 3, 4, 11, 17, 18	15	\$51,666.67	\$1,488.00	\$740.33	\$740.33	\$740.33	\$740.33	\$740.33	\$740.33	\$4,240.33	\$5,700.33	\$18,571.96
Change Order #1													\$0.00
Change Order #2													\$0.00
Change Order #3													\$0.00
Total Berth Cost			\$3,567,950	\$34,625.00	\$6,573.33	\$176,377.33	\$31,773.33	\$0.00	\$1,706.13	\$0.00	\$37,472.27	\$0.00	\$18,571.96
Cost Breakdown													
Labor (S)			\$0.00	\$0.00	\$0.00	\$21,833.38	\$0.00	\$0.00	\$0.00	\$0.00	\$37,472.27	\$0.00	\$18,571.96
Labor (man-hours)			\$0.00	\$0.00	\$0.00	471.50	\$0.00	\$0.00	\$0.00	\$0.00	701.00	\$0.00	\$18,571.96
Materials			\$772.20	\$6,003.00	\$99,977.79	\$137,760.31	\$30,251.90	\$5,773.72	\$1,900,795.16	\$5,973.20	\$7,094.60	\$5,440.52	\$30,665.72
Equipment			\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1,230.52	\$0.00	\$4,087.29	\$0.00	\$153.06
Other			\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Actual Port Payment Amounts (Less Retentions)

Period Ending	Amount	Check No.	Retention Amount	Check No.	Paid Amount	Check No.	Retention Amount	Check No.	Paid Amount	Check No.	Retention Amount	Check No.	Retention Amount
8/30/2012	\$44,424.94	1010292	\$2,338.16	1010294	\$20,988.70	1010292	\$1,547.30	1010294	\$18,064.30	1010292	\$1,711.30	1010294	\$0.00
9/30/2012	\$12,057.98	1011437	\$1,887.26	1011438	\$4,396.61	1011437	\$231.42	1011438	\$3,844.66	1011437	\$331.67	1011438	\$0.00
10/30/2012	\$208,433.07	1017592	\$10,970.16	1017593	\$165,546.61	1017592	\$5,083.42	1017593	\$306,304.66	1017592	\$5,271.67	1017593	\$0.00
11/30/2012	\$366,364.85	1023063	\$19,382.37	1023064	\$165,706.92	1023063	\$8,721.42	1023064	\$162,554.66	1023063	\$4,813.67	1023064	\$0.00
12/31/2012	\$662,821.25	1027973	\$34,885.33	1027974	\$560,336.92	1027973	\$29,491.42	1027974	\$30,184.66	1027973	\$1,848.66	1027974	\$0.00
1/31/2013	\$347,294.20	1032258	\$18,636.85	1032259	\$4,396.91	1032258	\$231.42	1032259	\$4,204.66	1032258	\$328.66	1032259	\$0.00
2/28/2013	\$1,386,447.20	1037109	\$72,970.01	1037110	\$1,226,144.42	1037109	\$64,553.02	1037110	\$1,299,404.66	1037109	\$91,568.66	1037110	\$0.00
3/31/2013	\$89,225	1039225	\$2,177.40	1039226	\$456,102.38	1039225	\$24,005.39	1039226	\$6,244.66	1039225	\$328.67	1039226	\$0.00
4/30/2013	\$87,103.11	1043037	\$4,258.16	1043038	\$217,959.38	1043037	\$14,469.97	1043038	\$91,290.56	1043037	\$4,804.77	1043038	\$0.00
5/31/2013	\$37,087.21	1045348	\$1,950.90	1045349	\$29,976.00	1045348	\$1,577.43	1045349	\$198,950.44	1045348	\$10,471.08	1045349	\$0.00
6/30/2013	\$18,462.56	1051035	\$9,708.55	1051036	\$159,202.07	1051035	\$8,379.05	1051036	\$771,113.10	1051035	\$14,209.12	1051036	\$0.00
7/31/2013	\$500,455.71	1054083	\$27,392.40	1054084	\$450,877.91	1054083	\$23,330.42	1054084	\$473,445.15	1054083	\$24,916.12	1054084	\$0.00
8/31/2013	\$103,346.29	1059185	\$6,334.02	1059187	\$126,638.39	1059185	\$6,665.18	1059187	\$112,368.39	1059185	\$5,914.12	1059187	\$0.00
TOTAL	\$4,059,257.07		\$213,592.47		\$3,527,652.80		\$186,685.97		\$3,234,925.06		\$170,252.22		\$0.00
GRAND TOTAL			\$4,351,849.54		\$3,713,338.77		\$3,234,925.06		\$3,713,338.77		\$170,252.22		\$0.00

AO0

AO2

AO4









Contract No.	Contract Description	Item No.	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
13	Commissioning and testing	45, 46	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
14	Demolition	4	\$8,488.06	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
15	Soil, excavation, fill and waste handling	2, 5, 6, 7	\$67,641.20	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
16	Other costs*	3, 4, 3, 4, 4	\$19,219.67	\$262.07	\$1,048.31	\$611.52	\$988.94	\$611.52	\$7,788.07	\$279,608.21	\$167,154.86	\$117,932.76	\$ -	\$ -	\$645,284.00
Change order #1															
Change order #2															
Total Birth Cost			\$47,116,247.74	\$146,480.45	\$5,243,219	\$146,660.54	\$333,404.75	\$730,170.71	\$35,075.69	\$2,516,803.89	\$352,755.65	\$505,106.15	\$9,641.52	\$109,794.82	\$5,118,421.36
Cost Breakdown															
	Labor (\$)		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Labor (man-hours)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Materials		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Equipment		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Other		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

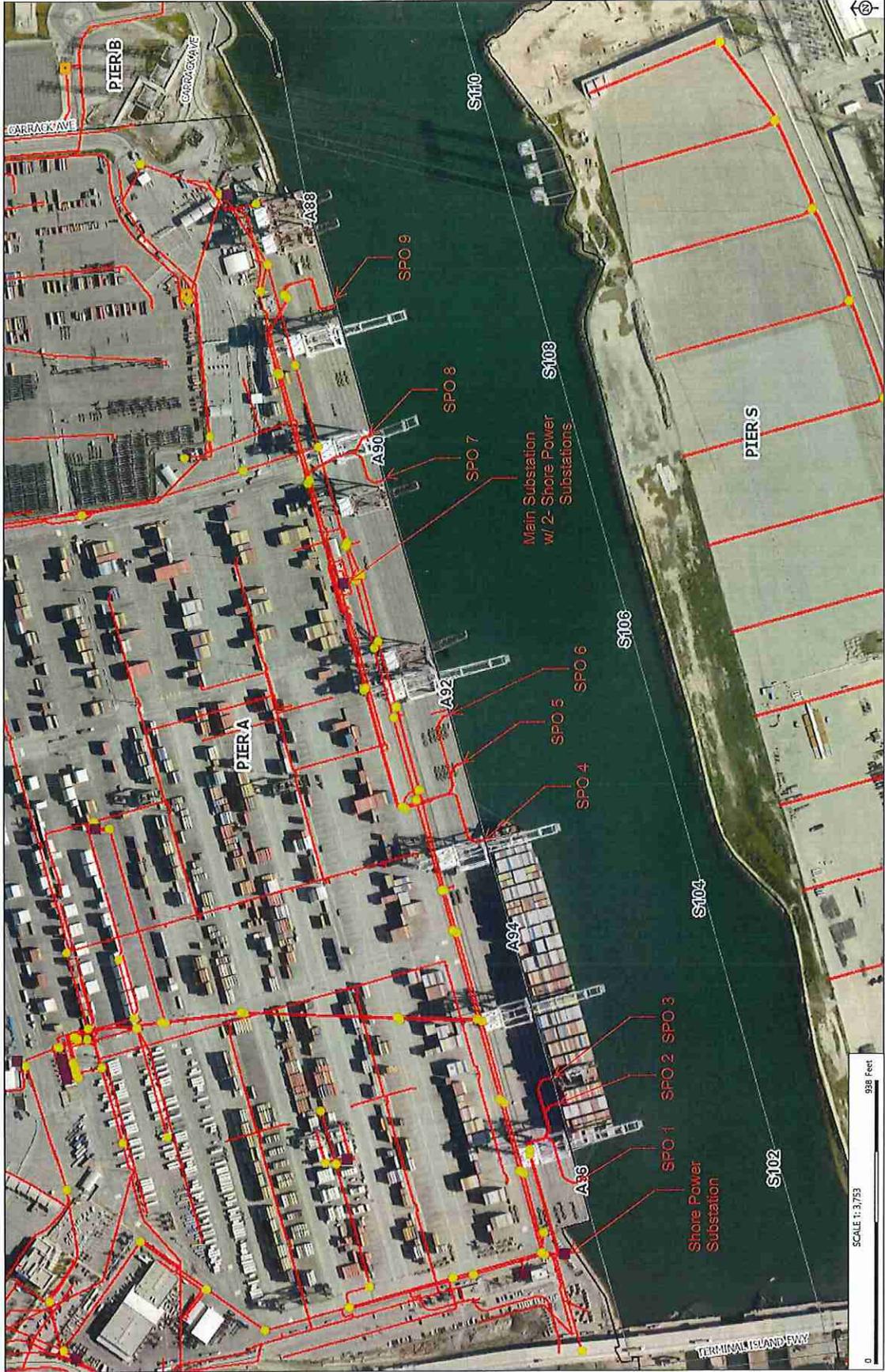
Contract No.	Contract Description	Item No.	Progress Payment No.												TOTAL	
			1	2	3	4	5	6	7	8	9	10	11	12		
1	Mobilization and Demobilization	1	\$290,829.61	\$145,131.50	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2	Chain-Link Fence and Gate	8, 9, 10	\$11,909.20	\$1,287.08	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
3	Pipe Bells	11, 12, 13	\$67,175.38	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4	Pavement (including striping)	4	\$37,178.71	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
5	Relocation of utilities	17	\$6,709.15	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
6	Transformers	18	\$709,933.23	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
7	Switchgear assembly(s)	18	\$8,930,255.79	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8	Ductbanks and raceways	26	\$349,501.61	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9	Conductors	30	\$413,138.96	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
10	SPO Receivers	34	\$226,959.79	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
11	SPO Vaults	n/a	\$0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
12	All other electrical work	38	\$86,714.11	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13	Commissioning and testing	45, 46	\$37,831.79	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
14	Demolition	4	\$8,408.06	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
15	Soil, excavation, fill and waste handling	2, 5, 6, 7	\$67,641.20	\$262.07	\$1,048.31	\$611.52	\$988.94	\$611.52	\$7,788.07	\$279,608.21	\$167,154.86	\$117,932.76	\$ -	\$ -	\$ -	
16	Other costs*	3, 4, 3, 4, 4	\$19,219.67	\$262.07	\$1,048.31	\$611.52	\$988.94	\$611.52	\$7,788.07	\$279,608.21	\$167,154.86	\$117,932.76	\$ -	\$ -	\$ -	
Change order #1																
Change order #2																
Total Birth Cost			\$5,271,899.30	\$146,480.45	\$5,243,219	\$146,660.54	\$333,404.75	\$730,170.71	\$35,075.69	\$2,516,803.89	\$352,755.65	\$505,106.15	\$9,641.52	\$109,794.82	\$5,118,421.36	
Cost Breakdown																
	Labor (\$)		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Labor (man-hours)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Materials		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Equipment		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Other		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Progress Payment No.	Period Ending	T132/134			T136			T138			T140				
		Amount	Check No.	Retention	Amount	Check No.	Retention	Amount	Check No.	Retention	Amount	Check No.	Retention		
1	8/31/2012	\$130,156.45	1013569	\$7,374.02	1013550	\$13,324.02	1013569	\$130,156.43	1013569	\$7,374.02	1013569	\$130,156.43	1013569		
2	9/30/2012	\$3,984.28	1017157	\$0.00	1017158	\$209.70	1017157	\$3,984.28	1017157	\$0.00	1017157	\$3,984.28	1017157		
3	10/31/2012	\$7,211.30	1018365	\$1,274.35	1018365	\$22,311.38	1018365	\$7,211.30	1018365	\$1,274.35	1018365	\$7,211.30	1018365		
4	11/30/2012	\$35,118.55	1025882	\$0,735.32	1025882	\$157,558.00	1025882	\$35,118.55	1025882	\$0,735.32	1025882	\$35,118.55	1025882		
5	12/31/2012	\$41,531.73	1027728	\$2,733.23	1027728	\$9,287.29	1027728	\$41,531.73	1027728	\$2,733.23	1027728	\$41,531.73	1027728		
6	1/31/2013	\$78,889.48	1032234	\$4,152.08	1032234	\$78,889.48	1032234	\$78,889.48	1032234	\$4,152.08	1032234	\$78,889.48	1032234		
7	2/28/2013	\$10,348.91	1038592	\$544.08	1038592	\$10,348.91	1038592	\$10,348.91	1038592	\$544.08	1038592	\$10,348.91	1038592		
8	3/31/2013	\$10,350.05	1042463	\$159.74	1042463	\$10,350.05	1042463	\$10,350.05	1042463	\$159.74	1042463	\$10,350.05	1042463		
9	4/30/2013	\$607,145.54	1046897	\$31,691.87	1046898	\$7,564,087.05	1046897	\$607,145.54	1046897	\$31,691.87	1046897	\$607,145.54	1046897		
10	5/31/2013	\$74,084.55	1052050	\$1,899.19	1052050	\$244,035.33	1052050	\$74,084.55	1052050	\$1,899.19	1052050	\$74,084.55	1052050		
11	6/30/2013	\$2,858,522.08	1059654	\$150,448.43	1059654	\$412,174.36	1059654	\$2,858,522.08	1059654	\$150,448.43	1059654	\$2,858,522.08	1059654		
12	9/30/2013	\$796,744.51	1069922	\$42,408.14	1069922	\$533,494.96	1069922	\$796,744.51	1069922	\$42,408.14	1069922	\$796,744.51	1069922		
TOTAL		\$5,228,172.45		\$275,641.15		\$4,466,367.42		\$5,228,172.45		\$275,641.15		\$4,466,367.42		\$5,228,172.45	
GRAND TOTAL		\$5,503,813.61		\$4,712,262.52		\$4,712,262.52		\$5,503,813.61		\$4,712,262.52		\$4,712,262.52		\$5,503,813.61	

**ATTACHMENT C**  
**Maps of Container Terminal Shore Power Infrastructure**

# Port of Long Beach

- Legend**
- Electric Junction
  - Maintenance Hole
  - Substation
  - Transformer
  - Electric Meter
  - Active Electric Line
  - Abandoned Electric Line
  - P.O.L.B Roads
  - Railroad Track
  - Pierhead Line
  - Piers



SCALE 1:3,753  
0 938 Feet

**Disclaimer:**  
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Author / Notes:

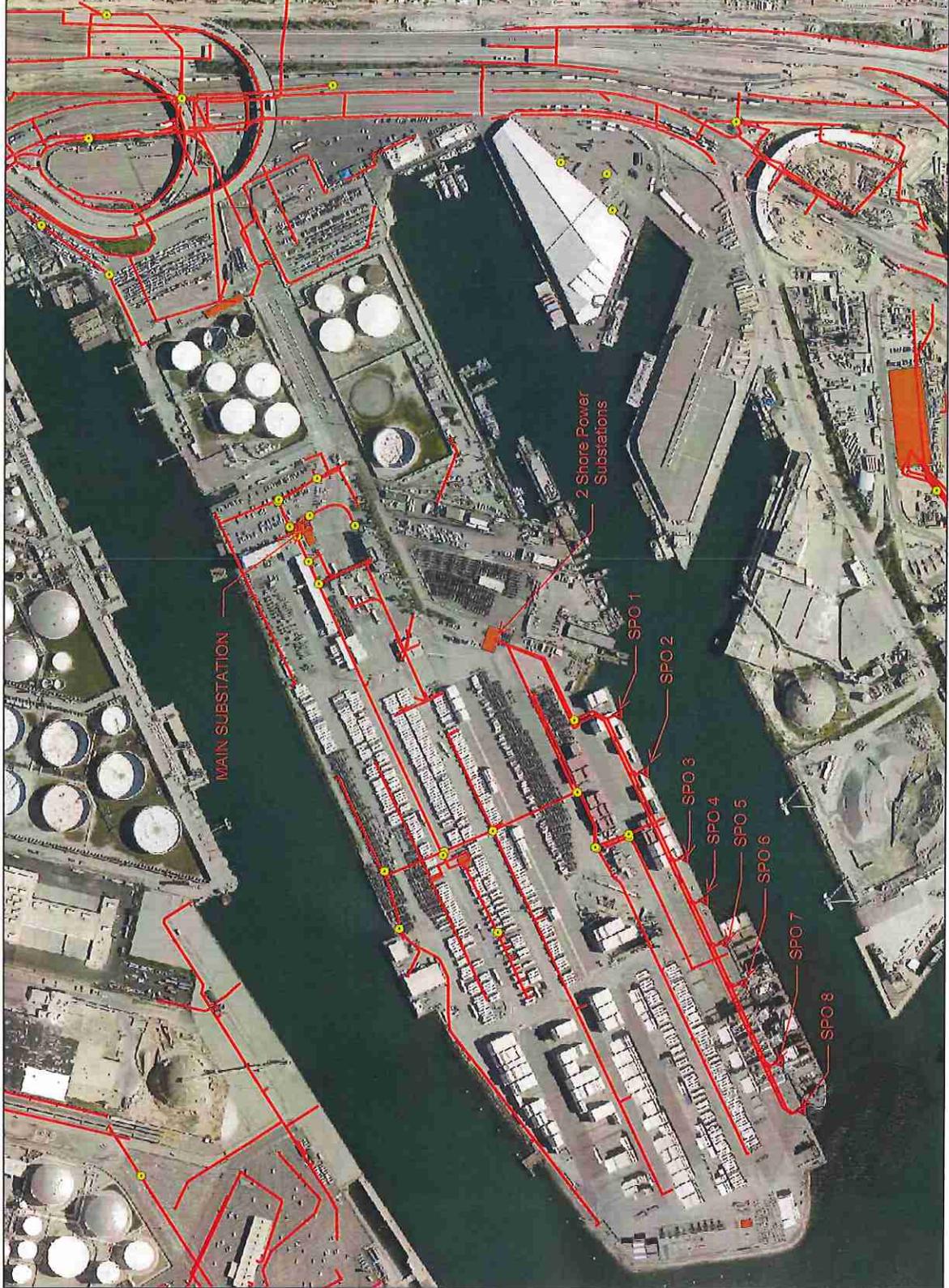
# PORT OF LONG BEACH PIER C



- Maintenance Hole
- ▲ Shore Power Outlet
- ★ Transformer
- Active Electric Line
- Substation

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**Aerial Photo:** This is a proprietary dataset provided courtesy of the Los Angeles Region Imagery Acquisition Consortium (LAR-IAC), Eagle View Technologies, Inc. Use other than what is allowable under license or by written permission from Eagle View Technologies, Inc. will be considered unauthorized and may be punishable by law. Permission for external use may be given with written permission from Eagle View Technologies, Inc.



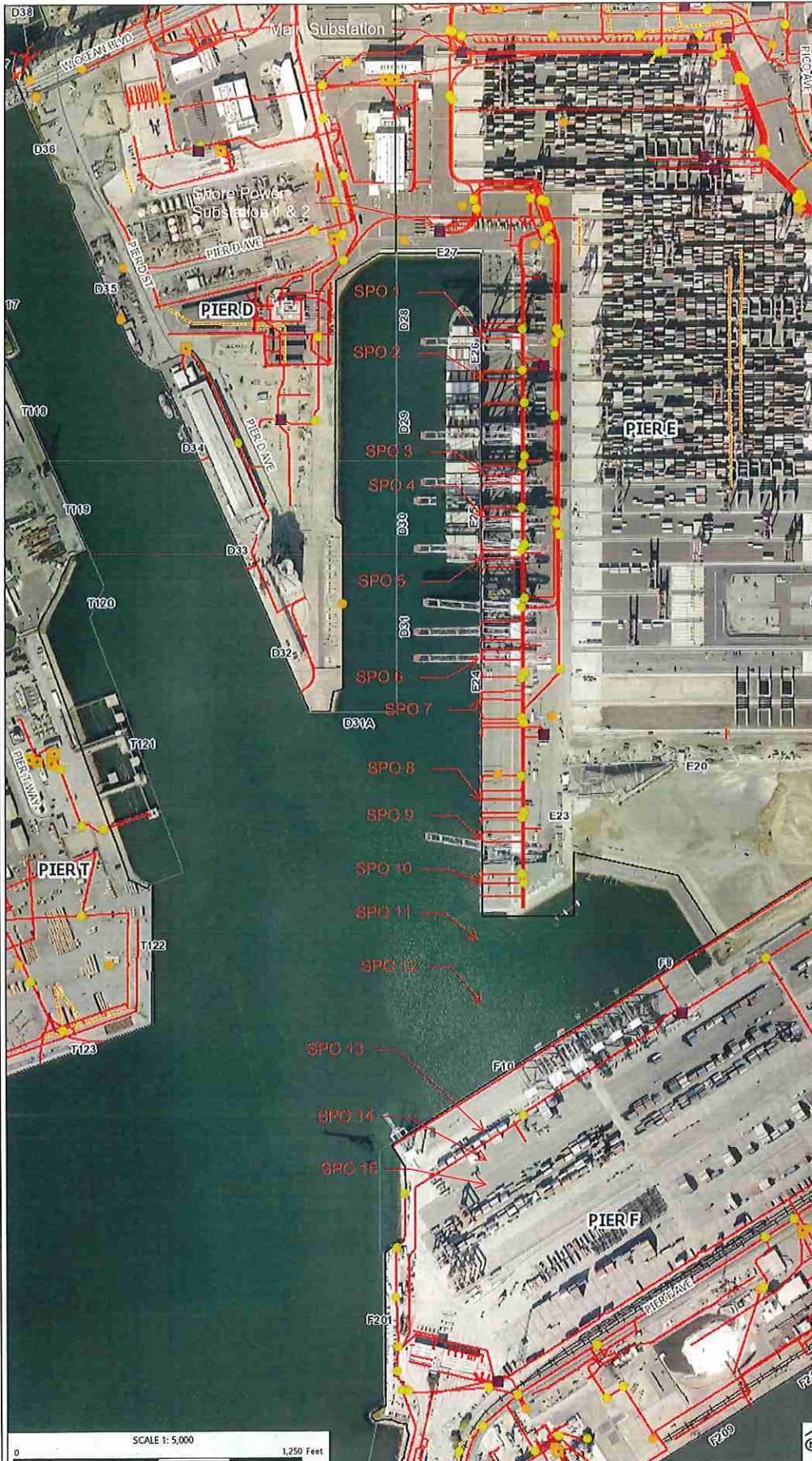
# Port of Long Beach

Port ATLAS

Port of LONG BEACH  
The Green Port

## Legend

- Electric Junction
- Maintenance Hole
- Substation
- Transformer
- Electric Meter
- Active Electric Line
- Abandoned Electric Line
- POLB Roads
- Railroad Track
- Pierhead Line
- Piers



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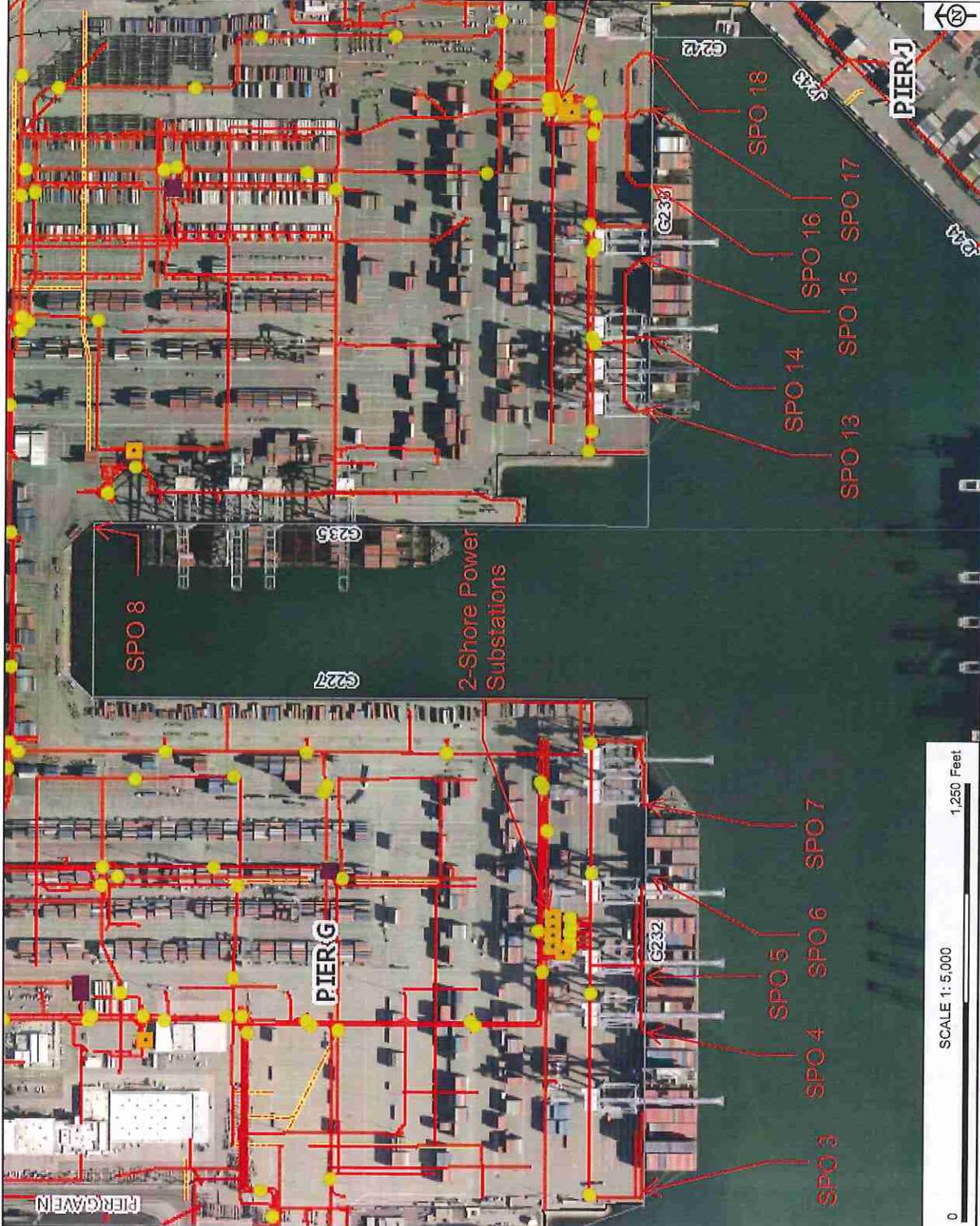
SPOs 11 thru 15 on  
Phase 3 not complete

# Port ATLAS

Port of LONG BEACH  
The Green Port

## Legend

- Electric Junction
- Maintenance Hole
- Substation
- Transformer
- Electric Meter
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- Abandoned Electric Line
- POLB Roads
- Railroad Track
- Pierhead Line
- Piers



2-Shore Power Substations

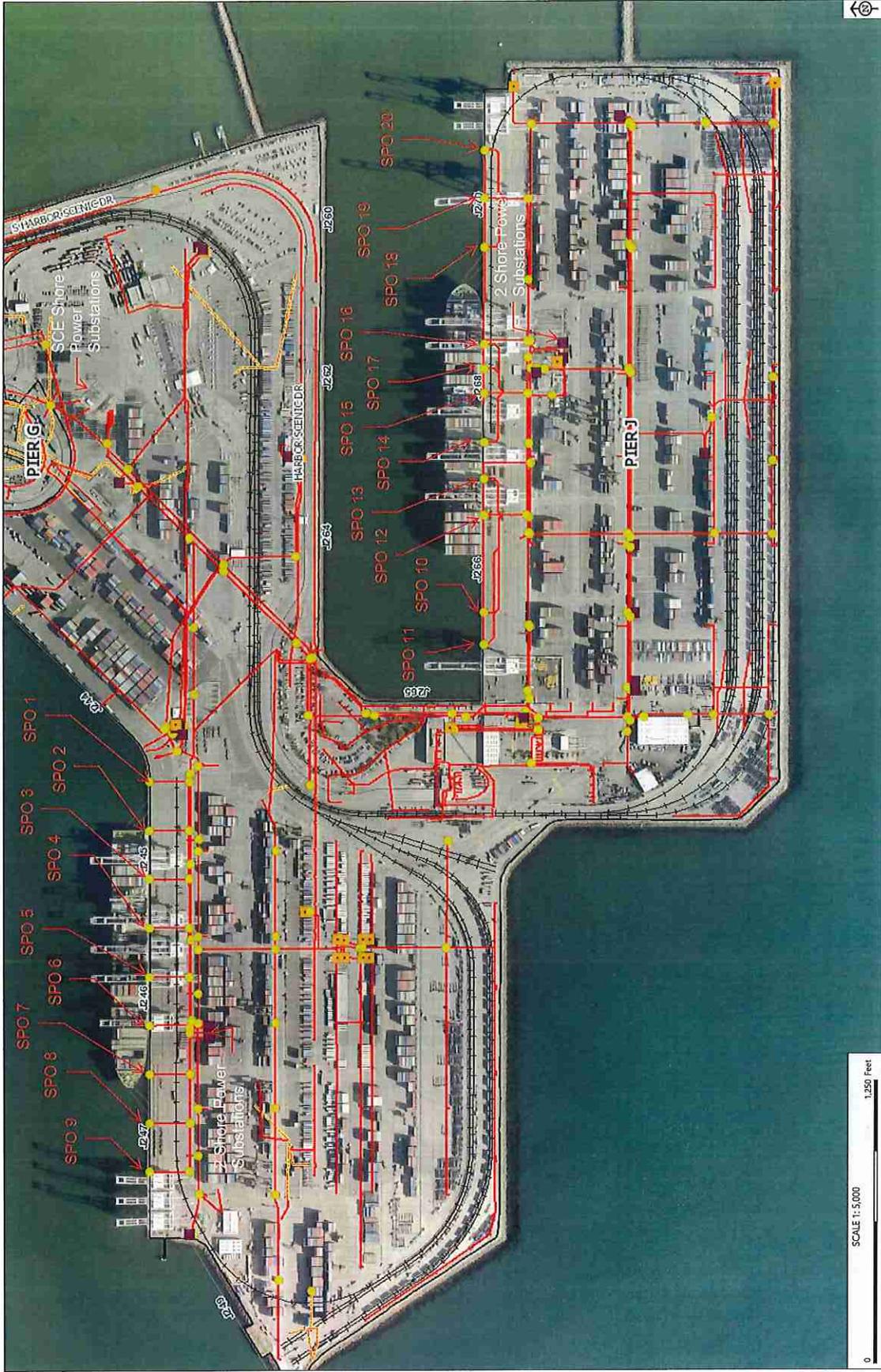
2-Shore Power Substations

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# Port of Long Beach

- Legend**
- Electric Junction
  - Maintenance Hole
  - Substation
  - Transformer
  - Electric Meter
  - Active Electric Line
  - Abandoned Electric Line
  - POLB Roads
  - Railroad Track
  - Pierhead Line
  - Piers



0 SCALE 1:5,000 1,250 Feet

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Author / Notes:

# Port of Long Beach

- Legend**
- Electric Junction
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**ATTACHMENT D**  
**Port of Long Beach Vessel Visits by Berth**

Container Vessel Visits Subject to the New At-Berth and At Anchor Regulation

ITS		LBCT		Pacific Container Terminal		SSA Terminals Pier A		SSA Terminals Pier C		TTI	
Berth	Visits	Berth	Visits	Berth	Visits	Berth	Visits	Berth	Visits	Berth	Visits
G232		53 E24		34	J245 (includes reefer)	52	A92	43	C60	1 T132	
G235		25 E26		49	J265	65	A94	104	C62	81 T134	1
G256		68 FS		19	J270	21	A96				124
										82 T136	55
Total Visits	146	Total Visits	102	Total Visits	138	Total Visits	225			T138	12
										T140	43
										Total Visits	235

RoRo Vessel Visits Subject to the New At-Berth and At Anchor Regulation			
Toyota Logistics		SSA-Crescent	
Berth	Visits	Berth	Visits
B83	104	F204	3
<b>Total Visits</b>	<b>104</b>	F205	44
		F207	60
		<b>Total Visits</b>	<b>104</b>

<b>Tanker Vessel Visits Subject to the New At-Berth and At Anchor Regulation</b>					
<b>Tesoro Pier B</b>		<b>Tesoro Pier T</b>		<b>Chemoil</b>	
Berth	Visits	Berth	Visits	Berth	Visits
B77	6	T121	204	F209	65
B78	65	<b>Total Visits</b>	<b>204</b>	<b>Total Visits</b>	<b>65</b>
B84	4				
B84A	76				
B86	49				
<b>Total Visits</b>	<b>200</b>				

Comments on Revised Draft Regulatory Concept, April  
10, 2019



April 10, 2019

Bonnie Soriano  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Subject: Comments on Revised Draft Regulatory Concept

Dear Ms. Soriano:

Thank you for the opportunity to provide comments on the updated regulatory concepts for the At-Berth Regulation Amendments. The industry coalition appreciates that in revising the regulatory concepts staff was attempting to address issues raised on the original regulatory concept, such as redundancy and control over unforeseen events. Unfortunately, as described below, the proposed concept does not fundamentally address these flaws. As one example, responsibility for matters beyond a carrier's control, such as weather, are not addressed but laid at the feet of terminal operators.

*Industry Proposal*

The industry coalition proposal submitted for CARB's consideration addresses all of the issues described below. The proposal submitted is consistent with the emissions reduction goals set by CARB staff proposal, streamlines compliance methodologies for currently regulated fleet, expands regulatory framework to include reporting requirements and evaluation benchmarks for currently unregulated vessels, and creates new compliance and reporting requirements for ports and marine terminal operators. In light of the issues raised below, we urge CARB staff to re-examine the industry proposal that avoids the problems discussed and meets the goals outlined by CARB staff.

*Requirements in 2020*

The industry coalition remains concerned that the current proposal does not address immediate implementation issues with the current regulation. As has been previously discussed with CARB staff, the existing At-Berth regulation has fundamental problems that makes compliance beginning in 2020 likely impossible. The maritime industry has been raising issues with the structure of the existing rule for several years and has requested amendments to address those concerns. CARB staff have partially addressed those concerns by issuing multiple advisories. But now that the opportunity exists to fully address issues with the existing rule and eliminate the use of the advisories, the draft proposal does not contain any provisions to address the failings of the existing rule in 2020. CARB's first priority should be to address the current failings of the existing rule before expanding the rule.

### *Infrastructure*

We appreciate the effort undertaken by CARB staff to evaluate the necessary infrastructure to support the proposed regulatory concept. This analysis is a necessary step in understanding the impact of the proposed concept. Unfortunately, the analysis raises a number of concerns.

The analysis is inconsistent with the analysis prepared by the ports of Long Beach and Los Angeles. In a separate comment letter dated February 6, 2019, the two ports provide an analysis that demonstrates that an additional \$200 million dollars of infrastructure would be necessary to under the original regulatory concept. Yet, the ports conclude, that investment would not ensure 100% compliance. While the updated regulatory concept does create a five percent allowance for terminal incident events, there is no demonstration that such an allowance would obviate the need for additional infrastructure as the CARB analysis essentially finds.

The analysis was based on discussions with terminal operators, but it does not appear that the discussion was based on the detailed requirements of the revised regulatory concept. Discussions with terminal operators following the CARB workshops indicated that their response to discussions with CARB staff was based on their “we will make it work” culture that defines stevedoring. The specifics of the regulatory proposal have given several terminal operators pause about their ability to meet the requirements.

This is not surprising giving the outstanding issues already being experienced as described in CARB’s latest enforcement report on the At-Berth Regulation (2017 Annual Enforcement Report, June 2018). The report identified 327 instances that Scenario 1 (Equipped vessel not able to receive power from shore) were used in 2015 and another 284 instances in 2016, the most recent year that CARB has published data. Yet, CARB’s analysis for container terminals found additional vaults are needed at only one terminal and only one shared barge-based emission control. It is inconceivable that such little infrastructure would be necessary when existing infrastructure is already strained beyond existing needs.

### *Redundancy*

When CARB staff released their original regulatory concept, the industry coalition raised concerns regarding the redundancy of infrastructure required by the regulatory concept. One of the primary concerns was that of infrastructure redundancy. The original At-Berth Regulation required the investment in shore power as means of compliance. The original rule only allowed alternative technologies if they were adopted early. As no alternative technologies were available within the constraints of the original rule, industry made an investment totaling billions of dollars in supporting shore power. It is important to note that this investment is ongoing.

There is no dedicated California vessel fleet. Vessels are regularly moved into and out of California service to meet the needs of vessel maintenance and changing trade flows. As a result, shore power

equipment must be retrofitted onto vessels entering California service. In addition, shoreside infrastructure requires ongoing investment in the form of costly maintenance.

As a result of these sunk and ongoing costs, a regulatory requirement that would force carriers and terminal operators to maintain new and additional equipment to remain in compliance is concerning. The original regulatory concept, in essence, required back up control equipment throughout California ports. In the long-term, this would likely necessitate the abandonment of shore power in favor of capture and control systems. While capture and control systems are less than preferable from both an economic and environmental perspective, offering less emissions control (and increased greenhouse gas emissions) for higher costs, the flexibility offered is likely the means of remaining in compliance while only supporting a single control technology pathway.

#### *TIEs and Redundancy*

The revised regulatory concept attempts to resolve the redundancy issue through the introduction of a concept termed “Terminal Incident Events” (TIEs). While TIEs would provide a five percent buffer in some situations, it does not eliminate the need for redundant equipment. It has not been demonstrated that a terminal can remain in compliance within the five percent margin provided by TIEs. The data available, such as CARB’s most recent enforcement report and the analysis conducted by the ports of Long Beach and Los Angeles, would indicate that a five percent margin is an insufficient margin. It is quite possible that all TIEs would be used simply managing scheduling problems that arise from weather, prior port delays, and unscheduled vessels calls that would impact berth assignments and ability to reach a shore power outlet. As a result, if industry always wants to ensure compliance (which we expect is CARB’s goal), industry will need to begin investing in alternative technologies.

As previously mentioned, supporting shore power requires ongoing investment, as a result of needed maintenance and vessel redeployments. If the amended At-Berth Regulation requires the investment in alternative technologies, the industry will likely gravitate over time to the technology that provides greater flexibility. While this is more expensive than shore power alone, it would be more cost-effective than supporting both pathways simultaneously, likely resulting in less reductions of criteria and toxic pollutants and an increase in greenhouse gas emissions. Simply put, a five percent margin cannot ensure the industry can remain in compliance with the proposed regulatory concept and would necessitate the investment of a redundant technology control pathway.

#### *TIEs are an Inadequate Substitute for Vessel or Terminal Checklist Approaches*

TIEs are an unworkable solution to the problem of inadequate infrastructure. The terminal operator typically has no control over the issues that impact berth availability. The terminal operator will plan vessel berth assignments around schedules provided by the ocean carrier. The vessel schedule can be impacted by issues outside the vessel and/or terminal’s control:

- Vessel delayed arrival due to weather
- Vessel delayed arrival due to prior port delays

- Vessel early arrival due to quicker turnaround at prior ports
- Vessel departure delay due to the union dispatching insufficient labor
- Vessel arrival/departure delay due to tide
- Unscheduled vessel arrival (extra loaders)

None of these factors are within the control of the terminal operator in any fashion, yet the terminal operator would be liable in each of these circumstances for the number of chance occurrences that impact their facility in addition to the 5% TIE buffer. One of the fundamental problems of the existing At-Berth Regulation is that it holds ocean carriers responsible for issues outside their control. CARB's draft regulatory concept does not resolve this issue. The concept turns the issue on its head and holds terminal operators accountable for issues outside their control. Questions of enforceability plague the existing rule as a result of these issues. TIEs only shift this problem to terminal operators.

In addition, TIEs ignore the relationship that landlords/port authorities may have with terminals in ensuring a proper connection. In several ports, port staff are responsible for providing power, energizing the shore power connection, and maintaining infrastructure. TIEs ignore this fundamental relationship and place responsibility solely with the terminal operator with the expectation that can manage other, independent entities. As an example, if a port is responsible for maintaining shore power infrastructure and there is an equipment failure, it will be the port's responsibility to conduct repairs. The terminal operator has no ability to influence the speed of its public works contracting process or establish a schedule for repairs. Yet, the draft regulatory concept would hold the terminal operator responsible for this equipment failure. Should an equipment failure occur after a terminal has exhausted its annual TIE allocation, the terminal would be non-compliant as a result of actions by others – an untenable situation.

In a similar situation, CARB proposes to hold terminal operators accountable for the commissioning requirements established by port authorities. Terminal operators would not have any control if vessels, after their first visit, make changes to their electrical equipment that would trigger a port authorities' requirements for re-commissioning. Likewise, a port authority may modify shoreside equipment that necessitates re-commissioning. In these instances, CARB is proposing to hold terminal operators accountable for the actions of others.

Finally, TIEs constrain a terminal operator's ability to grow. Terminal operators compete vigorously for cargo. The decision of a single ocean carrier can result in the shift of dozens of vessel calls between terminals. The ability of terminal operator to capture business will be directly constrained by basing their number of TIEs to a prior year's cargo volume. This is particularly true when so many reasons that a terminal operator would use a TIE are for events outside their ability to control or influence.

#### *Need for Flexibility*

The revised draft regulatory concept still does not incorporate any meaningful flexibility for ocean carriers. Ocean carriers must regularly make changes to vessels serving California. The worldwide

container fleet is not retrofitted for shore power. A vessel substitution due to maintenance needs or changing trade flows would likely mean a replacement with a vessel that does not support shore power. An ocean carrier needs time to make the replacement vessel ready to connect to shore power. Unfortunately, without a massive shift away from electrification toward alternative technologies, alternative technologies are not a viable solution for the long-term and have a number of drawbacks. The alternative technology is substantially more expensive at its current level of utilization and is expected to become more expensive as the use of shore power increases and the number of alternative technology users supporting high fixed costs drop. The very large container and cruise vessels cannot use the current alternative technology due to the particular structure and constraints of those vessels, leaving those vessels without a viable alternative to shore power. In addition, the technology, whether barge-based or land-based increases greenhouse gas emissions in all cases. Finally, to facilitate peak events (such as extra loaders), there may be a need for a dozen such systems that sit idle most of the year – there is no way to capitalize such an investment with no prospect of return. Rather than pinning regulatory success on such technology, CARB should revise the proposal in a way that recognizes the dynamic nature of international trade and develop an approach consistent with the principles laid out in the industry proposal.

#### *Responsibilities Under the Proposed Regulatory Concept*

The coalition of maritime industries strongly disagrees with an approach that establishes an indirect source rule (ISR) for the At-Berth Regulation, making terminal operators responsible for the emissions of third-party vessel operators that call their facilities. CARB staff has stated that their intention was not to develop an ISR but was to establish requirements to facilitate additional infrastructure. The proposed regulatory concept does not do this. Instead, it makes terminal operators directly liable for emissions from vessels.

In making terminal operators liable for vessel emissions, the proposed regulatory concept makes terminal operators liable for issues outside their control, such as weather, delays at other ports, and schedule changes by ocean carriers. Infrastructure, by its nature, is limited. While a terminal operator can ensure that vessels are connected based on a pro forma schedule for a given set of vessels, schedule, and infrastructure, if any of those parameters change the terminal operator may no longer be able to complete a connection. If arriving vessels are delayed due to weather or delays at a prior port by even a couple of hours, the terminals infrastructure is immediately impacted. Similarly, if ocean carriers add a one-time vessel service to respond to changing trade flows, that will immediately impact a terminal operators infrastructure availability – something that the terminal operator was unable to plan for. Despite the fact that scheduling impacts have been raised as a primary reason why shore power connections are unable to be made (particularly at ports constrained by tight tide windows), the proposed regulatory concept ignores the issue and places responsibility on the terminal operator.

#### *Conclusion*

The draft concept commits the same error of the original At-Berth Regulations by holding parties responsible for issues outside their control. As a result of the dilemma that such responsibility poses,

the draft concept requires significant investment in redundant technology as the only means that carriers and terminal operators can ensure regulatory compliance at all times. Finally, the proposed concept provides no accommodation for the known variability in international trade that occurs regularly. With no means of accommodating the changing vessel fleet, ocean carriers are left to rely on alternatives that do not exist or where they do are unreliable in their availability. The industry proposal submitted to CARB addresses all of these concerns, achieves the emission reductions that CARB is seeking, and does not require the complexity of the proposed concept. We look forward to continuing to work with you on the development of the regulatory amendments.

Sincerely,

***California Association of Port Authorities  
Pacific Merchant Shipping Association***

***Cruise Lines International Association  
Western States Petroleum Association***

Industry Coalition Alternative Proposal for Amendments  
to At-Berth Regulations, February 15, 2019



**WSPA**

**WORLD SHIPPING COUNCIL**  
PARTNERS IN AMERICA'S TRADE

February 15, 2019

Cynthia Marvin  
California Air Resources Board  
*Delivered via email to [Cynthia.marvin@arb.ca.gov](mailto:Cynthia.marvin@arb.ca.gov)*

**Re: Alternative Proposal for Amendments to At-Berth Regulations**

Dear Ms. Marvin:

Thank you and all of the ARB staff for giving us the opportunity to develop an Alternative Proposal for moving forward with Amendments to the At-Berth Regulations for Oceangoing Vessels. We are pleased to present this Alternative Proposal to you today.

As you and your team are well aware the existing regulations on vessels at-berth within the container, cruise, and refrigerated sectors of the maritime industry have resulted in significant levels of emissions reductions well in excess of predictions, created a tremendous and globally unprecedented level of private and public investment in vessel fleets and on-shore cold-ironing infrastructure, and the rule is still being phased-in, with even stricter compliance on the horizon starting in 2020.

The Alternative Proposal builds on this strong foundation to increase compliance and expand the current rule into currently unregulated sectors. It consists of provisions meant for immediate action to address compliance issues for currently regulated fleets and outlines the next steps necessary to evaluate the basis upon which additional investments may or may not be justified in addressing the emissions of vessels while at berth.

The Alternative Proposal is a true compromise document that took two months of negotiation amongst all the parties to craft. It represents a result that is as close to consensus as possible about the best way to boost and improve compliance within the existing regulations and set a true foundation for a discussion on how, if, and when to further reduce emissions from vessels at-berth in the near future. As a true compromise document, none of our signatory organizations or their memberships agree with every aspect of the Proposal, but all of the signatory organizations commit their resources and attention to working with CARB to improve the current regulation for existing regulated fleets and facilitate the process for evaluating future rule expansions consistent with the principles described here.

We very truly look forward to immediately improving the current rule and working to achieve the most cost-effective and successful future emissions reductions from the waterfront as possible.

Sincerely,  
***California Association of Port Authorities  
Pacific Merchant Shipping Association  
World Shipping Council***

***Cruise Lines International Association  
Western States Petroleum Association***



## 2019 At-Berth Regulation - Alternative Proposal

### Executive Summary

All signatory parties to this Alternative Proposal share the California Air Resources Board (CARB) goal of reducing health impacts related to waterborne-related goods movement emissions impacting local residents. We would like to thank CARB staff for the opportunity to develop the following Alternative Proposal as we are moving forward with Amendments to the At-Berth Regulations for Oceangoing Vessels and are pleased to present the following.

Existing at-berth regulations have resulted in significant emissions reductions well in excess of original agency projections. This success has resulted from the collaboration of many key public and private stakeholders, and has included an unprecedented level of worldwide investment in vessel fleets and shore-side power infrastructure. This Alternative Proposal establishes additional compliance procedures for the current Shore Power Rule as the last emission reduction target is reached in 2020, while offering a path forward toward potential increased emission reductions from existing and new vessel classes in the years to follow.

### **Highlights**

- Requires that every shorepower-equipped vessel plug-in while at a berth which is able to provide shoreside power to that vessel;
- Is consistent with the emissions reductions goals set by CARB staff proposal;
- Improves and streamlines compliance methodologies for currently regulated fleet;
- Expands regulatory framework to include reporting requirements and evaluation benchmarks for currently unregulated vessels;
- Creates new compliance and reporting requirements for ports and marine terminal operators;
- Establishes a feasibility and cost-effectiveness framework for evaluating potential new shore power requirements and infrastructure needs;
- Reinvests non-compliance fees in new Port infrastructure or waterfront emissions reductions; and
- Establishes prioritization dialogue for investment of private and state Incentives dollars.

This Alternative Proposal builds on California's strong regulatory foundation for reducing vessel emissions while at berth. It outlines a program that will increase compliance and bring currently unregulated vessels into the regulatory framework.

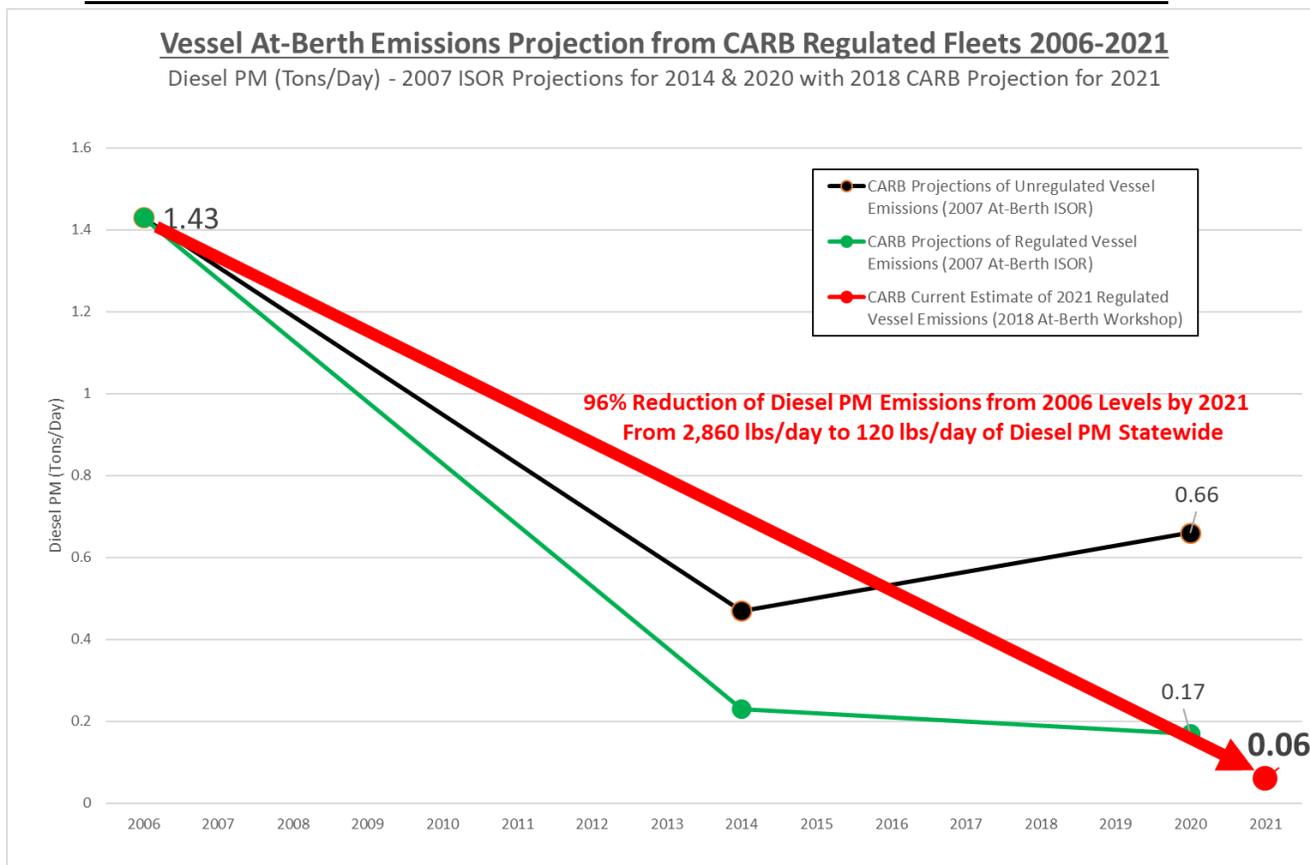
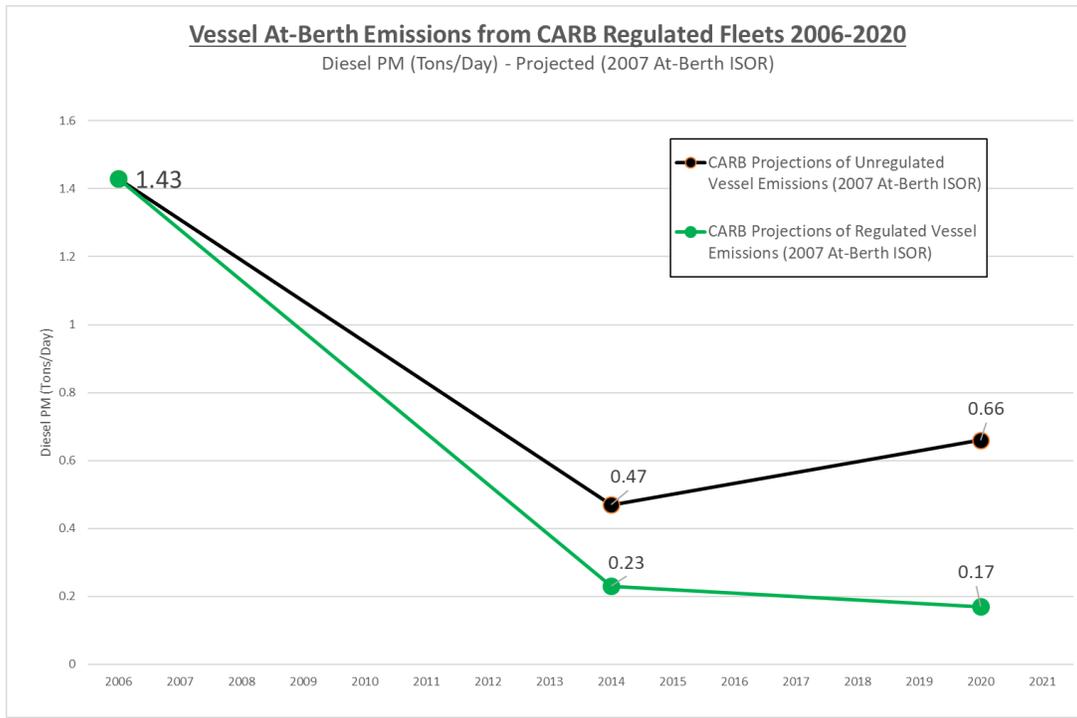
All of the signatory parties commit to continuing this dialogue and to serious consideration of amendments to create and perfect an achievable rule and set of standards that meet the needs of industry, the state, and local public health interests.

## **Background – Current Regulatory Benefits and Industry Achievements**

***CARB currently administers the world's most comprehensive At Berth ocean-going vessel regulation.*** At the time of its adoption this rule was predicted to result in tremendous, unprecedented air quality benefits and also billions of dollars of new investments in vessel and port electrical infrastructure. Under the current At-Berth regulation, CARB staff estimated (in the original 2007 ISOR) that:

- "... the proposed regulation would reduce hoteling diesel PM and NOx emissions from container ships, passenger ships, and refrigerated cargo ships by 50 percent and 75 percent relative to levels expected to be emitted in 2014 and 2020, respectively." (pg. 14)
- "...approximately 1,100 tons of diesel PM and 61,700 tons of NOx will be removed from California's air between 2006 and 2020 due to the implementation." (pg. 15)
- "For the container-ship category, the regulatory period is 2009-2030 to account for ship turnover. Total emissions reductions to 2030 are 2,600 tons of diesel PM and 140,000 tons of NOx." (pg. 16, Table 4)
- "In addition, hoteling CO2 emissions are expected to be reduced by 122,000 to 242,000 metric tons in 2020." (pg. 14)
- "... total statewide costs for affected businesses and port authorities to comply with the proposed regulation to be approximately \$1.8 billion, in 2006 dollars." (pg. 21)
- "Annually, the costs are expected to vary from \$30 million to \$137 million. ... the high end of the range represents a year when capital expenditures are being made for shoreside infrastructure and for retrofitting a considerable number of ships to meet the 2020 milestone." (pg. 21)
- "The total costs to a typical ship company complying with the proposed regulation, including capital and ongoing costs are estimated to be about \$34 million. This cost would be distributed over the years 2009 to 2020 for passenger ship companies and reefer ship companies and to 2030 for container ship companies." (pg. 21)
- "Similarly, the total costs to a typical terminal operator complying with the proposed regulation, including capital and ongoing costs, are estimated to be about \$11 million. ... With 31 terminals and 35 vessel fleets affected by the proposed regulation, the costs to a typical business would be \$26 million." (pp. 21-22)
- "The costs to be expended by the port authorities to add shore-power equipment to their facilities ranges from \$4 million to \$86 million. ... Staff assumes that the landlord ports will work with their tenants, the terminal lessees, to provide the shoreside infrastructure necessary to meet the requirements of the proposed regulation. Furthermore, staff assumes that the landlord ports will eventually recover their capital costs through modifications to terminal leases, while the non-landlord ports will recover their capital costs through fees collected from the carriers." (pp. 22-23)

The results of the current rule and the resulting estimated \$1.8 billion investment by the regulated components of the maritime industry have been impressive – with total Diesel PM projected by CARB staff to be reduced by 96% since 2006 in 2021. (see below charts based on CARB data, Attachment A)



## **Alternative Proposal Overview**

The Alternative Proposal establishes a path forward to increase compliance and continue to ensure further emission reductions from vessels while at-berth in California ports. The Proposal includes measures to ensure compliance and emissions reductions consistent with current CARB emissions goals, expand investments in port infrastructure, and increase vessel compliance.

CARB currently regulates Container, Passenger and Refrigerated vessel fleets and the ports they visit. CARB has also determined currently unregulated vessel fleets include Ro-Ro, Auto Carrier, Liquid Bulk and Tanker vessels and the ports they visit.

### ***Improves the Currently Regulated Vessel Program***

The following outcomes will be assured through a series of amendments to the existing rule:

- Improves and streamlines compliance methodologies for the currently regulated fleet in 2020.
- Creates new compliance and reporting requirements for ports and marine terminal operators.
- Requires that when a terminal is able to provide shorepower to a shore power-equipped vessel that the vessel must plug-in while at berth, subject to exceptions or exemptions.
- Reinvests non-compliance fees in new Port infrastructure or waterfront emissions reductions.
- Prioritizes cost-effective investment of private and CARB Incentives dollars.
- Establishes a consensus regulatory framework for the evaluation of future rule expansions.

With respect to currently Regulated Vessel Fleets and Ports, the Alternative Proposal would update and improve current vessel compliance mechanisms applicable immediately to the 2020 fleet requirements, establish new and expanded marine terminal and port compliance requirements, and create a framework for new investment in at-berth infrastructure.

With respect to currently Unregulated Vessel Fleets, these fleets would be included in the amendments as well. The Alternative Proposal would establish reporting compliance methodologies and evaluation benchmarks consistent with the current staff proposal for Bulk vessels for all vessel types and meet all of CARB's SIP requirements, the Climate Change Scoping Plan, and the AB 617 Blueprint.

### ***Builds a Framework to Include Future Vessel Types and Fleets***

During the November 2018 work sessions held with the Industry Coalition and its members, CARB indicated that to be viable, an Alternative Proposal should at least meet and achieve the following principles:

- Emissions reduction goals of the current CARB staff proposal must be met
- All parties to a successful at-berth connection must have substantive roles to play in the new regulatory framework for the currently Regulated Vessel Fleets: vessels, marine terminal operators, ports, and equipment providers.
- If a "check-list" approach is applied to currently Regulated Vessel Fleets, non-compliance must have consequences.
- Vessel Fleet rules should not include complicated credit or trading schemes.

## **Alternative Proposal – Substantive 2020 Effective Amendments**

*All provisions Effective Immediately upon Adoption at December 2019 CARB Board Meeting*

### **FOR CURRENTLY REGULATED VESSEL FLEETS AND ASSOCIATED TERMINALS and PORTS:**

- CONNECTING EQUIPPED VESSELS – When a Shorepower-Equipped Berth is available and able to safely Connect a Shorepower-Equipped Vessel, the connection must be made.  
No time-based rules (including 3&5-hour rule). Commissioning is presumed to be a Connection. Use updated definitions for vessel connected, plugged, and able to work.
- PORTS and MARINE TERMINALS ARE REQUIRED TO PLAN & REPORT – all Ports and Marine Terminal Operators must comply with recordkeeping, reporting rules and submit Terminal Plans with subsequent updates beginning in 2021 for currently regulated fleets. Updates must include description and timeline of all infrastructure installations planned at specific-berths.

### **Accelerated Transition to New Requirements & Improve Compliance Over Current Rule**

- Enforce Vessel Fleet Compliance against Vessel Compliance Checklist (to be developed)  
Vessel Fleet Compliance would be determined on an Annual Fleet-Average Basis by Port  
2020 – 80% compliance w/ checklist  
2031\*– 85% compliance w/ checklist \*(dependent on feasibility and rulemaking)  
Vessel Fleet Compliance reporting would occur on an Annual Basis  
Update and improve current reporting requirements and avoid usage of old technology or applications (i.e. approve uses of automated technologies).
- Enforce Marine Terminal compliance against Terminal Compliance Checklist (to be developed)  
Marine Terminal Compliance would be determined on an Annual Berth-Average Basis  
2022 – 80% compliance w/ checklist  
2031\* – 90% compliance w/ checklist \*(dependent on feasibility and rulemaking)  
Marine Terminal Compliance reporting would occur on an Annual Basis  
Marine Terminal 30-day Reports for non-connection, equipment, & electrical issues
- At-Berth Infrastructure Incentive Funding Applications by Ports remain eligible for GGRF/VW Incentives independent of Vessel or Terminal Checklist compliance status
- Conform and maintain existing exemptions and exceptions plus add new and clarifying exceptions for Vessel and Marine Terminal safety and force majeure situations
- Maintain existing regulatory thresholds for minimum number of calls for Regulated Fleets on a port by port basis (including treating LA/LB as one port for Fleet thresholds)

### **FOR ALL CURRENTLY UNREGULATED VESSEL FLEETS AND ASSOCIATED MARINE TERMINALS and PORTS:**

- BULK CARGO, RO-RO & TANKER VESSEL FLEETS ARE REQUIRED TO REPORT – all vessels must report General Visit Information Annually beginning in 2021
- PORTS and MARINE TERMINALS ARE REQUIRED TO PLAN & REPORT – all Ports and Marine Terminal Operators serving currently unregulated fleets must comply with recordkeeping, reporting rules and submit Terminal Plans with subsequent updates beginning in 2024

### **FOR OPERATORS OF ALTERNATIVE EMISSIONS CONTROL STRATEGIES:**

- Certification must demonstrate cost-effectiveness and Emissions Control greater than Vessel Fleet Average Basis standard

**APPLICABLE TO ALL AT BERTH RULE EXPANSION AMENDMENTS FOR THE CURRENTLY REGULATED FLEET AND CURRENTLY UNREGULATED FLEET**

- Conduct a feasibility study to identify cost effective emission control programs for all vessel categories based on reasonable implementation deadlines, safety concerns, and technological feasibility. This feasibility study should be conducted in cooperation with all industry stakeholders, be based on data which is made publicly available during study development, and include a detailed evaluation of all of the following:
  - (i) the status and timing of rule implementation in light of port/terminal infrastructure planning and any future infrastructure development potentially necessary to provide at-berth emissions controls, with future infrastructure designation to include rigorous cost estimates of any necessary electrical infrastructure modifications or alternatives,
  - (ii) the existing shore-side electrical infrastructure, including electrical sub-station and off-terminal electric utility infrastructure, and present availability of alternatives,
  - (iii) the feasibility of alternative at-berth emission control technologies to capture emissions from ships that cannot plug in to shore power, including vessel types that can't use the alternatives in each vessel category and for different engine sizes, and including currently unregulated vessel fleets,
  - (iv) the number and types of alternative control technologies that would be needed at each California port,
  - (v) navigation, safety and harbor logistical considerations, especially for barge systems,
  - (vi) cost effectiveness of various rule expansion scenarios and alternative programs based on a detailed estimate of the additional emission reductions to be gained with possible expansion of the rule, including an assessment of additional costs on a cost per ton of emissions reduced basis under all possible additional infrastructure scenarios,
  - (vii) determine how the marginal cost of various potential port emission control programs compare to other potential efforts to reduce emissions from other sources at ports which could be more cost-effective investments for control programs.
  - (viii) opportunity costs as at-berth regulations impose substantial infrastructure obligations on the industry, funds may need to be diverted from other important air quality programs, including zero- and/or near-zero emissions vehicles and equipment, to ensure compliance as soon as possible.
  
- Evaluate emission control programs for all key source categories that operate in and around ports in order to prioritize incentive funding from GGRF/VW and other sources of incentive funds and maximize total emission reduction per dollar, with the most long-term residual emissions benefits, and facilitating highest cost-effectiveness. For programs that operate throughout California, evaluate ports within regional context (versus other regional potential sources of prioritized health risk or criteria pollutant evaluation) instead of by comparing ports against each other.

**SUBSEQUENT ACTION FOR CURRENTLY REGULATED VESSEL FLEETS, MARINE TERMINALS, and PORTS:**

*For Implementation After Current Rulemaking (2021 and beyond):*

- Establish regular feasibility “check-in” steps as part of the rule, 2022, 2025, 2028, 2031, to assess whether the proposed implementation deadlines remain viable or can be accelerated through additional amendments to the rule.
  
- Any acceleration would require providing vessels with at least 18 months’ notice in advance of a future rule effective date.

## **CONCURRENT AND SUBSEQUENT ACTIONS FOR CURRENTLY UNREGULATED VESSEL FLEETS, MARINE TERMINALS, and PORTS:**

### *During Rulemaking (2019-2020):*

- Immediately disclose the Bulk Vessel cost-effectiveness calculations which led to their exclusion from emissions reductions.
- Compare Bulk Vessel cost-effectiveness with other vessel cost-effectiveness calculations for Tankers and Ro-Ro's.
- Contrast DPM reductions from the Ro-Ro and Tanker fleets with other sources of emissions at and near Ports and Terminals.
- Conduct actual emissions profiles for all bulk, ro-ro, and tanker terminals, individually by actual operating Port facilities, not "Port Complex" entities.
- Evaluate all bulk, ro-ro, and tanker terminals, individually for shore-based alternative emissions controls, and water-based alternative emissions controls.

### *After Rulemaking (2021 and beyond):*

- Establish program staff calendar and deliverable to the Board for future discussion of whether or not these vessel fleets are good subjects for statewide rulemaking or if their emissions are best off-set through incentives, MOUs, or alternative emission reduction strategies. Discussion required in context of SIP, AB 617, and Scoping Plans.
- Establish 2025, 2028 and 2031 as target dates for full reviews of Bulk, Ro-Ro, and Tanker Reporting Data and Terminal infrastructure plans and application of new evaluation of Cost-Effectiveness Data and Emissions.

## **PRIORITIZATION OF AWARDED PORT (AT BERTH OR ALTERNATIVE) INCENTIVES AND USE OF NON-COMPLIANCE FEES:**

### *During Current Rulemaking and After Rulemaking (2019 and beyond)*

- Prioritize Port projects and emissions reductions alternatives for receipt of GHG Reduction Fund and VW Settlement Fund proceeds
- Take a multi-pronged approach towards incentives for new At-Berth or alternative emissions reductions programs at Ports which is reflective of need for multiple strategies and approaches, and which acknowledges need for demonstrations to help establish cost-effectiveness and feasibility goals
- Utilize non-compliance fee revenues to build pooled funding which can be reinvested into shorepower infrastructure or other port-related air quality programs in accordance with prioritization based on cost-effectiveness

# Attachment A

## Data References

2007 ISOR, pg. 6-7:

### 3. EMISSIONS INVENTORY

Hotelling emissions are associated with the use of diesel-fueled auxiliary engines on ocean-going ships to power the vessels' electrical systems while the ships are docked. These emissions are a function of how often the ship visits a California port, how long the ship is at berth, the emissions rate of the engines, and the typical operating load of the auxiliary engines while the ship is at berth.

ARB staff estimates that in 2006, the statewide hotelling emissions from approximately 2000 ocean-going vessels was 1.8 tons per day (TPD) of diesel PM emissions, and 21.1 TPD of NOx emissions. Table I presents hotelling emissions for the six major categories of ocean-going vessels that visit California ports—container ships, passenger ships, reefer ships, vessel carriers, bulk ships, and tankers. As can be seen in this table, hotelling emissions from the three affected ship categories, container ships, passenger ships, and reefer ships, represent over 80 percent of total statewide hotelling emissions.

**Table 1: Estimated 2006 Hotelling Emissions by Ship Category**

Ship Category	2006 Emissions, Tons/Day	
	NOx	PM
Container	13.8	1.1
Passenger	2.8	0.2
Reefers	0.9	0.1
Tanker	2.0	0.2
Bulk/General	1.0	0.1
Vehicle Carriers	0.6	0.1
Totals	21.1	1.8

**Table 2: Estimated 2006 Hotelling Emissions by Port (Tons per Day)**

Port	NOx	PM
Los Angeles/Long Beach	14.3	1.2
Oakland	2.6	0.2
San Diego	1.1	0.1
Hueneme	0.7	0.1
San Francisco	0.5	0.1
Other Ports	1.2	0.2
Total	21.1	1.8

As can be seen in this table, most of the shipping activities and hotelling emissions occur at the largest ports in California: Los Angeles and Long Beach followed by Oakland. The six ports affected by the proposed regulation account for over 90 percent of total hotelling emissions at California ports.

Staff developed growth factors for each ship category to project future hotelling emissions. In general, the growth in vessel hotelling emissions is directly proportional to the growth in vessel visits, ship size, berthing times, and, in the case of container ships, the number of refrigerated containers aboard.

Hotelling emissions from ocean-going ships are predicted to increase from 2006. Container ship and passenger ship emissions are expected to double by 2020. Reefer ship emissions are expected to decline at the Ports of Long Beach and Los Angeles, slightly increase at the Port of Hueneme, and triple at the Port of San Diego by 2020.

Table 3 presents projected 2014 and 2020 emission estimates for container ships, passenger ships, and reefer ships. In December 2005, the Board adopted an auxiliary engine fuel regulation that would limit the sulfur content of fuel used with auxiliary engines starting in 2007. At the time this staff report was published, the regulation had been challenged in federal district court and is undergoing appeal at the Ninth Circuit Court of Appeals. The future emission projections were based on the assumption that the auxiliary engine regulation would ultimately be upheld and the auxiliary engines would be operating on low-sulfur fuel.

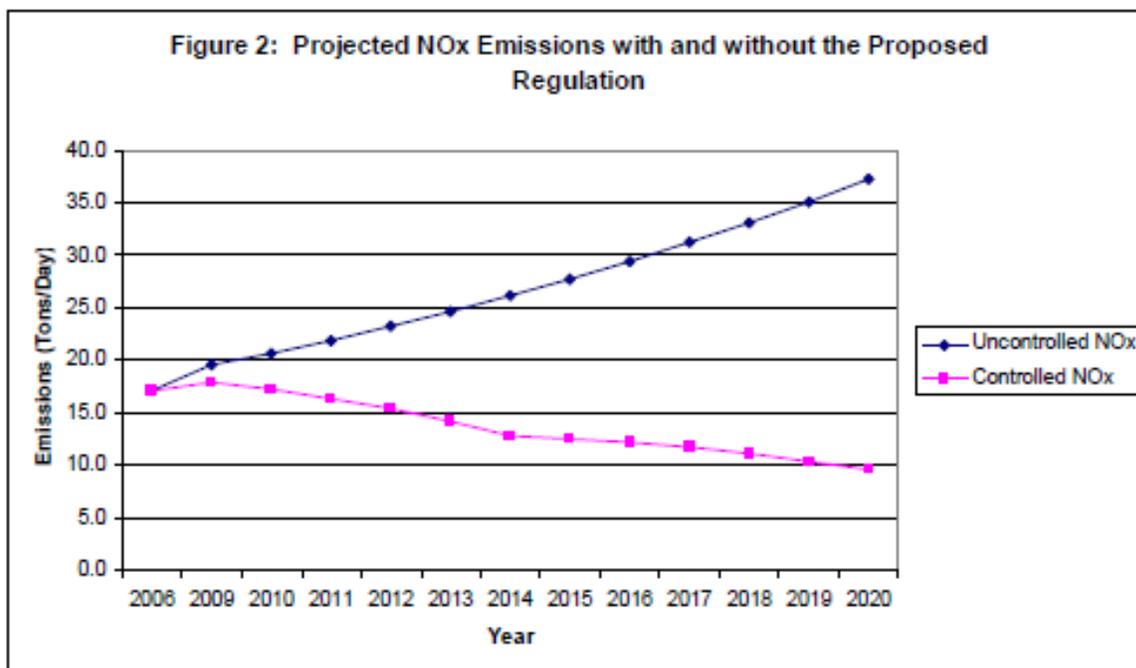
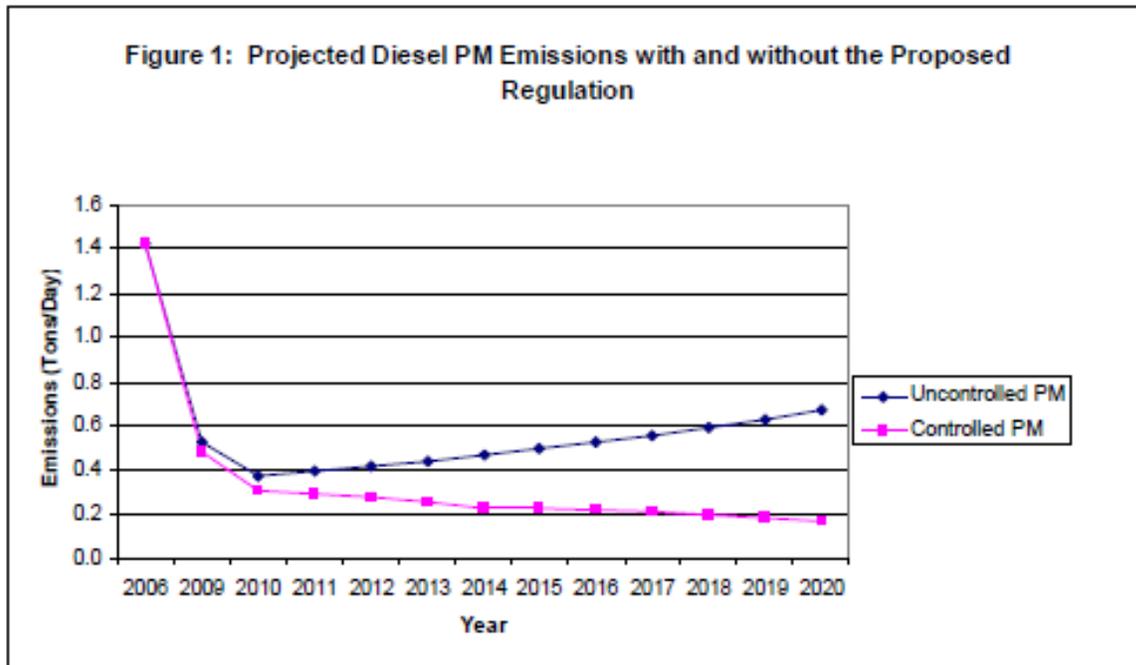
2007 ISOR, Appendix B, pg. B-19:

### III. EMISSION ESTIMATES

Using the revised methodology we can estimate emissions associated with container, cruise, and reefer vessels operating at ports subject to the proposed Shore Power Regulation. Table III-1 provides auxiliary engine hotelling emissions estimates by vessel type; we estimate covered emissions sources emit about 17 tons/day NOx and 1.5 tons/day PM in 2006. Assuming existing controls (without the benefit of the proposed regulation) we estimate NOx emissions will grow in 2020 to approximately 37 tons/day, and in 2020 PM emissions will grow to approximately 0.6 tons/day. As the data suggest, ARB's auxiliary engine regulation that was adopted in 2005 will generate significant reductions in future years.

**Table III-1 Auxiliary Engine Hotelling Emissions by Vessel Type without Shore Power Regulation**

Emissions - 2006 (tons/day)				
Vessel Type	NO <sub>x</sub>	PM <sub>10</sub>	ROG	SO <sub>x</sub>
Container	13.8	1.12	0.32	8.1
Cruise	2.5	0.24	0.06	1.7
Reefer	0.9	0.07	0.02	0.5
<b>Total</b>	<b>17.1</b>	<b>1.43</b>	<b>0.40</b>	<b>10.33</b>
Emissions - 2014 (tons/day)				
Vessel Type	NO <sub>x</sub>	PM <sub>10</sub>	ROG	SO <sub>x</sub>
Container	21.5	0.38	0.52	0.57
Cruise	3.6	0.07	0.09	0.09
Reefer	1.0	0.02	0.03	0.03
<b>Total</b>	<b>26.1</b>	<b>0.47</b>	<b>0.63</b>	<b>0.69</b>
Emissions - 2020 (tons/day)				
Vessel Type	NO <sub>x</sub>	PM <sub>10</sub>	ROG	SO <sub>x</sub>
Container	30.8	0.55	0.75	0.82
Cruise	5.2	0.09	0.12	0.13
Reefer	1.3	0.02	0.03	0.04
<b>Total</b>	<b>37.3</b>	<b>0.66</b>	<b>0.91</b>	<b>0.99</b>



CARB, "CARB Draft At Berth Emissions Estimates (from Aux Engines and Boilers) under Existing Regulation and Draft Regulatory Concept (11/8/2018)" ("2018 Emissions Estimates")

2018 Emissions Estimates, DPM Inventory A:1-AE:23

2016 At-Berth Existing Rule Diesel PM (DPM) Emissions (Tons/Year)															
Auxiliary Engine Emissions DPM (Tons/Year)															
Air Basin	San Francisco Bay Area Air Basin						South Coast Air Basin		South Central Coast Air Basin	Sacramento Valley Air Basin	San Diego Air Basin	San Joaquin County Air Basin	North Coast Air Basin		
Ships	Carquinez MTC	Rodeo MTC	Oakland	Redwood City	Richmond MTC	San Francisco	Long Beach	Los Angeles	Hueneme	Sacramento	San Diego	Stockton MTC	Eureka	Total (TPY)	
Container/Reefers	0.0	0.0	4.9	0.0	0.0	0.1	5.7	7.0	0.7	0.0	0.1	0.0	0.0	18.5	
Tanker	2.7	1.1	0.0	0.0	3.6	0.1	4.1	1.8	0.1	0.0	0.5	0.5	0.0	14.5	
Cruise	0.0	0.0	0.0	0.0	0.0	1.9	1.8	0.8	0.0	0.0	0.8	0.0	0.0	5.2	
Roro	0.6	0.0	0.0	0.0	0.5	0.0	0.7	0.6	0.9	0.0	1.5	0.0	0.0	5.0	
Bulk/General	0.3	0.0	0.1	0.1	0.2	0.0	0.6	0.7	0.1	0.4	0.1	1.0	0.0	3.7	
<b>Total</b>	<b>3.6</b>	<b>1.1</b>	<b>5.0</b>	<b>0.1</b>	<b>4.3</b>	<b>2.1</b>	<b>12.9</b>	<b>10.9</b>	<b>1.8</b>	<b>0.4</b>	<b>3.0</b>	<b>1.5</b>	<b>0.0</b>	<b>46.8</b>	

2021 At-Berth Existing Rule DPM Emissions (Tons/Year)															
Auxiliary Engine Emissions DPM (Tons/Year)															
Air Basin	San Francisco Bay Area Air Basin						South Coast Air Basin		South Central Coast Air Basin	Sacramento Valley Air Basin	San Diego Air Basin	San Joaquin County Air Basin	North Coast Air Basin		
Ships	Carquinez MTC	Rodeo MTC	Oakland	Redwood City	Richmond MTC	San Francisco	Long Beach	Los Angeles	Hueneme	Sacramento	San Diego	Stockton MTC	Eureka	Total (TPY)	
Container/Reefers	0.0	0.0	4.0	0.0	0.0	0.2	5.9	6.1	0.2	0.0	0.1	0.0	0.0	16.5	
Tanker	2.6	1.1	0.0	0.0	3.5	0.1	4.4	2.0	0.1	0.0	0.6	0.5	0.0	14.9	
Cruise	0.0	0.0	0.0	0.0	0.0	2.0	1.6	0.7	0.0	0.0	0.9	0.0	0.0	5.2	
Roro	0.7	0.0	0.1	0.0	0.6	0.0	0.9	0.8	1.0	0.0	1.7	0.0	0.0	5.9	
Bulk/General	0.4	0.0	0.1	0.1	0.2	0.0	0.8	0.9	0.1	0.5	0.2	1.2	0.0	4.3	
<b>Total</b>	<b>3.7</b>	<b>1.1</b>	<b>4.1</b>	<b>0.1</b>	<b>4.3</b>	<b>2.3</b>	<b>13.7</b>	<b>10.5</b>	<b>1.4</b>	<b>0.5</b>	<b>3.5</b>	<b>1.7</b>	<b>0.0</b>	<b>46.9</b>	

2021 At-Berth Draft Regulatory Concepts DPM Emissions (Tons/Year)															
Auxiliary Engine Emissions DPM (Tons/Year)															
Air Basin	San Francisco Bay Area Air Basin						South Coast Air Basin		South Central Coast Air Basin	Sacramento Valley Air Basin	San Diego Air Basin	San Joaquin County Air Basin	North Coast Air Basin		
Ships	Carquinez MTC	Rodeo MTC	Oakland	Redwood City	Richmond MTC	San Francisco	Long Beach	Los Angeles	Hueneme	Sacramento	San Diego	Stockton MTC	Eureka	Total (TPY)	
Container/Reefers	0.0	0.0	1.6	0.0	0.0	0.2	1.7	2.1	0.1	0.0	0.0	0.0	0.0	5.6	
Tanker	2.6	1.1	0.0	0.0	3.5	0.1	4.4	2.0	0.1	0.0	0.6	0.5	0.0	14.9	
Cruise	0.0	0.0	0.0	0.0	0.0	0.6	0.8	0.4	0.0	0.0	0.3	0.0	0.0	2.1	
Roro	0.7	0.0	0.1	0.0	0.6	0.0	0.9	0.8	1.0	0.0	1.7	0.0	0.0	5.9	
Bulk/General	0.4	0.0	0.1	0.1	0.2	0.0	0.8	0.9	0.1	0.5	0.2	1.2	0.0	4.3	
<b>Total</b>	<b>3.7</b>	<b>1.1</b>	<b>1.8</b>	<b>0.1</b>	<b>4.3</b>	<b>0.9</b>	<b>8.6</b>	<b>6.2</b>	<b>1.3</b>	<b>0.5</b>	<b>2.8</b>	<b>1.7</b>	<b>0.0</b>	<b>32.9</b>	

## Attachment B

### Policy & Procedural Context for Alternative Proposal

*In addition to the existing Regulations, CARB is operating under or has adopted multiple policy positions with respect to the consideration of updates to the scope, breadth, and applicability of the At-Berth Rules.* These include all of the following:

#### **Executive Order B-32-15, Sustainable Freight Action Plan, Action G-3 (pg. C-53)(adopted 2016):**

##### **3. At-Berth Regulation Amendments**

*Overview:* The goal of this proposed measure is to further reduce emissions from ships. ARB staff would develop and propose amendments to the current At-Berth Regulation and look for additional reductions from additional vessel fleets or types.

...

*Proposed Actions:* ARB would evaluate how the current At-Berth Regulation can be amended to achieve further emissions reductions by including smaller fleets and/or additional vessel types (including roll-on/roll-off vehicle carriers, bulk cargo carriers, and tankers). In addition, there are two companies with portable emissions capture and control systems that have successfully demonstrated performance and may now be used for compliance with the current Regulation on certain container vessels. If one or both systems prove to be feasible and cost-effective on additional vessel types, the technology could help support an ARB staff proposal to expand the scope of the Regulation to include additional vessel types and/or smaller fleets. ARB staff anticipate bringing this measure to the Board in 2017.

*Estimated Cost:* ARB will estimate costs from this action during the measure development process for the Proposed 2016 State Strategy for the State Implementation Plan. See <http://www.arb.ca.gov/planning/sip/sip.htm>.

*Benefits:* This action is anticipated to provide criteria pollutant and greenhouse gas emissions reduction benefits. ARB will quantify emissions reductions from this action during the measure development process for the Mobile Source Strategy and Proposed 2016 State Strategy for the State Implementation Plan. See <http://www.arb.ca.gov/planning/sip/2016sip/2016mobsr.htm> and <http://www.arb.ca.gov/planning/sip/sip.htm>.

#### **2016 State Implementation Plan (Resolution 17-7, Attachment A, “Proposed New SIP Measures and Schedule”), Mobile Source Strategy (pg. 84), (adopted 2017)**

*Measure Title:* At-Berth Regulation Amendments

*Measure Overview:* The goal of this measure concept is to further reduce emissions from ships at berth and to advance the commercialization of near-zero and zero emission technologies. ARB staff would develop and propose amendments to the current At-Berth Regulation to include other vessel fleets and types.

...

*Description of Measure and Commitment:* In December 2007, ARB approved the Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At-Berth in a California Port Regulation (Regulation). The Regulation was designed to reduce emissions from diesel auxiliary engines on container ships, passenger ships, and refrigerated cargo ships while at berth at California’s major seaports. The Regulation is also limited to fleets of 25 or more vessels (five or more for passenger ships).

ARB would investigate whether the Regulation can be amended to include smaller fleets and/or additional vessel types (including roll-on/roll-off vehicle carriers, bulk cargo carriers, and tankers). In addition, there are two companies working on portable systems. One company has successfully demonstrated that its system can provide durable performance and may now be used for compliance with the Regulation on specified vessel types. If one or

both systems become commercially available and are cost-effective, the technology could help support an ARB staff proposal to expand the scope of the Regulation to include additional vessel types and/or smaller fleets. ARB staff needs to investigate the feasibility and cost-effectiveness of expanding shore-power or alternative At-Berth technologies to additional vessel fleets and types not currently covered by the existing Regulation.

### **Climate Change Scoping Plan Update (pp. 73-74, 78-80, Appendix H) (adopted 2017)**

#### Transportation Sustainability

California's population is projected to grow to 50 million people by 2050. How and where the State grows will have important implications for all sectors of the economy, especially the transportation sector. ...

Transportation also enables the movement of freight such as food, building materials, and other consumable products, as well as waste and recyclables. The California freight system includes myriad equipment and facilities, and is the most extensive, complex, and interconnected system in the country, with approximately 1.5 billion tons of freight valued at \$2.8 trillion shipped in 2015 to, through, and within California. Freight dependent industries accounted for over \$740 billion of California's GDP and over 5 million California jobs in 2014.

...

#### Efforts to Reduce Greenhouse Gases

The measures below include some required and new potential measures to help achieve the State's 2030 target and to support the high-level objectives for the transportation sector. Some measures may be designed to directly address GHG reductions, while others may result in GHG reductions as a co-benefit. ...

#### Ongoing and Proposed Measures – Sustainable Freight

- Implement the California Sustainable Freight Action Plan:
- 25 percent improvement of freight system efficiency by 2030.
- Deployment of over 100,000 freight vehicles and equipment capable of zero emission operation, and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030.

...

[Table H3-2. Vehicle Technology and Fuel Description]

#### 2016 Mobile Source Strategy

The Mobile Source Strategy identifies actions to be undertaken to simultaneously meet air quality standards, achieve GHG emission reduction targets, decrease toxics health risk, and reduce petroleum consumption from transportation emissions by 2031. More information on the Mobile Source Strategy can be found at:

<https://www.arb.ca.gov/planning/sip/2016sip/2016mobsr.htm>

#### The California Sustainable Freight Action Plan

The California Sustainable Freight Action Plan (Action Plan) is a multi-State agency effort to improve freight system efficiency by 25 percent by 2030, and to deploy over 100,000 freight vehicles and equipment capable of zero emission operation, and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030.

The Action Plan Includes recommendations on: • A long-term 2050 Vision and Guiding Principles for California's future freight transport system. • Targets for 2030 to guide the State toward meeting the Vision. • Opportunities to leverage State freight transport system investments. • Actions to initiate over the next five years to make progress towards the Targets and the Vision. • Pilot projects to achieve on-the-ground progress in the near-term. • Additional concepts for further exploration and development, if viable. More information on can be found at: <http://www.dot.ca.gov/casustainablefreight/>

### **AB 617 Community Air Protection Blueprint, Appendix D (pp. D-3-4, D-6, D-8-10) (adopted 2018)**

#### II. STATEWIDE EMISSION REDUCTION STRATEGIES

Identifying specific strategies for reducing criteria air pollutants and toxic air contaminants in communities with high cumulative exposure burdens is critical for implementing strong statewide actions to ensure new emissions reductions. The strategies outlined in this section reflect actions that CARB and air districts are already taking to deliver new reductions in communities. This includes new strategies from existing air quality and climate plans, early action incentive funding appropriated by the Legislature, and additional community-focused actions (e.g., new regulatory measures, targeted enforcement activities, other new tools and resources).

## FOUNDATIONAL STRATEGIES IN CARB AIR QUALITY AND CLIMATE PLANS

CARB's Governing Board has adopted several comprehensive air quality and climate plans in recent years, including the State Strategy for the State Implementation Plan, the California Sustainable Freight Action Plan, California's 2017 Climate Change Scoping Plan, and the Short-Lived Climate Pollutants Reduction Strategy. Each of these plans includes a suite of emissions reduction strategies that will address many of the sources that are concentrated within heavily impacted communities like cars, trucks, freight sources, and other equipment. Together they provide a foundation for additional emissions reductions needed to deliver healthful air in communities with high cumulative exposure burdens.

Table D-1, Table D-2, and Table D-3 provide lists of new CARB strategies associated with these plans. CARB staff have already begun developing regulations, policies, and incentive programs to implement these strategies. This is an ongoing process that will begin achieving emissions reductions in the near-term and providing benefits that support community-level actions, with a focus on zero emission technologies where the technologies are now feasible. New regulations cover the following range of sources:

- For communities heavily impacted by freight sources –
  - o Expanded standards for clean operation for ships while they are in port.

...

[Table D-1 "State Strategy for the State Implementation Plan Measures and Schedule (*Approved 2017*)"]  
At-Berth Regulation Amendments

...

[Table D-2 Summary of California's 2017 Climate Change Scoping Plan Update Measures (*Approved 2017*)]  
Mobile Source Strategy (Cleaner Technology and Fuels [CTF] Scenario)\* ...  
California Sustainable Freight Action Plan\* ...

\*These measures and policies are referred to as "known commitments."

### **Addendum to the adoption of Resolution 17-7**

***Furthermore, in addition to the existing Regulations and multiple policy positions regarding potential At-Berth Rule amendments,*** there was additional procedural, non-policy direction given to the staff by the Board in an Addendum to the adoption of Resolution 17-7, which was the motion to approve the state SIP in March 2017.

This additional direction in the Addendum was that "within 18 months of this date, ARB staff shall develop At-Berth regulation amendments that achieve up to 100% compliance by 2030 for LA Ports and Ports that are in or adjacent to areas in the top 10% of those defined as most impacted by CES."

This is not an adoption of a policy or amendment of a plan, including the SIP, but just a direction to staff to develop and work on the preparation of a proposal for the Board for future consideration. The Alternative Proposal is consistent with this direction and seeks to work with staff to place a set of amendments before the Board which will be an increase in compliance beyond 80%.

Port of Los Angeles and Port of Long Beach Comments on  
Proposed Draft Regulatory Language, “Control Measure  
for Ocean-Going Vessels Operating At Berth and At  
Anchor”, February 6, 2019

# SAN PEDRO BAY PORTS CLEAN AIR ACTION PLAN

February 6, 2019

Bonnie Soriano  
Chief, Freight Activity Branch  
California Air Resources Board  
1001 "I" Street  
Sacramento, CA 95814

**SUBJECT: PORT OF LOS ANGELES AND PORT OF LONG BEACH COMMENTS ON PROPOSED DRAFT REGULATORY LANGUAGE, "CONTROL MEASURE FOR OCEAN-GOING VESSELS OPERATING AT BERTH AND AT ANCHOR"**

Dear Ms. Soriano:

The Port of Long Beach and Port of Los Angeles (Ports) appreciate this opportunity to provide comments on the California Air Resources Board (CARB) proposed draft regulatory language, "Control Measure for Ocean-Going Vessels Operating At Berth and At Anchor."

We value the partnership we have built with CARB and credit this positive relationship in large part to helping us achieve very significant emissions reductions at the Ports and throughout the freight industry over the last decade. Likewise, we appreciate CARB's willingness to continue to work with us to find solutions for overcoming the various challenges to meet our common emissions goals.

As described in the 2017 Clean Air Action Plan (CAAP) Update, the Ports' support increased efforts to capture at-berth emissions from ships and to obtain more emissions reductions from non-regulated vessels, and we are committed to working with CARB to achieve these goals.

The purpose of this comment letter is to assist CARB in the development of a feasible at-berth regulation that maximizes public health benefits, and also to communicate the challenges associated with implementing the draft regulatory language as currently proposed.



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The following summarizes comments of the Ports regarding proposed components of the draft regulation:

- **A Requirement to Control 100% of Visits Is Not Realistic** – Requiring 100% of vessel visits to use at-berth controls will require redundant systems to ensure coverage at all times, leading to skyrocketing costs for Ports, terminal operators, and ship owners with little additional emissions benefit. We urge reconsideration of such an absolute goal, even in light of your proposed use of exceptions, including terminal safety and emergency events, equipment failure, and physical and spatial constraints.
- **The Proposed Implementation Timelines Are Too Aggressive** – Of particular concern to the Ports, and our respective engineering staffs, is the implementation timeline for the proposed at-berth regulation. Expansion of shore power infrastructure, either through additional shore power outlets (SPOs) or via cable reel management systems, to meet the updated regulation requirement of 100% compliance for container, refrigerated cargo (reefer vessels) and cruise ships by 2021 will be a near impossible task for the Ports or the terminal operators to achieve due to the requisite planning and construction process for capital construction projects. The Port of Long Beach has estimated both the cost and timeline required to maximize compliance with the proposed draft regulation in the attached document, “Potential Strategies and Costs to Address the At-Berth Regulation” (Attachment A). The potential completion date for infrastructure required at the Port of Long Beach to accommodate the proposed regulations for container terminals is December 2025 at the earliest, depending on the extent of infrastructure required. Port of Los Angeles Engineering staff estimates the timelines and costs would be similar.

Further, given the lack of proven and available shore power or alternative options for at-berth controls that can be utilized by Tankers and Auto/Ro-Ros, it is highly unlikely that technically feasible, cost-effective technologies will be available for implementation by 2025. Additional time is needed to allow for the necessary capital improvements and/or technology advancements that will be required.

The Ports also believe that adequate time should be built into the schedule for submittal of terminal operator and Port plans, well in advance of the compliance deadline, in order to provide ample opportunity to adjust their plan given CARB feedback. It would also be helpful to see more details on what the required elements of such plans would be in the regulation.

- **A Technology Feasibility Assessment Process Is Needed** – As you know, the CAAP relies on a process for preparing regular feasibility assessments to assess the state of technology development and its readiness to be deployed in the marketplace to support efforts to achieve air quality benefits consistent with our CAAP goals. Given the reliance of the proposed regulatory amendment on emerging technologies, we believe a similar process would be appropriate and helpful for understanding the state of the technologies that would be needed to meet the requirements of the proposed regulatory language. This feasibility assessment should include an evaluation of:
  - (i) The state of technology for both shore power and alternative emission control devices and deployment readiness;
  - (ii) the requisite timeline for design, build, testing, and deployment of shore power and alternative control technologies for each California port and identification of any associated constraints such as wharf space;
  - (iii) safety and navigation of harbor waters space due to applications of new technologies for unregulated vessel types;
  - (iv) number and types of alternative control technologies, which would be needed at each California port;
  - (iv) and the availability of incentives to encourage early demonstration of such technologies.

Attachment A provides very useful information about the many technical challenges associated with the compliance options available today. These include immaturity of shore power for the non-container fleet, the safety concerns associated with using shore power and alternative emission control technologies to control emissions from tankers, and the navigability, space, and wharf integrity challenges associated with alternative emission control technologies. It is our finding that alternative compliance options may increase greenhouse gases, and cable reel management systems, which are needed for instances where ships do not line up with their requisite shore power outlet, are not in the shore power standard today (IEC/IEEE-80005), posing safety risks to ships and terminal equipment.

In order to accelerate the development and deployment of shore power and alternative control options, including infrastructure, for non-container terminals and vessels, the Ports would like to see CARB prioritize funding in their investment plan, as they did for the currently regulated fleet through Proposition 1B in 2006. This funding would assist with economic feasibility and ensure this regulation is not an unfunded state mandate.

- **A Cost Effectiveness Assessment Is Needed** – An increase in at-berth control levels for currently regulated fleets and the addition of at-berth control requirements for other vessel categories will result in considerable costs to ports, terminals, and shipping lines. The Ports of Long Beach and Los Angeles have already spent more than \$400M in infrastructure to meet the current shore power rule. Both Ports estimate that it would take at least another \$100M per port to bring their container terminal infrastructure to a level to meet the 100% requirement proposed by the at-berth rule. Additional costs, which have not yet been defined, will be associated with implementing at-berth controls for Tankers and Auto/Ro-Ros. In addition, millions more dollars would be needed to outfit unregulated ships for shore power.

While we fully support the goal of increased control of ocean-going ship emissions, we recommend a study be undertaken to determine how the marginal cost of bringing container ship emission controls from 80% to 100% under the proposed rule compares with other potential efforts to reduce emissions from ocean-going ships, including transiting or maneuvering movements. We also wonder whether emissions reductions from other sources at ports could be identified as more cost-effective investments for control programs, such as incentive programs to retrofit or replace harbor craft engines as an example. Further, we encourage a discussion among stakeholders to determine the sequencing of emission control programs for all of the key source categories that operate in and around ports, in order to identify where money should be spent first to move forward with cleaning the air regionally and throughout California.

- **Compliance Comes First** - The proposed At-Berth Regulatory language imposes a substantial infrastructure obligation on the Ports and their tenants. As a result, should the regulation be adopted as is, the Ports and their tenants will need to align their priorities and resources to ensure compliance with the regulation is achieved. As a result, the Ports may need to divert funds from other CAAP commitments, including zero-emissions terminal equipment and near-zero and zero-emissions trucks. We urge a discussion among key stakeholders to consider the trade-offs of investing in one program versus another, based on overall local, regional and state air quality needs.
- **The Best Practices Checklist Is a Concept Worth Pursuing** – The Ports acknowledge that a major goal of this rule-making is to assign roles and responsibilities so that CARB may apportion compliance enforcement if multiple parties are at fault when a vessel fails to connect to shore power. Previously, CARB had suggested development of a “best

practices checklist” which the vessel owner, the terminal operator, and the Ports would follow to maximize compliance. The Ports support exploration of this concept.

The Ports thank CARB staff for the consideration of our comments. The Ports agree that more can be done to increase at-berth emission reductions over the next decade in parallel to our efforts to advance zero-emissions terminal equipment and trucks; it is a matter of finding the balance among all of these CAAP commitments by establishing realistic timeframes and implementation objectives with approved and verified technologies.

We look forward to meeting with the CARB in the future to further discuss the proposed amendments to the At-Berth Regulation. Please feel free to contact us with any questions or concerns regarding this letter.

Sincerely,



CHRISTOPHER CANNON  
Director of Environmental Management  
Port of Los Angeles



HEATHER TOMLEY  
Acting Managing Director of Environmental  
Affairs and Planning  
Port of Long Beach

CC: CARB – Cynthia Marvin ([Cynthia.Marvin@arb.ca.gov](mailto:Cynthia.Marvin@arb.ca.gov))  
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## Potential Strategies and Costs to Address the At-Berth Regulation

### Background

In August 2018 the California Air Resources Board (CARB) released draft regulatory concepts and the associated preliminary cost analysis for the Control Measure for Ocean Going Vessels At Berth and At Anchor Regulation (At-Berth Regulation). If adopted, CARB would require control of emissions from container and refrigerated cargo vessels for 100% of visits to the Port of Long Beach beginning in 2021. Roll-on roll-off (RoRo) vessels will need to reduce auxiliary engine emissions for 100% of visits beginning January 1, 2025. Tanker vessels must control auxiliary engine emissions through an interim CARB approved technology beginning January 1, 2025. All vessel visits for tankers must control auxiliary engine emissions through a CARB approved emission control beginning January 1, 2031. In addition to the auxiliary engine reduction requirements for all tankers, tanker vessels with steam driven product pumps are required to reduce their tanker auxiliary boiler emissions.

### About This Assessment

In response to the proposed regulatory amendments, the Port of Long Beach (Port) has conducted a preliminary analysis of the infrastructure needed at each container terminal, the assumptions and caveats related to each method proposed to maximize compliance, the time required to design and install the necessary infrastructure, and the costs for each solution. The Port also estimated the hours of control required and operational costs for both container and non-container vessels visits to meet the proposed regulatory language requirements should alternative compliance strategies such as barge and land-based emission control technologies be utilized. This document outlines the Port's findings, which includes content from a third party analysis and in-house expertise.

### Assumptions

In assessing the potential options for complying with the proposed regulation, the Port made several assumptions. First, the Port assumed that ships would meet the following requirements:

- All ships calling the Port will have shore power equipment available on both sides of the vessel.
- All shipside shore power equipment meets the IEC/IEEE 80005-01 standard, including "sufficient cable length to reach the shore side supply point (considering the tide loading conditions, etc.) plus 10 meters."
- Vessels calling the Port are equipped with 60 Hertz (Hz) operation.<sup>1</sup>

Ships not meeting these requirements may not be able to plug into shore power; however, this is outside of the Port's control.

Additionally, the Port assumed that all potential strategies must comply with the IEC/IEEE 80005-01 shore power standard and the National Electrical Code at least by the time the

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<sup>1</sup> To provide infrastructure for 50 Hz ships would require complete duplication of the 60 Hz shore power infrastructure, including installation of transformers, substations, and SPOs. This solution is cost and operationally prohibitive. It is estimated only 1-2% of vessels which call the Port are equipped with 50 Hz operation.

regulation takes effect, that is, by January 1, 2020. Only strategies that have been proven and certified by these standards agencies have been deemed fit for deployment.

### Potential Shore Power Compliance Strategies for Container Vessels

The Port evaluated three potential strategies for maximizing shore power usage.

- Installation of additional shore power outlets (SPOs)
- Cable-reel management system – currently under development and assumed to be approved and certified by 2021
- A combination of the above

Although other potential strategies exist, including cable chains with SPOs mounted on the face of the wharf and moveable transformers, these technologies are unproven and cost prohibitive.

#### *Shore Power Outlet (SPOs) Installations*

Installing additional shore power outlets is the only strategy that fully complies with IEC/IEEE 80005-1 and National Electrical Code, and it is the only strategy that is proven and ready for execution today. The Port already has installed 78 SPOs at all of its container terminals. At some terminals, these SPOs are spaced approximately every 200 feet. At other terminals, the SPOs are spaced at varying intervals according to berthing analyses performed several years ago based on the strings of vessels information provided by the terminal operators and shipping lines.

Per the IEC/IEEE 80005-1 code, ships at berth must provide enough cable to reach the SPO plus 10 meters. Given this requirement, the Port would need to install SPOs every 64 feet at container terminals in order to ensure that every compliant ship can meet an SPO.

Unfortunately, this solution is implausible. Each SPO vault measures roughly 12 feet across and requires significant cuts into the wharf's edge. Additionally, the placement of SPO vaults has limitations, such as the presence of mooring anchors and fender systems or vaults for water lines. Thus, installing SPOs every 64 feet would compromise the structural integrity of the wharf and pose significant operational and safety impacts. In other words, there is a physical limit to the number of new SPOs the Port can install.

As stated earlier, additional SPOs do not solve connectivity issues for ships with inadequate cable length, cables on the opposite side of the vessel, or 50 Hz ships. Further, upstream electrical constraints may impede connection. One transformer serves multiple SPOs; only one ship can connect to that transformer at any given time. Thus, while additional SPOs may appear to provide more opportunities for ships to connect, as long as those SPOs are tied to a single transformer, the connectivity is limited by the upstream equipment. Each new SPO requires additional equipment at the substation. Each substation can only accept a limited amount of additional equipment at which point another substation need be installed. The space requirements along the wharf and inside the terminal along with the costs make this option unfeasible.

In summary, even with additional SPOs, there are likely to be instances in which a ship cannot connect.

#### *Cable Reel Management Systems*

## Potential Strategies and Costs to Maximize Compliance with the At-Berth Regulation

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A potential strategy to maximize shore power compliance at container terminals is a cable reel management system. Cable reel management systems provide additional cable length between the SPO and ship-side connection point. In theory, these systems should be able to close the gap between a ship and an SPO that is out of reach. The Port and its operators have purchased a few 100' cable management systems. These systems were limited to 100' in length due to space constraints; however, these systems have not yet been successfully deployed due to limitations of the technology and conflicts with current code.

First, 100' of cable is not long enough to facilitate ship connections 100% of the time. In order to achieve 100% compliance, cable reels of up to 600' would be required.

Second, the cable reel system is not a proven, approved technology in the shore power standard (IEC/IEEE 80005-1). The system also does not comply with the National Electrical Code, which does not allow for exposed high-voltage cables. This lack of certification raises issues about safety and labor's willingness to employ the system. It is unclear when the cable reel management system will be adopted under the shore power standard. If this system has not been adopted by January 1, 2020, the Port will be unable to use this strategy.

Third, if the cable reel management system is approved, some terminals may not have sufficient space between the cranes and guard timber to accommodate the cable reel system. This will necessitate wharf upgrades and cable-containment strategies. Custom cable extensions may need to be fabricated for a ship that does not line up with an existing SPO, which could require additional cable extensions at each berth.

Lastly, cable reel management systems may interfere with shore power communications systems, and thus, some ships may not be able to connect.

The Port analyzed the cost and timeframe for deploying cable reel management systems. Additional costs will be incurred by the tenant each time the cable reel system is deployed, removed and stored and are not included in the table below.

Costs and anticipated timeline per pier for cable reel systems are summarized in Table 3 below.

Table 3. Deployment of Cable Reel Management Systems

	Cost	Expected Completion Date
Pier A	\$3,000,000	May 2021
Pier C	\$2,000,000	May 2021
Pier E	\$3,000,000	May 2021
Pier G	\$3,000,000	May 2021
Pier J	\$4,000,000	May 2021
Pier T	\$4,000,000	July 2021
<b>All Container Terminals</b>	<b>\$19,000,000</b>	<b>July 2021</b>

\*This table estimates a start date for design as January 1, 2020 when the regulation would go into effect.

\*\*Assume \$1 million per each 200 linear foot Cable Reel Management System and 1 per berth were used for the estimates which includes equipment, additional mobile platform for the existing wharf, and soft costs.

In summary, absent changes to the National Electrical Code and IEC/IEEE 80005-1 standard, cable reel management systems are not a solution port-wide, and even with these changes, require significant infrastructure improvements and may not be a solution for every terminal

*SPOs and Cable Reel Management Systems*

The Port analyzed a combination of new SPOs and cable reel management systems. This option utilizes additional SPOs to ensure a maximum of 200 feet between SPO installations and one 100-foot, cable reel management system at each berth to provide the needed extension from the shipside shore power equipment to the designated terminal SPOs.

A major challenge with this option is that it still would require the installation of an additional 67 SPOs. This strategy does not eliminate the challenges detailed above under the subsection “Shore Power Outlet (SPOs) Installations” nor subsection “Cable Reel Management Systems.” Therefore, issues such as a limited upstream transformation and lack of standardization for cable reel management systems will also interfere with successful deployment of this strategy. Therefore at this time this option is not feasible.

Costs and anticipated timeline per pier for SPOs every 200 feet, combined with one 100-foot cable reel system at each berth are summarized in Table 4 below.

Table 4. Deployment of SPOs approximately every 200 feet, combined with one 100-foot cable reel system

Deployment of SPO every 200 feet and one cable reel per berth	Cost	Expected Completion Date
Pier A	\$15,750,000	Dec. 2025
Pier C	\$10,500,000	Dec. 2025
Pier E	\$13,450,000	Dec. 2025
Pier G	\$17,050,000	Dec. 2025
Pier J	\$13,800,000	Dec. 2025
Pier T	\$23,300,000	Dec. 2025
<b>All Container Terminals</b>	<b>\$93,850,000</b>	<b>Dec. 2025</b>

\*This table estimates a start date for design as January 1, 2020 when the regulation would go into effect.

\*\* Costs include construction cost and soft cost to plan, design, and construct additional SPOs at each terminal. Pier G includes a new transformer to provide the power to one berth.

**Additional Strategies**

The Port also evaluated additional strategies not related to landside infrastructure that could improve shore power compliance. These strategies are likely to be undertaken by the terminal operators and shipping lines, not the Port itself.

- Worker training
- Alternative compliance systems for ships not capable of connecting to the landside infrastructure

*Worker Training*

The Port believes training of workers responsible for plugging and unplugging ships will improve shore power compliance. Assuming a ship can make a physical connection, with the requisite training, workers would be more likely to successfully troubleshoot connection problems as they occur, and provide the needed adjustment of the circuit breaker settings and other components involved in connection.

With or without training, Port terminals are going to continue to face situations where shore power connection is simply not possible, even after implementation of any of the pathways described above.

### *Alternative Compliance*

Terminal operators may opt to invest in emission capture and control devices, rather than investing in additional shore power.

### Container Terminals

It is estimated the container terminals will require an additional 15,000 hours of emissions control time.

Annual operating costs alone could be \$23.2 million<sup>2</sup> dollars per year.

### Non-Container Terminals

It is estimated the non-container terminals will require an additional 42,000 hours of emission control time.

Annual operational costs alone could be \$39.4 million dollars per year.

The terminal operators may decide to design and construct their own emissions capture and control system to ensure the system is always available, and there will be significant upfront costs on the order of \$5,000,000-\$10,000,000.

### Limitations of Alternative Control Systems

Alternative control systems face two key challenges for deployment in the timeframe proposed by CARB:

- Lack of available units
- Lack of wharf space for barge-based system berthing

### Lack of Available Units

As of today, only two barge-based systems have been certified and a land-based system has yet to be tested. Many more systems would be required to help meet the 100% compliance deadline of 2021 for the regulated fleet and 2025 for the unregulated fleet. There are currently no production

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<sup>2</sup> Operating costs used in this document only include the hourly labor cost to operate the emission capture and control systems. The Port assumed \$1,000 per hour for barge-based systems, and \$1,100 per hour for land-based systems, which is consistent with CARB assumptions. Any increases in these costs over time are not accounted for, nor are any capital or other operational/maintenance costs.

## Potential Strategies and Costs to Maximize Compliance with the At-Berth Regulation

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facilities manufacturing these systems. It is doubtful such systems can be certified, cost effective, and commercially available in such a short amount of time.

### Lack of Wharf Space

One significant barrier to deploying barge-based systems is the lack of berth space for units that are not in use. The Port of Long Beach only has 2,000 linear feet of wharf space – equivalent to two berths – that are open and could be available for barge-based systems:

- D52, which is used for temporary berthing. 600' linear feet.
- T124, which is really designed for OGVs and thus would require fender installations and wharf modifications to accommodate barges. 1,400 linear feet.

All other space is leased out, which means the Port will be limited in its storage capacity for emissions capture and control systems.

### Summary of Findings

The Port cannot identify a single method to ensure 100% shore power, but has established internal consensus that a mix of methods may be required to maximize shore power compliance for container vessels.

The most promising way to maximize compliance at a container terminal is for the Port to install additional SPOs with additional support from cable reel management systems.

Table 5. Comparison of Three Strategies to Maximize At-Berth Compliance

Strategy	Cost for all Container Terminals	Timeline (Design, Bid and Award, Construction)	State of Technology	Remaining Challenges
Additional SPOs Every 64 Feet	-----	-----	Established/Proven	<ul style="list-style-type: none"> <li>• Wharf Integrity</li> <li>• Operation and safety</li> <li>• Physically impossible to install at 64'</li> </ul>
Cable Reel Management System	Approx. \$20 million	2 Years	Unproven	<ul style="list-style-type: none"> <li>• No Standard</li> <li>• Electrical Code Issues</li> <li>• Requires additional mobile platform to the existing wharves</li> <li>• Moderate Cost</li> </ul>
SPOs + 1 Cable Reel System	Approx. 94 million	5 Years	Unproven	<ul style="list-style-type: none"> <li>• Timeline</li> <li>• High Cost</li> <li>• No Standard</li> <li>• Electrical Code Issues</li> <li>• Requires additional mobile platform to the existing wharves</li> </ul>

In all of these scenarios, the Port is apt to spend millions of dollars on infrastructure beyond the roughly \$200 million already spent on shore power. Additionally, the timeframe for completing these projects is likely to go well past January 1, 2021.

It is unclear what strategy non-container terminal operators will choose for regulatory compliance. Given shore power is an unproved technology for the proposed non-container vessel categories and the stringent timeline proposed, the Port assumed in this assessment that ships and terminals would opt for alternative compliance through emission capture and control systems. Should the non-container industry choose this strategy, it is clear industry will bear millions of dollars in operating costs per year.

### **Path Forward**

The Port will need to produce a more detailed berthing analysis prior to entering the formal design process upon adoption of the proposed At-Berth Regulation. This analysis will directly inform decision-makers, including terminal operators and Port staff, and the design of each container terminal shore power compliance plan. In addition, the Port should continue to work with IEC/IEEE on the effort to update the current shore power regulation for container ships to ensure the cable reel management systems are safe, and standardized pieces of equipment

**Potential Strategies and Costs to Maximize Compliance with the At-Berth Regulation**

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Comments on Preliminary At-Berth Cost Analyses  
Presented at “Workgroup Meetings to Discuss Costs of  
Proposed Amendments to the Ocean-Going Vessel At-  
Berth Regulation”, September 14, 2018

September 14, 2018

Angela Csondes  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812

Submitted via e-mail to [angela.csondes@arb.ca.gov](mailto:angela.csondes@arb.ca.gov)

**Subject: Comments on Preliminary At-Berth Cost Analyses Presented at “Workgroup Meetings to Discuss Costs of Proposed Amendments to the Ocean-Going Vessel At-Berth Regulation”**

Dear Ms. Csondes:

The Pacific Merchant Shipping Association (PMSA) appreciates the opportunity to submit comments on the preliminary cost analysis presented by California Air Resources Board (CARB) staff during the August 15 and 16, 2018 “Workgroup Meetings to Discuss Costs of Proposed Amendments to the Ocean-Going Vessel At-Berth Regulation.” However, PMSA remains concerned that the preliminary cost data contains a number of inconsistencies that substantively reduce the data’s value as the basis for regulatory decision making, raise fundamental questions with respect to accuracy, and are presented in the context of numerous outstanding unknowns with respect to the proposed rule.

**Vessel Modification Costs Are Underestimated**

PMSA appreciates the effort that CARB staff undertook to collect data on the cost of complying with the At-Berth Regulation. Indeed, PMSA has endeavored, and is continuing in its efforts, to provide CARB with the most data possible in response to the Vessel Cost Surveys circulated amongst vessel owners and operators and we incorporate our correspondence to that end by reference.

With respect to the limited vessel cost data that you included in the initial report, there is a surprising and significant variability in the responses from ocean carriers on the cost of shore power retrofits and new builds. For example, the cost of retrofits among 14 containership responders ranges from a low of approximately \$250,000 to a high of approximately \$1,750,000. This range is surprisingly large and reflects a number of unreasonably low estimates. During previous meetings with CARB staff and PMSA and its members, initial discussions indicated that costs were upwards of \$1 million per vessel; and, we know from discussions with ocean carriers and ports, that cable reels represent the most expensive portion of these installation costs, at between \$300,000 and \$600,000. Yet, half the responses indicate the cost of retrofit at \$500,000 or less. PMSA believes that actual costs are still relatively in line with the original estimate used for the current regulation, where “In the cost-effectiveness analysis, staff

used \$1,500,000 as the cost to add shore-power equipment to each vessel, which is ¾ of highest reported cost.” (ISOR, Appendix E, page E-2).

The variability in the responses from bulk and Ro-Ro vessel operators is also substantial. The high value response for Ro-Ro vessels is five times the value of the low value. The high value response for bulk vessels is over four times the value of the low response. The most likely reason for these significant variances appears that there may have been issues in interpreting the questionnaire among the responders. These unbelievably low costs will skew any analysis in which they are used. CARB staff should exclude any costs below \$600,000 from their analysis.

**Application of Vessel Costs to Affected Fleets to Find Total Container Vessel Costs Raise Questions**

It is fundamentally unclear how CARB came to the conclusion that only 20 additional container vessels are necessary to be addressed in order to comply with an expanded At-Berth Rule statewide. This number is surprisingly small and likely unrealistic. It was disclosed during the meeting that one of the assumptions that CARB staff have made to arrive at this number was that 94% of all container vessels calling California will have already been retrofitted by 2021. There is no discussion of this assumption in the cost workgroup background, there was no data cited to support this assumption, nor were there any questions posed in the vessel surveys which would lend credence one way or the other to such an assumption.

CARB estimates that only 10 additional container and reefer vessels are required to be retrofitted in order to reach the 100% compliance figure and 10 additional ships would use Capture & Control technology. How these assumptions are made are unclear, but moreover the baseline assumption that only 20 ships are going to be responsible for 248 additional visits is also not likely to be realistic. On average, those 20 vessels would then each need to have just over 12 visits a year. The only way that would be possible would be if they were in a high frequency service calling both San Pedro Bay and Oakland. However, those are the vessels that are most likely to be already outfitted for shore power in order to meet current regulatory requirements, especially after the implementation of the 2020 standards. It is far more likely that the vessels that have not been retrofitted for shore power are infrequent visitors to California ports. CARB staff needs to provide the basis for the estimate of how only 20 additional vessels would provide 248 port calls and, most likely, revise the number of vessels significantly upwards using assumptions for infrequent visitors.

The estimate of the number of additional vessel retrofits also appears to assume that the fleet serving California ports is static. As PMSA and its members have discussed with CARB staff, the fleet is not static and redeployments occur as a normal part of vessel operations. As a result, for any one vessel currently calling California, multiple vessels will need to be retrofitted as maintenance needs and changing trade volumes require existing shore power-capable vessels are rotated out of California service and different non-shore power capable vessels are rotated into California service.

In addition, because CARB’s staff concept at this point is to eliminate fleet-based compliance and its related applicability thresholds, and to substitute a 100% compliance standard across all container vessels operating statewide, CARB must demonstrate what new costs are associated with the capture of

smaller container fleets, if any. Under the present concept of total statewide costs presented by staff at only 20 total vessels, it is unrealistic to conclude that there are any smaller fleets which are currently not participating that might be included in this cost basis.

No matter which numbers are utilized, CARB staff should demonstrate how the annualized costs for compliance with a 100% rule, as outlined in staff's proposed concepts, would only reach \$7.5 million per year at Full Implementation for the entire container and refrigerated vessel fleets. For a rule with outsized capital and operational costs, which CARB initially pegged at approximately \$1.8 billion through 2020 for all vessels and terminals impacted, this is an unrealistically low expectation of annualized costs (see related comments below). The carrying costs on existing capital alone will dwarf this number, not including the costs of additional retrofits and new-builds.

**Port and Marine Terminal Infrastructure Is Unrealistically Low**

One of the more troubling aspects of CARB's preliminary cost analysis is the complete dearth of estimates of the well-known, significant additional infrastructure necessary to support 100% shore power use by containerships and refrigerated vessels statewide. According to the preliminary cost estimates, the only additional infrastructure necessary across the entire State to accomplish this goal is the improvement of one, single berth. This is just simply not a credible conclusion. CARB's own enforcement report for 2016 indicates that ocean carriers had to make use of Advisory Scenario 1 ("Equipped vessel not able to receive power from shore") 327 times in 2015 and 284 times in 2016. During numerous meetings over the past year, PMSA and its members repeatedly discussed the insufficient infrastructure at berth as the primary hurdle to increasing the use of shore power for containerships.

One of the primary reasons for this is the rigidity inherent in shore power. As has been demonstrated at terminals to CARB staff, shore power cables must be dropped perpendicular from the vessel to the vault containing the shore power outlet. As a result, if there is a misalignment between the vessel and the berth – as there has been hundreds of times – it is not possible to make the shore power connection. CARB staff needs to work with PMSA, its members, and ports (the owners of this infrastructure) to evaluate how many additional shore power outlets are needed per berth. Short of turning the entire wharf face into a continuous connection point, which appears to be both technically and financially infeasible, it will not be possible to match every berthing position to a connection point.

Added infrastructure will improve the opportunity to connect substantially. The question of how to invest in additional infrastructure and its associated cost will be dependent on the allowance that the regulation will grant for the inevitable berth/vault mismatch. While connections may be feasible the vast majority of time, that fraction of time they are not, even if it is only in a tiny percentage of cases, poses unacceptable regulatory jeopardy for marine terminal operators. In addition, the only way to assess the needed infrastructure cost is to understand what level of regulatory certainty CARB expects from this regulation. In the absence of such an allowance for the rigidity shore power connections impose, it will be impossible to properly assess costs.

### **Penalty of Doubling Costs on Carriers, Ports, and Terminals Already Invested in Shorepower “Gold Standard” Solutions**

A regulatory proposal providing no accommodation for those vessels and terminals which have already invested in the infrastructure necessary to comply with the “gold standard” of shore power would continue to maintain the perverse incentive of keeping a vessel at anchorage in the event of any uncertainty. As CARB is well aware, this results in far greater emissions than would have been avoided – a situation we have seen occur many times under the existing regulation. In addition, such a regulatory concept would necessarily incentivize vessels and marine terminals to move away from shore power and to rely on emission capture systems since, in concept, such systems provide the necessary flexibility to accommodate the provisions of the regulatory concept without the fixed overhead expense.

This would also be counter-productive to the ultimate goals of the regulation, since as CARB has acknowledged, such a move would actually decrease overall Air Quality benefits, mute emission reductions, and increase greenhouse gas (GHG) emissions, but it’s the logical outcome of a rule which imposes significant cost impacts on terminals, ports and ocean carriers and then penalizes them for making investments in shore power. The penalty is obvious, these carriers, ports and terminals will be required to pay for TWO solutions to remain compliant instead of just ONE solution. This penalty is not accounted for and is an unreported Cost outcome in the present preliminary cost estimates. In requiring a standby system, the regulatory proposal imposes new costs for vessel operators and terminals operators that have already invested billions of dollars under the current regulatory framework. Again, the cost analysis does not consider the additional costs that every vessel and terminal operator will experience under the proposed regulatory concept.

An illustration of this problem is clear when examining the Port of Oakland. The Port of Oakland leases container terminal facilities only (no bulk/tanker terminals). In addition, the percentage of vessels using shore power is dramatically increasing. If, as expected and CARB staff intends, all future vessels use shore power, vessels at terminals would still need to have a standby solution in the event of equipment failure or inability to make a shore power connection. Yet, what viable business could exist serving exception cases? Further, it is not unforeseeable that there could be an equipment failure at multiple berths simultaneously; for example, at the point where electricity for the shore power system enters the terminal. In such a scenario, every berth will need an alternative control technology at a port where there would be zero demand for such technology otherwise. Terminal and vessel operators would be pushed to maintain multiple systems to avoid regulatory jeopardy.

### **State-wide Analysis Is A Flawed Cost Methodology for A Rule With Localized Impacts**

In assembling its preliminary cost analysis, CARB staff has aggregated data state-wide despite the fact that each port has very different physical and operational constraints and emissions profiles. These variances are even more critical to assess if the basis for the promulgation of this rule is focused on the need for community impact mitigation or local air basin criteria pollutant compliance purposes. As a result, the costs and benefits of implementing the measure will vary wildly between ports. Without analyses on a port-by-port measure, it will be impossible to weigh the value expanding the rule to each port. Smaller ports more likely need significant infrastructure improvements that this rule would require, but such ports also have much smaller emissions profiles. To the degree that smaller ports

must rely on alternative technologies for compliance under the regulatory proposal, it is likely that nearly all of the GHG emission increases associated with the use of alternative technologies takes place at these smaller ports. Without a port-by-port analysis, it is impossible to understand the cost versus benefits of an expanded rule, both in terms of monetary and potential GHG impact, and make an informed decision.

**Alternative Technology Costs Have Not Been Demonstrated With Evidence**

The preliminary cost analysis includes a cost of \$1,000 per hour for the use of barge-based emission capture systems. The bases for these costs are anecdotal at best and there is significant evidence that they do not represent the true cost for such systems. There is no accommodation for the capital costs of these systems or the associated costs of affiliated infrastructure.

In addition, given the limited marketplace that currently exists and the small number of suppliers that should ever be expected to enter into such a relatively small customer venue, the monopsony factors associated with these costs cannot be underestimated, as there will inevitably be market pressure to drive up costs and reduce customer service.

For instance, there have already been instances when, due to modest vessel schedule changes, a barge-based system has had to leave one vessel it was servicing to provide service to another vessel. If the rule requires that barge-based systems be present for the entire length of the vessel visit, there will need to be more barge-based systems. More systems will require a lower utilization rate per barge and, in turn, will necessitate a higher hourly cost. There have been other instances of ocean carriers competing to schedule the same barge-based system. Yet, such demand has not been sufficient to result in the construction of additional systems. For all these reasons, the cost of \$1,000 per hour most likely grossly underestimates the true future cost. CARB staff should conduct a bottom-up approach, estimating the cost to construct and operate such a barge, at a profit, and amortize those costs over the life of the equipment. Such an approach can be based on documented data, rather than anecdotal information.

CARB's cost analysis of these systems should also note whether or not the existing costs reflect actual market pricing or are more reflective of extensive government subsidies for the provisioning of such systems. Industry is unaware of the full extent to which the current system infrastructure and operations are more truly reflective of real-world market conditions or of subsidies. Industry is also unaware of whether there have been any independent evaluations of the quality of services that have been or could be provided by alternative technology systems, or of the financial durability and capitalization strength of such system providers, absent such subsidies. Such an evaluation by a party independent of public agencies, such as CARB or local air districts which are administering the subsidies in question, would be worthwhile evaluations of the true costs of these types of systems.

**Preliminary Cost Estimates Must Be Reconciled With The Regulatory Cost Context of the Existing Rule**

Under the current At-Berth regulation, the regulated container, cruise, and refrigerated vessel fleets must reach emissions reductions of at least 80% by 2020. To achieve this 80% reduction, CARB

## Comments on Preliminary At-Berth Cost Analysis

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estimated the total cost of compliance to be approximately \$1.8 billion to cover the 2014-2020 phase in period.

Compare this scope and scale with the preliminary cost estimate for this amendment: to reach the additional 20% of vessel emissions reductions from these same fleets by 2021, CARB's staff analysis shows a cost of approximately \$11.3 million in one year.

This is simply and fundamentally not a credible conclusion.

Even if one were to annualize an average annual cost of the \$1.8 billion over the full 6-year phase-in of the current rule's phase-in of participation of vessel fleets at 50% compliance in 2014, then 70% compliance in 2017, and then 80% compliance in 2020 at \$300 million per year, it is only one year later that achieving the last 20% compliance benchmark has annualized costs of only \$10 million in 2021 under this analysis.

The preliminary cost estimates demonstrate no credible basis or evidence for the belief that the cost for the achievement of the final 20% would be so radically different (order of magnitude smaller!) as to be almost negligible. In the past 10 years none of the many factors of cost that could be the reason for a reduction, including the following, have become appreciably cheaper: equipment costs, equipment technology, port real estate, electrical supply, labor.

Additionally, because the existing rule is pervasive at 80%, the vessels and related port and terminal infrastructure left to retrofit and equip for the final 20% are those for whom it was the most costly to comply in the first place. In other words, the reasonably prudent person at this point must assume that the cheapest vessels for compliance have been addressed first and that the more expensive vessels have been avoided. This would point towards higher average and marginal costs of compliance per unit, not lower.

This is consistent with economic realities known to CARB, other regulators, and regulated entities as the law of diminishing returns. That the marginal and average costs (and resulting cost-effectiveness) for having achieved the first set of first, broad, and significant emissions reductions are almost always much lower than the marginal and average costs for achieving the final, smaller, and potentially less than significant emissions reductions, is so well known as to be a truism.

The staff analysis here presents a theory which (is prima facie and by orders of magnitude) the precise opposite. Without a comprehensive and well-documented explanation as to why this should be the case there is simply no logical basis upon which the public should assume that these costs for the final 20% of compliance should have total costs and average costs which are some 95% lower for the industry than the achievement of the first 80%.

**Comments on Preliminary At-Berth Cost Analysis**

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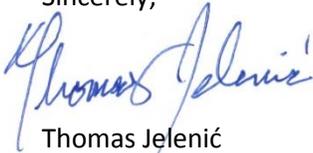
**Data and Follow-Up Requests**

PMSA requests that CARB provide the underlying spreadsheets that were used generate the tables presented as part of the preliminary cost analysis. Without understanding how the cost analysis was constructed, it will be impossible later to evaluate the cost-benefit analysis.

PMSA also respectfully requests that CARB staff work collaboratively to review and revise the equipment costs that will serve as the basis of the both the economic analysis and cost-benefit analysis through a series of collaborative workshops during this informal rulemaking phase with stakeholders.

Thank you for consideration of these comments. PMSA is available to discuss these comments in more detail with staff at any time.

Sincerely,

A handwritten signature in blue ink that reads "Thomas Jelenić". The signature is written in a cursive style with a large initial 'T'.

Thomas Jelenić  
Vice President

PMSA Comments on CARB Proposed At-Berth Regulation  
Amendment Workshop, October 9, 2017

October 9, 2017

Angela Csondes  
California Air Resources Board  
1001 'I' Street  
Sacramento, California 95812

Submitted Electronically to [angela.csondes@arb.ca.gov](mailto:angela.csondes@arb.ca.gov)

**Comments on CARB Proposed At-Berth Regulation Amendment Workshop**

Dear Ms. Csondes:

On behalf of the Pacific Merchant Shipping Association (PMSA) and its members, PMSA would like to thank the California Air Resources Board (CARB) staff for considering PMSA's comments on the proposed At-Berth regulatory amendment concepts. While PMSA continues to have significant concerns regarding the approach CARB is taking on this regulatory amendment process, PMSA does sincerely appreciate that there continues to be a constructive relationship that will allow the maritime industry to inform this rulemaking process.

Policy Basis for Rulemaking

During CARB's recent regulatory workshop on the proposed amendments, staff made clear that their goal was to propose a rule that would require every vessel on every visit to control emissions at-berth. This is a new approach on the part of CARB staff that is not consistent with the provisions proposed as part of the State Implementation Plan (SIP) in the Mobile Source Strategy recently adopted by the CARB Board or in the state's positions as adopted in the Governor's Sustainable Freight Action Plan.

*Sustainable Freight Action Plan*

The 2016 Sustainable Freight Action Plan included a provision that directed CARB to "develop and propose amendments to the At-Berth Regulation to include other vessel fleets and types." Nowhere in the proposed action does CARB identify an every vessel/every visit regulatory approach. Nor was an across the board sweeping change such as this even contemplated during the creation of the Plan, which goes on to state that "if the systems prove to be feasible and cost-effective on additional vessel types, the technology could help support an ARB staff proposal to expand the scope of the At Berth Regulation to include other vessel types and/or smaller fleets." These technologies have not been demonstrated to be "feasible and cost-effective." In fact, CARB is currently funding a further demonstration project of this technology. If staff is proposing to move forward with an every vessel/every visit regulatory concept despite the current immature state of technology, prior to commercial availability, and without cost-effectiveness criteria, then such a proposal would be inconsistent with the Governor's specific provisions for At-Berth Regulation amendments as outlined in the Sustainable Freight Action Plan. PMSA requests that the draft amendments be consistent with the description of action included in the Sustainable Freight Action Plan.

*SIP Mobile Source Strategy*

In March 2017, the CARB Board adopted the Mobile Source Strategy for inclusion in the State Implementation Plan (SIP), which lays out the State's enforceable commitments to reduce emissions. That document reiterates the same statements made in the Sustainable Freight Action Plan regarding amendments to the At-Berth Regulation. The Mobile Source Strategy goes on to say for determining the emissions benefit of the proposal that "the amendments were limited to the ports that are currently offering shore power and implementation was assumed to start in 2022 at 10 percent fleet compliance and to increase to 50 percent fleet compliance by 2032." Nowhere does the Mobile Source Strategy propose or model an every vessel/every visit approach, and such a proposal was never discussed or ever suggested in the preparation of the SIP. PMSA would respectfully request that the draft amendments be consistent with the SIP Mobile Source Strategy.

*March Board Resolution Addendum Direction to Staff*

Also in March, the CARB Board adopted a last-minute amendment to an addendum to a Resolution that was neither created by CARB staff nor circulated to the public prior to its adoption. These addendum additions have since been clarified by CARB to be mere direction to staff (see 9/6/17 Discussion Paper), that they are not amendments to the adopted SIP Mobile Source Strategy or substantive revisions of any other documents, including the Sustainable Freight Action Plan, and that staff will investigate options in future public processes. PMSA agrees with this interpretation of the March Board amendment and addendum actions.

Specifically to this regulatory process, the last-minute addendum amendment directs staff to "develop At-Berth regulation amendments that achieve up to 100% compliance by 2030 for LA Ports and Ports that are in or adjacent to areas in the top 10% of those defined as most impacted by [CalEnviroScreen]." Relying on the wording of the resolution, which did not amend the SIP Mobile Source Strategy, would lead one to the conclusion that the Board direction to staff is to ensure that the regulatory amendments ensure 100% compliance with the proposed At-Berth Strategy contained in the Mobile Source Strategy ONLY at the Ports of LA and Long Beach, and in certain other CalEnviroScreen jurisdictions, NOT for every vessel at every port. Moreover, if one were to interpret "compliance" as meaning "ensure that every vessel on every visit is subject to the rule," this would either be an amendment to the direction required by the SIP Mobile Source Strategy, or it would be a concept which is inconsistent with the SIP Mobile Source Strategy. PMSA requests that the CARB staff apply an interpretation of the last-minute amendments to the uncirculated addendum to the March Board Meeting Resolutions as "direction to staff" as described in the 9/6/17 Discussion Paper. To do otherwise would be inconsistent with the requirements adopted in the SIP Mobile Source Strategy, and that would be an impermissible revision of the SIP, and precisely what the Board specifically clarified in the 9/6/17 Discussion Paper did not occur in March.

To the extent that any portion of the proposed amendments represent significant deviations from the adopted Sustainable Freight Action Plan policy or requirements outlined in the SIP Mobile Source

Strategy, staff needs to explain how they came to the current proposal, what is the air quality need for such an expanded approach (even in places in attainment of federal air quality standards or where reductions would border on the trivial), and what is the basis from deviating from adopting policy that has been subject to the public process.

In addition, CARB staff has not identified any criteria that will inform their development of the limits of the rule. The current approach seems to be “if we can do it, we will”. The every vessel/every visit approach is no longer tied to the emission reductions sought as part of mobile source strategy, local air quality needs, technical feasibility, cost-effectiveness, or economic feasibility. Before proceeding CARB should identify the criteria that will determine the scope of the rule; conversely, it should not develop the most restrictive rule imaginable and then identify the criteria post-hoc.

#### Proposed Amendment Structure

The attachment provides a list of components that PMSA believes can serve as the structure for the At-Berth amendments. The proposed concepts build on those presented at the workshop and add flexibility elements that PMSA believes are necessary to meet the realities of the maritime industry.

CARB is proposing what is being called a “single, flexible compliance pathway”. Unfortunately, there is nothing flexible about an every vessel/every visit standard for At-Berth controls. As has been demonstrated over the past several years under the current At-Berth Regulation, different ocean carriers have different operational needs. Some ocean carriers may be able to operate under an “every vessel/every visit” structure, assuming that the appropriate exemptions exist and accommodation is made for inevitable vessel redeployments necessary to meet the needs of changing trade flows. Other carriers, because of more diverse operational needs, may need a fleet average approach.

In order to handle these differences, PMSA believes that a different structure is necessary. In addition, an alternative compliance pathway for ocean carriers that would allow the flexibility of a fleet average approach should also be included. In the attachment, PMSA provides two options that build on the ideas presented by CARB staff, but also address questions of how to handle low call vessels and ports. An alternative compliance pathway is also presented that would provide some fleets the necessary flexibility they require and a mechanism to encourage the deployment of cleaner Tier 2 and Tier 3 vessels, alternatively-fueled vessels, early compliance, or more efficient vessels.

The differences between liner and non-liner vessel services are too fundamentally different to accommodate under a single rule or compliance pathway as proposed by CARB. Many non-liner vessels will only call a California port once ever and others so infrequently as to almost never call. To make such vessels comply with California-specific requirements for a single visit or an exceptionally rare visit does not make economic sense, environmental sense, or regulatory sense. There are also practical considerations, if a vessel is allowed an exemption for a commissioning visit, how would that be handled for vessels that call California once ever or that don't make a return voyage for years at a time? The only way that the same regulatory approach could apply to liner and non-liner services equally, would be to apply similar thresholds to both groups of vessels. In the options that PMSA proposes, a threshold would establish which fleet or vessel is subject to the rule.

The “every vessel/every visit” approach also creates problems with regard to the phase-in proposed by CARB staff. As CARB staff acknowledged, how do you implement an incremental phase-in over multiple years for a single vessel visit? The likely answer is that you cannot and that subjecting a vessel engaged in international trade that will visit California only once or rarely to California-specific rules will likely result in cargo diversion that will have its own environmental impacts, as CARB has seen from PMSA’s Greenhouse Gas Route Comparison Tool. Another option hinted at by CARB staff is making the terminal operator select which vessels must comply during a phase-in period, but terminal operators have no basis to make such decisions. Further, in some cases the terminal operator may only provide stevedoring services at a public berth and may not have a contractual relationship with the vessel, and in others such a requirement could prove legally problematic. The only way a phase-in period can be successfully accomplished is from an ocean carrier perspective. As recommended in the attachment, a threshold for being subject to the rule will also allow the implementation of a phase-in period.

Finally, as we have seen during the implementation of the existing rule, the unforeseen realities of the maritime industry and waterfront cargo operations have made implementation of the rule difficult. CARB staff has tried to respond to these realities through the use of an “Advisory” on multiple occasions. CARB staff should determine if a mechanism for administrative adjustments to the rule could be incorporated in an effort to “future proof” the rule should new issues arise.

#### Determining Compliance

PMSA agrees with CARB staff that the checklist approach to determining compliance of an individual visit may be the best approach. Starting with the shared responsibility approach discussed below and in our August 4, 2017 comment letter, a short checklist of best practices necessary to ensure timely connection to shorepower could ensure that all parties work together to for successful implementation of the regulation.

As previously mentioned, ocean shipping is simply too complex for one size fits all and requires an approach with more flexibility than “every visit”. Under an alternative pathway that allows fleet averaging, PMSA recommends that CARB measure compliance in the same manner that it uses to calculate emission reductions achieved from the regulation: total time controlled divided by berthing time. Such an approach is both simple and straightforward and consistent with CARB’s emissions inventory methodology.

#### Shared Responsibility

PMSA has many reservations about the implementation of a “shared responsibility” approach. As we previously commented, not all carriers, stevedores, terminals, and port authorities have the same operating and business models, but all public Port authorities are ultimately responsible for all landside infrastructure and Port operations. If this rule expands applicability to every vessel/every visit at all California ports and harbors, it is important to reiterate that CARB is essentially capturing every conceivable commercial waterfront berthing arrangement and business transaction possible, including many at facilities do not have private marine terminal operators. And, even at most facilities where marine terminal operators are tenants of the public port authority, they cannot control any modification or expansion of the shoreside infrastructure that may be necessary to comply, as these are public works infrastructure projects requiring the port authority’s direct involvement.

As CARB's presentation acknowledged, many responsibilities may be modified as a result of a contract. The proposed regulation cannot imagine every contractual permutation and should recognize that these requirements lie with the port authority, or more broadly the facility owner (which would also encompass private facilities), unless contracted to a third party. PMSA refers CARB staff to our comment letter of August 4, 2017 (attached) for our proposal on the breakdown of responsibilities.

If a shared responsibility approach is implemented despite these concerns, it must contain two clear components. First, the ocean carrier and the terminal operator should not be held responsible for matters outside their direct control. Second, if a vessel is unable to connect as a result of issues outside the ocean carrier's control, then that visit should still count as a compliant visit in any compliance calculation under the regulation. To not do so, would be to hold the ocean carrier responsible for the actions of others. The regulation should also consider some sort of *Force Majeure* provision. As CARB knows, there can be industry-wide events, such as the labor slowdown of 2014/2015. In such instances, the regulation should be able to provide broad relief to parties experiencing compliance difficulties that are the result of the event.

#### Alternative Technology

The workshop presentation continues to point to alternative technologies as necessary to the expansion of the rule. In order for alternative technologies to be a viable solution, CARB must address two issues. If such technology is to be a replacement for shorepower under the future regulatory approach, CARB must define the emission reduction parameters that the technology must meet to be considered a replacement. Will current technology meet the requirements of the future rule? If not, what level of emission reduction will be necessary for the technology to be considered viable?

The second issue that CARB must address is feasibility and cost-effectiveness. As stated earlier, CARB has acknowledged in the Sustainable Freight document and Mobile Source Strategy that these technologies are not currently up to par for meeting future regulatory needs, stating that expansion of the rule is dependent on "if the systems prove to be feasible and cost-effective". How will CARB determine whether the technology has become feasible and cost-effective? Finally, PMSA refers CARB staff to our comment letter of August 4, 2017 (attached) for our concerns regarding alternative technology.

#### Regulatory Criteria

Given its importance to the final structure of the expanded rule, PMSA reiterates the need for CARB to identify the criteria that will inform their development of the rule. Without criteria, the current deviation from adopted CARB policy is arbitrary. The approach is no longer tied to the emission reductions sought as part of mobile source strategy, local air quality needs, technical feasibility, cost-effectiveness, or economic feasibility. CARB staff must identify what criteria will be used to determine the scope of the rule. Criteria must not be developed after the fact to fit the rule sought by CARB staff.

#### GHG Leakage and Impacts of Diversion Must Be Analyzed

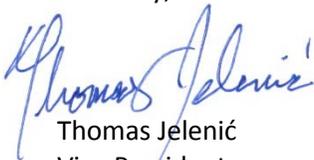
An analysis commissioned by PMSA and conducted by Starcrest Consulting Group demonstrates that emissions of greenhouse gasses (GHG) increase as certain cargo is diverted from West Coast ports. The

GHG increases are dependent on a number of factors including port of origin, port of destination, inland destination and container vessel sizes moving the cargo. As a result, policy proposals to reduce GHGs could have an opposite effect than intended when shippers and cargo owners, in response to increased costs due to regulation, divert cargo from higher-cost West Coast ports to lower-cost East Coast and Gulf Coast ports. The analysis found that GHG emissions may average up to 22 percent higher, when cargo originating from Asia bypasses California ports in favor of ports on the East Coast and Gulf Coast (see attached infographic, a copy of the report has been previously transmitted and is also available on PMSA's website). CARB must analyze the potential impacts of cargo diversion from California. A poorly crafted regulation could result in the loss of business and increase in GHG emissions, while a well-crafted regulation will retain cargo at California ports while reducing emissions.

Conclusion

Again, PMSA and its members wish to thank CARB staff as they continue to work with the maritime industry on these issues. The complexity of the issues will require further significant discussions. PMSA will meet with CARB at any time to discuss these issues at length. If you have any questions, please contact me (562) 432-4043.

Sincerely,



Thomas Jelenić  
Vice President

Attachments: PMSA Regulatory Proposal  
Greenhouse Gas Route Comparison Tool Infographic  
PMSA Response to CARB At-Berth Regulatory Concepts, August 4, 2017

cc: Cynthia Marvin, California Air Resources Board  
Elizabeth Yura, California Air Resources Board  
Jonathan Foster, California Air Resources Board  
Nicole Light, California Air Resources Board

## Regulatory Proposal

The concepts below build off the concepts presented by CARB staff at the regulatory workshop. CARB staff presented an “every vessel/every visit” approach. Given the infrequency of some vessel visits, PMSA does not believe an “every vessel/every visit” approach is feasible nor justified. Instead, PMSA proposes a modified approach for fleets (Option 1) or vessels (Option 2) that make sufficient calls to be subject to the regulation. Even such a modified approach cannot meet all of the diverse needs of today’s maritime industry, so PMSA also proposes that the regulation contain an alternative pathway that would allow fleet averaging while maintaining a high rate of compliance.

### Primary Pathway Option 1: Simplified Fleet Approach

This approach would set a threshold for a fleet to be subject to the rule and set necessary exemptions to allow flexibility.

- Applicable to fleets with “X” or more vessel calls per year to a California port
- Every visit by subject fleet must be controlled (except for exemptions)
- Exemptions would be applicable in certain, limited circumstances. Though not exhaustive, examples include vessel commissioning, vessel redeployment, equipment failure, other unexpected event, and vessels calling California no more than once per year
- Retain the requirement that if a vessel is capable of connecting and it is at a berth capable of connecting, then the vessel must connect
- Redefined berthing time
  - “Berthing Time” (or Visit) means the period that begins when clearance to work the vessel is granted by Customs and Border Protection (CBP), or other governmental agency, and the gangway is down and safety nets secured. Berthing Time (or Visit) ends when the departure Pilot assumes navigational assistance.
- Compliance based on the principle that neither ocean carriers nor terminal operators would be held responsible for actions outside their direct control and determined by checklist of best practices
- Failure to connect that is not the fault of the ocean carrier would be considered a compliant visit for any compliance calculation under the rule
- Eliminate 3 hour/5 hour rules
- Maintain exemption for natural gas-fueled auxiliary engines

## Primary Pathway Option 2: Individual Vessel-based Approach

This approach would set a threshold for an individual vessel to be subject to the rule and set necessary exemptions to allow flexibility.

- Require a vessel to be controlled on its X<sup>th</sup> visit to a California port, but no sooner than 12 months after the first visit.
- Exemptions would be applicable in certain circumstances. Though not exhaustive, examples include vessel commissioning, vessel redeployment, equipment failure, other unexpected event, and vessels calling California no more than once per year
- Retain the requirement that if a vessel is capable of connecting, it must connect
- Redefine Berthing Time
  - “Berthing Time” (or Visit) means the period that begins when clearance to work the vessel is granted by Customs and Border Protection (CBP), or other governmental agency, and the gangway is down and safety nets secured. Berthing Time (or Visit) ends when the departure Pilot assumes navigational assistance.
- Compliance based on the principle that neither ocean carriers nor terminal operators would be held responsible for actions outside their direct control and determined by checklist of best practices
- Failure to connect that is not the fault of the ocean carrier would be considered a compliant visit for any compliance calculation under the rule
- Eliminate 3 hour/5 hour rules
- Maintain exemption for natural gas-fueled auxiliary engines

### Alternative Pathway: Fleet-Averaging Approach

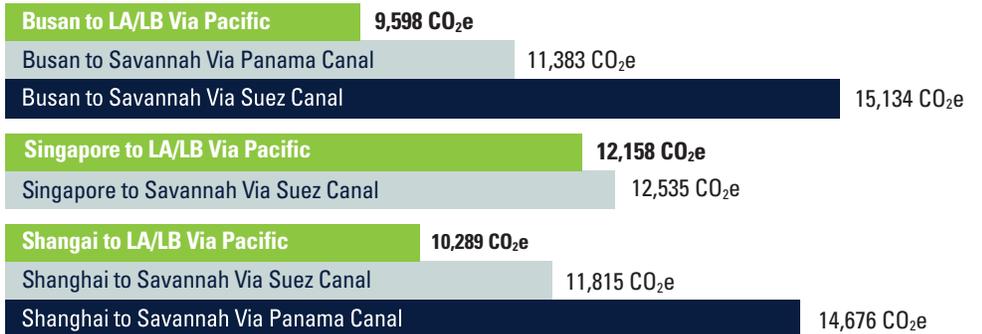
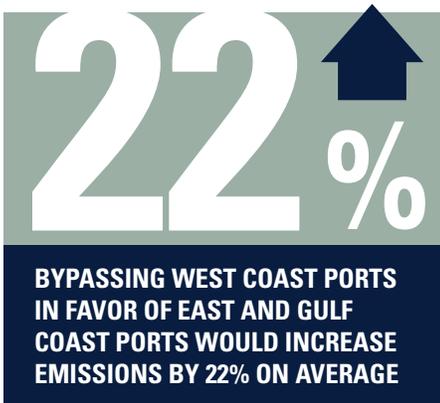
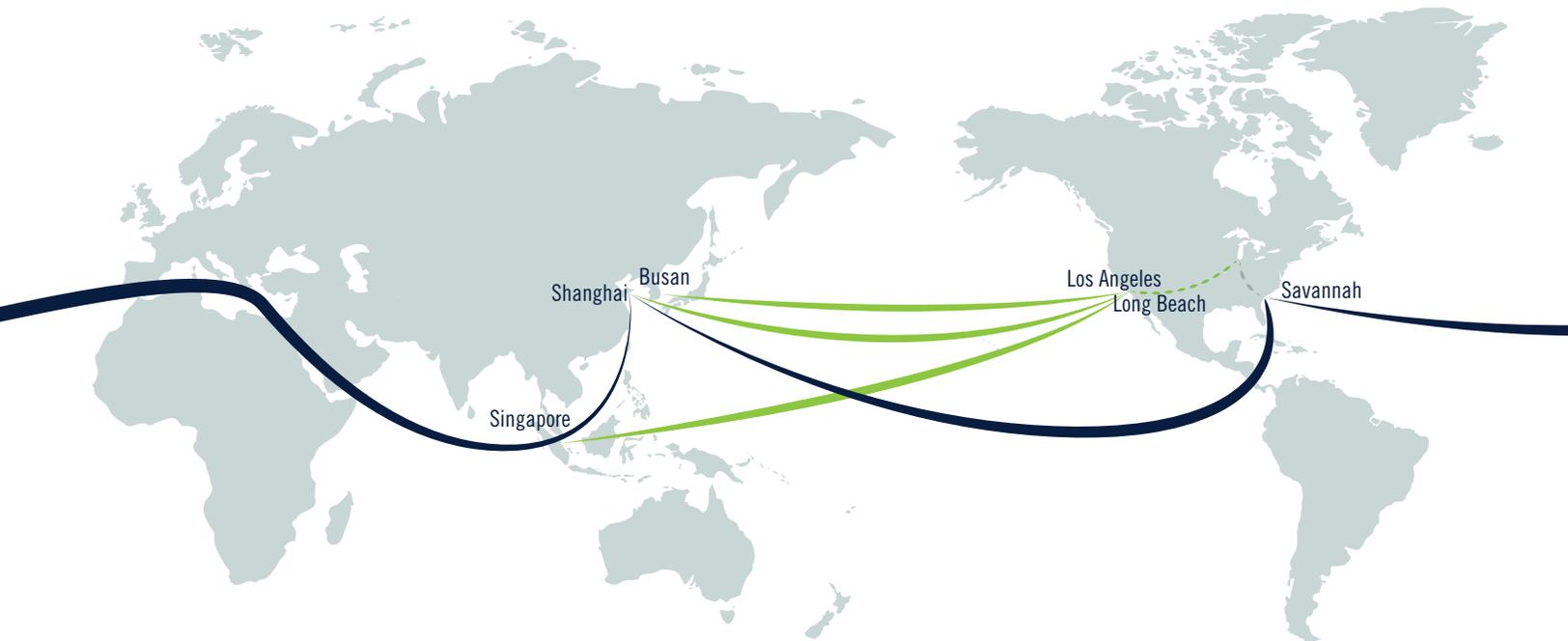
This approach would set a threshold for a fleet to be controlled but would allow exemptions to improve flexibility.

- Allow to fleets with vessels subject to the rule select this compliance option
- Fleet must meet a total time controlled goal of XX%
- Exemptions for commissioning, equipment failure, other unexpected event
- Redefined Berthing Time
  - “Berthing Time” (or Visit) means the period that begins when clearance to work the vessel is granted by Customs and Border Protection (CBP), or other governmental agency, and the gangway is down and safety nets secured. Berthing Time (or Visit) ends when the departure Pilot assumes navigational assistance.
- Compliance based on the principle that neither ocean carriers nor terminal operators would be held responsible for actions outside their direct control and determined by checklist of best practices and meet time-controlled goal as determined by ‘total time controlled for all vessels’ divided by ‘total visit time for all vessels’
- Failure to connect that is not the fault of the ocean carrier would be considered a compliant visit for any compliance calculation under the rule
- Credits to the calculation can be obtained by bringing in Tier 2 or cleaner vessels, alternatively-fueled vessels, more efficient vessels or operations, or early compliance.
- Eliminate 3 hour/5 hour rules
- Maintain exemption for natural gas-fueled auxiliary engines

# A GLOBAL PERSPECTIVE

## PROPOSED CALIFORNIA POLICIES MAY INCREASE GREENHOUSE GAS EMISSIONS DUE TO CARGO DIVERSION

Ships are the most environmentally-friendly means of moving cargo as they have the smallest greenhouse gas footprint of any transportation mode. California is a destination for cargo thanks to its proximity to Asia. On average, greenhouse gas emissions are **22% higher when shippers bypass a California port** for East Coast or Gulf Coast ports. If California policy proposals do not consider the global impacts of their rules, efforts to reduce GHG emissions in California may have the unintended effect of diverting cargo to other ports.



As calculated from the Starcrest Greenhouse Gas Route Comparison Tool. The emissions presented in this comparison are estimates of emissions that would result from the diversion of 10,000 TEUs across a string of 8,000-TEU vessels for illustrative purposes.

**1** California ports are the most direct route to inland U.S. destinations. Using California ports delivers jobs and prosperity to our communities. It also results in the lowest carbon footprint. **Moving cargo through an East Coast port to Chicago instead of a California port could increase emissions 86%.**

**2** Policies that make California ports uncompetitive will drive cargo to other gateways and increase greenhouse gas emissions. **Cargo that moves through a Gulf Coast port instead of a California port on its way to Memphis could increase greenhouse gas emissions by 47%.**

**3** California ports have not experienced growth in the past decade and have lost market share to East Coast and Gulf Coast ports. **If California ports had maintained their previous market share from 2006, more than FIVE HUNDRED THOUSAND metric tons of GHG emissions would be avoided annually.**

PMSA Comments on CARB Proposed At-Berth Regulation  
Amendment Concepts, August 4, 2017

August 4, 2017

Angela Csondes  
California Air Resources Board  
1001 'I' Street  
Sacramento, California 95812

Submitted Electronically to [angela.csondes@arb.ca.gov](mailto:angela.csondes@arb.ca.gov)

**Comments on CARB Proposed At-Berth Regulation Amendment Concepts**

Dear Ms. Csondes:

On behalf of PMSA and its members, I would like to thank California Air Resources Board (CARB) staff for considering comments on the proposed regulatory amendment concepts. This rule and others CARB is considering will directly impact the competitiveness of California's maritime industry. As you know, the cargo growth in California has stagnated for the past decade; while CARB's projections called for doubling of cargo volumes at our Ports by 2020, we have actually been losing market share, experiencing no growth while ports around the country have grown strongly. As a result, PMSA puts forward the following thoughts on the proposed regulatory framework in the hope that CARB arrives at a rule that is flexible, predictable, and fair, in order to support the state's environmental goals in a manner which also supports the renewed economic competitiveness of California's maritime industry.

The At-Berth Regulation is complex and unlike any other regulation promulgated by CARB, and, in that it directly regulates the highly varied logistics activity of internationally-flagged ocean-going vessels, is also unique worldwide and unlike any other regulation promulgated by any other public agencies. As such, while we understand that CARB staff has direction to return to their Board with regulatory concepts in just over one year, PMSA asks that CARB staff place the substantive requirements of rule development, and the supporting analysis, above meeting an arbitrary fixed schedule for rule finalization. This rule and others CARB is considering will directly impact the competitiveness of California's maritime industry. PMSA is committed to continuing our current positive working relationship with CARB staff to ensure that this rulemaking process is done as thoroughly and thoughtfully as possible and with the most efficient and cost-effective results.

**Proposed Amendment Structure**

We are pleased to see that CARB staff is proposing to eliminate the 3-hour rule. The 3-hour rule created substantial compliance problems due to its lack of accommodation for many factors outside the ocean carrier or terminal operator's control. In its place, CARB is proposing to measure compliance on an individual vessel basis. In concept, the proposal provides an opportunity to simplify compliance and reporting. However, staff has also proposed an, as yet undefined, emission reduction threshold for each visit. PMSA is concerned that, depending on how it is structured, such a threshold would duplicate the problems of the existing 3-hour rule through the creation of a variable connection window requirement. This threshold, which would vary by vessel by visit, would be far harder to administer. If the threshold

were based on emission reductions from a hypothetical baseline, every vessel would have a unique maximum connection/disconnection period allowed based upon the hypothetical baseline, auxiliary engine size/load, and forecast berthing time. This would make planning and compliance a nightmare for the regulated community, as well as for CARB.

If such a proposal moves forward, it should be with fleet-wide averaging, not on a single vessel visit. The challenge of determining compliance on a real-time basis would be extremely challenging on a per-vessel visit. Such an approach would also make compliance for short vessel calls nearly impossible. Alternatively, a vessel visit approach could be successful if it were based on a checklist of best practices to determine compliance. In such a way, every vessel would be treated equally. This approach would also provide a clear methodology to avoid the arbitrary penalties that everyone agrees are unworkable under the current 3-hour rule. PMSA would also propose that in the interest of simplicity, that a fleet-averaging approach be based on the time connected to control technology based on a regulatory (e.g., 80% in 2020). Such an approach would be easy to measure and maximize emission reductions.

#### Visit Definition

PMSA appreciates that CARB staff is revisiting the definition of berthing time. In order to address the many issues that have been discussed, PMSA proposes the following definition:

“Berthing Time” (or Visit) means the period that begins when clearance to work the vessel is granted by Customs and Border Protection (CBP), or other governmental agency, and the gangway is down and safety nets secured. Berthing Time (or Visit) ends when the departure Pilot assumes navigational assistance.

#### Updated Baseline

CARB staff has proposed updating the hypothetical baseline from Tier 0 to Tier 1. PMSA opposes this approach. Changing the baseline ignores the reductions that industry has achieved. In addition, measuring from a hypothetical baseline rather than a simpler metric such as emissions reduced or hours connected needlessly complicates reporting. Finally, because the At-Berth regulation is an operational control measure, it should not set different operational controls for different vessels. It will complicate compliance and create confusion.

#### Exemptions & Exemption Fees

PMSA supports the idea of providing exemptions from controlling emissions in some cases. For instance, both commissioning and re-commissioning of vessels is required by the international standard and often enforced by port authorities. The regulation should provide a clear exemption for these and other mandated activities. In general, fees should not be assessed for actions that ocean carriers do not have discretion over. Exemptions should also address other issues outside the ocean carrier’s control, including failure by the utility to provide power or failure by the port to maintain port-wide electrical infrastructure.

One consequence of moving to an every visit approach from a fleet averaging approach is that there is no opportunity to address vessel redeployments and drydocking without penalty. The dynamic nature of the maritime industry means that vessels will be rotated into and out of California service due to changes in trade flows or the need to drydock a vessel. Bringing a replacement vessel into California service will necessitate retrofitting the vessel. As such, CARB should provide an exemption for the initial visit of a vessel rotated into California service.

In other cases, exemption fees in the proposed regulatory concept provide flexibility in the constantly changing maritime industry. Equipment failures are a reality. In addition, such fees provide an opportunity to more quickly level the regulatory playing field between those that are unable or unwilling to comply and the vast majority of ocean carriers that are in compliance.

Initial exemption fees should be moderated to reflect the dynamic nature of the industry and the necessary fleet changes and changes in world-wide trade flows. CARB should consider a structure for “exemption fees” that reflect the ability to mitigate the inability to connect to shoreside power. As discussed later, alternative technologies, like bonnet systems, are not available in all ports and a very limited number of such systems are in existence. The “exemption fee” could reflect whether an alternative technology system was available for use or not in determining fee amount (i.e., a higher fee when such a system is available and compatible but not used versus a lower fee when a compatible system is not available).

If CARB retains a “fleet average” approach as PMSA recommends, CARB should explore the use of the “fee exemption” as means of addressing the same connections issues by allowing the use of the fee to remove the applicable visit from the fleet average calculation.

#### Shared Responsibility

PMSA and its members agree that there can be shared responsibility for compliance under the At-Berth Regulation. However, that shared responsibility must reflect the history of the rule, the role of port authorities, and decision by CARB to initially bifurcate the compliance pathway resulting in the industry overwhelmingly selecting electrification as the compliance option. This will be especially important as CARB extends this rule beyond the discrete applications of container ships, cruise ships, and refrigerated ships. Not all carriers, stevedores, terminals, and port authorities have the same operating and business models, but all public Port authorities are ultimately responsible for all landside infrastructure and Port operations. To the extent that this regulation intends to create new landside liabilities and responsibilities, it should not seek to further limit, isolate, or pick winners and losers between particular landside operating models.

These amendments must also be mindful of the fact that the largest and most glaring obstacle to compliance at present is not a lack of preparation by ocean carriers, or operating restrictions by terminals and stevedores, but it is the inadequate infrastructure necessary to meet compliance with the existing rule. Under the current rule, this will become acute in 2020, much and once fleets are required to meet an every vessel/every visit standard, as proposed in the new regulatory concept, the infrastructure deficiency will be an unavoidable barrier to compliance.

Before trying to write a rule to address the many variable market dynamics of the ever-changing maritime industry, CARB should identify the fundamental responsibilities of infrastructure. Shoreside electrical infrastructure is public infrastructure constructed and owned by the port authority and either operated directly by the port authority, or a public utility, or a marine terminal subject to a lease, or some combination of these and other relationships, contracts and agreements.

As this rule is intended to be expansive to all commercial vessels at all California ports and harbors, it is critical to note that many facilities do not have private marine terminal operators. And, even at most facilities where marine terminal operators are tenants of the public port authority, they cannot control any modification or expansion of the shoreside infrastructure that may be necessary to comply, as these are public works infrastructure projects requiring the port authority's direct involvement. As such, while Port authorities may choose to enter into contracts with stevedoring and marine terminal operators, these will vary from port to port and terminal to terminal. Therefore, if CARB intends a provision of this Rule to apply to landside infrastructure and operations, it should be designated as the responsibility of a port authority. However, PMSA would also note that nothing in this proposed Rule should impose new and distinct requirements on ports that would prohibit them from agreeing to manage the infrastructure or conduct their operations through a third party, either by lease or contract.

Below is the maritime industry's proposed framework for responsibility under the amended rule. As current infrastructure is inadequate to meet future regulatory needs, it is important that these responsibilities be set out clearly.

#### *Ocean Carrier*

- Maintain with the Port Authority (or its third party private terminal operator) an up-to-date *pro forma* vessel schedule, which would include vessel arrival time, vessel size, method and point of connection
- Provide a vessel capable of connecting to shoreside power or, for vessels not fitted to receive shoreside power, the Ocean Carrier shall arrange for the use of a CARB-certified alternative technology
- Advise the Port Authority (or its third party private terminal operator) of the operating requirements and specifications of the equipment on its vessels that will receive electrical power transmitted from shoreside facilities to the vessels.
- Equipment provided by Carrier shall be capable of protecting itself against damage in the event of a malfunction of the Port Authority's equipment.

#### *Port Authority*

- Provide sufficient shoreside infrastructure capable of providing electrical power compatible with International Electrotechnical Commission ("IEC") standard 80005-1
- In the absence of sufficient shoreside infrastructure, Port Authority shall provide sufficient equipment to extend connection points (e.g., cable management systems) or provide CARB-certified alternative technology
- Provide, as necessary and in conjunction with any third party private terminal operator if applicable, any qualified personnel required to complete the shoreside power connection

- Maintain shoreside electrical equipment as necessary and in conjunction with any 3<sup>rd</sup> party private terminal operator if applicable
- Confirm availability of berth or necessary equipment to connect Ocean Carrier's vessels based on *pro forma* schedule at the time of receipt of the *pro forma* schedule

As you know, PMSA has raised many times the issue of inadequate infrastructure causing most instances when a vessel is unable to connect. The infrastructure, designed and constructed by the port authorities, is rigid and based for a fleet that has substantially changed. Without substantially more infrastructure or tools that make the existing infrastructure more flexible, like cable management systems, the rule will need to provide allowance for prior port delays, weather delays, or other factors that are outside the control of the Ocean Carrier or Marine Terminal Operator and result in inaccessible shorepower connections.

As every port and every marine terminal within a port is unique, the infrastructure issues will need to be resolved case-by-case. If a port authority is unable or unwilling to install additional infrastructure, other solutions may be possible to implement, such as cable management systems that extend the reach of the shoreside power receptacle. To that end, CARB, in conjunction with the ports and maritime industry, should assess the need for additional infrastructure at California ports to address the ability of Ocean Carriers to meet future compliance levels. Such an assessment would also inform whether the shift to 100% compliance by 2022 is achievable.

#### Other Vessel Categories & Ports

PMSA is deeply concerned by the proposed expansion of the At-Berth Regulation to other vessel categories. The proposed amendments would also expand the regulation to currently unregulated vessel types. The impact to non-liner services, especially in small ports, will potentially be devastating. In the absence of the scheduled service that is the mainstay containerhips, other vessel types can visit any port that provides the most cost-effective service, and the commodities they often carry are extremely price sensitive. In comparison, the hoteling emissions from non-liner ships are relatively small, in line with their much smaller auxiliary engines.

Despite being verified by CARB, the existing technologies are not mature. Making other vessel categories captive to start-up companies will create regulatory and business uncertainty in California. Along with potential economic impacts (discussed further below), price sensitive break bulk, dry bulk, and ro-ro vessels could stop calling California ports. The bulk commodities in particular have very small profit margins and very competitive global markets. California's agricultural industry would be heavily impacted. In addition, most ports in California do not have the financial wherewithal to provide the necessary shoreside infrastructure in relation to the level of maritime business that they service.

#### Alternative Technologies

The creation of a single compliance pathway will ease the way for the use of alternative technologies. However, the bifurcated pathway of the original rule drove ocean carriers to invest hundreds of millions of dollars to accommodate successful electrification of their vessels – an outcome that was intended and supported by CARB. The availability of alternatives under the regulation should not be used as a reason for port authorities to avoid the construction of additional shoreside infrastructure or to create a

stranded asset problem or to put those carriers who have invested the money to comply with the existing rule at a further competitive disadvantage in the marketplace.

The use of alternative technologies should be viewed as a way to accommodate vessel redeployment or vessels not already outfitted for shoreside electrification equipment. The first goal of the regulation should be to ensure that port authorities have provided sufficient infrastructure in their ports. Failure to provide sufficient shoreside infrastructure should not result in the ocean carriers facing non-compliance and ocean carriers that have elected to retrofit their vessels for shorepower should not be obligated to shoulder additional costs for alternative control technologies. Additionally, alternative technologies also have the potential to exacerbate berth congestion/misalignment issues that terminals and vessels contend with. Some thought will need to be given for conflicts that could arise from using different technologies at the same facility.

Of course, for some of the smaller ports with infrequent vessel calls, alternative technology paths may be the only viable option for compliance. These situations must be directly and fully analyzed and unnecessary costs must be avoided.

#### Alternative Compliance

One of the limitations of the existing rule is its lack of flexibility and ability to only reduce emissions at berth. An alternative compliance pathway would have the potential to expand the possible scope of emission reductions. The goal of an alternative compliance plan would be to increase flexibility by allowing vessel operators to enter into a voluntary agreement with CARB to reduce emissions using methods beyond those envisioned by the At-Berth Regulation.

For example, ocean-going vessels are responsible for emissions while transiting to ports, anchoring while waiting for a berth, and at berth. Transiting emissions represent a significant opportunity to reduce emissions as compared to other modes of vessel emissions. As a result, it may be possible to reduce emissions significantly from transiting to offset some portion of the required at berth emission reductions, and achieve these results in a much more cost-effective manner. Additionally, a plan that allowed for a voluntary agreement of reductions between ocean carriers could incentivize the reduction of some near-community emissions (and risk reduction) to provide offsetting reductions for other sources further from communities.

Such an alternative compliance pathway should consider the vessel's engine tier, improved vessel efficiency (e.g., as achieved through larger vessels), cleaner than required fuels, engines with lower verified emissions factors, improved cargo operations (e.g., as demonstrated through reduced berth time) and reduced vessel speeds. Surplus reductions achieved through a voluntary compliance pathway could be tracked and used in a mechanism similar to the existing rule's Fleet Emission Credit. An alternative compliance pathway has the potential to incentivize the use of higher tier vessels, the deployment of scrubber systems, and induce operational changes that could have substantial impacts on air quality.

### Economic Analysis & Cost effectiveness

PMSA believes that it is important that CARB conduct a thorough economic analysis and evaluation of cost-effectiveness of the proposed rule. The escalation in costs for the proposal will be significant and in excess of the criteria to make this a regulation of significant economic impact to the state. For those already regulated under the rule, adequate infrastructure does not exist to support shorepower for every vessel/every visit. Tens of millions of dollars will need to be spent to add infrastructure, cable management systems, or alternative control technologies.

Cargo has been diverted from west coast ports for the past decade as evidenced by declining market share and strong growth of east coast and gulf coast ports (see attached chart). This is especially important because CARB's economic projections of future container growth at the time of the adoption of the current At-Berth Regulation were exceptionally aggressive, and relied on assumptions that cargo through California's container ports would double by 2020. Our industry is woefully underperforming when compared to these economic forecasts which were used to underpin the existing program's cost-effectiveness and cost-benefit analyses. Revising such rosy scenarios to reflect current conditions in the new economic analysis is crucial for an accurate representation of the regulation's true costs.

As part of CARB's cost-effectiveness and economic analysis, CARB should also analyze the environmental impacts of diversion. Cargo moved through east coast and gulf coast ports will have a higher greenhouse gas footprint than cargo moved through west coast ports. It is important that any regulation does not reduce California greenhouse gas emissions by increasing them elsewhere. Any proposal resulting in cargo diversion would cause California to lose twice: economically and environmentally. Diversion is even more likely for non-containerships.

For all of these reasons, PMSA hopes that CARB will start the first working group meeting on the economic implications that CARB staff previously proposed as soon as possible. PMSA and its members plan to be active members in that working group and any others that CARB convenes on this regulation.

### "Every Vessel" Standard and "Up To 100%" Goals and Aspirations

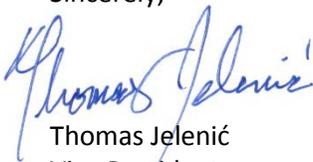
PMSA understands that the CARB Board has given "direction to staff" to seek "up to 100%" emissions reductions as a result of revised At-Berth Regulations. This is an ambitious goal, but one that gives the CARB staff sufficient discretion to explain what level of an aggressive compliance standard of less than 100% is most realistic and achievable. We believe that this does not require CARB to propose an "Every Vessel" standard, and that as a matter of practicality, CARB staff should avoid starting a discussion on setting the new at-berth regulatory discussion with an "Every Vessel" standard. We would recommend that instead of establishing this standard out of the gate, that the final goal for these proposals should initially be listed as "up to 100%" exactly as contemplated by the Board's direction to staff. This will give CARB staff, industry, ports, and the public the opportunity to talk about what the most realistic regulatory standards should actually be during the rule development process. Nothing in the real world is 100% effective or implementable and even if that is a worthy aspirational goal, it is not a realistic regulatory standard, making this a difficult specific starting point for the informal rulemaking. This would be true for a regulatory proposal that impacted a non-economically dynamic, entirely local industry that was controlled by domestic interests. For an industry that will require substantive capital improvements to mobile assets, subject to coordination of multiple layers of tremendously expensive

infrastructure across multiple infrastructure providers, it would still be unrealistic to project levels of 100% emission reductions. Even if 100% compliance is achieved, 100% emissions reductions will not be in any real world application of a rule. We would highly encourage that CARB staff avoid the initial informal rulemaking documents set the wrong expectation and tie your hands to a level of emissions reduction which will not be realistically achievable.

Conclusion

Again, PMSA and its members wish to thank CARB staff for taking the time to discuss these issues. The complexity of the issues will require further significant discussions. PMSA will meet with CARB at any time to discuss these issues at length. If you have any questions, please contact me (562) 432-4043.

Sincerely,

A handwritten signature in blue ink that reads "Thomas Jelenić". The signature is fluid and cursive, with the first name being more prominent.

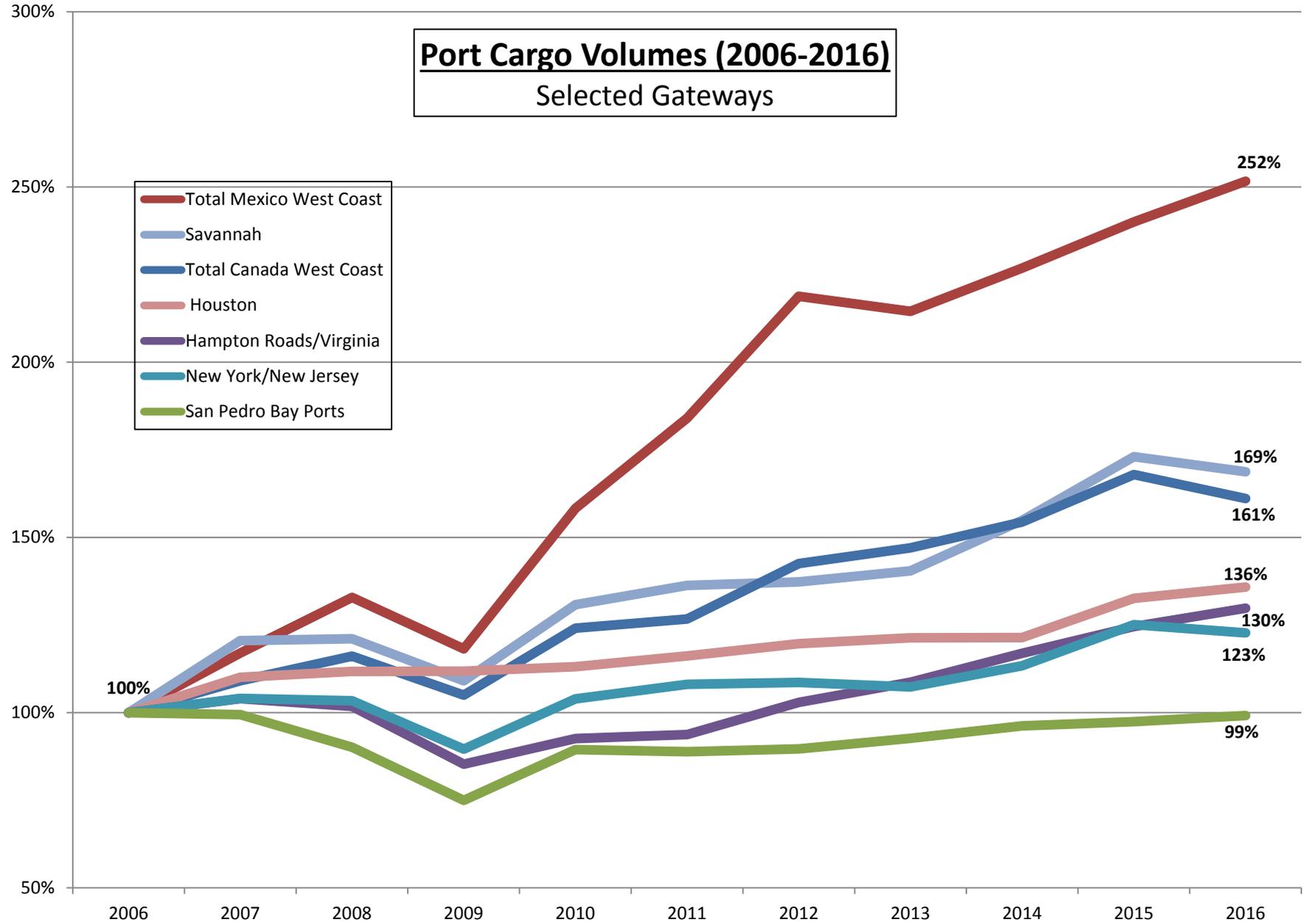
Thomas Jelenić  
Vice President

Attachment

cc: Cynthia Marvin, California Air Resources Board  
Elizabeth Yura, California Air Resources Board  
Jonathan Foster, California Air Resources Board  
Nicole Light, California Air Resources Board

## Port Cargo Volumes (2006-2016)

### Selected Gateways



Source: American Association of Port Authorities (AAPA), NAFTA Port Container Traffic Data

Attachment D:  
Alternative Proposal for  
Amendments to At-Berth Regulations  
February 15, 2019



**WSPA**

**WORLD SHIPPING COUNCIL**  
PARTNERS IN AMERICA'S TRADE

February 15, 2019

Cynthia Marvin  
California Air Resources Board  
*Delivered via email to [Cynthia.marvin@arb.ca.gov](mailto:Cynthia.marvin@arb.ca.gov)*

**Re: Alternative Proposal for Amendments to At-Berth Regulations**

Dear Ms. Marvin:

Thank you and all of the ARB staff for giving us the opportunity to develop an Alternative Proposal for moving forward with Amendments to the At-Berth Regulations for Oceangoing Vessels. We are pleased to present this Alternative Proposal to you today.

As you and your team are well aware the existing regulations on vessels at-berth within the container, cruise, and refrigerated sectors of the maritime industry have resulted in significant levels of emissions reductions well in excess of predictions, created a tremendous and globally unprecedented level of private and public investment in vessel fleets and on-shore cold-ironing infrastructure, and the rule is still being phased-in, with even stricter compliance on the horizon starting in 2020.

The Alternative Proposal builds on this strong foundation to increase compliance and expand the current rule into currently unregulated sectors. It consists of provisions meant for immediate action to address compliance issues for currently regulated fleets and outlines the next steps necessary to evaluate the basis upon which additional investments may or may not be justified in addressing the emissions of vessels while at berth.

The Alternative Proposal is a true compromise document that took two months of negotiation amongst all the parties to craft. It represents a result that is as close to consensus as possible about the best way to boost and improve compliance within the existing regulations and set a true foundation for a discussion on how, if, and when to further reduce emissions from vessels at-berth in the near future. As a true compromise document, none of our signatory organizations or their memberships agree with every aspect of the Proposal, but all of the signatory organizations commit their resources and attention to working with CARB to improve the current regulation for existing regulated fleets and facilitate the process for evaluating future rule expansions consistent with the principles described here.

We very truly look forward to immediately improving the current rule and working to achieve the most cost-effective and successful future emissions reductions from the waterfront as possible.

Sincerely,  
***California Association of Port Authorities  
Pacific Merchant Shipping Association  
World Shipping Council***

***Cruise Lines International Association  
Western States Petroleum Association***



## 2019 At-Berth Regulation - Alternative Proposal

### Executive Summary

All signatory parties to this Alternative Proposal share the California Air Resources Board (CARB) goal of reducing health impacts related to waterborne-related goods movement emissions impacting local residents. We would like to thank CARB staff for the opportunity to develop the following Alternative Proposal as we are moving forward with Amendments to the At-Berth Regulations for Oceangoing Vessels and are pleased to present the following.

Existing at-berth regulations have resulted in significant emissions reductions well in excess of original agency projections. This success has resulted from the collaboration of many key public and private stakeholders, and has included an unprecedented level of worldwide investment in vessel fleets and shore-side power infrastructure. This Alternative Proposal establishes additional compliance procedures for the current Shore Power Rule as the last emission reduction target is reached in 2020, while offering a path forward toward potential increased emission reductions from existing and new vessel classes in the years to follow.

### **Highlights**

- Requires that every shorepower-equipped vessel plug-in while at a berth which is able to provide shoreside power to that vessel;
- Is consistent with the emissions reductions goals set by CARB staff proposal;
- Improves and streamlines compliance methodologies for currently regulated fleet;
- Expands regulatory framework to include reporting requirements and evaluation benchmarks for currently unregulated vessels;
- Creates new compliance and reporting requirements for ports and marine terminal operators;
- Establishes a feasibility and cost-effectiveness framework for evaluating potential new shore power requirements and infrastructure needs;
- Reinvests non-compliance fees in new Port infrastructure or waterfront emissions reductions; and
- Establishes prioritization dialogue for investment of private and state Incentives dollars.

This Alternative Proposal builds on California's strong regulatory foundation for reducing vessel emissions while at berth. It outlines a program that will increase compliance and bring currently unregulated vessels into the regulatory framework.

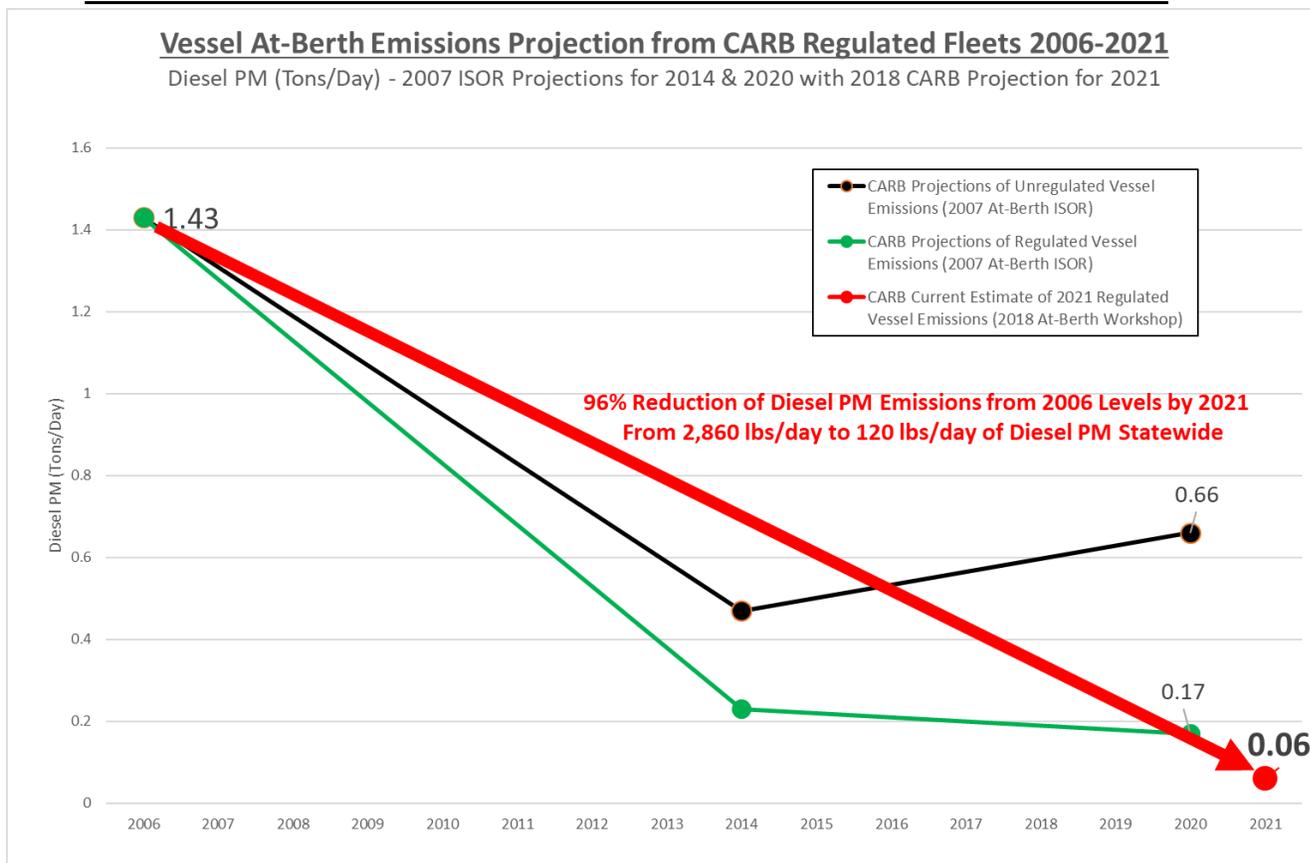
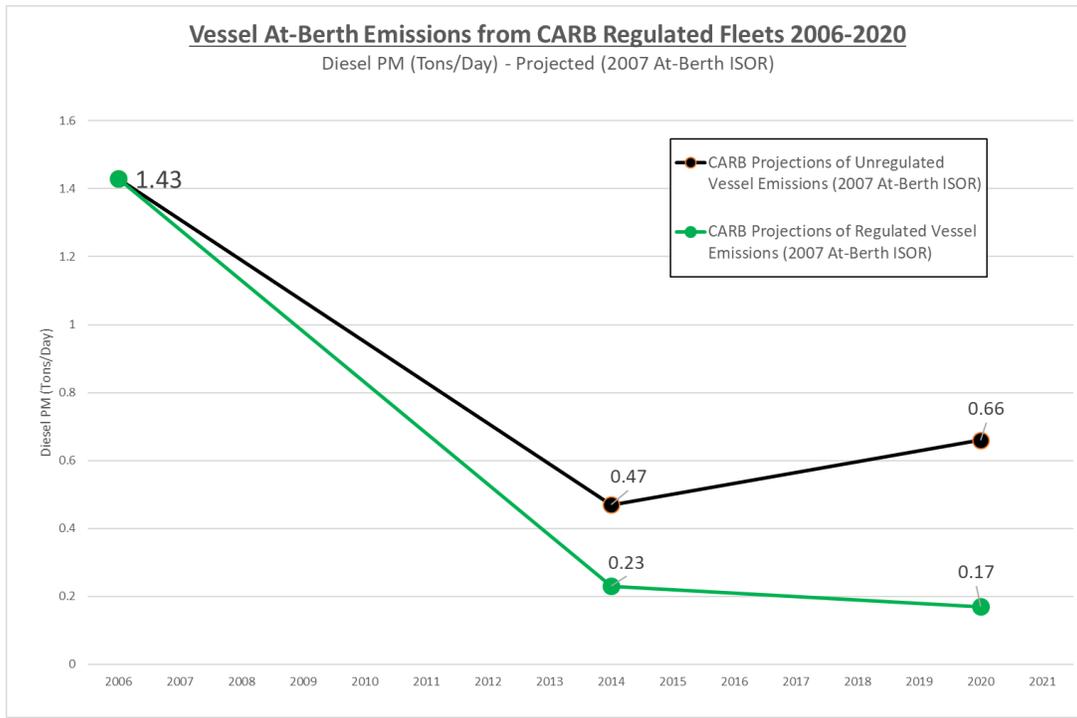
All of the signatory parties commit to continuing this dialogue and to serious consideration of amendments to create and perfect an achievable rule and set of standards that meet the needs of industry, the state, and local public health interests.

## **Background – Current Regulatory Benefits and Industry Achievements**

***CARB currently administers the world's most comprehensive At Berth ocean-going vessel regulation.*** At the time of its adoption this rule was predicted to result in tremendous, unprecedented air quality benefits and also billions of dollars of new investments in vessel and port electrical infrastructure. Under the current At-Berth regulation, CARB staff estimated (in the original 2007 ISOR) that:

- "... the proposed regulation would reduce hoteling diesel PM and NOx emissions from container ships, passenger ships, and refrigerated cargo ships by 50 percent and 75 percent relative to levels expected to be emitted in 2014 and 2020, respectively." (pg. 14)
- "...approximately 1,100 tons of diesel PM and 61,700 tons of NOx will be removed from California's air between 2006 and 2020 due to the implementation." (pg. 15)
- "For the container-ship category, the regulatory period is 2009-2030 to account for ship turnover. Total emissions reductions to 2030 are 2,600 tons of diesel PM and 140,000 tons of NOx." (pg. 16, Table 4)
- "In addition, hoteling CO2 emissions are expected to be reduced by 122,000 to 242,000 metric tons in 2020." (pg. 14)
- "... total statewide costs for affected businesses and port authorities to comply with the proposed regulation to be approximately \$1.8 billion, in 2006 dollars." (pg. 21)
- "Annually, the costs are expected to vary from \$30 million to \$137 million. ... the high end of the range represents a year when capital expenditures are being made for shoreside infrastructure and for retrofitting a considerable number of ships to meet the 2020 milestone." (pg. 21)
- "The total costs to a typical ship company complying with the proposed regulation, including capital and ongoing costs are estimated to be about \$34 million. This cost would be distributed over the years 2009 to 2020 for passenger ship companies and reefer ship companies and to 2030 for container ship companies." (pg. 21)
- "Similarly, the total costs to a typical terminal operator complying with the proposed regulation, including capital and ongoing costs, are estimated to be about \$11 million. ... With 31 terminals and 35 vessel fleets affected by the proposed regulation, the costs to a typical business would be \$26 million." (pp. 21-22)
- "The costs to be expended by the port authorities to add shore-power equipment to their facilities ranges from \$4 million to \$86 million. ... Staff assumes that the landlord ports will work with their tenants, the terminal lessees, to provide the shoreside infrastructure necessary to meet the requirements of the proposed regulation. Furthermore, staff assumes that the landlord ports will eventually recover their capital costs through modifications to terminal leases, while the non-landlord ports will recover their capital costs through fees collected from the carriers." (pp. 22-23)

The results of the current rule and the resulting estimated \$1.8 billion investment by the regulated components of the maritime industry have been impressive – with total Diesel PM projected by CARB staff to be reduced by 96% since 2006 in 2021. (see below charts based on CARB data, Attachment A)



## **Alternative Proposal Overview**

The Alternative Proposal establishes a path forward to increase compliance and continue to ensure further emission reductions from vessels while at-berth in California ports. The Proposal includes measures to ensure compliance and emissions reductions consistent with current CARB emissions goals, expand investments in port infrastructure, and increase vessel compliance.

CARB currently regulates Container, Passenger and Refrigerated vessel fleets and the ports they visit. CARB has also determined currently unregulated vessel fleets include Ro-Ro, Auto Carrier, Liquid Bulk and Tanker vessels and the ports they visit.

### ***Improves the Currently Regulated Vessel Program***

The following outcomes will be assured through a series of amendments to the existing rule:

- Improves and streamlines compliance methodologies for the currently regulated fleet in 2020.
- Creates new compliance and reporting requirements for ports and marine terminal operators.
- Requires that when a terminal is able to provide shorepower to a shore power-equipped vessel that the vessel must plug-in while at berth, subject to exceptions or exemptions.
- Reinvests non-compliance fees in new Port infrastructure or waterfront emissions reductions.
- Prioritizes cost-effective investment of private and CARB Incentives dollars.
- Establishes a consensus regulatory framework for the evaluation of future rule expansions.

With respect to currently Regulated Vessel Fleets and Ports, the Alternative Proposal would update and improve current vessel compliance mechanisms applicable immediately to the 2020 fleet requirements, establish new and expanded marine terminal and port compliance requirements, and create a framework for new investment in at-berth infrastructure.

With respect to currently Unregulated Vessel Fleets, these fleets would be included in the amendments as well. The Alternative Proposal would establish reporting compliance methodologies and evaluation benchmarks consistent with the current staff proposal for Bulk vessels for all vessel types and meet all of CARB's SIP requirements, the Climate Change Scoping Plan, and the AB 617 Blueprint.

### ***Builds a Framework to Include Future Vessel Types and Fleets***

During the November 2018 work sessions held with the Industry Coalition and its members, CARB indicated that to be viable, an Alternative Proposal should at least meet and achieve the following principles:

- Emissions reduction goals of the current CARB staff proposal must be met
- All parties to a successful at-berth connection must have substantive roles to play in the new regulatory framework for the currently Regulated Vessel Fleets: vessels, marine terminal operators, ports, and equipment providers.
- If a "check-list" approach is applied to currently Regulated Vessel Fleets, non-compliance must have consequences.
- Vessel Fleet rules should not include complicated credit or trading schemes.

## **Alternative Proposal – Substantive 2020 Effective Amendments**

*All provisions Effective Immediately upon Adoption at December 2019 CARB Board Meeting*

### **FOR CURRENTLY REGULATED VESSEL FLEETS AND ASSOCIATED TERMINALS and PORTS:**

- CONNECTING EQUIPPED VESSELS – When a Shorepower-Equipped Berth is available and able to safely Connect a Shorepower-Equipped Vessel, the connection must be made.  
No time-based rules (including 3&5-hour rule). Commissioning is presumed to be a Connection. Use updated definitions for vessel connected, plugged, and able to work.
- PORTS and MARINE TERMINALS ARE REQUIRED TO PLAN & REPORT – all Ports and Marine Terminal Operators must comply with recordkeeping, reporting rules and submit Terminal Plans with subsequent updates beginning in 2021 for currently regulated fleets. Updates must include description and timeline of all infrastructure installations planned at specific-berths.

### **Accelerated Transition to New Requirements & Improve Compliance Over Current Rule**

- Enforce Vessel Fleet Compliance against Vessel Compliance Checklist (to be developed)  
Vessel Fleet Compliance would be determined on an Annual Fleet-Average Basis by Port  
2020 – 80% compliance w/ checklist  
2031\*– 85% compliance w/ checklist \*(dependent on feasibility and rulemaking)  
Vessel Fleet Compliance reporting would occur on an Annual Basis  
Update and improve current reporting requirements and avoid usage of old technology or applications (i.e. approve uses of automated technologies).
- Enforce Marine Terminal compliance against Terminal Compliance Checklist (to be developed)  
Marine Terminal Compliance would be determined on an Annual Berth-Average Basis  
2022 – 80% compliance w/ checklist  
2031\* – 90% compliance w/ checklist \*(dependent on feasibility and rulemaking)  
Marine Terminal Compliance reporting would occur on an Annual Basis  
Marine Terminal 30-day Reports for non-connection, equipment, & electrical issues
- At-Berth Infrastructure Incentive Funding Applications by Ports remain eligible for GGRF/VW Incentives independent of Vessel or Terminal Checklist compliance status
- Conform and maintain existing exemptions and exceptions plus add new and clarifying exceptions for Vessel and Marine Terminal safety and force majeure situations
- Maintain existing regulatory thresholds for minimum number of calls for Regulated Fleets on a port by port basis (including treating LA/LB as one port for Fleet thresholds)

### **FOR ALL CURRENTLY UNREGULATED VESSEL FLEETS AND ASSOCIATED MARINE TERMINALS and PORTS:**

- BULK CARGO, RO-RO & TANKER VESSEL FLEETS ARE REQUIRED TO REPORT – all vessels must report General Visit Information Annually beginning in 2021
- PORTS and MARINE TERMINALS ARE REQUIRED TO PLAN & REPORT – all Ports and Marine Terminal Operators serving currently unregulated fleets must comply with recordkeeping, reporting rules and submit Terminal Plans with subsequent updates beginning in 2024

### **FOR OPERATORS OF ALTERNATIVE EMISSIONS CONTROL STRATEGIES:**

- Certification must demonstrate cost-effectiveness and Emissions Control greater than Vessel Fleet Average Basis standard

**APPLICABLE TO ALL AT BERTH RULE EXPANSION AMENDMENTS FOR THE CURRENTLY REGULATED FLEET AND CURRENTLY UNREGULATED FLEET**

- Conduct a feasibility study to identify cost effective emission control programs for all vessel categories based on reasonable implementation deadlines, safety concerns, and technological feasibility. This feasibility study should be conducted in cooperation with all industry stakeholders, be based on data which is made publicly available during study development, and include a detailed evaluation of all of the following:
  - (i) the status and timing of rule implementation in light of port/terminal infrastructure planning and any future infrastructure development potentially necessary to provide at-berth emissions controls, with future infrastructure designation to include rigorous cost estimates of any necessary electrical infrastructure modifications or alternatives,
  - (ii) the existing shore-side electrical infrastructure, including electrical sub-station and off-terminal electric utility infrastructure, and present availability of alternatives,
  - (iii) the feasibility of alternative at-berth emission control technologies to capture emissions from ships that cannot plug in to shore power, including vessel types that can't use the alternatives in each vessel category and for different engine sizes, and including currently unregulated vessel fleets,
  - (iv) the number and types of alternative control technologies that would be needed at each California port,
  - (v) navigation, safety and harbor logistical considerations, especially for barge systems,
  - (vi) cost effectiveness of various rule expansion scenarios and alternative programs based on a detailed estimate of the additional emission reductions to be gained with possible expansion of the rule, including an assessment of additional costs on a cost per ton of emissions reduced basis under all possible additional infrastructure scenarios,
  - (vii) determine how the marginal cost of various potential port emission control programs compare to other potential efforts to reduce emissions from other sources at ports which could be more cost-effective investments for control programs.
  - (viii) opportunity costs as at-berth regulations impose substantial infrastructure obligations on the industry, funds may need to be diverted from other important air quality programs, including zero- and/or near-zero emissions vehicles and equipment, to ensure compliance as soon as possible.
  
- Evaluate emission control programs for all key source categories that operate in and around ports in order to prioritize incentive funding from GGRF/VW and other sources of incentive funds and maximize total emission reduction per dollar, with the most long-term residual emissions benefits, and facilitating highest cost-effectiveness. For programs that operate throughout California, evaluate ports within regional context (versus other regional potential sources of prioritized health risk or criteria pollutant evaluation) instead of by comparing ports against each other.

**SUBSEQUENT ACTION FOR CURRENTLY REGULATED VESSEL FLEETS, MARINE TERMINALS, and PORTS:**

*For Implementation After Current Rulemaking (2021 and beyond):*

- Establish regular feasibility “check-in” steps as part of the rule, 2022, 2025, 2028, 2031, to assess whether the proposed implementation deadlines remain viable or can be accelerated through additional amendments to the rule.
  
- Any acceleration would require providing vessels with at least 18 months’ notice in advance of a future rule effective date.

## **CONCURRENT AND SUBSEQUENT ACTIONS FOR CURRENTLY UNREGULATED VESSEL FLEETS, MARINE TERMINALS, and PORTS:**

### *During Rulemaking (2019-2020):*

- Immediately disclose the Bulk Vessel cost-effectiveness calculations which led to their exclusion from emissions reductions.
- Compare Bulk Vessel cost-effectiveness with other vessel cost-effectiveness calculations for Tankers and Ro-Ro's.
- Contrast DPM reductions from the Ro-Ro and Tanker fleets with other sources of emissions at and near Ports and Terminals.
- Conduct actual emissions profiles for all bulk, ro-ro, and tanker terminals, individually by actual operating Port facilities, not "Port Complex" entities.
- Evaluate all bulk, ro-ro, and tanker terminals, individually for shore-based alternative emissions controls, and water-based alternative emissions controls.

### *After Rulemaking (2021 and beyond):*

- Establish program staff calendar and deliverable to the Board for future discussion of whether or not these vessel fleets are good subjects for statewide rulemaking or if their emissions are best off-set through incentives, MOUs, or alternative emission reduction strategies. Discussion required in context of SIP, AB 617, and Scoping Plans.
- Establish 2025, 2028 and 2031 as target dates for full reviews of Bulk, Ro-Ro, and Tanker Reporting Data and Terminal infrastructure plans and application of new evaluation of Cost-Effectiveness Data and Emissions.

## **PRIORITIZATION OF AWARDED PORT (AT BERTH OR ALTERNATIVE) INCENTIVES AND USE OF NON-COMPLIANCE FEES:**

### *During Current Rulemaking and After Rulemaking (2019 and beyond)*

- Prioritize Port projects and emissions reductions alternatives for receipt of GHG Reduction Fund and VW Settlement Fund proceeds
- Take a multi-pronged approach towards incentives for new At-Berth or alternative emissions reductions programs at Ports which is reflective of need for multiple strategies and approaches, and which acknowledges need for demonstrations to help establish cost-effectiveness and feasibility goals
- Utilize non-compliance fee revenues to build pooled funding which can be reinvested into shorepower infrastructure or other port-related air quality programs in accordance with prioritization based on cost-effectiveness

# Attachment A

## Data References

2007 ISOR, pg. 6-7:

### 3. EMISSIONS INVENTORY

Hotelling emissions are associated with the use of diesel-fueled auxiliary engines on ocean-going ships to power the vessels' electrical systems while the ships are docked. These emissions are a function of how often the ship visits a California port, how long the ship is at berth, the emissions rate of the engines, and the typical operating load of the auxiliary engines while the ship is at berth.

ARB staff estimates that in 2006, the statewide hotelling emissions from approximately 2000 ocean-going vessels was 1.8 tons per day (TPD) of diesel PM emissions, and 21.1 TPD of NOx emissions. Table I presents hotelling emissions for the six major categories of ocean-going vessels that visit California ports—container ships, passenger ships, reefer ships, vessel carriers, bulk ships, and tankers. As can be seen in this table, hotelling emissions from the three affected ship categories, container ships, passenger ships, and reefer ships, represent over 80 percent of total statewide hotelling emissions.

**Table 1: Estimated 2006 Hotelling Emissions by Ship Category**

Ship Category	2006 Emissions, Tons/Day	
	NOx	PM
Container	13.8	1.1
Passenger	2.8	0.2
Reefers	0.9	0.1
Tanker	2.0	0.2
Bulk/General	1.0	0.1
Vehicle Carriers	0.6	0.1
Totals	21.1	1.8

**Table 2: Estimated 2006 Hotelling Emissions by Port (Tons per Day)**

Port	NOx	PM
Los Angeles/Long Beach	14.3	1.2
Oakland	2.6	0.2
San Diego	1.1	0.1
Hueneme	0.7	0.1
San Francisco	0.5	0.1
Other Ports	1.2	0.2
Total	21.1	1.8

As can be seen in this table, most of the shipping activities and hotelling emissions occur at the largest ports in California: Los Angeles and Long Beach followed by Oakland. The six ports affected by the proposed regulation account for over 90 percent of total hotelling emissions at California ports.

Staff developed growth factors for each ship category to project future hotelling emissions. In general, the growth in vessel hotelling emissions is directly proportional to the growth in vessel visits, ship size, berthing times, and, in the case of container ships, the number of refrigerated containers aboard.

Hotelling emissions from ocean-going ships are predicted to increase from 2006. Container ship and passenger ship emissions are expected to double by 2020. Reefer ship emissions are expected to decline at the Ports of Long Beach and Los Angeles, slightly increase at the Port of Hueneme, and triple at the Port of San Diego by 2020.

Table 3 presents projected 2014 and 2020 emission estimates for container ships, passenger ships, and reefer ships. In December 2005, the Board adopted an auxiliary engine fuel regulation that would limit the sulfur content of fuel used with auxiliary engines starting in 2007. At the time this staff report was published, the regulation had been challenged in federal district court and is undergoing appeal at the Ninth Circuit Court of Appeals. The future emission projections were based on the assumption that the auxiliary engine regulation would ultimately be upheld and the auxiliary engines would be operating on low-sulfur fuel.

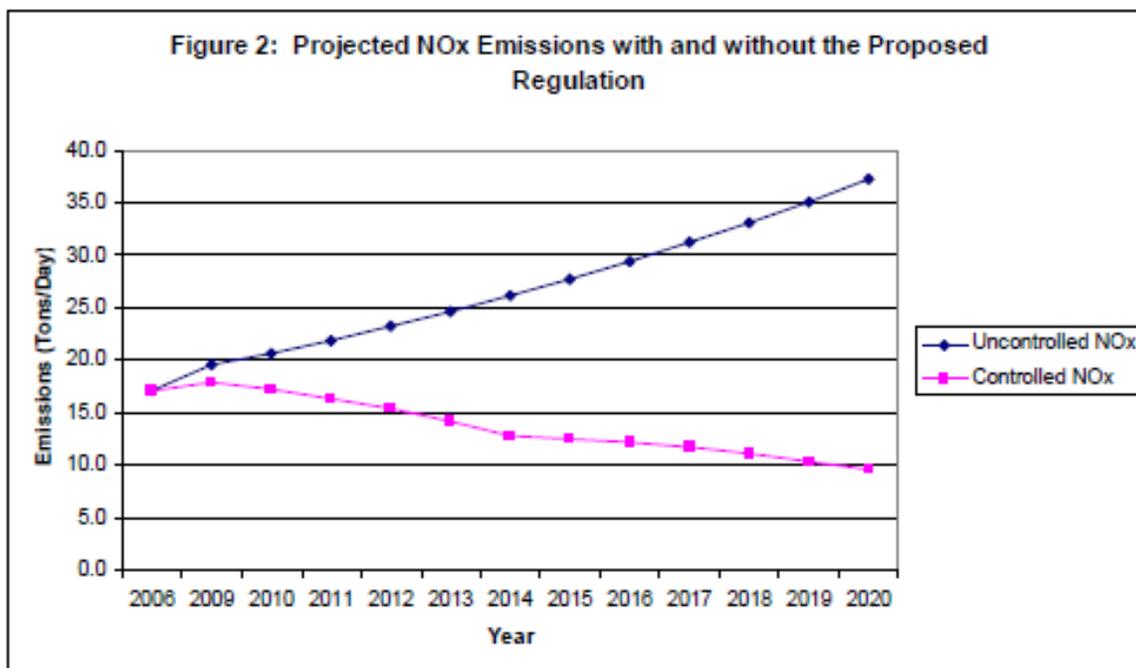
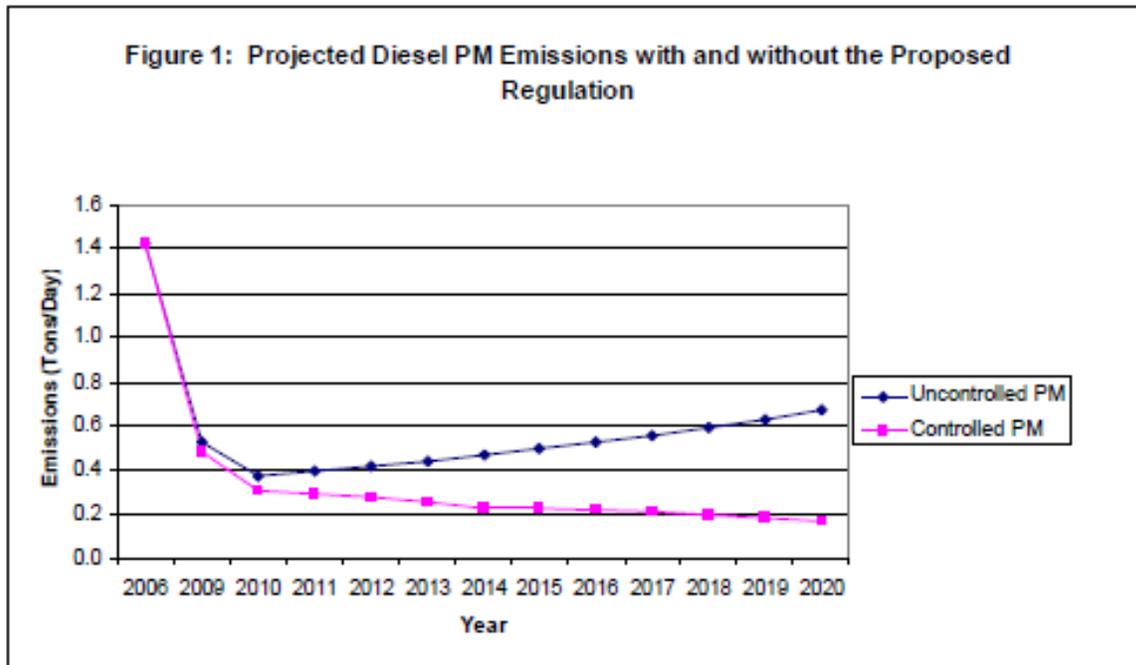
2007 ISOR, Appendix B, pg. B-19:

### III. EMISSION ESTIMATES

Using the revised methodology we can estimate emissions associated with container, cruise, and reefer vessels operating at ports subject to the proposed Shore Power Regulation. Table III-1 provides auxiliary engine hotelling emissions estimates by vessel type; we estimate covered emissions sources emit about 17 tons/day NOx and 1.5 tons/day PM in 2006. Assuming existing controls (without the benefit of the proposed regulation) we estimate NOx emissions will grow in 2020 to approximately 37 tons/day, and in 2020 PM emissions will grow to approximately 0.6 tons/day. As the data suggest, ARB's auxiliary engine regulation that was adopted in 2005 will generate significant reductions in future years.

**Table III-1 Auxiliary Engine Hotelling Emissions by Vessel Type without Shore Power Regulation**

Emissions - 2006 (tons/day)				
Vessel Type	NO <sub>x</sub>	PM <sub>10</sub>	ROG	SO <sub>x</sub>
Container	13.8	1.12	0.32	8.1
Cruise	2.5	0.24	0.06	1.7
Reefer	0.9	0.07	0.02	0.5
<b>Total</b>	<b>17.1</b>	<b>1.43</b>	<b>0.40</b>	<b>10.33</b>
Emissions - 2014 (tons/day)				
Vessel Type	NO <sub>x</sub>	PM <sub>10</sub>	ROG	SO <sub>x</sub>
Container	21.5	0.38	0.52	0.57
Cruise	3.6	0.07	0.09	0.09
Reefer	1.0	0.02	0.03	0.03
<b>Total</b>	<b>26.1</b>	<b>0.47</b>	<b>0.63</b>	<b>0.69</b>
Emissions - 2020 (tons/day)				
Vessel Type	NO <sub>x</sub>	PM <sub>10</sub>	ROG	SO <sub>x</sub>
Container	30.8	0.55	0.75	0.82
Cruise	5.2	0.09	0.12	0.13
Reefer	1.3	0.02	0.03	0.04
<b>Total</b>	<b>37.3</b>	<b>0.66</b>	<b>0.91</b>	<b>0.99</b>



CARB, "CARB Draft At Berth Emissions Estimates (from Aux Engines and Boilers) under Existing Regulation and Draft Regulatory Concept (11/8/2018)" ("2018 Emissions Estimates")

2018 Emissions Estimates, DPM Inventory A:1-AE:23

2016 At-Berth Existing Rule Diesel PM (DPM) Emissions (Tons/Year)															
Auxiliary Engine Emissions DPM (Tons/Year)															
Air Basin	San Francisco Bay Area Air Basin						South Coast Air Basin		South Central Coast Air Basin	Sacramento Valley Air Basin	San Diego Air Basin	San Joaquin County Air Basin	North Coast Air Basin		
Ships	Carquinez MTC	Rodeo MTC	Oakland	Redwood City	Richmond MTC	San Francisco	Long Beach	Los Angeles	Hueneme	Sacramento	San Diego	Stockton MTC	Eureka	Total (TPY)	
Container/Reefers	0.0	0.0	4.9	0.0	0.0	0.1	5.7	7.0	0.7	0.0	0.1	0.0	0.0	18.5	
Tanker	2.7	1.1	0.0	0.0	3.6	0.1	4.1	1.8	0.1	0.0	0.5	0.5	0.0	14.5	
Cruise	0.0	0.0	0.0	0.0	0.0	1.9	1.8	0.8	0.0	0.0	0.8	0.0	0.0	5.2	
Roro	0.6	0.0	0.0	0.0	0.5	0.0	0.7	0.6	0.9	0.0	1.5	0.0	0.0	5.0	
Bulk/General	0.3	0.0	0.1	0.1	0.2	0.0	0.6	0.7	0.1	0.4	0.1	1.0	0.0	3.7	
<b>Total</b>	<b>3.6</b>	<b>1.1</b>	<b>5.0</b>	<b>0.1</b>	<b>4.3</b>	<b>2.1</b>	<b>12.9</b>	<b>10.9</b>	<b>1.8</b>	<b>0.4</b>	<b>3.0</b>	<b>1.5</b>	<b>0.0</b>	<b>46.8</b>	

2021 At-Berth Existing Rule DPM Emissions (Tons/Year)															
Auxiliary Engine Emissions DPM (Tons/Year)															
Air Basin	San Francisco Bay Area Air Basin						South Coast Air Basin		South Central Coast Air Basin	Sacramento Valley Air Basin	San Diego Air Basin	San Joaquin County Air Basin	North Coast Air Basin		
Ships	Carquinez MTC	Rodeo MTC	Oakland	Redwood City	Richmond MTC	San Francisco	Long Beach	Los Angeles	Hueneme	Sacramento	San Diego	Stockton MTC	Eureka	Total (TPY)	
Container/Reefers	0.0	0.0	4.0	0.0	0.0	0.2	5.9	6.1	0.2	0.0	0.1	0.0	0.0	16.5	
Tanker	2.6	1.1	0.0	0.0	3.5	0.1	4.4	2.0	0.1	0.0	0.6	0.5	0.0	14.9	
Cruise	0.0	0.0	0.0	0.0	0.0	2.0	1.6	0.7	0.0	0.0	0.9	0.0	0.0	5.2	
Roro	0.7	0.0	0.1	0.0	0.6	0.0	0.9	0.8	1.0	0.0	1.7	0.0	0.0	5.9	
Bulk/General	0.4	0.0	0.1	0.1	0.2	0.0	0.8	0.9	0.1	0.5	0.2	1.2	0.0	4.3	
<b>Total</b>	<b>3.7</b>	<b>1.1</b>	<b>4.1</b>	<b>0.1</b>	<b>4.3</b>	<b>2.3</b>	<b>13.7</b>	<b>10.5</b>	<b>1.4</b>	<b>0.5</b>	<b>3.5</b>	<b>1.7</b>	<b>0.0</b>	<b>46.9</b>	

2021 At-Berth Draft Regulatory Concepts DPM Emissions (Tons/Year)															
Auxiliary Engine Emissions DPM (Tons/Year)															
Air Basin	San Francisco Bay Area Air Basin						South Coast Air Basin		South Central Coast Air Basin	Sacramento Valley Air Basin	San Diego Air Basin	San Joaquin County Air Basin	North Coast Air Basin		
Ships	Carquinez MTC	Rodeo MTC	Oakland	Redwood City	Richmond MTC	San Francisco	Long Beach	Los Angeles	Hueneme	Sacramento	San Diego	Stockton MTC	Eureka	Total (TPY)	
Container/Reefers	0.0	0.0	1.6	0.0	0.0	0.2	1.7	2.1	0.1	0.0	0.0	0.0	0.0	5.6	
Tanker	2.6	1.1	0.0	0.0	3.5	0.1	4.4	2.0	0.1	0.0	0.6	0.5	0.0	14.9	
Cruise	0.0	0.0	0.0	0.0	0.0	0.6	0.8	0.4	0.0	0.0	0.3	0.0	0.0	2.1	
Roro	0.7	0.0	0.1	0.0	0.6	0.0	0.9	0.8	1.0	0.0	1.7	0.0	0.0	5.9	
Bulk/General	0.4	0.0	0.1	0.1	0.2	0.0	0.8	0.9	0.1	0.5	0.2	1.2	0.0	4.3	
<b>Total</b>	<b>3.7</b>	<b>1.1</b>	<b>1.8</b>	<b>0.1</b>	<b>4.3</b>	<b>0.9</b>	<b>8.6</b>	<b>6.2</b>	<b>1.3</b>	<b>0.5</b>	<b>2.8</b>	<b>1.7</b>	<b>0.0</b>	<b>32.9</b>	

## Attachment B

### Policy & Procedural Context for Alternative Proposal

*In addition to the existing Regulations, CARB is operating under or has adopted multiple policy positions with respect to the consideration of updates to the scope, breadth, and applicability of the At-Berth Rules.* These include all of the following:

#### **Executive Order B-32-15, Sustainable Freight Action Plan, Action G-3 (pg. C-53)(adopted 2016):**

##### **3. At-Berth Regulation Amendments**

*Overview:* The goal of this proposed measure is to further reduce emissions from ships. ARB staff would develop and propose amendments to the current At-Berth Regulation and look for additional reductions from additional vessel fleets or types.

...

*Proposed Actions:* ARB would evaluate how the current At-Berth Regulation can be amended to achieve further emissions reductions by including smaller fleets and/or additional vessel types (including roll-on/roll-off vehicle carriers, bulk cargo carriers, and tankers). In addition, there are two companies with portable emissions capture and control systems that have successfully demonstrated performance and may now be used for compliance with the current Regulation on certain container vessels. If one or both systems prove to be feasible and cost-effective on additional vessel types, the technology could help support an ARB staff proposal to expand the scope of the Regulation to include additional vessel types and/or smaller fleets. ARB staff anticipate bringing this measure to the Board in 2017.

*Estimated Cost:* ARB will estimate costs from this action during the measure development process for the Proposed 2016 State Strategy for the State Implementation Plan. See <http://www.arb.ca.gov/planning/sip/sip.htm>.

*Benefits:* This action is anticipated to provide criteria pollutant and greenhouse gas emissions reduction benefits. ARB will quantify emissions reductions from this action during the measure development process for the Mobile Source Strategy and Proposed 2016 State Strategy for the State Implementation Plan. See <http://www.arb.ca.gov/planning/sip/2016sip/2016mobsr.htm> and <http://www.arb.ca.gov/planning/sip/sip.htm>.

#### **2016 State Implementation Plan (Resolution 17-7, Attachment A, “Proposed New SIP Measures and Schedule”), Mobile Source Strategy (pg. 84), (adopted 2017)**

*Measure Title:* At-Berth Regulation Amendments

*Measure Overview:* The goal of this measure concept is to further reduce emissions from ships at berth and to advance the commercialization of near-zero and zero emission technologies. ARB staff would develop and propose amendments to the current At-Berth Regulation to include other vessel fleets and types.

...

*Description of Measure and Commitment:* In December 2007, ARB approved the Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At-Berth in a California Port Regulation (Regulation). The Regulation was designed to reduce emissions from diesel auxiliary engines on container ships, passenger ships, and refrigerated cargo ships while at berth at California’s major seaports. The Regulation is also limited to fleets of 25 or more vessels (five or more for passenger ships).

ARB would investigate whether the Regulation can be amended to include smaller fleets and/or additional vessel types (including roll-on/roll-off vehicle carriers, bulk cargo carriers, and tankers). In addition, there are two companies working on portable systems. One company has successfully demonstrated that its system can provide durable performance and may now be used for compliance with the Regulation on specified vessel types. If one or

both systems become commercially available and are cost-effective, the technology could help support an ARB staff proposal to expand the scope of the Regulation to include additional vessel types and/or smaller fleets. ARB staff needs to investigate the feasibility and cost-effectiveness of expanding shore-power or alternative At-Berth technologies to additional vessel fleets and types not currently covered by the existing Regulation.

### **Climate Change Scoping Plan Update (pp. 73-74, 78-80, Appendix H) (adopted 2017)**

#### Transportation Sustainability

California's population is projected to grow to 50 million people by 2050. How and where the State grows will have important implications for all sectors of the economy, especially the transportation sector. ...

Transportation also enables the movement of freight such as food, building materials, and other consumable products, as well as waste and recyclables. The California freight system includes myriad equipment and facilities, and is the most extensive, complex, and interconnected system in the country, with approximately 1.5 billion tons of freight valued at \$2.8 trillion shipped in 2015 to, through, and within California. Freight dependent industries accounted for over \$740 billion of California's GDP and over 5 million California jobs in 2014.

...

#### Efforts to Reduce Greenhouse Gases

The measures below include some required and new potential measures to help achieve the State's 2030 target and to support the high-level objectives for the transportation sector. Some measures may be designed to directly address GHG reductions, while others may result in GHG reductions as a co-benefit. ...

#### Ongoing and Proposed Measures – Sustainable Freight

- Implement the California Sustainable Freight Action Plan:
- 25 percent improvement of freight system efficiency by 2030.
- Deployment of over 100,000 freight vehicles and equipment capable of zero emission operation, and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030.

...

[Table H3-2. Vehicle Technology and Fuel Description]

#### 2016 Mobile Source Strategy

The Mobile Source Strategy identifies actions to be undertaken to simultaneously meet air quality standards, achieve GHG emission reduction targets, decrease toxics health risk, and reduce petroleum consumption from transportation emissions by 2031. More information on the Mobile Source Strategy can be found at:

<https://www.arb.ca.gov/planning/sip/2016sip/2016mobsr.htm>

#### The California Sustainable Freight Action Plan

The California Sustainable Freight Action Plan (Action Plan) is a multi-State agency effort to improve freight system efficiency by 25 percent by 2030, and to deploy over 100,000 freight vehicles and equipment capable of zero emission operation, and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030.

The Action Plan Includes recommendations on: • A long-term 2050 Vision and Guiding Principles for California's future freight transport system. • Targets for 2030 to guide the State toward meeting the Vision. • Opportunities to leverage State freight transport system investments. • Actions to initiate over the next five years to make progress towards the Targets and the Vision. • Pilot projects to achieve on-the-ground progress in the near-term. • Additional concepts for further exploration and development, if viable. More information on can be found at: <http://www.dot.ca.gov/casustainablefreight/>

### **AB 617 Community Air Protection Blueprint, Appendix D (pp. D-3-4, D-6, D-8-10) (adopted 2018)**

#### II. STATEWIDE EMISSION REDUCTION STRATEGIES

Identifying specific strategies for reducing criteria air pollutants and toxic air contaminants in communities with high cumulative exposure burdens is critical for implementing strong statewide actions to ensure new emissions reductions. The strategies outlined in this section reflect actions that CARB and air districts are already taking to deliver new reductions in communities. This includes new strategies from existing air quality and climate plans, early action incentive funding appropriated by the Legislature, and additional community-focused actions (e.g., new regulatory measures, targeted enforcement activities, other new tools and resources).

## FOUNDATIONAL STRATEGIES IN CARB AIR QUALITY AND CLIMATE PLANS

CARB's Governing Board has adopted several comprehensive air quality and climate plans in recent years, including the State Strategy for the State Implementation Plan, the California Sustainable Freight Action Plan, California's 2017 Climate Change Scoping Plan, and the Short-Lived Climate Pollutants Reduction Strategy. Each of these plans includes a suite of emissions reduction strategies that will address many of the sources that are concentrated within heavily impacted communities like cars, trucks, freight sources, and other equipment. Together they provide a foundation for additional emissions reductions needed to deliver healthful air in communities with high cumulative exposure burdens.

Table D-1, Table D-2, and Table D-3 provide lists of new CARB strategies associated with these plans. CARB staff have already begun developing regulations, policies, and incentive programs to implement these strategies. This is an ongoing process that will begin achieving emissions reductions in the near-term and providing benefits that support community-level actions, with a focus on zero emission technologies where the technologies are now feasible. New regulations cover the following range of sources:

- For communities heavily impacted by freight sources –
  - o Expanded standards for clean operation for ships while they are in port.

...

[Table D-1 "State Strategy for the State Implementation Plan Measures and Schedule (*Approved 2017*)"]  
At-Berth Regulation Amendments

...

[Table D-2 Summary of California's 2017 Climate Change Scoping Plan Update Measures (*Approved 2017*)]  
Mobile Source Strategy (Cleaner Technology and Fuels [CTF] Scenario)\* ...  
California Sustainable Freight Action Plan\* ...

\*These measures and policies are referred to as "known commitments."

### **Addendum to the adoption of Resolution 17-7**

***Furthermore, in addition to the existing Regulations and multiple policy positions regarding potential At-Berth Rule amendments,*** there was additional procedural, non-policy direction given to the staff by the Board in an Addendum to the adoption of Resolution 17-7, which was the motion to approve the state SIP in March 2017.

This additional direction in the Addendum was that "within 18 months of this date, ARB staff shall develop At-Berth regulation amendments that achieve up to 100% compliance by 2030 for LA Ports and Ports that are in or adjacent to areas in the top 10% of those defined as most impacted by CES."

This is not an adoption of a policy or amendment of a plan, including the SIP, but just a direction to staff to develop and work on the preparation of a proposal for the Board for future consideration. The Alternative Proposal is consistent with this direction and seeks to work with staff to place a set of amendments before the Board which will be an increase in compliance beyond 80%.

Attachment E:  
Port of Oakland Cost-Effectiveness Comparison

**Current Rule to Proposed Rule DPM Cost-Effectiveness (Oakland 2018)**

Average rate of auxiliary engine emissions (DPM):	0.18 g / kWh
Average power of 4 auxiliary engines (container vessels at berth):	1100 kW
Average Oakland time at berth per call (container vessels 2018):	<u>20 hours / call</u> 3,960g DPM per call

Number of New Vessel calls covered (per Application of Proposed Reg to 2018): 39 calls

Total New At Berth DPM Reductions (2021)(assumes 100% reduction):	154,440 g / year 340 lbs / year 0.93 lbs/day 0.17 tons / year 0.0005 tons / day 0.93 lbs/day
---	---

2021 Required Power Vaults – Oakland 3 x \$2m/vault (CARB est. <sup>1</sup> ):	\$6,000,000
2021 Required Retrofit Costs per vessel (CARB est.):	\$900,000
2021 Required Container vessel retrofits (57) for new visits (403):	7 calls/vessel
2018 Oakland newly regulated calls (39)	5.5 vessels
Total Estimated 2021 Oakland Costs for 39 calls:	\$11,000,000
Annualized (2021-2031):	\$1,000,000 / year

Remediation Fund Costs (\$4,890/hour) x 39 calls x 20 hours: \$3,814,200 / year

Half Costs DPM:	\$500,000 - \$1,900,000
Annual DPM tons reduced:	0.17
<b>Cost-Effectiveness:</b>	<b>\$2.9m - \$11.2m/ ton</b>

**Apples to Apples COST-EFFECTIVENESS with Current Regulation**

Current Regulation ISOR Methodology (pp. 23-24)

“Because the proposed regulation reduces significant amounts of both NOx and PM, staff also evaluated cost-effectiveness by attributing half the total annualized cost to the PM emission reductions and half to the NOx emission reductions. The resulting cost-effectiveness values using that method are \$6,400 per ton of NOx reduced and \$345,000 per ton of PM reduced.”

“Table 5. Summary of Cost-Effectiveness for Shore-Power  
Half Costs for PM (Dollars per Ton of Pollutant Reduced)  
**Container Ships – Oakland \$200,000 to \$1.2 million”**

---

<sup>1</sup> SRIA Appendix A



December 9, 2019

Heather Arias  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Submitted Electronically

Comments on CARB Proposed At-Berth Regulation

Dear Ms. Arias:

We write today to provide comment on the proposed rewrite of the Control Measure for Ocean-Going Vessels At Berth regulation. This letter presents the Port of Hueneme's (Port) updated comments on status of California Air Resources Board's (CARB) new proposed At Berth Regulations. In light of our extensive comments which are reproduced below unchanged from our 2017 and 2019 comments, we will update CARB with briefer commentary herein which is largely based upon the information and discussion conducted at the recent CARB Board meeting on December 5, 2019.

- The Port would first like to state unequivocally that it is in full support of regulating the emissions from Ocean Going Vessels (OGV) and has partnered with CARB and our local air district to achieve substantial emission reduction progress since the implementation of the first At Berth regulation. Thanks to the combination of the clean fuel rules and the current At Berth regulation **the Port has seen as greater than 84% reduction in the emission of diesel particulate matter from OGV at berth in the Port since 2008.**
- The Port believes that this rule rewrite has the potential to achieve further emissions reductions from OGV, however in order to ensure that the Port can continue its role as the engine which drives substantial regional economic activity, enabling employment of more than 15,000 people, these proposed revisions must be conducted in a manner which pursue the most cost effective reductions in emissions. For the Port, CARB is seeking to apply requirements for further emissions reductions which would be nearly completely reliant upon a technology that is not currently commercially available and is not yet approved for use by CARB. This alternative control system (ACT) will likely be a system which captures emissions from OGV and physically or chemically removes the pollutants from the exhaust gases. These systems are large, heavy, and technically complicated in their design and operation. The implementation of one of these systems at the Port will take substantial resources and time. **This is not to imply that the Port is in opposition to the use of an ACT system for emissions reductions in any way!** However as a steward of public funds the Port does not take lightly the responsibility of investing in a yet unproven technology which may have a cost equivalent to a third of its annual revenue.
- The CARB Board seemed during the December 5<sup>th</sup> meeting to favor moving the date of compliance for requiring an ACT for Roll On Roll Off (RORO) vessels from 2025 to 2023. At the present time the Port presumes that the State of California will require that the ACT system

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operate as a zero emission system which will require it to be powered by electrical power. Current barge based emissions capture systems use diesel fuel and produce significant emissions through the use of heavy machinery and generators to power the emissions filter process. Presently the Port is nearly at the maximum of its available electrical power ceiling as it seeks to continue the implementation of zero emission technologies on Port. Adding additional power load to the Port will require additional power supply from its utility provider Southern California Edison (SCE). SCE has notified the Port that the regional circuitry upgrades needed to supply the Port with additional power will be of such scale as to take three to five years to complete and cost \$30-50 million dollars. This utility upgrade would preclude the Port from being able to operate a zero emissions ACT by 2023.

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- As noted, the annual revenue of the Port is approximately \$16-18 million dollars annually. It is estimated that additional shoreside power capacity at the Port would cost approximately \$20 million dollars. An ACT system for the Port is estimated to cost \$5-7 million dollars. Additionally, the Port has only six major customers which move cargo through the Port enabling those 15,000 jobs. As noted in previous comment letters, some of the communities surrounding the Port are State designated disadvantaged communities and the Port takes seriously its role of providing the types of jobs which can enable individuals to reach ladders of opportunity. Port related jobs can bring families out of poverty and are increasingly uncommon in the state of growing economic disparity in Ventura County and the State in general. The loss of a single customer would have major economic implications to the surrounding region as each direct Port job has a multiplier creating an additional five to six jobs in the community.
- During the meeting on the 5<sup>th</sup>, many in the audience and the Commissioners stated that it would be “large multinational corporations” who would be forced to pay for these regulations and therefore the impact would be minimal amongst the “billions” which these corporations make in profits. Unfortunately, the reality is that most of the cost of these regulations will be carried by the State’s ports. Goods movement is a global system of connectivity which is structured to move goods from their location of manufacture to their location of consumption. The “large multinational corporations” involved in this process have a growing amount of choice when it comes to choosing a path through this supply chain and the ports of California are not their only choice for offloading their goods. Ports in the Gulf of Mexico and in other states along the Pacific Coast can be significantly cheaper. Rates of cargo diversion away from California will increase as California ports raise their rates to help fund the needed infrastructure improvements required by these new regulations. California ports will continue to lose market share and employment opportunities for local citizens, especially in areas already suffering from a lack of middle class jobs as the costs of doing business in California continues to increase. Additionally, the local demand for goods shipped from overseas will not diminish and that market will continue to demand fast cheap shipping for a plethora of goods from fresh produce to consumer goods. These goods will still have to reach consumers in California and when shipped into out of State ports will be trucked back into local stores and warehouses resulting in significant net increases in emissions of toxic pollutants and greenhouse gases.
- As part of its conversations with CARB over the last two years of the development of this proposed regulation, the Port has sought to make clear to the CARB staff how unique the characteristics of the Port are, and how these characteristics directly impact how it would comply

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with the proposed regulation. Due to our size and physical constraints solutions that work for ports like Los Angeles or Oakland are typically not well suited for application at Hueneme. However, the Port sought to show CARB that we are in full support of their goals to further reduce emissions from the Port. Thus, in an effort to help ensure that currently uncaptured emissions originating from the at berth time of the currently unregulated fleet could be reduced in the most cost effective way, the Port put together a list of potential projects which could achieve significant emissions reductions in the near term future and potentially at a lower cost. These “alternatives” were brought forward in a good faith effort to show the potential for in-lieu emissions reductions which could be financed in part by those customers of the Port in the unregulated fleets. Following months of collaborative communication with CARB staff, it was unexpected to the Port that the discussion at the December 5<sup>th</sup> meeting centered around these projects in no way being undertaken in lieu of the new requirements and could be required in the interim when direct compliance was infeasible on the short term. Thus it appears that CARB intends to require the Port and its customers operating RORO vessels be required to implement the alternative projects which the Port proposed on an earlier timeline and not in lieu of any of the requirements of the proposed regulations. As noted by some of the audience members the operation of a modern seaport berth is a highly technical, dangerous, and expensive ballet of many players all of whom play a part in successfully moving cargo safely and efficiently. In applying new regulations into this system, the “devil is in the details,” as noted by several CARB Board members during the meeting on the 5<sup>th</sup>. As implied by Board members during this meeting, if CARB were to propose a scheme in which the alternative projects proposed by the Port were to be required as a short term compliance step, any such regulation would have to ensure that it was procedurally and legally sound, scientifically valid, and equitable to those parties subject to the rule.

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- In closing the Port wishes to reiterate again, that it is fully on-board with further reducing emissions from its operations and has multiple efforts underway at present including:
  - Writing in conjunction with the Ventura County Air Pollution Control District, its own clean air plan which will assess a brand new emission inventory for all Port activities and operations; and
  - Has just installed the first reference grade air quality monitors at a local elementary school which once running and calibrated will provide current air quality information to the local community; and
  - Writing a Port wide electrical master plan which will help to guide the extensive engineering analyses and future scenario assessment needed to continue the Port on its plans toward zero emissions; and
  - In 2020 installing infrastructure including switchgear, transformers, conduit and plugs to plug in a new generation of zero emission electric cargo handling equipment at the Port, and
  - Will be operating in conjunction with partners, an electric hybrid mobile harbor crane as well as a zero emissions hydrogen fuel cell Class 8 heavy duty truck prototype, and the first electric terminal trucks within the next two years.

The Port is committed to maintaining its critical role of being the economic engine for the region while growing its leadership in the path to a future of zero emission, sustainable goods



movement. The Port envisions an equitable future in which economic opportunities and a clean, decarbonized environment are accessible locally and which both provide and give back to future generations.

Sincerely,

Giles Pettifor,  
Environmental Manager



Spring 2019 Comments:

Our comments on the current process include:

- It is imperative that CARB identify the potential for real and profound economic impacts (especially at smaller, niche ports) as well as increased state-wide emissions, (from the diversion of cargo to out of state ports) which may result from increased costs associated with the proposed regulation. Without a cost benefit analysis on a port by port basis the real impact of these changes cannot be ascertained. The Port wishes to document its request prior to **CARB's moving forward that the regulation process must include the completion of a full cost benefit analysis at each of the subject ports!** These costs should be made clear in comparison against the quantity of emissions that will be reduced at each individual port subject to the new regulations.
- **CARB needs to identify the quantified emission reductions it is seeking to achieve via the implementation of the new regulations.** This targeted volume reduction should then be applied to the modelled emissions of each port, on a port by port basis to determine what is the scientifically calculated emission reduction goal. Bringing verified, valid emissions data into the analyses for this regulatory process will ensure that the cost benefit analysis, which must accompany this effort, is as accurate as possible. The emissions of each port are different as well as the basin status and these characteristics should be reflected in CARB's analyses.
- CARB estimates of **port emissions for each port subject to the regulations should be scientifically valid, using the best available science and valid methodologies** that both CARB and the subject ports concur are valid. CARB's reduction target should be applied to the agreed upon inventory emissions amount to ensure fair calculation of responsibility.
- **The costs of proposed emissions reductions should be grounded in emissions costs generated for other similar State programs** such as the Carl Moyer technology retrofit program.
- Many ports statewide, including the Port, are investing in developing air quality plans specifically tailored to their own emissions inventory, physical and logistical characteristics of their cargo and waterfront setting, as well as their own community inputs and resource availability. These **local plans should be recognized when appropriate as real alternatives to the regulations and are avenues to emission reduction opportunities not currently contemplated by CARB as they are quantifying strategies to meet emission reduction goals.**



## **As follows the original fall of 2017 Comment Letter from the Port to CARB:**

### **I. Introduction**

The Port of Hueneme (Port) would like to thank the California Air Resources Board (CARB) for this opportunity to provide formal comments on the proposed amendments to the existing At Berth Regulations. The Port enjoys a long history of working cooperatively with both CARB and the Ventura County Air Pollution Control District (APCD) and looks forward to continuing these productive relationships to ensure success in future emission reduction programs.

Our collective efforts realized the installation of shoreside power vault and substation systems to enable the plug in of regulated refrigerated vessel fleets. At the forefront of new and innovative technologies, California leads not only the nation, but the world with shoreside capabilities. In leading the world with clean technology, we become the first to learn how to tackle the challenges inevitable with new technologies. This comment letter puts forth recommendations to address those challenges and respectfully requests that getting the first phase of the regulations perfected be the main purpose of the at-berth regulation amendments.

In the workshops of August 28 and September 7, 2017, CARB presented the concept of expanding its regulatory authority to new fleets, a concept which need thoughtful consideration, particularly as we continue to iron out the challenges with existing systems under the current regulations. As a partner in sustainable economic development, we urge CARB to consider the potential of very real impacts to local economies and pursue a cost-benefit analysis of the socio-economic impacts of the proposed amendments prior to promulgation of regulations mandating requirements on all vessel calls. Further, the true air quality benefit to a given air quality basin coupled with the actual costs of the expanded amendments needs to be fully understood to ensure the enactment of sound public policy consistent with the Governor's Executive Order B-32-15<sup>1</sup> which calls for transitions to zero emission, efficiency and increased competitiveness.

The Port appreciates the challenge CARB faces in drafting these regulations with a level of detail and forethought which accounts for the inherent complexities of the global maritime industry as well as the unique characteristics of California's ports and in a way which does not place an undue burden on these ports and put them at a competitive disadvantage. Working together we can find a solution that meets our mutual goals. The following comments provide important data and strategies to best inform future policy and regulation specific to the Port of Hueneme. The ultimate goal being to find a tangible pathway forward to achieve ambitious air quality improvements while supporting the economic backbone of socioeconomically distressed communities.

### **II. Environmental Profile**

#### ***Port of Hueneme's Environmental Framework***

Located at nexus of vibrant coastal communities, precious coastal wetlands, and Pacific Ocean pathways to our global trade partners, the Port takes very seriously its stewardship of the environment. As part of

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<sup>1</sup> [http://dot.ca.gov/hq/tpp/offices/ogm/cs\\_freight\\_action\\_plan/main.html](http://dot.ca.gov/hq/tpp/offices/ogm/cs_freight_action_plan/main.html)



this responsibility the Port focuses particularly on its surrounding communities of Oxnard and Port Hueneme, its commissioning jurisdictions. The Port exists to serve these communities as an economic center providing employment, tax revenue and trade benefits for local citizens. The Port also strives to minimize potential impacts to these communities as it is nestled in adjacent to homes, schools and businesses. Due to the proximity of these sensitive receptors, air quality is of particular interest to the Port, and the Port works every day to take steps to minimize impacts to air quality. In an effort to demonstrate the seriousness with which the Port takes these duties of protecting the environment, the Port adopted an Environmental Management Framework (EMF) in 2012. The EMF outlines the strategic efforts the Port will undertake to protect the environment, and covers eight environmental elements including:

1. Community engagement
2. Sustainability
3. Air Quality
4. Water Quality
5. Soil and sediment
6. Marine resources
7. Energy management
8. Climate change adaptation

Since adopting this proactive agenda of sustainability, the Port has pursued the integration of the elements of the EMF into its daily operations as well as long term planning. Progress has been made every year since, and in 2016 the Port became the first port in California to be certified by Green Marine, the preeminent third party environmental certification organization for marine facilities. The Port is fully committed to making environmental progress in every way that it can as it grows and changes with the global economy.

While the Port moves forward with the implementation of its EMF, it must work to expend its limited resources in a manner that balances maintenance of critical Port infrastructure with investments in new equipment and technology which help the Port to comply with regulations and improve environmental performance. For this reason, the Port is continually looking for solutions that are both cost efficient and effective for the Port's characteristics, its operations and the local community.

The Port is unique in many ways that set it apart from both the large Ports of Los Angeles/Long Beach (LA/LB) and other smaller ports like San Diego or Stockton. As the Port was constructed with private funds in the 1930's it is not a California State Tidelands Port, which gives the Port more control over its operations, more accountability directly to its commissioning communities and the ability to operate more nimbly. The Port operates on 120 dockside acres and while this is smaller than other ports, the Port is very efficient with its limited space and constantly strives to use every bit of it as efficiently as possible.

### **III. Port Hueneme's Air Quality Basin and Port Emissions**

**RECOMMENDATION: Apply the attainment status of Ventura County air basin to any regulation impacting the Port and consider the emissions data and growth rates specific to the Port as opposed to that of the LA/LB air basin or the Ports of LA/LB.**



Air quality regulation respective to a port or similar emission source should begin with a very simple analysis with two major local components:

1. Basin Status - Historical and current air quality within the basin in which the port operates.
2. Emissions - Current and estimated future quantity and quality of the port's emissions.

When beginning with these two components, it becomes clear how different the Port is from LA/LB.

### 1. Basin Status

It is not just the Port's physical setting and operations which are different from nearby LA/LB, the air quality within its surrounding basin is also very different. Table 1 presents the projected dates of attainment with National Ambient Air Quality Standards (NAAQS) for the air basins surrounding both the Port and LA/LB. The ozone standards are shown as this pollutant has the potential to exacerbate respiratory illness symptoms in sensitive populations including children and the elderly and those with inflammatory airways or asthma, and is of particular concern for community health activists.

Ozone Standard	Attainment Date	
	VC Basin	LA Basin
2008 - 8hr.	2020	2032
2015 - 8hr.	2026	2037

Table 1 Comparison Dates of NAAQS Attainment for Ventura County and Los Angeles Air Basins

Table 1 makes clear that the air quality within the air basin around the Port is now and will continue to be substantially better than that of LA/LB. The air quality within Ventura County has steadily improved during the last twenty five years even while the County's population has grown by more than 30% during that time period as clearly shown in Figure 1. Despite this growth in population, Figure 2 shows that the average ozone concentrations within the County have decreased over time, driving the reductions in days over the NAAQS metric that are shown in Figure 1.

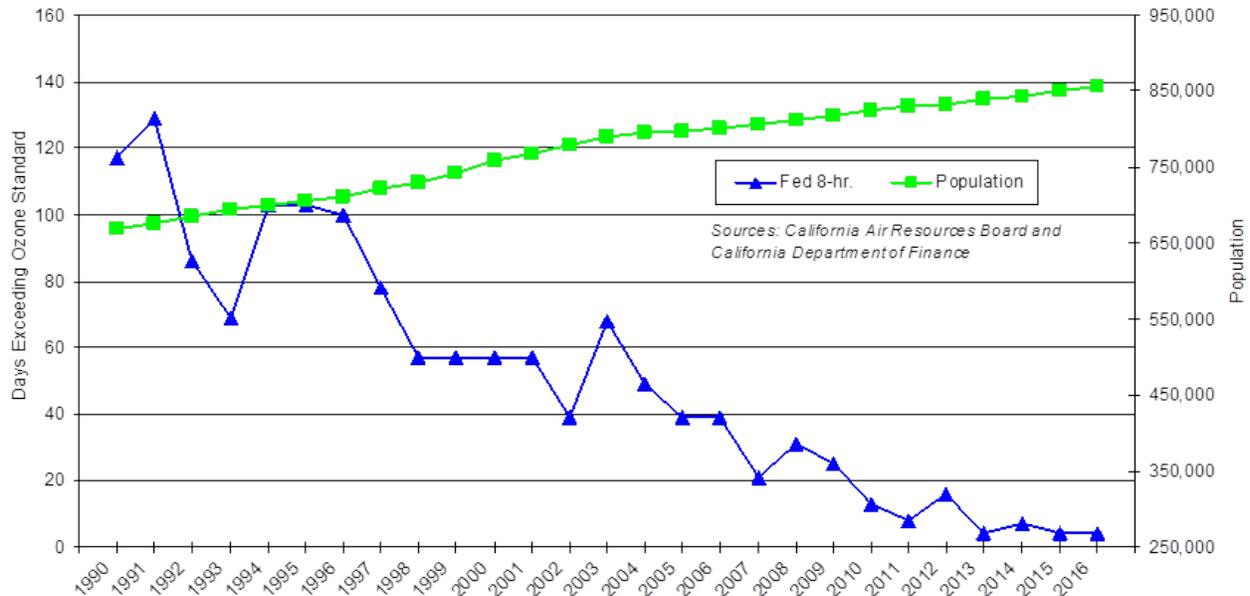


Figure 1 Ventura County Days Over Federal Ozone Standard vs. Population Growth.

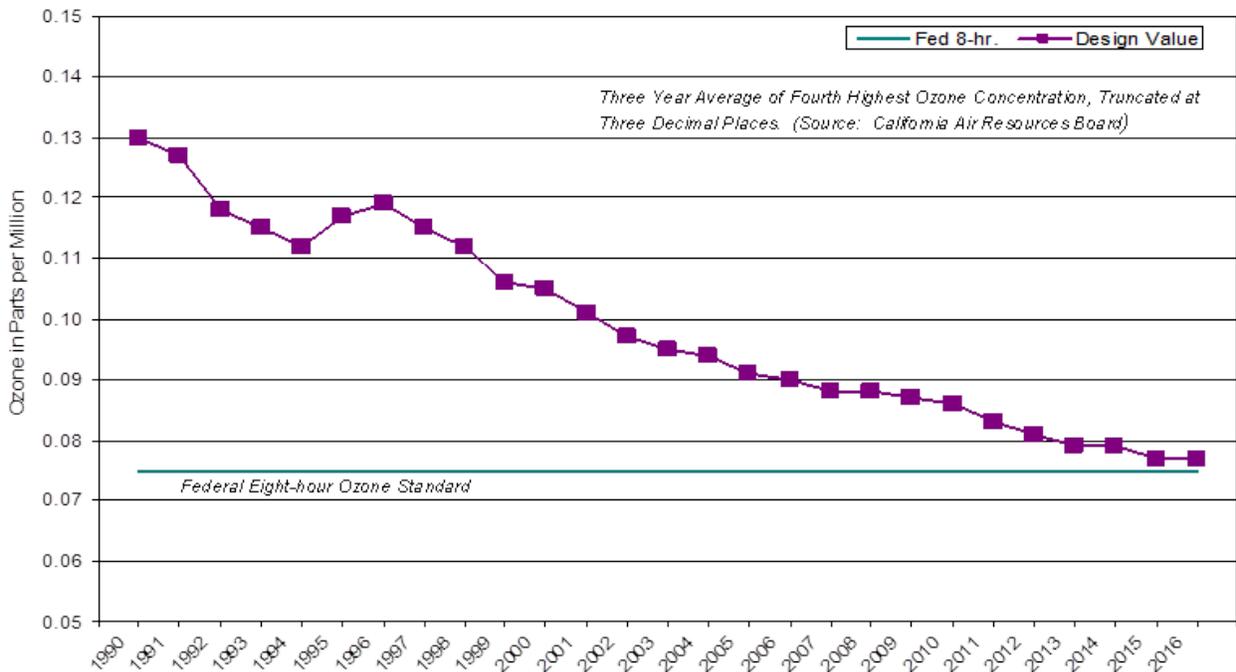


Figure 2 Ventura County 8-Hour Ozone Values

2. Emissions

*OGV Emissions*



Not only is the Ventura County air quality substantially better than that of the LA basin, a great deal of the air pollution within the air basins of Ventura County come from emissions from ocean going vessel (OGV) traffic offshore that is bound for LA/LB. The air basin over Ventura County extends three nautical miles offshore and is called the South Central Coast (SCC) Basin, while the basin which extends from three to one hundred nautical miles offshore is called the Outer Continental Shelf (OCS) Basin. CARB calculates attainment status for the SCC Basin using a photochemical model which incorporates emissions from both basins, meaning that transitory OGV emissions from LA/LB bound vessels in the OCS directly impact air quality in the SCC. When the pollutant quantities emitted by OGVs in both basins are analyzed, it becomes clear how much of a negative contribution is made by the OCS OGV, passing inside of the Channel Islands, as the majority of trans-Pacific traffic does, in transit to LA/LB.

Table 2 shows the estimated pollution contribution from OGV in both the SCC and OCS basins, while Figure 3 uses these numbers to clearly show how much greater the OCS portion is than that of the SCC basin, where the Port is located and represents a considerably low contribution to the problem.

		2020		2035	
Basin		ROG	NO <sub>x</sub>	ROG	NO <sub>x</sub>
OGV Emissions*	SCC	0.04	<b>0.84</b>	0.06	<b>1.07</b>
	OCS	0.86	<b>12.54</b>	1.6	<b>9.63</b>

Table 2. Emissions from Ocean Going Vessels within Ventura County SCC and OCS Basins<sup>2</sup>

<sup>2</sup> Ventura County Air Pollution Control District. *Final 2016 Air Quality Management Plan*. 2016

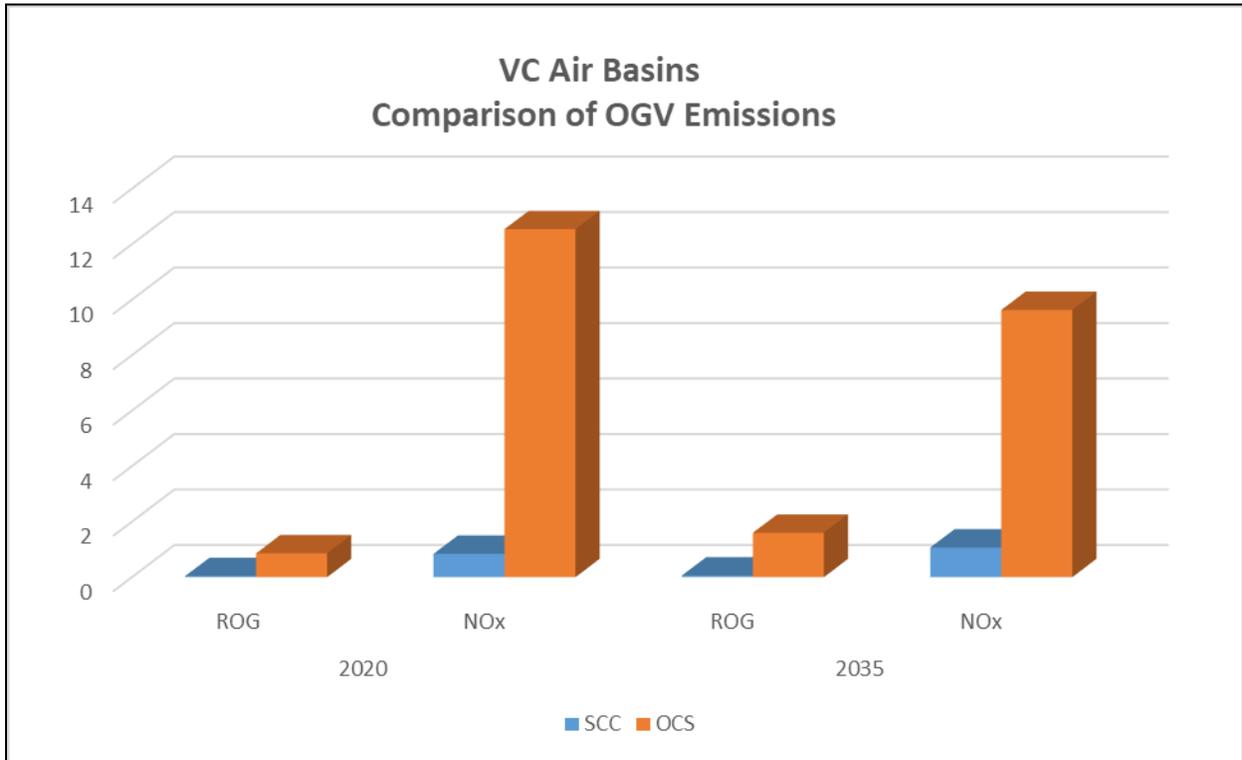


Figure 3. Emissions from Ocean Going Vessels within Ventura County SCC and OCS Basins

These numbers make it clear that Ventura County is coming from a very different place with regards to ambient air pollution levels. Essentially, the Ventura County basin's status quo is so much lower than LA/LB that it does not make sense to apply the same assumptions about emission related impacts for the Port. This point is extremely important to the proposed regulation amendments.

CARB's ongoing emission inventory analysis makes assumptions about growth rates of OGV business at California ports. CARB is applying estimated growth in OGV traffic in various vessel classes to calculate growth in emissions, rationalized by the assumption that more OGV activity means more engine use, which equates to proportional increases in emissions. During this process, the ports were lumped into regions for simplified assessments. The Port was thus included in the same region as LA/LB. Consequently, the growth rate of a significantly larger port complex with extremely different growth estimates was used in the emissions calculations as a surrogate for the Port. Due to a number of reasons, including the size constraints of the Port's berths and shore-side area, the growth rates of LA/LB are in no way accurate for the Port, and would grossly overestimate the anticipated growth of the Port and its future emissions. This would in turn overestimate the potential for impact on local air quality and potential for human health effects. The inaccurate growth numbers CARB used for the Port were: an increase in refrigerated carriers by almost 44% and roll-on roll-off vessels of over 80% by 2025. The Port has calculated as part of its own business planning a more modest growth rate of approximately 30% over 30 years. The emissions associated with this growth forecast should be applied to any policy impacting the Port.

***Criteria Pollutant Emissions***

Within the air basin of Ventura County, the Port is a fairly small contributor of pollutants as evidenced in Table 3. The Port's emissions of all of the assessed criteria pollutants, except NO<sub>x</sub>, contribute less than one percent of the Ventura County SCC air basin's totals! The Port has worked in the last decade to implement operational changes and new technologies to reduce emissions, such as the addition of shore power, and through investments in efficiencies to reduce delays in cargo movement. In comparison to the Port's 2008 emissions, and despite an increase in vessel calls and goods throughput, the Port has seen a reduction in nearly all of assessed criteria pollutants including carbon dioxide, VOCs, particulate matter and SO<sub>x</sub>.

<b>Port of Hueneme Compared to Port of LA, VCAPCD, SCAQMD Emissions</b>						
<b>Criteria Pollutants</b>	<b>VOC tons/day</b>	<b>CO tons/day</b>	<b>NO<sub>x</sub> tons/day</b>	<b>PM 10 tons/ day</b>	<b>PM 2.5 tons/day</b>	<b>SO<sub>x</sub> tons/ day</b>
Port of Hueneme Total	0.05	0.2	1.6	0.02	0.01	0.01
Total VCAPCD Emissions	45	169.5	60	29.1	10.5	17.0
Port of Los Angeles	1.1	5.2	22	0.4	0.4	0.4
SCAQMD Total Emissions	640	2,735	673	346	127	70
Port of Hueneme % of VCAPCD	0.1%	0.1%	2.7%	0.06%	0.1%	0.1%
Port of LA % of SCAQMD	0.2%	0.2%	3.2%	0.12%	0.3%	0.5%

Table 3. Port Hueneme Emissions Contribution to VCAPCD Totals<sup>3</sup>

<sup>3</sup> VCAPCD emissions data obtained from California Air Resources Board. 2015. [https://www.arb.ca.gov/app/emsmv/emssumcat\\_query.php?F\\_YR=2015&F\\_DIV=-4&F\\_SEASON=A&SP=2009&F\\_AREA=DIS&F\\_DIS=VEN](https://www.arb.ca.gov/app/emsmv/emssumcat_query.php?F_YR=2015&F_DIV=-4&F_SEASON=A&SP=2009&F_AREA=DIS&F_DIS=VEN). (accessed September 2017).

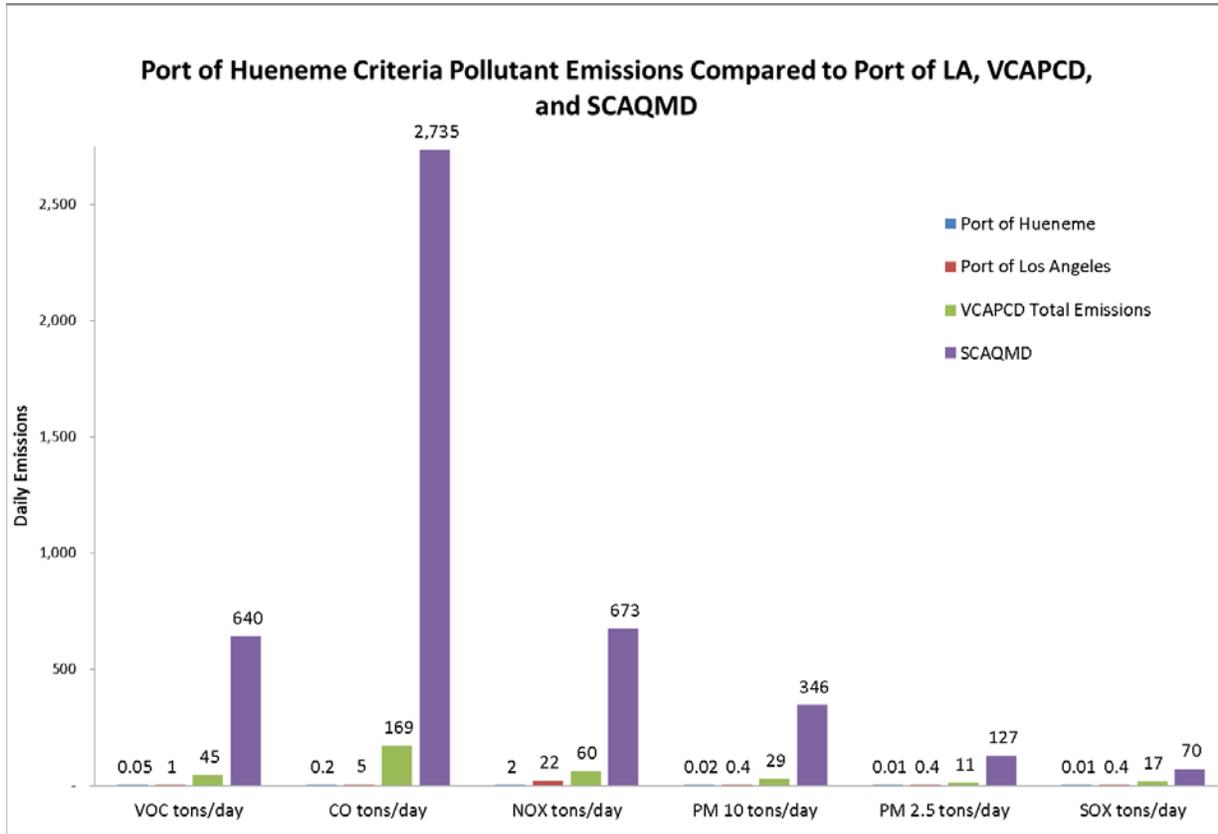


Figure 4. Emissions Comparison of Port of Hueneme to VCAPCD, Port of LA, and SCAQMD<sup>4</sup>

#### IV. Economic Profile

**RECOMMENDATION: Perform a robust cost-benefit analysis to understand the impacts of the proposed Amendments to the At-Berth Regulations to both the economy and the environment for the various business segments proposed to be regulated.**

##### *State of the Local Economy and the Importance of the Port*

The Port is one of the most productive and efficient commercial trade gateways for niche cargo on the West Coast. The Port is governed by five locally elected Port Commissioners from the communities of Oxnard and Port Hueneme. The Port moves \$9 billion in goods each year and consistently ranks among the top ten U.S. ports for automobiles and fresh produce. Port operations support the community by bringing \$1.5 billion in economic activity and creating 13,633 trade-related jobs. Trade through the Port

<sup>4</sup> California Environmental Protection Agency Air Resources Board. 2015 Estimated Annual Average Emissions: South Coast AQMD [https://www.arb.ca.gov/app/emsinv/emseic1\\_query.php](https://www.arb.ca.gov/app/emsinv/emseic1_query.php) (accessed September 2017).  
South Coast Air Quality Management District. Final 2016 Air Quality Management Plan 2017 <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf?sfvrsn=15> (accessed September 2017).



generates more than \$93 million in direct and related state and local taxes, which fund vital community services.

As shown in Table 4, the median household income in Oxnard is \$54,524 and \$49,627 in Port Hueneme. Both Oxnard and Port Hueneme median household incomes are lower than Ventura County’s \$71,451. Oxnard median household income is lower than the state of California and Port Hueneme median household income is also lower than California’s level of \$58,916. Port Hueneme’s per capita income is 33 percent less than Ventura County and Oxnard’s per capita income is even less than the county per capita income, measuring at 42 percent less.

	California	Ventura County	Oxnard	Port Hueneme
<b>Income: 2014B</b>				
Average Household Income	\$87,744	\$99,452	\$74,377	\$64,251
Median Household Income	\$58,916	\$71,451	\$54,524	\$49,627
Per Capita Income	\$30,268	\$32,724	\$18,921	\$21,889
Avg Income Growth 2000-2010	33.0%	31.1%	26.6%	30.9%
Avg Income Growth 2014B-2019	15.3%	14.0%	14.9%	13.8%

Table 4. Median Household Income & Per Capita Income (2014)<sup>5</sup>

**Poverty and Misery Index**

The measure is an index known as the “Misery Index,” which is made up of eight socioeconomic indicators, applied to 11 areas (called Neighborhood for Learning or NfLs) in Ventura County. The eight indicators are: the poverty rate among children age 5 and under; the percentage of women-led households with children 5 and younger who are below the poverty line; the percentage of adults 25 and older without a high school diploma; the percentage of people who speak English “less than very well”; the portion of schoolchildren eligible for subsidized lunches; the portion of students classified as English learners; and the percentage of students who tested at “below proficient” for math and language arts. The percentages are added together and weighted equally for the index.

As seen in Table 5, this index illustrates the deep socioeconomic divides in Ventura County. At one end of the spectrum is Oak Park, where more than 98 percent of the adult population has a high school diploma, and not a single child under the age of 6 lived below the poverty line in 2011. Oak Park’s score on the index the sum of the percentages on eight different risk measures — was 37.2, less than one-third the score of the next area, the Conejo Valley. In Oxnard, El Rio and Port Hueneme the total index was more than 10 times as high as Oak Park. In El Rio, for example, 45.9 percent of households led by a woman, with children 5 or younger, were living in poverty.

<sup>5</sup> 2015, Easy Analytic Software, Inc.(EASI®) All Rights Reserved, Alteryx, Inc.

**“Misery Index” for Ventura County  
Neighborhoods for Learning (NFL) (2011)**

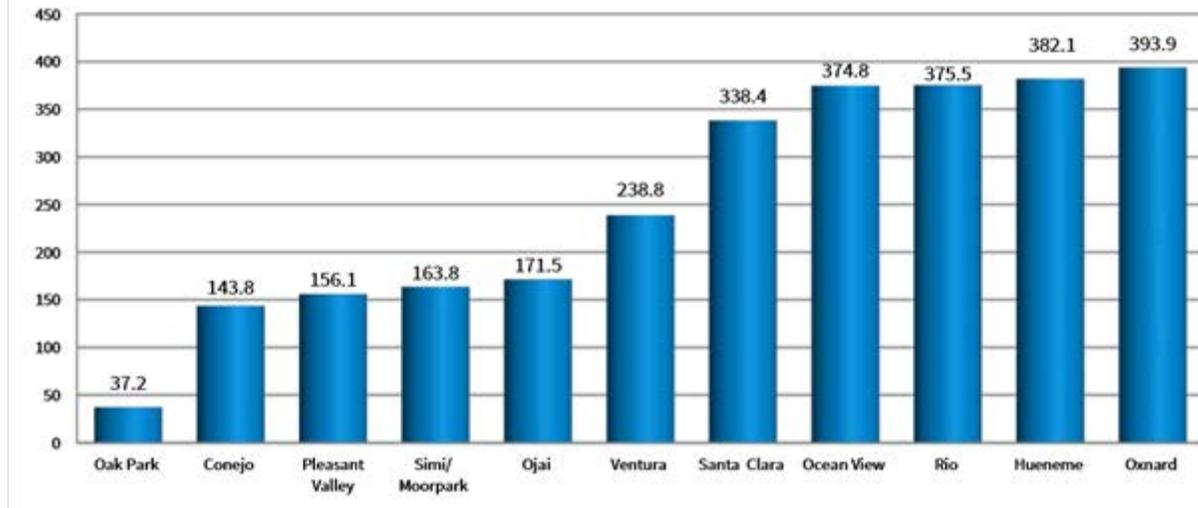


Table 5. Misery Index for Ventura County (2011)<sup>6</sup>

***Business Environment and Challenges of At Berth Regulations***

***Automotive Category***

Cargo throughput at the Port is dominated by two product lines, fresh fruit and automobiles. While demand and business for fresh fruit is fairly constant, the demand for automobiles is much more elastic and subject to broader global economic influences. The American public will likely purchase a banana in good economic times and bad, yet that is not the case with automobiles. In general, automobile transportation is a competitive business in which margins are small and competition is significant between carriers and amongst ports seeking to attract new business. In addition, many global carrier companies have large fleets of roll on roll off (RORO) vessels which travel on global routes that frequently change following the demand for specific product. For example, a global shipping company that has a significant presence in the Port and globally operates a fleet of approximately 120 RORO vessels, may only have half of their fleet call at the Port on an average year. Often, one vessel will call on the Port once a year, or once every two to five years. Due to the high costs to retrofit even a single vessel, this company would be very unlikely to retrofit all sixty vessels in order to comply with the proposed amendments. Thus, two choices would remain: the Port could purchase an emissions capture system for use by this company, or they could choose to move some portion of their automobile business to ports outside of California. The emission capture system would likely have to be a shore-side system as the Port does not have the space to be able to operate a barge mounted system and continue normal vessel operations. Yet, no shore-side systems are available as of yet, nor are any approved for use by CARB. This is an uncertain option to base compliance plans upon.

<sup>6</sup> VCCA 2015 State of the Region Ventura County Report



If shipping lines chose to pursue the retrofit of a few vessels, they would become the only ones capable of calling at California ports. However, this places the company at a disadvantage globally by having the entire state of California only serviceable by a specific set of vessels and not others. This is problematic for air quality as well, as the shipping lines will have to operate inefficiently. When vessels are not being used efficiently it results in greater emissions and high costs to the consumer. Logistically, many shipping lines will begin to look to the Pacific Northwest and Gulf ports to import their automobiles. Once imported, they will simply place them on trucks or rail and send them to California. The demand is in California, and they will find the cheapest way to get the automobiles here. Furthermore, this option leads to much more air pollution, the very consequence CARB is working so diligently to reduce.

John Martin, a nationally recognized maritime economist, conducted a study on the economic impact of the Port of Hueneme. He concluded that the Port is responsible for over 13,633 jobs, and \$1.5 billion in economic activity for the region. The study also highlighted the Port's \$93 million annual contribution to state and local taxes. If our customers decide to ship to other states, these jobs, economic activity, and tax revenues will be lost. Being located in a disadvantaged community where the city of Oxnard has a 24% poverty rate, higher than the state's average, makes the economic opportunity of the Port paramount to the citizens of this region. The Port not only provides jobs, but family sustaining jobs.

The Port's customers are not exempt from property taxes because they purchase property off Port. This means that all those imports and exports are generating the \$93 million that is then reinvested in the schools, fire, police, healthcare, social services, and even our local AQMD. The Port services three automobile shipping lines. For just one of those to relocate means a loss of one third of the jobs, economic impact, and tax revenues over night. The Martin study found that the At Berth amendments as analyzed could have the potential impact on the local economy of the loss of:

- More than 2,700 jobs; and
- \$300 million in economic activity annually; and
- More than \$200 million in salaries and local consumption; and
- \$25 million in of State and local taxes

In addition, to these socioeconomic impacts, business leakage from the Port to the Pacific Northwest ports, would have a substantial environmental costs as well. Emissions from the automobiles being delivered to distant markets like Los Angeles and Phoenix are accounted for with a U.S. Department of Transportation emission ton monetization rate. The emissions and subsequent costs resulting from vehicles being driven the increased distances to vehicle markets which are beyond that of delivery from the Port would be a cost of the proposed amendments and are shown in Table 6.



	Truck Miles		Ton Miles Penalty		Emissions Cost
	Portland to:	Huneme to:	Mileage Penalty	Ton Miles	Annual
San Francisco	645	364	281	21,053,236	\$1,462,071
Los Angeles	975	70	905	225,140,993	\$15,635,232
Seattle	171	1147	-976	-10,791,163	-\$749,407
Portland	0	975	-975	-10,852,054	-\$753,636
Denver	1252	1079	173	1,906,395	\$132,392
Phoenix	1345	444	901	36,290,883	\$2,520,271
Salt Lake City	775	752	23	258,967	\$17,984
Las Vegas, NV	982	325	657	14,125,214	\$980,945
<b>Total Emissions Cost</b>					<b>\$19,245,853</b>

Table 6. Total Emissions Costs for Vehicle Deliveries Resulting from Business Leakage from Port of Hueneme

The Martin Study identifies the worst-case scenario, but the true global nature of the Ro-Ro fleets would make the carriers very reluctant to retrofit their vessels when alternatives just up the coast and in Mexico and Canada exist. The competitive threat is very real. The extent to which the regulations could cause such leakage merits further evaluation and study for both the economic and environmental impacts before regulations are promulgated.

#### ***Break Bulk Project Cargo Category***

Another important business segment to the Port is break bulk project cargo which contributes about 4% of the Port's revenue. This business line is extremely important to the Port's overall competitiveness and the thousands of jobs it supports. 100% requirement to reach zero emission for this vessel type call, would cause the industry to virtually disappear. These vessels make one time calls to ports to load and unload special cargoes, and may never return for another call at the Port. By way of example the largest crane in the world from Arizona, came to Hueneme for a one time move to China. These types of pieces frequently move through the Port on a different vessel on each occasion. A retrofit would not be justified in the eyes of an ocean carrier for a single voyage, thus potentially eliminating this business segment at the Port.

To best understand the implications of the proposed amendments, all business types at the Port need to be evaluated and the opportunity costs understood, again calling the need for a cost-benefit analysis to inform the draft regulations.

#### ***Tanker Business Category***

The Port operates a distribution hub for liquid fertilizer product which is an essential tool for the massive agricultural industry of Ventura County. This \$2 billion industry relies of timely delivery of fertilizer which is delivered to the Port by tanker vessel currently service by the Champion Tankers line. Champion operates about 20 tankers globally approximately six of which may visit the Port annually. This vessel category is subject to many of the same global economic challenges as any other ocean carrier and thus would reflect the same business challenges in justifying an expensive vessel retrofit or the risks of developing a fleet of captured California-only tankers.

### **V. Proposed Elements for Inclusion in At Berth Amendments**



The Port is providing these comments not out of any effort to avoid regulation or doing its part to improve air quality in the region. The Port is fully committed to making progress to reduce emissions at the Port in a manner that is effective in addressing the pollutants which are most problematic in the surrounding areas and cost effective in reducing those emissions. It is clear to the Port that a one size fits all compliance pathway will not be effective in fairly applying emission reductions across the ports of California. Furthermore, smaller ports like Hueneme and its surrounding communities which rely on the Port for employment, will carry a much greater burden and are more at risk of serious negative economic consequences if the proposed amendments move forward without specific accommodations for smaller ports including Hueneme.

For these reasons, the Port would like to propose the following solutions to integrating a more equitable and realistic approach into the proposed amendments.

#### **Alternative 1: Fix Current At-Berth Regulations**

Under this alternative the Port recommends that the proposed amendments be shelved until the problems effecting the current regulations are solved. Presently under the existing At Berth regulations, several problems impact compliance attainment for vessels and fleet owners, and the Port believes that air quality would best be served by fixing these challenges before adding significant increases in the breadth of these regulations and thus compounding the level of regulatory complexity and compliance challenges by orders of magnitude. The current three hour plug in rule for shore power seems to be an arbitrary number which is difficult under even the best circumstances for a vessel to comply with. In numerous instances small delays or unforeseen events result in connections taking more than three hours, and missing the mark eliminates any incentive for continuing the attempted connection and thus negates potential emissions reductions. A sliding scale of compliance could be contemplated in which the duration at berth under shore power would be applied to a compliance total. A second confounding factor is the limited availability of technology vendors capable of providing support, system service and spare parts for shore power systems. Currently one company services all of the shore power systems in the State with one electrical engineer, this scenario leads to significant delays in servicing shore power equipment which results in vessel calls operating off of ship power and resulting emissions. It is challenging to not envision a situation in which these same types of problems will plague the emission reduction technologies which are currently being touted as significant solutions to reducing emissions from vessels including bonnet capture systems or similar technologies with the proposed amendments.

#### **Alternative 2: Delayed Application of Requirements and Development of Local Air Plans**

Under this scenario, smaller ports would fall subject to the proposed amendments after a set period of time such as ten years. During this intervening period, smaller ports would continue to be subject to the current At-Berth regulations. During this time, larger ports would be working with industry to develop and refine emissions control technologies including bonnet capture equipment and on-board scrubbers to such a degree that initial problems typical of any new technology could be worked out before they are required in all ports. Presently there are already problems with getting the resources needed from technology vendors to support ports with shore-side power systems in need of repair, and it is easy to envision a similar situation occurring with bonnet capture systems in the future. By implementing a delay for small ports, owners of vessel fleets visiting smaller ports would have time to assess new technologies and make informed decisions about retrofitting their fleets with new emission control technologies. In addition, smaller ports would have time to pursue the additional funds needed to invest in emission control technologies such as bonnet capture systems.



In addition, CARB had requested from the Port and its customers estimates of a specific cost point, a “tipping point” at which the burden on complying with the proposed amendments would drive business to leave the Port and move to a less expensive port such as Portland, Tacoma or the Gulf Coast. In discussion with customers of the Port, it has become clear that they are uncomfortable disclosing or even discussing such a cost due to the sensitive nature of disclosing strategic business planning with such detailed proprietary financial information, particularly in the highly competitive business segment of global vehicle shipping. However, one benefit of delaying the application of the proposed amendments to the smaller ports would be that in the interim time market forces would reach equilibrium between vendors of new control technologies and vessel owners and port authorities and make more clear how the increased regulatory costs of the At Berth amendments translate into increased operational costs and a resulting loss of business to other regions with lower compliance costs. This approach creates the opportunity to quantifiably measure leakage without impacting the most vulnerable ports. Delayed implementation would also enable ports time during which to begin coordination with local air pollution control agencies on developing local solutions.

### **Alternative 3 - Regional Targets and Solutions**

Under this scenario, ports would be allowed to achieve compliance with the proposed amendments through the implementation of a locally developed plan which would achieve reductions in air pollutants equivalent to those of the proposed At-Berth amendments but through other efforts. A large percentage of the emission reductions, such as 75%, would have to take place at the port or adjacent port owned properties so that the benefits of these plans would be felt in the immediate communities around the ports which are most impacted by their emissions. These plans would be tailored specifically to a port’s surrounding air basin, including NAAQS attainment dates, and its community needs and problem pollutants. These plans would be developed in partnership with their local Air Pollution Control District or Air Quality Management District with final approval from CARB.

The Port has begun the collaborative development process of a more comprehensive air quality plan that the Port is calling its Port of Hueneme Reducing Emissions and Supporting Health Plan (PHRESH Plan). The PHRESH Plan will be focused on developing Port specific strategies for reducing air pollutant emissions within the Port’s direct operations or financial control. The PHRESH Plan will be tailored to the Port’s features, equipment and operations and will assess a range of feasible reduction methodologies and source control technologies which could be implemented. The focus will be on achieving the most cost-effective solutions that provide the greatest amount of feasible reductions.



*Additional Specific Comments on Proposed Amendments to the At Berth Regulations*

Comment #1:

The Port strongly encourage CARB to conduct a socioeconomic assessment of the proposed amendments incorporating a full cost-benefit analysis due to the potential impacts of the concepts currently being discussed. As outlined above, the Port cannot emphasize enough the potential of economic harm which could result from the loss of small numbers of customers at the State's smaller ports.

Comment #2:

The Port frequently receives military cargo for the U.S. military which arrives on civilian vessels. The Port requests that CARB clarify if this situation would result in the vessel being exempt from the regulations due to the nature of its cargo.

Comments #3:

Some vessel lines are already developing and launching new vessels which call at the Port which incorporate onboard emissions controls technologies. The Port requests that CARB clarify whether this type of vessel will be exempted from the regulations or be grandfathered in.

Comments #4:

The Port requests clarification on the size of tanker vessels which will be subject to the regulations.

Comment #5:

There was discussion during the workshop of requiring ports to report vessel data to CARB under a new, streamlined reporting regimen. The Port requests clarification of this change and notes that altering the nature of the relationship between the Port and its clients could negatively influence it especially when regulatory compliance documentation is involved.

Comment #6:

The Port's customers encourage CARB making available grant funding or other incentive to offset the significant labor costs associated with shore power connections, which can total over \$5,000 per call and at times exceed the cost of electricity used during the call.

We greatly appreciate the opportunity to provide these comments, and we look forward to working with CARB further on this important regulatory action. Please contact us if you have any questions or comments regarding this letter or its contents.

Sincerely,

Christina Birdsey,  
Chief Operating Officer,  
Port of Hueneme

MEMBERS

Humboldt Bay Harbor District  
Port of Hueneme  
Port of Long Beach  
Port of Los Angeles  
Port of Oakland  
Port of Redwood City  
Port of Richmond  
Port of San Diego  
Port of San Francisco  
Port of Stockton  
Port of West Sacramento



**CALIFORNIA ASSOCIATION OF PORT AUTHORITIES**  
1215 K Street, Suite 1150, Sacramento, CA 95814 • (916) 443-8891 Phone  
600 Massachusetts Avenue NW, Washington, DC 20001 • (310) 229-9603 Phone

OFFICERS



Andrew Palomares  
*Treasurer*

December 9, 2019

Mr. Richard Corey  
California Air Resources Board  
Clerks' Office  
1001 I Street  
Sacramento, CA 95814

**SUBJECT: COMMENTS ON THE PROPOSED AT-BERTH REGULATION**

Dear Mr. Corey:

The California Association of Port Authorities (“CAPA”), which is comprised of the state’s eleven publicly owned commercial ports, appreciates this opportunity to provide comments on the California Air Resources Board’s (“CARB”) proposed “Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At-Berth in a California Port.”

CAPA and its members have a long history of working collaboratively with CARB on air emissions regulations. We appreciate your willingness to meet with our members during the rulemaking process and take their comments into account, and we hope to continue serving as constructive partners to CARB as the process moves forward.

CAPA members are fully committed to reducing air emissions from vessels at-berth and their public health impacts on our communities, including homes, schools, and businesses, and we share CARB’s goals of achieving ambitious improvements to air quality. We are proud of our role as environmental stewards and the significant results in reducing freight-related emissions reduction that we have already achieved working closely with our partners – including CARB, our local air quality and pollution control regulators, and our customers – through a combination of regulatory, incentive, and voluntary programs.

For example, the Port of Oakland has reduced diesel particulate matter (DPM) from truck emissions by 98%; between 2006 and 2016, the Port of San Diego reduced DPM by 85%, SOx by 97%, and NOx by 61%; and the Port of San Francisco has reduced particulate matter emissions from cruise ships by 61% from 2006 levels. Since 2005, the Ports of Los Angeles and Long Beach have reduced diesel particulate matter from OGVs by 93%, NOx by 60%, SOx by 97%, and CO2e by 31%, according to 2018 emissions inventories.

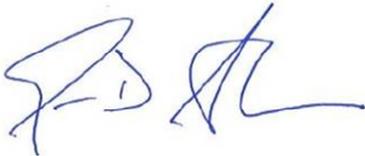
As CARB reviews the comments and considers next steps, CAPA suggests three important factors to bear in mind in seeking to realize our shared air quality improvement objectives:

- First, as CAPA noted in its October 9, 2017 submission and as is clear from the comments that have been submitted by our member port authorities, taking a standardized approach to achieving air emissions reduction is problematic. “If you’ve seen one port, you’ve seen one port” is a common expression in the port community. That statement certainly applies when it comes to California ports, whose operations vary significantly from port to port. Their facilities are different, as are the vessel types they service. CAPA members also operate in different air basins that have differing air quality concerns. These differences should be highly relevant to CARB as it seeks to put in place a world-class standard for reducing harmful air emissions, and CARB should take these differences into account in order to maximize the effectiveness of its regulatory scheme.
- Second, CARB should undertake a thorough analysis of the proposed measure and feasible alternatives to ensure that the measure selected maximizes net benefits to society. A final rule that inadvertently diverts cargo to ports outside California would result in the cargo being trucked back to California markets and actually increase air emissions and GHG concerns. In crafting a suitable approach, it is critical that CARB utilize the best available scientific and technical information. For instance, CARB forecasts a 5% year-over-year growth of cargo for the next decade, whereas our ports have voiced that a 2-2.5% growth rate is realistic. Accordingly, the forecasted emissions assumptions that CARB is relying on do not appear to be supported by the data and, as a result, they distort CARB’s analysis of the proposal’s effectiveness, impact on regulated entities, and benefits. In addition, the proposed rule relies on technologies – such as the bonnet system – that are still being proven for different vessel categories, and for which the cost effectiveness of widespread use remains to be confirmed. Given the proposal’s potential negative impacts on employment, both at the ports and in the communities they serve (which are often in economically-challenged areas), it is important that we get this right.
- Taking into account these elements, CARB should modify its proposal to focus less on a “one size fits all approach” and more on permitting the use of flexible approaches, or alternative compliance plans, that will help each port achieve compliance taking into account its own unique circumstances. Approaches that CARB could usefully consider include: (1) providing funding to support investment in technologies that will help ports to comply with the proposed at-berth regulations and do not increase GHG emissions, recognizing that the funding and technologies required may differ from port to port; (2) providing flexible timeframes, given the uncertainty surrounding the availability of emissions capture and control technologies that are necessary to achieve compliance and taking into account the differences between California ports; and (3) allowing vessel operators, in coordination with ports, to develop local or regional emissions reduction plans that would achieve air emissions reductions that are equivalent to the proposed at-berth regulations, but through other means.

59-1

Thank you again for providing the opportunity to comment. This rulemaking will set an important environmental precedent for the United States, as well as globally, and we want these efforts to serve as a model throughout the country and the world for reducing air emissions from ships at-berth. We look forward to working with you to continue reducing emissions to the benefit of our communities, and improving the competitiveness of the California freight system. Please feel free contact us with any questions.

Best,

A handwritten signature in blue ink, appearing to read 'E. Seroka', with a stylized flourish extending to the right.

Eugene D. Seroka  
President, California Association of Port Authorities

cc: Bonnie Soriano, CARB (via email [Bonnie.Soriano@arb.ca.gov](mailto:Bonnie.Soriano@arb.ca.gov))  
Angela Csondes, CARB (via email [Angela.Csondes@arb.ca.gov](mailto:Angela.Csondes@arb.ca.gov))  
Nicole Light, CARB (via email [Nicole.Light@arb.ca.gov](mailto:Nicole.Light@arb.ca.gov))

**First 15-Day  
Comment  
Period  
Letters**

23 April 2020

California Air Resources Board  
Attention: Clerk's Office  
1001 I Street  
Sacramento, CA 95814

Re: Proposed 15-Day Changes to the Control Measure  
for Ocean-Going Vessels At Berth ("At-Berth Rule")

California Air Resources Board:

On behalf of Crowley Maritime Corporation ("Crowley"), we thank you for the opportunity to comment on the changes proposed by California Air Resources Board ("CARB") to the At-Berth Rule (the "15-Day Changes"). As the largest operator of tankers and large petroleum articulated tug barges ("ATB") in the United States whose tankers and ATBs operate regularly in California ports, Crowley is directly affected by the Proposed Regulation.

There are two aspects of the proposed 15-Day Changes to which we draw your attention:

(1) the proposed updated implementation schedule is not practical for tankers; and,

(2) the 15-Day Changes omit the modification requested in our written comment dated December 6, 2019, specifically, that the Proposed Regulation be modified to delete the arbitrary and improper exclusion of ATBs from the definition of ocean-going vessels.

With regard to the proper inclusion of ATBs within the category of vessels regulated under the Proposed Regulation, CARB's failure to consider Crowley's written comment is inconsistent with its duties under the Administrative Procedures Act, Cal. Gov. Code, §§ 11346 *et seq.*, and with the direction the Board, as set forth in Resolution 19-28 of December 5, 2019.

Crowley respectfully submits that the Proposed 15-Day Changes be modified as set forth herein.

## I. Preliminary Comment

Crowley applauds CARB's leadership in the stewardship of California's air quality and shares the goals of the Proposed Regulation to reduce the impacts of air pollution for Californians. Furthermore, Crowley appreciates CARB's recognition that the United States domestic maritime industry's fleet of ocean-going vessels play a substantial role supporting the economies of West Coast states and the livelihood of their citizens, including those of California, with respect to the region's requirements for coastal energy transportation.

By advocating for the Proposed Regulation to include an implementation schedule that is practical for tankers, and that ATBs be included within the definition of vessels it regulates, Crowley proposes amendments that, we submit, will improve the Proposed Regulation.

There should be no doubt as to Crowley's expertise and experience in connection with these matters, particularly in relation to the practicalities of the operation of tankers and ATBs. Crowley has proven itself as an innovator and leader in petroleum transportation through the development of an unrivaled ATB and tanker fleet which includes the newest and most sophisticated United States-flagged vessels. The company owns and operates a diverse, sophisticated fleet of double-hull tank vessels, enabling us to offer a wide range of environmentally safe and reliable transportation options and meet virtually any commercial or governmental customer requirement. In so doing, we maintain an extensive fleet of 40 United States flagged product and crude oil tankers and large petroleum ATBs ranging in size from 20,000 deadweight tons (DWT) to 115,000 DWT that safely and reliably carries petroleum in bulk throughout the United States East, Gulf and West Coasts, including Alaska, as well as international ports.

Crowley is directly affected by the Proposed Regulation. Crowley-affiliated companies operate self-propelled tank ships and ATBs that regularly call at California ports, general cargo vessels and container ships that may call California ports, and a fleet of harbor tugboats servicing the San Francisco Bay area, the Los Angeles-Long Beach area, and San Diego. Because of Crowley's extensive experience with vessel operations across a broad range of vessel types, many of which may be covered under the proposed At-Berth rule, Crowley is uniquely qualified to submit these comments to CARB.

## II. Support for World Shipping Council Comments

Crowley is a member of World Shipping Council ("WSC") and supports WSC's comments provided to CARB on proposed 15-day changes to the At-Berth Rule.

### III. Accelerated Tank Vessel Compliance Dates

The accelerated tank vessel compliance dates are not practical.

The proposed 15-day Changes call for an accelerated timeline to 2025 for compliance by tank vessels calling Los Angeles-Long Beach, and to 2027 for compliance by tank vessels calling at other California ports. Crowley accepts that there is substantial urgency surrounding reducing emissions from vessels at berth in California. We respect CARB's interest in accelerating the compliance timeline. But adopting an accelerated timeline for compliance that cannot be complied with by the industry is counterproductive. The accelerated timeline proposed is contrary to the comprehensive comments presented to CARB late last year by both the Western States' Petroleum Association and Power Engineering and Construction, who detailed the significant infrastructure modifications required and showed that these modifications rendered it impractical to meet CARB emissions control requirements by even the original 2027 and 2029 deadlines, let alone the accelerated timetable.

12-1

Crowley is not aware that there is any evidence to support the theory that the use of an emissions capture barge is or could be a safe alternative for petroleum tank vessels. Shore-side electrical infrastructure or shoreside emissions capture are options that have the potential to be implemented safely, but only if such implementation provides sufficient time for design, permitting, construction, installation, and commissioning (both of onshore and vessel components). But we submit that such processes could not reasonably be completed by 2025 or 2027.

Under the circumstances, we respectfully request, therefore, that, with reference to objective evidence, CARB should revisit the accelerated timelines set forth in the proposed 15-day changes to the At-Berth Rule.

### IV. It Would Be Arbitrary and Capricious to Exclude ATBs from the Proposed Regulation

The exclusion of ATBs from the definition of tankers in the proposed 15-Day Changes makes no common sense and is inconsistent with industry practice. ATBs, which are ocean-going vessels designed to transport oil cargo between ports, squarely fall within CARB's own definition of "ocean-going vessels". See, Initial Statement of Reasons, dated October 15, 2019 (ISoR), p. ES-1. In the ISoR, CARB itself recognized that,

"When an ATB is fully connected, it may meet the definition of ocean going vessel, as defined in this chapter."

Respectfully, Crowley submits that there should be no doubt: an ATB that is "fully connected", to use CARB's own language, definitely meets the definition of ocean-going vessel.

In short, there can be no justification for excluding ATBs from the definition of “ocean-going vessel” for the purposes of regulation under the Proposed Regulation.

An ATB is clearly a tanker. It carries oil cargoes from port to port and conducts operations at berth that are effectively indistinguishable from those of a tanker. The particular nature and functions of ATBs properly render these tankers, when transiting within California ports and conducting cargo operations at berth, to be within the definition of “ocean-going vessels” for the purpose of being regulated vessels under the Proposed Regulation. Merely because the propulsion unit of the ATB is not contained within the same hull as the cargo tanks and pumps does not prevent an ATB from operating as a tanker. CARB has acknowledged this fact: In its Standardized Regulatory Impact Assessment for the Proposed Regulation, dated August 1, 2019, CARB properly defined Tankers by reference to the industry meaning of the term explained in the publication *Marine insight* (see, p. 9 thereof); that definition of tanker included among the various types of tanker Integrated Tug Barges, a forerunner to the modern ATB. To adopt this definition but arbitrarily exclude ATBs from the regulation makes no sense.

In the ISoR, CARB staff stated, without support or substantiation:

“However, despite being defined as subcategory of tankers, ATBs are considered a barge and a tug separately.” [p.IV-6]

Crowley submits that this statement is plainly incorrect. When the tug is connected to the barge, an ATB is not considered to be a separate tug and barge, but as one vessel, functioning as a tanker. For the purposes of regulating the emissions of an ATB conducting operations at berth in a California port, there can be no justification whatsoever in not treating an ATB like any other tanker.

The At-Berth Rule arbitrarily excludes ATBs from the definition of ocean-going vessels and improperly classifies ATBs as commercial harbor craft, which they are not. When the ATB is underway or conducting cargo operations at berth, the tug unit is not operating separately as a harbor tug. Crowley commented extensively on this matter in a 6 December 2019 letter to CARB regarding the At-Berth rule. CARB has offered no reasoning in the 15-day Changes that explains this anomaly. As such, the 15-day Changes are flawed and incomplete.

To summarize, ATBs are principally United States-flagged, Jones Act-qualified combined tug and barge vessels consisting of a large-bulk, liquid shipping capacity barge connected to a large ocean-going tug for propulsion. These vessels are functionally equivalent to ocean-going, medium-range, self-propelled tankers. Under the Board’s current proposal, all self-propelled bulk tank vessels calling at port in California—whether foreign or US-flagged—will be subject to the At-Berth Rule while their functional equivalents, Jones Act ATBs, will not. This makes little sense, especially given that ATBs operate at multiple ports of call across the United States and internationally. They are regulated as ocean-going vessels under numerous applicable Federal regulations and should be included as such under the Proposed Regulation.

If not included in the final At-Berth Rule, ATBs and self-propelled tank vessels will face significantly different emissions control requirements in California, despite performing the same function. This would be neither rational nor fair, considering that self-propelled bulk liquid tankers, many of which fly foreign flags of convenience, are ATBs' competition in interstate and international commerce. Including ATBs in the final rule will ensure they are subject to the At-Berth Rule's cold iron, plug-in, or emissions capture requirements when moored alongside bulk liquid terminals in California.

CARB's failure to address the classification of ATBs in the proposed 15-day changes moves the agency further along a path that will result in the control of emissions from two types of vessels with nearly-identical operational profiles – ATBs and tank ships – under separate regulatory schemes. As noted in Crowley's 6 December 2019 letter, this approach will generate an illogical, inefficient, costly patchwork regulatory scheme applicable to the movement of petroleum products in bulk between California ports and among California and other West Coast States or Foreign countries. This disparity in treatment between vessels also raises regulatory process issues under applicable statutes and Constitutional violations related to ATBs' role in interstate commerce. Failing to include ATBs in the At-Berth Rule would not advance CARB's interest in improving California air quality. There can be no justification for a regulation that treats ATBs differently from other tankers and ocean-going vessels.

The Board's resolution 19-28 directed CARB, in preparing the 15-Day Changes, to consider any additional conforming modifications that are appropriate and to consider and evaluate all comments in doing so. CARB evidently failed to take Crowley's December 6, 2019 comment into proper consideration. In failing to do so, CARB has, we submit, acted arbitrarily and capriciously and not in accordance with the California Administrative Procedures Act. Moreover, by failing to consider and incorporate Crowley's comment and position in the proposed 15-Day Changes, CARB is proposing a regulation that is neither workable nor fair to the segment of the industry that, like Crowley, relies upon its ability to transport oil products to California ports using ATBs.

We urge you to reconsider.

Yours respectfully,  
**CROWLEY MARITIME CORPORATION**

Art Mead  
*Vice President & Chief Counsel*  
*Government and Regulatory*

Comment 35 for To Consider Proposed Control Measure for Ocean-Going Vessels At Berth (ogvatberth2019) - 15-1.

First Name: Dragos  
Last Name: Rauta  
Email Address: dragos.rauta@intertanko.com  
Affiliation: INTERTANKO

Subject: OGV At Berth Regulation INTERTANKO Comments  
Comment:

INTERTANKO (The International Association of Independent Tanker Owners), is a non-profit association of independent (i.e. non-Governmental and non-oil company owned tankers) owners from 40 countries operating approximately 4,100 oil, chemical and gas tankers trading worldwide. INTERTANKO has made previous contributions to this process and some will be repetitive as we could not see being commented or taken into account. These previous comments expressed the INTERTANKO Members concern with the lack of safety assessment with regard to the enforcement of the Control Measures for OGV at Berth to tankers.

INTERTANKO comments are as follows:

Section 93130.3 Applicability. (b) Federal requirements it indicates that Noting in the control measures shall be construed to amend, repeal, modify or change any applicable federal laws or regulations, including the USCG regulations or requirements. The synonyms for the word construed are interpreted, read, taken, seen or understood. Based on this, we do suggest that Control Measures for OGV at Berth construe the air emissions limits regulated under the IMO's MARPOL Annex VI which USCG has incorporated in the US CFRs. We understand CARB may wish to have more stringent limits than the ones in CFRs and in the IMO MARPOL Annex VI but this is a serious challenge to the nature of the international legislation to ensure same applicable standards ships can comply with at any port. No need to stress the consequences is any States or any country setting their own and different limits.

Safety aspects. We studied the proposed amendments, we did studied the justifications and the annexed documents. Although we understand and do not disagree with the aim to improve the environment in the California ports, we would strongly suggest that such measures are efficient only if they are not impairing the safety of the operations. We are very concerned that of lack of assessment of the safety aspects as a consequence of the application of the Control Measures for OGV at Berth to tankers. There are three important safety aspects which need assessment:

- (1) for use of shore power responsibility and guaranty assumed by the shore power provider for possible damages or pollution events in case power cut or in case of insufficient/variable power provided to tankers, particularly large tankers, during cargo operation.
- (2) standards for construction and certification of capture and control systems or other innovative options whether there are

shore based but particularly if they are on board barges.  
(3) safety operational procedures when capture and control systems or innovative options operate in tandem with tankers.

The first point was raised by INTERTANKO several times but we have not seen any response. It is of concern if such a risk, of which degree no one has assessed so far, is ignored.

With regard to number (2) and (3) and based on Section 93130.5 (i) or 93130.17, we note there are no provisions to address standards and regulations for manufacturing capture and control systems such innovative option. The only requirements addressed their capturing performance and their durability. In addition, there is no provision or requirement for safe tandem operation of tankers with these capture and control systems or innovative options.

Availability of capture and control systems/innovative options. INTERTANKO would suggest there is a need to clarify situations of availability of such systems, including providing shore power to tankers. If a tanker which has no means to use shore power arrives and the systems are not available, what would be the consequence of proceeding to berth and to cargo operations? Similarly, if a tanker can use shore power but the level of shore power required by a large tanker is not available to be supplied for some time, what would be the consequences? Would the ship wait with cargo operations until such an option becomes available? We strongly suggest such aspects need to be clarified in due time. INTERTANKO will suggest this question is not a pure commercial issue. Such a scenario could create a lot of bottle necks in port activities.

INTERTANKO appreciates the opportunity to provide its input on this rule development. We will continue to assist to the best of our ability and hope that CARB recognises the challenges that need to be addressed, since, as long as the tanker is moored at-berth, particularly during cargo operations, there is not much it can do to control many of the associated risks indicated.

Looking forward to further dialogue.

Kind regards  
Dragos Rauta  
Technical Director  
INTERTANKO

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2020-05-01 09:13:26

No Duplicates.

13-1  
cont.



April 29, 2019

Ms. Mary D. Nichols, Board Chair  
Mr. Richard Corey, Executive Officer  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Submitted via docket as directed at <http://www.arb.ca.gov/lispub/comm/bclist.php>  
Also transmitted via email

Cc (email): Heather Arias, Bonnie Soriano, Angela Csondes, Nicole Light

**Subject: Maersk Comments on the Supplemental 15 Day Notice Package for the Proposed Control Measure for Ocean-Going Vessels At Berth and Associated Standardized Regulatory Impact Assessment (SRIA), Board item ogvatberth2019**

Dear Board Chair Nichols and Mr. Corey,

Thank you for this opportunity to comment on the Supplemental 15 Day package of Changes to the Proposed Control Measure for Ocean-Going Vessels At Berth and Associated SRIA and ISOR, Board item ogvatberth2019. We have provided four sets of written comments in 2019 (March 8, March 26, June 10 and December 6), as well as less formal communications including analyses of arrival time feasibilities. We also provided input and analyses to PMSA and the World Shipping Council to incorporate in their consolidated industry comments. Our comments of December 6, 2019 are attached. We appreciate that some of our previous comments were considered and adopted and look forward to CARB's full response to comments.

Our comments today will focus on these critical points:

1. Maersk and the other currently-regulated fleets have been complying with the existing At-Berth rule since the first EERO plan was required in 2009 and began connecting to shore power in 2013-2014. In January 2020 this existing rule entered the final phase of implementation with requirements of 80% connections and emissions reductions, and 90% for berths funded under Proposition 1B. As defined in the existing rule this is a challenging goal. In addition, the current rule requires that any vessel with shore power capability must connect when calling a berth with shore power. With little margin beyond connection times, overcompliance is required to ensure compliance.

The currently-regulated fleets must continue to comply with this strict existing rule until the new rule is fully implemented.

2. The aggressive timeline for implementation of a new shore power regulation has become infeasible with the onset of COVID-19. Key industry stakeholders have been required to prioritize personnel safety and adapting to dramatically changing operational and supply chain needs. This had left little time or bandwidth to adequately evaluate the very complex new Innovative Concepts section, or to fully analyse the proposed language to ensure that feasible compliance pathways exist for all reasonably anticipated occurrences. Meaningful engagement in the process has become much more difficult since travel restrictions required Maersk, CARB staffs and ARB members to work from home. This challenge extends to simple things – e.g., the shore power website was inaccessible on 4/29 so those working from home could not access the current regulation in the preparation of these comments.

I have been responsible for Maersk’s California shore power compliance program since the regulation was implemented in 2008. I am also part of the North American (NAM) Health, Safety Security and Environment team that has the lead for crisis management during the COVID-19 outbreak and am the primary author for our NAM COVID-19 Business Continuity/Crisis Management plans and procedures. I am now deeply engaged in plans for a safe and orderly Return to Work for the personnel in all of our sites and businesses in North America.

Maersk is not unique; it’s an “All hands on deck” situation. The Department of Homeland Security has deemed our industry to be “mission critical” to provide food, medical supplies and other essentials to our country, and the US Coast Guard has designated maritime workers as critical. (see <https://www.cisa.gov/transportation-systems-sector>). The industry has been seriously challenged to keep supply chains moving while keeping our people safe, dealing with dramatically reduced customer shipment volumes and unprecedented vessel schedule changes, assisting our communities with protection and recovery, and still complying with existing regulations. These overriding priorities have left very limited bandwidth for thoughtful analysis or suggestions on new regulatory proposals.

Recommendation: Pause action on the proposed regulatory package until the crisis subsides and we return to normal when meaningful stakeholder participation is again possible. During this time the performance of the currently regulated fleets, ports and terminals can be determined under the full requirements of the existing rule. Work on the technologies and feasibilities for the proposed new fleets can continue with no impact on compliance timelines.

27-1

3. Significant questions have been raised about the economic and emissions inventory projections used in the SRIA. These questions merited answers prior to the Board vote to enable an informed decision. Now due to COVID-19 these assumptions are clearly invalid, and any projection of future business activity is sheer guesswork. For example, the Port of Los Angeles experienced a 30% volume year-over-year decline in March (see [https://www.logisticsmgmt.com/article/polb\\_and\\_pola\\_see\\_further\\_volume\\_declines\\_in\\_march](https://www.logisticsmgmt.com/article/polb_and_pola_see_further_volume_declines_in_march) and <https://www.portoflosangeles.org/business/statistics/container-statistics>.) PMSA has provided an excellent graph in the industry coalition comments.

Recommendation: Pause action on the proposed regulatory package for 9-12 months until the state, national and international economic impacts and outlooks can be determined. As stated above, this could be done without “backsliding” for the currently regulated fleets and should not delay work for the newly proposed vessel types.

4. Successful implementation will require clearly defined compliance pathways that are fully established in each port prior to activating the compliance requirement in that port. The rule as written does not ensure that Remediation funds are available in each port prior to full implementation on 1/1/2020, and we now question whether these Fund Administrators could be established, and MOUs completed in the few months remaining. We also are concerned about the lack of alternatives (CAECS), with no alternatives in most ports and only one prototype system each in LA and Long Beach.

Recommendation: CARB needs to align implementation schedules to ensure that the defined compliance pathways are available in each port prior to required compliance at that port.

5. We welcome the inclusion of the Innovative Concepts (IC) provisions and would like to fully understand the concept and it’s intended applications and constraints. We are not aware of any detailed staff presentations or explanations on the concept or workshops to work through implementation options. The regulatory language is very complex and includes a number of prohibitions that seem to preclude many uses. These prohibitions include the following:
  - a. Compliance – “The proposed innovative concept must achieve emissions of NOx, PM 2.5 and ROG that are early or in excess of any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity, or an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB’s Governing Board.” AND “The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation or



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legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario.”

Is this limited to compliance with California laws and programs or does it apply to international/IMO requirements and requirements in other countries?

Note too that the few AB 617 plans proposed to date have been very broad in scope and the proposed Oakland AB 617 plan included an Indirect Source Rule. This expectation should be clarified.

- b. Impact on other ports or terminals - “The proposed innovative concept must not increase emissions at other ports or marine terminals.” Must there be no negative impact on any other California Port, or if this prohibition is global, and if so, how might a global impact be evaluated? For example, it could be said that redeploying a vessel with a Tier 3 NOx engine to California might negatively impact the ports on the service where that vessel had been deployed.
- c. Funding - “No innovative concept shall be partially or fully funded with a public incentive program.” – There is no definition of a “public incentive program”. Is this provision restricted to California “public incentive programs,” or might it preclude use of approaches funded under International programs such as those in the European Union? Would it disqualify technology funded under various Port Technology Demonstration Programs?

International vessels travel the world and must comply with IMO plus the rules in every port and country. As written these restrictions appear to preclude participation in programs in other jurisdictions or inhibit deployment of innovative technologies to California. For example: the NAM ECA requires vessels built after 2016 to be NOx Tier 3, but there is no requirement to assign these new vessels to visit California. California want to encourage such vessels to come here, but the proposed IC language appears to exclude this source of emissions reductions and thus provides a disincentive to bringing such vessels to California.

Maersk is an integrated international container logistics company, operating about 750 container vessels globally as well as marine terminals, warehouses and other essential supply chain functions. Each year 45 to 60 of our vessels make over 500 calls in California ports, some at our sister location APM Terminals in Los Angeles. Typically, each of these international vessels spends less than 5% of its operable lifetime in the waters of any one



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state or country. Network changes and vessel redeployments are an essential part of supply chain operations.

Maersk has long been an environmental leader in shipping. Since 2008 we have reduced our fuel consumed and related emissions by 43% on a per container per kilometer basis. We committed to a 60% reduction and to launch a first carbon-neutral vessel by 2030 on our way to zero carbon emissions shipping by 2050. We now offer a first commercial net zero CO2 service called "ECO Delivery." In the past Maersk voluntarily used dramatically cleaner fuels in California ports, and supported establishing both the California fuel rule and the North American Emissions Control Area. APM Terminals has also been committed to environmental leadership and is now implementing a major modernization project in Los Angeles including electrified cargo handling equipment.

We are committed to going beyond compliance to achieve environmental excellence and hope these comments will be taken in the constructive spirit with which they are offered.

Again, thank you for this opportunity to comment on the proposed regulatory language and ISOR.

Sincerely,

A handwritten signature in black ink that reads "Lee Kindberg". The signature is written in a cursive style and is positioned to the left of a vertical blue line.

Lee Kindberg, Ph.D.  
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ATTACHMENT to April 30, 2020 Comments on 15 Day Package

December 6, 2019

Ms. Mary D. Nichols, Board Chair  
Mr. Richard Corey, Executive Officer  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Submitted via docket as directed at <http://www.arb.ca.gov/lispub/comm/bclist.php>  
Also transmitted via email

Cc (email): Heather Arias, Bonnie Soriano, Angela Csondes, Nicole Light

Subject: **Maersk Comments on Proposed Control Measure for Ocean-Going Vessels At Berth and Associated Standardized Regulatory Impact Assessment (SRIA)**, Board item [ogvatberth2019](#)

Dear Board Chair Nichols and Mr. Corey,

Thank you for this opportunity to comment on the Proposed Control Measure for Ocean-Going Vessels At Berth and Associated SRIA and ISOR. We commend staff for the outreach to stakeholders and the clear writing in the ISOR.

We have been engaged with CARB staff during the development of this new approach, in both workshops and meetings and through written comments. Three sets written comments were provided in 2019 (March 8, March 26, and June 10) and my speaker notes for the CARB Board public hearing on Dec. 5, 2019 are attached. Our comments in this document focus primarily on the proposed regulatory language and the processes defined for implementation. We have also provided input to PMSA and the World Shipping Council to incorporate in their comments.

**Structure of these comments:**

1. Executive Summary of comments
2. Maersk's interest in this rule and approach to regulation
3. The current At-berth regulation
4. Comments on the proposed new regulation
5. Recommendations

**1. Executive summary of comments**

The existing At-berth regulation has been an important and successful contributor in the dramatic reduction of shipping-related emissions. It is administratively complex, and CARB issued three Regulatory Advisories (2013, 2015 and 2017) to enable implementation and improve clarity. If this approach is continued in whole or in part in the future, some updating and technical corrections should be considered. A possible productive continuation could include a fleet averaging approach for the currently regulated fleets. Suggested areas for technical corrections are in Table 1.

Currently-regulated vessel fleet operators have developed sophisticated predictive models and expertise to manage this complex requirement and improve operations. Change to a new structure will make these models obsolete while achieving little to no additional environmental benefit vs the fully-implemented 2020 requirements already in place.

The per-vessel/checklist-based concept was initially supported by industry as a way to clarify and streamline the compliance process, address many of the issues in the current rule, establish balanced responsibilities for all participants, and make enforcement simpler. However, as the concept and language developed, the spirit changed from encouraging desired behaviors to a more controlling, punitive approach, which is also complex to administer, provides significantly less flexibility and planning capability, and creates conflict rather than cooperation between regulated entities.

The proposed "per-vessel" rule requires vessels to connect almost all calls starting January 1, 2021, however, the infrastructure to do so is not in place. The proposed regulation calls for Ports' infrastructure plans to be submitted by July 2021, approved by CARB in 90 days (October), and only then start the funding, permitting and construction process. In addition, the envisioned alternative control systems are inadequate in LA/LB and do not exist in any other ports, and barge-based alternatives may not be usable in some locations due to safety concerns.

The proposed language includes positives such as a creative remediation fund (limited in use), and mechanisms to evaluate and approve future technologies. However the proposed rule still does not provide clear mechanisms to deal with significant operational disruptions, redeployments or market shifts. It also creates new technical issues which must be addressed if this approach is to be implemented. For example, the new rule calls for 1-hour connection times on arrival and departure, which is not feasible. We found that 38% of our vessel calls in California between May and October would not have met this requirement. (54% in Oakland). Clearly these technical issues need to be addressed before a rule based on this approach could be effectively implemented.

We recommend that staff work with the currently regulated vessel operators to improve the proposed compliance structure for these fleets – based on the current regulation's

EERO pathway (fleet averaging), the per-vessel approach, or some third alternative. The final direction should ensure at least one clear, feasible, reasonably cost-effective compliance pathway for all the typical variations of this business – including the periodic major disruptions (e.g., the 2015 labor disruptions, and the 2018 surge in extra vessels calls due to the threat of new tariffs in 2019, which resulted in a surge of over 30 additional vessels to CA ports in late 2018, few of which were shore power equipped).

We also recommend that CARB Staff work with Ports and other stakeholders to evaluate whether other reduction projects could provide earlier and more cost-effective ways to achieve the needed reductions.

Finally, only California has experience with shore power. Other ports and governments around the world are looking to California for data and best practices, so we need to get it right.

## **2. Maersk's interest in this rule and approach to regulation**

Maersk is the global leader in container shipping, operating in 130 countries and employing roughly 76,000 people. We operate about 750 container vessels globally. Each year 45 to 60 of our vessels make over 500 calls in five California ports. These international vessels spend on the order of 5% or less of their operable lifetimes in the waters of any one state or country.

Maersk has long been an environmental leader in shipping. Examples of this environmental leadership include:

- Our voluntary clean fuel initiatives in California started in 2006, and other high-priority ports followed (e.g., Hong Kong, Houston). We are the only shipping line that supported both the California Vessel Fuel Rule and the US EPA's North American Emissions Control Area proposal.
- Since 2007 we have reduced our fuel consumed and related emissions by 47% on a per container per kilometer basis, through new larger vessels, improved operational and vessel management practices, and retrofits of our existing fleet. Our fuel and CO<sub>2</sub> data are calculated using Clean Cargo methodologies and third-party verified by Lloyd's Register.
- Our 2018 commitment to Net Zero CO<sub>2</sub> Shipping by 2050 means that we must launch our first carbon neutral vessel by 2030. New fuel, propulsion and technology development initiatives are underway to support this goal.
- We now provide the first carbon-neutral shipping options for customers, and we are partnering with major cargo owners and technology providers to develop future fuels and technologies.

- Maersk's APM Terminals company is now installing hybrid cargo handling equipment in priority ports around the world, including Pier 400 in Los Angeles. This hybrid equipment reduces diesel emissions by well over half and can be converted to fully electric operations as equipment technology, supply of electricity and charging infrastructure become available.

**Maersk's approach to compliance:**

Maersk supports California's clean air and climate goals and strives to meet or exceed all requirements. We have committed time and resources to work with regulators to provide information on operations and capabilities to help their development of regulations that achieve environmental goals, are cost effective, clear and enforceable, and avoid unintended consequences. Our goal is that there will be clear, feasible compliance pathways for all reasonably foreseeable operational modes, which encourage desired behaviors and discourage counterproductive actions. We also support the development of emissions inventories that recognize the full range of efficiency and environmental improvements implemented by fleets, terminals and ports.

Maersk vessels began complying with the California At-berth rule in 2010 using the Equivalent Emissions Reduction Option, which focuses on fleet emissions reductions. This is four years earlier than the 2014 compliance date on the Reduced On-board Generation compliance approach taken by most carriers.

We have been engaged with CARB staff during the development of the proposed rule and ISOR, including numerous meetings, calls and written communications. We have also provided significant input to both PMSA and WSC on their comments, and support most of their industry recommendations. This letter will provide more specifics on a few key issues that we feel are of particular concern.

**3. The Current California At-berth rule**

The existing At-berth Rule and Vessel Fuel Rule have been important and successful contributors in the dramatic reduction of shipping-related emissions near California ports. However, the current rule is administratively complex for both the regulated entities and the Enforcement division and does need technical corrections. The existing structure encourages "spreadsheet exercises" rather than encouraging operational behaviors that minimize emissions. It is also not yet fully implemented.

The existing At-berth Rule established a multi-year phase-in, with the final step scheduled in 2020. On 1/1/2020 the vessel fleet emissions reduction requirements step up from a

minimum of 70% to a minimum of 80% emissions reductions. <sup>1</sup> Assuring that fleets achieve the requirements requires that operational targets be set well above the minimum. On the shore side, berths where shore power infrastructure was funded by Proposition 1B have 10% higher requirements, so their requirements step up from 80% to 90%. Achieving these existing requirements means almost all regular calling vessels must be shore-power capable and connect.

In 2-3 years data on the outcome of the fully implemented rule will be available, enabling more thorough assessments.

Table 1: Structural Aspects and Technical Corrections for the Existing At-berth Rule

General structure:

- The existing Equivalent Emissions Reduction compliance pathway (fleet averaging approach to emissions reductions) encourages focus on the largest sources with over-compliance to ensure full compliance. This structure does provide some flexibility to address normal operational variations and challenges, but is complex to manage for both the vessel operators and CARB Enforcement.
- Currently-regulated vessel fleet operators have developed sophisticated predictive models and expertise to manage this complex requirement and improve operation. Change to a new structure will make these models obsolete while achieving little to no additional environmental benefit from these fleets.
- Obligations and penalties should be balanced for all participants responsible for making shore power effective: vessel operators, marine terminals, Ports, and alternative technology providers. This is not currently the case. The key role of labor must also be considered.
- No mechanism is provided to address for major redeployments or business disruptions (e.g., 2015 labor situation, or the 2018 influx of over 30 extra vessels due to the threat of federal tariffs).

Need to clarify use of Regulatory Advisory scenarios and streamline reporting.

- The Regulatory Advisories include several key provisions ("scenarios") essential for effective operation of the Rule, including Commissioning calls, shore-side power unavailability (e.g. infrastructure projects), annual reporting and averaging, research and testing of alternatives technologies, etc. These issues need to be addressed in any technical corrections.

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<sup>1</sup> The current first line-last line vessel visit definition results in low calculated reductions since it includes time prior to regulatory clearances and time needed for shore power connection and disconnection. It is not feasible to operate on shore power or an alternative during these times.



- Dealing with short calls <30 hours. The emissions reduction calculation structure defined in the existing rule is increasingly challenging with the upcoming 80% reduction requirement. For example, a 10-hour call with 3 hour connect/disconnect time is a 70% reduction.
- Power consumption defaults given in "Table 1" are not accurate for today's vessels, and do not include larger vessels. This can distort emissions calculations.
- Arrival/departure definitions and the connection window were originally not based on actual experience and should be adjusted now that data is available.
- Review and clarify the math to be used for exclusions outside the vessel operator's control. The existing structure penalizes smaller ports and vessel fleet operators making short calls.

The initial concept of a per-vessel/checklist approach was attractive and widely supported as addressing many of the issues in the current rule. However, as the concept, structure and language developed, the spirit changed from encouraging desired behaviors to a more controlling, punitive approach. Particular concerns include these:

1. Compliance Pathway:
  - The rule basis is per-vessel with only a few exemptions. This demands near perfect performance from a mobile source technology that is used only intermittently and must withstand the challenging ocean environment during and between uses.
  - The rule does not provide feasible compliance pathways for some normal operational situations (e.g., major business or economic changes, network redesigns, or the large number of "extra loaders" encountered in late 2018).
2. Control options: Alternatives are very limited in LA/Long Beach, and completely unavailable in other ports. Feasible compliance options need to be available and clearly defined for all ports prior to implementation of a more stringent requirement.
3. Complexity: The proposed rule is also administratively complex and challenging, so is not an improvement vs. the existing rule. The seven-day reporting requirement conflicts with annual allowance of VIEs and TIEs. This adds significant uncertainty and challenge to planning, decision-making and reporting for any non-routine call.
4. Conflict vs. cooperation: The design as now written will lead to conflict between vessel operators, terminals and ports rather than increasing cooperation.



5. Cost: The rule as currently structured increases costs and the risk of non-compliance, particularly at ports with few or no alternatives (assuming payment to the remediation fund is allowed at these locations). This will increase costs per container more at these ports, further disadvantaging these smaller ports.

Examples of practical flaws in the proposed regulatory language:

1. Replaces the current 3-hour engine run time with two one-hour requirements. No data was provided to support this change. (why a 1-hour rule was chosen/feasible).

In October 2019 Maersk analyzed data on 135 vessel calls back to May 7, 2019. We found that 38% of the calls would not have met the proposed 1-hour rule on arrival. (Details: 27% in LA, 34% in Long Beach and 54% in Oakland). Would these visits all have paid mitigation fees (if available and allowed) or been out of compliance?

If 38% of vessels cannot meet a fundamental requirement in the regulation, there is a problem with the feasibility of the regulation. Analysis of engine run times required by size and port are available for discussion with staff.

- Recommendation: Initially require documentation of reasons when the time is exceeded, with no penalty, and review in the proposed 2023 program review to determine statistically feasible times.
2. Currently regulated Vessel fleet operators are required to comply on essentially every vessel call starting 1/1/2021, but infrastructure does not exist to do so. Ports and terminals must submit PLANS by July 2021, and CARB has 90 days to review and approve those plans. Only then can the infrastructure proposal, permitting, funding and construction processes be started.
    - Recommendation: Defer implementation of the per-vessel approach until this infrastructure availability is addressed.
  3. Reporting is required within 7 days, however VIEs and TIEs are granted annually. This incompatibility in time spans means vessel operators must make decisions with very significant annual cost and operational impacts without knowing the annual impact and without the ability to plan for the full year.
    - The Terminal TIEs may not be available for some needs, and could be provided preferentially to fleets with ownership interests
    - VIEs at 5% mean only 2 calls per year in some small ports
    - The VIE structure does not provide a mechanism to address the periodic business changes and disruptions mentioned above.

- Recommendation: Allow adjustment of VIE and TIE visit allocations on an annual basis to enable cost controls and effective planning.

## 5. Recommendations:

1. Ports and government agencies around the world are looking to California as the only place with experience and data. CARB needs to ensure anything published or enacted is accurate, clear and a scalable practice.
2. The proposed rule should not go forward as currently designed. This rule, by requiring near 100% connections for shore power or alternatives, no ability to use an alternative (CAECT) for many vessels including very large cargo and cruise vessels, and no fleet averaging leaves no margin for error and sets up vessel operators for failure in spite of all reasonable efforts to comply.

Instead, we ask that the Agency “hit pause” and re-evaluate options including the following:

- Other port-specific concepts that could achieve greater reductions
  - The “Industry alternatives” which include fleet averaging.
  - Allowing the currently regulated fleets to continue under the Equivalent Emissions Reduction Option with technical corrections.
  - Another clear and simple approach is a fleet averaging approach based solely on the percent of time the fleet is connected. We believe this is consistent with CARB’s inventory approach.
3. If the proposed rule does move forward as currently structured, the following changes would make it more feasible and practical:
    - a. We ask that the CARB Board direct staff to ensure that any rule changes provide clear feasible pathways for all reasonably foreseeable business events outside the control of the vessel fleet and marine terminal operators.
      - i. Conduct an analysis covering at least the known occurrences encountered in the decade this rule has been on the books (economic and trade disruptions, labor issues impacting productivity, ownership and alliance changes, redeployments, business swings due to carrier bankruptcy, et. al.). Use the results of this analysis to fine-tune the requirements.
      - ii. Ensure implementation of the infrastructure improvement projects required to deliver high levels of control for the future and provide mechanisms to



enable vessel and terminal compliance during construction while minimizing total environmental impact (all modes). This has been addressed under Scenario 1 of the 2015 Regulatory Advisories, which discourages diversions to other modes such as trucking.

- iii. Phase in the new requirements in alignment with availability of infrastructure and alternative control systems.

b. Technical aspects for the proposed regulatory language:

- i. Modify the "1 hour connect/disconnect time requirements" to be "as soon as practicable." If a numeric standard is needed, CARB could initially require documentation of reasons when a defined time is exceeded, with no penalty, and review performance in the proposed 2023 program review to determine statistically feasible times.
- ii. Please clarify that "compatible" and "compatibility" refer to shore power electrical standards and are not related to physical vessel configurations (e.g., not intended to require installation of shore power on the second side of the vessel).
- iii. Please clarify a vessel operator's options and responsibilities if the master or CAECT provider believes the available CAECT cannot safely connect to the vessel's stack due to height, configuration or presence of a scrubber.
- iv. Clarify and fine tune processes for managing exceptions:

We continue to be concerned about the complexity and fault-finding involved in managing the TIEs/VIEs and remediation fees.

- VIEs needs to be flexible within a port complex like LA/LB since vessel services may move from terminal to terminal as business changes.
- To be most useful, VIEs and remediation fees should be reviewable and adjustable if needed and valid for at least 18 months.
- Clarify whether a VIE covers a vessel visit to one port or a full California voyage. It appears that as written a vessel scheduled to make calls in 3 ports that experiences a malfunction could be required to expend VIEs in each port called until repairs can be made. The operational alternative would be to omit vessel port calls, potentially requiring that containers be trucked to the other ports.
- Clarify the mechanism for the managing the situation where a vessel experiences a major mechanical problem and is moved to a "lay by" berth for repairs. We are checking to determine whether such occasionally-used berths have shore power capability. If shore power is not available could this be covered under the original TIE/VIE, or would a



second TIE/VIE be required? An unintended consequence could be prolonging repairs by making them at anchorage instead of at berth.

- A similar question applies if a vessel “double calls” – visits one terminal in a port complex and then makes a brief stop in another terminal in the same port (e.g., to load empty containers). Is there a *de minimis* visit?
- Is there a way to address the regulatorily-required 5-year vessel dry dockings? A service with 5 identical vessels will almost certainly include vessels of the same class, with dry dockings bunched rather than being spaced evenly at one per year. For a short rotation service, (e.g., 5 vessels in 5 weeks) such dry dockings may require a replacement vessel for 2 to 3 visits. Replacement vessels with shore power can be difficult to charter and are not available in some sizes. Thus, dry dock replacement could exhaust or exceed all VIEs at each port, leaving no VIEs for extra loaders, redeployments or operational issues. Would remediation fees be an option in this case?
- Similarly, how will a port or terminal operator handle major public works or infrastructure projects, such as the major projects to install infrastructure for electrification of cargo handling equipment and heavy duty over-the-road vehicles? Is the only option to increase the cost of these desirable projects due to remediation fees? Is it clear that remediation fees would be allowed for these uses?

c. Reporting

- i. The Responsible Official must manage data quality and carefully allocate VIEs/TIEs/exemptions for the full fleet on a centralized basis. Thus, individual vessels will not be capable of reporting directly to CARB.
- ii. Due to the high level of expertise and knowledge required for managing VIEs, seven (7) days is not feasible during certain seasons (summer holidays, Christmas, etc.). Negotiation with terminals around use of TIEs vs. VIEs will also require time. In addition, VIE vs. remediation cost management calls for a minimum of 30 calendar days, and a quarterly or annual adjustment period would be more feasible for planning and fleet/cost management.
- iii. We do not yet know what information will need to be reported or how the system will work, and therefore cannot comment specifically on the feasibility, time commitment or individual items to report. This requirement should be made transparent to the regulated community quickly or be revisited when the reporting system design is available.

- d. Remediation fee: The remediation fee is an interesting and creative mechanism for addressing operational challenges and enabling community air quality



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improvements. Broad availability of the remediation fee option would help address the flexibility needs identified in both the existing and the proposed rule. As mentioned above, to be most useful, VIEs and remediation fees should be reviewable and adjustable if needed during the time that they are valid. A critical question is when is the Fee payable, how and by whom in each operational scenario?

- e. The severability clause on the last page will leave the rule unbalanced and unworkable if any party is able to successfully challenge their inclusion in the rule. A reversion to some modified version of the existing rule may be more appropriate in this case.
- f. The research exemption needs to be broader to cover testing of new measurement devices (e.g., CEMs), new treatment technologies, fuels, etc. for both ship and shore side.

Again, thank you for this opportunity to comment on the proposed regulatory language and ISOR.

Sincerely,

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## Speaking Points for CARB At-berth Public Hearing

Oakland CA, Dec. 5, 2019

B. Lee Kindberg, Ph.D.

Good Morning. I am Lee Kindberg, Head of Environment & Sustainability for Maersk North America.

Maersk is the world's largest container shipping company and has long been committed to environmental leadership.

- voluntary use of clean fuels in California starting in 2006.
- reduced CO2 by 41% per container moved in the last decade.
- We have committed to zero carbon shipping by 2050 so are working to launch our first zero carbon vessel by 2030.

I've managed our clean fuels and shore power programs from the beginning.

Maersk Exeter arrived in Oakland this morning. She left here in early August -- 16 weeks ago -- and visited Asia, Singapore, Suez and Antwerp before returning.

A weekly sailing on that route takes 16 vessels - all shore power capable at a cost ~\$1M. If we change out vessels that's an additional million each and takes 6 to 9 months.

Current rule:

- Has helped reduce emissions @ ports
- Is complex for us to manage and CARB to enforce, so we have built models and expertise to do so.
- Needs technical corrections – but not necessarily a whole new rule.

We were optimistic that the new rule would streamline compliance and establish responsibilities for all participants.

However, as the proposal evolved the spirit changed, and it became equally complex and even punitive.

The proposal means throwing out our models, SOPs and experience, and starting over – with less flexibility, far less ability to plan, and minimal additional environmental benefit.

- The new rule requires vessels to connect 100% starting 1/1/2019 but the infrastructure to do so just isn't there. Ports' infrastructure plans would be approved by CARB in October that year.

And the envisioned alternative systems just don't exist in most ports.

- There is still no clear mechanism to deal with significant disruptions, redeployments or market shifts.
- Technical issues – e.g. 1-hour connection times –

38% of our vessels calls since May would not have met. (54% here in Oakland)

What would we like to see?

1. Direct staff to pause and work with currently regulated fleets to improve the structure – old or new or a third approach.
2. Ensure at least one clear, feasible, reasonably cost-effective compliance pathway for all the likely variations of this business – including the periodic major disruptions.

2015 labor

2018 tariffs → surge of 34 additional vessels to CA

3. Finally, only California has experience with shore power. Other ports and governments are watching so we need to get it right.

Thank you again for this opportunity to speak. I will also submit written comments by Monday.



April 29, 2020

Ms. Mary D. Nichols, Board Chair  
Mr. Richard Corey, Executive Officer  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Submitted via docket as directed at <http://www.arb.ca.gov/lispub/comm/bclist.php>  
Also transmitted via email

Cc (email): Heather Arias, Bonnie Soriano, Angela Csondes, Nicole Light

**Subject: Maersk Comments on the Supplemental 15 Day Notice Package for the Proposed Control Measure for Ocean-Going Vessels At Berth and Associated Standardized Regulatory Impact Assessment (SRIA), Board item ogvatberth2019**

Dear Board Chair Nichols and Mr. Corey,

Thank you for this opportunity to comment on the Supplemental 15 Day package of Changes to the Proposed Control Measure for Ocean-Going Vessels At Berth and Associated SRIA and ISOR, Board item ogvatberth2019. We have provided four sets of written comments in 2019 (March 8, March 26, June 10 and December 6), as well as less formal communications including analyses of arrival time feasibilities. We also provided input and analyses to PMSA and the World Shipping Council to incorporate in their consolidated industry comments. Our comments of December 6, 2019 are attached. We appreciate that some of our previous comments were considered and adopted and look forward to CARB's full response to comments.

Our comments today will focus on these critical points:

1. Maersk and the other currently-regulated fleets have been complying with the existing At-Berth rule since the first EERO plan was required in 2009 and began connecting to shore power in 2013-2014. In January 2020 this existing rule entered the final phase of implementation with requirements of 80% connections and emissions reductions, and 90% for berths funded under Proposition 1B. As defined in the existing rule this is a challenging goal. In addition, the current rule requires that any vessel with shore power capability must connect when calling a berth with shore power. With little margin beyond connection times, overcompliance is required to ensure compliance.

The currently-regulated fleets must continue to comply with this strict existing rule until the new rule is fully implemented.

2. The aggressive timeline for implementation of a new shore power regulation has become infeasible with the onset of COVID-19. Key industry stakeholders have been required to prioritize personnel safety and adapting to dramatically changing operational and supply chain needs. This had left little time or bandwidth to adequately evaluate the very complex new Innovative Concepts section, or to fully analyse the proposed language to ensure that feasible compliance pathways exist for all reasonably anticipated occurrences. Meaningful engagement in the process has become much more difficult since travel restrictions required Maersk, CARB staffs and ARB members to work from home. This challenge extends to simple things – e.g., the shore power website was inaccessible on 4/29 so those working from home could not access the current regulation in the preparation of these comments.

I have been responsible for Maersk’s California shore power compliance program since the regulation was implemented in 2008. I am also part of the North American (NAM) Health, Safety Security and Environment team that has the lead for crisis management during the COVID-19 outbreak and am the primary author for our NAM COVID-19 Business Continuity/Crisis Management plans and procedures. I am now deeply engaged in plans for a safe and orderly Return to Work for the personnel in all of our sites and businesses in North America.

Maersk is not unique; it’s an “All hands on deck” situation. The Department of Homeland Security has deemed our industry to be “mission critical” to provide food, medical supplies and other essentials to our country, and the US Coast Guard has designated maritime workers as critical. (see <https://www.cisa.gov/transportation-systems-sector>). The industry has been seriously challenged to keep supply chains moving while keeping our people safe, dealing with dramatically reduced customer shipment volumes and unprecedented vessel schedule changes, assisting our communities with protection and recovery, and still complying with existing regulations. These overriding priorities have left very limited bandwidth for thoughtful analysis or suggestions on new regulatory proposals.

Recommendation: Pause action on the proposed regulatory package until the crisis subsides and we return to normal when meaningful stakeholder participation is again possible. During this time the performance of the currently regulated fleets, ports and terminals can be determined under the full requirements of the existing rule. Work on the technologies and feasibilities for the proposed new fleets can continue with no impact on compliance timelines.

28-1

3. Significant questions have been raised about the economic and emissions inventory projections used in the SRIA. These questions merited answers prior to the Board vote to enable an informed decision. Now due to COVID-19 these assumptions are clearly invalid, and any projection of future business activity is sheer guesswork. For example, the Port of Los Angeles experienced a 30% volume year-over-year decline in March (see [https://www.logisticsmgmt.com/article/polb\\_and\\_pola\\_see\\_further\\_volume\\_declines\\_in\\_march](https://www.logisticsmgmt.com/article/polb_and_pola_see_further_volume_declines_in_march) and <https://www.portoflosangeles.org/business/statistics/container-statistics>.) PMSA has provided an excellent graph in the industry coalition comments.

Recommendation: Pause action on the proposed regulatory package for 9-12 months until the state, national and international economic impacts and outlooks can be determined. As stated above, this could be done without “backsliding” for the currently regulated fleets and should not delay work for the newly proposed vessel types.

4. Successful implementation will require clearly defined compliance pathways that are fully established in each port prior to activating the compliance requirement in that port. The rule as written does not ensure that Remediation funds are available in each port prior to full implementation on 1/1/2020, and we now question whether these Fund Administrators could be established, and MOUs completed in the few months remaining. We also are concerned about the lack of alternatives (CAECS), with no alternatives in most ports and only one prototype system each in LA and Long Beach.

Recommendation: CARB needs to align implementation schedules to ensure that the defined compliance pathways are available in each port prior to required compliance at that port.

5. We welcome the inclusion of the Innovative Concepts (IC) provisions and would like to fully understand the concept and it’s intended applications and constraints. We are not aware of any detailed staff presentations or explanations on the concept or workshops to work through implementation options. The regulatory language is very complex and includes a number of prohibitions that seem to preclude many uses. These prohibitions include the following:
  - a. Compliance – “The proposed innovative concept must achieve emissions of NOx, PM 2.5 and ROG that are early or in excess of any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity, or an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB’s Governing Board.” AND “The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation or



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legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario.”

Is this limited to compliance with California laws and programs or does it apply to international/IMO requirements and requirements in other countries?

Note too that the few AB 617 plans proposed to date have been very broad in scope and the proposed Oakland AB 617 plan included an Indirect Source Rule. This expectation should be clarified.

- b. Impact on other ports or terminals - “The proposed innovative concept must not increase emissions at other ports or marine terminals.” Must there be no negative impact on any other California Port, or if this prohibition is global, and if so, how might a global impact be evaluated? For example, it could be said that redeploying a vessel with a Tier 3 NOx engine to California might negatively impact the ports on the service where that vessel had been deployed.
- c. Funding - “No innovative concept shall be partially or fully funded with a public incentive program.” – There is no definition of a “public incentive program”. Is this provision restricted to California “public incentive programs,” or might it preclude use of approaches funded under International programs such as those in the European Union? Would it disqualify technology funded under various Port Technology Demonstration Programs?

International vessels travel the world and must comply with IMO plus the rules in every port and country. As written these restrictions appear to preclude participation in programs in other jurisdictions or inhibit deployment of innovative technologies to California. For example: the NAM ECA requires vessels built after 2016 to be NOx Tier 3, but there is no requirement to assign these new vessels to visit California. California want to encourage such vessels to come here, but the proposed IC language appears to exclude this source of emissions reductions and thus provides a disincentive to bringing such vessels to California.

Maersk is an integrated international container logistics company, operating about 750 container vessels globally as well as marine terminals, warehouses and other essential supply chain functions. Each year 45 to 60 of our vessels make over 500 calls in California ports, some at our sister location APM Terminals in Los Angeles. Typically, each of these international vessels spends less than 5% of its operable lifetime in the waters of any one



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state or country. Network changes and vessel redeployments are an essential part of supply chain operations.

Maersk has long been an environmental leader in shipping. Since 2008 we have reduced our fuel consumed and related emissions by 43% on a per container per kilometer basis. We committed to a 60% reduction and to launch a first carbon-neutral vessel by 2030 on our way to zero carbon emissions shipping by 2050. We now offer a first commercial net zero CO2 service called "ECO Delivery." In the past Maersk voluntarily used dramatically cleaner fuels in California ports, and supported establishing both the California fuel rule and the North American Emissions Control Area. APM Terminals has also been committed to environmental leadership and is now implementing a major modernization project in Los Angeles including electrified cargo handling equipment.

We are committed to going beyond compliance to achieve environmental excellence and hope these comments will be taken in the constructive spirit with which they are offered.

Again, thank you for this opportunity to comment on the proposed regulatory language and ISOR.

Sincerely,

A handwritten signature in black ink that reads "Lee Kindberg". The signature is written in a cursive style and is positioned to the left of a vertical blue line.

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ATTACHMENT to April 30, 2020 Comments on 15 Day Package

December 6, 2019

Ms. Mary D. Nichols, Board Chair  
Mr. Richard Corey, Executive Officer  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Submitted via docket as directed at <http://www.arb.ca.gov/lispub/comm/bclist.php>  
Also transmitted via email

Cc (email): Heather Arias, Bonnie Soriano, Angela Csondes, Nicole Light

Subject: **Maersk Comments on Proposed Control Measure for Ocean-Going Vessels At Berth and Associated Standardized Regulatory Impact Assessment (SRIA)**, Board item [ogvatberth2019](#)

Dear Board Chair Nichols and Mr. Corey,

Thank you for this opportunity to comment on the Proposed Control Measure for Ocean-Going Vessels At Berth and Associated SRIA and ISOR. We commend staff for the outreach to stakeholders and the clear writing in the ISOR.

We have been engaged with CARB staff during the development of this new approach, in both workshops and meetings and through written comments. Three sets written comments were provided in 2019 (March 8, March 26, and June 10) and my speaker notes for the CARB Board public hearing on Dec. 5, 2019 are attached. Our comments in this document focus primarily on the proposed regulatory language and the processes defined for implementation. We have also provided input to PMSA and the World Shipping Council to incorporate in their comments.

**Structure of these comments:**

1. Executive Summary of comments
2. Maersk's interest in this rule and approach to regulation
3. The current At-berth regulation
4. Comments on the proposed new regulation
5. Recommendations

**1. Executive summary of comments**

The existing At-berth regulation has been an important and successful contributor in the dramatic reduction of shipping-related emissions. It is administratively complex, and CARB issued three Regulatory Advisories (2013, 2015 and 2017) to enable implementation and improve clarity. If this approach is continued in whole or in part in the future, some updating and technical corrections should be considered. A possible productive continuation could include a fleet averaging approach for the currently regulated fleets. Suggested areas for technical corrections are in Table 1.

Currently-regulated vessel fleet operators have developed sophisticated predictive models and expertise to manage this complex requirement and improve operations. Change to a new structure will make these models obsolete while achieving little to no additional environmental benefit vs the fully-implemented 2020 requirements already in place.

The per-vessel/checklist-based concept was initially supported by industry as a way to clarify and streamline the compliance process, address many of the issues in the current rule, establish balanced responsibilities for all participants, and make enforcement simpler. However, as the concept and language developed, the spirit changed from encouraging desired behaviors to a more controlling, punitive approach, which is also complex to administer, provides significantly less flexibility and planning capability, and creates conflict rather than cooperation between regulated entities.

The proposed "per-vessel" rule requires vessels to connect almost all calls starting January 1, 2021, however, the infrastructure to do so is not in place. The proposed regulation calls for Ports' infrastructure plans to be submitted by July 2021, approved by CARB in 90 days (October), and only then start the funding, permitting and construction process. In addition, the envisioned alternative control systems are inadequate in LA/LB and do not exist in any other ports, and barge-based alternatives may not be usable in some locations due to safety concerns.

The proposed language includes positives such as a creative remediation fund (limited in use), and mechanisms to evaluate and approve future technologies. However the proposed rule still does not provide clear mechanisms to deal with significant operational disruptions, redeployments or market shifts. It also creates new technical issues which must be addressed if this approach is to be implemented. For example, the new rule calls for 1-hour connection times on arrival and departure, which is not feasible. We found that 38% of our vessel calls in California between May and October would not have met this requirement. (54% in Oakland). Clearly these technical issues need to be addressed before a rule based on this approach could be effectively implemented.

We recommend that staff work with the currently regulated vessel operators to improve the proposed compliance structure for these fleets – based on the current regulation's

EERO pathway (fleet averaging), the per-vessel approach, or some third alternative. The final direction should ensure at least one clear, feasible, reasonably cost-effective compliance pathway for all the typical variations of this business – including the periodic major disruptions (e.g., the 2015 labor disruptions, and the 2018 surge in extra vessels calls due to the threat of new tariffs in 2019, which resulted in a surge of over 30 additional vessels to CA ports in late 2018, few of which were shore power equipped).

We also recommend that CARB Staff work with Ports and other stakeholders to evaluate whether other reduction projects could provide earlier and more cost-effective ways to achieve the needed reductions.

Finally, only California has experience with shore power. Other ports and governments around the world are looking to California for data and best practices, so we need to get it right.

## **2. Maersk’s interest in this rule and approach to regulation**

Maersk is the global leader in container shipping, operating in 130 countries and employing roughly 76,000 people. We operate about 750 container vessels globally. Each year 45 to 60 of our vessels make over 500 calls in five California ports. These international vessels spend on the order of 5% or less of their operable lifetimes in the waters of any one state or country.

Maersk has long been an environmental leader in shipping. Examples of this environmental leadership include:

- Our voluntary clean fuel initiatives in California started in 2006, and other high-priority ports followed (e.g., Hong Kong, Houston). We are the only shipping line that supported both the California Vessel Fuel Rule and the US EPA’s North American Emissions Control Area proposal.
- Since 2007 we have reduced our fuel consumed and related emissions by 47% on a per container per kilometer basis, through new larger vessels, improved operational and vessel management practices, and retrofits of our existing fleet. Our fuel and CO<sub>2</sub> data are calculated using Clean Cargo methodologies and third-party verified by Lloyd’s Register.
- Our 2018 commitment to Net Zero CO<sub>2</sub> Shipping by 2050 means that we must launch our first carbon neutral vessel by 2030. New fuel, propulsion and technology development initiatives are underway to support this goal.
- We now provide the first carbon-neutral shipping options for customers, and we are partnering with major cargo owners and technology providers to develop future fuels and technologies.

- Maersk's APM Terminals company is now installing hybrid cargo handling equipment in priority ports around the world, including Pier 400 in Los Angeles. This hybrid equipment reduces diesel emissions by well over half and can be converted to fully electric operations as equipment technology, supply of electricity and charging infrastructure become available.

**Maersk's approach to compliance:**

Maersk supports California's clean air and climate goals and strives to meet or exceed all requirements. We have committed time and resources to work with regulators to provide information on operations and capabilities to help their development of regulations that achieve environmental goals, are cost effective, clear and enforceable, and avoid unintended consequences. Our goal is that there will be clear, feasible compliance pathways for all reasonably foreseeable operational modes, which encourage desired behaviors and discourage counterproductive actions. We also support the development of emissions inventories that recognize the full range of efficiency and environmental improvements implemented by fleets, terminals and ports.

Maersk vessels began complying with the California At-berth rule in 2010 using the Equivalent Emissions Reduction Option, which focuses on fleet emissions reductions. This is four years earlier than the 2014 compliance date on the Reduced On-board Generation compliance approach taken by most carriers.

We have been engaged with CARB staff during the development of the proposed rule and ISOR, including numerous meetings, calls and written communications. We have also provided significant input to both PMSA and WSC on their comments, and support most of their industry recommendations. This letter will provide more specifics on a few key issues that we feel are of particular concern.

**3. The Current California At-berth rule**

The existing At-berth Rule and Vessel Fuel Rule have been important and successful contributors in the dramatic reduction of shipping-related emissions near California ports. However, the current rule is administratively complex for both the regulated entities and the Enforcement division and does need technical corrections. The existing structure encourages "spreadsheet exercises" rather than encouraging operational behaviors that minimize emissions. It is also not yet fully implemented.

The existing At-berth Rule established a multi-year phase-in, with the final step scheduled in 2020. On 1/1/2020 the vessel fleet emissions reduction requirements step up from a

minimum of 70% to a minimum of 80% emissions reductions. <sup>1</sup> Assuring that fleets achieve the requirements requires that operational targets be set well above the minimum. On the shore side, berths where shore power infrastructure was funded by Proposition 1B have 10% higher requirements, so their requirements step up from 80% to 90%. Achieving these existing requirements means almost all regular calling vessels must be shore-power capable and connect.

In 2-3 years data on the outcome of the fully implemented rule will be available, enabling more thorough assessments.

Table 1: Structural Aspects and Technical Corrections for the Existing At-berth Rule

General structure:

- The existing Equivalent Emissions Reduction compliance pathway (fleet averaging approach to emissions reductions) encourages focus on the largest sources with over-compliance to ensure full compliance. This structure does provide some flexibility to address normal operational variations and challenges, but is complex to manage for both the vessel operators and CARB Enforcement.
- Currently-regulated vessel fleet operators have developed sophisticated predictive models and expertise to manage this complex requirement and improve operation. Change to a new structure will make these models obsolete while achieving little to no additional environmental benefit from these fleets.
- Obligations and penalties should be balanced for all participants responsible for making shore power effective: vessel operators, marine terminals, Ports, and alternative technology providers. This is not currently the case. The key role of labor must also be considered.
- No mechanism is provided to address for major redeployments or business disruptions (e.g., 2015 labor situation, or the 2018 influx of over 30 extra vessels due to the threat of federal tariffs).

Need to clarify use of Regulatory Advisory scenarios and streamline reporting.

- The Regulatory Advisories include several key provisions ("scenarios") essential for effective operation of the Rule, including Commissioning calls, shore-side power unavailability (e.g. infrastructure projects), annual reporting and averaging, research and testing of alternatives technologies, etc. These issues need to be addressed in any technical corrections.

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<sup>1</sup> The current first line-last line vessel visit definition results in low calculated reductions since it includes time prior to regulatory clearances and time needed for shore power connection and disconnection. It is not feasible to operate on shore power or an alternative during these times.



- Dealing with short calls <30 hours. The emissions reduction calculation structure defined in the existing rule is increasingly challenging with the upcoming 80% reduction requirement. For example, a 10-hour call with 3 hour connect/disconnect time is a 70% reduction.
- Power consumption defaults given in "Table 1" are not accurate for today's vessels, and do not include larger vessels. This can distort emissions calculations.
- Arrival/departure definitions and the connection window were originally not based on actual experience and should be adjusted now that data is available.
- Review and clarify the math to be used for exclusions outside the vessel operator's control. The existing structure penalizes smaller ports and vessel fleet operators making short calls.

The initial concept of a per-vessel/checklist approach was attractive and widely supported as addressing many of the issues in the current rule. However, as the concept, structure and language developed, the spirit changed from encouraging desired behaviors to a more controlling, punitive approach. Particular concerns include these:

1. Compliance Pathway:
  - The rule basis is per-vessel with only a few exemptions. This demands near perfect performance from a mobile source technology that is used only intermittently and must withstand the challenging ocean environment during and between uses.
  - The rule does not provide feasible compliance pathways for some normal operational situations (e.g., major business or economic changes, network redesigns, or the large number of "extra loaders" encountered in late 2018).
2. Control options: Alternatives are very limited in LA/Long Beach, and completely unavailable in other ports. Feasible compliance options need to be available and clearly defined for all ports prior to implementation of a more stringent requirement.
3. Complexity: The proposed rule is also administratively complex and challenging, so is not an improvement vs. the existing rule. The seven-day reporting requirement conflicts with annual allowance of VIEs and TIEs. This adds significant uncertainty and challenge to planning, decision-making and reporting for any non-routine call.
4. Conflict vs. cooperation: The design as now written will lead to conflict between vessel operators, terminals and ports rather than increasing cooperation.



5. Cost: The rule as currently structured increases costs and the risk of non-compliance, particularly at ports with few or no alternatives (assuming payment to the remediation fund is allowed at these locations). This will increase costs per container more at these ports, further disadvantaging these smaller ports.

Examples of practical flaws in the proposed regulatory language:

1. Replaces the current 3-hour engine run time with two one-hour requirements. No data was provided to support this change. (why a 1-hour rule was chosen/feasible).

In October 2019 Maersk analyzed data on 135 vessel calls back to May 7, 2019. We found that 38% of the calls would not have met the proposed 1-hour rule on arrival. (Details: 27% in LA, 34% in Long Beach and 54% in Oakland). Would these visits all have paid mitigation fees (if available and allowed) or been out of compliance?

If 38% of vessels cannot meet a fundamental requirement in the regulation, there is a problem with the feasibility of the regulation. Analysis of engine run times required by size and port are available for discussion with staff.

- Recommendation: Initially require documentation of reasons when the time is exceeded, with no penalty, and review in the proposed 2023 program review to determine statistically feasible times.
2. Currently regulated Vessel fleet operators are required to comply on essentially every vessel call starting 1/1/2021, but infrastructure does not exist to do so. Ports and terminals must submit PLANS by July 2021, and CARB has 90 days to review and approve those plans. Only then can the infrastructure proposal, permitting, funding and construction processes be started.
    - Recommendation: Defer implementation of the per-vessel approach until this infrastructure availability is addressed.
  3. Reporting is required within 7 days, however VIEs and TIEs are granted annually. This incompatibility in time spans means vessel operators must make decisions with very significant annual cost and operational impacts without knowing the annual impact and without the ability to plan for the full year.
    - The Terminal TIEs may not be available for some needs, and could be provided preferentially to fleets with ownership interests
    - VIEs at 5% mean only 2 calls per year in some small ports
    - The VIE structure does not provide a mechanism to address the periodic business changes and disruptions mentioned above.

- Recommendation: Allow adjustment of VIE and TIE visit allocations on an annual basis to enable cost controls and effective planning.

## 5. Recommendations:

1. Ports and government agencies around the world are looking to California as the only place with experience and data. CARB needs to ensure anything published or enacted is accurate, clear and a scalable practice.
2. The proposed rule should not go forward as currently designed. This rule, by requiring near 100% connections for shore power or alternatives, no ability to use an alternative (CAECT) for many vessels including very large cargo and cruise vessels, and no fleet averaging leaves no margin for error and sets up vessel operators for failure in spite of all reasonable efforts to comply.

Instead, we ask that the Agency “hit pause” and re-evaluate options including the following:

- Other port-specific concepts that could achieve greater reductions
  - The “Industry alternatives” which include fleet averaging.
  - Allowing the currently regulated fleets to continue under the Equivalent Emissions Reduction Option with technical corrections.
  - Another clear and simple approach is a fleet averaging approach based solely on the percent of time the fleet is connected. We believe this is consistent with CARB’s inventory approach.
3. If the proposed rule does move forward as currently structured, the following changes would make it more feasible and practical:
    - a. We ask that the CARB Board direct staff to ensure that any rule changes provide clear feasible pathways for all reasonably foreseeable business events outside the control of the vessel fleet and marine terminal operators.
      - i. Conduct an analysis covering at least the known occurrences encountered in the decade this rule has been on the books (economic and trade disruptions, labor issues impacting productivity, ownership and alliance changes, redeployments, business swings due to carrier bankruptcy, et. al.). Use the results of this analysis to fine-tune the requirements.
      - ii. Ensure implementation of the infrastructure improvement projects required to deliver high levels of control for the future and provide mechanisms to



enable vessel and terminal compliance during construction while minimizing total environmental impact (all modes). This has been addressed under Scenario 1 of the 2015 Regulatory Advisories, which discourages diversions to other modes such as trucking.

- iii. Phase in the new requirements in alignment with availability of infrastructure and alternative control systems.

b. Technical aspects for the proposed regulatory language:

- i. Modify the "1 hour connect/disconnect time requirements" to be "as soon as practicable." If a numeric standard is needed, CARB could initially require documentation of reasons when a defined time is exceeded, with no penalty, and review performance in the proposed 2023 program review to determine statistically feasible times.
- ii. Please clarify that "compatible" and "compatibility" refer to shore power electrical standards and are not related to physical vessel configurations (e.g., not intended to require installation of shore power on the second side of the vessel).
- iii. Please clarify a vessel operator's options and responsibilities if the master or CAECT provider believes the available CAECT cannot safely connect to the vessel's stack due to height, configuration or presence of a scrubber.
- iv. Clarify and fine tune processes for managing exceptions:

We continue to be concerned about the complexity and fault-finding involved in managing the TIEs/VIEs and remediation fees.

- VIEs needs to be flexible within a port complex like LA/LB since vessel services may move from terminal to terminal as business changes.
- To be most useful, VIEs and remediation fees should be reviewable and adjustable if needed and valid for at least 18 months.
- Clarify whether a VIE covers a vessel visit to one port or a full California voyage. It appears that as written a vessel scheduled to make calls in 3 ports that experiences a malfunction could be required to expend VIEs in each port called until repairs can be made. The operational alternative would be to omit vessel port calls, potentially requiring that containers be trucked to the other ports.
- Clarify the mechanism for the managing the situation where a vessel experiences a major mechanical problem and is moved to a "lay by" berth for repairs. We are checking to determine whether such occasionally-used berths have shore power capability. If shore power is not available could this be covered under the original TIE/VIE, or would a



second TIE/VIE be required? An unintended consequence could be prolonging repairs by making them at anchorage instead of at berth.

- A similar question applies if a vessel “double calls” – visits one terminal in a port complex and then makes a brief stop in another terminal in the same port (e.g., to load empty containers). Is there a *de minimis* visit?
- Is there a way to address the regulatorily-required 5-year vessel dry dockings? A service with 5 identical vessels will almost certainly include vessels of the same class, with dry dockings bunched rather than being spaced evenly at one per year. For a short rotation service, (e.g., 5 vessels in 5 weeks) such dry dockings may require a replacement vessel for 2 to 3 visits. Replacement vessels with shore power can be difficult to charter and are not available in some sizes. Thus, dry dock replacement could exhaust or exceed all VIEs at each port, leaving no VIEs for extra loaders, redeployments or operational issues. Would remediation fees be an option in this case?
- Similarly, how will a port or terminal operator handle major public works or infrastructure projects, such as the major projects to install infrastructure for electrification of cargo handling equipment and heavy duty over-the-road vehicles? Is the only option to increase the cost of these desirable projects due to remediation fees? Is it clear that remediation fees would be allowed for these uses?

c. Reporting

- i. The Responsible Official must manage data quality and carefully allocate VIEs/TIEs/exemptions for the full fleet on a centralized basis. Thus, individual vessels will not be capable of reporting directly to CARB.
- ii. Due to the high level of expertise and knowledge required for managing VIEs, seven (7) days is not feasible during certain seasons (summer holidays, Christmas, etc.). Negotiation with terminals around use of TIEs vs. VIEs will also require time. In addition, VIE vs. remediation cost management calls for a minimum of 30 calendar days, and a quarterly or annual adjustment period would be more feasible for planning and fleet/cost management.
- iii. We do not yet know what information will need to be reported or how the system will work, and therefore cannot comment specifically on the feasibility, time commitment or individual items to report. This requirement should be made transparent to the regulated community quickly or be revisited when the reporting system design is available.

- d. Remediation fee: The remediation fee is an interesting and creative mechanism for addressing operational challenges and enabling community air quality



improvements. Broad availability of the remediation fee option would help address the flexibility needs identified in both the existing and the proposed rule. As mentioned above, to be most useful, VIEs and remediation fees should be reviewable and adjustable if needed during the time that they are valid. A critical question is when is the Fee payable, how and by whom in each operational scenario?

- e. The severability clause on the last page will leave the rule unbalanced and unworkable if any party is able to successfully challenge their inclusion in the rule. A reversion to some modified version of the existing rule may be more appropriate in this case.
- f. The research exemption needs to be broader to cover testing of new measurement devices (e.g., CEMs), new treatment technologies, fuels, etc. for both ship and shore side.

Again, thank you for this opportunity to comment on the proposed regulatory language and ISOR.

Sincerely,

A handwritten signature in black ink that reads "Lee Kindberg". The signature is written in a cursive style and is positioned to the left of a vertical blue line.

Lee Kindberg, Ph.D.  
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## Speaking Points for CARB At-berth Public Hearing

Oakland CA, Dec. 5, 2019

B. Lee Kindberg, Ph.D.

Good Morning. I am Lee Kindberg, Head of Environment & Sustainability for Maersk North America.

Maersk is the world's largest container shipping company and has long been committed to environmental leadership.

- voluntary use of clean fuels in California starting in 2006.
- reduced CO2 by 41% per container moved in the last decade.
- We have committed to zero carbon shipping by 2050 so are working to launch our first zero carbon vessel by 2030.

I've managed our clean fuels and shore power programs from the beginning.

Maersk Exeter arrived in Oakland this morning. She left here in early August -- 16 weeks ago -- and visited Asia, Singapore, Suez and Antwerp before returning.

A weekly sailing on that route takes 16 vessels - all shore power capable at a cost ~\$1M. If we change out vessels that's an additional million each and takes 6 to 9 months.

Current rule:

- Has helped reduce emissions @ ports
- Is complex for us to manage and CARB to enforce, so we have built models and expertise to do so.
- Needs technical corrections – but not necessarily a whole new rule.

We were optimistic that the new rule would streamline compliance and establish responsibilities for all participants.

However, as the proposal evolved the spirit changed, and it became equally complex and even punitive.

The proposal means throwing out our models, SOPs and experience, and starting over – with less flexibility, far less ability to plan, and minimal additional environmental benefit.

- The new rule requires vessels to connect 100% starting 1/1/2019 but the infrastructure to do so just isn't there. Ports' infrastructure plans would be approved by CARB in October that year.

And the envisioned alternative systems just don't exist in most ports.

- There is still no clear mechanism to deal with significant disruptions, redeployments or market shifts.
- Technical issues – e.g. 1-hour connection times –

38% of our vessels calls since May would not have met. (54% here in Oakland)

What would we like to see?

1. Direct staff to pause and work with currently regulated fleets to improve the structure – old or new or a third approach.
2. Ensure at least one clear, feasible, reasonably cost-effective compliance pathway for all the likely variations of this business – including the periodic major disruptions.

2015 labor

2018 tariffs → surge of 34 additional vessels to CA

3. Finally, only California has experience with shore power. Other ports and governments are watching so we need to get it right.

Thank you again for this opportunity to speak. I will also submit written comments by Monday.



**Henry T. Perea**  
Manager, CA/OR/WA Government Affairs

April 30, 2020

Clerk's Office  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814  
Email: <http://www.arb.ca.gov/lispub/comm/bclist/php>

Re: Chevron's Comments on 15-Day Rule Changes for Proposed Control Measure for Ocean-Going Vessels at Birth

To the Clerk of the Board:

Chevron Products Company and Chevron Shipping Company (collectively, "Chevron") submits these comments on the proposed 15-day rule changes issued by the California Air Resources Board for its proposed regulation for ocean-going vessels at birth. Chevron also joins in the comments submitted by the Western States Petroleum Association ("WSPA") on CARB's proposed 15-day rule changes and hereby incorporates WSPA's comments, as well as WSPA's prior correspondence to CARB in this proceeding, as part of these comments by Chevron.

The proposed 15-day rule changes (among other revisions) would accelerate the compliance deadlines for meeting the new regulatory requirements. For example, the proposed changes would accelerate the compliance deadline for approved emissions control strategies for oil tankers by two years, to January 1, 2027; accelerate the compliance deadline for updates to terminal plans for tanker terminals by two years, to February 1, 2026; and accelerate the schedule for CARB's interim evaluation to December 2, 2022.

Prior comments by WSPA and Chevron in this rulemaking proceeding have described in detail the fundamental problems with CARB's proposed regulation. The acceleration of the compliance deadlines proposed in CARB's 15-day rule changes would make these problems worse.

This comment letter focuses on the following four issues associated with the impacts of CARB's proposed regulation and the accelerated compliance deadlines in the 15-day rule changes:

1. **Technological Infeasibility:** There is no safe and feasible technology for the types emissions capture and control systems that would be needed at tanker terminals to comply with the proposed regulation, and even if a feasibility study identifies such a technology, it would not be feasible to complete all of the design, engineering, environmental review, permitting and construction work to achieve compliance by 2029. Accelerating the deadline to 2027 makes this problem more acute and thus heightens the significant concerns about the technological infeasibility of compliance. 30-1
2. **Health & Safety Risks:** Tanker vessels carry flammable cargoes that pose unique risks and require special safety systems to avoid a fire or an explosion. The proposed regulation necessarily would require modifying how these important safety systems interface with the vessels' exhaust systems. It has not been shown that this can be done in a way that avoids compromising safety and increasing the risk of a hazardous incident, which could have deadly consequences and cause a spill that harms the marine environment. CARB has not adequately evaluated these potential impacts under CEQA. By accelerating the compliance deadlines in its 15-day rule changes, CARB aggravates this problem and amplifies the potential threats to human health and safety and the environment. 30-2

3. Impacts to Biological Resources: To comply with the proposed regulation, substantial in-water and shoreline construction work will be required, which could negatively affect a variety of special-status fish species, marine mammals and shoreline animals. CARB has not adequately evaluated these potential impacts under CEQA, and it compounds this deficiency by summarily dismissing the potential for increased or more severe impacts resulting from a compressed construction schedule. As one example, CARB has failed to address how accelerated, simultaneous construction actions affecting sensitive aquatic habitats can be aligned with seasonal work windows that are designed to protect endangered and threatened fish species. 30-3
  
4. Cumulative Impacts: Similarly, CARB has not adequately evaluated how the impacts to sensitive biological resources resulting from the construction activities needed to comply with the proposed regulation would aggregate with the impacts from other past, present and reasonably foreseeable future projects involving in-water and shoreline work affecting these same biological resources. CARB compounds this flaw by failing to evaluate how the impacts from the accelerated construction activities needed to achieve compliance under the 15-day rule changes would combine with the impacts of such other projects. These comments provide specific examples of other, cumulative projects that should be included in a revised cumulative impact analysis. 30-4

Each of these problems is evaluated separately below. In summary, the proposed 15-day rule changes bring new urgency to these problems and highlight the need—*before* the new regulatory requirements are adopted—for CARB to conduct additional studies in order to demonstrate technological feasibility and cost-effectiveness to meet the requirements of the California Health & Safety Code and additional environmental analysis to meet the requirements of CEQA.

### 1. Technological Infeasibility

As detailed in prior comments by WSPA and Chevron, CARB’s assessment is that tanker vessels would comply with the new regulatory requirements by using stack capture and control technology that does not now exist and has not been shown to be feasible or cost-effective. The comments in this proceeding have repeatedly emphasized the need to demonstrate that emissions control systems for tanker vessels, which have unique characteristics and safety concerns that distinguish them from other marine vessels, are feasible, reliable and safe before adopting regulations that mandate the use of these systems. The comments also have emphasized that the compliance deadlines are infeasible and do not reflect the real-world experience with marine terminal construction projects.

Chevron’s comments in this proceeding explained in detail that the compliance timeframes in the regulation were quite unrealistic, even assuming that achieving compliance is shown to be technologically feasible. Chevron’s comments of May 29, 2019 explained that it likely would take at least two years to complete a feasibility study to determine whether there is a safe and feasible technology for stack capture and control for tanker vessels. Assuming that a feasibility study identifies a safe and viable technology for use with tankers, it would then take another one to two years after completing the feasibility study to prepare the necessary 60 percent designs in order to begin the requisite permitting process for constructing and installing the new systems and equipment. Then, after completing the requisite design and starting the permitting process, it would then take another two to four years to complete the CEQA review and to obtain all of the required permits and approvals to be able to begin construction and installation. Once all permits and approvals are obtained, it would then take at least another five years to complete construction. 30-5

These timeframes are based on Chevron’s actual experience in permitting and constructing projects in the San Francisco Bay, most recently the Chevron Long Wharf Maintenance and Efficiency Project, as detailed in the information provided by Chevron to CARB via email correspondence dated October 8-9, 2018 and July 19, 2019. Additionally, David Mik, President of Power Engineering and Construction, a marine engineering and construction contractor with substantial experience working on projects in the San Francisco Bay, independently provided comments to CARB dated November 6, 2019, indicating that the construction activities needed to comply with the proposed regulation likely would take “more than 10 years to design, permit and construct.” The prior correspondence on this topic is included as Attachment 1. Further, in its December 2019 comment letter, WSPA submitted extensive documentation showing an actual average duration of 11.6 years, with a range from 7-

15 years, for projects comparable to the construction activities that would be needed to achieve compliance with CARB’s proposed regulation.

These timelines for a feasibility study, engineering and design, CEQA review and permitting, and then construction, would put the expected “in service date” of any new emissions control system after 2030 at the earliest. A compliance deadline of 2029 for oil tankers is unworkable. The proposed 15-day rule changes, by moving up the deadline to the beginning of 2027, would make this problem worse.

30-5  
cont.

## 2. Health & Safety Risks

The comments about technological feasibility reflect more than concerns about the costs, practicability and timeframe for achieving compliance. In its December 2019 comments, WSPA outlined a variety of unstudied safety risks created by the proposed regulation, which will require known and well-established safety systems for tanker vessels to be modified to interface with stack capture and control systems that are new and unproven for such vessels. These safety risks include failures in controlling electrostatic hazards, boiler pressure, processes to prevent an explosive vapor space in cargo tanks, exhaust stack pressure, and emergency disconnection. These types of failures can lead to explosions and fires on tanker vessels, which in turn can cause oil spills affecting water quality and marine species as well as significant human health and safety hazards including serious injury and loss of life.

WSPA’s December 2019 comments included an expert analysis from Woodbridge Marine Inc., a California-based marine consultant specializing in safety issues for oil tankers, which are different from container ships. Among other topics, this expert analysis explained that the use of inert gas in cargo holds of oil tankers to avoid fire and explosion risk, and resulting oil spills, is a key safety measure mandated by both U.S. regulations and international standards. The inert gas is needed in the cargo hold to reduce oxygen levels to the point where the hydrocarbon gas from the petroleum cannot burn and thus cause a fire or explosion. This typically is accomplished by cleaning exhaust gas from boilers to create inert gas, and then injecting the inert gas into the cargo hold as the cargo is being discharged.

This is an intricate and complex process. The boilers must be operated very carefully with a proper mix of fresh air in the combustion system in order to provide the correct amount of oxygen in the processed exhaust gas, so that the inert gas injected into the cargo hold matches the displacement of the cargo being pumped ashore. Any change in pressure in the exhaust stack therefore would affect this process and could negatively affect the oxygen content of the exhaust gas, resulting in a fire or explosion. Additionally, boiler loads are not constant during a cargo discharge, so the processing equipment for the exhaust gas must keep up with the changes, from the start of the discharge to the stripping (i.e., final emptying) of the cargo tanks, in a seamless manner. Manufacturers and operators of existing emissions capture systems have expressed concerns about their equipment being able to manage large changes in flow rates from marine boilers that are part of normal operations. Without sufficient study, it is impossible to know whether new emissions capture systems can be designed to adequately address these risks.

30-6

In addition to these critical safety issues, the analysis by Woodbridge Marine also outlined the operational concerns and constraints at marine oil terminals that would need to be addressed prior to instituting a new shore-based emissions control system. Based on its analysis, Woodbridge Marine concluded that a detailed and thorough feasibility study is needed to ensure that any mandated technological changes at marine oil terminals can be accomplished in a way that does not create an increased risk of fire and explosions, which could result in “loss of life and significant pollution events.” This study has not occurred.

As detailed in WSPA’s comments, these significant health, safety and environmental concerns should be addressed through further study and engineering design work *before* CARB adopts its proposed regulation, which would require new emissions control systems that have not been demonstrated to be feasible, reliable or safe for use on tanker exhaust systems. CARB’s Environmental Assessment failed to evaluate these potentially hazardous consequences under CEQA, let alone provide adequate mitigation.

Chevron has attached to these comments a further analysis of the critical importance of using inert gas in cargo tanks for safety purposes. This analysis is based on a 2017 study by Oil Companies International Marine Forum (OCIMF) entitled *Inert Gas Systems: The Use of Inert Gas for the Carriage of Flammable Oil Cargoes*, which in turn is based on historical incidents involving fires and explosions in the cargo areas on tankers carrying flammable cargoes. See Attachment 2. The OCIMF study presented data showing 15 incidents over the 12-year time frame from 2004 to 2015—these incidents resulted in 20 confirmed fatalities and a further 30 people missing and presumed dead. The majority of incidents occurred on smaller vessels that formerly were not required to use inert gas systems; two of the incidents occurred on larger vessels that were fitted with inert gas systems but the cargo areas were not being properly maintained in an inert condition at the time of the incident. The study concludes that if inert gas systems are used correctly, such systems serve to significantly increase safety by preventing incidents involving fires and explosions in cargo tanks.

As demonstrated by the Woodbridge Marine analysis and the OCIMF study, inert gas systems are of critical importance at marine oil terminals and further evaluation is needed to determine whether modifications to these systems can be performed safely such that stack capture and control systems can be operated on a tanker vessel in a manner that does not pose serious hazards to human health and safety and the environment. Stack capture and control systems will need to interface with highly integrated and well-established safety systems, but no standards for any such interface have been developed, let alone standards that would prevent hazardous consequences. A substantial engineering study is needed to determine whether an interface could be designed to operate safely with the safety systems of hundreds of unique tanker vessel configurations. By pressing to adopt its proposed regulation without taking the time or effort to address these important safety issues, CARB is rushing industry to install and use an unproven technology on tanker vessels in a way that would significantly increase the likelihood of hazardous incidents. CARB’s environmental analysis of the potential safety risks, hazards and hazardous materials impacts of its proposed regulation omits any meaningful discussion of these life-and-death health and safety issues.

The safety importance of inert gas systems is only one example of the numerous safety concerns raised by WSPA’s comments and Woodbridge Marine’s expert analysis with regard to CARB’s proposed regulation. Other safety issues include electrostatic hazards, boiler pressure, exhaust stack pressure, and emergency disconnection.

CEQA requires an analysis to assess both the probability of a potential impact and its severity. But CARB’s environmental evaluation assesses neither the probability nor the severity of the impact with respect to the hazardous consequences that could be caused by a transition to a new emissions control technology that has not been shown to be feasible, reliable or safe for oil tankers.

CEQA also requires that potential impacts are disclosed, and that effective mitigation is developed and adopted, *before* a proposed project is approved. CARB may not simply rely on some future “interim evaluation” to address the need—now—to make sure that the new regulations do not create gravely hazardous conditions that could lead to the loss of life.

The accelerated timeframe for compliance as proposed in the 15-day rule changes makes this serious issue even more acute. The 15-day rule changes make it more likely that compliance will be required before a determination can be made whether technical solutions are available to ensure that the new requirements will not compromise vitally needed safety systems and result in severe impacts to human health and safety and the environment. The rush to impose new regulatory requirements thus highlights the deficiencies in CARB’s CEQA analysis of impacts related to hazards and hazardous materials.

30-7

30-8

30-9

### 3. Biological Resources

WSPA's December 2019 comments also emphasized the deficiencies in CARB's cursory CEQA analysis of potential impacts to biological resources from constructing the wharf and shoreline infrastructure improvements that would be required for compliance with the regulation. CARB's analysis identifies only two species (the California Least Tern and the California Brown Pelican) that could be impacted by the extensive construction activities that would be needed to achieve compliance with the new regulatory requirements. CARB's analysis also asserts that the areas where these construction activities could occur "are all highly disturbed and not likely to be supportive of a large range of biological species." CARB Staff Report: Initial Statement of Reasons (Oct. 15, 2019), App. D, Draft Environmental Analysis, at p. 60.

30-10

CARB's truncated analysis of impacts to biological resources omits any discussion of the array of sensitive fish species, marine mammals and shoreline animals that are found near vessel terminals throughout the San Francisco Bay-Delta that will be required to undertake extensive construction activities to comply with CARB's proposed regulation. These resources have been documented by studies and environmental permits issued for facility improvements required by the Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) requirements adopted by the California State Lands Commission. CARB easily could have accessed these studies and included this information in its Environmental Assessment.

One example is the Chevron Richmond Refinery Long Wharf. As shown in the environmental documentation for the Long Wharf MOTEMS improvements, the Long Wharf is located in open Bay habitat, which is used as a migratory corridor between fish species' upstream spawning grounds and the Pacific Ocean. Sensitive fish species that may be found in the area around the Long Wharf, and that could be impacted by the types of construction activities required to comply with CARB's proposed regulation, include two types of listed steelhead (federally-threatened Central California Coast steelhead, and federally-threatened California Central Valley steelhead); two types of chinook salmon (federally-threatened and state-threatened Central Valley spring-run Chinook salmon, and federally-endangered and state-endangered Sacramento River winter-run Chinook salmon); the federally-threatened green sturgeon; and the state-threatened longfin smelt. *See, e.g., Attachment 3* (Excerpts from *Conditional 401 Water Quality Certification for Chevron Products Company, Chevron Richmond Refinery Long Wharf Maintenance & Efficiency Project, City of Richmond, Contra Costa County*, issued by the San Francisco Bay Regional Water Quality Control Board, June 23, 2017); *Attachment 4* (Excerpts from *California Endangered Species Act Incidental Take Permit No. 2081-2016-056-07*, issued by the California Department of Fish & Wildlife, Apr. 12, 2017).

30-11

Marine mammals such as the Pacific harbor seal and the California sea lion, which are protected by the Marine Mammal Protection Act, also could be impacted by construction at the Chevron Long Wharf, particularly from noise due to pile driving. Castro Rocks, an environmentally sensitive area designated by the California Department of Fish & Wildlife that is located just north of the Long Wharf, is the largest harbor seal haul out site in the northern part of San Francisco Bay and the second largest pupping site in the Bay. *See, e.g., Attachment 3 & Attachment 5* (Federal Register Notice issued by the National Marine Fisheries Service, 82 Fed. Reg. 27240, 27246 (June 14, 2017)).

Similarly, in the area of the Marathon Martinez Refinery (formerly the Golden Eagle Refinery), fish species that could be impacted by construction also include the federally-threatened and state-endangered delta smelt, a species that occurs only in the San Francisco Estuary and that has undergone a significant decline in recent years. This area also includes a variety of special-status terrestrial species (including the "fully protected" salt-marsh harvest mouse) and special-status plant species (including salty soft bird's-beak, mason's lilaeopsis, Suisun marsh aster, saline clover, delta tule pea, San Joaquin spearscale and delta mudwort) that could be impacted. Indeed, the shoreline in this area has been designated in the Contra Costa County General Plan as a Significant Ecological Resource Area, with goals and policies aimed at protecting this valuable resource. *See, e.g., Attachment 6* (Excerpts from *Draft Environmental Impact Statement for the Tesoro Avon Marine Oil Terminal Lease Consideration*, issued by the California State Lands Commission, Sept. 2014) & *Attachment 7* (Excerpts from *Final Environmental Impact Statement for the Tesoro Amorco Marine Oil Terminal Lease Consideration*, issued by the California State Lands Commission, Feb. 2014).

CARB’s environmental analysis does not even mention the potential for construction noise, vibration, and other effects to result in significant impacts to threatened and endangered fish species, special-status plants, protected marine mammals, or sensitive shoreline animals—let alone adequately disclose, evaluate and discuss mitigation measures for such impacts. Because of this omission, CARB has not provided adequate information to the public or the agency decision-makers concerning the true nature and magnitude of the adverse impacts to the Bay’s important biological resources.

30-12

The fact that CARB is conducting a program-level environmental review under CEQA does not relieve the agency of its CEQA obligation to provide an accurate depiction of the types of environmental impacts that the adoption of its proposed regulation could cause. As explained in the treatise *Practice Under the California Environmental Quality Act* (CEB, Mar. 2020), § 10.14:

As with any EIR, a program EIR must provide decision-makers with “sufficient analysis to intelligently consider the environmental consequences of the project,” and designating the EIR as a program EIR in itself does not decrease the level of analysis otherwise required. *Cleveland Nat’l Forest Found. v San Diego Ass’n of Gov’ts* (2017) 17 CA5th 413, 426. A lead agency preparing a program EIR must disclose what it reasonably can, and any determinations that it is not feasible to provide specific information must be supported by substantial evidence. *Id.* at 440 (rejecting air quality baseline discussion and impact analysis because substantial evidence did not support agency decision to omit more detailed analysis). *See generally Center for Biological Diversity v Department of Conserv.* (2019) 36 CA5th 210, 231, *citing Sierra Club v County of Fresno* (2018) 6 C5th 502, 516, and stating that a program EIR must include enough detail “to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project.”

30-13

Similarly, the fact that CARB has labelled the impacts to biological resources as significant does not relieve the agency of the obligation under CEQA to provide sufficient information about the extent of the impact. As the Supreme Court explained in *Sierra Club v. County of Fresno* (2018) 6 Cal. 502, 519, “the adequacy of an EIR’s discussion of environmental impacts is an issue distinct from the extent to which the agency is correct in its determination whether the impacts are significant. [A]n EIR’s designation of a particular adverse environmental effect as ‘significant’ does not excuse the EIR’s failure to reasonably describe the *nature and magnitude of the adverse effect.*” (Emphasis added, citations and internal quotation marks omitted).

30-14

CARB’s notice for its proposed 15-day rule changes asserts that accelerating the compliance deadlines would not change the nature or extent of the physical changes in the environment that would be caused by the regulation and would merely result in these changes occurring earlier. CARB Notice, at p. 34. Aside from the failure to undertake the requisite evaluation under CEQA of potential impacts to listed fish species, special-status plants, marine mammals, and shoreside animals in the first place, compressing an already-unrealistic time frame for the construction that would be needed to comply with CARB’s regulation would force regulated facilities to conduct a suite of construction activities simultaneously rather than spacing them out over time; this clearly has the potential to amplify the construction impacts on the various species that CARB declined to consider.

30-15

Additionally, a compressed compliance timeframe, as proposed in CARB’s 15-day rule changes, could hamper the ability of regulated facilities to conduct all the construction activities that are needed for compliance, while at the same time adhering to seasonal construction windows that are designed to protect fish species. Specifically, in-water construction work in the San Francisco Bay may be limited each year outside of the period from June 1 to November 30, in order to protect fish species regulated by the National Marine Fisheries Service. And there may be additional seasonal limitations for construction work affecting the other fish and wildlife species. *See, e.g., Attachment 8*, at Figure 2-6 (*Final Environmental Assessment/Environmental Impact Report, Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay, Fiscal Years 2015-2024*, issued by the U.S. Army Corps of Engineers and the San Francisco Regional Water Quality Control Board, Apr. 2015). CARB has not done any analysis to determine how in-water construction work required by the new regulation would be accomplished under a compressed timeframe while adhering to seasonal work windows to protect fish and wildlife species, or to assess the impacts of simultaneous intensive construction activities that could be needed to meet these two potentially conflicting objectives.

30-16

CARB therefore is incorrect in asserting that the acceleration of the compliance timeframes would not have any effect on its environmental impact analysis. CARB needs to revise its CEQA analysis to adequately address construction impacts to special-status fish, animals and plants in light of the accelerated compliance deadlines.

30-17

#### 4. Cumulative Impacts

WSPA's December 3, 2019 comments explain that CARB's CEQA review does not adequately evaluate the cumulative environmental impacts associated with the proposed regulation. As an example, the comments explain that CARB's cumulative impact analysis focuses on its 2016 State Implementation Plan strategy—an approach that summarily assesses how the impacts of its recommended SIP measures, such as impacts to biological resources from increased demand for biofuel feedstock production, would combine with the impacts from its proposed regulation. As explained in WSPA's comments, this approach ignores the key fact that the regulation will lead to construction impacts to biological resources along shorelines and open waterways and that the key types of cumulative construction projects that will aggregate with these types of impacts to biological resources are residential, industrial and other developments in and along the coastal zone. CARB's overly narrow approach focused exclusively upon air quality regulations, excludes consideration of precisely the types of cumulative development that would have biological impacts that are most likely to combine with the construction impacts of the proposed project to cause a cumulatively significant environmental effect.

30-18

CARB's notice for its 15-day rule changes compounds this critical flaw by asserting that the accelerated timeframe for compliance is not anticipated "to have a large potential to cause cumulative impacts from other marine-related construction associated with this regulation, as no other compliance dates for ocean-going vessels or their related terminals are scheduled to go into effect during the new implementation years." Notice, at p. 34. The notice goes on to state: "While the implementation date for ro-ro vessels and terminals are now only one year apart from the first tanker implementation date instead of two years, most ro-ro terminals are expected to utilize barge-based capture and control systems versus a land-based control system that would require construction of shore-side infrastructure. Because the dates remain staggered and no significant construction is anticipated for ro-ro terminals, no increase in cumulative emissions is expected as a result of moving the dates forward." Thus, CARB only discusses how different construction actions taken pursuant to *its own proposed project* (i.e., its proposed regulation) would combine with each other to define the scope of the *project's impacts*, instead of undertaking the requisite examination of how the project's impacts would aggregate with the impacts of *other projects* to cause a *cumulative impact*.

30-19

CARB needs to revise its cumulative impact discussion to evaluate how the impacts affecting the valuable biological resources of the Bay and shoreline resulting from the construction activities under its proposed regulation would interact and aggregate with the impacts on those same resources from other past, present and reasonably foreseeable future projects. Further, CARB needs to assess how the compressed timeframe as proposed in its 15-day rule changes would affect this important discussion of cumulative impacts by accelerating, compressing and potentially magnifying and intensifying the impacts on biological resources from its proposed regulation.

30-20

There are numerous past, present and reasonably foreseeable projects along the shoreline that should be part of this revised cumulative impact discussion, and the cumulative impacts associated with these projects are not captured by the artificially constrained approach CARB has followed in its Environmental Assessment. For example, past projects significantly impacting the same biological resources in the Bay that could be impacted by construction activities under the proposed regulation have involved facility improvements to comply with the State Lands Commission's MOTEMS requirements. *See, e.g., Attachments 6 & 7*. In addition, the San Francisco Regional Water Quality Control Board issued a Final EIR in 2015 for Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay, Fiscal Years 2015-2024 (State Clearinghouse No. 2013022056; *see Attachment 8*); and the U.S. Army Corps of Engineers issued a Draft Environmental Impact Statement in May 2019 and a Final Environmental Impact Statement in January 2020 for the San Francisco Bay to Stockton, California Navigation Study (State Clearinghouse No. 2019059049; the Final EIS is included as *Attachment 9*). Furthermore, the City of Oakland is in the midst of evaluating a substantial project to redevelop Howard Terminal (State Clearinghouse No. 2019039102; the November 30, 2018, Notice of Preparation is included as *Attachment 10*).

30-21

CARB's revised cumulative impact discussion needs to account for the impacts to biological resources from these and other cumulative projects along the shoreline, instead of simply relying on a generic air planning approach that misses the very projects affecting the same resources that could be impacted by construction under the proposed regulation.

30-21

\* \* \* \* \*

In summary, CARB needs to complete substantial additional studies to meet its statutory obligations under the Health & Safety Code and the California Environmental Quality Act. Under the Health & Safety Code, CARB's proposed 15-day rule changes exacerbate the numerous, serious feasibility problems identified in the prior comments. Under CEQA, CARB has not adequately disclosed or studied the potential health and safety, biological and cumulative impacts from its proposed regulation—much less identify mitigation for these impacts. CARB also has not adequately assessed how its proposed 15-day rule changes would affect this as-yet-uncompleted impact analysis. CARB needs to redo and recirculate its environmental analysis, in order to satisfy CEQA's fundamental goals of providing sufficient information to enable meaningful public participation and promote informed governmental decision-making.

30-22

Sincerely,



Henry Perea  
Manager, State Government Affairs  
*Original sent via e-mail (SY)*

CC: Richard Corey, CARB  
Heather Arias, CARB

## LIST OF ATTACHMENTS

- Attachment 1: Prior correspondence on infeasibility of CARB's compliance deadlines
- Attachment 2: *Fact Sheet: The Importance of the Use of Inert Gas Systems & Inert Gas Systems: The Use of Inert Gas for the Carriage of Flammable Cargoes* (OCIMF 2017)
- Attachment 3: Excerpts from *Conditional 401 Water Quality Certification for Chevron Products Company, Chevron Richmond Refinery Long Wharf Maintenance & Efficiency Project, City of Richmond, Contra Costa County* (issued by the San Francisco Bay Regional Water Quality Control Board, June 23, 2017)
- Attachment 4: Excerpts from *California Endangered Species Act Incidental Take Permit No. 2081-2016-056-07* (issued by the California Department of Fish & Wildlife, Apr. 12, 2017)
- Attachment 5: Federal Register Notice issued by the National Marine Fisheries Service, *Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Chevron Richmond Refinery Long Wharf Maintenance and Efficiency Project in San Francisco Bay, California*, 82 Fed. Reg. 27240, 27246 (June 14, 2017)
- Attachment 6: Excerpts from *Draft Environmental Impact Statement for the Tesoro Avon Marine Oil Terminal Lease Consideration* (issued by the California State Lands Commission, Sept. 2014)
- Attachment 7: Excerpts from *Final Environmental Impact Statement for the Tesoro Amorco Marine Oil Terminal Lease Consideration* (issued by the California State Lands Commission, Feb. 2014)
- Attachment 8: *Final Environmental Assessment/Environmental Impact Report, Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay, Fiscal Years 2015-2024* (issued by the U.S. Army Corps of Engineers and the San Francisco Regional Water Quality Control Board, Apr. 2015)
- Attachment 9: *Final Integrated General Reevaluation Report and Environmental Impact Statement, San Francisco Bay to Stockton, California Navigation Study* (issued by the U.S. Army Corps of Engineers, Jan. 2020)
- Attachment 10: *Notice of Preparation (NOP) of a Draft Environmental Impact Report for the Oakland Waterfront Ballpark District Project* (issued by the City of Oakland, Nov. 30, 2018)

# **ATTACHMENT 1**



**Henry T. Perea**  
Manager, CA/OR/WA Government Affairs

May 29, 2019

Ms. Cynthia Marvin  
via e-mail at [cynthia.marvin@arb.ca.gov](mailto:cynthia.marvin@arb.ca.gov)  
California Air Resources Board  
1001 I Street  
Sacramento, California 95814

**Chevron Comments on the *Control Measure for Ocean-Going Vessels At Berth: Cost Analysis Inputs and Assumptions and Cost Analysis for Standardized Regulatory Impact Assessment* revised on 5/10/19**

Dear. Ms. Marvin,  
Chevron Products Company and Chevron Shipping Company (collectively, "Chevron") have prepared comments in response to the release of the ARB's *Control Measure for Ocean-Going Vessels At-Berth: Cost Analysis Inputs and Assumptions for Standardized Regulatory Impact Assessment (5/10/19)* and *Control Measure for Ocean-Going Vessels At-Berth: Cost Analysis for Standardized Regulatory Impact Assessment (5/10/19)*.

Chevron appreciates ARB's willingness to engage collaboratively on this rulemaking and for the opportunity to comment on ARB's draft cost analysis. Chevron looks forward to working with the ARB to ensure that the emission inventory provides an accurate representation of the emissions from ocean-going vessels berthing at the Richmond Long Wharf (RLW). That said, Chevron is disappointed that a critical document to support the cost analysis which ARB referred to as the "Berth Analysis" in their 5/14/19 and 5/16/19 workshops was not released to the public prior to the comment deadline. As the "Berth Analysis" is critical to understand what equipment ARB predicted would be needed at each terminal and therefore critical to understanding the overall costs, in that regard; Chevron reserves the right to submit additional comments after the "Berth Analysis" is released. Additionally, Chevron has been forced to make some interpolations and assumptions regarding ARB's thinking in these comments.

In order to better assist ARB in more accurately predicting the costs of land-based capture and control systems for tankers, we are resubmitting in this letter, a significant portion of the information that we submitted previously under Confidential Business Information (CBI) in our March 8, 2019 letter entitled *Re: Chevron Comments to February 27, 2019 Workshop Regarding New At Berth and At Anchor Regulation Development for Crude and Product Tanker Vessel Operators, Ports and Terminals* for public disclosure. Specifically, while the cost-specific data we submitted remains CBI, the descriptions of the equipment and operational factors needed to install and operate a land-based capture and control system at the RLW are resubmitted here for public disclosure. ARB should use this information to develop cost estimates. Separately, we have worked with the Western States Petroleum Association (WSPA) to submit cost-information in an aggregated and blinded manner to allow ARB the use of the cost-specific data in its rulemaking efforts.

Overall, Chevron believes that ARB's cost analysis greatly underestimates the costs to permit, construct and operate a land-based capture and control system. To avoid misinformation to the public, we recommend this cost information be corrected. This is irrespective of the fact that the proposed

technology is a completely unproven and untested for tankers and ultimately may prove unsafe or infeasible regardless of the costs to construct. Moreover, Chevron has concerns that the emission inventory ARB is using to justify this regulation significantly overestimates the emissions (and thus the health risk and environmental impact) from tankers specifically at the RLW and likely across the state.

Chevron has broken its comments on the cost analysis and emission inventory up into the following sections.

1. Schedule to Implement
  2. Design/Engineering/Permitting Costs
  3. Construction Costs
  4. Operating Costs
  5. Emission Inventory Inaccuracies and Benefit Overestimation
1. **Schedule to Implement – ARB’s schedule to implement land-based capture and control systems for tankers underestimates the amount of time needed to permit, design and construct by approximately 5 years. Additionally, ARB’s timing of the costs is inaccurate when compared against a more realistic timeline.**

Chevron remains concerned regarding the potential adoption of a regulation that effectively mandates a control technology for tankers that is untested, unproven and currently not on the market. ARB must conduct a feasibility study on any such technologies to ensure they can be safely and effectively implemented prior to requiring the technology’s use. This study should include input from a broad spectrum of stakeholders, including industry. Chevron looks forward to working with the ARB on the development of this study.

Notwithstanding the concerns stated above, ARB severely underestimates the implementation timeline that would be required for this rule. Assuming a feasibility study could be started in 2020, it would likely take at least two years to complete. Design and permitting of a specific project could not begin until this feasibility study is completed and shows that the technology can be safely and effectively implemented. Engineering design could begin once the feasibility of the technology is determined and developed – as the weight, footprint and operating radius of any new equipment must be known and/or determined to ensure a correct layout and structural design to support the necessary equipment. Permitting could begin once approximately 60% of the design for any control technology was complete (approximately 2024-2025 at the earliest). That would be approximately 1-2 years after a completed study that determines the control technology is feasible and all safety concerns are fully addressed. Permitting alone will likely take another 2-4 more years to complete based on the CEQA process and the large number of state and federal regulatory agencies which would need to approve and issue permits for the project. Construction would then likely take 5-6 years to complete. This puts the expected final “in service date” for a terminal-side tanker control technology, assuming again that it is feasible and safe, in the 2033 timeframe at best.

30-23

While Chevron recognizes that this forecast is substantially greater than ARB’s forecast, it is based on recent and actual experience with an ongoing project at the RLW to meet the Marine Oil Terminal Engineering and Maintenance Standards. (MOTEMS). Further, other already approved projects are under construction at the RLW, and new construction of this magnitude likely cannot be done in parallel with existing ongoing construction due to space constraints and the need to maintain a functioning terminal throughout construction.

From the timeline above there are two key differences in the “timing of costs” presented in *Table I. Scope and Timing of Analysis*. on pages 3-4 of ARB’s *Inputs and Assumptions* document:

1. An increase of 1-2 years for Feasibility, Engineering, and Permitting (from 7 years to 9 years).
2. An increase of 3 years for construction of terminal infrastructure (from 3 years to 6 years).

The additional time needed to perform these two critical phases would also increase the costs compared to ARB’s estimates. More discussion of the increased costs for each of these phases is included below.

**2. Design/Engineering/Permitting Costs – Typically, Chevron estimates the engineering costs alone (excluding permitting) at around 6-8% of the total cost for the project which is significantly higher than the \$1,000,000 ARB estimates when taking into account the additional construction costs which ARB has underestimated or not included.**

ARB assumes in *Table IV. Tanker Terminal Infrastructure Feasibility, Engineering and Permitting Costs* on page 8 of the *Inputs and Assumptions* document that the engineering AND permitting costs will total around \$1,000,000 per berth. Even if ARB’s extremely low-cost estimates for terminal installation of land-based capture and control systems is taken (which Chevron does not believe is accurate and is discussed in further detail below), 6-8% of a \$66,000,000 project (which is ARB’s estimate) is around \$4,500,000 for engineering alone which is an additional \$500,000 on top of ARB’s estimate. The table below shows the 6-8% cost estimate for engineering is based off of ARB’s cost estimate in the *Land- Based Capture and Control Cost Input Table* in their *Cost Analysis* workbook.

Land-Based Capture and Control	Unit	Value	Total Cost with 4 Berths
Land-Based Emission Treatment System Cost - Tanker Terminals [B]	Cost per berth (\$)	\$4,999,500	\$ 19,998,000
Terminal Infrastructure (Berth to Shore Shoreside Piping) Capital Cost - Tanker Terminals [B]	Cost per berth (\$)	\$4,500,000	\$ 18,000,000
Loading Arm (Crane) Cost - Tanker Terminals [A]	Cost per berth (\$)	\$7,000,000	\$ 28,000,000
		<b>Total</b>	<b>\$ 65,998,000</b>
		6%	\$ 3,959,880
		8%	\$ 5,279,840

As discussed in item 3a, below, however, CARB’s assumption regarding the number of cranes (“loading arms”) per berth is incorrect. The cost per berth for cranes alone would double to \$14,000,000 per berth. For Richmond Long Wharf, the total for cranes alone based on CARB’s estimate is \$56,000,000 for all 4 berths, plus piping and emission treatment system costs. Consequently, the total investment using CARB’s values above would be \$94MM, with engineering ranging from 6% (\$5.64MM) to 8% (\$7.52MM). This number is likely still low based on the underestimate of construction costs which would inevitably increase the design and permitting costs. Lastly, the 6-8% estimate for design does not include the cost of permitting which would put ARB’s \$1,000,000 figure even more out of proportion with the true costs.

**3. Construction Costs – Chevron estimates that the equipment needed for the construction and installation of land-based capture and control systems at the RLW was significantly underestimated and undersized by ARB in their cost analysis. Specifically, Chevron believes that ARB a) underestimated the amount of cranes (referred to by ARB as “loading arms”) that would be needed, b) underestimated the terminal-side piping and electrical infrastructure needed, c) undersized the emission control system, d) did not account for the additional space needed on the RLW, e) did not account for the limited timing for driving piles and f) did not take into account the electrical upgrades which PG&E would need to undertake to support this project.**

- a. Number of Cranes – ARB incorrectly assumes in *Table XI. Berth and Terminal Counts, Anticipated Infrastructure Needs, and Unique Vessels* on page 17 of the *Inputs and Assumptions* document that only one crane would be needed for each berth to operate a land-based capture and control system. For the RLW, two cranes would be needed to operate a land-based capture and control system thus doubling the cost of this element and requiring additional engineering and construction time. Two cranes are needed for the following reasons:
  - i. Vessels need to be able to arrive and depart with the tides, which requires them to be able to berth starboard- and port-side-to (i.e. face different directions). Two cranes are required to address the two directions a vessel may berth.

- ii. Should a ship need to take stores aboard while at berth, it would necessitate berthing in the direction such that the vessel's crane is adjacent to the Wharf. Each vessel is unique in its layout for the shipside crane, which may be located on the port side or the starboard side. This means a terminal must have the flexibility of port-side-to or starboard-side-to berthing for each vessel call.
  - iii. A single crane is only feasible if vessels are designed to have an OCIMF-developed standard ship-to-shore exhaust port located in a central location near the midpoint on the ship. However, no such standard currently exists. Vessel stacks are at the stern, and consequently, one single crane at the midpoint of the berth cannot reach hundreds of feet horizontally while also reaching over a hundred feet vertically while also avoiding conflicts with the operating envelopes of other terminal equipment such as marine cranes, permanent gangways and vessel cranes/equipment on deck.
- b. Piping and Electrical Infrastructure Needs – Similar to the discussion on cranes, we believe ARB has underestimated the costs of piping and electrical infrastructure needs in *Table III. Land-Based Capture and Control Systems – Cost Inputs* on page 7 of the *Inputs and Assumptions* document. To begin, ARB is only taking into account the piping infrastructure needs and has not accounted for the necessary electrical upgrades. For the RLW, this is a critical cost element as almost a mile of medium or high-voltage electrical infrastructure (cables, conduit and duct bank) and potentially a new sub-station or expanded substation would be needed to connect the land-based capture and control system to the refinery's electrical grid. Chevron would also likely need to upgrade another substation inside the refinery and replace two 12kV 24 MVA transformers with 48 MVA transformers. Further modifications may be necessary at the point of interconnection with PG&E. Consequently ARB's cost estimate is significantly underestimated. Please see the blinded cost information submitted by WSPA for additional details.
- c. Undersized Emission Control Systems – ARB has estimated the costs of the emissions control system in *Table III. Land-Based Capture and Control Systems – Cost Inputs* on page 7 of the *Inputs and Assumptions* document based on the boiler loads from tankers as opposed to the volumetric flowrate expected from the tanker stacks. This significantly underestimates the sizing of the emission control system needed and subsequently also underestimates the costs. Typical exhaust flow rates for Suezmax vessel are around 55,000 cubic feet per minute (cfm) and those for very large crude carriers (VLCC) and ultra large crude carriers (ULCC) would be even more, although VLCCs and ULCCs do not currently call at the RLW. After discussing the costs of an emission control system with vendors of these technologies, Chevron believes that the costs ARB estimated using the boiler loads is over 2x less than what the cost would be if they were estimated based upon the stack exhaust flow rates which the vendors deem appropriate.
- d. Additional Space Needed at the RLW – Nowhere in ARB's *Inputs and Assumptions* document is an estimate of the costs associated with the need to expand the RLW's footprint to account for the additional space needed to house the cranes, piping and emission control systems. Chevron estimates that in order to house the necessary equipment, the RLW would need to add approximately 25,000 square feet to its existing footprint. This would necessitate driving between 1,500 and 2,000 new piles to support the additional space and weight. Without taking these critical costs into account, ARB is severely underestimating the cost for the RLW, and likely other marine terminals. Additionally, the need to drive piles and expand the footprint adds a significant amount of time to the permitting process and construction, as described in 3e, below.
- e. Pile driving windows – Pile driving work within San Francisco Bay is currently restricted to activity between June 1 and November 30 each year to protect fisheries and accommodate fish breeding seasons. As a result, pile driving activities can only occur 6 months per year. Chevron believes, based on extensive actual project experience at the RLW, that only two (2) 24-inch diameter concrete vertical piles could be driven per day. For 1500 piles, that

equates to 750 work days to install, and in a given year there are approximately 182 pile driving days.<sup>1</sup> Under this aggressive schedule, it would take at least 3.75 years to just drive the piles necessary for a project of this magnitude, and that's not taking into account work delays due to weather or other factors. Furthermore, potential environmental concerns relating to the pile driving work would be a focus of project permitting and could result in additional delays.

- f. Necessary PG&E Electrical Upgrades – Nowhere in ARB's *Inputs and Assumptions* document is an estimate of the costs which would be born by the end user (e.g., the Richmond Refinery) for the necessary upgrades to PG&E's systems to account for the additional load needed to operate a land-based capture and control system. It is unclear without an engineering assessment conducted by PG&E what the costs would be for upgrading PG&E's equipment outside the refinery's control to meet the additional electrical demand necessary to operate the land-based capture and control systems. ARB should engage with PG&E and include the scope of improvements necessary and include those costs into their cost estimates. Additionally, PG&E will pass along the costs of long-term operations and maintenance (O&M) to the customer requesting the electrical infrastructure upgrades in the form of "special facilities fees". In recent years, those fees have ranged from 70% to 100% of the cost of the new infrastructure built, meaning the actual cost of the upgrades are nearly double. PG&E infrastructure was not taken into account in ARB's electricity cost calculations in their *Cost Analysis* workbook. When Chevron representatives inquired on May 17, 2019, PG&E's customer service representative for major industrials in the East Bay region commented that he had not yet been consulted or asked to evaluate PG&E infrastructure needed to support expanded electrical demand at the marine terminals and ports in the East Bay region, and that it would take some substantial engineering effort by PG&E staff. Further, any PG&E infrastructure needed should be included in the CEQA analysis for the regulation.

**4. Operating Costs – Chevron estimates that the operating and maintenance costs needed to ensure safe and efficient operations of a land-based capture and control system at the RLW are underestimated by ARB. Specifically, Chevron believes that ARB a) underestimated the ongoing labor costs, b) underestimated the ongoing maintenance costs, c) did not account for additional demurrage due to longer times at berth and d) did not account for increase in electricity rates over the during of this regulation.**

- a. Additional Labor – In *Table III. Land-Based Capture and Control Systems – Cost Inputs* on page 7 of the *Inputs and Assumptions* document, ARB assumes that no additional labor would be needed to operate and maintain the land-based capture and control systems but does not provide any justification for this assumption. For the RLW, which would need eight new cranes and a new emission control system, it is likely that additional personnel time will be necessary to ensure safe and efficient operations.
- b. Maintenance Costs – While ARB breaks out the maintenance costs for the shore power option in *Table XII. Shore Power Infrastructure, Maintenance and Labor – Cost Inputs* on page 18 of the *Inputs and Assumptions* document, they do not provide an equivalent table for land-based capture and control systems. The only information which ARB provides is an estimate of \$17,500 for the maintenance on the emission control system which in itself appears very low. Additional data on the equipment's reliability would provide for a much more accurate cost estimate especially given the significant size increase over existing systems which serve a similar purpose. Additionally, this estimate does not appear to include the maintenance costs associated with the cranes, electrical systems or piping.

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<sup>1</sup> Assumes work proceeds 7 days a week, 10 hours per day (7x10) schedule. This schedule would result in significant overtime at 150-200% normal labor rate on the hours > 40 hour per week.

Considering the RLW would need eight cranes and over a mile of electrical infrastructure and piping, this cost would be significant.

- c. Additional Demurrage Costs – ARB does not account for the additional time needed to connect, ensure operability and disconnect the shore-based capture and control systems which would lead to additional demurrage. Chevron estimates that approximately 1-2 additional hours would be needed per vessel visit to account for the addition of a land-based capture and control system.
- d. Increase in Electricity Rates – PG&E's approved Time of Use (TOU) electric rate change effective October 2020 effects a 30% increase in electricity rates for E-20T industrial consumers with Standby electrical supply, including demand charges. Current proposed rate increases are 4-7% per rate case (every 3 years). Further, with the 4Q2018 Camp Fire wildfire costs yet to be allocated and PG&E's ongoing bankruptcy, there is a very strong possibility that electricity rates and demand/standby charges will increase dramatically in the next 3-6 years. The referenced CEC Mid Case Feb 2018 estimate is already out of date based on current information, which pre-dates the wildfires and PG&E's approved Time of Use rate structure changes.

**5. Emission Inventory Inaccuracies and Benefit Overestimation – While Chevron appreciates ARB's willingness to engage with us to correct inaccuracies in the emission inventory, ARB has yet to provide an updated inventory for our review. Our concerns related to the overestimation of emissions from tankers berthing at the RLW are included below. It is critical to note that this overestimation of emissions is also leading to an overestimation of the benefits (including NOx, particulate matter, diesel particulate matter, and health risk reductions) and skewing the regulation's cost-effectiveness. Specifically, Chevron remains concerned that ARB's emission inventory a) does not take into account the implementation of upcoming International Maritime Organization (IMO) regulations for tankers, b) does not take into account Chevron's two Tier 3 equivalent vessels which deliver the majority of crude to the refinery, c) overestimates the growth of vessel visits to the RLW and d) assumes tankers are pumping the entire time while at-berth.**

30-24

- a. Implementation of IMO Regulations –IMO has one regulation in place and one in the planning stages which will impact the emissions of tankers through the timeframe of this regulation, and ARB has not taken either into account in their emission inventory projections for 2030. IMO Regulation 13, approved in 2008, requires that all vessels built during or after 2016 meet Tier 3 requirements for NOx while operating within the North American Emission Control Area<sup>2</sup>. Meaning that from 2016 to 2030 the amount of Tier 3 tankers berthing in California will increase as ship owners turn over their fleets. In turn this will lead to less NOx overall from tankers berthing in California as the percentage of Tier 3 vessels increase. Note that Chevron partnered with Clarkson to estimate that the penetration rate of Tier 3 vessels into California by 2030 will be around 50%. Separately while the regulation has not yet been passed, IMO has committed to a climate change strategy which expects to reduce greenhouse gas emissions from the shipping industry by 40% in 2030.<sup>3</sup> Since much of the reductions are expected to come from energy efficiency, there is a high likelihood that ships will see an equivalent reduction in PM and DPM over that timeframe.
- b. Chevron's two Tier 3 Equivalent Vessels – As previously discussed with ARB, Chevron Shipping owns and operates, as of 2018, two Tier 3 equivalent vessels which make the majority of the crude deliveries to the refinery. ARB's emissions inventory does not currently reflect the significant NOx reductions which are associated with these two vessels. Additionally, these two vessels have steam driven auxiliary engines and thus produce no

<sup>2</sup> [http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Nitrogen-oxides-\(NOx\)-%E2%80%93-Regulation-13.aspx](http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Nitrogen-oxides-(NOx)-%E2%80%93-Regulation-13.aspx)

<sup>3</sup> <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/06GHGinitialstrategy.aspx>

diesel particulate matter (DPM), significantly reducing the health risk to the surrounding community. ARB should update their emission inventory projections and health risk assessment for 2030 to account for these two vessels at RLW.

- c. Overestimation of RLW Growth Rates – The ~1% growth rate for tankers which ARB has estimated in *Table IX. Growth Factors* on page 12 of the *Inputs and Assumptions* document is not representative of the expected growth rate at the RLW. RLW has seen an average 0.3% per annum growth rate in vessel calls over the past ~10 years (comparing 2008 and 2016 numbers) using data collected by the San Francisco Marine Exchange (SFME). Below is a summary of this data.

		Calendar Year			
		2008	2009	2010	2016
Calls	SeawayMax	205	215	193	212
	PanaMax	20	22	18	27
	AfraMax	20	18	15	25
	SuezMax	162	142	140	114

In general, vessel activity "growth" to the RLW is driven by Sacramento River runoff and sedimentation as well as dredging activities in the San Francisco Bay which impacts the "allowable" parcel sizes of vessels which can be brought into the RLW. Growth is not directly linked to the amount of crude or products delivered to the refinery. Overall volumes of crude and products are limited by refinery process unit capacity and scheduled plant maintenance cycles.

- d. Discharge/Pumping Times while At-Berth – ARB’s current emission inventory currently assumes that tankers spend their entire at-berth time discharging crude using their boilers and does not take into account the significant amount of at-berth time that a vessel is simply hoteling. As the boilers are running at low loads when the tanker is not pumping, there is significantly less emissions than ARB currently estimates. Below is a summary chart from the SFME which summarizes the amount of time hoteling and discharging. Using a weighted average based on the number of visits and the of time spent discharging vs. hoteling, ARB appears to be overestimating the emissions from discharging by approximately 60%.

		Calendar Year			
Class		2008	2009	2010	2016
Calls	SeawayMax	205	215	193	212
	PanaMax	20	22	18	27
	AfraMax	20	18	15	25
	SuezMax	162	142	140	114
Hoteling Time (hr)	SeawayMax	45.7	45.9	44.3	43.0
	PanaMax	61.4	74.5	61.7	62.9
	AfraMax	43.4	52.5	44.8	57.4
	SuezMax	26.2	30.5	28.2	28.1
Discharge Time (hr)	SeawayMax	12.4	15.8	11.8	15.2
	PanaMax	41.7	55.7	47.3	41.1
	AfraMax	2.0	2.0	1.9	25.0
	SuezMax	15.6	17.3	17.1	17.6
% of Time Discharging	SeawayMax	27%	34%	27%	35%
	PanaMax	68%	75%	77%	65%
	AfraMax	5%	4%	4%	44%
	SuezMax	60%	57%	61%	63%

30-25

Chevron recognizes the challenge of trying to estimate costs for a technology which is untested, unproven, and currently not on the market. That said, Chevron remains concerned that ARB's current cost estimates do not take into account a number of expected costs, underestimates many of the costs which are quantified, and could mislead decision-makers and the public as to the correct course of action. Chevron continues to appreciate ARB's willingness to engage on this regulation and would like to continue working with the ARB to establish realistic cost projections for this regulation.

Sincerely,



Henry Perea  
 Manager, State Government Affairs

cc: Richard Corey, Executive Officer, ARB  
 Chris Brown, Chevron Shipping  
 Brian Hubinger, Chevron Richmond Refinery

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**From:** ARITA, STEVEN J <STEVENARITA@chevron.com>  
**Sent:** Friday, July 19, 2019 6:37 PM  
**To:** cmarvin@arb.ca.gov  
**Cc:** Medeiros, Kevin; Boven, Karen L (KBOV); ARITA, STEVEN J  
**Subject:** FW: At Berth Regulation tanker implementation timeline  
**Attachments:** BW118 WMEP FULL SCHED OCT 08.pdf

Hi Cynthia – Thank you for the meeting yesterday, appreciated the discussion and your comments and the questions you raised about the feasibility study, including wanting more information regarding timing of permits, agency review times/permit issuance, construction schedules and other factors that need to be considered.

WSPA will be working on collecting that information.

We went back and checked on the information we provided to ARB, I am resending the email below that we had sent to ARB back on October 9, 2018 that provided much of the same information that was discussed in yesterday's meeting.

We also met with ARB on June 10, 2019 and discussed many of these same issues regarding timing, construction schedules, including examples of the time it takes to get agency permits, etc.

We are happy to revisit that discussion if ARB needs additional information.

Again, we appreciate ARB wanting this information and as I mentioned, WSPA is working to collect the information and provide to you as soon as possible.

Please let me know if you have any questions.

Steve

---

**From:** Boven, Karen L (KBOV)  
**Sent:** Tuesday, October 9, 2018 8:45 PM  
**To:** Light, Nicole@ARB <[Nicole.Light@arb.ca.gov](mailto:Nicole.Light@arb.ca.gov)>; Brown, Chris <[BROC@chevron.com](mailto:BROC@chevron.com)>  
**Cc:** Csondes, Angela@ARB <[acondes@arb.ca.gov](mailto:acondes@arb.ca.gov)>; Soriano, Bonnie@ARB <[Bonnie.Soriano@arb.ca.gov](mailto:Bonnie.Soriano@arb.ca.gov)>; Lee, Shawn (ShawnLee) <[ShawnLee@chevron.com](mailto:ShawnLee@chevron.com)>; Yang, Steven <[StevenYang@chevron.com](mailto:StevenYang@chevron.com)>; Hubinger, Brian R (HUBI) <[Brian.Hubinger@chevron.com](mailto:Brian.Hubinger@chevron.com)>; Medeiros, Kevin <[krmediros@chevron.com](mailto:krmediros@chevron.com)>  
**Subject:** RE: At Berth Regulation tanker implementation timeline

Nicole,

Thanks for your response. I am glad you found the information helpful.

The Wharf Maintenance and Efficiency Project (WMEP) did have some unique regulatory complexities, which I'd be glad to explain in a phone conversation – but it is not what I'd consider unusual for any major infrastructure project. Despite the determination that an MND was a suitable level of environmental review, the MND process still took well over 2.5 years from initial submittal of the project description and preparation of the CEQA checklist to the final approved/certified MND and addendum. This was in part due to CSLC's competing demands for many CEQA documents to be processed simultaneously during this timeframe, so resources were constrained at the agency.

Attached is the current Wharf Maintenance and Efficiency Project [construction schedule](#) for the Compliance Scope only. I've highlighted some key information below to put the project scope and schedule in context.

Figure 1-1. Project Location



Chevron Long Wharf Maintenance  
and Efficiency Project MND

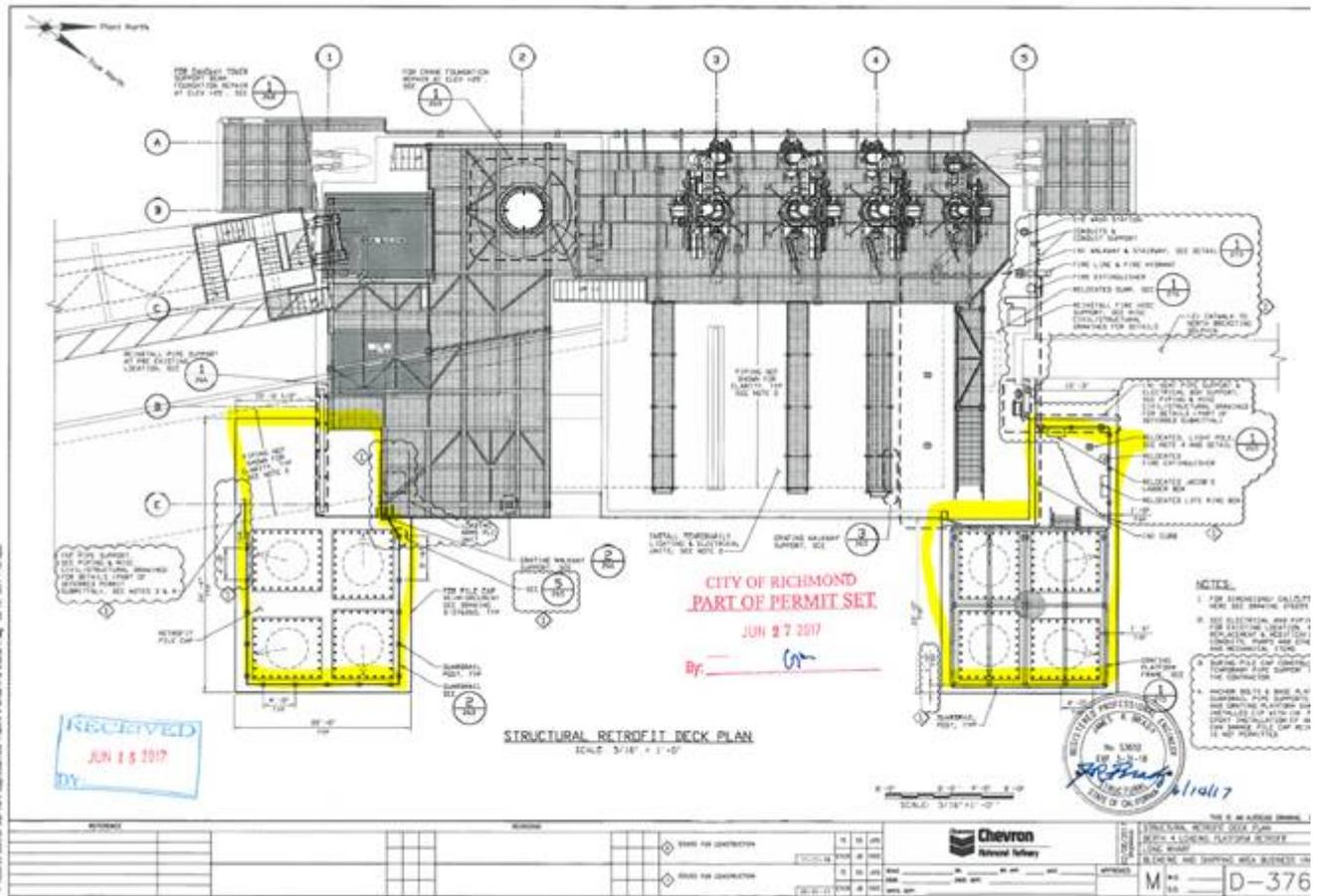
1-2

October 2016

### Key schedule information:

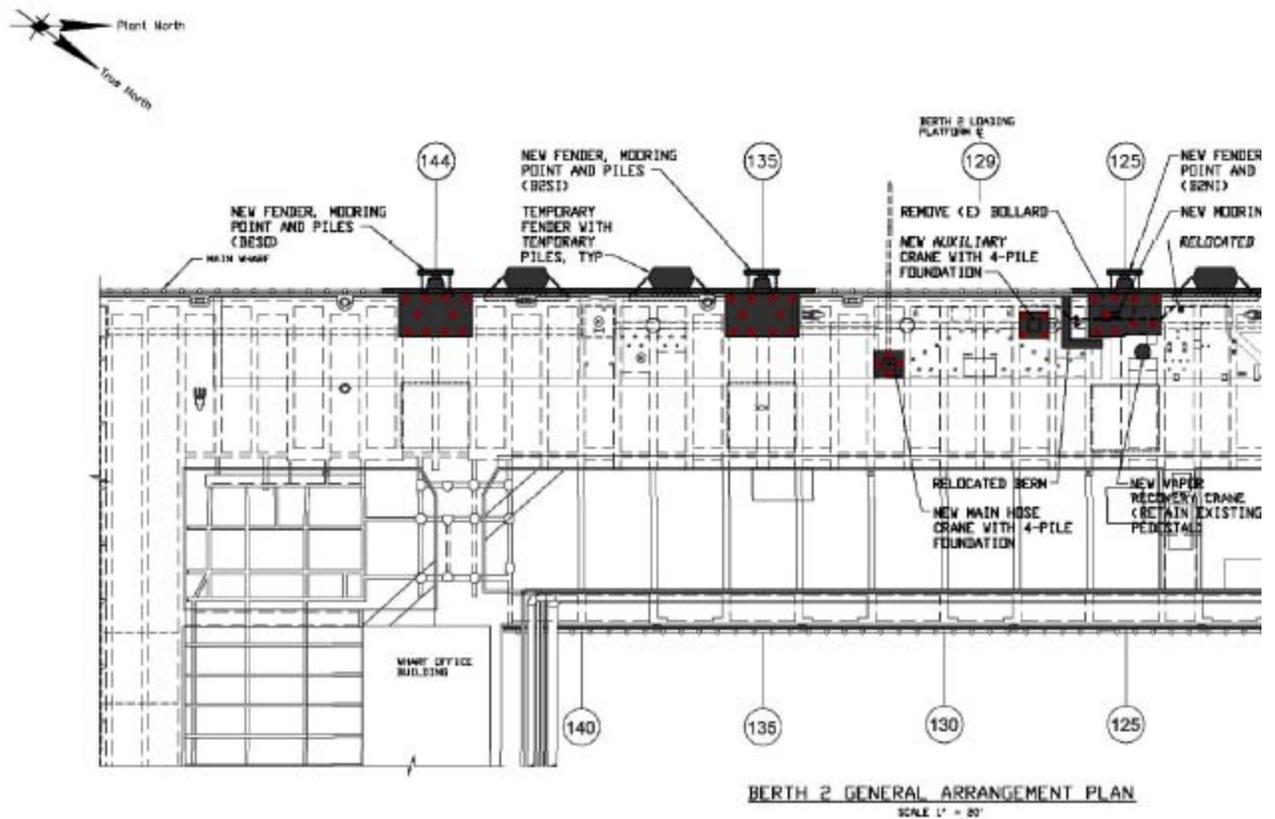
1. **Berth 4 Seismic Retrofit** – The Berth 4 scope of work includes enlarging the Berth 4 loading platform 1,070 square feet (sf) by installing 8 new 60-in diameter steel batter piles and 1,070 total sf. cast-in-place concrete pile caps, and tying them in to the existing structure. NOTE: This is likely a smaller surface area than what we would need to install to accommodate at-berth capture and control equipment sufficient to collect and process all four berths simultaneously, including up to Suezmax-sized vessels, and with sufficient equipment redundancy to enable reliable operation.

**Construction Duration: May 8, 2018 to April 12, 2022**



2. **Berth 2 Fender Replacement** – The scope of work includes replacing the Berth 2 timber fender system with four stand-off conical fenders, including replacing the existing hose crane, auxiliary crane and outboard portion of vapor recovery crane, retrofitting the vapor crane pedestal base, and installing a new mooring hook.  
**Construction Duration: August 16, 2018 to February 14, 2023**

Figure A-3. Berth 2 Features



October 2016

A-3

**Key cost information:**

We can discuss the cost of these improvements with you, or provide our general assessment of costs as part of our public comments. From a cost-effectiveness standpoint, as I've mentioned in the CARB workshops, building out infrastructure at an offshore marine oil terminal is substantially more expensive than at a port/marginal terminal that abuts land. The work at Berth 4 alone is expected to cost approximately \$37MM for an ~1,100 sq. ft. deck expansion and associated modifications to piping, sumps and ancillary equipment (~\$35,000/sf); 77% of that cost is labor, contractor equipment rental and indirects including mitigation requirements, and the work takes 4 years to complete. Major materials and equipment are delivered by barge, and all heavy lifts are made with barge-mounted cranes when no vessel is present at berth. The above cost does not include the shore-based power supply (a new substation) that would be needed to operate a gas collection and processing system, or cold ironing. A new substation is estimated at approximately \$40MM total installed cost based on recently completed projects at the Richmond Refinery, and that substation cost was corroborated verbally by P66 during the Oakland At-Berth scoping meeting.

If you'd find it helpful, I would be happy to coordinate a WebEx meeting to provide an overview of construction methods and operational constraints that may further help put these costs and schedules in context.

Thanks,

**Karen Boven**

*Energy and Commercial Lead*

Chevron Richmond Refinery  
510.242.3421 office  
510.427.9524 mobile  
[Karen.Boven@chevron.com](mailto:Karen.Boven@chevron.com)

---

**From:** Light, Nicole@ARB <[Nicole.Light@arb.ca.gov](mailto:Nicole.Light@arb.ca.gov)>  
**Sent:** Tuesday, October 9, 2018 3:27 PM  
**To:** Boven, Karen L (KBOV) <[Karen.Boven@chevron.com](mailto:Karen.Boven@chevron.com)>; Brown, Chris <[BROC@chevron.com](mailto:BROC@chevron.com)>  
**Cc:** Csondes, Angela@ARB <[acsondes@arb.ca.gov](mailto:acsondes@arb.ca.gov)>; Soriano, Bonnie@ARB <[Bonnie.Soriano@arb.ca.gov](mailto:Bonnie.Soriano@arb.ca.gov)>  
**Subject:** [\*\*EXTERNAL\*\*] RE: At Berth Regulation tanker implementation timeline

Karen,

Thank you very much for the below, this information is very helpful for our understanding. We will follow up if we have any questions, and look forward to any additional information you and/or your team can provide about timelines for construction, inspections and commissioning.

Best regards,  
Nicole

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**From:** Boven, Karen L (KBOV) <[Karen.Boven@chevron.com](mailto:Karen.Boven@chevron.com)>  
**Sent:** Monday, October 08, 2018 4:32 PM  
**To:** Light, Nicole@ARB <[Nicole.Light@arb.ca.gov](mailto:Nicole.Light@arb.ca.gov)>; Brown, Chris <[BROC@chevron.com](mailto:BROC@chevron.com)>  
**Cc:** Csondes, Angela@ARB <[acsondes@arb.ca.gov](mailto:acsondes@arb.ca.gov)>; Soriano, Bonnie@ARB <[Bonnie.Soriano@arb.ca.gov](mailto:Bonnie.Soriano@arb.ca.gov)>  
**Subject:** RE: At Berth Regulation tanker implementation timeline

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Nicole,

Thank you for your note. Yes, we can provide the requested information for the Wharf Maintenance and Efficiency Project (WMEP). At a high level, here is a summary of project inception through permitting:

**Design, Engineering/Regulatory Review and Permit Submittals:**

- **October 2008:** Project inception - scope developed as a result of 2008 MOTEMS Initial Audit (Chapter 31F California Building Code) findings.
- **October 2008-January 2010:** Research/data generation to develop suitable project scope and alternatives. Incorporating 2009 MOTEMS Initial Audit Rev. 1 findings.
- **January 2010-September 2014:** Project design and planning process, including completing regulatory required technical studies in support of MOTEMS-compliant project design (i.e. RLW current study – 2010-2012)
- **April 2014:** Initial permit applications submitted to resource agencies (BCDC as CEQA lead agency; ultimately this transitioned to CSLC)

- **September 2014 – September 2015:** CSLC and 3<sup>rd</sup> Party engineering peer review completed pursuant to MOTEMS; additional peer review completed by BCDC engineering division.
- **April 2016:** Final revised permit applications submitted to resource agencies (CSLC as CEQA lead agency)

**Permitting and resource agencies:**

**Table 1-1. Agencies with Review/Approval over Project Activities**

	<b>Permitting Agency</b>	<b>Anticipated Approvals/Regulatory Requirements</b>
<b>Local</b>	City of Richmond	Ministerial Building Permits in accordance with the California Building Code and City of Richmond Zoning Ordinance
<b>State</b>	California State Lands Commission	Environmental review and project approval pursuant to an existing lease
	California Department of Fish and Wildlife (CDFW)	California Endangered Species Act section 2081
	San Francisco Bay Regional Water Quality Control Board (SFBRWQCB)	Clean Water Act Section 401 Water Quality Certification
	San Francisco Bay Conservation and Development Commission (BCDC)	Amendment to Refinery Long Wharf Permit No. M1987.015
<b>Federal</b>	U.S. Army Corps of Engineers (USACE)	Clean Water Act (CWA) Section 404 (under Nationwide Permit No. 3)
	U.S. Fish and Wildlife Service (USFWS)	Section 7 Consultation under federal Endangered Species Act (if necessary)
	National Marine Fisheries Service (NMFS)	Marine Mammal Protection Act – Incidental Harassment Authorization

**CEQA Mitigated Negative Declaration (SCH#2016082014) and Addendum (due to construction method change); CSLC served as CEQA lead agency.**

MND - October 2016: [http://www.slc.ca.gov/info/Reports/Chevron\\_LongWharf/MND.pdf](http://www.slc.ca.gov/info/Reports/Chevron_LongWharf/MND.pdf)

Addendum - June 2017: [http://www.slc.ca.gov/info/Reports/Chevron\\_LongWharf/LWMEP\\_MND\\_addendum.pdf](http://www.slc.ca.gov/info/Reports/Chevron_LongWharf/LWMEP_MND_addendum.pdf)

**Permits Received:**

1. CSLC CEQA Mitigated Negative Declaration and project approval pursuant to an existing lease: October 2016, June 2017 addendum
2. NMFS Section 7 Biological Opinion in support of Clean Water Action Section 404, ACOE NWP 3 Letter of Permission: April 4, 2017
3. CDFW Section 2081 Incidental Take Permit: April 12, 2017
4. NMFS MMPA Incidental Harassment Authorization: May 31, 2017
5. RWQCB 401 Water Quality Cert: June 23, 2017
6. BCDC Maintenance Permit Amendment: July 13, 2017
7. ACOE CWA Section 404 Letter of Permission for NWP3: July 24, 2017

Please understand that the described WMEP work scope included pile driving and new permanent over-water shading (any at-berth emissions reduction equipment would also require structural expansion to the wharf deck), which are complicated to permit and construct in San Francisco Bay due to the presence of marine mammals, endangered species and fill mitigation requirements.

Regarding ongoing construction, inspections and commissioning – I have requested the latest schedule from the project team and will share it as soon as possible.

Sincerely,

**Karen Boven**

*Energy and Commercial Lead*

Chevron Richmond Refinery  
510.242.3421 office  
510.427.9524 mobile  
[Karen.Boven@chevron.com](mailto:Karen.Boven@chevron.com)

---

**From:** Light, Nicole@ARB <[Nicole.Light@arb.ca.gov](mailto:Nicole.Light@arb.ca.gov)>  
**Sent:** Monday, October 8, 2018 1:33 PM  
**To:** Brown, Chris <[BROC@chevron.com](mailto:BROC@chevron.com)>; Boven, Karen L (KBOV) <[Karen.Boven@chevron.com](mailto:Karen.Boven@chevron.com)>  
**Cc:** Csondes, Angela@ARB <[acsondes@arb.ca.gov](mailto:acsondes@arb.ca.gov)>; Soriano, Bonnie@ARB <[Bonnie.Soriano@arb.ca.gov](mailto:Bonnie.Soriano@arb.ca.gov)>  
**Subject:** [**\*\*EXTERNAL\*\***] At Berth Regulation tanker implementation timeline

Hi Chris, Karen,

Thank you both very much for the insight you've provided to CARB staff so far in regards to tanker vessels and the At Berth regulatory concepts.

We are in the process of re-evaluating the implementation timeline for tankers in the draft regulatory concepts, and were wondering if either of you had any information you could share with us about timelines and the process undertaken in Chevron's recent Long Wharf project that was referenced at CARB's Oakland workshop last month? In particular, we are looking for information on the time it takes for components included in a completed major project at a terminal like Richmond Long Wharf, such as the design, planning, engineering, permitting and approvals, EIR, construction, inspections/commissioning. It would also be helpful to know what other state agencies you have to work with besides State Lands Commission (if any).

If there is anything you can share to this regard, we would be most appreciative. We are looking to move forward with a decision on implementation timelines within the next few weeks. Feel free to give me a call if needed.

Thanks and best regards,  
Nicole Light  
*Air Pollution Specialist*  
*Marine Strategies Section | Transportation and Toxics Division*  
1001 I Street, P.O. Box 2815  
Sacramento, CA, 95812, USA  
Phone: 916-445-6012  
Email: [Nicole.Light@arb.ca.gov](mailto:Nicole.Light@arb.ca.gov)



WMEP-Compliance (LIVE PROJECT) (BW118)		MADIGAN_Update Book		10/08/2018 07:39	
Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete
<b>Total</b>		<b>02/12/2018 08:00 A</b>	<b>04/25/2023 12:00</b>		
DWRRRI-BW118 WMEP-Compliance (LIVE PROJECT) (BW118)		02/12/2018 08:00 A	04/25/2023 12:00		
DWRRRI-BW118.6 Compliance-Only		02/12/2018 08:00 A	04/25/2023 12:00		
DWRRRI-BW118.6.1 CPDEP		03/13/2018 08:00 A	04/25/2023 12:00		
A2200	Phase 4b(LOE)	03/13/2018 08:00 A	02/07/2023 12:00		15.28%
A2210	Phase 5(LOE)	02/07/2023 12:00	04/25/2023 12:00		0%
SMS.WF2854	Phase 5 Start	02/07/2023 12:00			0%
SMS.WF2855	Phase 4b Finish		02/07/2023 12:00		0%
SMS.WF2853	Phase 5 Finish		04/25/2023 12:00		0%
DWRRRI-BW118.6.6 Compliance Phase 4		02/12/2018 08:00 A	04/25/2023 12:00		
DWRRRI-BW118.6.6.A Compliance Phase 4a Project Management		02/12/2018 08:00 A	04/25/2023 12:00		
DWRRRI-BW118.6.6.A.3 IHA Permit ( Incidental Harrassment Authorization )		12/28/2018 14:00	02/24/2022 14:00		
PER.IHA.1000	IHA Renewal FOR 2019	12/28/2018 14:00*	02/26/2019 14:00		0%
PER.IHA.1001	IHA Renewal FOR 2020	12/26/2019 14:00*	02/24/2020 14:00		0%
PER.IHA.1002	IHA Renewal FOR 2021	12/29/2020 14:00*	02/23/2021 14:00		0%
PER.IHA.1003	IHA Renewal FOR 2022	12/30/2021 14:00*	02/24/2022 14:00		0%
DWRRRI-BW118.6.6.A.2 Compliance MOC B2 Cranes		10/17/2018 11:00	10/25/2018 13:00		
FD.MC1250	B2 PKG 12 Cranes- PSSR	10/17/2018 11:00	10/24/2018 11:00		0%
FD.MC1350	B2 PKG 12 Cranes MOC Complete M2018XXX-001-1	10/24/2018 11:00	10/25/2018 13:00		0%
FD.MC1356	B2 PKG 12 Cranes MOC Complete M2018XXX-001-2	10/24/2018 11:00	10/25/2018 13:00		0%
FD.MC1357	B2 PKG 12 Cranes MOC Complete M2018XXX-001-3	10/24/2018 11:00	10/25/2018 13:00		0%
FD.MC1358	B2 PKG 12 Cranes MOC Complete M2018XXX-001-4	10/24/2018 11:00	10/25/2018 13:00		0%
FD.MC1359	B2 PKG 12 Cranes MOC Complete M2018XXX-001-5	10/24/2018 11:00	10/25/2018 13:00		0%
FD.MC1360	B2 PKG 12 Cranes MOC Complete M2018XXX-001-6	10/24/2018 11:00	10/25/2018 13:00		0%
DWRRRI-BW118.6.6.A.5 Compliance MOC# - B2 Interim Fenders, Perm Fenders		02/06/2023 12:00	02/14/2023 14:00		
FD.MC1047	B2 PKG 5 Fenders - PSSR	02/06/2023 12:00	02/13/2023 12:00		0%
FD.MC1045	B2 PKG 5 Fenders - MOC Complete M2018XXX-002-1	02/13/2023 12:00	02/14/2023 14:00		0%
FD.MC1361	B2 PKG 5 Fenders - MOC Complete M2018XXX-002-2	02/13/2023 12:00	02/14/2023 14:00		0%
FD.MC1362	B2 PKG 5 Fenders - MOC Complete M2018XXX-003-1	02/13/2023 12:00	02/14/2023 14:00		0%
FD.MC1363	B2 PKG 5 Fenders - MOC Complete M2018XXX-003-2	02/13/2023 12:00	02/14/2023 14:00		0%
FD.MC1364	B2 PKG 5 Fenders - MOC Complete M2018XXX-003-3	02/13/2023 12:00	02/14/2023 14:00		0%
FD.MC1365	B2 PKG 5 Fenders - MOC Complete M2018XXX-003-4	02/13/2023 12:00	02/14/2023 14:00		0%
DWRRRI-BW118.6.6.A.6 Compliance MOC # - B4 Loading Platform Retrofit		04/01/2022 08:00	04/07/2022 16:00		
FD.MC1049	B4 PKG 13 Loading Platform - PSSR	04/01/2022 08:00	04/06/2022 14:00		0%
MH.MC1015	B4 PKG 13 Loading Platform - MOC Complete M2018XXX-005-1	04/06/2022 14:00	04/07/2022 16:00		0%
MH.MC1016	B4 PKG 13 Loading Platform - MOC Complete M2018XXX-005-2	04/06/2022 14:00	04/07/2022 16:00		0%
MH.MC1017	B4 PKG 13 Loading Platform - MOC Complete M2018XXX-005-3	04/06/2022 14:00	04/07/2022 16:00		0%

WMEP-Compliance (LIVE PROJECT) (BW118)		MADIGAN_Update Book	10/08/2018 07:39			
Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete	
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MH.MC1019	B4 PKG 13 Loading Platform - MOC Complete M2018XXX-005-5	04/06/2022 14:00	04/07/2022 16:00		0%	
MH.MC1020	B4 PKG 13 Loading Platform - MOC Complete M2018XXX-005-6	04/06/2022 14:00	04/07/2022 16:00		0%	
DWRRRI-BW118.6.6.A.1	Construction Planning and Support	02/12/2018 08:00 A	04/25/2023 12:00			
WPD.1005	Eichleay Engineering Support (LOE)	02/12/2018 08:00 A	04/25/2023 12:00		14.67%	
WPD.1004	Moffett & Nichol Engineering Support (LOE)	02/12/2018 08:00 A	04/25/2023 12:00		14.67%	
WPD.1006	Berth 4 Critical Lift Plan Development and Review	09/30/2019 10:30	02/21/2020 10:30		0%	
DWRRRI-BW118.6.6.A.7	Service Orders	10/08/2018 08:00	10/14/2021 16:00			
PHS4.SO.2019	Develop 2019 Major Construction SO's ( Service Orders)	10/08/2018 08:00*	10/19/2018 16:00		0%	
PHS4.SO.2020	Develop 2020 Major Construction SO's ( Service Orders)	10/01/2019 08:00*	10/14/2019 16:00		0%	
PHS4.SO.2021	Develop 2021 Major Construction SO's ( Service Orders)	10/01/2020 08:00*	10/14/2020 16:00		0%	
PHS4.SO.2022	Develop 2022 Major Construction SO's ( Service Orders)	10/01/2021 08:00*	10/14/2021 16:00		0%	
DWRRRI-BW118.6.6.A.4	Construction Work Package Tracking	10/08/2018 08:00	02/22/2022 13:00			
DWRRRI-BW118.6.6.A.4.12	Package 12 B2 Cranes Replacement	10/08/2018 08:00	10/16/2018 17:00			
DWRRRI-BW118.6.6.A.4.12.001	CWP-001	10/08/2018 08:00	10/16/2018 17:00			
CWP-001.3	Berth 2 Drain Line Replacement Construction Start	10/08/2018 08:00			0%	
CWP-001.4	Berth 2 Drain Line Replacement Construction Finish		10/16/2018 17:00		0%	
DWRRRI-BW118.6.6.A.4.12.003	CWP-003	10/08/2018 08:00	10/08/2018 08:00			
CWP-003.4	Berth 2 Cargo Line Riser ("8- 2R7) Removal Construction Finish		10/08/2018 08:00		0%	
DWRRRI-BW118.6.6.A.4.12.132	CWP-132	10/08/2018 08:00	10/08/2018 08:00			
CWP-132.4	Catch Basins modifications Construction Finish		10/08/2018 08:00		0%	
DWRRRI-BW118.6.6.A.4.5	Package 5 B2 Fenders and Mooring Hook Installation	10/08/2018 08:00	02/22/2022 13:00			
DWRRRI-BW118.6.6.A.4.5.024	CWP-024	10/08/2018 08:00	09/15/2020 11:30			
CWP-024.1	Mooring Hook (above deck conduits, wire terminations, start up) Package IFA	10/08/2018 08:00*			0%	
CWP-024.2	Mooring Hook (above deck conduits, wire terminations, start up)Package IFC	10/08/2018 08:00			0%	
CWP-024.3	Mooring Hook (above deck conduits, wire terminations, start up)Construction Start	09/15/2020 11:30			0%	
CWP-024.4	Mooring Hook (above deck conduits, wire terminations, start up)Construction Finish		09/15/2020 11:30		0%	
DWRRRI-BW118.6.6.A.4.5.119	CWP-119	10/08/2018 08:00	03/18/2019 08:00			
CWP-119.1	Install Temporary Foam Fenders Package IFA	10/08/2018 08:00*			0%	
CWP-119.2	Install Temporary Foam Fenders Package IFC	10/17/2018 08:00*			0%	
CWP-119.3	Install Temporary Foam Fenders Construction Start	03/18/2019 08:00			0%	
CWP-119.4	Install Temporary Foam Fenders Construction Finish		03/18/2019 08:00		0%	
DWRRRI-BW118.6.6.A.4.5.122	CWP-122	10/29/2018 08:00	07/16/2019 13:30			
CWP-122.1	Permanent Fenders Concrete demolition Package IFA	10/29/2018 08:00*			0%	
CWP-122.2	Permanent Fenders Concrete demolition Package IFC	11/12/2018 08:00*			0%	
CWP-122.3	Permanent Fenders Concrete demolition Construction Start	07/16/2019 13:30			0%	
CWP-122.4	Permanent Fenders Concrete demolition Construction Finish		07/16/2019 13:30		0%	

Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete
DWRRRI-BW118.6.6.A.4.5.124 CWP-124		11/19/2018 08:00	10/16/2019 14:30		
CWP-124.1	Permanent Fenders 24" sq Pile driving Package IFA	11/19/2018 08:00*			0%
CWP-124.2	Permanent Fenders 24" sq Pile driving Package IFC	12/03/2018 08:00*			0%
CWP-124.3	Permanent Fenders 24" sq Pile driving Construction Start	10/16/2019 14:30			0%
CWP-124.4	Permanent Fenders 24" sq Pile driving Construction Finish		10/16/2019 14:30		0%
DWRRRI-BW118.6.6.A.4.5.125 CWP-125		12/04/2018 08:00	04/20/2020 08:00		
CWP-125.1	Permanent Fenders Cast in place Concrete Package IFA	12/04/2018 08:00*			0%
CWP-125.2	Permanent Fenders Cast in place Concrete Package IFC	12/18/2018 08:00*			0%
CWP-125.3	Permanent Fenders Cast in place Concrete Construction Start	04/20/2020 08:00			0%
CWP-125.4	Permanent Fenders Cast in place Concrete Construction Finish		04/20/2020 08:00		0%
DWRRRI-BW118.6.6.A.4.5.126 CWP-126		01/25/2019 08:00	10/01/2019 14:00		
CWP-126.1	Removal of existing piles Package IFA	01/25/2019 08:00*			0%
CWP-126.2	Removal of existing piles Package IFC	02/08/2019 08:00*			0%
CWP-126.3	Removal of existing piles Construction Start	10/01/2019 14:00			0%
CWP-126.4	Removal of existing piles Construction Finish		10/01/2019 14:00		0%
DWRRRI-BW118.6.6.A.4.5.130 CWP-130		03/26/2019 08:00	09/15/2020 11:30		
CWP-130.1	Install Mooring Hook at B2NI Package IFA	03/26/2019 08:00*			0%
CWP-130.2	Install Mooring Hook at B2NI Package IFC	04/09/2019 08:00*			0%
CWP-130.3	Install Mooring Hook at B2NI Construction Start	09/15/2020 11:30			0%
CWP-130.4	Install Mooring Hook at B2NI Construction Finish		09/15/2020 11:30		0%
DWRRRI-BW118.6.6.A.4.5.131 CWP-131		04/17/2019 08:00	09/09/2021 08:30		
CWP-131.1	Install Permanent Fenders Package IFA	04/17/2019 08:00*			0%
CWP-131.2	Install Permanent Fenders Package IFC	05/01/2019 08:00*			0%
CWP-131.3	Install Permanent Fenders Construction Start	09/09/2021 08:30			0%
CWP-131.4	Install Permanent Fenders Construction Finish		09/09/2021 08:30		0%
DWRRRI-BW118.6.6.A.4.5.134 CWP-134		01/16/2020 08:00	02/22/2022 13:00		
CWP-134.1	Remaining Timber Fender Piles removal Package IFC	01/16/2020 08:00*			0%
CWP-134.3	Remaining Timber Fender Piles removal Package IFA	02/22/2022 13:00			0%
CWP-134.2	Remaining Timber Fender Piles removal Construction Start	02/22/2022 13:00*			0%
CWP-134.4	Remaining Timber Fender Piles removal Construction Finish		02/22/2022 13:00		0%
DWRRRI-BW118.6.6.A.4.13 Package 13 B4 Loading Platform Seismic Retrofit		10/08/2018 08:00	07/16/2021 14:00		
DWRRRI-BW118.6.6.A.4.13.004 CWP-004		10/08/2018 08:00	10/17/2018 08:00		
CWP-004.3	Berth 4 Instrument Air Line Relocation Construction Start	10/08/2018 08:00			0%
CWP-004.4	Berth 4 Instrument Air Line Relocation Construction Finish		10/17/2018 08:00		0%
DWRRRI-BW118.6.6.A.4.13.005 CWP-005		10/17/2018 08:00	10/17/2018 08:00		
CWP-005.4	Berth 4 Natural Gas Line Relocation Construction Finish		10/17/2018 08:00		0%
DWRRRI-BW118.6.6.A.4.13.006 CWP-006		10/17/2018 08:00	10/17/2018 08:00		

Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete
CWP-006.4	Berth 4 Nitrogen Line Relocation Construction Finish		10/17/2018 08:00		0%
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CWP-007.3	Berth 4 Utility Tie Ins Construction Start	10/17/2018 08:00			0%
CWP-007.4	Berth 4 Utility Tie Ins Construction Finish		10/17/2018 08:00		0%
DWRRRI-BW118.6.6.A.4.13.008 CWP-008		10/11/2018 13:00	11/02/2018 13:00		
CWP-008.3	Berth 4 New Sump Pump Installation Construction Start	10/11/2018 13:00			0%
CWP-008.4	Berth 4 New Sump Pump Installation Construction Finish		11/02/2018 13:00		0%
DWRRRI-BW118.6.6.A.4.13.009 CWP-009		10/19/2018 14:00	10/19/2018 14:00		
CWP-009.4	Berth 4 New Process Drain Piping Construction Finish		10/19/2018 14:00		0%
DWRRRI-BW118.6.6.A.4.13.010 CWP-010		10/11/2018 13:00	11/02/2018 13:00		
CWP-010.3	Berth 4 New Sump Discharge Line Construction Start	10/11/2018 13:00			0%
CWP-010.4	Berth 4 New Sump Discharge Line Construction Finish		11/02/2018 13:00		0%
DWRRRI-BW118.6.6.A.4.13.011 CWP-011		10/08/2018 08:00	11/02/2018 13:00		
CWP-011.3	Berth 4 New Sump Vent Line Phase 1 Construction Start	10/08/2018 08:00			0%
CWP-011.4	Berth 4 New Sump Vent Line Phase 1 Construction Finish		11/02/2018 13:00		0%
DWRRRI-BW118.6.6.A.4.13.012 CWP-012		11/02/2018 13:00	11/02/2018 13:00		
CWP-012.4	Berth 4 New Sump Tie In's Construction Finish		11/02/2018 13:00		0%
DWRRRI-BW118.6.6.A.4.13.013 CWP-013		10/08/2018 08:00	02/06/2019 15:00		
CWP-013.1	Berth 4 Demolition Package IFA	10/08/2018 08:00*			0%
CWP-013.2	Berth 4 Demolition Package IFC	10/08/2018 08:00*			0%
CWP-013.3	Berth 4 Demolition Construction Start	02/06/2019 15:00			0%
CWP-013.4	Berth 4 Demolition Construction Finish		02/06/2019 15:00		0%
DWRRRI-BW118.6.6.A.4.13.014 CWP-014		10/08/2018 08:00	11/02/2018 13:00		
CWP-014.1	Berth 4 New Sump Vent Line Phase 2 Package IFA	10/08/2018 08:00*			0%
CWP-014.2	Berth 4 New Sump Vent Line Phase 2 Package IFC	10/08/2018 08:00			0%
CWP-014.3	Berth 4 New Sump Vent Line Phase 2 Construction Start	10/11/2018 13:00			0%
CWP-014.4	Berth 4 New Sump Vent Line Phase 2 Construction Finish		11/02/2018 13:00		0%
DWRRRI-BW118.6.6.A.4.13.027 CWP-027		05/12/2021 13:00	05/12/2021 13:00		
CWP-027.3	Lighting Pole and Conduit removal Mooring Lights Construction Start	05/12/2021 13:00			0%
CWP-027.4	Lighting Pole and Conduit removal Mooring Lights Construction Finish		05/12/2021 13:00		0%
DWRRRI-BW118.6.6.A.4.13.028 CWP-028		10/08/2018 08:00	10/08/2018 08:00		
CWP-028.4	Temporary Lighting Construction Finish		10/08/2018 08:00		0%
DWRRRI-BW118.6.6.A.4.13.029 CWP-029		10/11/2018 13:00	11/02/2018 13:00		
CWP-029.3	New Sump pump I&E Construction Start	10/11/2018 13:00			0%
CWP-029.4	New Sump pump I&E Construction Finish		11/02/2018 13:00		0%
DWRRRI-BW118.6.6.A.4.13.030 CWP-030		10/09/2018 13:00	11/02/2018 13:00		
CWP-030.3	Existing Sump Pump I&E Removal Construction Start	10/09/2018 13:00			0%

WMEP-Compliance (LIVE PROJECT) (BW118)		MADIGAN_Update Book		10/08/2018 07:39	
Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete
CWP-030.4	Existing Sump Pump I&E Removal Construction Finish		11/02/2018 13:00		0%
DWRRRI-BW118.6.6.A.4.13.031 CWP-031		10/08/2018 08:00	05/12/2021 13:00		
CWP-031.1	Lighting Pole re-installation at Pile Cap Package IFA	10/08/2018 08:00*			0%
CWP-031.2	Lighting Pole re-installation at Pile Cap Package IFC	10/08/2018 08:00			0%
CWP-031.3	Lighting Pole re-installation at Pile Cap Construction Start	05/12/2021 13:00			0%
CWP-031.4	Lighting Pole re-installation at Pile Cap Construction Finish		05/12/2021 13:00		0%
DWRRRI-BW118.6.6.A.4.13.032 CWP-032		10/23/2018 08:00	10/23/2018 08:00		
CWP-032.4	H2S and LEL Detectors (incl. Horn & Beacon) I&E Construction Finish		10/23/2018 08:00		0%
DWRRRI-BW118.6.6.A.4.13.102 CWP-102		10/09/2018 13:00	11/02/2018 13:00		
CWP-102.3	Concrete demolition at New Sump location Construction Start	10/09/2018 13:00			0%
CWP-102.4	Concrete demolition at New Sump location Construction Finish		11/02/2018 13:00		0%
DWRRRI-BW118.6.6.A.4.13.104 CWP-104		10/11/2018 13:00	11/02/2018 13:00		
CWP-104.3	Installation of New Sump with Coating Construction Start	10/11/2018 13:00			0%
CWP-104.4	Installation of New Sump with Coating Construction Finish		11/02/2018 13:00		0%
DWRRRI-BW118.6.6.A.4.13.107 CWP-107		10/08/2018 08:00	06/12/2019 16:00		
CWP-107.1	Install 36" Template Piles for 60" Permanent Piles Package IFA	10/08/2018 08:00*			0%
CWP-107.2	Install 36" Template Piles for 60" Permanent Piles Package IFC	10/08/2018 08:00*			0%
CWP-107.3	Install 36" Template Piles for 60" Permanent Piles Construction Start	06/12/2019 16:00			0%
CWP-107.4	Install 36" Template Piles for 60" Permanent Piles Construction Finish		06/12/2019 16:00		0%
DWRRRI-BW118.6.6.A.4.13.115 CWP-115		10/08/2018 08:00	11/02/2018 13:00		
CWP-115.2	Concrete demolition of existing sump Package IFC	10/08/2018 08:00*			0%
CWP-115.3	Concrete demolition of existing sump Construction Start	10/09/2018 13:00			0%
CWP-115.4	Concrete demolition of existing sump Construction Finish		11/02/2018 13:00		0%
DWRRRI-BW118.6.6.A.4.13.116 CWP-116		10/08/2018 08:00	06/10/2019 09:00		
CWP-116.1	Gangway Support Retrofits and Bolstering Package IFA	10/08/2018 08:00*			0%
CWP-116.2	Gangway Support Retrofits and Bolstering Package IFC	10/08/2018 08:00*			0%
CWP-116.3	Gangway Support Retrofits and Bolstering Construction Start	06/10/2019 09:00			0%
CWP-116.4	Gangway Support Retrofits and Bolstering Construction Finish		06/10/2019 09:00		0%
DWRRRI-BW118.6.6.A.4.13.117 CWP-117		10/08/2018 08:00	03/04/2019 16:00		
CWP-117.1	Bolstering Concrete below loading arms area Package IFA	10/08/2018 08:00*			0%
CWP-117.2	Bolstering Concrete below loading arms area Package IFC	10/08/2018 08:00*			0%
CWP-117.3	Bolstering Concrete below loading arms area Construction Start	03/04/2019 16:00			0%
CWP-117.4	Bolstering Concrete below loading arms area Construction Finish		03/04/2019 16:00		0%
DWRRRI-BW118.6.6.A.4.13.118 CWP-118		10/08/2018 08:00	10/08/2018 08:00		
CWP-118.1	Berth 4 Vapor Recovery Crane retrofits Package IFA	10/08/2018 08:00*			0%
CWP-118.2	Berth 4 Vapor Recovery Crane retrofits Package IFC	10/08/2018 08:00*			0%
CWP-118.3	Berth 4 Vapor Recovery Crane retrofits Construction Start	10/08/2018 08:00*			0%

Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete
CWP-118.4	Berth 4 Vapor Recovery Crane retrofits Construction Finish		10/08/2018 08:00		0%
DWRRRI-BW118.6.6.A.4.13.120 CWP-120		10/12/2018 08:00	06/01/2020 08:00		
CWP-120.1	Install 60" Permanent Piles Package IFA	10/12/2018 08:00*			0%
CWP-120.2	Install 60" Permanent Piles Package IFC	10/26/2018 08:00*			0%
CWP-120.3	Install 60" Permanent Piles Construction Start	06/01/2020 08:00			0%
CWP-120.4	Install 60" Permanent Piles Construction Finish		06/01/2020 08:00		0%
DWRRRI-BW118.6.6.A.4.13.121 CWP-121		10/17/2018 08:00	06/12/2019 16:00		
CWP-121.1	Temporary Support of South-East Utility piping (with Concrete demo) Package IFA	10/17/2018 08:00*			0%
CWP-121.2	Temporary Support of South-East Utility piping (with Concrete demo) Package IFC	10/31/2018 08:00*			0%
CWP-121.3	Temporary Support of South-East Utility piping (with Concrete demo) Construction Start	06/12/2019 16:00			0%
CWP-121.4	Temporary Support of South-East Utility piping (with Concrete demo) Construction Finish		06/12/2019 16:00		0%
DWRRRI-BW118.6.6.A.4.13.123 CWP-123		11/13/2018 08:00	12/22/2020 13:00		
CWP-123.1	Cast in Place Pile Caps Package IFA	11/13/2018 08:00*			0%
CWP-123.2	Cast in Place Pile Caps Package IFC	11/27/2018 08:00*			0%
CWP-123.3	Cast in Place Pile Caps Construction Start	12/22/2020 13:00			0%
CWP-123.4	Cast in Place Pile Caps Construction Finish		12/22/2020 13:00		0%
DWRRRI-BW118.6.6.A.4.13.127 CWP-127		02/08/2019 08:00	07/16/2021 14:00		
CWP-127.1	Install Cluster Dolphins Package IFA	02/08/2019 08:00*			0%
CWP-127.2	Install Cluster Dolphins Package IFC	02/22/2019 08:00*			0%
CWP-127.3	Install Cluster Dolphins Construction Start	07/16/2021 14:00			0%
CWP-127.4	Install Cluster Dolphins Construction Finish		07/16/2021 14:00		0%
DWRRRI-BW118.6.6.A.4.13.128 CWP-128		02/22/2019 08:00	03/08/2021 13:00		
CWP-128.1	Removal of Template Piles Package IFA	02/22/2019 08:00*			0%
CWP-128.2	Removal of Template Piles Package IFC	03/08/2019 08:00*			0%
CWP-128.3	Removal of Template Piles Construction Start	03/08/2021 13:00			0%
CWP-128.4	Removal of Template Piles Construction Finish		03/08/2021 13:00		0%
DWRRRI-BW118.6.6.A.4.13.129 CWP-129		03/08/2019 08:00	04/21/2021 08:00		
CWP-129.1	Install plates and grating above pile caps Package IFA	03/08/2019 08:00*			0%
CWP-129.2	Install plates and grating above pile caps Package IFC	03/22/2019 08:00*			0%
CWP-129.3	Install plates and grating above pile caps Construction Start	04/21/2021 08:00			0%
CWP-129.4	Install plates and grating above pile caps Construction Finish		04/21/2021 08:00		0%
DWRRRI-BW118.6.6.A.4.13.133 CWP-133		06/17/2019 08:00	07/01/2019 08:00		
CWP-133.1	Install Stairway Package IFA	06/17/2019 08:00*			0%
CWP-133.2	Install Stairway Package IFC	07/01/2019 08:00*			0%
CWP-133.3	Install Stairway Construction Start	07/01/2019 08:00			0%
CWP-133.4	Install Stairway Construction Finish		07/01/2019 08:00		0%
DWRRRI-BW118.6.6.B Compliance Phase 4b - Compliance Construction		05/08/2018 16:00 A	02/07/2023 12:00		

Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete
DWRRI-BW118.6.6.B.P12 Compliance B2 Cranes (P12)		08/16/2018 07:00 A	10/31/2018 11:00		
DWRRI-BW118.6.6.B.P12.1 Compliance Package 12 - Milestones		10/17/2018 11:00	10/17/2018 11:00		
SMS.B2.PKG12.400	PKG 12 B2 Cranes - End of Construction		10/17/2018 11:00		0%
DWRRI-BW118.6.6.B.P12.3 Compliance B2 Cranes (P12) - Construction		08/16/2018 07:00 A	10/31/2018 11:00		
PHS4.B2.P12.221	PKG 12 Demobilization	10/17/2018 11:00	10/31/2018 11:00		0%
DWRRI-BW118.6.6.B.P12.3.1 Compliance B2 Cranes Pre-Assembly		10/08/2018 07:00	10/08/2018 16:00		
DWRRI-BW118.6.6.B.P12.3.1.1 Receive Equipment		10/08/2018 07:00	10/08/2018 16:00		
PHS4.B2.P12.217	Demobilize hydraulic equipment (KRAUS)	10/08/2018 07:00	10/08/2018 16:00		0%
DWRRI-BW118.6.6.B.P12.3.2 Berth 2 Mechanical Scope		08/16/2018 07:00 A	10/17/2018 11:00		
DWRRI-BW118.6.6.B.P12.3.2.1 6" Drain Line		08/16/2018 07:00 A	10/17/2018 11:00		
PHS4.B2.P12.177	Field Verifications (TARGET FINISH 5/31)	08/16/2018 07:00 A	10/08/2018 08:00		95%
PHS4.B2.P12.110	Setup Jobsite for 6" DEMO	08/20/2018 07:00 A	10/09/2018 09:00		80%
PHS4.B2.P12.115	NDE new piping	08/20/2018 07:00 A	10/08/2018 14:00		50%
PHS4.B2.P12.112	Install re-routed 6" drain line	08/21/2018 13:00 A	10/10/2018 16:00		85%
PHS4.B2.P12.128	NDE Welds	08/22/2018 13:00 A	10/15/2018 16:00		50%
PHS4.B2.P12.116	Demo Catch basin	10/09/2018 09:00	10/10/2018 09:00		0%
PHS4.B2.P12.117	Install Catch Basin	10/10/2018 16:00	10/11/2018 16:00		0%
PHS4.B2.P12.139	Service Test system	10/15/2018 16:00	10/16/2018 16:00		0%
PHS4.B2.P12.152	Return to OPS (TARGET FINISH 6/21)	10/16/2018 16:00	10/16/2018 17:00		0%
PHS4.B2.P12.153	DeMobe	10/16/2018 17:00	10/17/2018 11:00		0%
DWRRI-BW118.6.6.B.P12.3.2.2 8" 2R7 System Piping under dock		09/21/2018 06:00 A	10/12/2018 06:12		
PHS4.B2.2R7.1011	Inspect Bolt ups	09/21/2018 06:00 A	10/12/2018 06:12		80%
PHS4.B2.2R7.1003	Install Catch Basin (PEC)	10/08/2018 07:00	10/11/2018 18:00		0%
DWRRI-BW118.6.6.B.P12.3.2.3 Air Line system under Dock		10/08/2018 07:00	10/16/2018 09:00		
PHS4.B2.AIR.1105	Install Pipe support	10/08/2018 07:00	10/09/2018 18:00		0%
PHS4.B2.AIR.1205	Install new air line per RFI-006	10/10/2018 07:00	10/11/2018 18:00		0%
PHS4.B2.AIR.1305	Install Pipe sleeve and deck penetration plate	10/15/2018 07:00	10/15/2018 18:00		0%
PHS4.B2.AIR.1004	Inspect and service Test	10/16/2018 06:00	10/16/2018 07:00		0%
PHS4.B2.AIR.1005	Return to OPS (TARGET FINISH 5/31)	10/16/2018 07:00	10/16/2018 08:00		0%
PHS4.B2.AIR.1006	DeMobe	10/16/2018 08:00	10/16/2018 09:00		0%
DWRRI-BW118.6.6.B.P12.3.4 Berth 2 Civil Scope		09/19/2018 12:00 A	10/09/2018 10:00		
DWRRI-BW118.6.6.B.P12.3.4.2 B2 Main Hose Crane CIVIL		09/19/2018 12:00 A	10/09/2018 06:48		
PHS4.B2.SCAFF.400	MAIN (South): Remove Work Platforms	09/19/2018 12:00 A	10/09/2018 06:48		20%
DWRRI-BW118.6.6.B.P12.3.4.3 B2 Vapor Hose Crane CIVIL		09/22/2018 10:00 A	10/09/2018 10:00		
PHS4.B2.SCAFF.600	VAPOR: Remove Work Platforms	09/22/2018 10:00 A	10/09/2018 10:00		0%
DWRRI-BW118.6.6.B.P5 Compliance B2 Fenders (P5)		07/09/2018 07:00 A	02/07/2023 12:00		
DWRRI-BW118.6.6.B.P5.3 Compliance Package 5 - Milestones		10/08/2019 11:00	02/06/2023 12:00		

WMEP-Compliance (LIVE PROJECT) (BW118)		MADIGAN_Update Book		10/08/2018 07:39	
Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete
SMS.OUTAG.B2.P5.1007	B2SI B2NO Permanent Fenders(1) Drive Piles (JUNE 2021)	10/08/2019 11:00			0%
SMS.OUTAG.B2.P5.1005	B2SI B2NO Permanent Fenders(1) Drive Piles (JUNE 2020)	10/08/2019 11:00			0%
SMS.OUTAG.B2.P5.1006	B2SI B2NO Permanent Fenders (2) CIP Concrete	06/09/2020 13:00			0%
DELAY.2000	Delay 60 days Outer to Inner FBP CIP Pours	06/22/2020 07:00	08/17/2020 18:00		0%
SMS.OUTAG.B2.P5.1008	B2SO B2NI Permanent Fenders (2) CIP Concrete	08/23/2020 09:30			0%
OUTAGE.B2.P5.1009	Permanent Fenders Final Installation (JAN 2022)	09/09/2021 08:30	09/09/2021 09:30		0%
OUTAGE.B2.P5.1010	Removal of Wide flange piles	10/19/2021 11:30	10/19/2021 13:30		0%
SMS.B2.P5.103	B2 PKG 5 End of Construction		02/06/2023 12:00		0%
DWRRI-BW118.6.6.B.P5.2 Compliance Package 5 - Procurement		10/23/2018 07:00	08/25/2021 16:00		
DWRRI-BW118.6.6.B.P5.2.2 Compliance Piles		12/17/2018 07:00	02/14/2019 18:00		
PHS4.B2.P5.1100	PKG 5 PEC Issue PO Concrete Piles (TARGET: Jan 2019)	12/17/2018 07:00	12/17/2018 08:00		0%
PHS4.B2.P5.1000	PKG 5 Fabrication & Delivery of 24" sq concrete Piles - P5, B2 fenders	12/17/2018 08:00	02/14/2019 18:00		0%
DWRRI-BW118.6.6.B.P5.2.4 Compliance Temp Foam Fenders		10/23/2018 07:00	03/14/2019 08:00		
PHS4.B2.P5.107	Temp Foam Fenders - Issue PO (NOV 2018)	10/23/2018 07:00	10/23/2018 08:00		0%
PHS4.B2.P5.116	Temp Foam Fenders - Fabrication & Delivery (5 Months)	10/23/2018 08:00	03/14/2019 08:00		0%
DWRRI-BW118.6.6.B.P5.2.5 Compliance MCN Cone Fenders		04/07/2021 16:00	08/25/2021 16:00		
PHS4.B2.P5.108	MCN Cone Fenders - Issue PO for Fabrication (700d Lag from Funding)(MAY 2021)	04/07/2021 16:00	04/08/2021 16:00		0%
PHS4.B2.P5.123	B2 MCN Cone Fenders - Fabrication, Inspection & Delivery (5 mo's)	04/08/2021 16:00	08/25/2021 16:00		0%
DWRRI-BW118.6.6.B.P5.2.6 Compliance Mooring Hook & Dolphin		01/09/2019 16:00	08/07/2019 16:00		
PHS4.B2.P5.118	Pkg 5 - B2 Mooring Hook - Issue PO for Fabrication (1Q2019 appx. )	01/09/2019 16:00	01/10/2019 16:00		0%
PHS4.B2.P5.159	Pkg 5 - B2 Mooring Hook - Fabrication, Inspection & Delivery on Site (7.5 mo's)	01/10/2019 16:00	08/07/2019 16:00		0%
DWRRI-BW118.6.6.B.P5.1 Compliance Package 5 - Construction		07/09/2018 07:00 A	02/07/2023 12:00		
PHS4.B2.P5.SHIP	B2 PKG5 Fenders Shipping /Schedule Delays	02/22/2022 13:00	11/07/2022 12:00		0%
PHS4.B2.P5.CONTG	Contingency 50 Days	11/07/2022 13:00	02/06/2023 12:00		0%
PHS4.B2.P5.DMOB	B2 PKG 5 DE-Mobe	02/06/2023 13:00	02/07/2023 12:00		0%
DWRRI-BW118.6.6.B.P5.1.4 B2 PKG 5 Permanent Fender Installation		08/25/2021 16:00	09/12/2021 14:30		
PHS4.B2.P5.99	Prep & Load Cone Fender Assembly (4ea)	08/25/2021 16:00	09/09/2021 08:30		0%
PHS4.B2.P5.100	Install Cone Fender Assembly (4ea)	09/09/2021 09:30	09/12/2021 14:30		0%
DWRRI-BW118.6.6.B.P5.1.1 B2 PKG5 Electrical Scope		07/09/2018 07:00 A	10/16/2018 09:30		
PHS4.B2.P5.26	Install new conduit to MK-203A (mooring hook)	07/09/2018 07:00 A	10/08/2018 18:00		75%
PHS4.B2.P5.33	Pull in wiring	07/09/2018 13:00 A	10/15/2018 09:30		50%
PHS4.B2.P5.34	Terminate associated wiring	09/10/2018 07:00 A	10/16/2018 09:30		50%
PHS4.B2.P5.27	Install 2 new conduits from MK-203A (mooring hook) Rack to cable trough	09/10/2018 07:00 A	10/09/2018 15:30		75%
PHS4.B2.P5.30	Terminate cables for MK-203A (mooring hook)	09/10/2018 09:30 A	10/10/2018 15:30		50%
DWRRI-BW118.6.6.B.P5.1.2 B2 PKG5 Civil Structural TEMP Works		03/14/2019 08:00	02/22/2022 13:00		
PHS4.B2.P5.51	Install Foam Filled Fenders - 5 each	03/14/2019 08:00	03/16/2019 15:30		0%
PHS4.B2.P5.52	Remove Foam Filled Fenders at Project Completion - 5 each	09/14/2021 08:30	09/21/2021 11:30		0%

WMEP-Compliance (LIVE PROJECT) (BW118)		MADIGAN_Update Book	10/08/2018 07:39			
Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete	
PHS4.B2.P5.53	Cut WF Piles from Backing Plates	09/21/2021 11:30	10/19/2021 11:30		0%	
PHS4.B2.P5.54	Remove WF Piles - 36 each	10/19/2021 13:30	10/22/2021 10:00		0%	
PHS4.B2.P5.55	Remove Glulam Beams	10/26/2021 08:00	11/16/2021 15:00		0%	
PHS4.B2.P5.56	Remaining Timber Pile removal	11/23/2021 08:00	02/22/2022 13:00		0%	
DWRR1-BW118.6.6.B.P5.1.1.2.2	Compliance Berth 2 South Outer Fender & Breasting Point	03/16/2019 15:30	07/07/2020 14:00			
PHS4.B2.P5.57	SOFBP - Remove Existing Timber Fender System, incl. 5 piles/35LF waler	03/16/2019 15:30	03/18/2019 10:30		0%	
PHS4.B2.P5.59	SOFBP - Install Temporary Rope Guard	03/18/2019 10:30	03/20/2019 10:30		0%	
PHS4.B2.P5.60	SOFBP - Demo Concrete Curb & Deck	03/26/2019 08:00	06/04/2019 10:00		0%	
PHS4.B2.P5.60A	SOFBP - Demo Concrete Curb & Deck (Unsound Concrete , 100%Allowance)	06/04/2019 10:00	08/13/2019 12:00		0%	
PHS4.B2.P5.61	SOFBP - Drive PC/PS Concrete Piles - 10 ea. X 24" Sq.	10/08/2019 11:00	10/16/2019 14:30		0%	
PHS4.B2.P5.62	SOFBP - Install Reinforcing Steel and Setting forms	10/22/2019 08:00	02/18/2020 10:00		0%	
PHS4.B2.P5.62A	SOFBP - Install Reinforcing Steel and Setting forms (Unsound Concrete 100% Allowance)	02/18/2020 10:00	06/09/2020 12:00		0%	
PHS4.B2.P5.63	SOFBP - CIP Concrete	06/09/2020 13:00	06/14/2020 15:30		0%	
PHS4.B2.P5.63A	SOFBP - CIP Concrete (Unsound Concrete 100% Allowance)	06/14/2020 15:30	06/19/2020 18:00		0%	
PHS4.B2.P5.64	SOFBP - Furnish & Install Bull Rail	06/23/2020 08:00	06/23/2020 13:00		0%	
PHS4.B2.P5.65	SOFBP - Remove Temporary Rope Guard	06/23/2020 13:00	07/07/2020 14:00		0%	
DWRR1-BW118.6.6.B.P5.1.1.2.3	Compliance Berth 2 South Inner Fender & Breasting Point	03/18/2019 10:30	09/15/2020 13:30			
PHS4.B2.P5.67	SIFBP - Remove Existing Timber Fender System, incl. 5 piles/35LF waler	03/18/2019 10:30	03/19/2019 17:00		0%	
PHS4.B2.P5.68A	SIFBP - Place Concrete Closure Walls	03/21/2019 08:00	04/16/2019 16:00		0%	
PHS4.B2.P5.69	SIFBP - Install Temporary Rope Guard	04/16/2019 16:00	04/18/2019 16:00		0%	
PHS4.B2.P5.70	SIFBP - Demo Concrete Curb & Deck	04/23/2019 08:00	07/09/2019 10:00		0%	
PHS4.B2.P5.70A	SIFBP - Demo Concrete Curb & Deck (Unsound Concrete 100% Allowance)	07/09/2019 10:00	09/24/2019 12:00		0%	
PHS4.B2.P5.71	SIFBP - Remove Concrete Batter Piles - 2 ea	09/24/2019 12:00	10/01/2019 14:00		0%	
PHS4.B2.P5.72	SIFBP - Drive PC/PS Concrete Piles - 10 ea. X 24" Sq.	10/08/2019 11:00	10/18/2019 15:00		0%	
PHS4.B2.P5.73	SIFBP - Install Reinforcing Steel and Setting forms	10/22/2019 08:00	02/18/2020 10:00		0%	
PHS4.B2.P5.73A	SIFBP - Install Reinforcing Steel and Setting forms ( Unsound Concrete 100% Allowance)	02/18/2020 10:00	06/09/2020 12:00		0%	
PHS4.B2.P5.74	SIFBP - CIP Concrete	08/18/2020 07:00	08/23/2020 09:30		0%	
PHS4.B2.P5.74A	SIFBP - CIP Concrete (Unsound Concrete 100% Allowance)	08/23/2020 09:30	08/28/2020 12:00		0%	
PHS4.B2.P5.75	SIFBP - Furnish & Install Bull Rail	09/01/2020 08:00	09/01/2020 13:00		0%	
PHS4.B2.P5.76	SIFBP - Remove Temporary Rope Guard	09/01/2020 13:00	09/15/2020 13:30		0%	
DWRR1-BW118.6.6.B.P5.1.1.2.4	Compliance Berth 2 North Inner Fender & Breasting Point	03/19/2019 17:00	09/29/2020 12:30			
PHS4.B2.P5.78	NIFBP - Remove Existing Timber Fender System, incl. 5 piles/35LF waler	03/19/2019 17:00	03/21/2019 11:30		0%	
PHS4.B2.P5.80	NIFBP - Install Temporary Rope Guard	03/21/2019 11:30	03/26/2019 11:30		0%	
PHS4.B2.P5.79A	NIFBP - Place Concrete Closure Walls	03/21/2019 11:30	04/18/2019 15:30		0%	
PHS4.B2.P5.81	NIFBP - Demo Concrete Curb & Deck	04/23/2019 08:00	07/09/2019 13:30		0%	
PHS4.B2.P5.81A	NIFBP - Demo Concrete Curb & Deck (Unsound Concrete 100% Allowance)	07/09/2019 13:30	10/01/2019 11:00		0%	
PHS4.B2.P5.82	NIFBP - Remove Concrete Batter Pile - 1 ea	10/01/2019 11:00	10/05/2019 10:30		0%	

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Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete
PHS4.B2.P5.83	NIFBP - Drive PC/PS Concrete Piles - 9 ea. X 24" Sq.	10/08/2019 11:00	10/16/2019 08:30		0%
PHS4.B2.P5.84	NIFBP - Install Reinforcing Steel and Setting forms	10/22/2019 08:00	02/18/2020 10:00		0%
PHS4.B2.P5.84A	NIFBP - Install Reinforcing Steel and Setting forms (Unsound Concrete 100% Allowance)	02/18/2020 10:00	06/09/2020 12:00		0%
PHS4.B2.P5.85	NIFBP - CIP Concrete	08/18/2020 07:00	08/23/2020 09:30		0%
PHS4.B2.P5.85A	NIFBP - CIP Concrete (Unsound Concrete 100% Allowance)	08/23/2020 09:30	08/28/2020 12:00		0%
PHS4.B2.P5.86	NIFBP - Furnish & Install Bull Rail	09/01/2020 08:00	09/01/2020 13:00		0%
PHS4.B2.P5.87	NIFBP - Install New Mooring Hook	09/01/2020 13:00	09/15/2020 11:30		0%
PHS4.B2.P5.88	NIFBP - Remove Temporary Rope Guard	09/15/2020 11:30	09/29/2020 12:30		0%
DWRRRI-BW118.6.6.B.P5.1.1.2.5	Compliance Berth 2 North Outer Fender & Breasting Point	03/21/2019 11:30	07/07/2020 11:00		
PHS4.B2.P5.90	NOFBP - Remove Existing Timber Fender System, incl. 5 piles/35LF waler	03/21/2019 11:30	03/22/2019 18:00		0%
PHS4.B2.P5.91A	NOFBP - Place Concrete Closure Walls	03/26/2019 08:00	04/18/2019 16:00		0%
PHS4.B2.P5.92	NOFBP - Install Temporary Rope Guard	04/18/2019 16:00	04/23/2019 16:00		0%
PHS4.B2.P5.93	NOFBP - Demo Concrete Curb & Deck	04/30/2019 08:00	07/16/2019 13:30		0%
PHS4.B2.P5.93A	NOFBP - Demo Concrete Curb & Deck (Unsound Concrete 100% Allowance)	07/16/2019 13:30	10/08/2019 11:00		0%
PHS4.B2.P5.94	NOFBP - Drive PC/PS Concrete Piles - 10 ea. X 24" Sq.	10/08/2019 11:00	10/19/2019 13:00		0%
PHS4.B2.P5.95	NOFBP - Install Reinforcing Steel and Setting forms	10/22/2019 08:00	01/21/2020 09:30		0%
PHS4.B2.P5.95A	NOFBP - Install Reinforcing Steel and Setting forms (Unsound Concrete 100% Allowance)	01/21/2020 09:30	04/14/2020 11:00		0%
PHS4.B2.P5.96	NOFBP - CIP Concrete	04/14/2020 11:00	04/19/2020 14:30		0%
PHS4.B2.P5.96A	NOFBP - CIP Concrete (Unsound Concrete 100% Allowance)	06/09/2020 13:00	06/14/2020 15:30		0%
PHS4.B2.P5.97	NOFBP - Furnish & Install Bull Rail	06/16/2020 08:00	06/23/2020 10:00		0%
PHS4.B2.P5.98	NOFBP - Remove Temporary Rope Guard	06/23/2020 10:00	07/07/2020 11:00		0%
DWRRRI-BW118.6.6.B.P13	Compliance B4 Loading Platform Retrofit (P13)	05/08/2018 16:00 A	04/12/2022 12:00		
DWRRRI-BW118.6.6.B.P13.2	Compliance B4 Loading Platform Retrofit (P13) Milestones	10/22/2018 18:00	03/31/2022 18:00		
MS.B4.P13.332	PKG 13 B4 Loading Platform Retrofit - Piping Complete		10/22/2018 18:00		0%
SMS.B4.P13.1400	PKG 13 B4 Loading Platform Retrofit -START Install 60" Steel Pipe Piles	06/01/2020 08:00			0%
SMS.B4.P13.330	PKG 13 B4 Loading Platform Retrofit - Construction Complete		03/31/2022 18:00		0%
DWRRRI-BW118.6.6.B.P13.3	Compliance B4 Loading Platform Retrofit (P13) Procurement	10/24/2018 07:00	05/09/2019 18:00		
PHS4.B4.P13.130	PKG 13 B4 Loading Platform Retrofit - PEC Issue PO Composite Piles	10/24/2018 07:00	10/24/2018 18:00		0%
PHS4.B4.P13.120	PKG 13 B4 Loading Platform Retrofit - PEC Issue PO 60: Steel Piles (TARGET NOV 2018)	10/24/2018 07:00	10/24/2018 18:00		0%
PHS4.B4.P13.110	PKG 13 B4 Loading Platform Retrofit - Fabrication & Delivery of composite piles - B4 LP retrofit	10/25/2018 07:00	12/20/2018 18:00		0%
PHS4.B4.P13.100	PKG 13 B4 Loading Platform Retrofit - Fabrication & Delivery of 60" Steel piles - B4 LP retrofit	10/25/2018 07:00	05/09/2019 18:00		0%
DWRRRI-BW118.6.6.B.P13.1	Compliance B4 Loading Platform Retrofit (P13) Construction	05/08/2018 16:00 A	04/12/2022 12:00		
PHS4.B4.P13N.331	PKG 13 B4 Loading Platform Retrofit - Shipping/ Schedule Delays	07/19/2021 07:00	03/31/2022 18:00		0%
PHS4.B4.P13N.332	PKG 13 B4 Loading Platform Retrofit - Demobilization	04/04/2022 07:00	04/12/2022 12:00		0%
DWRRRI-BW118.6.6.B.P13.1.1	Berth 4 Pkg 13 Mechanical (HARDER)	06/04/2018 07:00 A	11/02/2018 13:00		
DWRRRI-BW118.6.6.B.P13.1.1.2	Natural Gas Line	09/13/2018 13:12 A	10/08/2018 07:00		
PHS4.B4.NG.1500	Install new supports	09/13/2018 13:12 A	10/08/2018 07:00		90%

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Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete
DWRR1-BW118.6.6.B.P13.1.1.4	Process Waste Line	06/04/2018 07:00 A	10/22/2018 18:00		
PHS4.B4.PW.1200	NDE	06/04/2018 07:00 A	10/08/2018 10:00		90%
PHS4.B4.PW.1900	Install new PW line piping and perform field welds	06/07/2018 07:00 A	10/12/2018 18:00		90%
PHS4.B4.PW.2000	NDE welds	06/07/2018 07:00 A	10/12/2018 18:00		90%
PHS4.B4.PW.1500	Install new supports	07/16/2018 09:24 A	10/08/2018 14:00		90%
PHS4.B4.PW.1600	Install Process Waste Line perform field welds	08/06/2018 07:00 A	10/09/2018 10:00		90%
PHS4.B4.PW.4200	OP's support to isolate discharge systemfor TP430 tie in	10/08/2018 06:00	10/11/2018 10:00		0%
PHS4.B4.PW.1700	Install 2" sump vent piping (TARGET FINISH 8/14)	10/09/2018 10:00	10/12/2018 14:00		0%
PHS4.B4.PW.1800	NDE welds	10/09/2018 10:00	10/12/2018 14:00		0%
PHS4.B4.PW.4300	OP's permit to perform tie ins TP430	10/11/2018 10:00	10/11/2018 11:00		0%
PHS4.B4.PW.4400	Perform discharge line tie in TP430	10/11/2018 11:00	10/12/2018 07:00		0%
PHS4.B4.PW.4500	Remove temporary waste line bypass and tie it into new sump	10/12/2018 07:00	10/12/2018 15:00		0%
PHS4.B4.PW.4600	NDE RT welds on TP430 and waste line piping (TARGET 8/3)	10/12/2018 15:00	10/12/2018 17:00		0%
PHS4.B4.PW.2100	Field setup and prep for PW line demo	10/12/2018 17:00	10/14/2018 13:00		0%
PHS4.B4.PW.4700	Inspection by Chevron Inspector	10/13/2018 06:00	10/15/2018 12:00		0%
PHS4.B4.PW.4800	Hydrotest sump discharge system after tie in	10/15/2018 12:00	10/15/2018 13:00		0%
PHS4.B4.PW.4900	OP's support to de-blind discharge system (TARGET 8/11)	10/17/2018 08:00	10/19/2018 14:00		0%
PHS4.B4.PW.5000	Return to OP's discharge system	10/19/2018 14:00	10/22/2018 18:00		0%
DWRR1-BW118.6.6.B.P13.1.1.5	Waste Vent Line	10/17/2018 08:00	10/21/2018 17:30		
PHS4.B4.P13N.256	Install Waste Vent Line	10/17/2018 08:00	10/21/2018 17:30		0%
DWRR1-BW118.6.6.B.P13.1.1.6	Hydrotesting	10/15/2018 12:00	11/02/2018 13:00		
PHS4.B4.P13N.260	Hydro Sump discharge line	10/15/2018 12:00	10/17/2018 08:00		0%
PHS4.B4.P13N.261	PSSR New Sump	11/01/2018 15:00	11/02/2018 13:00		0%
DWRR1-BW118.6.6.B.P13.1.2	Civil Structural (PEC)	05/08/2018 16:00 A	07/16/2021 14:00		
DWRR1-BW118.6.6.B.P13.1.2.3	Pre- Work Civil Structural	05/08/2018 16:00 A	06/10/2019 09:00		
PHS4.B4.P13N.263	Build Scaffold to access Pipe Supports (Temporary Pipe Supports)	05/08/2018 16:00 A	10/09/2018 12:00		50%
PHS4.B4.P13N.266	Remove/Replace existing Pipe Supports	10/08/2018 07:00	10/17/2018 08:00		0%
PHS4.B4.P13N.267	Install new Sump	10/09/2018 13:00	10/11/2018 12:00		0%
PHS4.B4.P13N.268	Remove remaining concrete deck and Existing Sump	11/05/2018 08:00	12/19/2018 09:00		0%
PHS4.B4.P13N.268A	Remove remaining concrete deck and Existing Sump ( Unsound Concrete 20% Allowance)	12/19/2018 09:00	12/26/2018 14:00		0%
PHS4.B4.P13N.269	Remove/ Replace existing Guardrail and Install New grating Platform	12/26/2018 14:00	02/06/2019 15:00		0%
PHS4.B4.P13N.270	Remove existing PC/PS Concrete piling	06/01/2019 08:00	06/10/2019 09:00		0%
DWRR1-BW118.6.6.B.P13.1.2.1	Install 60' Steel Pipe Piles	06/01/2019 08:00	11/16/2020 12:00		
PHS4.B4.P13N.273	Install Template piles for both North and South Caps	06/01/2019 08:00	06/12/2019 16:00		0%
PHS4.B4.P13N.274	Set and Weld template frames for North and South Caps	06/17/2019 08:00	09/30/2019 10:30		0%
DWRR1-BW118.6.6.B.P13.1.2.1.1	Drive Piles South Cap	09/30/2019 10:30	07/24/2020 10:00		
PHS4.B4.P13N.276	Set Pile guide for NW Pile	09/30/2019 10:30	10/04/2019 08:30		0%

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Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete
PHS4.B4.P13N.277	Stab drive and cut NW Pile	06/01/2020 08:00	06/02/2020 15:00		0%
PHS4.B4.P13N.278	Set Pile guide for SW Pile	06/03/2020 08:00	06/17/2020 10:00		0%
PHS4.B4.P13N.279	Stab drive and cut SW Pile	06/17/2020 10:00	06/19/2020 09:00		0%
PHS4.B4.P13N.280	Set Pile guide for SE Pile	06/22/2020 08:00	07/06/2020 10:00		0%
PHS4.B4.P13N.281	Stab drive and cut SE Pile	07/06/2020 10:00	07/08/2020 09:00		0%
PHS4.B4.P13N.282	Set Pile guide for NE Pile	07/08/2020 09:00	07/22/2020 11:00		0%
PHS4.B4.P13N.283	Stab drive and cut NE Pile	07/22/2020 11:00	07/24/2020 10:00		0%
DWRRRI-BW118.6.6.B.P13.1.2.1.2	Drive Piles North Cap	07/27/2020 08:00	10/07/2020 09:00		
PHS4.B4.P13N.285	Set Pile guide for NW Pile	07/27/2020 08:00	08/10/2020 10:00		0%
PHS4.B4.P13N.286	Stab drive and cut NW Pile	08/10/2020 10:00	08/12/2020 09:00		0%
PHS4.B4.P13N.287	Set Pile guide for SW Pile	08/12/2020 09:00	08/26/2020 11:00		0%
PHS4.B4.P13N.288	Stab drive and cut SW Pile	08/26/2020 11:00	08/28/2020 10:00		0%
PHS4.B4.P13N.289	Set Pile guide for SE Pile	08/31/2020 08:00	09/16/2020 10:00		0%
PHS4.B4.P13N.290	Stab drive and cut SE Pile	09/16/2020 10:00	09/18/2020 09:00		0%
PHS4.B4.P13N.291	Set Pile guide for NE Pile	09/21/2020 08:00	10/05/2020 10:00		0%
PHS4.B4.P13N.292	Stab drive and cut NE Pile	10/05/2020 10:00	10/07/2020 09:00		0%
DWRRRI-BW118.6.6.B.P13.1.2.1.3	Weld Piles	07/27/2020 08:00	11/16/2020 12:00		
DWRRRI-BW118.6.6.B.P13.1.2.1.3.1	South Cap	07/27/2020 08:00	09/02/2020 11:00		
PHS4.B4.P13N.295	Weld Piles NW Pile Cap	07/27/2020 08:00	08/03/2020 14:00		0%
PHS4.B4.P13N.296	Weld Piles SW Pile Cap	08/03/2020 14:00	08/12/2020 13:00		0%
PHS4.B4.P13N.297	Weld Piles SE Pile Cap	08/12/2020 13:00	08/24/2020 12:00		0%
PHS4.B4.P13N.298	Weld Piles NE Pile Cap	08/24/2020 12:00	09/02/2020 11:00		0%
DWRRRI-BW118.6.6.B.P13.1.2.1.3.2	North Cap	10/07/2020 09:00	11/16/2020 12:00		
PHS4.B4.P13N.300	Weld Piles NW Pile Cap	10/07/2020 09:00	10/14/2020 15:00		0%
PHS4.B4.P13N.301	Weld Piles SW Pile Cap	10/19/2020 08:00	10/26/2020 14:00		0%
PHS4.B4.P13N.302	Weld Piles SE Pile Cap	10/26/2020 14:00	11/04/2020 13:00		0%
PHS4.B4.P13N.303	Weld Piles NE Pile Cap	11/04/2020 13:00	11/16/2020 12:00		0%
DWRRRI-BW118.6.6.B.P13.1.2.2	CIP Concrete	08/23/2018 09:00 A	05/11/2021 12:00		
DWRRRI-BW118.6.6.B.P13.1.2.2.1	Pour Seismic Caps	11/16/2020 13:00	03/17/2021 14:30		
PHS4.B4.P13N.306	Form Soffits	11/16/2020 13:00	12/22/2020 12:00		0%
PHS4.B4.P13N.307	Fit and Install Rebar (includes coring and high strength rod installation)	12/22/2020 13:00	01/14/2021 18:00		0%
PHS4.B4.P13N.308	Form lower half of seismic caps	01/18/2021 07:00	01/25/2021 09:00		0%
PHS4.B4.P13N.309	Install Slick Line	01/25/2021 09:00	01/28/2021 09:00		0%
PHS4.B4.P13N.310	Pour lower half of seismic caps	01/28/2021 09:00	01/31/2021 09:00		0%
PHS4.B4.P13N.311	Prep CJ and form upper half of seismic caps	02/01/2021 07:00	02/04/2021 18:00		0%
PHS4.B4.P13N.312	Pour upper half seismic caps	02/05/2021 07:00	02/07/2021 18:00		0%
PHS4.B4.P13N.313	Remove Slick Line	02/08/2021 07:00	02/09/2021 18:00		0%

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Activity ID	Activity Name	Start	Finish	Activity	Activity % Complete	
PHS4.B4.P13N.314	Strip forms and S&P	02/10/2021 07:00	02/25/2021 09:00		0%	
PHS4.B4.P13N.315	Remove Pile Template Frame	02/25/2021 09:00	03/08/2021 12:00		0%	
PHS4.B4.P13N.316	Remove Template Piles	03/08/2021 12:00	03/17/2021 14:30		0%	
DWRRRI-BW118.6.6.B.P13.1.2.2.2	Pour Deck Concrete	03/17/2021 14:30	05/11/2021 12:00			
PHS4.B4.P13N.318	Bush , Install Rebar, form soffitt, and sides	03/17/2021 14:30	03/29/2021 16:30		0%	
PHS4.B4.P13N.319	Pour Deck Concrete	03/29/2021 16:30	03/31/2021 16:30		0%	
PHS4.B4.P13N.320	Strip forms and S&P	03/31/2021 16:30	04/12/2021 07:30		0%	
PHS4.B4.P13N.320A	Unsound Concrete 20% Allowance x Bush, Pour, Strip Hours.	04/12/2021 07:30	04/14/2021 14:30		0%	
PHS4.B4.P13N.321	Install 2" top plates on siesmic caps	04/14/2021 14:30	04/20/2021 17:30		0%	
PHS4.B4.P13N.322	Grout 2" top plates	04/21/2021 07:00	05/11/2021 12:00		0%	
DWRRRI-BW118.6.6.B.P13.1.2.2.3	Bolster Existing Concrete beams	08/23/2018 09:00 A	06/11/2019 14:00			
PHS4.B4.P13N.324	Bush surface	08/23/2018 09:00 A	03/04/2019 16:00		5%	
PHS4.B4.P13N.325	Start to core drill, Install High Strength rod , drill and install rebar dowels	08/23/2018 13:00 A	05/07/2019 16:30		5%	
PHS4.B4.P13N.326	Form soffitt and sides	05/07/2019 16:30	05/22/2019 16:30		0%	
PHS4.B4.P13N.327	Pour Concrete	05/29/2019 08:00	06/05/2019 14:00		0%	
PHS4.B4.P13N.328	Strip forms and Sack and Patch	06/05/2019 14:00	06/11/2019 14:00		0%	
DWRRRI-BW118.6.6.B.P13.1.2.4	Post Pile Caps and Floating Work	10/08/2018 08:00	07/16/2021 14:00			
PHS4.B4.P13N.271	Equipment Foundation retrofit ( Vapor Crane)	10/08/2018 08:00	10/31/2018 09:00		0%	
PHS4.B4.P13N.329	PKG 13 B4 Loading Platform Retrofit - Install New Hand Rail	05/11/2021 12:00	06/02/2021 17:00		0%	
PHS4.B4.P13N.330	PKG 13 B4 Loading Platform Retrofit - Install Composite Pile Cluster Dolphins	06/03/2021 08:00	07/16/2021 14:00		0%	
DWRRRI-BW118.6.6.B.P13.1.3	Electrical (CCE)	05/30/2018 07:00 A	05/20/2021 12:00			
PHS4.B4.P13N.229	Install LEL/ H2S Detectors	05/30/2018 07:00 A	10/23/2018 08:00		50%	
PHS4.B4.P13N.239	Install conduit receptacles and seal tite to the sump	09/10/2018 08:30 A	11/01/2018 15:00		85%	
PHS4.B4.P13N.232	New feeder conduit for sump	09/17/2018 07:00 A	10/31/2018 10:30		25%	
PHS4.B4.P13N.230	Disconnect existing light pole and store securely	10/22/2018 07:00	10/24/2018 18:00		0%	
PHS4.B4.P13N.240	Install light pole	05/11/2021 13:00	05/12/2021 12:00		0%	
PHS4.B4.P13N.231	Change out 8 fixtures on light pole	05/12/2021 13:00	05/20/2021 12:00		0%	
DWRRRI-BW118.6.7	Compliance Phase 5 - Operate and Evaluate	02/07/2023 13:00	04/25/2023 12:00			
WF1045	Distribute Required Manuals/Technical Materials	02/07/2023 13:00	02/14/2023 12:00		0%	
WF1071	Formally Turn-Over Drawings to Chevron	02/14/2023 13:00	03/21/2023 12:00		0%	
WF1072	Settle Assets - Close Out SAP	03/21/2023 13:00	04/04/2023 12:00		0%	
WF1073	Schedule Look Back	04/04/2023 13:00	04/11/2023 12:00		0%	
WF1075	Capture Lessons Learned	04/11/2023 13:00	04/25/2023 12:00		0%	



November 6, 2019

Clerk's Office  
California Air Resources Board (CARB)  
1001 "I" Street  
Sacramento, CA 95814

Subj: Comments on Proposed Control Measure for Ocean-Going Vessels at Berth

To CARB Staff:

I am writing to provide commentary on the proposed timeline for the design, permitting, construction, and testing of an At-Berth Shore Based Emission Control Program for tankers at California Ports. As an Oakland, CA resident and business owner, I share CARB's desire to implement regulations that achieve real world air quality goals.

My goal in writing is to share my experience as a California marine contractor – specifically as it applies to the lengthy project timelines of most marine projects in California and the reality of how difficult it is to move quickly through the phases of marine work. Marine projects routinely face regulatory hurdles and engineering constraints not found in land-based construction. These hurdles and constraints translate into long program schedules. I believe the timeline being considered for the proposed Control Measure is unrealistically short and doesn't consider the unique nature of designing, entitling, and constructing over-water structures and facilities.

As background, I am the President and Principle owner of Power Engineering Construction Co. We are a marine contractor based in Alameda, CA. The company has been in business for 33 years and I've been with the company for 27 years. Our business focuses on building and repairing in-water structures. Our slogan is "Engineering Construction near, on, and under the water". We routinely get involved in up-front preconstruction, design, and entitlement of marine structures and systems as part of the services we offer our clients. Our customer base is diverse and includes most major oil companies, a variety of municipal clients including SFPUC, the Port of San Francisco, WETA, and a range of private business owners working along the waterfront. For a small snapshot of projects we've completed throughout California, the attached graphic (**Exhibit A**) shows our recent San Francisco waterfront projects.

The range and breadth of our marine construction experience affords a unique perspective in how long it takes for a successful project to go from concept to operation. In general, we advise clients to expect a full project timeline of 8-10 years for a standard over-water marine facility. This timeline includes work from concept, through entitlement, to construction and operation.

One can quibble with the durations of individual tasks including site studies, engineering, the CEQA process, contracting, etc. However, empirically, all but the most basic marine construction projects prove to track into an 8 to 10-year timeline. The attached spreadsheet (**Exhibit B**) shows three example projects *outside* of the marine oil terminal industry that

30-26



support this assertion. Each of these projects was considered publicly desirable, faced little opposition, and each was managed by a very motivated team. Regardless, each example project followed a decadal life cycle due to the complexity of regulatory review, the challenges of over-water design, and the limitations and work windows imposed during construction.

While the three example projects demonstrate only a small sample size, these projects provide similarities to the work required to implement an At-Berth Emission Capture program. In a sense, the example projects provide a lower bound for the anticipated project duration as none was completed in an active marine terminal. An active marine fuel terminal imposes additional safety and scheduling constraints that generally result in longer construction durations.

Also, the three projects selected as examples do not consider one key element of the proposed new regulation: issues surrounding the technical feasibility of an At-Berth Shore Based Emission Control System. The Emission Capture equipment and supporting machinery will add to the overall project timeline through both feasibility testing and extended equipment procurement. The attached spreadsheet (**Exhibit C**) shows a sampling of recent heavy over-water equipment purchases (cranes and fuel loading arms) and demonstrates the additional timeline that may be required. One can assume the required emission control equipment, or the expansion of required electrical infrastructure, will follow a similar (if not longer) procurement cycle to these example purchases.

I believe the Proposed Emission Control Measure projects at California Marine Oil Terminals will likely take more than 10 years to design, permit, and construct when one considers the added on-going operational and safety issues. I ask the CARB staff to consider proposing on a minimum 10-year timeline for design, entitlement, and construction of an At-Berth Emission Control program in California Marine Terminals. This timeline should begin once a feasibility study is completed and appropriate emission control technology is proven to be readily available.

30-26  
cont.

Should you have any questions, please contact me at 415-559-0097.

Sincerely;

**Power Engineering Construction Co.**

A handwritten signature in blue ink, appearing to read "DMik", is written over the company name.

David Mik  
President

Enclosed:

Exhibit A – Power Engineering Construction Co. example projects.

Exhibit B - examples of three relevant marine project timelines.

Exhibit C - examples of equipment procurement and installation timelines.



Ferry Building Pier Repairs  
WETA Downtown SF Ferry Terminal Expansion  
Pier 1 Seismic and Structural Upgrade  
Pier 1.5 Water Taxi Dock Design-Build  
Pier 3 Wharf Repairs  
Pier 5 Substructure Strengthening  
Pier 7 Wharf Repairs  
Pier 9 Substructure Repairs  
Pier 15 Water Taxi Dock Design-Build  
Pier 15 & 17 Complete Pier Reconstruction  
Pier 19 Dive Inspection & Repairs  
Pier 23 Dive Inspection & Repairs

Pier 29 Wharf Repairs

Pier 29 & 31.5 Substructure Strengthening

Pier 31 Dive Inspection & Pile Testing

Pier 39 Timber Deck Replacement

Pier 43 Ferry Arch Foundation Improvements

Alcatraz Dive Inspection

Over water Deck Extension to Alioto's

Rock Rip Rap Slope Improvements

China Basin Wharf Reconstruction

South Beach Harbor Marina Float Reconstruction

Pier 38 Below Deck Inspection

Pier 30-32 Inspection & Substructure Repairs

Pier 26 & 28 Inspection & Repairs

Pier 22.5 Emergency Pile Repairs

Pier 22.5 New Floating Fireboat Station 35  
(in progress)

Pier 52 Small Craft Dock Installation

Pier 50 Substructure Repairs

Pier 48 Substructure Repairs

Pier 80 Mooring Install

Pier 70 Pile Load Testing

SFPUC Southwest Ocean Outfall End Gate Replacement

WETA South San Francisco Ferry Terminal Design-Build

Oyster Point Marina Floating Breakwater

Oyster Point Marina Concrete Sheet Pile Wall

PG&E Hunters Point Tunnel Closures

Hyde Street Pier & Piling Repairs

Hyde Street Pier Hercules Berthing Dock

Fort Mason Rock Rip Rap Slope Improvements

# WHERE WE'VE WORKED SAN FRANCISCO WATERFRONT USA

Pier 1 Reconstruction

SF Marina Breakwater Seawall Repair

Chrissy Field Outfall Replacement

Presidio Pier Inspection

SFPUC Baker Street Outfall Repair



**Heavy Equipment**

**Procurement & Installation Duration**

**Large Container Cranes (source, Shanghai Zhenhua Heavy Industries/ZPMC/Liftech Consultants, Inc.)**

Duration for Standard Cranes:

Average	Min	Max	
33.0	30.0	36.0	

*(for non-standard, add "several quarters" to duration)*

	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Procurement/Vendor Selection	Yellow	Yellow										
Design			Yellow	Yellow								
Fabrication					Yellow	Yellow	Yellow	Yellow				
Delivery									Yellow			
Installation & Testing										Yellow		

*(install duration is for one berth)*

**Conventional Dock Mounted Marine Hydraulic Cranes (source, Rapp Marine NW, LLC - see WETA Central Bay Maintenance Terminal, Chevron RLW Berth 2, etc.)**

Duration for Hydraulic Cranes:

Average	Min	Max	
17.0	15.0	19.0	

	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Procurement/Vendor Selection		Yellow										
Design			Yellow	Yellow								
Fabrication				Yellow	Yellow	Yellow						
Delivery							Yellow					
Installation & Testing							Yellow					

*(install duration is for one berth)*

**Rotary or Dual Counterweight Fuel Loading Arms (source, FMC/PEC - see Chevron RLW Loading Arm Replacement Project)**

Duration for Fuel Loading Arms:

Average	Min	Max	
23.5	22.0	25.0	

	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Procurement/Vendor Selection	Yellow	Yellow										
Design			Yellow	Yellow								
Fabrication					Yellow	Yellow	Yellow					
Delivery							Yellow					
Installation & Testing								Yellow				

*(install duration is for one berth)*

# **ATTACHMENT 2**



## fact sheet

# the importance of the use of inert gas systems

The details contained in the OCIMF paper published in 2017 entitled “Inert Gas Systems – The use of inert gas for the carriage of flammable oil cargoes” are summarized below in an effort to highlight the critical nature of inert gas systems on tankers. The inert gas in these systems is generated and delivered from the exhaust gas from the ships boilers.

Source: <https://www.ocimf.org/media/61325/Inert-Gas-Systems-the-use-of-inert-gas-for-the-carriage-of-flammable-oil-cargoes.pdf>

The safety benefits of inert gas in cargo tanks are well recognized throughout the tanker industry. Over the years many lives have been lost, or serious injuries sustained, due to incidents involving fires and explosions on non-inerted tankers.

The enhanced safety associated with the use of inert gas systems outweighs concerns such as increased port turn-around time and issues associated with cargo segregation and product quality.

The International Convention for the Safety of Life at Sea (SOLAS 1974), as amended, requires that inert gas systems be capable of delivering inert gas with an oxygen content in the inert gas main of not more than 5% by volume. By maintaining a positive pressure in the cargo tanks at all times, with an atmosphere not having an oxygen content greater than 8% by volume, the tank atmosphere is rendered non-flammable.

Even with this requirement in place, incidents continue to occur.

In 2006, an inter-industry working group, formed to investigate fires and explosions in cargo areas on oil and chemical tankers, presented its findings to the IMO Maritime Safety Committee. The group examined 35 incidents that had occurred over the previous 25 years and the report noted that none of the incidents occurred during the use or operation of inert gas.

OCIMF has undertaken a further study of incidents involving fires and explosions in the cargo area on tankers during the period 2004–2015 where maintaining the cargo tank in an inert condition is likely to have prevented the incident.

The data, which was collected from public and member incident databases, indicated that a total of 15 incidents involving fires and explosions occurred in the cargo area over the 12-year time frame. From the data reviewed by OCIMF, these events resulted in 20 fatalities and a further 30 people missing, presumed dead.

Hydrocarbon gas normally carried in petroleum tankers cannot burn in an atmosphere containing less than approximately 11% oxygen by volume. Accordingly, one way to provide protection against fires or explosions in the vapor space of cargo tanks is to keep the oxygen level below that figure. This is usually achieved by using a fixed piping arrangement to blow inert gas into each cargo tank in order to reduce the oxygen content and render the tank atmosphere non-flammable.

The current traditional tanker design makes use of the exhaust gas from the boilers as inert gas in the cargo tanks. From the data that was studied, uninterrupted inert gas supply is critical to maintain safe conditions and avoid serious incidents, including explosion.

Any change to the design of the exhaust from a boiler that is supplying inert gas requires careful engineering review, design, and implementation of modifications to ensure that the change will not impact the reliable supply of inert gas or create a dangerous operating condition in the boiler.

According to boiler manufacturers, if an exhaust capture system were considered it is likely that modifications to the boilers forced draft systems would be required and integration of controls might be required to meet IMO and Classification requirements. Complicating this process is the fact that ships are not fitted with the same boiler installations creating the potential for thousands of different installations to consider.

**Chris Brown**

Manager - Regulatory Affairs & Advocacy

[broc@chevron.com](mailto:broc@chevron.com)

**Chevron Shipping**

Chevron Shipping Company LLC

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San Ramon, CA 94583

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# Inert gas systems

The use of inert gas for the carriage of flammable  
oil cargoes

(First edition 2017)



Issued by the

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**First edition 2017**

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**The Oil Companies International Marine Forum (OCIMF)**

is a voluntary association of oil companies having an interest in the shipment and terminalling of crude oil and oil products. OCIMF is organised to represent its membership before, and consult with, the International Maritime Organization (IMO) and other government bodies on matters relating to the shipment and terminalling of crude oil and oil products, including marine pollution and safety.

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## **Abbreviations and glossary**

The following are agreed definitions for terms used within this paper:

### **CDI**

Chemical Distribution Institute

### **Deadweight (DWT)**

The carrying capacity of a ship, including cargo, bunkers and stores, expressed in metric tonnes. It can be given for any draught, but here is used to indicate summer deadweight at summer draught.

### **Guidance**

Provision of advice or information by OCIMF.

### **IMO**

International Maritime Organization

### **Inert condition**

A condition in which the oxygen content throughout the atmosphere of a tank has been reduced to 8% or less by volume by the addition of inert gas.

### **Inert gas**

A gas or a mixture of gases, such as flue gas, containing insufficient oxygen to support the combustion of hydrocarbons.

### **Inert gas plant**

All equipment fitted to supply, cool, clean, pressurise, monitor and control the delivery of inert gas to the cargo tank systems.

### **Inert Gas System (IGS)**

An inert gas plant and inert gas distribution system together with means for preventing backflow of cargo gases to the machinery spaces, fixed and portable measuring instruments and control devices.

### **SOLAS**

International Convention for the Safety of Life at Sea

## **Bibliography**

### **CDI**

*CDI Best Practice Recommendations Regarding the use of Nitrogen*

The publication provides recommended procedures for the safe handling of nitrogen on chemical tankers.

### **ICS**

*Tanker Safety Guide (Chemicals)*

Chapter 5 contains useful information on the requirements for inert gas and options for sourcing including Nitrogen generators.

### **IMO**

*International Convention for the Safety of Life at Sea 1974, as amended (SOLAS)*

Chapter II-2, Part B Prevention of Fire and Explosion contains carriage and operational requirements for inert gas systems.

*International Code for Fire Safety Systems (FSS Code)*

Chapter 15 *Inert Gas Systems* details the specifications for inert gas systems as required by SOLAS Chapter II-2.

*Inert Gas Systems*

Comprehensive guidelines containing details of the design and operation of inert gas systems together with legislative requirements.

*Study on incidents of explosions on chemical and product tankers (IMO MSC 81/8/1)*

This document summarises the activities and conclusions of the inter-industry working group formed to investigate fires and explosions on chemical and product tankers.

### **OCIMF/ICS/IAPH**

*The International Safety Guide for Oil Tankers and Terminals (ISGOTT)*

Contains comprehensive guidance on inert gas systems and operational procedures.

## 1 Introduction

Hydrocarbon gas normally carried in petroleum tankers cannot burn in an atmosphere containing less than approximately 11% oxygen by volume. Accordingly, one way to provide protection against fires or explosions in the vapour space of cargo tanks is to keep the oxygen level below that figure. This is usually achieved by using a fixed piping arrangement to blow inert gas into each cargo tank in order to reduce the oxygen content and render the tank atmosphere non-flammable.

The International Convention for the Safety of Life at Sea (SOLAS 1974), as amended, requires that inert gas systems be capable of delivering inert gas with an oxygen content in the inert gas main of not more than 5% by volume. By maintaining a positive pressure in the cargo tanks at all times, with an atmosphere not having an oxygen content greater than 8% by volume, the tank atmosphere is rendered non-flammable.

This document provides guidance on the use of inert gas for the carriage of flammable oil cargoes on oil tankers of all sizes. For the purposes of this paper, and in accordance with SOLAS Chapter II-2, Regulation 1-6.1, flammable oil cargoes are defined as crude oil or petroleum products that have both:

- A flashpoint of less than 60°C in a closed cup test using approved flashpoint apparatus.
- A Reid vapour pressure below the atmospheric pressure or other liquid products that have a similar fire hazard.

This paper is based on historical incidents involving fires and explosions in the cargo areas on tankers carrying flammable cargoes. The guidance establishes the safety benefits of using inert gas as an effective barrier to prevent cargo tank fires and explosions, regardless of vessel size.

This paper does not offer guidance for chemical tankers carrying chemical cargoes. OCIMF supports the guidance issued by CDI, in *CDI Best Practice Recommendations Regarding the use of Nitrogen*. The CDI recommends that all cargo and tank cleaning operations involving flammable chemical cargoes are carried out whilst the relevant cargo tanks are inerted by nitrogen.

## 2 Legislation

The SOLAS requirements for tankers to be fitted with an inert gas system were developed by the IMO and had initially entered into force in 1980 for tankers 100,000 DWT and upwards. The SOLAS amendments, that entered into force 1981, reduced the threshold to 20,000 DWT.

The SOLAS amendments, that entered into force on 1 January 2016, reduced the threshold further and require new build tankers 8,000 DWT and over, constructed on or after this date, to be fitted with an inert gas system when carrying flammable cargoes.

OCIMF welcomes these changes; however, the principle of basing inert gas requirements on vessel DWT does not adequately recognise the risks posed by flammable oil cargoes or the proven safety benefits of carrying such cargoes under inert conditions.

## 3 Review of incidents

### 3.1 Historical incident review

In 2006, an inter-industry working group, formed to investigate fires and explosions in cargo areas on oil and chemical tankers, presented its findings to the IMO Maritime Safety Committee (MSC 81/8/1 and MSC 81-INF.8). The group examined 35 incidents that had occurred over the previous 25 years and the report noted that:

- In the majority of cases the ship was tank cleaning, venting or gas freeing when the incidents occurred.
- Failure to follow established procedures was observed in a significant number of incidents.
- In several cases, the tank atmosphere for non-inerted tanks had apparently not been evaluated or was not being monitored.
- In most cases ignition occurred within a cargo tank.
- None of the incidents occurred during the use or operation of inert gas.

The inter-industry working group report was considered by IMO delegates and influenced the debate that resulted in the adoption of the 2014 SOLAS amendments and the consequent reduction in the oil tanker DWT requirements for fitting inert gas systems from 20,000 DWT to 8,000 DWT for tankers constructed on or after 1 January 2016 when carrying flammable cargoes.

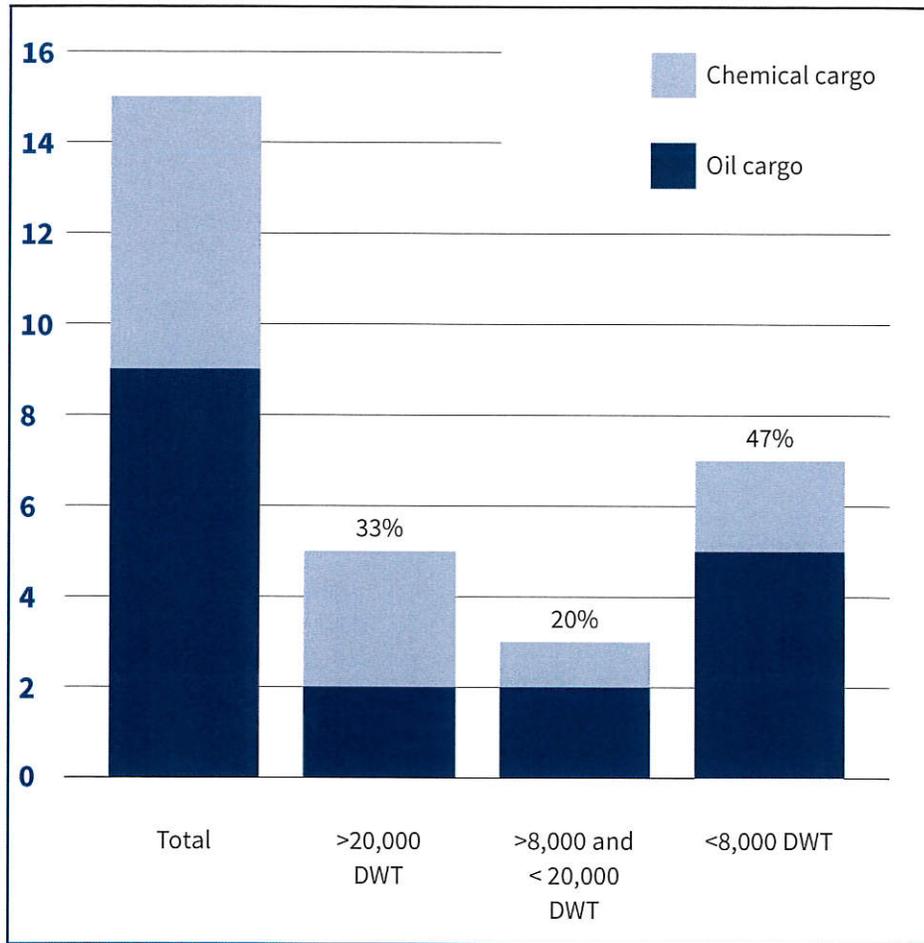
### 3.2 OCIMF analysis of incidents 2004–2015

OCIMF has undertaken a further study of incidents involving fires and explosions in the cargo area on tankers during the period 2004–2015 where maintaining the cargo tank in an inert condition is likely to have prevented the incident. For consistency with the IMO study oil and chemical cargoes have been included.

The data, which was collected from public and member incident databases, indicated that a total of 15 incidents involving fires and explosions occurred in the cargo area over the 12-year time frame. From the data reviewed by OCIMF, these events resulted in 20 fatalities and a further 30 people missing, presumed dead.

Vessel	8,000 DWT or less	8,000-20,000 DWT	20,000+ DWT	Oil cargo	Chemical cargo	Activity
1	X			X		Tank cleaning
2	X			X		Gas freeing
3	X				X	Loading
4		X		X		Tank cleaning
5			X		X	Gas freeing
6		X			X	Discharging
7			X		X	Tank cleaning
8			X	X		Tank cleaning
9			X		X	Loading
10	X			X		Tank cleaning
11	X			X		Ballast condition
12		X		X		Tank cleaning
13			X	X		Decanting slop tank
14	X			X		Deck maintenance
15	X				X	Tank cleaning

**Table 3.1:** Number of fires and explosions on oil and chemical tankers 2004–2015



**Figure 3.1:** Number of fires and explosions with oil cargoes and chemical cargoes 2004–2015

The data indicated that a majority of the incidents involving fires and explosions occurred on vessels less than 20,000 DWT. The two incidents involving fires and explosions on oil tankers greater than 20,000 DWT occurred on vessels with inert gas systems installed; however, the tank was not being maintained in an inert condition at the time of the incident.

The study supports that the provision of inert gas on vessels over 20,000 DWT carrying oil cargoes is preventing incidents involving fires and explosions. There continues to be incidents involving fires and explosions on vessels less than 20,000 DWT carrying oil cargoes resulting in fatalities.

## 4 Guidance for the use of inert gas systems on oil tankers

The IMO inter-industry working group report and the OCIMF study found that flammable oil cargoes are carried more safely on oil tankers that have installed, and are effectively using, an inert gas system to maintain the cargo vapour space in an inert condition.

The enhanced safety associated with the use of inert gas systems outweighs concerns such as increased port turn-around time and issues associated with cargo segregation and product quality.

The safety benefits of inert gas in cargo tanks are well recognised throughout the tanker industry. Over the years many lives have been lost, or serious injuries sustained, due to incidents involving fires and explosions on non-inerted tankers transporting flammable oil cargoes. The installation of an inert gas system on oil tankers of all sizes that carry flammable oil cargoes is both technically and operationally feasible. The effective use of the system, allied with training and the application of correct procedures, prevents incidents involving fires and explosions in cargo tanks and will result in a significant safety performance improvement when carrying flammable oil cargoes on oil tankers.

In summary, OCIMF has concluded that oil tankers that carry flammable oil cargoes should be designed and fitted with a SOLAS compliant inert gas system.

- Operators of existing oil tankers not already covered by the SOLAS inert gas requirements should consider installing a SOLAS compliant inert gas system on those vessels during the vessel's next special survey/major refit.
- Existing oil tankers less than 20,000 DWT fitted with an inert gas system that is not fully compliant with SOLAS requirements should be operated in such a manner that cargo tanks are maintained in an inert condition.
- New oil tankers that are to carry flammable oil cargoes should install a SOLAS compliant inert gas system when the vessel is being built.

All vessels fitted with an inert gas system should maintain it fully functional, use it in accordance with ISGOTT guidance, and maintain cargo tanks in an inert condition at all times, except when it is necessary to be gas-free for tank entry.

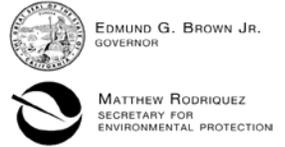


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# **ATTACHMENT 3**



EDMUND G. BROWN JR.  
GOVERNOR

MATTHEW RODRIGUEZ  
SECRETARY FOR  
ENVIRONMENTAL PROTECTION

---

## San Francisco Bay Regional Water Quality Control Board

*Sent via electronic mail: no hard copy to follow*

June 23, 2017  
CIWQS Place No. 805346  
CIWQS Reg ID No. 395631

Chevron Products Company  
841 Chevron Way  
Richmond, CA 94802

Attention: David Feiglstok (c/o Mark Piersante ([mpie@chevron.com](mailto:mpie@chevron.com)))

**Subject: Conditional 401 Water Quality Certification for Chevron Products Company, Chevron Richmond Refinery Long Wharf Maintenance & Efficiency Project, City of Richmond, Contra Costa County**

Dear Mr. Feiglstok:

San Francisco Bay Regional Water Quality Control Board (Water Board) staff has reviewed the application submitted by Chevron Products Company (Applicant) for the Chevron Richmond Refinery Long Wharf Maintenance & Efficiency Project (Project) in the City of Richmond, Contra Costa County. You have applied to the U.S. Army Corp of Engineers (Corps) for authorization of the Project pursuant to Section 10 of the Rivers and Harbors Act (RHA) of 1899, as amended (33 U.S.C. §403 *et seq.*). The Corps anticipates issuance of a Letter of Permission. You applied to the Water Board in compliance with Section 401 of the federal Clean Water Act for certification that the Project will not violate State water quality standards.

**Project Application & Location:** The Project description is derived from the *Application for Water Quality Certification, Chevron Long Wharf Efficiency Project* submitted on April 3, 2014, as updated and modified by revised application materials dated April 27, 2016, and submitted on May 19, 2016 (*Application*). The *Application* includes the following documents, and supplemental information submitted to the Water Board in June 2017: *Biological Assessment* (URS Corporation, January 2014); *Stormwater Pollution Prevention Plan* (Chevron Products Company, October 2012); *Richmond Eelgrass Beds/ACP Site SF-452-A Monitoring Program for the Chevron Long Wharf* (Merkel & Associates, Inc., July 2013); *Richmond Long Wharf Current Survey* (Chevron Products Company, March 21, 2014); and *Acoustic Doppler Current Profile Monitoring: May 2011*.

DR. TERRY F. YOUNG, CHAIR | BRUCE H. WOLFE, EXECUTIVE OFFICER

1515 Clay St., Suite 1400, Oakland, CA 94612 | [www.waterboards.ca.gov/sanfranciscobay](http://www.waterboards.ca.gov/sanfranciscobay)

The Project site is located in San Francisco Bay just south of the eastern end of the Richmond San Rafael Bridge, off the shoreline of the community of Point Richmond (latitude 37.93336 °N, longitude -122.41785 °W). The site is an active industrial area and is subject to regular disturbance from vessel transit. Water depths range from 15 to 20 feet and the subtidal area consists of soft-bottom benthic habitat.

**Site Description:** The Long Wharf is the largest marine oil terminal in California and its operations are regulated primarily by the California State Lands Commission (CSLC) and the Marine Oil Terminal Engineering & Maintenance Standards (MOTEMS). The Long Wharf is used for off-loading crude oil from vessels to the Richmond Refinery and for loading petroleum products onto vessels. The Long Wharf has existed in its current location since the early 1900s. The wharf is configured as a T-Head pier, is 3,440 feet long, and is comprised of four deep water cargo berths and two breasting dolphins. Several additional berths provide temporary moorings for standby tugs and barges, and launching facilities for crew and oil spill response boats. Various operational buildings, petroleum transfer equipment and piping are maintained on the wharf. A roughly 4,000-foot-long causeway connects these berths to the shore at the refinery (see Attachment). The Project footprint, which includes all construction activities and construction staging, is approximately 5,700 square feet (SF) (0.13 acre)(see Attachment to this certification for site map).

In general, the berths were constructed with cast-in-place concrete beams and pile caps supported by precast vertical concrete piles and concrete-sleeved-timber vertical and batter piles. Berth 2 is also supported by timber piles. The Long Wharf has had several major upgrades over the years. These have included addition of a Low Sulfur Fuel Oil pipe way, addition of the Berth 4 Loading Platform, and addition of independent mooring dolphins and breasting dolphins at Berths 1 and 4. Previous improvements have also included seismic strengthening. Annual maintenance includes replacement of timber and concrete piles (see *Conditional 401 Water Quality Certification for Chevron Products Company, Chevron Richmond Refinery Long Wharf Five-Year (2017-2021) Pile Replacement Project*, CIWQS Place No. 821281).

The Long Wharf is located in open Bay habitat which is used by anadromous fish as a migratory corridor between their upstream spawning grounds and the Pacific Ocean. San Francisco Bay provides habitat to more than 100 species of fish, roughly 120 waterbird species, and several marine mammal species. The Project site does not contain natural terrestrial habitat, though the Long Wharf itself is used for roosting and occasional nesting by waterbird species. Listed fish species that use this portion of the Bay include Steelhead (*Oncorhynchus mykiss*; Central California Coast and Central Valley steelhead), Chinook salmon (*O. tshawytscha*; Sacramento River winter-run and Central Valley spring-run), Green sturgeon (*Acipenser medirostris*), and Longfin smelt (*Spirinchus thaleichthys*). The most common marine mammals in San Francisco Bay, and those most likely to occur in the Project vicinity, are the Pacific harbor seal (*Phoca vitulina*) and the California sea lion (*Zalophus californianus*). Other species that could

# **ATTACHMENT 4**



California Department of Fish and Wildlife  
Marine Region  
1933 CLIFF DRIVE, SUITE 9  
SANTA BARBARA, CA 93109

California Endangered Species Act  
Incidental Take Permit No. 2081-2016-056-07

### CHEVRON LONG WHARF MAINTENANCE AND EFFICIENCY PROJECT

**Authority:** This California Endangered Species Act (CESA) incidental take permit (ITP) is issued by the California Department of Fish and Wildlife (CDFW) pursuant to Fish and Game Code section 2081, subdivisions (b) and (c), and California Code of Regulations, Title 14, section 783.0 et seq. CESA prohibits the take<sup>1</sup> of any species of wildlife designated by the California Fish and Game Commission as an endangered, threatened, or candidate species.<sup>2</sup> CDFW may authorize the take of any such species by permit if the conditions set forth in Fish and Game Code section 2081, subdivisions (b) and (c) are met. (See Cal. Code Regs., tit. 14, § 783.4).

<b>Permittee:</b>	<b>Chevron Products Company</b>
<b>Principal Officer:</b>	<b>Brittany Breaux</b>
<b>Contact Person:</b>	<b>Brittany Breaux, (510) 242-9458</b>
<b>Mailing Address:</b>	<b>1450 Marina Way South, Room 2104B Richmond, CA 94804</b>

#### **Effective Date and Expiration Date of this ITP:**

This ITP shall be executed in duplicate original form and shall become effective once a duplicate original is acknowledged by signature of the Permittee on the last page of this ITP and returned to CDFW's Habitat Conservation Planning Branch at the address listed in the Notices section of this ITP. Unless renewed by CDFW, this ITP's authorization to take the Covered Species shall expire on **December 31, 2022**.

Notwithstanding the expiration date on the take authorization provided by this ITP, Permittee's obligations pursuant to this ITP do not end until CDFW accepts as complete the Permittee's Final Mitigation Report required by Condition of Approval 6.8 of this ITP.

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<sup>1</sup>Pursuant to Fish and Game Code section 86, "'take' means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." (See also *Environmental Protection Information Center v. California Department of Forestry and Fire Protection* (2008) 44 Cal.4th 459, 507 [for purposes of incidental take permitting under Fish and Game Code section 2081, subdivision (b), "'take' ... means to catch, capture or kill"].)

<sup>2</sup>"The definition of an endangered, threatened, and candidate species for purposes of CESA are found in Fish and Game Code sections 2062, 2067, and 2068, respectively.

**Project Location:**

The Chevron Long Wharf Maintenance and Efficiency Project (Project) is located at the Chevron Products Company Richmond Refinery Long Wharf within the City of Richmond, Contra Costa County (See Figure 1). The Project is located approximately 0.75 miles south of the eastern side of the Richmond-San Rafael Bridge at approximately N121.411788, 37.923881.

**Project Description:**

The Project includes multiple construction components within and above the water to bring the Long Wharf, Berths 1 through 4, into compliance with the Marine Oil Terminal Engineering and Maintenance Standards and to improve the overall operational efficiency. Project components include fender replacements, a loading platform seismic retrofit, gangway replacements and additions, fender replacements, and addition of a mooring hook dolphin. The Project will add 5,740 square feet of new overwater structure and remove 909 square feet for a net increase of 4,831 square feet (0.11 acres). Permanent piles will vary in size up to 60” in diameter and will be a mix of pile types and will include up to 52 composite piles, 141 24” diameter concrete piles, and 8 60” diameter piles.

**Covered Species Subject to Take Authorization Provided by this ITP:**

This ITP covers the following species:

Name	CESA Status
1. Sacramento River Winter-Run Chinook Salmon ( <i>Oncorhynchus tshawytscha</i> )	Endangered <sup>3</sup>
2. Central Valley Spring-Run Chinook Salmon ( <i>Oncorhynchus tshawytscha</i> )	Threatened <sup>4</sup>
3. Longfin Smelt ( <i>Spirinchus thaleichthys</i> )	Threatened <sup>5</sup>

These species and only these species are the “Covered Species” for the purposes of this ITP.

**Impacts of the Taking on Covered Species:**

Project activities and their resulting impacts are expected to result in the incidental take of individuals of the Covered Species. The activities described above expected to result in incidental take of individuals of the Covered Species include pile driving and permanent habitat loss from new overwater structures (Covered Activities).

Incidental take of individuals of the Covered Species in the form of mortality (“kill”) may occur

<sup>3</sup>See Cal. Code Regs. tit. 14 § 670.5, subd. (a)(2)(M)

<sup>4</sup>See Cal. Code Regs. tit. 14 § 670.5, subd. (b)(2)(C)

<sup>5</sup>See Cal. Code Regs. tit. 14 § 670.5, subd. (b)(2)(E)

as a result of Covered Activities such as hydroacoustic impacts due to pile driving. Pile driving hydroacoustic impacts would result in short-term but repeated impacts during the in-water phases of construction, with potential to harm to fish. Driving of the largest diameter steel and concrete piles (60" and 24" diameter) could result in significant injury or mortality to fish by exceeding hydroacoustic thresholds (206 dB peak pressure, 187 dB accumulated sound exposure level (SEL), and 183 dB SEL for fish under 2 grams), determined by the multi-agency Fisheries Hydroacoustic Working Group. Incidental take of individuals of the Covered Species may also occur from the Covered Activities in the form of pursue, catch, capture, or attempt to do so of the Covered Species from placement of bubble curtains to reduce hydroacoustic impacts. The areas where authorized take of the Covered Species is expected to occur include: Central San Francisco Bay in the immediate area surrounding the Long Wharf from Berth 1 through Berth 4 (collectively, the Project Area).

The Project is expected to cause the permanent loss of 0.11 acres of habitat for the Covered Species. Impacts of the authorized taking also include adverse impacts to the Covered Species related to temporal losses, increased habitat fragmentation and edge effects, and the Project's incremental contribution to cumulative impacts (indirect impacts). These impacts include: stress resulting from underwater noise and vibrations caused by pile driving, general in-water construction; potential impacts from spills of pollutants (oils, gasoline, diesel, lubricants, etc.), and long-term effects due to permanent habitat loss, increased pollution, increased aquatic vessel traffic, and increased vulnerability to predation.

**Incidental Take Authorization of Covered Species:**

This ITP authorizes incidental take of the Covered Species and only the Covered Species. With respect to incidental take of the Covered Species, CDFW authorizes the Permittee, its employees, contractors, and agents to take Covered Species incidentally in carrying out the Covered Activities, subject to the limitations described in this section and the Conditions of Approval identified below. This ITP does not authorize take of Covered Species from activities outside the scope of the Covered Activities, take of Covered Species outside of the Project Area, take of Covered Species resulting from violation of this ITP, or intentional take of Covered Species.

**Conditions of Approval:**

Unless specified otherwise, the following measures apply to all Covered Activities within the Project Area, including areas used for equipment ingress and egress, staging and parking, and noise and vibration generating activities that will cause take. CDFW's issuance of this ITP and Permittee's authorization to take the Covered Species are subject to Permittee's compliance with and implementation of the following Conditions of Approval:

- 1. Legal Compliance:** Permittee shall comply with all applicable federal, state, and local laws in existence on the effective date of this ITP or adopted thereafter.

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CHEVRON LONG WHARF MAINTENANCE AND EFFICIENCY PROJECT

# **ATTACHMENT 5**

Halibut incidental catch amounts are constrained by an annual prohibited species catch (PSC) limit in the BSAI and GOA. Future halibut incidental catch levels likely will be similar to those experienced from 2014 through 2016 with some reductions possible relative to 2014 and 2015 incidental catch levels. Amendment 111 to the BSAI FMP reduced BSAI halibut PSC limits in 2016 and incidental catch decreased beginning that year (81 FR 24714, April 27, 2016).

Chinook salmon PSC limits are established for the Bering Sea and central and western GOA pollock fisheries that, when attained, result in the closure of pollock fishing. The Chinook salmon PSC limits for the Bering Sea pollock fisheries were originally established by Amendment 91 to the BSAI FMP (75 FR 53026, August 30, 2010) and established for the central and western GOA pollock fisheries by Amendment 93 to the GOA FMP (77 FR 42629, July 20, 2012). In 2016, Amendment 110 to the BSAI FMP was implemented to improve the management of Chinook and chum salmon bycatch in the Bering Sea pollock fishery by creating a comprehensive salmon bycatch avoidance program (81 FR 37534, June

10, 2016). In 2015, Amendment 97 to the GOA FMP established annual Chinook salmon PSC limits for the groundfish trawl fisheries, except for pollock trawl fisheries, in the Western and Central GOA (79 FR 71350, December 2, 2014). While salmon incidental catch amounts tend to vary between years, making it difficult to accurately predict future incidental take amounts, the total, or maximum, amount of annual Chinook salmon incidental catch in the Bering Sea and GOA pollock fisheries is constrained by the PSC limits.

4. *The number of vessels and processors participating in the PSD program.* For the 2017 permit renewal, shoreside processors will decrease slightly from 15 to 13, and vessels delivering to shoreside processors will increase slightly from 137 to 138. Catcher/processors participating in the PSD program for salmon will decrease slightly from 36 to 35 under the 2017 permit renewal. Catcher vessels delivering to motherships will remain at 15 vessels.

NMFS issues PSD permits to SeaShare for a 3-year period unless the permits are suspended or revoked under § 679.26. The permits may not be transferred; however, they may be renewed following the application procedures in § 679.26.

If the authorized distributor modifies the list of participants in the PSD program or delivery locations, the authorized distributor must submit a modified list of participants or a modified list of delivery locations to the Regional Administrator.

These permits may be suspended, modified, or revoked under 15 CFR part 904 for violation of § 679.26 or other regulations in 50 CFR part 679.

#### Classification

This action is taken under § 679.26.

**Authority:** 16 U.S.C. 773 *et seq.*; 1801 *et seq.*; 3631 *et seq.*; Pub. L. 108–447; Pub. L. 111–281.

Dated: June 9, 2017.

**Margo B. Schulze-Haugen,**

*Acting Deputy Director, Office of Sustainable Fisheries, National Marine Fisheries Service.*

[FR Doc. 2017–12313 Filed 6–13–17; 8:45 am]

**BILLING CODE 3510–22–P**

## DEPARTMENT OF COMMERCE

### National Oceanic and Atmospheric Administration

RIN 0648–XF246

#### Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Chevron Richmond Refinery Long Wharf Maintenance and Efficiency Project in San Francisco Bay, California

**AGENCY:** National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

**ACTION:** Notice; issuance of an incidental harassment authorization.

**SUMMARY:** In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an incidental harassment authorization (IHA) to Chevron to incidentally harass, by Level B harassment only, marine mammals during construction activities associated with the Richmond Refinery Long Wharf Maintenance and Efficiency Project (WMEP) in San Francisco Bay, California.

**DATES:** The Authorization is in effect for one year beginning January 1, 2018 through December 31, 2018.

**FOR FURTHER INFORMATION CONTACT:** Robert Pauline, Office of Protected Resources, NMFS, (301) 427–8401.

#### SUPPLEMENTARY INFORMATION:

##### Availability

An electronic copy of Chevron's application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: [www.nmfs.noaa.gov/pr/permits/incidental/construction.htm](http://www.nmfs.noaa.gov/pr/permits/incidental/construction.htm). In case of problems accessing these documents, please call the contact listed above (see **FOR FURTHER INFORMATION CONTACT**).

##### Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

<sup>1</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/chinook\\_salmon\\_mortality2017.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/chinook_salmon_mortality2017.pdf) accessed on 04/17/17.

<sup>2</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/chum\\_salmon\\_mortality2017.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/chum_salmon_mortality2017.pdf) accessed on 04/17/17.

<sup>3</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_goa2014.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_goa2014.pdf) accessed on 04/17/17.

<sup>4</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_goa2015.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_goa2015.pdf) accessed on 04/17/17.

<sup>5</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_goa2016.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_goa2016.pdf) accessed on 04/17/17.

<sup>6</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_goa2014.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_goa2014.pdf) accessed on 04/17/17.

<sup>7</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_goa2015.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_goa2015.pdf) accessed on 04/17/17.

<sup>8</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_goa2016.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_goa2016.pdf) accessed on 04/17/17.

<sup>9</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_bsai\\_with\\_cdq2014.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_bsai_with_cdq2014.pdf) accessed on 04/17/17.

<sup>10</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_bsai\\_with\\_cdq2015.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_bsai_with_cdq2015.pdf) accessed on 04/17/17.

<sup>11</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_bsai\\_with\\_cdq2016.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_bsai_with_cdq2016.pdf) accessed on 04/17/17.

<sup>12</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_goa2014.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_goa2014.pdf) accessed on 04/17/17.

<sup>13</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_goa2015.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_goa2015.pdf) accessed on 04/17/17.

<sup>14</sup> [https://alaskafisheries.noaa.gov/sites/default/files/reports/car120\\_psc\\_goa2016.pdf](https://alaskafisheries.noaa.gov/sites/default/files/reports/car120_psc_goa2016.pdf) accessed on 04/17/17.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has defined “negligible impact” in 50 CFR 216.103 as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

The MMPA states that the term “take” means to harass, hunt, capture, kill or attempt to harass, hunt, capture, or kill any marine mammal.

Except with respect to certain activities not pertinent here, the MMPA defines “harassment” as: Any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

### Summary of Request

On July 21, 2014, NMFS received a request from Chevron for authorization to take marine mammals incidental to pile driving and removal associated with the WMEP in San Francisco Bay, California. The project was delayed due to funding constraints. Chevron submitted a revised version of the request on November 16, 2016, which was deemed adequate and complete on January 12, 2017. Chevron will undertake the WMEP in order to comply with current Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) requirements and to improve safety and efficiency at the Long Wharf. Construction would start in 2018, and be complete by the fourth quarter of 2022. Therefore, Chevron expects to request additional IHAs in association with this multi-year project. The effective dates for this first IHA would be from January 1, 2018 through December 31, 2018. The use of both vibratory and impact pile driving during pile removal and installation during the four-year construction period is expected to produce underwater sound at levels that have the potential to result in Level B (behavioral) harassment of

marine mammals. However, only impact driving will occur during 2018 and will be covered under the issued IHA. Species expected to occur in the area and for which take is authorized include California sea lion (*Zalophus californianus*) and Pacific harbor seal (*Phoca vitulina*).

### Description of the Specified Activity

#### Overview

Chevron’s Richmond Refinery Long Wharf (Long Wharf) is the largest marine oil terminal in California. Its operations are regulated primarily by the California State Lands Commission (CSLC) through a State Lands lease, Article 5 of CSLC regulations, and MOTEMS (California Building Code (CBC) Chapter 31F). The Long Wharf has existed in its current location since the early 1900s (Figure 1–1 in Application). The Berth 2 fender system (timber pile and whaler) was designed and installed in 1940. Marine loading arms, gangways, and fender systems at Berths 1, 3 and 4 were installed in 1972. The Berth 4 fender panels were replaced in 2011 and the Berth 1 fender panels were replaced in 2012. The existing configuration of these systems have limitations to accepting more modern, fuel efficient vessels with shorter, parallel mid-body hulls and in some cases do not meet current MOTEMS requirements.

The purpose of the WMEP is to comply with current MOTEMS requirements and to improve safety and efficiency at the Long Wharf. To meet MOTEMS requirements, the fendering system at Berth 2 is being updated and the Berth 4 loading platform will be seismically retrofitted to stiffen the structure and reduce movement of the Long Wharf in the event of a level 1 or 2 earthquake. Safety will be improved by replacing gangways and fire monitors. Efficiency at the Long Wharf will be improved by updating the fender system configuration at Berth 4 to accommodate newer, more fuel efficient vessels and thus reduce idling time for vessels waiting to berth. Further, efficiency will be improved by updating the fender system at Berth 1 to accommodate barges, enabling balanced utilization across Berths 1, 2, and 3.

#### Dates and Duration

Project construction will start in 2018 and be completed by the fourth quarter of 2022. Pile driving activities will be timed to occur within the standard NMFS work windows for listed fish species (June 1 through November 30) during those 4 years. The effective date for this initial IHA will be from January

1, 2018 through December 31, 2018. Over the course of the multi-year project, 249 piles of various sizes will be installed via impact and vibratory driving; 161 piles will be removed via vibratory removal; and 209 driving days are planned. During the first year of construction covered under this IHA, 8,24-inch concrete piles will be installed by impact driving over 4 workdays at Berth 2.

#### Specified Geographic Region

The Long Wharf is located in San Francisco Bay (the Bay) just south of the eastern terminus of the Richmond-San Rafael Bridge (RSRB) in Contra Costa County. The wharf is located in the northern portion of the Central Bay, which is generally defined as the area between the RSRB, Golden Gate Bridge, and San Francisco-Oakland Bay Bridge. The South Bay is located south of the San Francisco-Oakland Bay Bridge. San Pablo Bay extends north of the RSRB.

#### Detailed Description of Specified Activities

The complete multi-year project will involve modifications at 4 berths (Berths 1, 2, 3, and 4) as shown in Figure 1–1 in the Application. Planned modifications to the Long Wharf include replacing gangways and cranes, adding new mooring hooks and standoff fenders, adding new dolphins and catwalks, and modifying the fire water system at Berths 1, 2, 3 and/or 4, as well as the seismic retrofit to the Berth 4 loading platform. The type and numbers of piles to be installed, as well as those that will be removed, are summarized in Table 1–1 in the Application and an overview of the modifications at Berths 1 to 4 are shown in Figure 1–2 in the Application.

The combined modifications to Berths 1–4 will require the installation of 141 new concrete piles to support new and replacement equipment and their associated structures. The Berth 4 loading platform will add 8, 60-inch diameter steel piles as part of the seismic retrofit.

The project will also add 4 clusters of 13 composite piles each (52 total) as markers and protection of the new batter (driven at an angle) piles on the east side of the Berth 4 retrofit. The project will remove 106 existing timber piles, two existing 18-inch and two existing 24-inch concrete piles. A total of 12 24-inch temporary steel piles will also be installed and removed during the seismic retrofit of Berth 4.

The modifications at each berth are summarized below.

Modifications at Berth 1 include the following:

- Replace gangway to accommodate barges and add a new raised fire monitor.

- Construct a new 24' x 20' mooring dolphin and hook to accommodate barges.

- Construct a new 24' x 25' breasting dolphin and 13' x 26' breasting point with standoff fenders to accommodate barges. The new breasting dolphin will require removal of an existing catwalk and two piles and moving a catwalk to a slightly different location to maintain access to currently existing dolphins. A new catwalk will be installed to provide access to the new breasting dolphin.

- A portion of the existing gangway will be removed. The remaining portion is used for other existing services located on its structure.

Much of this work will be above the water or on the deck of the terminal. The mooring dolphin and hook, breasting dolphin, and new gangway will require installation of 42 new 24-inch square concrete piles using impact driving methods.

Modifications at Berth 2 include the following:

- Install new gangway to replace portable gangway and add a new elevated fire monitor.

- Replace one bollard with a new hook.

- Install four new standoff fenders (to replace timber fender pile system).

- Replace existing auxiliary and hose cranes and vapor recovery crane to accommodate the new standoff fenders.

- Remove the existing timber fender pile system along the length of the Berth (~650 ft.)

- Three (3) existing brace piles (22-inch square concrete jacketed timber piles) would be removed by cutting below the mud line if possible.

These modifications will require the installation of 51 new 24-inch square concrete piles, using impact driving methods, to support the gangway, standoff fenders, hose crane, and auxiliary crane. To keep Berth 2 operational during construction, four temporary fenders will be installed, supported by 36 temporary 14-inch H-piles driven using vibratory methods. It is expected that the H-piles would largely sink under their own weight and would require very little driving. The H-piles and temporary fenders will be removed once the permanent standoff fenders are complete. The auxiliary and hose cranes are being replaced with cranes with longer reach to accommodate the additional distance of the new standoff fenders. The new vapor recovery crane would be mounted on an existing pedestal and not require in-water work.

Modifications at Berth 3 include the following:

- Install new fixed gangway to replace portable gangway and add a new raised fire monitor. The gangway would be supported by four, 24-inch square concrete piles. This would be the only in-water work for modifications at Berth 3.

Modifications at Berth 4 include the following:

- Install two new 36' x 20' dolphins with standoff fenders (two per dolphin) and two catwalks.

- Seismically retrofit the Berth 4 loading platform including bolstering and relocation of piping and electrical facilities.

The new fenders would add 44 new 24-inch square concrete piles.

The seismic retrofit would structurally stiffen the Berth 4 Loading Platform under seismic loads. This will require cutting holes in the concrete decking and driving 8, 60-inch diameter hollow steel batter piles, using impact pile driving. To accommodate the new retrofit, an existing sump will be replaced with a new sump and two, 24-inch square concrete piles will be removed or cut to the mudline. The engineering team has determined that to drive the 60-inch batter piles, twelve temporary steel piles, 24 inches in diameter, will be needed to support templates for the angled piles during driving. Two templates are required, each 24 feet by 4 feet and supported by up to six 24-inch steel pipe piles. The templates will be above water. The project would also add 4 clusters of 13 composite piles each (52 total composite piles) as markers and protection of the new batter piles on the east side of the retrofit. See Table 1 for pile summary information.

**Table 1. Summary of Pile Types, Sizes, Locations, and Installation/Removal Methods for Full Project 2018-2022.**

Item	Description	No. Piles	Pile Installation / Removal Method
New Installation	Berth 1 Mooring Hook Dolphin	13	Impact
	Berth 1 Outer Breasting Dolphin	17	Impact
	Berth 1 Inner Breasting Point	8	Impact
	Berth 1 Gangway	4	Impact
	Berth 2 South Outside Fender	10	Impact
	Berth 2 South Inside Fender	10	Impact
	Berth 2 North Inside Fender	9	Impact
	Berth 2 North Outside Fender	10	Impact
	Berth 2 Main Hose Crane	4	Impact
	Berth 2 Aux Crane	4	Impact
	Berth 2 Gangway	4	Impact
	Berth 2 Gangway	4	Impact
	Berth 3 Gangway	4	Impact
	Berth 4 South Breasting Dolphin	22	Impact
	Berth 4 North Breasting Dolphin	22	Impact
	<b>Total 24-inch Square Concrete Piles</b>	<b>141</b>	
	Berth 4 Loading Platform Retrofit (60-inch-diameter Steel Piles)	8	Impact
	Berth 4 Barrier Piles (4 Clusters of 13 Composite Piles)	52	Vibrate
<b>Total</b>	<b>201</b>		
Permanent Removal	Berth 1 Pile Removal	-2	Vibrate
	Berth 2 Pile Removal (106 Wooden - Actual Count)	-106	Vibrate
	Berth 2 Brace Piles (22-inch Square Concrete Jacketed Timber Piles)	-3	Cut
	Berth 4 Concrete Pile Removal	-2	Cut
	<b>Total Removal</b>	<b>-113</b>	
	<b>Net Change</b>	<b>88</b>	
Temporary	Berth 1 Pile Installation and Removal	36	Vibrate
	Berth 2 Whaler Installation and Removal (excluding wooden Piles)	12	Vibrate
	<b>Total Installation</b>	<b>249</b>	
	<b>Total Removal</b>	<b>116</b>	

Note that the issued IHA covers actions occurring during 2018 only. These actions include the installation of 8, 24-inch concrete piles by impact hammer driving over 4 workdays. These piles will replace existing auxiliary and hose cranes and vapor recovery crane at Berth 2. Impact installation will occur utilizing a DelMag D62 22 or similar diesel hammer, producing approximately 165,000 ft lbs maximum energy (may not need full energy) over a duration of approximately 20 minutes per pile.

Mitigation, monitoring, and reporting measures are described in detail later in the document (*Mitigation and Monitoring and Reporting* sections).

#### Comments and Responses

A notice of NMFS's proposal to issue an IHA to Chevron was published in the **Federal Register** on March 24, 2017 (82

FR 05025). That notice described, in detail, Chevron's activity, the marine mammal species that may be affected by the activity, and the anticipated effects on marine mammals. During the 30-day public comment period, NMFS received comments from the Marine Mammal Commission. The Marine Mammal Commission recommended that NMFS issue the requested IHA, subject to inclusion of the mitigation, monitoring, and reporting measures as described in our notice of proposed IHA and the application. All measures proposed in the initial **Federal Register** notice are included within the IHA.

#### Description of Marine Mammals in the Area of the Specified Activity

Although 35 species of marine mammals can be found off the coast of California, few species venture into San Francisco Bay, and only Pacific harbor

seals (*Phoca vitulina*), California sea lions (*Zalophus californianus*), and harbor porpoises (*Phocoena phocoena*) make the Bay a permanent home. Small numbers of gray whales (*Eschrichtius robustus*) are regularly sighted in the Bay during their yearly migration, though most sightings tend to occur in the Central Bay near the Golden Gate Bridge. Two other species that may occasionally occur within San Francisco Bay include the Steller sea lion (*Eumetopias jubatus*) and bottlenose dolphin (*Tursiops truncatus*). Table 2 provides information about the species that are expected to potentially be present in the project area. A detailed description of the species likely to be affected by the project, including brief introductions to the species and relevant stocks as well as available information regarding population trends

and threats, and information regarding local occurrence, were provided in the **Federal Register** notice for the proposed IHA (82 FR 15025; March 24, 2017). Since that time, we are not aware of any

changes in the status of these species and stocks; therefore, detailed descriptions are not provided here. Please refer to that **Federal Register** notice for these descriptions. Please also

refer to NMFS' Web site ([www.nmfs.noaa.gov/pr/species/mammals/](http://www.nmfs.noaa.gov/pr/species/mammals/)) for generalized species accounts.

TABLE 2—MARINE MAMMALS POTENTIALLY PRESENT IN THE VICINITY OF THE PROJECT <sup>1</sup>

Species	Stock	ESA/MMPA status; strategic (Y/N) <sup>2</sup>	Stock abundance (CV/N <sub>min</sub> ) <sup>3</sup>	PBR <sup>4</sup>	Occurrence in/near project	Seasonal
Pacific harbor seal, <i>Phoca vitulina</i> .	California Stock .....	-/N	30,968 (-/27,348) .....	1,641	Common .....	Year-round.
California sea lion, <i>Zalophus californianus</i> .	Eastern U.S. Stock .....	-/N	296,750 (-/153,337) .....	9,200	Uncommon .....	Year-round.
Harbor porpoise, <i>Phocoena phocoena</i> .	San Francisco-Rus-sian River Stock.	-/N	9,886 (0.51/6,625) .....	66	Common in the vicinity of the Golden Gate and Richardson's Bay, Rare elsewhere.	Year-round.
Gray whale, <i>Eschrichtius robustus</i> .	Eastern North Pacific Stock.	-/N	20,990 (0.05/20,125) ..	624	Rare to occasional .....	December–April.

<sup>1</sup> Source: Carretta *et al.*, 2016

<sup>2</sup> ESA status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR (see footnote 3) or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

<sup>3</sup> CV is coefficient of variation; N<sub>min</sub> is the minimum estimate of stock abundance. In some cases, CV is not applicable. For certain stocks of pinnipeds, abundance estimates are based upon observations of animals (often pups) ashore multiplied by some correction factor derived from knowledge of the species' (or similar species') life history to arrive at a best abundance estimate; therefore, there is no associated CV. In these cases, the minimum abundance may represent actual counts of all animals ashore.

<sup>4</sup> Potential biological removal, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population size (OSP).

**Potential Effects of the Specified Activity on Marine Mammals and Their Habitat**

The effects of underwater noise from construction activities for the project have the potential to result in behavioral harassment of marine mammals in the vicinity of the action area. The **Federal Register** notice for the proposed IHA (82 FR 15025; March 24, 2017) included a discussion of the potential effects of anthropogenic noise on marine mammals, therefore that information is not repeated here; please refer to the **Federal Register** notice for that information.

The primary impacts to marine mammal habitat are associated with elevated sound levels produced by impact pile driving in the area. However, other potential impacts to the surrounding habitat from physical disturbance are also possible. The project would not result in permanent impacts to habitats used directly by marine mammals, such as haulout sites, but may have potential short-term impacts to food sources and minor impacts to the immediate substrate during installation of piles during the project. These potential effects are discussed in detail in the **Federal Register** notice for the proposed IHA (82 FR 15025; March 24, 2017), therefore, that information is not repeated here.

**Estimated Take**

This section includes an estimate of the number of incidental takes expected

to occur as a result of the specified activities considered pursuant to this IHA, which will inform both NMFS' consideration of whether the number of takes is small and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as: Any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would be by Level B harassment only, in the form of disruption of behavioral for individual marine mammals resulting from exposure to impact driving. Based on the nature of the activity and the anticipated effectiveness of the mitigation measures (*i.e.*, shutdown, soft start discussed in detail below in *Proposed Mitigation* section), Level A harassment is neither anticipated nor authorized. The death of a marine mammal is also a type of incidental take. However, as described previously, no mortality is anticipated or authorized for this activity. Below we describe how the take is estimated.

In order to estimate the potential incidents of take that may occur incidental to the specified activity, we must first estimate the extent of the sound field that may be produced by the activity and then consider the sound field in combination with information about marine mammal density or abundance in the project area. We first provide information on applicable sound thresholds for determining effects to marine mammals before describing the information used in estimating the sound fields, the available marine mammal density or abundance information, and the method of estimating potential incidences of take.

*Sound Thresholds*—NMFS uses sound exposure thresholds to determine when an activity that produces underwater sound might result in impacts to a marine mammal such that a take by harassment might occur. On August 4, 2016, NMFS released its Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Guidance) (81 FR 51694) (available at <http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm>). This new guidance established new thresholds for predicting auditory injury, which equates to Level A harassment under the MMPA. As will be discussed below, NMFS has revised Permanent Threshold Shift (PTS) (and Temporary Threshold Shift (TTS)) onset acoustic thresholds for impulsive and non-impulsive sound as part of its new acoustic guidance. The

Guidance does not address Level B harassment; therefore, NMFS uses the current acoustic exposure criteria to determine exposure to underwater noise sound pressure levels for Level B harassment (Table 5).

During the installation of piles, the project has the potential to increase airborne noise levels. Airborne pile-driving root means square (RMS) noise levels above the NMFS airborne noise thresholds are not expected to extend to the Castro Rocks haul-out site, which is located 650 meters (m) north of Long Wharf. In addition, the Castro Rocks haul out is subject to high levels of background noise from the Richmond Bridge, ongoing vessel activity at the Long Wharf, ferry traffic, and other general boat traffic. Any pinnipeds that surface in the area over which the airborne noise thresholds may be exceeded would have already been exposed to underwater noise levels above the applicable thresholds and thus would not result in an additional incidental take. Airborne noise is not considered further.

**Source Levels**—Pile driving generates underwater noise that can potentially result in disturbance to marine mammals in the project area. In order to establish distances to PTS and behavioral harassment isopleths, the sound source level associated with a specific pile driving activity must be measured directly or estimated using proxy information. The intensity of pile driving sounds is greatly influenced by factors such as the material type and dimension of piles. To estimate the noise effects of the 24-inch square concrete piles planned for use in Year 1 of this project, Chevron reviewed sound pressure levels (SPLs) from other projects conducted under similar circumstances. These projects include the Pier 40 Berth Construction in San Francisco, and the Berth 22 and Berth 32 reconstruction projects at the Port of Oakland. However, NMFS elected to use data from only the Pier 40 project since 24-inch square concrete piles were installed at that location. At Berth 22 and Berth 32, 24-inch octagonal concrete piles were installed. The differences in pile shape may result in varying SPLs. Impact pile driving at Pier 40 resulted in measured RMS values ranging from 162–174 dB and peak SPLs from 172 to 186 dB. SEL measurements were not recorded. From Pier 40, NMFS selected a RMS value of 171 decibel (dB), which was the average of the eight piles tested, excluding two piles that

utilized “jetting.” Jetting consists of employing a carefully directed and pressurized flow of water to assist in pile placement by liquefying soils at the pile tip during pile placement. Jetting tends to increase driving efficiency while decreasing sound levels and will not be utilized by Chevron during this project. Note that NMFS had incorrectly used a RMS value of 170 dB in the Notice of Proposed IHA. Utilizing the corrected value of 171 dB results in slightly larger predicted Level A and Level B isopleths. NMFS used an identical approach to arrive at an average peak value of 181 dB based on results from Pier 40.

**Sound Propagation**—Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:  $TL = B * \log_{10} (R_1/R_2)$ ,

Where:

R1 = the distance of the modeled SPL from the driven pile, and  
 R2 = the distance from the driven pile of the initial measurement.  
 B = spreading loss value

This formula does not account for loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB reduction in sound level for each doubling of distance from the source ( $20 * \log(\text{range})$ ). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source ( $10 * \log(\text{range})$ ). As is common practice in coastal waters, here we assume practical spreading loss (4.5 dB reduction in sound level for each doubling of distance) here. Practical spreading is a compromise that is often used under conditions where water increases with depth as the receiver moves away from the shoreline,

resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions.

**Level A Zone**—Chevron’s Level A harassment zone was calculated by utilizing the methods presented in Appendix D of NMFS’ Guidance and the accompanying User Spreadsheet. The Guidance provides updated PTS onset thresholds using the cumulative SEL ( $SEL_{cum}$ ) metric, which incorporates marine mammal auditory weighting functions, to identify the received levels, or acoustic thresholds, at which individual marine mammals are predicted to experience changes in their hearing sensitivity for acute, incidental exposure to all underwater anthropogenic sound sources. The Guidance and its companion User Spreadsheet provide alternative methodology for incorporating these more complex thresholds and associated weighting functions.

The User Spreadsheet accounts for weighting functions using Weighting Factor Adjustments (WFAs), and NMFS used the recommended values for impact driving therein (2 kilohertz (kHz)). Pile driving durations were estimated based on similar project experience. NMFS’ new acoustic thresholds use dual metrics of  $SEL_{cum}$  and peak sound level (PK) for impulsive sounds (e.g., impact pile driving). The noise levels noted above were used in the Spreadsheet for 24-inch square concrete piles. It was estimated that two piles would be installed in one 24-hr workday with installation for each pile requiring approximately 300 blows. NMFS used an RMS of 171 dB and pulse duration of 0.1 seconds. Measured SEL values were not available for 24-inch square concrete piles.

Utilizing the User Spreadsheet, NMFS applied the updated PTS onset thresholds for impulsive PK and  $SEL_{cum}$  in the new acoustic guidance to determine distance to the isopleths for PTS onset for impact pile driving. In determining the cumulative sound exposure levels, the Guidance considers the duration of the activity, the sound exposure level produced by the source during a 24-hr period, and the generalized hearing range of the receiving species. In the case of the dual metric acoustic thresholds for impulsive sound, the larger of the two isopleths for calculating PTS onset is used. Results in Table 4 display the Level A injury zones for the various hearing groups.

TABLE 4—INJURY ZONES AND SHUTDOWN ZONES FOR HEARING GROUPS ASSOCIATED WITH INSTALLATION OF 24-INCH CONCRETE PILES VIA IMPACT DRIVING

Hearing group	Low-frequency cetaceans (gray whale)	Mid-frequency cetaceans	High-frequency cetaceans (harbor porpoise)	Phocid pinnipeds (harbor seal)	Otariid pinnipeds (CA sea lion)
PTS Onset Acoustic Thresholds—Impulsive*. (Received Level) .....	Lpk,flat: 219 dB ..... L <sub>E</sub> ,LF,24h: 183 dB ....	Lpk,flat: 230 dB ..... L <sub>E</sub> ,MF,24h: 185 dB ...	Lpk,flat: 202 dB ..... L <sub>E</sub> ,HF,24h: 155 dB ....	Lpk,flat: 218 dB ..... L <sub>E</sub> ,PW,24h: 185 dB ...	Lpk,flat: 232 dB L <sub>E</sub> ,OW,24h: 203 dB
PTS Isoleth to threshold (m).	24.3 .....	0.9 .....	28.9 .....	13.0 .....	0.9

\* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

**Note:** Peak sound pressure ( $L_{pk}$ ) has a reference value of 1  $\mu$ Pa, and cumulative sound exposure level ( $L_E$ ) has a reference value of 1  $\mu$ Pa<sup>2</sup>s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript “flat” is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

The zone of influence (ZOI) refers to the area(s) in which SPLs equal or exceed NMFS’ current Level B harassment thresholds (160 dB for impulse sound). Calculated radial

distances to the 160 dB threshold assume a field free of obstruction. Assuming a source level of 171 dB RMS, installation of the 24-inch concrete piles is expected to produce underwater

sound exceeding the Level B 160 dB RMS threshold over a distance of 54 meters (177 feet) (Table 5).

TABLE 5—ISOPLETH FOR LEVEL B HARASSMENT ASSOCIATED WITH IMPACT DRIVING OF 24-INCH CONCRETE PILES

Criterion	Definition	Threshold	Isoleth (distance from source)
Level B harassment .....	Behavioral disruption .....	160 dB RMS ..... (impulse sources) .....	54m

**Density/Abundance**—Data specifying a marine mammal’s density or abundance in a given area can often be used to generate exposure estimates. However, no systematic line transect surveys of marine mammals have been performed in the San Francisco Bay near the project site. Density information for marine mammal species has been generated by Caltrans based on 15 years (2000–2015) of observations as part of the San Francisco-Oakland Bay Bridge replacement project (Caltrans 2016). The data revealed densities of 0.00004 animals/kilometer (km<sup>2</sup> for gray whale, 0.021 animals/km<sup>2</sup> for harbor porpoise, 0.09 animals/km<sup>2</sup> for California sea lion, and 0.17 animals/km<sup>2</sup> for harbor seal. Utilization of these data to develop exposure estimates results in very small exposure values. Despite the near zero estimate provided through use of the Caltrans density data, local observational data led us to believe that this estimate may not be accurate in illustrating the potential for take at this particular site, so we have to use other information. Instead, NMFS relied on local observational data as described below.

**Take Estimate**—The estimated number of marine mammals that may be exposed to noise at levels expected to result in take as defined in the MMPA is determined by comparing the calculated areas over which the Level B harassment threshold may be exceeded, as described above, with the expected distribution of marine mammal species within the vicinity of the project. NMFS calculated take qualitatively utilizing observational data taken during marine mammal monitoring associated with the RSRB retrofit project, the San Francisco-Oakland Bay Bridge replacement project, and other marine mammal observations for San Francisco Bay. As described previously in the *Effects* section, Level B Harassment is expected to occur and is authorized in the numbers identified below.

*Pacific Harbor Seal*

Castro Rocks is the largest harbor seal haul out site in the northern part of San Francisco Bay and is the second largest pupping site in the Bay (Green *et al.*, 2002). The pupping season is from March to June in San Francisco Bay. During the molting season (typically

June-July and coinciding with the period when piles will be driven) as many as 129 harbor seals have been observed using Castro Rocks as a haul out. Harbor seals are more likely to be hauled out in the late afternoon and evening, and are more likely to be in the water during the morning and early afternoon (Green *et al.*, 2002). However, during the molting season, harbor seals spend more time hauled out and tend to enter the water later in the evening. During molting, harbor seals can stay onshore resting for an average of 12 hours per day during the molt compared to around 7 hours per day outside of the pupping/molting seasons (NPS 2014).

Tidal stage is a major controlling factor of haul out usage at Castro Rocks with more seals present during low tides than high tide periods (Green *et al.*, 2002). Additionally, the number of seals hauled out at Castro Rocks also varies with the time of day, with proportionally more animals hauled out during the nighttime hours (Green *et al.*, 2002). Therefore, the number of harbor seals in the water around Castro Rocks will vary throughout the work period. The take estimates are based on the

highest number of harbor seals observed at Castro Rocks during 2007 to 2012 annual surveys (approximately 129 seals). Without site-specific data, it is impossible to determine how many hauled out seals enter the water and, of those, how many enter into the Level B harassment area. Given the relatively small size of the Level B harassment area compared to the large expanse of Bay water that is available to the seals, NMFS will assume that no more than 6 seals per day would enter into the Level B harassment area during the 40 minutes of pile driving per day scheduled to occur over 4 days. Therefore, NMFS authorizes Level B take of up to 6 seals per day may over 4 days of impact driving, resulting in a total of 24 authorized incidents of take.

*California Sea Lion*

Relatively few California sea lions are expected to be present in the project area during periods of pile driving, as there are no haul-outs utilized by this species in the vicinity. However, monitoring for the RSRB did observe small numbers of this species in the north and central portions of the Bay during working hours. During

monitoring that occurred over a period of May 1998 to February 2002, California sea lions were sighted at least 90 times in the northern portion of the Central Bay and at least 57 times near the San Francisco-Oakland Bay Bridge in the Central Bay. During monitoring for the San Francisco-Oakland Bay Bridge Project in the Central Bay, California sea lions were observed on 69 occasions in the vicinity of the bridge over a 14-year period from 2000–2014 (Caltrans 2015b). The limited data regarding these observations do not allow a quantitative assessment of potential take. Given the limited driving time, low number of sea lions that are likely to be found in the northern part of the Bay, and small size of the level B zone, NMFS is authorizing a total of two incidents of take for California sea lions.

*Harbor Porpoise*

A small but growing population of harbor porpoises utilizes San Francisco Bay. Harbor porpoises are typically spotted in the vicinity of Angel Island and the Golden Gate Bridge (6 and 12 km southwest respectively) (Keener 2011), but may utilize other areas in the

Central Bay in low numbers, including the project area. The density and frequency of this usage throughout the Bay is unknown. For this IHA, NMFS is not authorizing take of any harbor porpoise since the exclusion zone will be conservatively set at 55 m, which is larger than the Level B zone isopleth of 54 m, and take can be avoided.

*Gray Whale*

The only whale species that enters San Francisco bay with any regularity is the gray whale. Gray whales occasionally enter the Bay during their northward migration period, and are most often sighted in the Bay between February and May. Most venture only about 2 to 3 km past the Golden Gate Bridge, but gray whales have occasionally been sighted as far north as San Pablo Bay. Impact pile driving is not expected to occur during this time, however, and gray whales are not likely to be present at other times of year. Furthermore, the exclusion zone of 55 m for this species is larger than the Level B zone isopleth of 54 m. As such, NMFS is not authorizing any gray whale take.

Table 6 shows estimated Level B take for authorized species.

TABLE 6—SUMMARY OF ESTIMATED TAKE BY SPECIES (LEVEL B HARASSMENT)

Pile type	Pile driver type	Number of piles	Number of driving days	Species	
				Harbor seal	CA sea lion
24-inch square concrete .....	Impact .....	8	4	24	2

**Mitigation**

Under section 101(a)(5)(D) of the MMPA, NMFS shall prescribe the permissible methods of taking by harassment pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for subsistence uses.

To ensure that the “least practicable impact” will be achieved, NMFS evaluates mitigation measures in consideration of the following factors in relation to one another:

- The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, their habitat; and
- their availability for subsistence uses (latter where relevant); the proven or likely efficacy of the measures; and the practicability of the measures for applicant implementation.

*Mitigation for Mammals and Their Habitat*

The following measures would apply to Chevron’s mitigation through the exclusion zone and zone of influence (ZOI):

*Time Restriction*—For all in-water pile driving activities, Chevron shall operate only during daylight hours when visual monitoring of marine mammals can be conducted.

*Seasonal Restriction*—To minimize impacts to listed fish species, pile-driving activities would occur between June 1 and November 30.

*Exclusion Zone*—For all pile driving activities, Chevron will establish an exclusion zone intended to contain the area in which Level A harassment thresholds are exceeded. The purpose of the exclusion zone is to define an area within which shutdown of construction activity would occur upon sighting of a marine mammal within that area (or in anticipation of an animal entering the defined area), thus preventing potential injury of marine mammals. The calculated distance to Level A

harassment isopleths threshold during impact pile driving, assuming a maximum of 2 piles per day is 28.9 m for harbor porpoise; 13.0 m for harbor seal; 0.9 m for California sea lion, and; 24.3 m for gray whales.

NMFS will require a 15 m exclusion zone for harbor seals and California sea lions. In order to prevent any take of the cetacean species, a 55 m exclusion zone will be required for harbor porpoises and gray whales, which exceeds the Level B harassment isopleth. A shutdown will occur prior to a marine mammal entering the shutdown zones. Activity will cease until the observer is confident that the animal is clear of the shutdown zone. The animal will be considered clear if:

- It has been observed leaving the shutdown zone; or
- It has not been seen in the shutdown zone for 30 minutes for cetaceans and 15 minutes for pinnipeds.

*10-Meter Shutdown Zone*—During the in-water operation of heavy machinery (e.g., barge movements), a 10-m shutdown zone for all marine mammals

will be implemented. If a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions.

**Level B Harassment Zone (Zone of Influence)**—The ZOI refers to the area(s) in which SPLs equal or exceed NMFS' current Level B harassment thresholds (160 dB rms for pulse sources). ZOIs provide utility for monitoring that is conducted for mitigation purposes (*i.e.*, exclusion zone monitoring) by establishing monitoring protocols for areas adjacent to the exclusion zone. Monitoring of the ZOI enables observers to be aware of, and communicate about, the presence of marine mammals within the project area but outside the exclusion zone and thus prepare for potential shutdowns of activity should those marine mammals approach the exclusion zone. However, the primary purpose of ZOI monitoring is to allow documentation of incidents of Level B harassment; ZOI monitoring is discussed in greater detail later (see *Monitoring and Reporting*). The modeled radial distances for the ZOI for impact pile driving of 24-inch square concrete piles is 54 m. NMFS will require a 55 m Level B zone for harbor seals and California sea lions.

In order to document observed incidents of harassment, monitors will record all marine mammals observed within the ZOI. Due to the relatively small ZOI and to the monitoring locations chosen by Chevron we expect that two monitors will be able to observe the entire ZOI.

The shutdown zone and ZOI shall be monitored throughout the time required to install a pile. If a harbor seal or California sea lion is observed entering the ZOI, a Level B exposure shall be recorded and behaviors documented. That pile segment shall be completed without cessation, unless the animal approaches the shutdown zone. Pile installation shall be halted immediately before the animal enters the Level A zone.

If any marine mammal species other than those for which take is authorized, or if a species for which authorization has been granted but the number of authorized takes has been met enters or approaches the ZOI, all activities shall be shut down until the animal is observed leaving the ZOI or it has not been observed in the ZOI for 30 minutes for cetaceans and 15 minutes for pinnipeds.

**Ramp up/Soft-Start**—A "soft-start" technique is intended to allow marine mammals to vacate the area before the pile driver reaches full power. For

impact driving, an initial set of three strikes would be made by the hammer at reduced energy, followed by a 30-sec waiting period, then two subsequent three-strike sets before initiating continuous driving. Soft start will be required at the beginning of each day's impact pile driving work and at any time following a cessation of impact pile driving of thirty minutes or longer.

If a marine mammal is present within a shutdown zone, ramping up shall be delayed until the animal(s) leaves the relevant shutdown zone. Activity shall begin only after the MMO has determined, through sighting, that the animal(s) has moved outside the relevant shutdown zone or it has not been observed in the shutdown zone for 30 minutes for cetaceans and 15 minutes for pinnipeds.

If an authorized species is present in the Level B harassment zone, ramping up shall begin and a Level B take shall be documented. Ramping up shall occur when these species are in the Level B harassment zone whether they entered the Level B zone from the Level A zone, or from outside the project area.

**Pile Caps/Cushions**—Chevron will employ the use of pile caps or cushions as sound attenuation devices to reduce impacts from sound exposure during impact pile driving.

Based on our evaluation of the applicant's measures, as well as other measures considered by NMFS, we have determined that the required mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

### Monitoring and Reporting

In order to issue an IHA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must set forth, requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved

understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the action area (*e.g.*, presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) Action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) Long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and
- Mitigation and monitoring effectiveness.

Chevron will collect sighting data and will record behavioral responses to construction activities for marine mammal species observed in the project location during the period of activity. Monitoring will be conducted by qualified marine mammal observers (MMO), who are trained biologists, with the following minimum qualifications:

- Independent observers (*i.e.*, not construction personnel) are required;
- At least one observer must have prior experience working as an observer;
- Other observers may substitute education (undergraduate degree in biological science or related field) or training for experience;
- Ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and

times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone; and marine mammal behavior;

- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary; and
- NMFS will require submission and approval of observer CVs.

Chevron will monitor the exclusion zones and Level B harassment zone before, during, and after pile driving, with at least two observers located at the best practicable vantage points. Based on our requirements, the Marine Mammal Monitoring Plan would implement the following procedures for pile driving:

- During observation periods, observers will continuously scan the area for marine mammals using binoculars and the naked eye;
- Monitoring shall begin 30 minutes prior to impact pile driving;
- Observers will conduct observations, meet training requirements, fill out data forms, and report findings in accordance with this IHA;

- If the exclusion zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the exclusion zone is clearly visible. Should such conditions arise while impact driving is underway, the activity would be halted;

- Observers will be in continuous contact with the construction personnel via two-way radio. A cellular phone will be used for back-up communications and for safety purposes;

- Observers will implement mitigation measures including monitoring of the shutdown and monitoring zones, clearing of the zones, and shutdown procedures; and

- At the end of the pile-driving day, post-construction monitoring will be conducted for 30 minutes beyond the cessation of pile driving.

#### *Sound Source Verification*

Sound Source Verification (SSV) testing of impact driving will be conducted under this IHA. Little data exist for source levels associated with installation of 24-in square concrete piles (including data on single strike sound exposure level metrics). Chevron will conduct in-situ measurements during installation of four out of eight piles. The SSV will be conducted by an acoustical firm with prior experience

conducting SSV tests. NMFS must approve the acoustic monitoring plan. Final results will be sent to NMFS. Findings will be used to establish Level A and Level B isopleths during impact driving of 24-in square concrete piles for future IHA's associated with this project.

#### *Data Collection*

We require that observers use approved data forms. Among other pieces of information, chevron will record detailed information about any implementation of shutdowns, including the distance of animals to the pile being driven, a description of specific actions that ensued, and resulting behavior of the animal, if any. In addition, Chevron will attempt to distinguish between the number of individual animals taken and the number of incidents of take, when possible. We require that, at a minimum, that the following information be recorded on sighting forms:

- Date and time that permitted construction activity begins or ends;
- Weather parameters (*e.g.*, percent cloud cover, percent glare, visibility) and Beaufort sea state;
- Species, numbers, and, if possible, sex and age class of observed marine mammals;
- Construction activities occurring during each sighting;
- Marine mammal behavior patterns observed, including bearing and direction of travel;
- Specific focus should be paid to behavioral reactions just prior to, or during, soft-start and shutdown procedures;
- Location of marine mammal, distance from observer to the marine mammal, and distance from pile driving activities to marine mammals;
- Record of whether an observation required the implementation of mitigation measures, including shutdown procedures and the duration of each shutdown; and
- Other human activity in the area.

Record the hull numbers of fishing vessels if possible.

#### *Reporting Measures*

Chevron shall submit a draft report to NMFS within 90 days of the completion of marine mammal monitoring, or 60 days prior to the issuance of any subsequent IHA for this project (if required), whichever comes first. The annual report would detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed.

If no comments are received from NMFS within 30 days, the draft final report will become final. If comments are received, a final report must be submitted up to 30 days after receipt of comments. Reports shall contain the following information:

- Summaries of monitoring effort (*e.g.*, total hours, total distances, and marine mammal distribution through the study period, accounting for sea state and other factors affecting visibility and detectability of marine mammals);
- Analyses of the effects of various factors influencing detectability of marine mammals (*e.g.*, sea state, number of observers, and fog/glare); and
- Species composition, occurrence, and distribution of marine mammal sightings, including date, numbers, age/size/gender categories (if determinable), and group sizes.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as an injury (Level A harassment), serious injury or mortality (*e.g.*, ship-strike, gear interaction, and/or entanglement), Chevron would immediately cease the specified activities and immediately report the incident to the Office of Protected Resources, NMFS, and the West Coast Regional Stranding Coordinator. The report would include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved (if applicable);
- Vessel's speed during and leading up to the incident (if applicable);
- Description of the incident;
- Status of all sound source used in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with Chevron to determine necessary actions to minimize the likelihood of further prohibited take and ensure MMPA compliance.

Chevron would not be able to resume their activities until notified by NMFS via letter, email, or telephone.

In the event that Chevron discovers an injured or dead marine mammal, and the lead MMO determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.*, in less than a moderate state of decomposition as described in the next paragraph), Chevron would immediately report the incident to the Office of Protected Resources, NMFS, and the West Coast Regional Stranding Coordinator. The report would include the same information identified in the section above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with Chevron to determine whether modifications in the activities are appropriate.

In the event that Chevron discovers an injured or dead marine mammal, and the lead MMO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Chevron would report the incident to Office of Protected Resources, NMFS, and West Coast Regional Stranding Coordinator, within 24 hours of the discovery. Chevron would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. Pile driving activities would be permitted to continue.

#### **Negligible Impact Analysis and Determination**

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes, alone, is not enough information on which to base an impact determination. In addition to considering the authorized number of marine mammals that might be taken through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration, etc.), as well as effects on habitat, the status of the affected stocks, and the likely effectiveness of the mitigation. Consistent with the 1989 preamble for NMFS's implementing regulations (54

FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into these analyses via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, this introductory discussion of our analyses applies to all the species listed in Table 7 given that the anticipated effects of Chevron's construction activities involving impact pile driving on marine mammals are expected to be relatively similar in nature. There is no information about the nature or severity of the impacts, or the size, status, or structure of any species or stock that would lead to a different analysis for this activity, or else species-specific factors would be identified and analyzed.

Impact pile driving activities associated with the project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment (behavioral disturbance), from underwater sounds generated from pile driving. Potential takes could occur if individuals of these species are present in the ensonified zone when in-water construction is under way.

No marine mammal stocks for which incidental take authorization are listed as threatened or endangered under the ESA or determined to be strategic or depleted under the MMPA. No injuries or mortalities are anticipated to occur as a result of Chevron's impact pile driving activities. The relatively low marine mammal density and small shutdown zones make injury takes of marine mammals unlikely. In addition, the Level A exclusion zones would be thoroughly monitored before the impact pile driving occurs and driving activities would be postponed if a marine mammal is sighted entering the exclusion zones. The likelihood that marine mammals will be detected by trained observers is high under the environmental conditions described for the project. The employment of the soft-start mitigation measure would also allow marine mammal in or near the ZOI or exclusion zone to move away from the impact driving sound source. Therefore, the mitigation and monitoring measures are expected to eliminate the potential for injury and reduce the amount and intensity of behavioral harassment. Furthermore, the pile driving activities analyzed here are similar to, or less impactful than,

numerous construction activities conducted in other similar locations which have taken place with no reported injuries or mortality to marine mammals, and no known long-term adverse consequences from behavioral harassment.

The takes that are anticipated and authorized are expected to be limited to short-term Level B harassment (behavioral) as only eight piles will be driven over 4 days with each pile requiring approximately 20 minutes of driving time. Marine mammals present near the action area and taken by Level B harassment would most likely show overt brief disturbance (*e.g.* startle reaction) and avoidance of the area from elevated noise level during pile driving. Repeated exposures of individuals to levels of sound that may cause Level B harassment are unlikely to significantly disrupt foraging behavior. Thus, even repeated Level B harassment of some small subset of the overall stock is unlikely to result in any significant realized decrease in fitness for the affected individuals, and thus would not result in any adverse impact to the stock as a whole.

The project is not expected to have significant adverse effects on affected marine mammals' habitat. While EFH for several species does exist in the project area, the activities would not permanently modify existing marine mammal habitat. The activities may cause fish to leave the area temporarily. This could impact marine mammals' foraging opportunities in a limited portion of the foraging range; but, because of the short duration of the activities and the relatively small area of affected habitat, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

In summary, this negligible impact analysis is founded on the following factors: (1) The possibility of non-auditory injury, serious injury, or mortality may reasonably be considered discountable; (2) the anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior; (3) the short duration of in-water construction activities (4 days, 160 minutes total driving time); (4) limited spatial impacts to marine mammal habitat; and (5) the presumed efficacy of the mitigation measures in reducing the effects of the specified activity to the level of least practicable impact. In combination, we believe that these factors, as well as the available body of evidence from other similar activities, demonstrate that the potential effects of the specified activity will have only short-term effects on individuals.

The specified activity is not expected to impact rates of recruitment or survival and will therefore not result in population-level impacts.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the monitoring and mitigation measures, NMFS finds that the total marine mammal take from the activity will have a negligible impact on all affected marine mammal species or stocks.

#### Small Numbers

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, NMFS compares the number of individuals taken to the most appropriate estimation of the relevant species or stock size in our determination of whether an

authorization is limited to small numbers of marine mammals.

The numbers of animals authorized to be taken would be considered small relative to the relevant stocks or populations (<0.01 percent for both species as shown in Table 7) even if each estimated taking occurred to a new individual. However, the likelihood that each take would occur to a new individual is extremely low. Further, these takes are likely to occur only within some small portion of the overall regional stock.

TABLE 7—POPULATION ABUNDANCE ESTIMATES, TOTAL AUTHORIZED LEVEL B TAKE, AND PERCENTAGE OF POPULATION THAT MAY BE TAKEN FOR THE POTENTIALLY AFFECTED SPECIES DURING THE PROJECT

Species	Abundance*	Total level B take	Percentage of stock or population
Harbor seal .....	130,968	24	<0.01
California sea lion (U.S. Stock) .....	296,750	2	<0.01

\* Abundance estimates are taken from the 2015 U.S. Pacific Marine Mammal Stock Assessments (Carretta *et al.*, 2016).

<sup>1</sup> California stock abundance estimate.

Based on the analysis contained herein of the activity (including the mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

#### Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

#### Endangered Species Act (ESA)

Issuance of an MMPA authorization requires compliance with the ESA. No incidental take of ESA-listed species is authorized or expected to result from this activity. Therefore, NMFS has determined that consultation under section 7 of the ESA is not required for this action.

#### National Environmental Policy Act (NEPA)

Issuance of an MMPA authorization requires compliance with NEPA. NMFS has established categorical exclusion (CE) status under NEPA for this action. As such, we have determined the issuance of the IHA is consistent with categories of activities identified in CE B4 of the Companion Manual for NAO 216-6A and we have not identified any

extraordinary circumstances listed in Chapter 4 of the Companion Manual for NAO 216-6A that would preclude this categorical exclusion. NMFS has prepared a CE memorandum for the record.

#### Authorization

As a result of these determinations, NMFS has issued an IHA to Chevron for the harassment of small numbers of harbor seals and California sea lions incidental to the Richmond Refinery Long Wharf Maintenance and Efficiency Project in San Francisco Bay, California effective for one year beginning January 1, 2018, provided the previously mentioned mitigation, monitoring and reporting requirements are incorporated.

Dated: June 9, 2017.

Donna S. Wieting,

Director, Office of Protected Resources,  
National Marine Fisheries Service.

[FR Doc. 2017-12295 Filed 6-13-17; 8:45 am]

BILLING CODE 3510-22-P

#### DEPARTMENT OF COMMERCE

#### National Oceanic and Atmospheric Administration

RIN 0648-XF436

#### North Pacific Fishery Management Council; Public Meeting

**AGENCY:** National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

**ACTION:** Notice of an Outreach meeting of the North Pacific Fishery Management Council and St. Paul Residents.

**SUMMARY:** The North Pacific Fishery Management Council (Council) will meet June 26 through June 27, 2017.

**DATES:** Several Council members and Council staff will be meeting with community members and organizations on Monday, June 26 and Tuesday, June 27, 2017.

**ADDRESSES:** Meetings will be held in the Community Center on St. Paul Island, AK.

*Council address:* North Pacific Fishery Management Council, 605 W. 4th Ave., Suite 306, Anchorage, AK 99501-2252; telephone: (907) 271-2809.

**FOR FURTHER INFORMATION CONTACT:** Steve MacLean, Council staff; telephone: (907) 271-2809.

#### SUPPLEMENTARY INFORMATION:

#### Agenda

Monday, June 26, 2017 Through  
Tuesday, June 27, 2017

Public outreach meetings with St. Paul community members and organizations will be held. Issues for discussion will include the local halibut fishery and halibut bycatch, the Bering Sea Crab fishery, conservation of Northern Fur Seals, and other pertinent fishery management issues. All meetings are open to the public. The Agenda is subject to change, and the latest version will be posted at <http://www.npfmc.org/>.

# **ATTACHMENT 6**

DRAFT  
ENVIRONMENTAL IMPACT REPORT

*San Pablo Bay*

Vallejo

FOR THE

Martinez



TESORO

TESORO AVON  
MARINE OIL TERMINAL  
LEASE CONSIDERATION



PREPARED BY  
CALIFORNIA STATE LANDS COMMISSION  
100 HOWE AVENUE, SUITE 100-SOUTH  
SACRAMENTO, CALIFORNIA 95825-8202

SEPTEMBER 2014

## 4.2 BIOLOGICAL RESOURCES

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1  
2 Section 4.2 presents the existing environment and impacts analysis of biological  
3 resource issues associated with the granting of a new lease for the continued operation  
4 of the Tesoro Avon Marine Oil Terminal (Avon Terminal) in the lower Suisun Bay, and  
5 Marine Oil Terminal Engineering Maintenance Standards (MOTEMS) compliance-  
6 related renovation. This section describes the existing biological resources in the San  
7 Francisco Bay Estuary (SFBE) and in the Avon Marine Oil Terminal Lease  
8 Consideration Project (Project) study area (lower Suisun Bay, upper Carquinez Strait,  
9 and Avon Terminal vicinity) and summarizes laws and regulations associated with  
10 biological resources. This is followed by an analysis of the potential Project impacts  
11 associated with routine continued operations and MOTEMS renovation at the Avon  
12 Terminal. An accidental release of oil presents the potential to impact nearby biological  
13 resources and could have wide-ranging effects on biological resources in the SFBE.

### 14 4.2.1 ENVIRONMENTAL SETTING

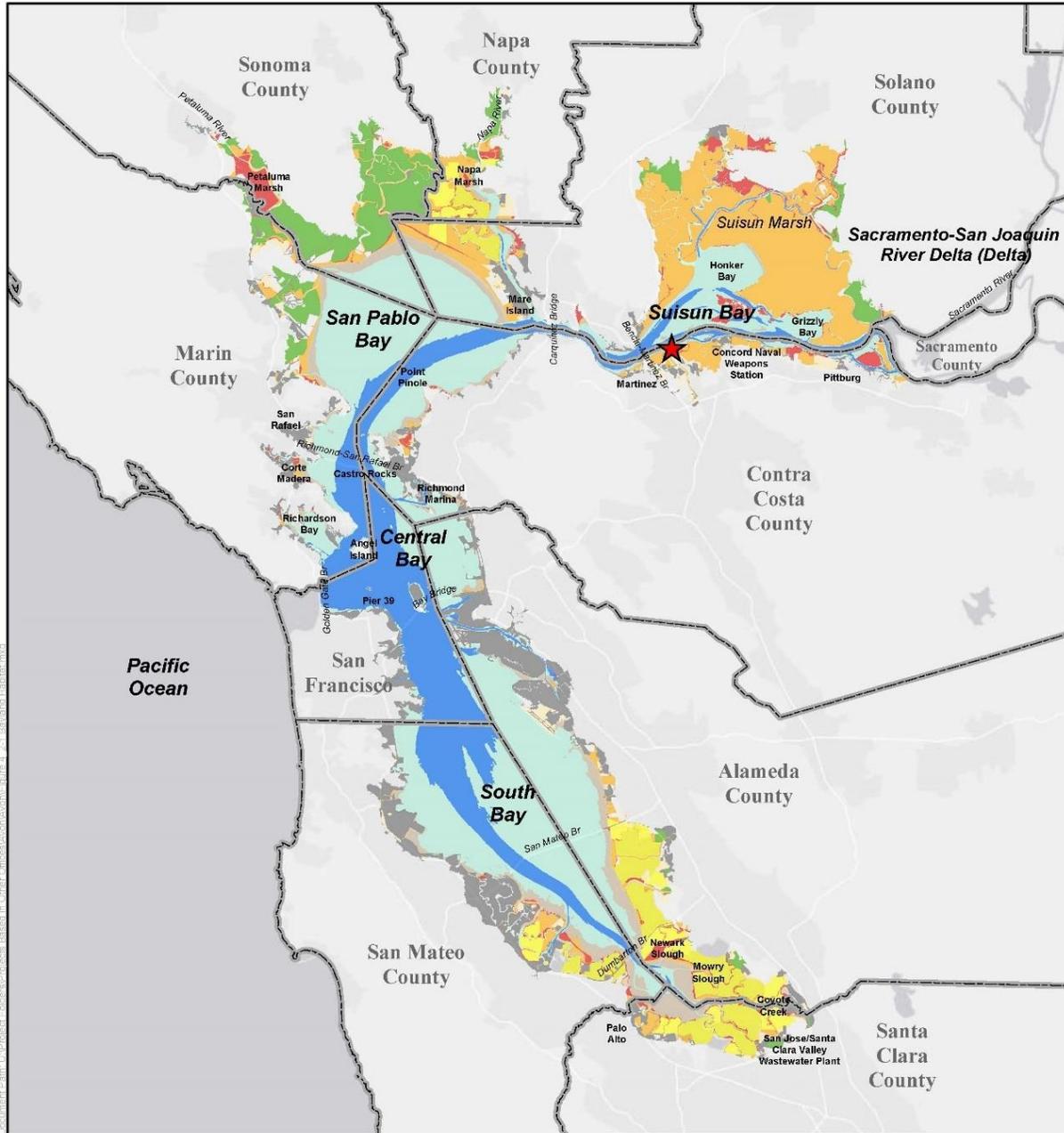
#### 15 4.2.1.1 San Francisco Bay Estuary

##### 16 Geographic and Hydrologic Characteristics of the San Francisco Bay Estuary

17 The SFBE is typically divided into five segments: Sacramento-San Joaquin River Delta  
18 (Delta), Suisun Bay, San Pablo Bay, Central Bay, and South Bay (see Figure 4.2-1). In  
19 recognition of the importance of the SFBE, the United States named it as its 35<sup>th</sup>  
20 Wetland of International Importance (Ramsar Convention on Wetlands 2013).

21 The Delta is the easternmost, or most upstream, segment. The Delta is a 1,150-square-  
22 mile triangle-shaped region roughly bounded on the north by the city of Sacramento, on  
23 the south by the city of Tracy, and on the west by Chipps Island. The Sacramento and  
24 San Joaquin Rivers and their tributaries flowing into the Delta drain about half of the  
25 surface area of California, and establish the extent of brackish water habitat in Suisun  
26 Bay.

27 Suisun Bay is a shallow estuarine bay bounded by Chipps Island on the east and the  
28 Benicia-Martinez Bridge on the west. Suisun Marsh, the largest brackish water marsh in  
29 the United States and the largest wetland in California, forms its northern boundary.  
30 Suisun Bay has the lowest salinity levels in the SFBE, with values ranging from  
31 oligohaline (0.5 to 5.0 parts per thousand [ppt]) to mesohaline (5.0 to 18.0 ppt)  
32 depending on seasonal variations in tides, evaporation, and freshwater inflows from the  
33 Delta. The southern shore of Suisun Bay is home to the Military Ocean Terminal  
34 Concord (MOTCO; formerly known as the Concord Naval Weapons Station), the cities  
35 of Pittsburg, West Pittsburg, and Martinez, and the unincorporated community of Avon.  
36 Suisun Bay is connected to San Pablo Bay via the Carquinez Strait, a narrow, 12-mile-  
37 long band of water that extends from the Benicia-Martinez Bridge to Mare Island.



**Figure 4.2-1**  
**Bayland Habitat**  
 California State Lands Commission  
*Avon Marine Oil Terminal Lease Consideration Project*

★ Approximate Terminal Location

- Shallow Bay
- Deep Bay
- Tidal Flat
- Old Tidal Marsh
- Tidal Marsh
- Diked Marsh
- Agricultural Bayland
- Salt Pond
- Filled Baylands

TRC  
 Results you can rely on

8/13/2014

0 4.5 9 Miles

Service Layer Credits: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community, SFEI

1 San Pablo Bay is the second largest bay in the SFBE; it extends from the Carquinez  
2 Strait to the San Pablo Strait, near the Richmond-San Rafael Bridge, where it forms the  
3 upstream boundary of the Central Bay. San Pablo Bay is moderately saline, or  
4 polyhaline, with salinity levels ranging from 18.0 to 30.0 ppt. Much of the north shore of  
5 San Pablo Bay is protected as part of the San Pablo Bay National Wildlife Refuge.

6 The Central Bay is defined as an area bound by three bridges: The Richmond-San  
7 Rafael Bridge, Golden Gate Bridge, and San Francisco-Oakland Bay Bridge. Central  
8 Bay is the coldest, deepest, and most saline of the bays; it is considered euhaline, with  
9 salinity levels between 30.0 and 35.0 ppt. Due to its proximity to the Pacific Ocean, its  
10 water quality parameters are more stable than its neighboring bays. Ecological  
11 conditions in the Central Bay are also more stable than in neighboring bays (San  
12 Francisco Estuary Partnership [SFEP] 2011).

13 The waters south of the San Francisco-Oakland Bay Bridge form the largest  
14 embayment, known as the South Bay. The waters in the South Bay are shallow and  
15 polyhaline. Freshwater flows to the South Bay are limited to seasonal flows from  
16 Guadalupe River and other streams. Throughout the year, the largest flows into South  
17 Bay are treated waters from the San Jose/Santa Clara County Water Pollution Control  
18 Plant (Okamoto and Wong 2011). Water circulation and fresh inflows are so limited that  
19 this bay is considered a lagoon-like, estuarine backwater.

20 The SFBE's tidal cycle is mixed semidiurnal, resulting in two cycles each day. The  
21 average height of the higher tide is called extreme high tide, or local mean higher high  
22 water (MHHW), while the average of the high tides is called high tide, or local mean  
23 high water (MHW). Extreme low tide or mean lower low water (MLLW) and low tide or  
24 mean low water (MLW) refer to the average height of the lowest tide and the average of  
25 all low tides, respectively. Mean tide level (MTL) lies midway between MHW and MLW.  
26 Tidal highs and lows in the bay vary with time of day, the position of the moon, season,  
27 and distance from the Pacific Ocean. The relative height covered by these tidal datums  
28 has important implications for shoreline habitat.

### 29 **Habitats of the San Francisco Bay Estuary**

30 The habitats in the SFBE are dynamic and can be influenced by seasonal flooding,  
31 extreme tides, drought, and human activity. Figure 4.2-1 depicts habitat distribution in  
32 the estuary. Characteristics of the biotic communities at each habitat are provided in  
33 Table 4.2-1.

**Table 4.2-1: Biotic Communities of the San Francisco Bay Estuary<sup>1</sup>**

Community	Locations and Examples	Characteristic Plants	Characteristic Animals
Diadromous	Open waters of the San Francisco Bay Estuary, Sacramento and San Joaquin Rivers, Napa River	N/A	Chinook salmon ( <i>Oncorhynchus tshawytscha</i> ), steelhead ( <i>Oncorhynchus mykiss</i> ), delta smelt ( <i>Hypomesus transpacificus</i> ), longfin smelt ( <i>Spirinchus thaleichthys</i> ), striped bass ( <i>Morone saxatilis</i> )
Limnetic	0 to 0.5 ppt <sup>2</sup> salinity. Sacramento River, San Joaquin River	Sago pondweed ( <i>Potamogeton pectinatus</i> )	Asian clam ( <i>Corbicula fluminea</i> )
Oligohaline	0.5 to 5.0 ppt salinity. Suisun Bay	Widgeon grass ( <i>Ruppia maritime</i> )	California bay shrimp ( <i>Crangon franciscorum</i> )
Mesohaline	5.0 to 18.0 ppt salinity. Suisun Bay, Carquinez Strait	Widgeon grass ( <i>Ruppia maritime</i> )	Overbite clam ( <i>Corbula amurensis</i> ), Oriental shrimp ( <i>Palaemon macrodactylus</i> ), starry flounder ( <i>Platichthys stellatus</i> )
Polyhaline	18.0 to 30.0 ppt salinity. Carquinez Strait, San Pablo Bay, South Bay	<i>Ulva</i> , <i>Gracilaria pacifica</i> , <i>Fucus</i> , <i>Sargassum muticum</i> , eelgrass ( <i>Zostera marina</i> )	Blacktail bay shrimp ( <i>Crangon nigricauda</i> ), Dungeness crab ( <i>Metacarcinus magister</i> ), Pacific herring ( <i>Clupea pallasii</i> ), Pacific staghorn sculpin ( <i>Leptocottus armatus</i> ), English sole ( <i>Parophrys vetulus</i> )
Euhaline	30.0 to 35.0 ppt salinity. Central Bay	<i>Ulva</i> , <i>Gracilaria pacifica</i> , <i>Fucus</i> , <i>Sargassum muticum</i> , eelgrass ( <i>Zostera marina</i> )	Blackspotted bay shrimp ( <i>Crangon nigromaculata</i> ), leopard shark ( <i>Triakis semifasciata</i> ), bat ray ( <i>Myliobatis californica</i> ), Pacific sardine ( <i>Sardinops sagax</i> ), northern anchovy ( <i>Engraulis mordax</i> ), California halibut ( <i>Paralichthys californicus</i> )
Tidal flat	Along bay shore in San Mateo, Santa Clara, Alameda, Marin, Napa, Contra Costa, Solano Counties	<i>Ulva</i> spp., <i>Gracilaria pacifica</i> , <i>Fucus</i> spp., <i>Sargassum muticum</i> , eelgrass ( <i>Zostera marina</i> )	California bay shrimp ( <i>Crangon franciscorum</i> ), least sandpiper ( <i>Calidris minutilla</i> ), western sandpiper ( <i>Calidris mauri</i> ), willet ( <i>Tringa semipalmata</i> )
Tidal marsh	Along bay shore in San Mateo, Santa Clara, Alameda, Marin, Napa, Contra Costa, Solano Counties (e.g., Martinez)	Pickleweed ( <i>Salicornia virginica</i> ), sea blite ( <i>Suaeda californica</i> ), marsh rosemary ( <i>Limonium commune</i> ), marsh grindelia ( <i>Grindelia hirsutula</i> ),	Clapper rail ( <i>Rallus longirostris</i> ), marsh hawk ( <i>Circus cyaneus</i> ), short-eared owl, ( <i>Asio flammeus</i> ), salt-marsh harvest mouse ( <i>Reithrodontomys raviventris</i> ), vagrant shrew ( <i>Sorex vagrans</i> ), salt marsh fly ( <i>Ephydra riparia</i> ),

Community	Locations and Examples	Characteristic Plants	Characteristic Animals
	marshes, Peyton Slough)	California cord grass ( <i>Spartina foliosa</i> )	salt marsh mosquitoes ( <i>Aedes sgamiger</i> , <i>A. dorsalis</i> ).
Coastal scrub	Dry rocky or gravelly slopes below 3,000 feet	California sage brush ( <i>Artemisia californica</i> ), black sage ( <i>Salvia mellifera</i> ), coyote brush ( <i>Baccharis pilularis</i> ), bush monkey-flower ( <i>Mimulus aurantiacus</i> ).	Rufous-crowned sparrow ( <i>Aimophila ruficeps</i> ), rock wren ( <i>Salpinctes obsoletus</i> ), wrentit ( <i>Chamaea fasciata</i> ), brush rabbit ( <i>Sylvilagus bachmani</i> ), western fence lizard ( <i>Sceloporus occidentalis</i> ).
Urban shoreline	Manmade shorelines in all San Francisco Bay Area counties, San Francisco shoreline, Oakland shoreline	Himalayan blackberry ( <i>Rubus armeniacus</i> ), pampas grass ( <i>Cortaderia spp.</i> ), Bermuda grass ( <i>Cynodon dactylon</i> )	House sparrow ( <i>Passer domesticus</i> ), rock dove ( <i>Columba livia</i> ), western scrub jay ( <i>Aphelocoma californica</i> ), domestic cat ( <i>Felis catus</i> ), domestic dog ( <i>Canis lupus familiaris</i> ), raccoon ( <i>Procyon lotor</i> )

Sources: Smith 1959, National Oceanic and Atmospheric Administration 2007

<sup>1</sup> Many aquatic plant and animal species may be found in more than one biotic community and inclusion as a characteristic species does not mean a species can only be found in a single habitat.

<sup>2</sup> ppt = Parts by weight of salt per thousand parts of water

## 1 Subtidal

2 Open-water habitats are divided into shallow bay (subtidal areas less than 18 feet deep  
3 below extreme low tide) and deep bay (more than 18 feet deep). The bay contains  
4 approximately 164,000 acres of shallow bay habitat and 81,000 acres of deep bay  
5 habitat (Monroe et al. 1999). Deep bay areas are found in the Central Bay and South  
6 Bay, and along the main deep-water channel in the San Pablo and Suisun Bays. All of  
7 the bays in the SFBE contain extensive areas of shallow bay habitat.

8 The open waters of the SFBE are primarily underlain by soft-bottom bay sediments,  
9 although small areas exist where the substrate is either vegetated or supports shellfish  
10 beds. Eelgrass is present, and has potential to expand its range in the North, Central,  
11 and South Bays, but is absent from Suisun Bay (Boyer and Wyllie-Echeverria 2010).  
12 Areas of eelgrass habitat are found along the urban coastlines west of Richmond and  
13 Oakland. The southern shoreline of San Pablo Bay contains the most extensive areas  
14 of eelgrass beds in the SFBE. Native oyster beds are found in the same general areas  
15 as eelgrass habitats. Crushed shell substrate is found in the South Bay (SFEP 2011).

16 Soft-bottom substrate consists of sedimentary particles such as clay, silt, and sand that  
17 can be readily mobilized by tidal currents. This widespread substrate covers 90 percent  
18 of the SFBE (SFEP 2011). The primary sources of sediment into the SFBE are the  
19 watersheds of the Sacramento and San Joaquin Rivers. River currents carry sediment

1 into the estuary and deposit it onto the channel bottom, while tidal currents resuspend  
2 the fine sediment into the water column. The cyclical deposition and resuspension of  
3 fine sediments leads to sorting by grain size, where larger grain sediments are found in  
4 the channels and mud/silt/clay accretes into consolidated mudflats near shore. Soft-  
5 bottom substrates are characterized by a lack of large, stable surfaces for plant and  
6 animal attachment (National Oceanic and Atmospheric Administration [NOAA] 2007).  
7 Due to a lack of hard surfaces for rooting, few plants are associated with soft-bottom  
8 habitats. However, though mobile, the fine-grained sediment is both stable and compact  
9 enough to support a diverse benthic assemblage.

10 The biotic assemblages in the subtidal habitats of the SFBE vary with salinity. Species  
11 tolerant of high levels of salinity, but less adaptable to variable changes in salinity, are  
12 found in the Central and South Bays. San Pablo Bay and Suisun Bay support brackish  
13 water and freshwater species that are more tolerant of shifting salinity levels. Suisun  
14 Bay is also the site of the entrapment zone, an area where suspended materials  
15 concentrate as a result of mixing by the outgoing freshwater flow from the Delta above  
16 the heavier saltwater flow from San Francisco Bay. The entrapment zone contains  
17 concentrations of suspended materials, such as nutrients, plankton, and fine sediments,  
18 which are often many times higher than in areas upstream or downstream of the  
19 entrapment zone (Levine-Fricke 2004). This trophically rich habitat is thought to be  
20 important for the rearing of many fish species. Its precise location between the lower  
21 Delta and Suisun Bay varies according to the strength and phase of the tides, and the  
22 level of freshwater inflow from the Sacramento and San Joaquin Rivers. High  
23 freshwater flows from the Delta push the entrapment zone west toward Carquinez  
24 Strait; low flows put it closer to the mouth of the Delta.

### 25 Tidal Flats

26 Tidal flat habitat is the strip of intertidal habitat located between MLLW and MTL. It is  
27 exposed twice a day during low tide. During high tide, inundated tidal flats provide  
28 foraging habitat for fish such as longfin smelt (*Spirinchus thaleichthys*), starry flounder  
29 (*Platichthys stellatus*), and several species of sculpin. During low tide, shorebirds feed  
30 on clams, shrimp, and worms found in the exposed tidal flats. Extreme high and low  
31 tides occur in May and June, and in November and December, the latter period  
32 coinciding with the time that high numbers of waterbirds migrate through the San  
33 Francisco Bay Area (Bay Area). The most extensive areas of tidal flat are found in the  
34 South Bay and along the north shore of San Pablo Bay. About half of the SFBE's tidal  
35 flats are found in the South Bay, making it the region's most important area for  
36 shorebirds (Monroe et al. 1999). Tidal flats in the Central Bay are limited by shoreline  
37 development. Suisun Bay has a more narrow tidal range than the other bays, and has  
38 correspondingly less tidal flat.

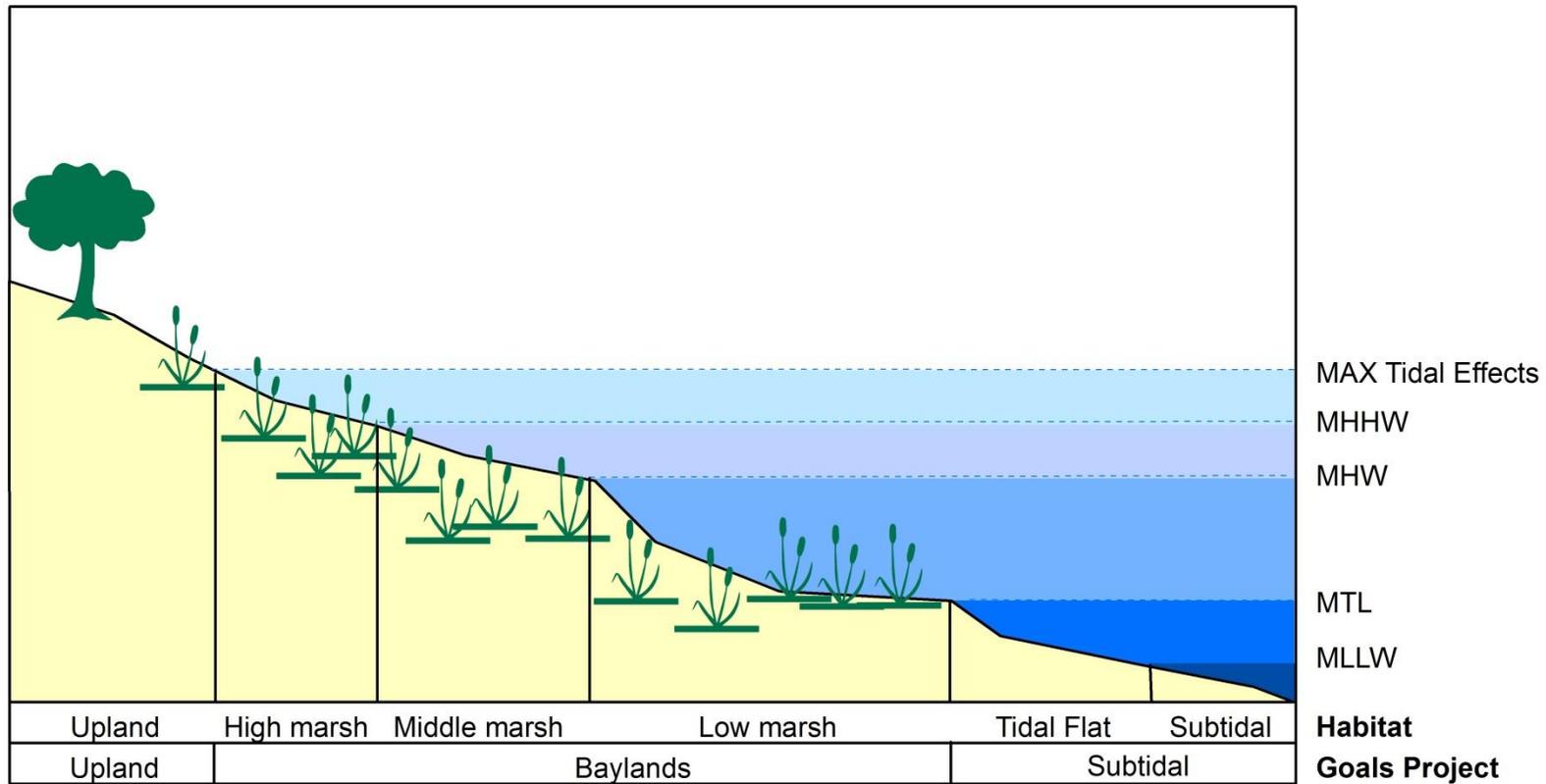
## 1 Tidal Marsh

2 Tidal marshes are defined as the vegetated habitat between MLW and extreme high  
3 water (Josselyn 1983). Though not all tidal marshes are saline, they are sometimes also  
4 called salt marshes or saline wetlands. These marshes intergrade on their bay side with  
5 tidal flats and on their inland side with freshwater marshes. Tidal marshes are highly  
6 productive biological systems. Though only a small number of vascular plant species  
7 are capable of living in these areas, they support unique and diverse communities of  
8 plants and animals. Vegetation in tidal marshes provides nurseries for commercially  
9 important species and endangered species; the tidal marshes are feeding and nesting  
10 areas for birds.

11 Birds that feed or roost in tidal marshes include herons, egrets, ducks, coots, rails,  
12 swallows, wrens, and hawks. The majority of birds that use the tidal marshes of the  
13 SFBE are migratory. Shorebirds that breed in the marshes include American avocet  
14 (*Recurvirostra Americana*), black-necked stilt (*Himantopus mexicanus*), and Western  
15 snowy plover (*Charadrius nivosus* ssp. *nivosus*). Mammals found in these areas include  
16 mice, shrews, bats, and raccoons. Lizards, snakes, frogs, and toads are commonly  
17 found here. Tidal marshes provide nursery habitat for fish, offering protection, food, and  
18 reduced osmoregulatory stress (Josselyn 1983).

19 Tidal marshes can be qualitatively divided into low, middle, and high marsh based on  
20 tidal inundation (see Figure 4.2-2). Low marsh consists of the area between MTL and  
21 MHW (Monroe et al. 1999). In salt marshes, these areas are characterized by saline-  
22 tolerant plants, usually grasses, which are adapted to regular inundation. In brackish  
23 and freshwater tidal marshes, cattails (*Typha* sp.), California bulrush (*Schoenoplectus*  
24 sp.), and alkali bulrush (*Bolboschoenus maritimus*) dominate the low marsh. Waterfowl  
25 and rails make extensive use of low marshes. Middle marsh consists of the area  
26 between MHW and MHHW. Plant species typically found in the middle marsh include  
27 bulrushes (*Scirpus* sp.), spike rush (*Eleocharis* sp.), silverweed (*Potentilla anserine*),  
28 and salt grass (*Atriplex* sp.). High marsh consists of the area between MHHW and the  
29 highest margin of the marsh. Plants found in the high marsh include pickleweed  
30 (*Salicornia* sp.), saltgrass, gumplant (*Grindelia* sp.), and alkali heath (*Frankenia salina*).

31 Extensive areas of tidal marsh are found in all bays except the Central Bay. Suisun  
32 Marsh, found north of Suisun Bay, is the State's largest brackish-water marsh. Most of  
33 northern San Pablo Bay is marshland, and the extent of marshland in the South Bay is  
34 rising with ongoing restoration of the area's salt ponds.



Source: Josselyn 1983

**Figure 4.2-2: Marsh Zonation**  
 California State Lands Commission  
*Avon Marine Oil Terminal Lease Consideration Project*

## 1 Urban Shoreline

2 Much of the historical shoreline of Central Bay has been replaced with artificial fill or  
3 structures armored with revetments, seawalls, or rip-rap. Urban land uses tend to  
4 encroach on the shoreline in urbanized areas. These areas of shoreline may be fringed  
5 with narrow bands of recently formed tidal marshes dominated by common, widespread  
6 marsh species, including a high proportion of non-native species. The shorelines of the  
7 Central Bay, and the northeast and northwest shorelines of the South Bay, are heavily  
8 urbanized; the south shorelines of San Pablo Bay and Suisun Bay are less urbanized.

## 9 Coastal Scrub

10 California's coastal scrub communities are dominated by low-growing shrubs such as  
11 coyote brush (*Baccharis pilularis*), California blackberry (*Rubus ursinus*), and poison  
12 oak (*Toxicodendron diversilobum*). Coastal scrub provides habitat for a variety of small-  
13 mammal species such as Botta's pocket gopher (*Thomomys bottae*), California mouse  
14 (*Peromyscus californicus*), and western harvest mouse (*Reithrodontomys megalotis*).  
15 Larger mammals such as bobcat (*Lynx rufus*), coyote (*Canis latrans*), and mule deer  
16 (*Odocoileus hemionus*) may occur in or near larger areas of coastal scrub communities.  
17 Bird species that frequent coastal scrub habitat include California towhee (*Melospiza*  
18 *crissalis*), spotted towhee (*Pipilo maculatus*), white-crowned sparrow (*Zonotrichia*  
19 *leucophrys*), wrentit (*Chamaea fasciata*), California thrasher (*Toxostoma redivivum*),  
20 and western scrub jay (*Aphelocoma californica*). Lizards, such as western fence lizard  
21 (*Sceloporus occidentalis*) and northern alligator lizard (*Elgaria coerulea*), may also  
22 occur within coastal scrub and adjacent grassland habitats.

## 23 **Biological Characteristics of the San Francisco Bay Estuary**

### 24 Plankton

25 Phytoplankton (e.g., diatoms, cyanobacteria, dinoflagellates) are photosynthesizing  
26 microorganisms that inhabit water. Phytoplankton provide a source of organic carbon  
27 and energy at the base of the food chain (Cloern 1979). Compared to other estuaries,  
28 phytoplankton primary productivity in the SFBE is relatively low. The population density  
29 of phytoplankton in the bay cycles throughout the year, with levels higher during spring  
30 in the San Pablo, Central, and South Bays, and during the summer in Suisun Bay  
31 (Cloern 1979). In the northern bays, phytoplankton growth can be separated into three  
32 seasons: A spring bloom period, during which water-borne nitrates are available to  
33 phytoplankton; a low-productivity period in the summer when turbidity limits light  
34 penetration into the water; and a second, smaller fall bloom based on ammonium  
35 uptake (Wilkerson et al. 2006). High levels of phytoplankton (algal blooms) can cause  
36 environmental stress, affecting concentrations of dissolved oxygen and carbon dioxide,  
37 dissolved organic and inorganic substances, and pH.

1 Zooplankton can range in size from microscopic (microplankton) to those that can be  
2 seen by the naked eye (macroplankton). This heterogeneous group includes mysid  
3 shrimp, clam larvae, cnidarians, copepods, and other crustaceans. They feed upon  
4 phytoplankton, bacteria, organic detritus, and each other.

5 Ichthyoplankton consist of fish eggs and larvae found in near-surface waters, where  
6 they float passively on water currents. Ichthyoplankton feed on microplankton and are in  
7 turn fed on by larger animals.

### 8 Invertebrates

9 The SFBE is a nursery area for shrimp, crabs, and fish. California bay shrimp (*Crangon*  
10 *franciscorum*) is the most common shrimp in the SFBE most years, and supports a  
11 small commercial fishery. The blacktail bay shrimp (*Crangon nigricauda*) is the second  
12 most common shrimp in the SFBE overall, with increased abundance during higher  
13 salinity years that result from low river inflows, but not to levels that replace California  
14 bay shrimp (CDFG 2001). The highest densities of bay shrimp are found in Suisun Bay,  
15 where juveniles rear in shallow, low-saline waters (NOAA 2007). Dungeness crab  
16 (*Metacarcinus magister*) reproduce in the ocean; the small juvenile stages are carried  
17 into the bay on tidal currents and spend the first year or two of their lives rearing in the  
18 San Pablo and South Bays (NOAA 2007).

19 Different species of shrimp tend to inhabit different regions of the SFBE, though species  
20 do overlap in distribution. Shrimp species that live in the more saline environment of the  
21 SFBE have grown in abundance over the past 15 years and expanded in range into the  
22 upstream regions of the bay, particularly in dry years when saline levels increase  
23 upstream. Low-salinity species, such as bay shrimp, show no increase in abundance  
24 over the past 15 years. Regionally, shrimp abundance increased in all parts of the  
25 SFBE except in Suisun Bay (SFEP 2011). The abundance of shrimp and crab in the  
26 South Bay during the last 15 years is largely in response to increased nutrient  
27 availability in coastal waters. Because shrimp and crab prey on large benthic  
28 invertebrates, particularly clams, the increased numbers have led to a decline in the  
29 abundance of clams in the South Bay (Cloern 2011).

### 30 Fish

31 The health of the SFBE fish communities varies geographically. The Central Bay fish  
32 population has been stable for 30 years, but the populations in the other bays have  
33 seen declines in health over the same period. This decline has been most dramatic for  
34 Suisun Bay, but is also apparent in San Pablo Bay and, increasingly, in the South Bay.  
35 Fish abundance, diversity, and percentage of native species have declined in all bays  
36 except the Central Bay (SFEP 2011).

1 Beginning in 2002, abundance indices of four pelagic fishes in the upper SFBE declined  
2 rapidly to record low levels from which they have not recovered. Since 2004, a  
3 consortium of federal and State agencies formed the Pelagic Organisms Decline  
4 Management Team to focus attention on the causes of the decline for delta smelt,  
5 longfin smelt, threadfin shad (*Dorosoma petenense*), and juvenile striped bass (*Morone*  
6 *saxatilis*). The emerging conclusion from nearly a decade of research is that the decline  
7 has its roots in multiple, interacting causes, including low original population abundance,  
8 a decrease in suitable habitat, mortality from predation and entrainment into water  
9 diversions, and a fundamental shift in the food web in the upper Delta from a  
10 phytoplankton-based food web to a detritus-based food web (Interagency Ecological  
11 Program 2010).

## 12 Birds

13 The SFBE is a major stopover for birds migrating along the Pacific Flyway, and many  
14 birds also nest along the San Francisco Bay. Nearly half of Pacific Coast waterfowl and  
15 shorebirds depend upon the SFBE and its mudflats for foraging during migration, with  
16 peak abundance occurring November through mid-March (SFEP 2011). In recognition  
17 of its critical conservation importance for shorebirds, SFBE is listed as an important  
18 shorebird migratory stopover in the Western Hemisphere Shorebird Reserve Network  
19 (U.S. Fish and Wildlife Service [USFWS] 2002). Migratory stopovers are wetlands and  
20 associated habitats that have high densities of food available at critical times during  
21 waterfowl and shorebird migration. These migrations are energy intensive, and may  
22 include long-distance, non-stop flights of over 1,000 miles between stopover areas.  
23 Migrating flocks are large, and migrations may occur in a very tight window, resulting in  
24 a large proportion of a species' entire population visiting a single site over a few weeks  
25 and requiring a vast quantity of available forage.

26 Waterbirds are typically classified based on habitat and foraging preference. Waterfowl  
27 are those species that depend primarily on open-water habitat for foraging and roosting,  
28 but breed in wetland and/or adjacent upland habitats. Ducks, geese, and grebes are all  
29 waterfowl. Waterfowl are further divided into dabblers and divers. Dabbling ducks, which  
30 feed at or below the surface of shallow water, have increased in the Suisun and San  
31 Pablo Bays, while populations have held steady in the Central and South Bays (Pitkin  
32 and Wood 2011). Diving ducks, which feed in deeper waters, have decreased in San  
33 Pablo Bay, but increased in Suisun Bay, as populations of their primary prey, large  
34 invertebrates, such as clams, have changed. Overall, populations of dabbling ducks  
35 have increased and winter populations of diving ducks have decreased. Seabirds, such  
36 as gulls, terns, and cormorants, forage and nest in many of the habitats found around  
37 the SFBE. Many species make use of human-created habitats such as piers, bridges,  
38 and the structures found at Alcatraz Island (Pitkin and Wood 2011).

1 Shorebirds primarily use beaches, tidal flats, salt ponds, and shallow open-water  
2 habitats for foraging and roosting, and nest on beaches or adjacent upland areas.  
3 Sandpipers, plovers, and dowitchers are all examples of shorebirds. The overall status  
4 of shorebirds in tidal flats is stable. Population declines in the South Bay have been  
5 offset by population increases in San Pablo Bay. The western sandpiper (*Calidris*  
6 *mauri*), one of the most common species, has declined across the SFBE, but  
7 populations of least sandpiper (*Calidris minutilla*) and willet (*Tringa semipalmata*) have  
8 increased greatly (Pitkin and Wood 2011).

9 Marsh birds include species that depend on emergent marshes for foraging, nesting,  
10 and roosting. California black rail (*Laterallus jamaicensis coturniculus*) and song  
11 sparrows are examples of marsh birds. Tidal marsh bird abundance has increased in  
12 San Pablo Bay and Suisun Bay, mainly driven by increases in common yellowthroat  
13 (*Geothlypis trichas*) and California black rail populations, but has decreased in the  
14 Central and South Bays (SFEP 2011). Reproductive success of tidal marsh birds has  
15 increased in Suisun Bay, but is decreasing in San Pablo Bay. In particular, San Pablo  
16 song sparrow (*Melospiza melodia samuelis*) and Suisun song sparrow (*Melospiza*  
17 *melodia maxillaris*) populations are below the level required to sustain their populations,  
18 and are expected to exhibit long-term declines. The decrease in tidal marsh bird  
19 abundance is attributed to predators and nest flooding (Pitkin and Wood 2011).

20 Wading birds use emergent marsh, marsh edge, and shallow open-water habitats to  
21 forage and roost in upland areas. Locally, examples include the great blue heron, cattle  
22 egret, and great egret. Heron and many egret populations are increasing in San Pablo  
23 Bay, but there has been a decline in the nesting success for great egrets (SFEP 2011).

### 24 Mammals

25 Mammals in the SFBE are found on the shore and in the water. The most common  
26 terrestrial species found in coastal marshes include generalists, such as Norway rat  
27 (*Rattus norvegicus*), house mouse (*Mus musculus*), California vole (*Microtus*  
28 *californicus*), and raccoon (*Procyon lotor*), which are adaptable to a wide range of  
29 habitats. Terrestrial mammals that are obligate users of marsh habitat, such as  
30 saltmarsh harvest mouse (*Reithrodontomys raviventris*), have seen drastic population  
31 declines as a result of habitat loss, and many are now listed as threatened or  
32 endangered by the federal and State governments. Populations of beaver (*Castor*  
33 *canadensis*), river otter (*Lontra canadensis*), and sea otter (*Enhydra lutris*) were  
34 extirpated from the SFBE by overharvesting in the 19<sup>th</sup> century. Both river otter and  
35 beaver have recently recolonized the SFBE; river otter have been reported throughout  
36 the San Francisco Bay, including Coyote Creek in the South Bay, the Richmond Marina  
37 in the Central Bay, Martinez Marina on Carquinez Strait, and wetlands in Suisun Bay  
38 (River Otter Ecology Project 2014). Beaver are now found in the marshes in north San  
39 Pablo Bay and on the lower Alhambra Creek in downtown Martinez.

1 The most common aquatic mammals in the SFBE are California sea lion (*Zalophus*  
2 *californianus*) and harbor seal (*Phoca vitulina*) (NOAA 2007). The California sea lions  
3 are mainly males that migrate to the SFBE to forage and establish a dominance  
4 hierarchy; female California sea lions stay south of Santa Barbara. California sea lion  
5 haul outs are found throughout the San Francisco Bay, most prominently on San  
6 Francisco's Pier 39. Harbor seals are resident breeders. Harbor seals will haul out  
7 throughout the San Francisco Bay; major haul out and pupping sites are located in the  
8 Central and South Bays at the Castro Rocks near the Richmond-San Rafael Bridge,  
9 Yerba Buena Island by the San Francisco-Oakland Bay Bridge, Corte Madera, and  
10 Mowry Slough in the South Bay.

### 11 **Nonindigenous Aquatic Species**

12 The SFBE has been described as one of the most invaded ecosystems in North  
13 America (Cohen and Carlton 1995). Nonindigenous aquatic species (NAS) dominate  
14 many parts of the SFBE, to the extent that in some locations it can be difficult to find any  
15 native species (Cohen and Carlton 1995). In 2010, a field survey funded by the  
16 California Department of Fish and Wildlife (CDFW) reported 497 species from SFBE, of  
17 which 98 species were classified as introduced, including three newly detected species  
18 to SFBE that had likely been spread from other locations in California (CDFW Office of  
19 Spill Prevention and Response [OSPR] 2011). The results indicate high numbers of  
20 introduced species are found in the South Bay, San Pablo Bay, and Central Bay. Suisun  
21 Bay had the lowest number of introduced species.

22 Nonindigenous aquatic species have been introduced to the SFBE via a number of  
23 vectors, including the deliberate introduction of species for recreational or commercial  
24 purposes. The shipping industry has been identified as one of the major vectors of NAS,  
25 and vessel biofouling and ballast water are considered the largest contributors of NAS  
26 to the SFBE (California State Lands Commission [CSLC] 2013c). Eighteen percent of  
27 established nonindigenous aquatic species are tied to vessel biofouling as the primary  
28 likely vector and 9 percent to ballast water; however, when considering established  
29 species with multiple possible vectors, 60 percent could have been introduced via  
30 vessel biofouling as one of several possible vectors, and 53 percent could have been  
31 introduced via ballast water as one of several possible vectors (OSPR 2011). Non-  
32 native jellyfish are found throughout the estuary, including three hydrozoan species  
33 thought to be native to the Black Sea and one scyphozoan species thought to be  
34 introduced from Tokyo Bay. The hydrozoan species are present among the plankton  
35 from May through November, with peak abundances coinciding with warmer summer  
36 and fall temperatures. Jellyfish may be passively spread through all low-salinity areas of  
37 SFBE via attachment to boat bottoms (NOAA 2007).

38 Nonindigenous aquatic species may compete directly with native species for food or  
39 space, or prey upon native species. They can also change the food chain or physical

1 environment to the detriment of native species. Approximately 42 percent of the species  
2 on the federal threatened or endangered species list are at risk, primarily because of  
3 predation, parasitism, and competition from NAS (OSPR 2011). One such currently  
4 pernicious NAS is the overbite clam (*Corbula amurensis*), first found in the SFBE in  
5 1986. Thought to have been introduced into the SFBE by ballast water discharge from a  
6 vessel, this filter feeder is now so abundant that the current population is capable of  
7 filtering the water column over the SFBE shallows almost 13 times per day (SFEP  
8 2004). In some portions of the Suisun Bay floor, the clam accounts for the vast majority  
9 of biomass, and it has been implicated in the pelagic organism decline by severely  
10 reducing the availability of phytoplankton in Suisun Bay (SFEP 2004).

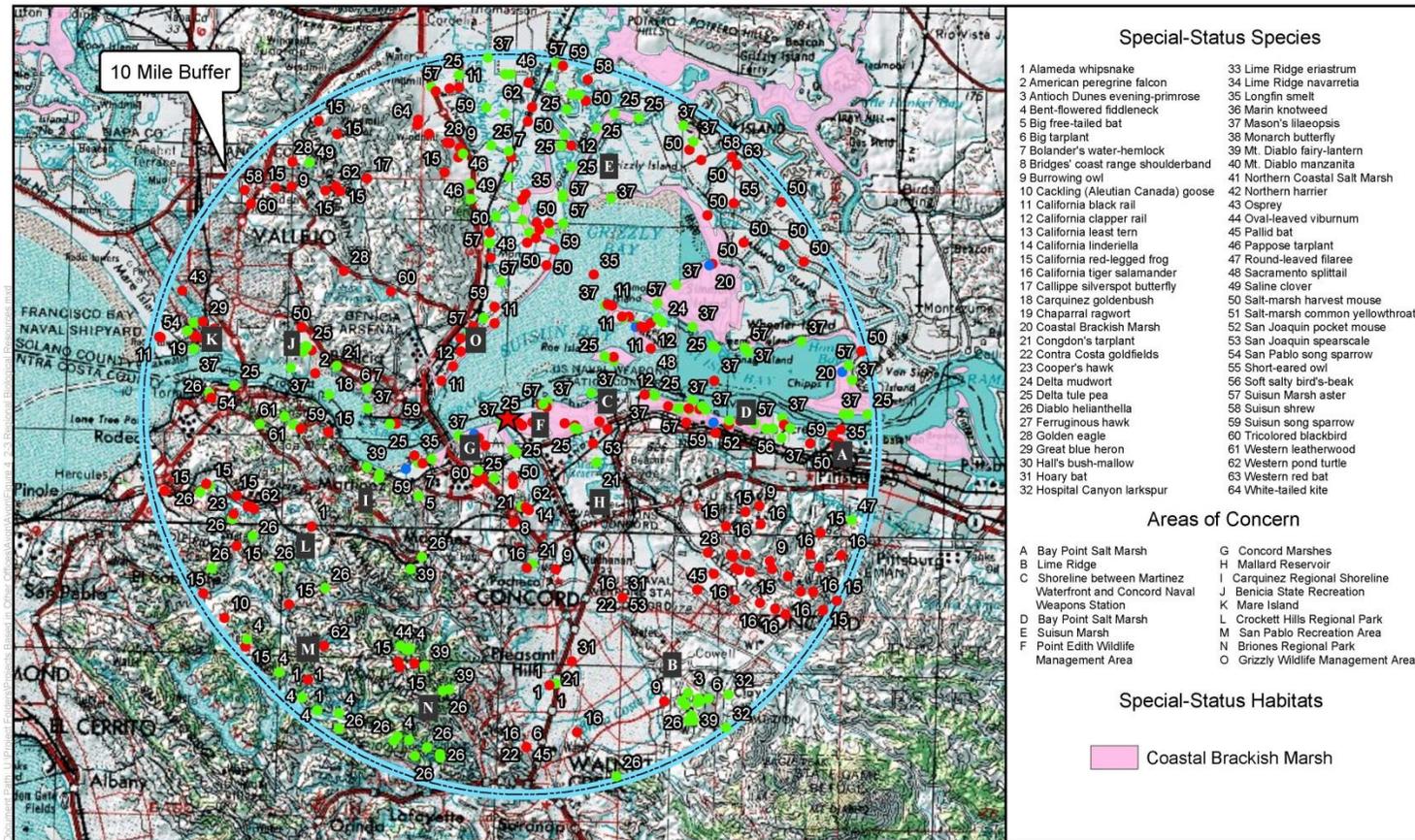
### 11 **Rare, Threatened, and Endangered Species**

12 The distribution and abundance of rare and sensitive species that depend on the  
13 estuarine habitat for some or all of their life cycle vary throughout the region due to the  
14 diversity of habitat between embayments. Each habitat supports a distinct community of  
15 sensitive species. To aid in impact assessment, each category of sensitive species is  
16 summarized by embayment (see Appendix C, Tables C-1 through C-5, for information  
17 about each species, and their potential to be present near the Project site and impacted  
18 by the Project). Figure 4.2-3 depicts the special-status species that have been recorded  
19 by the California Natural Diversity Database within a 10-mile radius of the Project.

### 20 Sensitive Plants

21 Tidal habitats in the SFBE support 12 plant species that are identified by federal and/or  
22 State agencies as endangered, threatened, or rare, or are listed by the California Native  
23 Plant Society as status 1B or higher (California Native Plant Society 2014). The  
24 distribution of sensitive plant species varies geographically within the SFBE. In general,  
25 the less urbanized the bay, the more likely it is to retain a proportion of its historical  
26 marshland and to support rare or sensitive plants (see Appendix C, Table C-1).

27 The Central Bay has not retained any historical tidal marsh remnants, which limits the  
28 potential for rare plants, with few exceptions. Naturally occurring populations of Point  
29 Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*) are found along the shores of  
30 Richardson Bay, and a population was reintroduced to the Crissy Field wetlands in the  
31 Presidio. This species inhabits the high marsh or upper middle marsh zone. It is a  
32 hemiparasitic plant, meaning that although it possesses chlorophyll and is capable of  
33 limited photosynthesis, it must attach its root system to a host plant to extract water and  
34 nutrients, and to reproduce. Point Reye's bird's-beak is dependent upon plants that are  
35 active in summer such as pickleweed (*Salicornia* sp.), saltgrass (*Distichlis* sp.), and  
36 fleshy jaumea (*Jaumea carnosa*), all of which are abundant in Richardson Bay.



**Figure 4.2-3**  
**Regional Biological Resources**  
 California State Lands Commission  
 Avon Marine Oil Terminal Lease Consideration Project



9/9/2014

**CNDDDB Element Occurrence**

- Plant
- Animal
- Terrestrial Community
- ★ Approximate Terminal Location

N



0 2 4 Miles

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1 One other sensitive species found in the Central Bay, California sea blite (*Suaeda*  
2 *californica*), is restricted to the intertidal zone of salt marshes, and was extirpated from  
3 the SFBE in the 1960s. Since 2000, it has been successfully reintroduced at four sites  
4 in the Central Bay: Heron's Head Park at Pier 98, Pier 94, Eastshore State Park north of  
5 Oakland, and Roberts Landing near San Leandro in the South Bay.

6 The South Bay retains fragments of historical tidal marshes at upper Newark Slough,  
7 Dumbarton Marsh, and along the Palo Alto shoreline. However, no sensitive tidal marsh  
8 or estuarine beach plants are known to remain in the South Bay. As mentioned  
9 previously, one population of California sea blite was re-introduced at Roberts Landing.

10 San Pablo Bay, which has retained more of its historic tidal marshes than any other bay,  
11 supports naturally occurring populations of six rare plant species. Historical tidal  
12 marshes are found along the north edge of San Pablo Bay, including China Camp in  
13 San Rafael, Heerdt Marsh by Corte Madera, most of Petaluma Marsh, George Whittell  
14 Marsh by Point Pinole, and areas of Napa marsh, including Fagan's Slough. The richest  
15 diversity of sensitive plants is found in the marshes at the mouths of the Petaluma and  
16 Napa Rivers. San Joaquin spearscale (*Atriplex joaquinana*) is a tall annual herb known  
17 mainly from alkali grasslands and is only rarely known from tidal marsh edges where it  
18 may opportunistically colonize high-tide shorelines. Recent populations are reported  
19 from along the lower Napa River. Saline marsh clover (*Trifolium hydrophilum*) occurs in  
20 marshes and alkaline grasslands and is present in the Viansa wetlands in northwest  
21 San Pablo Bay. The upper marsh zone of San Pablo Bay's brackish and freshwater  
22 marshes supports populations of endemic species known only to SFBE: Suisun marsh  
23 aster (*Symphyotrichum lentum*), delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), and  
24 Mason's lilaeopsis (*Lilaeopsis masonii*). Suisun marsh aster was once widely distributed  
25 in San Pablo Bay, but is now reported only near Fagan Slough. The delta tule pea, a  
26 climbing species, is present in marshes along the Napa River. Mason's lilaeopsis is also  
27 known from the Napa River corridor; it is a shade-sensitive, early successional colonizer  
28 of newly deposited or exposed sediments. Two species of bird's-beak are found in the  
29 upper marsh zone in San Pablo Bay: one population of Point Reyes bird's-beak is  
30 known from the Petaluma River; and extant populations of the federally endangered soft  
31 bird's-beak (*Cordylanthus mollis* ssp. *mollis*) are found in the marshes along the mouth  
32 of the Napa River.

33 Most sensitive plants found in San Pablo Bay are also found in Suisun Bay, where they  
34 are more widely distributed and abundant, particularly in the brackish waters of Suisun  
35 Marsh. In addition to the plants described previously, Suisun Bay contains populations  
36 of the federally endangered Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*) in the  
37 northern reaches of Suisun Marsh in the vicinity of Rush Ranch. Bolander's water-  
38 hemlock (*Cicuta maculata* var. *bolanderi*) was once common in Suisun Marsh.

## 1 Sensitive Fishes

2 The SFBE provides habitat to seven species of sensitive fish. Most sensitive fish  
3 species in the SFBE rely on brackish water habitat for their adult habitat and/or travel  
4 upstream to spawn in freshwaters, and have thus been affected by degradation or  
5 removal of spawning habitats, entrainment, drought, pollution, predation, disruption of  
6 the food web, and direct competition for space with and predation by nonindigenous  
7 aquatic species. The following discussion summarizes the distribution of sensitive  
8 species in the estuary; Table C-2 in Appendix C provides more detailed information for  
9 each species. Sensitive fish species are found mainly in the north bays. Suisun Bay is  
10 home to two native species of “true” estuarine fish (i.e., fish that spend all their lives in  
11 estuaries): delta smelt and Sacramento splittail (*Pogonichthys macrolepidotus*). Both  
12 species are endemic to the Delta, and both travel into fresh water to spawn. Delta smelt  
13 are found in greatest abundance in shallow, turbid waters at the freshwater edge of the  
14 entrainment zone, where they feed on plankton; Sacramento splittail are found mainly  
15 along the benthos of small, shallow, turbid sloughs lined with emergent vegetation,  
16 where they feed on macroinvertebrates and detritus. The delta smelt population is listed  
17 as threatened at the federal level and endangered by the State. As of 2010, populations  
18 of the splittail were considered stable by the USFWS, which found its listing was not  
19 warranted, but the species remains a CDFW species of special concern, and it is a  
20 targeted species of the Delta Stewardship Council.

21 Four anadromous species are found in the SFBE: longfin smelt, chinook salmon  
22 (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*), and the  
23 Southern Distinct Population of green sturgeon (*Acipenser medirostris*). Longfin smelt  
24 are primarily estuarine, though they are found in small numbers in the coastal waters  
25 beyond the Golden Gate Bridge. In summer, adults congregate in the cooler waters and  
26 deep-water habitats of the Central Bay, where they feed on zooplankton such as the  
27 opossum shrimp, *Acanthomysis* sp., and *Neomysis mercedis*, when available, and on  
28 copepods otherwise (Hobbs 2006). They migrate upstream in fall to spawn in the  
29 limnetic and oligohaline waters of the Delta. Populations have declined steadily over the  
30 past two decades (Rosenfield and Baxter 2007).

31 Chinook salmon are born in fresh water and migrate into the Pacific Ocean to mature,  
32 reaching maturity between 2 and 5 years of age. They migrate into freshwater streams  
33 to spawn, after which they die. Their eggs incubate for several months. Upon hatching,  
34 fry undergo physiological changes in preparation for migration, and enter the smolt  
35 stage. Most chinook smolt migrate to the ocean within a few months of hatching, though  
36 some may remain in fresh water for a year. Peak out-migrations are between April and  
37 June. The Sacramento-San Joaquin River basin runs of chinook salmon are  
38 differentiated into four runs by their time-of-spawning migrations: fall-run, late fall-run,  
39 winter-run, and spring-run. Fall-run chinook migrate upstream from July to November,  
40 late fall-run migrate October to February, winter-run migrate December to April, and

1 spring-run migrate April to July. The Delta is a nursery area for all runs of chinook  
2 salmon. Winter-run chinook, the young of which out-migrate during the driest times of  
3 the year, are listed as critically endangered at both the federal level and by the State.  
4 Spring-run salmon are listed as threatened at both the federal and State levels.

5 An ally to salmon, the steelhead, is an anadromous type of rainbow trout. They migrate  
6 into the estuarine river basins from October to April and spawn from December to May.  
7 Central California Coast steelhead populations in the SFBE are aggregated into two  
8 geographically based diversity strata, both of which are listed as threatened at the  
9 federal level. The Coastal SFBE strata includes populations that spawn in Corte Madera  
10 Creek, Guadalupe River, Miller Creek, Novato Creek, and San Francisquito Creek. The  
11 Interior SFBE strata includes populations that spawn in Alameda Creek, Coyote Creek,  
12 Napa River, Petaluma River, San Leandro Creek, and San Lorenzo Creek (National  
13 Marine Fisheries Service [NMFS] 2011a). Central Valley steelhead, which are also  
14 listed as threatened at the federal level, migrate through the SFBE en route to spawning  
15 sites in tributaries to the Sacramento and San Joaquin Rivers (NMFS 2011b).

16 Green sturgeon may be found throughout the Central, San Pablo, and Suisun Bays.  
17 Adults are primarily marine, but enter the estuary to feed or migrate to spawning  
18 grounds. Juveniles rear in the northern bays for 1 to 4 years before joining the more  
19 marine adults. Sturgeon are benthic feeders, feeding mainly on shrimp and crabs.

#### 20 Sensitive Birds

21 Sensitive birds in the SFBE are generally obligate inhabitants of tidal marshes, and  
22 have experienced population declines as a result of the removal and degradation of  
23 marsh habitat (see Appendix C, Table C-3 for species list). Thus, the Central Bay, which  
24 possesses few tidal marshes, has few populations of sensitive birds. Many sensitive  
25 species, such as California clapper rail (*Rallus longirostris obsoletus*) and California  
26 black rail, are widely distributed throughout the SFBE. Others are subspecies known  
27 from single embayments: the Suisun song sparrow is found in Suisun Bay, the San  
28 Pablo song sparrow in San Pablo Bay, and the Alameda song sparrow (*Melospiza*  
29 *melodia pusillula*) in the South Bay. California least tern (*Sterna antillarum browni*) is  
30 known to nest in the South Bay and along the southern shore of Suisun Bay. Western  
31 snowy plover also nests in the South Bay, as well as in the San Pablo Bay marshes.  
32 Colonial nesters found in the SFBE include double-crested cormorant (*Phalacrocorax*  
33 *auritus*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), black-crowned  
34 night-heron (*Nycticorax nycticorax*), and snowy egret (*Egretta thula*). Double-crested  
35 cormorant colony nest sites are found under the bridges that divide the bays and on  
36 large electric transmission structures in the South Bay. Heron rookeries, which may  
37 consist of several heron and egret species, are found throughout the Bay Area.

## 1 Sensitive Mammals

2 Tidal marshes in the SFBE support four sensitive mammalian species, while seven  
3 mammalian species use the aquatic habitats of the estuary. Additionally, three species  
4 of bats forage over tidal marsh and estuarine waters (see Appendix C, Table C-4). The  
5 sensitive mammals of the tidal marsh habitats are small rodents: Suisun ornate shrew  
6 (*Sorex ornatus sinuosus*), saltmarsh wandering shrew (*Sorex vagrans halicoetes*), the  
7 federally endangered saltmarsh harvest mouse, and San Pablo vole (*Microtus*  
8 *californicus sanpabloensis*), all weighing less than an ounce at adult size. Where  
9 present, they are prey species for higher-order predators. Both shrews are  
10 insectivorous, while the mouse and vole are vegetarian. The endemic saltmarsh harvest  
11 mouse is generally restricted to tidal marsh habitats. It is found throughout the SFBE,  
12 albeit in low numbers due to habitat destruction and degradation. The saltmarsh  
13 wandering shrew is found in the South Bay, while the Suisun ornate shrew is found in  
14 Suisun Bay. The San Pablo vole is known only from a small region in the vicinity of  
15 Wildcat Creek, on the southeast shore of San Pablo Bay.

16 Seven marine mammal species are known to migrate, forage, and rest in the SFBE.  
17 Gray whale (*Eschrichtius robustus*) and humpback whale (*Megaptera novaeangliae*)  
18 occasionally enter the Central Bay to feed during seasonal migrations. The harbor  
19 porpoise (*Phocoena phocoena*) is another visitor to the Central Bay. Harbor seal and  
20 California sea lion both venture as far upstream as Suisun Bay, but in general, marine  
21 mammals prefer the deep, cold waters of the Central Bay.

22 The distribution of bat species and their use of estuarine habitats has not been well  
23 described. The big free-tailed bat (*Nyctinomops macrotis*) has been collected in  
24 Martinez. Hoary bat (*Lasiurus cinereus*) has been observed in Suisun Marsh, but is  
25 more widely distributed in the South Bay. The pallid bat (*Antrozous pallidus*) has been  
26 collected in the Central, South, and San Pablo Bays.

## 27 Sensitive Amphibians and Reptiles

28 The SFBE supports a few sensitive amphibians and reptiles (see Appendix C, Table C-  
29 5). California red-legged frog (*Rana draytonii*) and western pond turtle (*Actinemys*  
30 *marmorata*), which prefer freshwater ponds and streams but are tolerant of limited  
31 saltwater intrusion, are distributed in low numbers throughout the SFBE (CDFW 2013c)  
32 and are documented from brackish marshes in the San Pablo and Suisun Bays.  
33 California red-legged frogs appear to be eliminated from the western lowland portions of  
34 Contra Costa and Alameda Counties, particularly in urban areas. California tiger  
35 salamanders (*Ambystoma californiense*), which are found in grasslands and vernal  
36 pools, are known only from the Don Edwards National Wildlife Refuge in the South Bay  
37 (CDFW 2013c).

1 **4.2.1.2 Project Study Area**

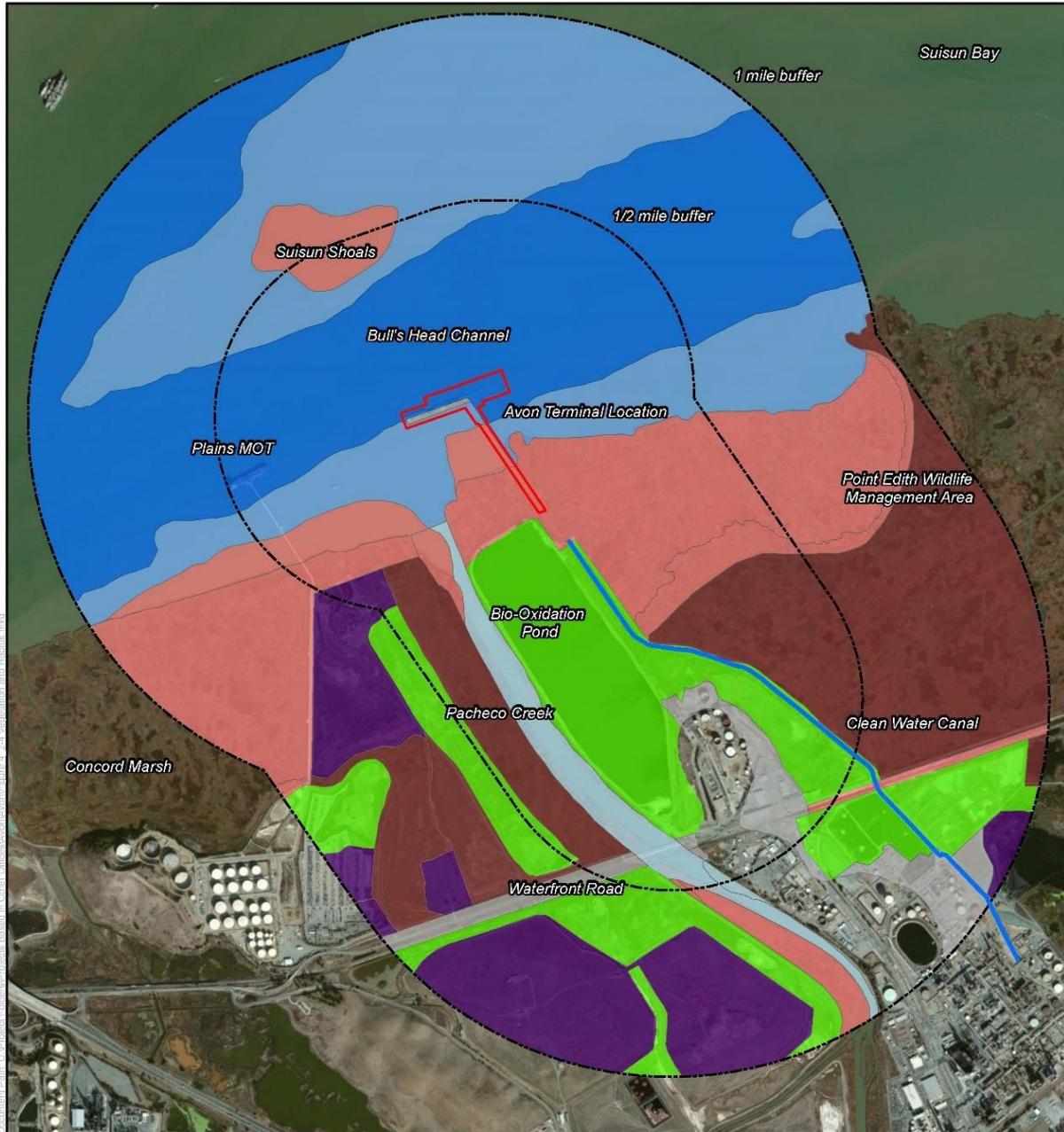
2 The Project study area includes lower Suisun Bay and upper Carquinez Strait, including  
3 vegetation at, and along the shoreline within a 0.5-mile radius of, the Avon Terminal.  
4 Known habitats of rare, threatened, or endangered plant or animal species are present  
5 within a 1-mile radius of the Avon Terminal (see Figure 4.2-4). Table C-6 in Appendix C  
6 includes a matrix depicting habitat use by wildlife found in the Project study area.

7 **Characteristics of the Project Study Area**

8 The Project is located on the south shore of Suisun Bay, approximately 1.75 miles east  
9 of the Benicia-Martinez Bridge. The existing lease extends approximately 1,200 feet into  
10 the bay. Water depths in the lease area range from 13 meters at the lease edge to 3  
11 meters along the dock. Maintenance dredging at the Avon Terminal maintains the  
12 overall sediment elevation at approximately 44 feet below MLLW. The benthic substrate  
13 consists of soft bay sediments over bedrock, also known as mudstone. The Avon  
14 Terminal is located in a slightly depositional environment, where water moving into the  
15 Carquinez Strait slows as it passes through Berth 1, allowing sediment in the water to  
16 settle out. Local scour occurs east of the Avon Terminal.

17 Land uses near the Avon Terminal include industrial and open space. North of the Avon  
18 Terminal, Carquinez Strait and Suisun Bay provide wildlife habitat, commercial and  
19 recreational water use, and industrial transport access. The channel north of the Avon  
20 Terminal is about 9,000 feet wide; the north shore is home to the Suisun Bay Reserve  
21 Fleet and Grizzly Island Wildlife Area. The shoreline east and west of the Avon Terminal  
22 is composed of coastal brackish marsh, and areas of tidal flats lie to the south and west.  
23 Point Edith Wildlife Area lies east of the Avon Terminal and approachway. West of the  
24 Avon Terminal are the Point Edith Wetlands (also known as Concord Marsh) and the  
25 Plains All American Marine Oil Terminal.

26 Carquinez Strait is a narrow gap in the Coast Range that connects San Pablo Bay to  
27 Suisun Bay and the Sacramento-San Joaquin River Delta. The Strait's narrow channel  
28 restricts the outflow of flood waters and sediment from the Central Valley to the ocean,  
29 causing waters to pool and sediment to slow and settle in Suisun Bay, resulting in a  
30 geological feature known as an inverted river delta. Upstream, channel depths transition  
31 rapidly from the deep channel of Carquinez Strait into the shallows of Suisun Bay. This  
32 area of bathymetric change, known as the Garnet Sill, is the upstream endpoint of a  
33 gravitational circulation cell that forms in response to strong tidal currents that carry salt  
34 water upstream along the bottom of the channel, while fresh water flows seaward along  
35 the top of the channel. Salinity in the water column in Suisun Bay is stratified by depth,  
36 with fresh water along the surface and saline water along the bottom (see Figure 4.2-5).  
37 Salinity stratification is greatest during neap tides. Following winter storms, surface  
38 waters reach their lowest levels of salinity, and for a brief time, the channel becomes  
39 oligohaline. Once winter floods have stopped, channel waters return to mesohaline.



**Figure 4.2-4**  
**Vegetation and Habitat**  
 California State Lands Commission  
 Avon Marine Oil Terminal Lease Consideration Project

- Deep Bay
- Fully Tidal Bayland
- Diked
- Muted Tidal Bayland
- Filled Bayland
- Shallow Bay
- Fully Tidal
- Undefined
- Proposed CSLC Lease Boundary
- Buffer
- Clean Water Canal

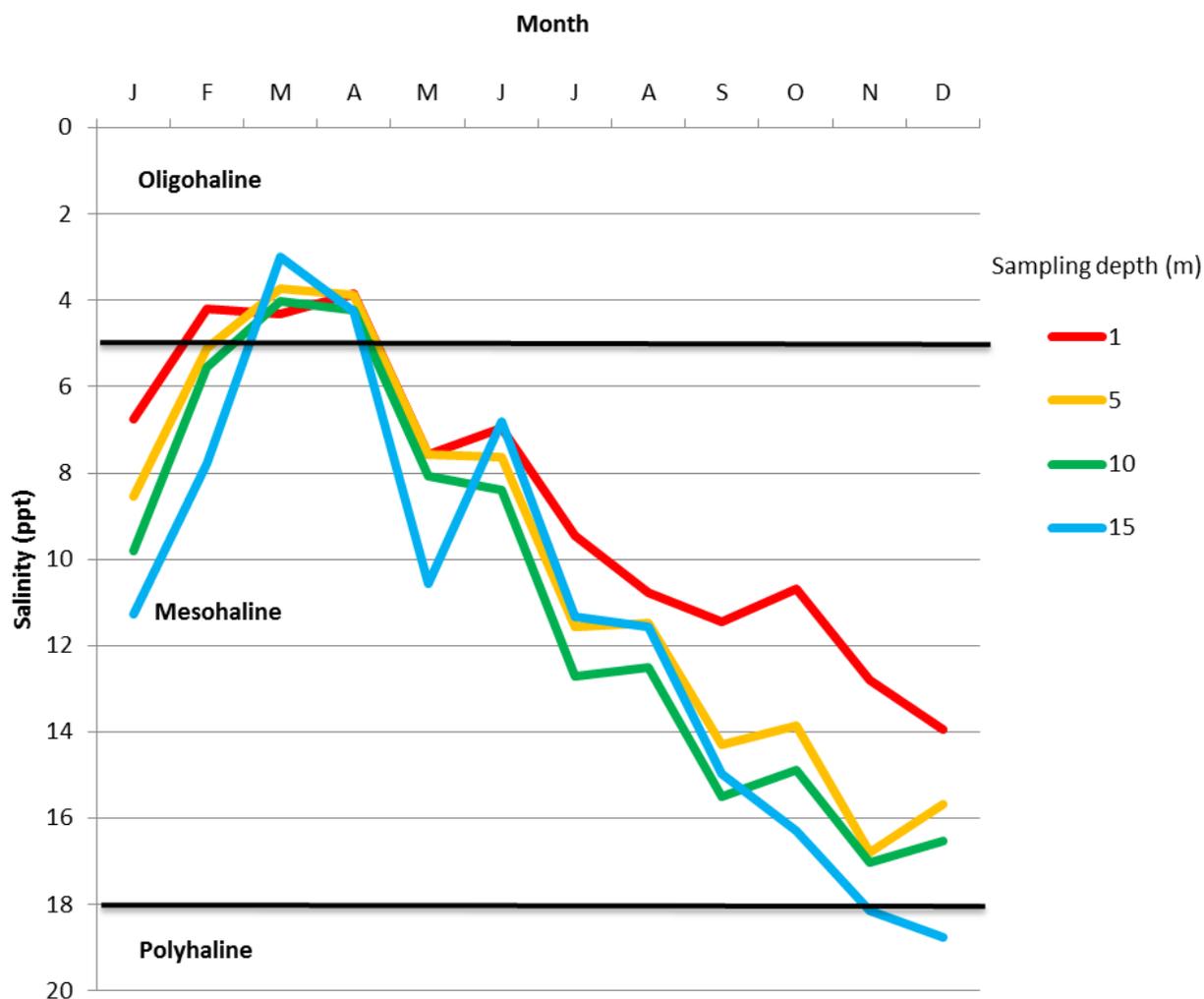
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0 1,000 2,000 Feet



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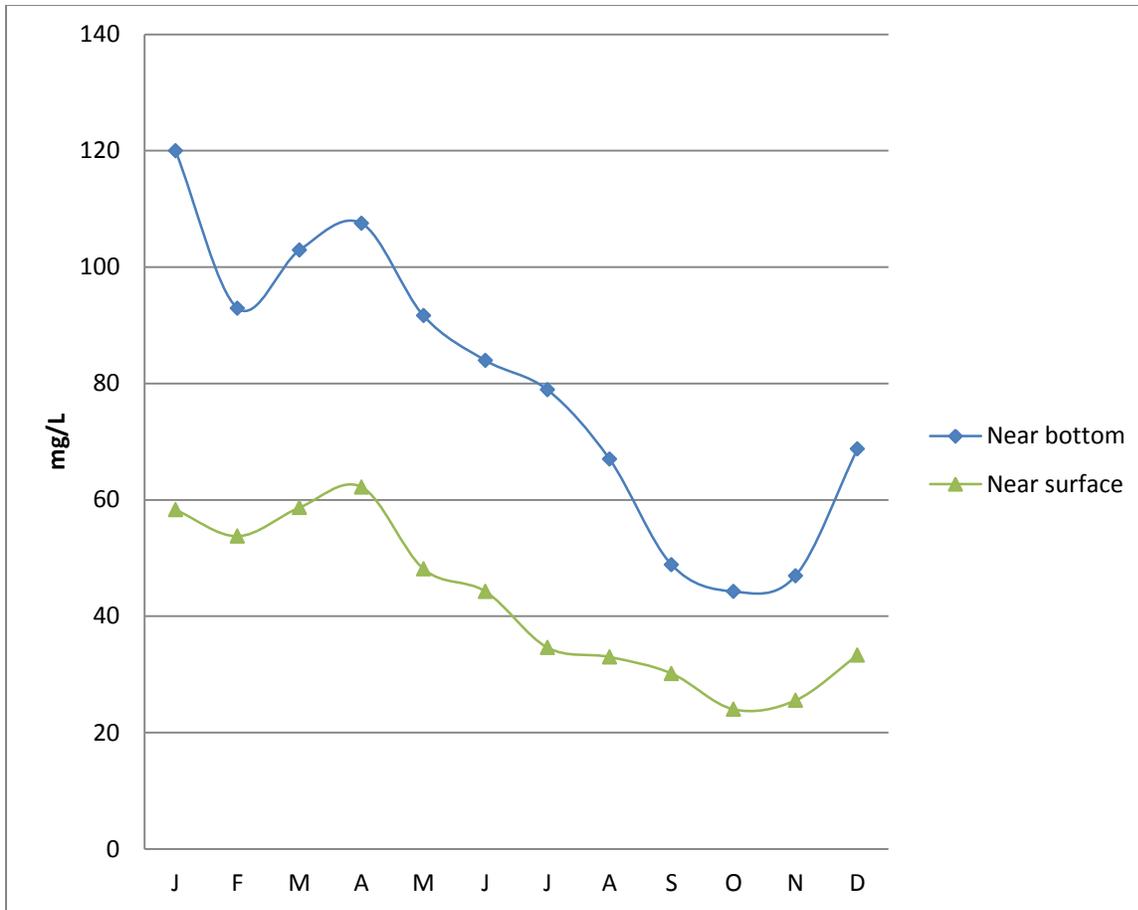
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Source: USGS 2013

**Figure 4.2-5: Salinity Stratification at Avon Terminal**  
 California State Lands Commission  
*Avon Marine Oil Terminal Lease Consideration Project*

- 1 The area where upstream and downstream currents meet and cancel each other out is
- 2 known as the null zone; in Carquinez Strait, this zone typically forms near the strait's
- 3 upper end, downstream of the Garnet Sill. During spring tide, the strait is the site of the
- 4 SFBE turbidity maxima; during neap tide, the estuarine turbidity maximum is found
- 5 upstream at Middle Ground (Schoellhamer 2002). Suspended sediment concentration
- 6 (SSC) is greater near the bottom of the channel than higher in the water column. SSCs
- 7 are seasonally dependent and are at their highest in the winter and spring, and
- 8 decrease through summer to fall lows (see Figure 4.2-6).



Source: USGS 2007

**Figure 4.2-6: Average Suspended Sediment Concentration at Benicia Bridge, 2003-2007**

California State Lands Commission

*Avon Marine Oil Terminal Lease Consideration Project*

### 1 Avon Terminal Structures

2 The Avon Terminal consists of an existing 1,520-foot-long docking facility connected to  
 3 the shore by an approximately 1-mile-long approachway. The Avon Terminal is  
 4 constructed of wood, concrete, and metal. Several buildings are located on the Avon  
 5 Terminal, including buildings for personnel, a pump house, and a tool shed. Lights are  
 6 placed regularly along the Avon Terminal and approachway, and there is a large light  
 7 bank under the main loading arm.

8 The Avon Terminal provides shade and refuge areas for fish, and resting spots and  
 9 foraging opportunities for fish, birds, and marine mammals. Avon Terminal structures  
 10 also provide nesting habitat for birds, including a pair of osprey nesting on Berth 5.  
 11 Support pilings provide attachment areas for sessile invertebrates and a place for fish to  
 12 spawn. The barren roads, road margins, and dirt parking lots within the Project area

1 provide nesting habitat for killdeer (*Charadrius vociferous*). The various structures and  
2 infrastructure (e.g., light poles, wires, pipelines) provide perch and nest sites for  
3 common birds such as black phoebe (*Sayornis nigricans*) and house finch  
4 (*Haemorhous mexicanus*). Western fence lizards (*Sceloporus occidentalis*) likely use  
5 exposed road beds, metal ladders, and other human-constructed hard surfaces. Most of  
6 the mammal species mentioned below under coyote brush scrub also forage and move  
7 through developed portions of the study area.

### 8 Open Water

9 Open-water habitat within the study area includes open estuarine waters of Suisun Bay  
10 (discussed further below) and associated tidal channels extending into the marsh, the  
11 eastern edge of the bio-oxidation pond, and freshwater wastewater treatment features  
12 (i.e., bio-oxidation pond and Clean Water Canal). Suisun Bay supports numerous native  
13 fish species, and provides foraging and loafing habitat for various species of ducks,  
14 gulls, terns, cormorants, and other waterbirds. Diving ducks, such as greater scaup  
15 (*Aythya marila*) and ruddy duck (*Oxyura jamaicensis*), are more likely to forage in the  
16 waters adjacent to the Avon Terminal, while dabbling ducks, such as mallard (*Anas*  
17 *platyrhynchos*), American wigeon (*Anas Americana*), and green-winged teal (*Anas*  
18 *crecca*), are more likely to forage within the marsh and water treatment features.

### 19 Subtidal Estuarine

20 The estuarine water column consists of the area between the benthos and the water  
21 surface. The water column contains both channels, which are areas with strong currents  
22 and a deep, rounded bottom, and shoals, or shallow, weak-current areas. Channels  
23 provide a connection between marine and freshwater ecosystems, while shoals function  
24 as collection areas for sediment and detritus. In the SFBE, areas of the water column  
25 less than 18 feet deep are considered shallow bay, and areas deeper than 18 feet are  
26 considered deep bay. Approximately 640 acres of shallow bay and 740 acres of deep  
27 bay are found within 1 mile of the Avon Terminal. These habitats provide foraging areas  
28 for invertebrates, fish, diving birds, and marine mammals, as well as nursery and  
29 spawning habitat for invertebrates and fish.

30 Compared to other parts of the SFBE, Suisun Bay is not especially rich in  
31 phytoplankton. Phytoplankton productivity is generally calculated from measurements of  
32 chlorophyll  $\alpha$ . Chlorophyll  $\alpha$  concentrations below about 10 micrograms per liter are  
33 known to cause food-limited declines in zooplankton reproduction. Measurements of  
34 water quality in west Suisun Bay from 2003 to 2013 show that chlorophyll  $\alpha$  levels in the  
35 Carquinez Strait rarely exceed this threshold in either spring or fall (USGS 2013a).

36 The benthic substrate at the Project site consists of soft bay sediments over bedrock,  
37 also known as mudstone. Due to the lack of hard surfaces for rooting, few plants are  
38 associated with soft-bottom habitats. However, although mobile, the fine-grained

1 sediment is stable and compact enough to support a diverse benthic assemblage. The  
2 biotic assemblage associated with this habitat is known as the benthos. Due to the  
3 variability in salinity, the benthic habitat and community composition fluctuates  
4 seasonally. The overbite clam (*Corbula amurensis*), a NAS, is the most common  
5 benthic species observed near the Avon Terminal.

#### 6 Tidal Flat

7 Three areas of tidal flat comprising an area of approximately 107 acres are located  
8 within 1 mile of the Avon Terminal lease. A 12-acre tidal flat is located between the  
9 Avon Terminal and the shoreline, and a band of tidal flat, approximately 54 acres,  
10 stretches along the west bank of Pacheco Creek and the southern shoreline of Suisun  
11 Bay. Tidal flats are also found at Suisun Shoal, approximately 0.5 mile north of the Avon  
12 Terminal. The Project area tidal flats are comprised of mudflats, which are formed of  
13 fine-grained silts and clays, and typically support a diverse community of diatoms,  
14 worms, shellfish, and algal flora. These creatures are prey for a wide variety of birds  
15 and fish. Wading birds known to use the tidal flats for forage during low tide include  
16 western sandpiper, least sandpiper, willet, and dunlin (*Calidris alpina*) (eBird 2012).  
17 Harbor seals are also known to frequent tidal flats. Other species, such as white pelican  
18 (*Pelecanus erythrorhynchos*), rest on the tidal flats between fishing expeditions. During  
19 high tide, the tidal flats provide foraging areas for fish, including longfin smelt.

#### 20 Tidal Marsh

21 Approximately 624 acres of fully tidal or muted tidal marsh are found along the southern  
22 shore of Suisun Bay within 1 mile of the Avon Terminal. West of the Avon Terminal, the  
23 predominantly low/middle marsh plain extends up to 3,500 feet from the edge of the  
24 tidal flat; east of the Avon Terminal, the marsh plain is approximately 2,500 feet wide.  
25 Both marsh plains contain a fringe of high tidal marsh and abut areas of muted tidal  
26 brackish marsh. The plains are fairly level. Their tidal channels are a combination of  
27 straight channels superimposed on the marsh for drainage or mosquito control and  
28 linear dendritic channels in areas closest to shore. The dominant species present are  
29 common reed (*Phragmites australis*), cattails, California tule (*Schoenoplectus*  
30 *californicus*), broad-leaf pepperweed (*Lepidium latifolium*), pickleweed (*Salicornia*  
31 *pacifica*), Baltic rush (*Juncus balticus*), and gumplant.

32 Tidal brackish marsh within the study area provides high-quality habitat for a variety of  
33 bird species, including great egret, snowy egret, northern harrier (*Circus cyaneus*),  
34 Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), marsh wren (*Cistothorus*  
35 *palustris*), salt marsh common yellowthroat (*Geothlypis trichas sinuosa*), Suisun song  
36 sparrow, and red-winged blackbird (*Agelaius phoeniceus*). The high saline content and  
37 regular inundation of brackish marsh precludes regular use by amphibians, reptiles, and  
38 most mammals, but species from these taxa that use adjacent uplands and developed  
39 areas likely forage in the marsh on an incidental basis. Common bat species, such as

1 big brown bat (*Eptesicus fuscus*) and Brazilian free-tailed bat (*Tadarida brasiliensis*),  
2 likely forage over the marsh at night.

3 Muted tidal marsh adjacent to the Avon Terminal provides habitat for a variety of rare,  
4 threatened, and endangered species, including California clapper rail and California  
5 black rail. Saltmarsh harvest mouse inhabit marshes in the Project area. Several rare  
6 plants have potential to be found in the marshes, including soft bird's-beak, delta tule  
7 pea, Mason's lilaepsis, and Suisun thistle.

8 An additional 104 acres of diked brackish marsh is found within 1 mile of the lease,  
9 including the marshlands under the approachway. Diked marshes provide important  
10 habitat for waterfowl, shorebirds, and small mammals, and may provide high-tide  
11 refugia for small mammals and roosting habitat for shorebirds.

## 12 Coyote Brush Scrub

13 The dense shrub cover and scattered trees growing on the levees and berms within the  
14 study area provide nesting and foraging habitat for bird species such as white-tailed kite  
15 (*Elanus leucurus*), red-tailed hawk (*Buteo jamaicensis*), great horned owl (*Bubo*  
16 *virginianus*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*),  
17 western scrub-jay (*Aphelocoma californica*), and northern mockingbird (*Mimus*  
18 *polyglottos*). Exposed concrete rubble, or other hard surfaces, provide basking habitat  
19 for western fence lizards, and the dense shrub cover may support common amphibians  
20 and reptiles such as Sierran treefrog (*Pseudacris sierra*), common garter snake  
21 (*Thamnophis sirtalis*), and gopher snake (*Thamnophis sirtalis*). Mammal species  
22 expected to occur in scrub and levee slopes include California ground squirrel  
23 (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), California vole  
24 (*Microtus californicus*), black-tailed jackrabbit (*Lepus californicus*), coyote (*Canis*  
25 *latrans*), northern raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*), along  
26 with the non-native Norway rat (*Rattus norvegicus*) and house mouse (*Mus musculus*).

## 27 **Special-status Species**

### 28 Plants

29 Of the 12 special-status plant species that occur in the tidal marshes of SFBE, seven  
30 species have potential to occur at the Project site:

- 31 • Salty soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*)
- 32 • Mason's lilaepsis (*Lilaeopsis masonii*)
- 33 • Suisun marsh aster (*Symphytrichum lentum*)
- 34 • Saline clover (*Trifolium depauperatum* var. *hydrophilum*)
- 35 • Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*)
- 36 • San Joaquin spearscale (*Atriplex joaquinana*)
- 37 • Delta mudwort (*Limosella australis*)

1 Fish

2 All special-status fish species of the SFBE with extant populations have potential to  
3 occur within the Project site:

- 4 • Green sturgeon, Southern Distinct Population Segment (*Acipenser medirostris*)
- 5 • Delta smelt (*Hypomesus transpacificus*)
- 6 • Longfin smelt (*Spirinchus thaleichthys*)
- 7 • Central Valley steelhead (*Oncorhynchus mykiss*)
- 8 • Central California Coast steelhead (*Oncorhynchus mykiss*)
- 9 • Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
- 10 • Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*)

11 Terrestrial Wildlife

12 Suitable habitat for 20 special-status wildlife species occurs within the Project site:

- 13 • Western pond turtle (*Emys marmorata*)
- 14 • Cooper's hawk (*Accipiter cooperii*)
- 15 • Tricolored blackbird (*Agelaius tricolor*)
- 16 • Great blue heron (*Ardea herodias*)
- 17 • Northern harrier (*Circus cyaneus*)
- 18 • Short-eared owl (*Asio flammeus*)
- 19 • Cackling (=Aleutian Canada) goose (*Branta hutchinsii leucopareia*)
- 20 • White-tailed kite (*Elanus leucurus*)
- 21 • American peregrine falcon (*Falco peregrinus anatum*)
- 22 • Salt marsh common yellowthroat (*Geothlypis trichas sinuosa*)
- 23 • Bald eagle (*Haliaeetus leucocephalus*)
- 24 • California black rail (*Laterallus jamaicensis coturniculus*)
- 25 • California clapper rail (*Rallus longirostris obsoletus*)
- 26 • Suisun song sparrow (*Melospiza melodia maxillaris*)
- 27 • San Pablo song sparrow (*Melospiza melodia samuelis*)
- 28 • Osprey (*Pandion haliaetus*)
- 29 • Double-crested cormorant (*Phalacrocorax auritis*)
- 30 • Salt marsh harvest mouse (*Reithrodontomys raviventris*)
- 31 • Suisun shrew (*Sorex ornatus sinuosus*)
- 32 • Big free-tailed bat (*Nyctinomops macrotis*)

33 Marine Mammals

34 Marine mammals with potential to occur within the Project site include:

- 35 • California sea lion (*Zalophus californianus*)
- 36 • Harbor seal (*Phoca vitulina richardii*)

1 **Special-status Habitats**

2 Jurisdictional Waters

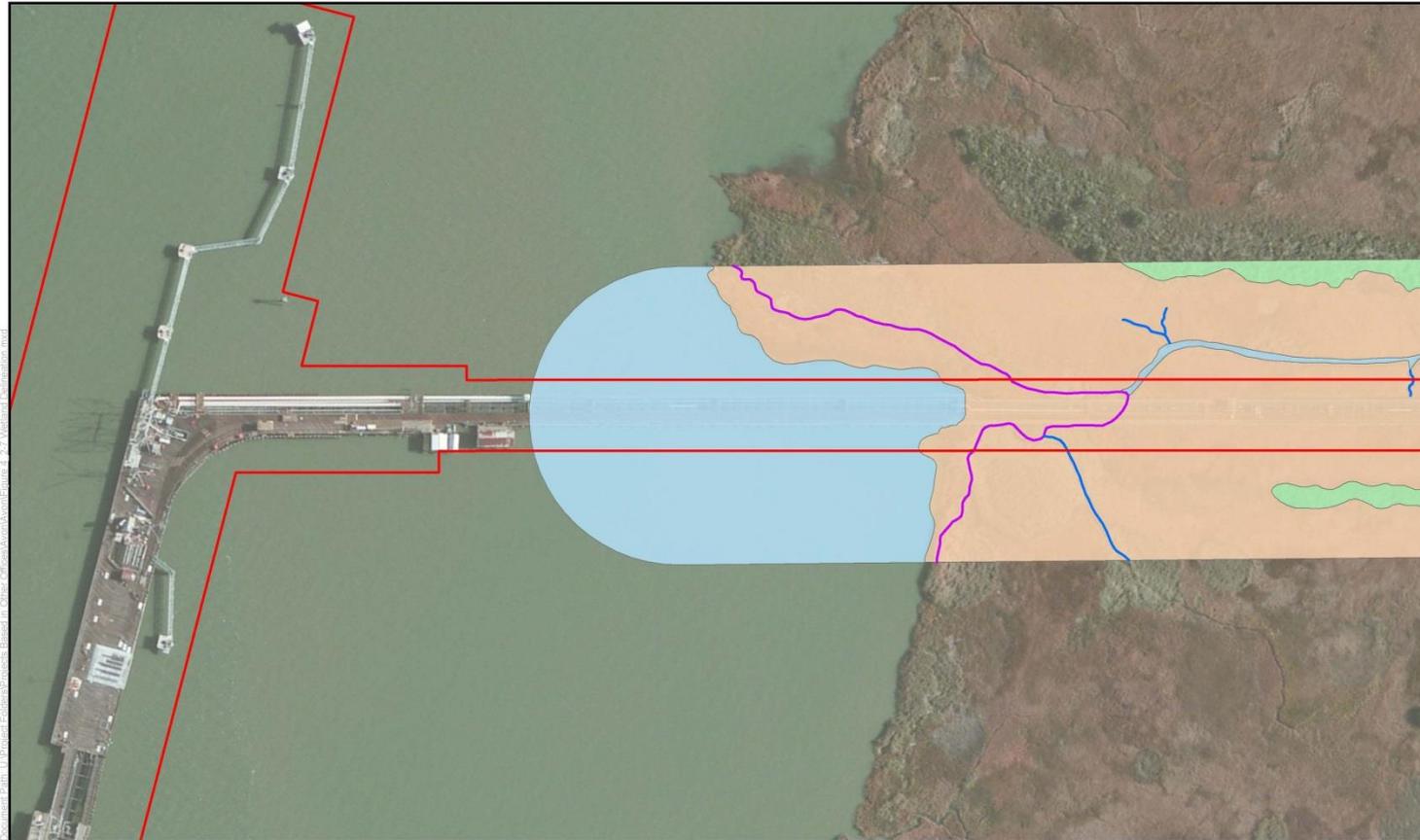
3 LSA Associates (2013) conducted a Preliminary Wetland Delineation within a 47-acre  
4 study area, and concluded that potential Clean Water Act (CWA) Section 404  
5 jurisdictional features consist of 22.78 acres of tidal/non-tidal marsh wetlands and 4.79  
6 acres of non-wetland waters (see Figure 4.2-7). Suisun Bay and a single tributary  
7 slough that parallels the approachway north of Land's End (located at Bent 168,  
8 between Areas B and C, on the approachway; refer to Figure 2-4) are also subject to  
9 U.S. Army Corps of Engineers (USACE) jurisdiction, pursuant to Section 10 of the  
10 Rivers and Harbors Act. The bio-oxidation pond and the Clean Water Canal are covered  
11 under a National Pollutant Discharge Elimination System permit, as part of the Golden  
12 Eagle Refinery's wastewater treatment system.

13 Critical Habitat

14 The open waters of Suisun Bay within the Project area have been designated as critical  
15 habitat for Sacramento River winter-run Chinook salmon (58 Code of Federal  
16 Regulations [CFR] 33212), delta smelt (59 CFR 65278), and green sturgeon (74 CFR  
17 52300). Primary constituent elements (PCEs) of designated critical habitat for salmon  
18 and sturgeon include the estuarine water column, which includes suitable depth,  
19 sediment, and water quality; and adequate food resources and foraging habitat. PCEs  
20 for the delta smelt that are located within the vicinity of the Project include the physical  
21 habitat, water, river flow, and salinity concentrations required to maintain delta smelt  
22 habitat for: (1) larval and juvenile transport, (2) rearing habitat, and (3) adult migration.  
23 Due to the fluid nature of the Delta's hydrology, the quality of the PCEs for the delta  
24 smelt fluctuate within the designated area.

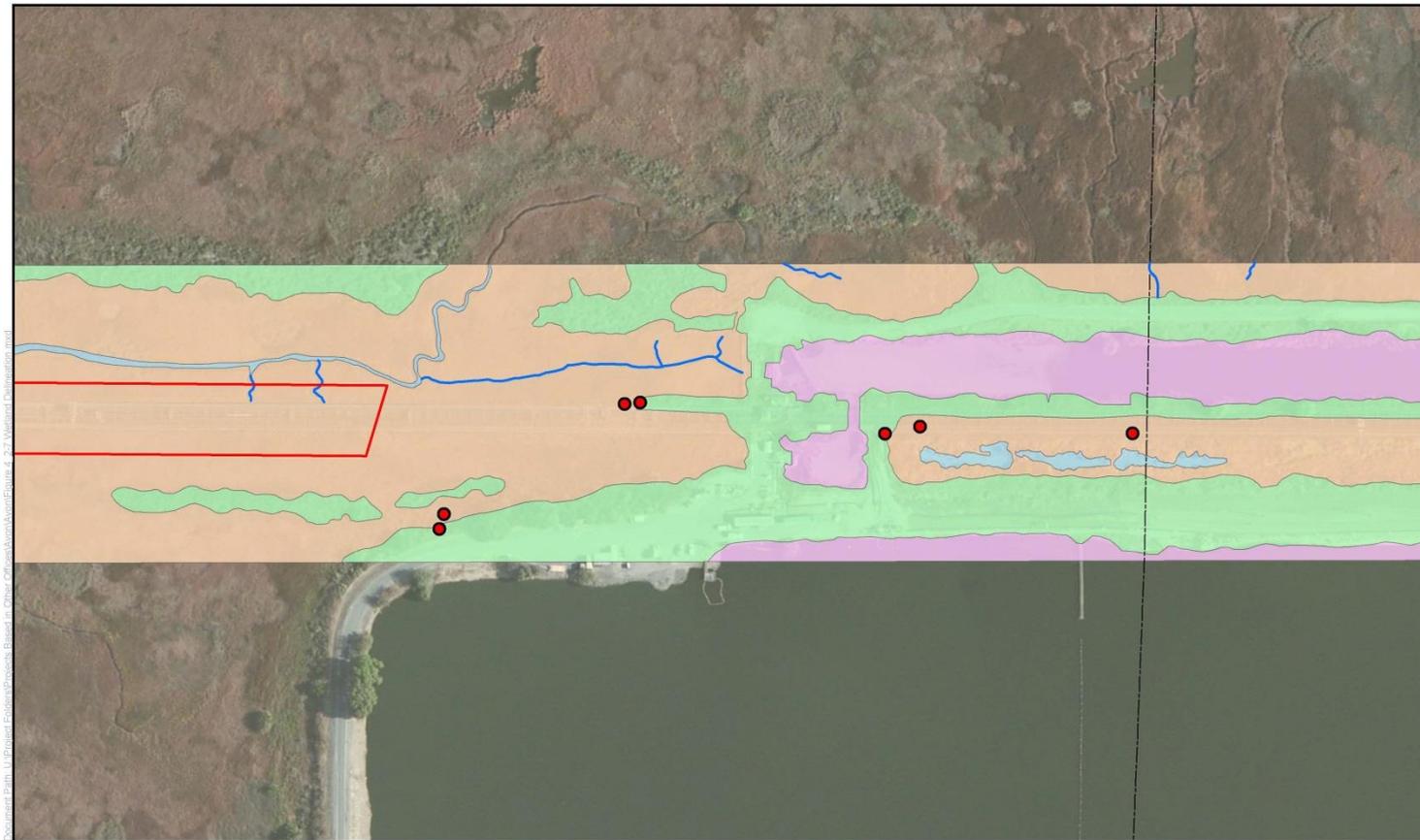
25 California Department of Fish and Wildlife Natural Communities

26 Coastal brackish marsh is found along the shoreline at the Avon Terminal. The coastal  
27 brackish marsh is dominated by perennial, emergent, herbaceous monocots that create  
28 a dense cover up to 2 meters tall. Due to the saline and semi-aquatic environment, plant  
29 species diversity in coastal brackish marshes is typically low. Plant species are stratified  
30 by salinity levels. Both marsh types support a diverse biotic assemblage and provide  
31 nursery grounds for numerous organisms, including fish, mammals, and birds (CERES  
32 1996).

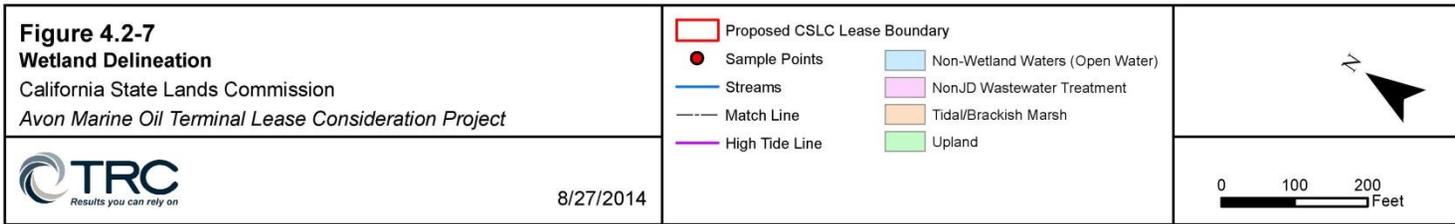


<p><b>Figure 4.2-7</b>  <b>Wetland Delineation</b>          California State Lands Commission  <i>Avon Marine Oil Terminal Lease Consideration Project</i></p>	<ul style="list-style-type: none"> <li><span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Proposed CSLC Lease Boundary</li> <li><span style="color: red; font-weight: bold;">●</span> Sample Points</li> <li><span style="color: blue; font-weight: bold;">—</span> Streams</li> <li><span style="border-bottom: 1px dashed black; width: 20px; margin-right: 5px;"></span> Match Line</li> <li><span style="color: magenta; font-weight: bold;">—</span> High Tide Line</li> <li><span style="background-color: lightblue; border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></span> Non-Wetland Waters (Open Water)</li> <li><span style="background-color: lightpurple; border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></span> NonJD Wastewater Treatment</li> <li><span style="background-color: orange; border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></span> Tidal/Brackish Marsh</li> <li><span style="background-color: lightgreen; border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></span> Upland</li> </ul>	
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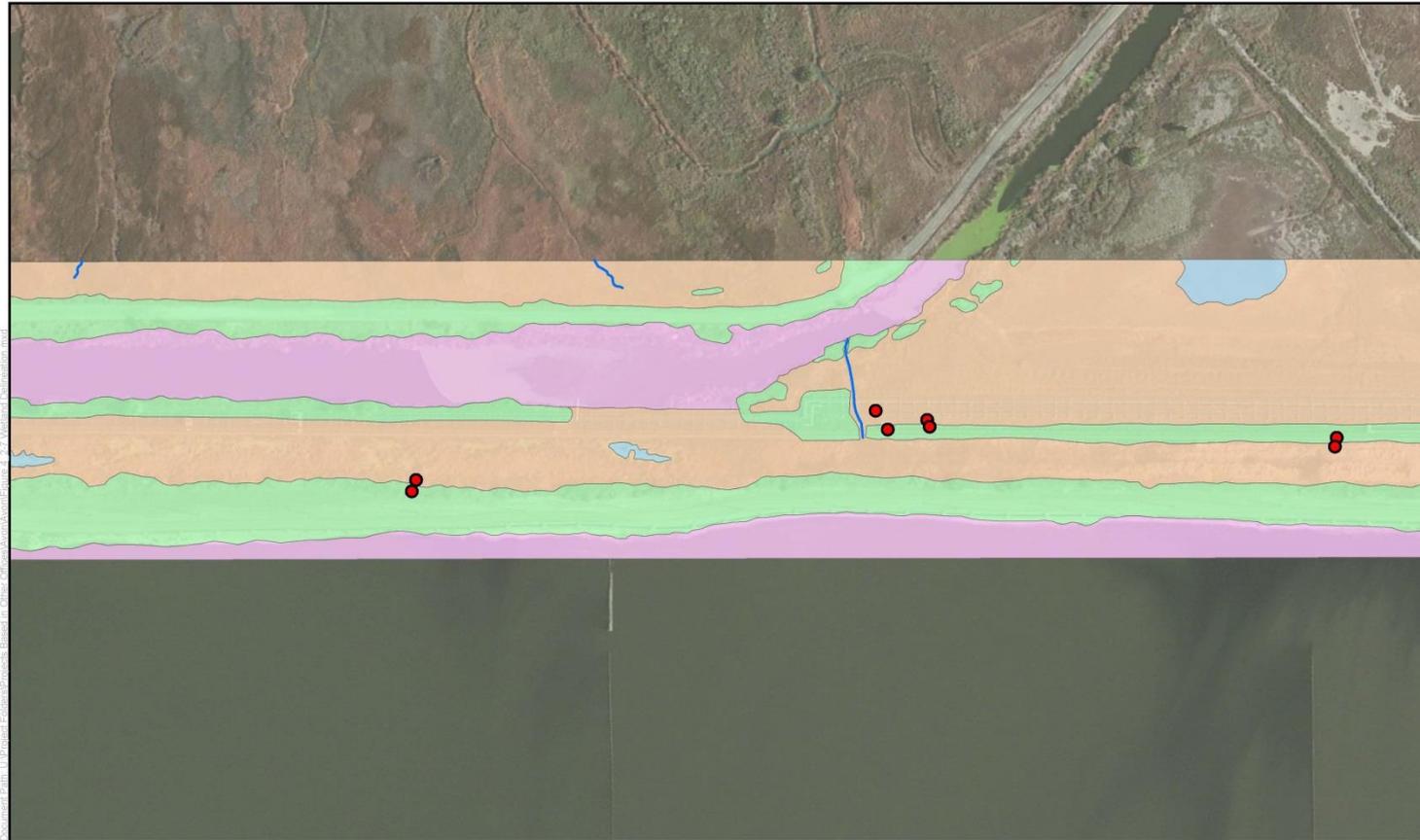
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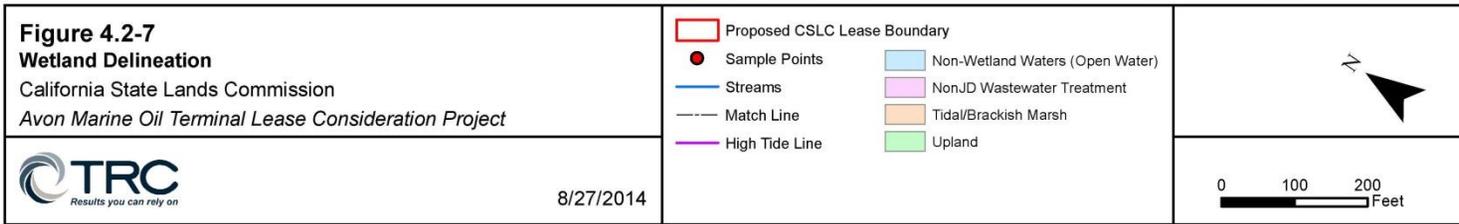
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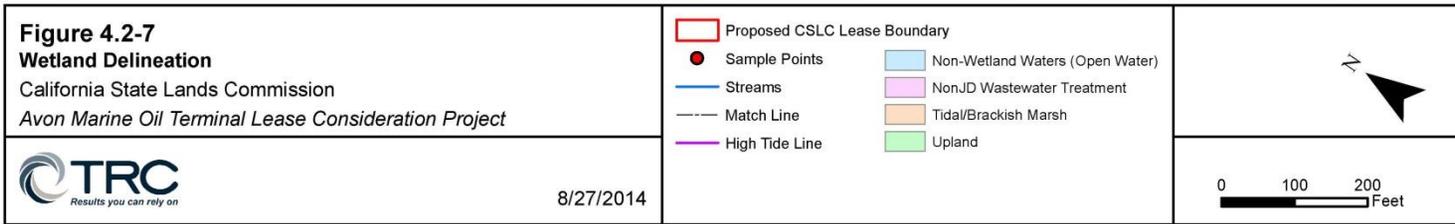
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# **ATTACHMENT 7**

FINAL  
ENVIRONMENTAL IMPACT REPORT

Vallejo

FOR THE

Martinez



TESORO

TESORO AMORCO  
MARINE OIL TERMINAL  
LEASE CONSIDERATION



PREPARED BY  
CALIFORNIA STATE LANDS COMMISSION  
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SACRAMENTO, CALIFORNIA 95825-8202

FEBRUARY 2014

## 4.2 BIOLOGICAL RESOURCES

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1  
2 Section 4.2 presents the existing environment and impacts analysis of biological resource  
3 issues associated with the granting of a new lease to the Amorco Marine Oil Terminal  
4 (Amorco Terminal) to continue to operate in the southeastern Carquinez Strait. The  
5 existing biological resources in the San Francisco Bay Estuary and in the Amorco Marine  
6 Oil Terminal Lease Consideration Project (Project) study area (lower Suisun Bay and  
7 upper Carquinez Strait) are described, as well as in the immediate vicinity of the Amorco  
8 Terminal. Also included is a summary of laws and regulations that may affect biological  
9 resources. This is followed by an analysis of the potential Project impacts. Routine  
10 operations at the Amorco Terminal, or an accidental release of oil, present the potential  
11 to impact nearby biological resources. An oil spill could have wide-ranging effects on  
12 biological resources in the San Francisco Bay Estuary.

### 13 4.2.1 ENVIRONMENTAL SETTING

#### 14 4.2.1.1 San Francisco Bay Estuary

##### 15 *Geographic and Hydrologic Characteristics of the San Francisco Bay Estuary*

16 The San Francisco Bay Estuary is typically divided into five segments: The Sacramento-  
17 San Joaquin River Delta (Delta), Suisun Bay, San Pablo Bay, Central Bay, and South  
18 Bay (see Figure 4.2-1).

19 The Delta is the easternmost, or most upstream, segment. The Delta is a 1,150-square-  
20 mile triangle-shaped region roughly bounded on the north by the city of Sacramento, on  
21 the south by the city of Tracy, and on the west by Chipps Island. The Sacramento and  
22 San Joaquin Rivers and their tributaries flowing into the Delta drain about half of the  
23 surface area of California and establish the extent of brackish water habitat in Suisun  
24 Bay.

25 Suisun Bay is a shallow estuarine bay bounded by Chipps Island on the east and the  
26 Benicia-Martinez Bridge on the west. Suisun Marsh, the largest brackish water marsh in  
27 the United States and the largest wetland in California, forms its northern boundary.  
28 Suisun Bay has the lowest salinity levels in the San Francisco Bay system, with values  
29 ranging from oligohaline (0.5 to 5.0 parts per thousand [ppt]) to mesohaline (5.0 to 18.0  
30 ppt) depending on seasonal variations in tides, evaporation, and freshwater inflows from  
31 the Delta. The southern shore of Suisun Bay is home to the Concord Naval Weapons  
32 Station and the cities of Pittsburg, West Pittsburg, Avon, and Martinez. Suisun Bay is  
33 connected to San Pablo Bay via the Carquinez Strait, a narrow, 12-mile-long band of  
34 water that extends from between the Benicia-Martinez Bridge to Mare Island.

1 San Pablo Bay is the second largest bay in the estuary; it extends from the Carquinez  
2 Strait to the San Pablo Strait near the Richmond-San Rafael Bridge, where it forms the  
3 upstream boundary of the Central Bay. San Pablo Bay is moderately saline, or polyhaline,  
4 with salinity levels ranging from 18.0 – 30.0 ppt. Much of the north shore of San Pablo  
5 Bay is protected as part of the San Pablo Bay National Wildlife Refuge.

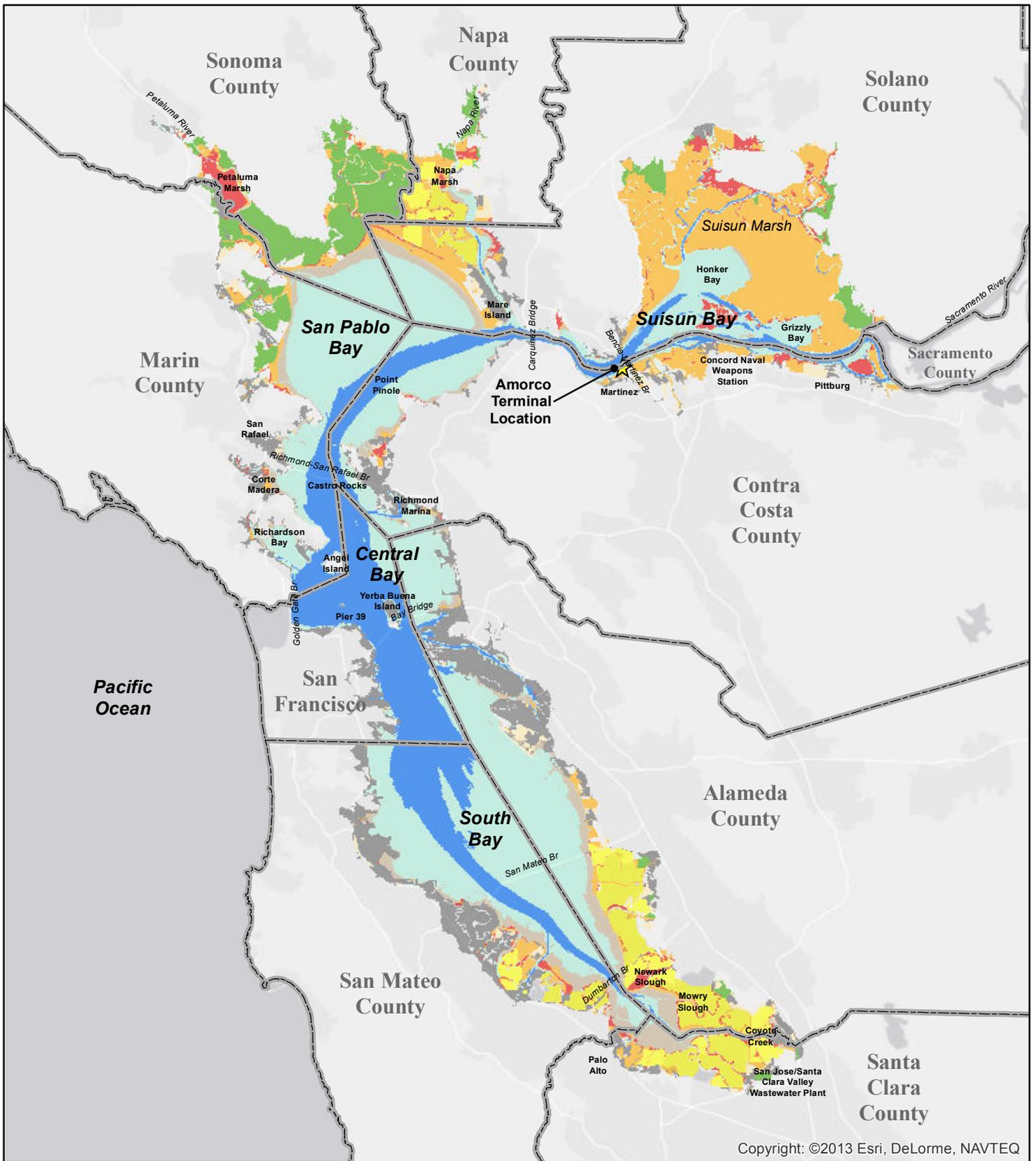
6 The Central Bay is defined as an area bounded by three bridges: The Richmond-San  
7 Rafael Bridge, Golden Gate Bridge, and San Francisco-Oakland Bay Bridge. Central Bay  
8 is the coldest, deepest, and most saline of the bays; it is considered euhaline, with salinity  
9 levels between 30.0 – 35.0 ppt. Because of its proximity to the Pacific Ocean, its water  
10 quality parameters are more stable than its neighboring bays. Ecological conditions in the  
11 Central Bay are also more stable than in neighboring bays (SFEP 2011).

12 The waters south of the San Francisco-Oakland Bay Bridge form the largest embayment,  
13 known as the South Bay. The waters here are shallow and polyhaline. Freshwater flows  
14 to the South Bay are limited to seasonal flows from Guadalupe River and other streams.  
15 Throughout the year, the largest flows into South Bay are treated waters from the San  
16 Jose/Santa Clara County Water Pollution Control Plant (Okamoto and Wong 2011).  
17 Water circulation and fresh inflows are so limited that this bay is considered a lagoon-like,  
18 estuarine backwater.

19 The estuary's tidal cycle is mixed semidiurnal, resulting in two cycles each day. The  
20 average height of the higher tide is called extreme high tide, or local mean higher high  
21 water (MHHW), while the average of the high tides is called high tide, or local mean high  
22 water (MHW). Extreme low tide or mean lower low water (MLLW) and low tide or mean  
23 low water (MLW) refer to the average height of the lowest tide and the average of all low  
24 tides, respectively. Mean tide level (MTL) lies midway between MHW and MLW. Tidal  
25 highs and lows in the bay vary with time of day, the position of the moon, season, and  
26 distance from the Pacific Ocean. The relative height covered by these tidal datums have  
27 important implications for shoreline habitat.

### 28 ***Habitats of the San Francisco Bay Estuary***

29 The habitats in the estuary are dynamic and can be influenced by seasonal flooding,  
30 extreme tides, drought, and human activity. Characteristics of the biotic communities at  
31 each habitat are found in Table 4.2-1. Figure 4.2-2 depicts habitat distribution in the  
32 estuary.



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F:\Maps\Amcorco\Biological Resources\mxd\Figure 4-2-1 - Baylands Habitat.mxd

**Figure 4.2-1 Bayland Habitat**  
 California State Lands Commission  
 Amcorco Marine Oil Terminal  
 Lease Consideration Project

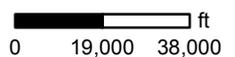
**Habitat Type**

- |   |                 |  |                      |
|---|-----------------|--|----------------------|
|  | Shallow Bay     |  | Diked Marsh          |
|  | Deep Bay        |  | Agricultural Bayland |
|  | Tidal Flat      |  | Salt Pond            |
|  | Old Tidal Marsh |  | Filled Baylands      |
|  | Tidal Marsh     |  |                      |



1:500,000

1 inch = 8 miles



8/21/2013

DATA: SFEI

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Table 4.2-1: Biotic Communities of the San Francisco Bay Estuary<sup>1</sup>

Community	Locations & Examples	Characteristic Plants	Characteristic Animals
Diadromous	Open waters of the San Francisco Bay Estuary, Sacramento and San Joaquin Rivers, Napa River	N/A	Chinook salmon ( <i>Oncorhynchus tshawytscha</i> ), steelhead ( <i>Oncorhynchus mykiss</i> ), delta smelt ( <i>Hypomesus transpacificus</i> ), longfin smelt ( <i>Spirinchus thaleichthys</i> ), striped bass ( <i>Morone saxatilis</i> )
Limnetic	0 – 0.5 ppt <sup>2</sup> salinity. Sacramento River, San Joaquin River	Sago pondweed ( <i>Potamogeton pectinatus</i> )	Asian clam ( <i>Corbicula fluminea</i> )
Oligohaline	0.5 – 5.0 ppt salinity. Suisun Bay	Widgeon grass ( <i>Ruppia maritima</i> )	California bay shrimp ( <i>Crangon franciscorum</i> )
Mesohaline	5.0 – 18.0 ppt salinity. Suisun Bay, Carquinez Strait	Widgeon grass ( <i>Ruppia maritima</i> )	Overbite clam ( <i>Corbula amurensis</i> ), Oriental shrimp ( <i>Palaemon macrodactylus</i> ), starry flounder ( <i>Platichthys stellatus</i> )
Polyhaline	18.0 – 30.0 ppt salinity. Carquinez Strait, San Pablo Bay, South Bay	<i>Ulva</i> , <i>Gracilaria pacifica</i> , <i>Fucus</i> , <i>Sargassum muticum</i> , eelgrass ( <i>Zostera marina</i> )	Blacktail bay shrimp ( <i>Crangon nigricauda</i> ), Dungeness crab ( <i>Metacarcinus magister</i> ), Pacific herring ( <i>Clupea pallasii</i> ), Pacific staghorn sculpin ( <i>Leptocottus armatus</i> ), English sole ( <i>Parophrys vetulus</i> )
Euhaline	30.0 – 35.0 ppt salinity. Central Bay	<i>Ulva</i> , <i>Gracilaria pacifica</i> , <i>Fucus</i> , <i>Sargassum muticum</i> , eelgrass ( <i>Zostera marina</i> )	Blackspotted bay shrimp ( <i>Crangon nigromaculata</i> ), leopard shark ( <i>Triakis semifasciata</i> ), bat ray ( <i>Myliobatis californica</i> ), Pacific sardine ( <i>Sardinops sagax</i> ), northern anchovy ( <i>Engraulis mordax</i> ), California halibut ( <i>Paralichthys californicus</i> )

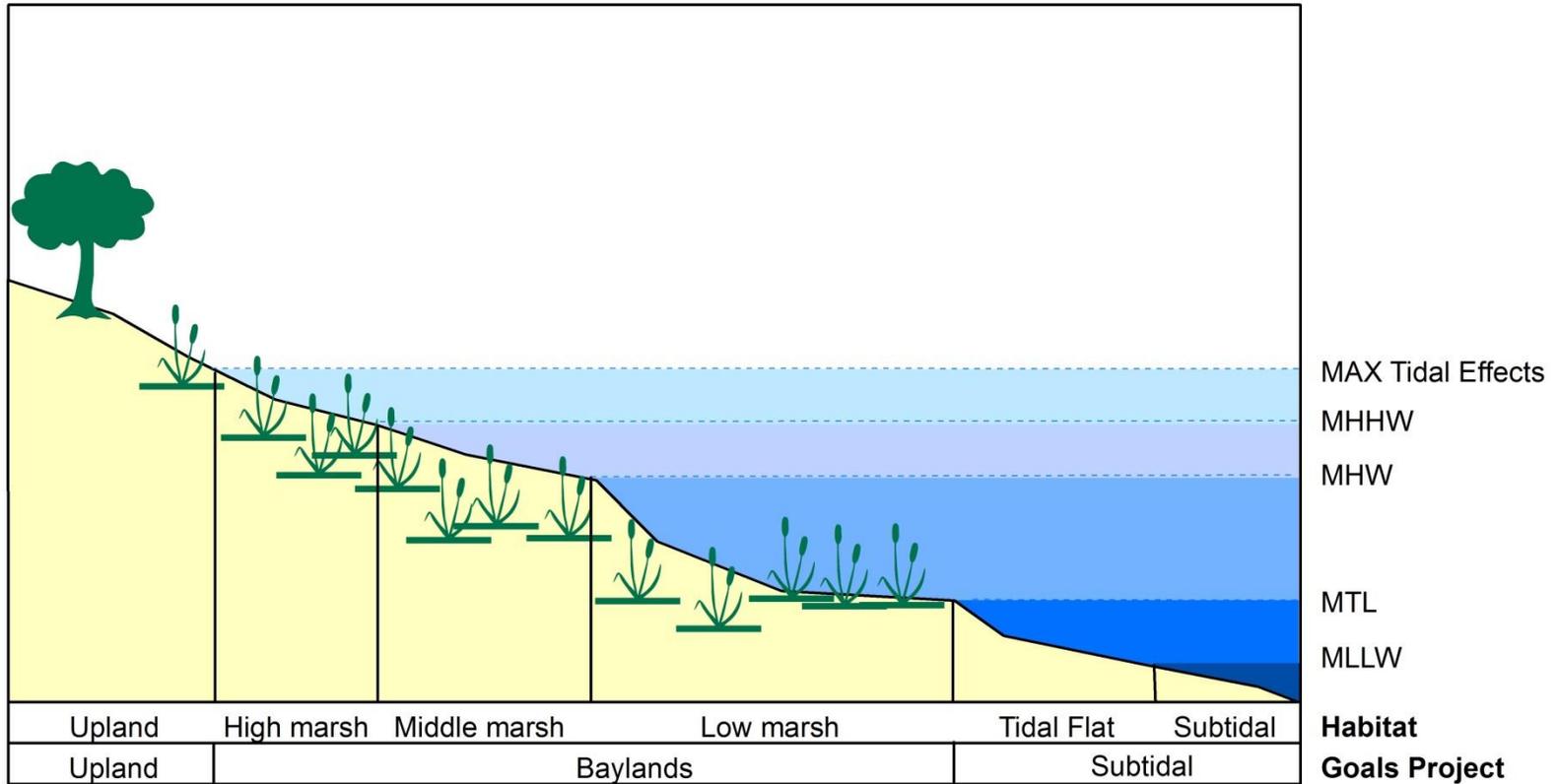
## 4.2 Biological Resources

Community	Locations & Examples	Characteristic Plants	Characteristic Animals
Tidal flat	Along bay shore in San Mateo, Santa Clara, Alameda, Marin, Napa, Contra Costa, Solano counties	<i>Ulva spp.</i> , <i>Gracilaria pacifica</i> , <i>Fucus spp.</i> , <i>Sargassum muticum</i> , eelgrass ( <i>Zostera marina</i> )	California bay shrimp ( <i>Crangon franciscorum</i> ), least sandpiper ( <i>Calidris minutilla</i> ), western sandpiper ( <i>Calidris mauri</i> ), willet ( <i>Tringa semipalmata</i> )
Tidal marsh	Along bay shore in San Mateo, Santa Clara, Alameda, Marin, Napa, Contra Costa, Solano counties (e.g., Martinez marshes, Peyton Slough)	Pickleweed ( <i>Salicornia virginica</i> ), sea blite ( <i>Suaeda californica</i> ), marsh rosemary ( <i>Limonium commune</i> ), marsh grindelia ( <i>Grindelia hirsutula</i> ), California cord grass ( <i>Spartina foliosa</i> )	Clapper rail ( <i>Rallus longirostris</i> ), marsh hawk ( <i>Circus cyaneus</i> ), short-eared owl, ( <i>Asio flammeus</i> ), salt-marsh harvest mouse ( <i>Reithrodontomys raviventris</i> ), vagrant shrew ( <i>Sorex vagrans</i> ), salt marsh fly ( <i>Ephydra riparia</i> ), salt marsh mosquitoes ( <i>Aedes sqamiger</i> , <i>A. dorsalis</i> ).
Coastal scrub	Dry rocky or gravelly slopes below 3,000 feet (e.g., steep slopes at the Amorco Terminal)	California sage brush ( <i>Artemesia californica</i> ), black sage ( <i>Salvia mellifera</i> ), coyote brush ( <i>Baccharis pilularis</i> ), bush monkey-flower ( <i>Mimulus aurantiacus</i> ).	Rufous-crowned sparrow ( <i>Aimophila rucifeps</i> ), rock wren ( <i>Salpinctes obsoletus</i> ), wrentit ( <i>Chamaea fasciata</i> ), brush rabbit ( <i>Sylvilagus bachmani</i> ), western fence lizard ( <i>Sceloporus occidentalis</i> ).
Urban shoreline	Manmade shorelines in all San Francisco Bay Area counties, San Francisco shoreline, Oakland shoreline	Himalayan blackberry ( <i>Rubus armeniacus</i> ), pampas grass ( <i>Cortaderia spp.</i> ), Bermuda grass ( <i>Cynodon dactylon</i> )	House sparrow ( <i>Passer domesticus</i> ), rock dove ( <i>Columba livia</i> ), western scrub jay ( <i>Aphelocoma californica</i> ), domestic cat ( <i>Felis catus</i> ), domestic dog ( <i>Canis lupus familiaris</i> ), raccoon ( <i>Procyon lotor</i> )

Note: <sup>1</sup> Many aquatic plant and animal species may be found in more than one biotic community and inclusion as a characteristic species does not mean a species can only be found in a single habitat.

<sup>2</sup> Parts by weight of salt per thousand parts of water (ppt)

Sources: Smith 1959, NOAA 2007



Source: Josselyn 1983

**Figure 4.2-2: Marsh Zonation**  
 California State Lands Commission  
*Amorco Marine Oil Terminal Lease Consideration Project*

1 Subtidal

2 Open-water habitats are divided into two categories: Shallow bay and deep bay. Shallow  
3 bays are subtidal areas less than 18 feet deep below extreme low tide; deep bay habitats  
4 are deeper. The bay contains approximately 164,000 acres of shallow bay habitat and  
5 81,000 acres of deep bay habitat (Monroe et al. 1999). Deep bay areas are found in the  
6 Central Bay and South Bay, and along the main deep-water channel in the San Pablo  
7 and Suisun Bays. All bays contain extensive areas of shallow bay habitat.

8 The open waters of the bay are primarily underlain by soft-bottom bay sediments,  
9 although there are small and important areas where the substrate is either vegetated or  
10 supports shellfish beds. Areas of eelgrass habitat are found along the urban coastlines  
11 west of Richmond and Oakland. The southern shoreline of San Pablo Bay contains the  
12 most extensive areas of eelgrass beds in the San Francisco Bay Estuary. Native oyster  
13 beds are found in the same general areas as eelgrass habitats. Crushed shell substrate  
14 is found in the South Bay (SFEP 2011).

15 Soft-bottom substrate consists of sedimentary particles such as clay, silt, and sand that  
16 can be readily mobilized by tidal currents. This widespread substrate covers 90 percent  
17 of the San Francisco Bay Estuary (SFEP 2011). The primary sources of sediment into the  
18 San Francisco Estuary are the watersheds of the Sacramento and San Joaquin Rivers.  
19 River currents carry sediment into the estuary and deposit it onto the channel bottom,  
20 while tidal currents resuspend the fine sediment into the water column. The cyclical  
21 deposition and resuspension of fine sediments leads to sorting by grain size, where larger  
22 grain sediments are found in the channels and mud/silt/clay accretes into consolidated  
23 mudflats near shore. Soft-bottom substrates are characterized by a lack of large, stable  
24 surfaces for plant and animal attachment (National Oceanic and Atmospheric  
25 Administration [NOAA] 2007). Because of the lack of hard surfaces for rooting, few plants  
26 are associated with soft-bottom habitats. However, though mobile, the fine-grained  
27 sediment is both stable and compact enough to support a diverse benthic assemblage.

28 The biotic assemblages in the subtidal habitats of the San Francisco Bay Estuary vary  
29 with salinity. Species tolerant of high levels of salinity but less adaptable to variable  
30 changes in salinity are found in Central and South Bays. San Pablo Bay and Suisun Bay  
31 support brackish water and freshwater species that are more tolerant of the shifting  
32 salinity levels.

33 Suisun Bay is also the site of the entrapment zone, an area where suspended materials  
34 concentrate as a result of mixing by the outgoing freshwater flow from the Delta above  
35 the heavier saltwater flow from San Francisco Bay. The entrapment zone contains  
36 concentrations of suspended materials such as nutrients, plankton, and fine sediments  
37 that are often many times higher than in areas upstream or downstream of the entrapment  
38 zone (Levine-Fricke 2004). This trophically rich habitat is thought to be important for the

1 rearing of many fish species. Its precise location between the lower Delta and Suisun Bay  
2 varies according to the strength and phase of the tides, and the level of freshwater inflow  
3 from the Sacramento and San Joaquin Rivers. High freshwater flows from the Delta push  
4 the entrapment zone west toward Carquinez Strait; low flows put it closer to the mouth of  
5 the Delta.

#### 6 Tidal Flats

7 Tidal flat habitat is the strip of intertidal habitat located between MLLW and MTL. It is  
8 exposed twice a day during low tide. During high tide, inundated tidal flats provide foraging  
9 habitat for fish such as longfin smelt, starry flounder (*Platichthys stellatus*), and several  
10 species of sculpin. During low tide, shorebirds feed on clams, shrimp, and worms found  
11 in the exposed tidal flats. Extreme high and low tides occur between May and June and  
12 in November and December, the latter period coinciding with the time that high numbers  
13 of waterbirds migrate through the San Francisco Bay Area (Bay Area).

14 The most extensive areas of tidal flat are found in the South Bay and along the north  
15 shore of San Pablo Bay. About half of the bay's tidal flats are found in the South Bay,  
16 making it the region's most important area for shorebirds (Monroe et al. 1999). Tidal flats  
17 in the Central Bay are limited by shoreline development. Suisun Bay has a more narrow  
18 tidal range than the other bays and has correspondingly less tidal flat.

#### 19 Tidal Marsh

20 Tidal marshes are defined as the vegetated habitat between MLW and extreme high  
21 water (Josselyn 1983). Though not all tidal marshes are saline, they are sometimes also  
22 called salt marshes or saline wetlands. These marshes intergrade on their bay side with  
23 tidal flats and on their inland side with freshwater marshes. Tidal marshes are highly  
24 productive biological systems. Though only a small number of vascular plant species are  
25 capable of living in these areas, they support unique and diverse communities of plants  
26 and animals. Vegetation in tidal marshes are nurseries for commercially important  
27 species and endangered species; the tidal marshes are feeding and nesting areas for  
28 birds. In recognition of the importance of the San Francisco Bay Estuary, the United  
29 States named it as its 35<sup>th</sup> Wetland of International Importance (Ramsar Convention on  
30 Wetlands 2013).

31 Birds that feed or roost in tidal marshes include herons, egrets, ducks, coots, rails,  
32 swallows, wrens, and hawks. The majority of birds that use the tidal marshes of San  
33 Francisco Bay are migratory. Shorebirds that breed in the marshes include American  
34 avocet (*Recurvirostra Americana*), black-necked stilt (*Himantopus mexicanus*), and  
35 snowy plover (*Charadrius alexandrinus*). Mammals found in these areas include mice,  
36 shrews, bats, and raccoons. Lizards and snakes are commonly found here, as are frogs  
37 and toads. Tidal marshes provide nursery habitat for fish, offering protection, food, and  
38 reduced osmoregulatory stress (Josselyn 1983).

1 Tidal marshes can be qualitatively divided into low, middle, and high marsh based on tidal  
2 inundation (see Figure 4.2-2). Low marsh consists of the area between MTL and MHW  
3 (Monroe et al. 1999). In salt marshes, these areas are characterized by saline-tolerant  
4 plants, usually grasses, which are adapted to regular inundation. In brackish and  
5 freshwater tidal marshes, cattails (*Typha* sp.), California bulrush (*Scirpus* sp.), and alkali  
6 bulrush (*Bolboschoenus maritimus*) dominate the low marsh. Waterfowl and rails make  
7 extensive use of low marshes. Middle marsh consists of the area between MHW and  
8 MHHW. Plant species typically found in the middle marsh include bulrushes (*Scirpus* sp.),  
9 spike rush (*Eleocharis* sp.), silverweed (*Potentilla anserine*), and salt grass (*Atriplex* sp.).  
10 High marsh consists of the area between MHHW and the highest margin of the marsh.  
11 Plants found in the high marsh include pickleweed (*Salicornia* sp.), saltgrass, gumplant  
12 (*Grindelia* sp.), and alkali heath (*Frankenia salina*).

13 Extensive areas of tidal marsh are found in all bays except the Central Bay. Suisun Marsh,  
14 found north of Suisun Bay, is the State's largest brackish-water marsh. Most of northern  
15 San Pablo Bay is marshland, and the extent of marshland in the South Bay is rising with  
16 ongoing restoration of the area's salt ponds.

### 17 Urban Shoreline

18 Much of the historical shoreline of Central Bay has been replaced with artificial fill or  
19 structures armored with revetments, seawalls, or rip-rap. Urban land uses tend to  
20 encroach on the shoreline in urbanized areas. These areas of shoreline may be fringed  
21 with narrow bands of recently formed tidal marshes dominated by common, widespread  
22 marsh species, including a high proportion of non-native species. The shorelines of the  
23 Central Bay and the northeast and northwest shorelines of the South Bay are heavily  
24 urbanized; the south shorelines of San Pablo Bay and Suisun Bay are less intensely  
25 urbanized.

### 26 Coastal Scrub

27 California's coastal scrub communities are dominated by low-growing shrubs such as  
28 coyote brush (*Baccharis pilularis*), California blackberry (*Rubus ursinus*), and poison oak  
29 (*Toxicodendron diversilobum*). Coastal scrub provides habitat for a variety of small-  
30 mammal species such as Botta's pocket gopher (*Thomomys bottae*), California mouse  
31 (*Peromyscus californicus*), and western harvest mouse (*Reithrodontomys megalotis*).  
32 Larger mammals such as bobcat (*Lynx rufus*), coyote (*Canis latrans*), and mule deer  
33 (*Odocoileus hemionus*) may occur in or near frequent larger areas of coastal scrub  
34 communities. Bird species that frequent coastal scrub habitat include California towhee  
35 (*Melospiza crissalis*), spotted towhee (*Pipilo maculatus*), white-crowned sparrow  
36 (*Zonotrichia leucophrys*), wrentit (*Chamaea fasciata*), California thrasher (*Toxostoma*  
37 *redivivum*), and western scrub jay (*Aphelocoma californica*). Lizards such as western  
38 fence lizard (*Sceloporus occidentalis*) and northern alligator lizard (*Elgaria coerulea*) may  
39 also occur within coastal scrub and adjacent grassland habitats.

## 1 **Biological Characteristics of the San Francisco Estuary**

### 2 Plankton

3 Phytoplankton (e.g., diatoms, cyanobacteria, dinoflagellates) are photosynthesizing  
4 microorganisms that inhabit water. Phytoplankton provide a source of organic carbon and  
5 energy at the base of the food chain (Cloern 1979). Compared to other estuaries,  
6 phytoplankton primary productivity in the San Francisco Bay Estuary is relatively low. The  
7 population density of phytoplankton in the bay cycles throughout the year, with levels  
8 higher during spring in San Pablo, Central, and South Bays, and during the summer in  
9 Suisun Bay (Cloern 1979). In the northern bays, phytoplankton growth can be separated  
10 into three seasons: A spring bloom period during which water-borne nitrates are available  
11 to phytoplankton; a low-productivity period in the summer when turbidity limits light  
12 penetration into the water; and a second, smaller fall bloom based on ammonium uptake  
13 (Wilkerson et al. 2006). High levels of phytoplankton (algal blooms) can cause  
14 environmental stress, affecting concentrations of dissolved oxygen and carbon dioxide,  
15 dissolved organic and inorganic substances, and pH.

16 Zooplankton are a diverse group that can range in size from microscopic (microplankton)  
17 to those that can be seen by the naked eye (macroplankton). This heterogeneous group  
18 includes mysid shrimp, clams, jellyfish, copepods, and crustaceans. They feed upon  
19 phytoplankton, bacteria, organic detritus, and each other.

20 Nonnative jellyfish are found throughout the estuary, including three hydrozoan species  
21 thought to be native to the Black Sea and one scyphozoan species thought to be  
22 introduced from Tokyo Bay. The hydrozoan species are present among the plankton from  
23 May through November, with peak abundances coinciding with warmer summer and fall  
24 temperatures. It has been suggested that jellyfish are passively spread through all low-  
25 salinity areas of San Francisco Bay via attachment to boat bottoms (NOAA 2007).

26 Ichthyoplankton consists of fish eggs and larvae found in near-surface waters, where they  
27 float passively on water currents. Ichthyoplankton feed on microplankton and are in turn  
28 fed on by larger animals.

### 29 Invertebrates

30 California bay shrimp (*Crangon franciscorum*) is the most common shrimp in San  
31 Francisco Bay most years and supports a small commercial fishery. The blackspotted  
32 shrimp (*Crangon nigromaculata*) is the second most common shrimp in the San Francisco  
33 Bay overall and the most common shrimp in some years.

34 The San Francisco Bay Estuary is a nursery area for shrimp and crabs, and fish. The  
35 highest densities of bay shrimp are found in Suisun Bay, where juveniles rear in shallow,  
36 low saline waters (NOAA 2007). Dungeness crab (*Metacarcinus magister*) reproduce in  
37 the ocean, and the small juvenile stages settle to the bottom of the ocean where they are

1 carried into the bay on tidal currents and spend the first year or two of their lives rearing  
2 in San Pablo and South Bays (NOAA 2007).

3 Different species of shrimp tend to inhabit different regions of the bay, though species do  
4 overlap in distribution. Shrimp species that live in the more saline environment of the bay  
5 have grown in abundance over the past 15 years and expanded in range into the  
6 upstream regions of the bay, particularly in dry years when saline levels increase  
7 upstream. Low-salinity species such as the bay shrimp show no increase in abundance  
8 over the past 15 years. Regionally, shrimp abundance increased in all parts of the bay  
9 except in Suisun Bay (SFEP 2011).

10 The abundance of shrimp and crab in the South Bay during the last 15 years is largely in  
11 response to increased nutrient availability in coastal waters. Because shrimp and crab  
12 prey on large benthic invertebrates, particularly clams, the increased numbers have led  
13 to a decline in the abundance of clams in the South Bay (Cloern 2011).

### 14 Fish

15 The health of the San Francisco Bay Estuary's fish communities varies geographically.  
16 The Central Bay fish population has been stable for 30 years, but the populations in the  
17 other bays have seen declines in health over the same period. This decline has been  
18 most dramatic for Suisun Bay, but is also apparent in San Pablo Bay and, increasingly,  
19 in the South Bay. Fish abundance, diversity, and percentage of native species have  
20 declined in all bays except the Central Bay (SFEP 2011).

21 Beginning in 2002, abundance indices of four pelagic fishes in the upper San Francisco  
22 Estuary declined rapidly to record low levels from which they have not recovered. Since  
23 2004, a consortium of federal and State agencies formed the Pelagic Organisms Decline  
24 Management Team to focus attention on the causes of the decline for delta smelt, longfin  
25 smelt, threadfin shad (*Dorosoma petenense*), and juvenile striped bass (*Morone*  
26 *saxatilis*). The emerging conclusion from nearly a decade of research is that the decline  
27 has its roots in multiple, interacting causes, including low original population abundance,  
28 a decrease in suitable habitat, mortality from predation and entrainment into water  
29 diversions, and a fundamental shift in the food web in the upper Delta from a  
30 phytoplankton-based food web to a detritus-based food web (IEP 2010).

### 31 Birds

32 San Francisco Bay Estuary is a major stopover for birds migrating along the Pacific  
33 Flyway, and many birds also nest along the San Francisco Bay. Nearly half of Pacific  
34 Coast waterfowl and shorebirds depend upon the San Francisco Bay and its mudflats for  
35 foraging during migration, with peak abundance occurring November through mid-March  
36 (SFEP 2011). In recognition of its critical conservation importance for shorebirds, San  
37 Francisco Bay Estuary is listed as an important shorebird migratory stopover in the  
38 Western Hemisphere Shorebird Reserve Network (USFWS 2002). Migratory stopovers

1 are wetlands and associated habitats that have high densities of food available at critical  
2 times during waterfowl and shorebird migration. These migrations are energy intensive  
3 and may include long-distance, non-stop flights of over 1,000 miles between stopover  
4 areas. Migrating flocks are large and migrations may occur in a very tight window,  
5 resulting in a large proportion of a species' entire population visiting a single site over a  
6 few weeks and requiring a vast quantity of available forage.

7 Waterbirds are typically classified based on habitat and foraging preference. Waterfowl  
8 are those species that depend primarily on open-water habitat for foraging and roosting,  
9 but breed in wetland and/or adjacent upland habitats. Ducks, geese, and grebes are all  
10 waterfowl. Waterfowl are further divided into dabblers and divers. Dabbling ducks, which  
11 feed at or below the surface of shallow water, have increased in Suisun and San Pablo  
12 Bays, while populations have held steady in the Central and South Bays (Pitkin and Wood  
13 2011). Diving ducks, which feed in deeper waters, have decreased in San Pablo Bay but  
14 increased in Suisun Bay as populations of their primary prey, large invertebrates such as  
15 clams, have changed. Overall, populations of dabbling ducks have increased and winter  
16 populations of diving ducks have decreased. Seabirds such as gulls, terns, and  
17 cormorants forage and nest in many of the habitats found around the San Francisco Bay.  
18 Many species make use of human-created habitats such as piers, bridges, and the  
19 structures found at Alcatraz Island (Pitkin and Wood 2011).

20 Shorebirds primarily use beach, tidal flats, salt ponds, and shallow open-water habitats  
21 for foraging and roosting, and nest on beaches or adjacent upland areas. Sandpipers,  
22 plovers, and dowitchers are all examples of shorebirds. The overall status of shorebirds  
23 in tidal flats is stable. Population declines in the South Bay have been offset by population  
24 increases in San Pablo Bay. The western sandpiper (*Calidris mauri*), one of the most  
25 common species, has declined across the San Francisco Estuary, but populations of two  
26 other common species, least sandpiper (*Calidris minutilla*) and willet (*Tringa*  
27 *semipalmata*), have increased greatly (Pitkin and Wood 2011).

28 Marsh birds include species that depend on emergent marshes for foraging, nesting, and  
29 roosting. California black rail (*Laterallus jamaicensis coturniculus*) and song sparrows are  
30 examples of marsh birds. Tidal marsh bird abundance has increased in San Pablo Bay  
31 and Suisun Bay, mainly driven by increases in common yellowthroat (*Geothlypis trichas*)  
32 and California black rail populations, but has decreased in the Central and South Bays  
33 (SFEP 2011). Reproductive success of tidal marsh birds has increased in Suisun Bay but  
34 is decreasing in San Pablo Bay. In particular, San Pablo song sparrow and Suisun song  
35 sparrow populations are below the level required to sustain their populations, and are  
36 expected to exhibit long-term declines. The decrease in tidal marsh bird abundance is  
37 attributed to predators and nest flooding (Pitkin and Wood 2011).

38 Wading birds use emergent marsh, marsh edge, and shallow open-water habitats to  
39 forage and roost in upland areas. Locally, examples include the great blue heron, cattle

1 egret, and great egret. Heron and many egret populations are increasing in San Pablo  
2 Bay, but there has been a decline in the nesting success for great egrets (SFEP 2011).

### 3 Mammals

4 San Francisco Bay Estuary's mammals are found on the shore and in the water. The most  
5 common terrestrial species found in coastal marshes include generalists such as Norway  
6 rat (*Rattus norvegicus*), house mouse (*Mus musculus*), California vole (*Microtus*  
7 *californicus*), and raccoon (*Procyon lotor*), which are adaptable to a wide range of  
8 habitats. Terrestrial mammals that are obligate users of marsh habitat, such as saltmarsh  
9 harvest mouse (*Reithrodontomys raviventris*), have seen drastic population declines as a  
10 result of habitat loss, and many are now listed as Threatened or Endangered by the  
11 federal and State governments.

12 Populations of beaver (*Castor canadensis*), river otter (*Lontra canadensis*), and sea otter  
13 (*Enhydra lutris*) were extirpated from the San Francisco Estuary by over harvesting in the  
14 19<sup>th</sup> century. Both river otter and beaver have recently recolonized the San Francisco  
15 Estuary; river otter have been reported throughout the San Francisco Bay, including  
16 Coyote Creek in the South Bay, the Richmond Marina in the Central Bay, Martinez Marina  
17 on Carquinez Strait, and from wetlands in Suisun Bay (ROEP 2013). Beaver are now  
18 found in the marshes in north San Pablo Bay and on the lower Alhambra Creek in  
19 downtown Martinez.

20 The most common aquatic mammals in the San Francisco Estuary are California sea lion  
21 (*Zalophus californianus*) and harbor seal (*Phoca vitulina*) (NOAA 2007). The California  
22 sea lions are mainly males that migrate to the San Francisco Estuary to forage and  
23 establish a dominance hierarchy; female California sea lions stay south of Santa Barbara.  
24 California sea lion haul outs are found throughout the San Francisco Bay, most  
25 prominently on San Francisco's Pier 39. Harbor seals are resident breeders. Harbor seals  
26 will haul out throughout the San Francisco Bay; major haul out and pupping sites are  
27 located in the Central and South Bays at the Castro Rocks near the Richmond-San Rafael  
28 Bridge, Yerba Buena Island by the San Francisco-Oakland Bay Bridge, Corte Madera,  
29 and Mowry Slough in the South Bay.

### 30 **Nonindigenous Aquatic Species**

31 San Francisco Bay Estuary has been described as one of the most invaded ecosystems  
32 in North America (Cohen and Carlton 1995). Nonindigenous aquatic species dominate  
33 many parts of the San Francisco Bay, to the extent that in some locations only introduced  
34 species can be found. In 2010, the California Department of Fish and Wildlife (CDFW)  
35 collected 497 species from San Francisco Bay Estuary, of which 98 species were  
36 classified as introduced, including three newly detected species to San Francisco Bay  
37 Estuary that had likely been spread from other locations in California (OSPR 2011). The

1 results indicate high numbers of introduced species are found in the South Bay, San  
2 Pablo Bay, and Central Bay. Suisun Bay had the lowest number of introduced species.

3 Nonindigenous aquatic species have been introduced to the San Francisco Bay via a  
4 number of vectors, including the deliberate introduction of species for recreational or  
5 commercial purposes. The shipping industry has been identified as one of the major  
6 vectors of nonindigenous aquatic species, and vessel biofouling and ballast water are  
7 considered the largest contributors of nonindigenous species to the San Francisco Bay  
8 (California State Lands Commission [CSLC] 2013e). Eighteen percent of established  
9 nonindigenous aquatic species are tied to vessel biofouling as the primary likely vector  
10 and 9 percent for ballast water; however, when considering established species with  
11 multiple possible vectors, 60 percent could have been introduced via vessel biofouling as  
12 one of several possible vectors, and 53 percent could have been introduced via ballast  
13 water as one of several possible vectors (OSPR 2011).

14 Invasive species may compete directly with native species for food or space, or prey upon  
15 native species. They can also change the food chain or physical environment to the  
16 detriment of native species. Approximately 42 percent of the species on the federal  
17 Threatened or Endangered species list are at risk primarily because of predation,  
18 parasitism, and competition from nonindigenous invasive species (OSPR 2011). One  
19 such currently pernicious invasive species is the overbite clam (*Corbula amurensis*), first  
20 found in the San Francisco Bay Estuary in 1986. Thought to have been introduced into  
21 the San Francisco Bay Estuary by ballast water discharge from a vessel, this planktivore  
22 is now so abundant that the current population is capable of filtering the estuary's water  
23 column several times a day. In some portions of the Suisun Bay floor, the clam accounts  
24 for the vast majority of biomass, and it has been implicated in the pelagic organism decline  
25 by severely reducing the availability of phytoplankton in Suisun Bay (SFEP 2004, Greene  
26 2011).

### 27 ***Rare, Threatened, and Endangered Species***

28 Owing to the diversity of habitat between embayments, the distribution and abundance of  
29 rare and sensitive species that depend on the estuarine habitat for some or all of their life  
30 cycle vary throughout the region. Each habitat supports a distinct community of sensitive  
31 species. To aid in the assessment of impacts, each category of sensitive species is  
32 summarized by embayment. Appendix D includes Tables D-1 through D-5, which provide  
33 further detailed information about each species that was considered under this  
34 assessment and their potential to be present near the Project site and impacted by the  
35 Project.

### 36 Sensitive Plants

37 Tidal habitats in the San Francisco Estuary support 12 plant species that are identified by  
38 federal and/or State agencies as endangered, threatened, or rare, or are listed by the

1 California Native Plant Society as status 1B or higher. The distribution of sensitive plant  
2 species varies geographically within the estuary. In general, the less urbanized the bay,  
3 the more likely it is to retain a proportion of its historical marshland and to support rare or  
4 sensitive plants (see Appendix D, Table D-1).

5 The Central Bay has not retained any historical tidal marsh remnants, which limits the  
6 potential for rare plants with few exceptions. Naturally occurring populations of Point  
7 Reye's bird's-beak (*Cordylanthus maritimus* ssp. *palustris*) are found along the shores of  
8 Richardson Bay, and a population was reintroduced to the Crissy Field wetlands in the  
9 Presidio. This species inhabits the high marsh or upper middle marsh zone. It is a  
10 hemiparasitic plant, meaning that although it possesses chlorophyll and is capable of  
11 limited photosynthesis, it must attach its root system to a host plant to extract water and  
12 nutrients and to reproduce. Point Reye's bird's-beak is dependent upon plants that are  
13 active in summer such as pickleweed (*Salicornia* sp.), saltgrass (*Distichlis* sp.), and fleshy  
14 jaumea (*Jaumea carnosa*), all of which are abundant in Richardson Bay. One other  
15 sensitive species is found in the Central Bay: California sea blite (*Suaeda californica*).  
16 This species is restricted to the intertidal zone of salt marshes, and was extirpated from  
17 the San Francisco Bay region in the 1960s. Since 2000, it has been successfully  
18 reintroduced at four sites in the Central Bay: Heron's Head Park at Pier 98, Pier 94,  
19 Eastshore State Park north of Oakland, and Roberts Landing near San Leandro in South  
20 Bay.

21 The South Bay retains fragments of historical tidal marshes at upper Newark Slough,  
22 Dumbarton Marsh, and along the Palo Alto shoreline. However, no sensitive tidal marsh  
23 or estuarine beach plants are known to remain in the South Bay. As mentioned above,  
24 one population of California sea blite was re-introduced at Roberts Landing.

25 San Pablo Bay has retained more of its historic tidal marshes than any other bay, and as  
26 a result supports naturally occurring populations of six rare species. Historical tidal  
27 marshes are found along the north edge of San Pablo Bay, including China Camp in San  
28 Rafael, Heerdt Marsh by Corte Madera, most of Petaluma Marsh, Whittell Marsh by Point  
29 Pinole, and areas of Napa marsh, including Fagan's Slough. The richest diversity of  
30 sensitive plants is found in the marshes at the mouths of the Petaluma and Napa Rivers.

31 San Joaquin spearscale (*Atriplex joaquinana*) is a tall annual herb known mainly from  
32 alkali grasslands and is only rarely known from tidal marsh edges where it may  
33 opportunistically colonize the high-tide shorelines. Recent populations are reported from  
34 along the lower Napa River. Saline marsh clover (*Trifolium hydrophilum*) is known to  
35 occur in marshes as well as alkaline grasslands. One population is known from the Viansa  
36 wetlands in northwest San Pablo Bay. The upper marsh zone of San Pablo Bay's brackish  
37 and freshwater marshes supports populations of endemic species known only to San  
38 Francisco Bay Estuary: Suisun marsh aster (*Symphotrichum lentum*), delta tule pea  
39 (*Lathyrus jepsonii* var. *jepsonii*), and Mason's lillaeopsis (*Lillaeopsis masonii*). Suisun

1 marsh aster was once widely distributed in San Pablo Bay, but is reported now only from  
2 the vicinity of Fagan Slough. The delta tule pea is a climbing species; individuals are  
3 present in marshes along the Napa River. Mason's lilaepsis (*Lilaeopsis masonii*) is also  
4 known from the Napa River corridor; it is a shade-sensitive, early successional colonizer  
5 of newly deposited or exposed sediments. Two species of bird's-beak are found in the  
6 upper marsh zone in San Pablo Bay: Point Reye's bird's beak and the federally  
7 endangered soft-bird's beak (*Cordylanthus mollis* ssp. *mollis*). One population of Point  
8 Reye's bird's-beak is known from the Petaluma River. Extant populations of soft bird's-  
9 beak are found in the marshes along the mouth of the Napa River.

10 Most of the sensitive plants found in San Pablo Bay are also found in Suisun Bay, where  
11 they are more widely distributed and abundant, particularly in the extensive brackish  
12 waters of Suisun Marsh. In addition to the plants described above, Suisun Bay contains  
13 populations of the federally endangered Suisun thistle (*Cirsium hydrophilum* var.  
14 *hydrophilum*) in the northern reaches of Suisun Marsh in the vicinity of Rush Ranch.  
15 Bolander's water-hemlock (*Cicuta maculata* var. *bolanderi*) was once common in Suisun  
16 Marsh.

#### 17 Sensitive Fishes

18 The San Francisco Estuary provides habitat to seven species of sensitive fish. Most of  
19 the sensitive fish species in the estuary either rely on brackish water habitat for their adult  
20 habitat and/or travel upstream to spawn in freshwaters and have thus been affected by  
21 degradation or removal of spawning habitats, entrainment by the State water projects,  
22 drought, pollution, predation, disruption of the food web and direct competition for space  
23 with and predation by non-indigenous aquatic species. The discussion below summarizes  
24 the distribution of sensitive species in the estuary; Table D-2 in Appendix D provides more  
25 detailed information for each species. Sensitive fish species are found mainly in the north  
26 bays. All sensitive fish species of the San Francisco Estuary have the potential to be  
27 impacted by a crude oil spill. Suisun Bay is home to two native species of "true" estuarine  
28 fish, i.e. fish that spend all their lives in estuaries: delta smelt and Sacramento splittail  
29 (*Pogonichthys macrolepidotus*). Both species are endemic to the Delta, and both travel  
30 into fresh water to spawn. Delta smelt are found in greatest abundance in shallow, turbid  
31 waters at the freshwater edge of the entrapment zone where they feed on plankton;  
32 Sacramento splittail are found mainly along the benthos of small, shallow, turbid sloughs  
33 lined with emergent vegetation, where they feed on macroinvertebrates and detritus. The  
34 delta smelt population is listed as threatened at the federal level and endangered by the  
35 State. As of 2010, populations of the splittail were considered stable by the United States  
36 Fish and Wildlife Service (USFWS), which found its listing was not warranted, but the  
37 species remains a CDFW species of special concern, and it is a targeted species of the  
38 Delta Stewardship Council (USFWS 2010).

1 Four anadromous species are found in the San Francisco Bay: longfin smelt, chinook  
2 salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*), and the  
3 Southern Distinct Population of green sturgeon (*Acipenser medirostris*). Longfin smelt are  
4 primarily estuarine, though they are found in small numbers in the coastal waters beyond  
5 the Golden Gate Bridge. In summer, adults congregate in the cooler waters and deep-  
6 water habitats of the Central Bay, where they feed on zooplankton such as the opossum  
7 shrimp, *Acanthomysis* sp., and *Neomysis mercedis* when available and on copepods  
8 otherwise (Hobbs 2006). They migrate upstream in fall to spawn in the limnetic and  
9 oligohaline waters of the Delta. Populations have declined steadily over the past two  
10 decades (Rosenfeld and Baxter 2007).

11 Chinook salmon are born in fresh water and migrate into the Pacific Ocean to mature,  
12 reaching maturity between 2 and 5 years of age. They migrate into freshwater streams to  
13 spawn, after which they die. Their eggs incubate for several months. Upon hatching, fry  
14 undergo physiological changes in preparation for migration and enter the smolt stage.  
15 Most chinook smolt migrate to the ocean within a few months of hatching, though some  
16 may remain in fresh water for a year. Peak out-migrations are between April and June.

17 The Sacramento-San Joaquin River basin runs of chinook salmon are differentiated into  
18 four runs by their time-of-spawning migrations: Fall-run, late fall-run, winter-run, and  
19 spring-run. Fall-run chinook migrate upstream from July to November, late fall-run migrate  
20 October to February, winter-run migrate December to April, and spring-run migrate April  
21 to July. The Delta is a nursery area for all runs of chinook salmon. Winter-run chinook,  
22 the young of which out-migrate during the driest times of the year, are listed as critically  
23 endangered at both the federal level and by the State. Spring-run salmon are listed as  
24 threatened at both federal and state levels.

25 A close ally to salmon, the steelhead is an anadromous kind of rainbow trout. They  
26 migrate into the estuarine river basins from October to April and spawn from December  
27 to May. Populations that spawn eastward to the Napa River are listed as threatened at  
28 the federal level. This includes runs in San Pablo Bay's Napa River, Petaluma River, and  
29 Sonoma Creek, and the South Bay's Guadalupe River.

30 Green sturgeon may be found throughout the Central, San Pablo, and Suisun Bays.  
31 Adults are primarily marine, but enter the estuary to feed or migrate to spawning grounds.  
32 Juveniles rear in the northern bays for 1 to 4 years before joining the more marine adults.  
33 Sturgeon are benthic feeders, feeding mainly on shrimp and crabs.

### 34 Sensitive Birds

35 San Francisco Bay Estuary's sensitive birds are generally obligate inhabitants of tidal  
36 marshes, and have experienced population declines as a result of the removal and  
37 degradation of marsh habitat. Thus, the Central Bay, which possesses few tidal marshes,  
38 has few populations of sensitive birds (see Appendix D, Table D-3).

1 Many sensitive species such as California clapper rail (*Rallus longirostris obsoletus*) and  
2 California black rail are widely distributed throughout the bays. Others are subspecies  
3 known from single embayments: The Suisun song sparrow (*Melospiza melodia maxillaris*)  
4 is found in Suisun Bay, the San Pablo song sparrow (*Melospiza melodia samuelis*) in San  
5 Pablo Bay, and the Alameda song sparrow (*Melospiza melodia pusillula*) in the South  
6 Bay. California least tern (*Sterna antillarum browni*) is known to nest in the South Bay and  
7 along the southern shore of Suisun Bay. Western snowy plover (*Charadrius nivosus* ssp.  
8 *nivosus*) also nests in the South Bay, as well as in the San Pablo Bay marshes.

9 Colonial nesters found in the estuary include double-crested cormorant (*Phalacrocorax*  
10 *auritus*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), black-crowned  
11 night-heron (*Nycticorax nycticorax*), and snowy egret (*Egretta thula*). Double-crested  
12 cormorant colony nest sites are found under the bridges that divide the bays and on large  
13 electric transmission structures in the South Bay. Heron rookeries, which may consist of  
14 several heron and egret species, are found throughout the Bay Area.

#### 15 Sensitive Mammals

16 Tidal marshes in the San Francisco Estuary support four sensitive mammalian species,  
17 while seven mammalian species use the aquatic habitats of the estuary. Additionally,  
18 three species of bats forage over tidal marsh and estuarine waters (see Appendix D,  
19 Table D-4).

20 Many of the sensitive mammals of the tidal marsh habitats are small rodents: Suisun  
21 ornate shrew (*Sorex ornatus sinuosus*), saltmarsh wandering shrew (*Sorex vagrans*  
22 *halicoetes*), the federally endangered saltmarsh harvest mouse, and the San Pablo vole  
23 (*Microtus californicus sanpabloensis*) all weigh less than an ounce at adult size. Where  
24 present, they are prey species for higher order predators. Both shrews are insectivorous,  
25 while the mouse and vole are vegetarian. The endemic saltmarsh harvest mouse is  
26 generally restricted to tidal marsh habitats. It is found throughout the estuary, albeit in low  
27 numbers due to habitat destruction and degradation. The saltmarsh wandering shrew is  
28 found in the South Bay, while the Suisun ornate shrew is found in Suisun Bay. The San  
29 Pablo vole is known only from a small region in the vicinity of Wildcat Creek, on the  
30 southeast shore of San Pablo Bay.

31 Seven marine mammal species are known to migrate, forage, and rest in the San  
32 Francisco Bay. Gray whale (*Eschrichtius robustus*) and humpback whale (*Megaptera*  
33 *novaeangliae*) occasionally enter the Central Bay to feed during seasonal migrations. The  
34 harbor porpoise (*Phocoena phocoena*) is another visitor to the Central Bay. Harbor seal  
35 and California sea lion both venture as far upstream as Suisun Bay, but in general marine  
36 mammals prefer the deep, cold waters of the Central Bay.

37 The big free-tailed bat (*Nyctinomops macrotis*) has been collected in Martinez. Hoary bat  
38 (*Lasiurus cinereus*) has been observed in Suisun Marsh, but is more widely distributed in

1 the South Bay. The pallid bat (*Antrozous pallidus*) has been collected in the Central,  
2 South, and San Pablo Bays. The distribution of these species and their use of estuarine  
3 habitats has not been well described.

#### 4 Sensitive Amphibians and Reptiles

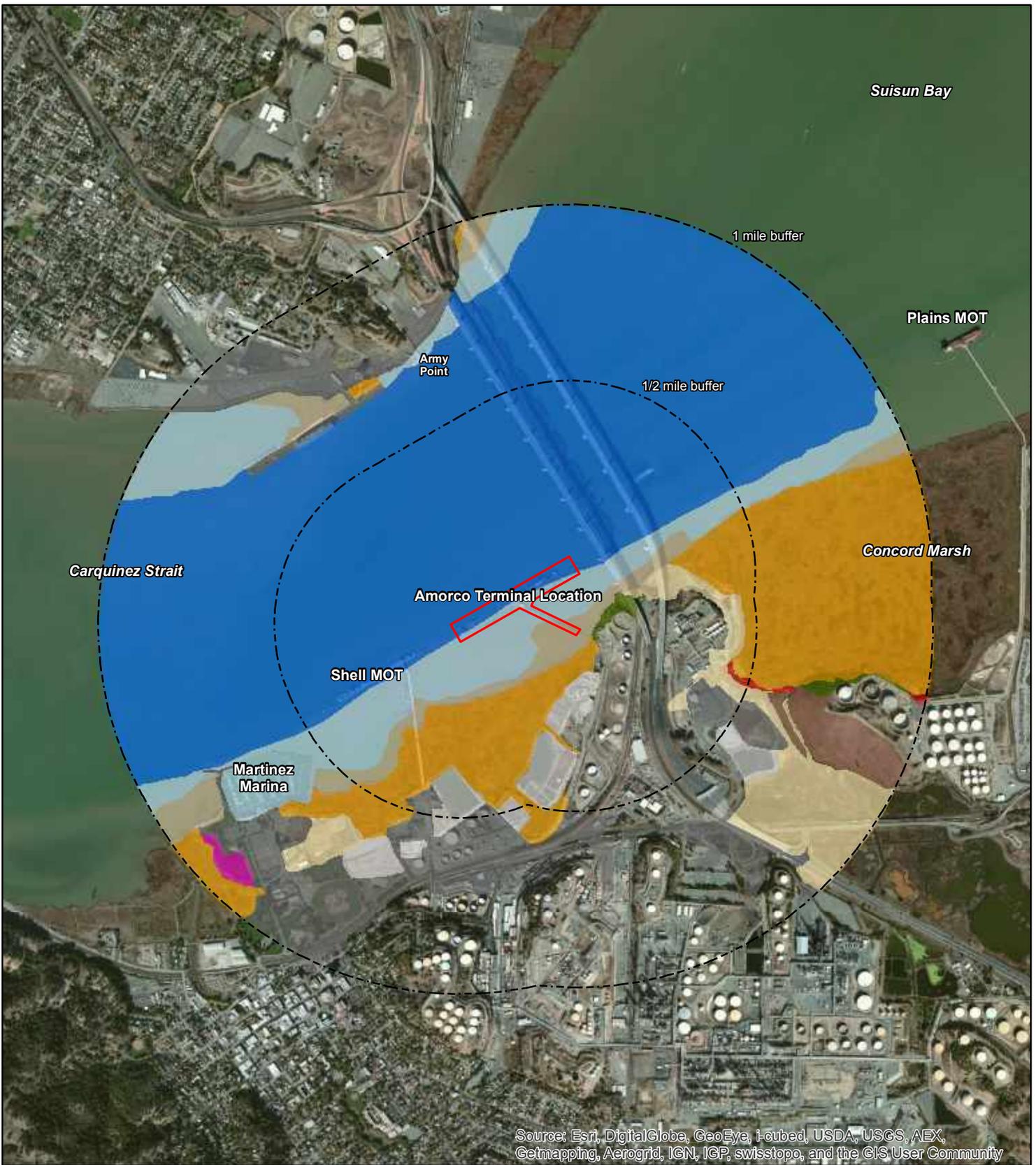
5 The San Francisco Bay Estuary supports only a handful of sensitive amphibians and  
6 reptiles (see Appendix D, Table D-5). Both California red-legged frog (*Rana draytonii*) and  
7 western pond turtle (*Actinemys marmorata*) are distributed in low numbers throughout the  
8 San Francisco Bay (CDFW 2013c). These species prefer freshwater ponds and streams,  
9 but are tolerant of limited saltwater intrusion and are documented from brackish marshes  
10 in San Pablo and Suisun Bays. California red-legged frogs appear to be eliminated from  
11 the western lowland portions of Contra Costa and Alameda counties (west of Highway 80  
12 and 880, particularly in urban areas). California tiger salamanders, which are found in  
13 grasslands and vernal pools, are known only from the Don Edwards National Wildlife  
14 Refuge in the South Bay (CDFW 2013c).

#### 15 **4.2.1.2 Project Study Area**

16 The Project study area includes lower Suisun Bay and upper Carquinez Strait, including  
17 vegetation at the Amorco Terminal lease area and along the shoreline within a 0.5-mile  
18 radius of the Amorco Terminal, as well as known habitats of rare, threatened, or  
19 endangered plant or animal species within a 1-mile radius of the Amorco Terminal (see  
20 Figure 4.2-3). Table D-6 in Appendix D includes a matrix depicting habitat use by wildlife  
21 found in the Project study area.

#### 22 ***Characteristics of the Project Study Area***

23 The Project is located on the eastern end of the Carquinez Strait in northern Contra Costa  
24 County on 16.6 acres of public land leased from the CSLC (proposed to be 14.9 acres as  
25 part of a new lease), approximately 300 feet west of the Benicia-Martinez Bridge. The  
26 lease extends approximately 1,300 feet into the Strait.



Source: Esri, DigitalGlobe, GeoEye, I-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

F:\Maps\Amorcito\Biological Resources\mxd\Figure 4\_2-2\_Vegetation.mxd

<p><b>Figure 4.2-3 Vegetation and Habitat</b> California State Lands Commission <i>Amorcito Marine Oil Terminal Lease Consideration Project</i></p>	<p><span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px;"></span> Terminal Boundary    <span style="border: 1px dashed black; display: inline-block; width: 15px; height: 10px;"></span> Buffer</p>	<p><b>Habitat</b></p> <table border="0"> <tr> <td><span style="display: inline-block; width: 15px; height: 10px; background-color: blue;"></span> Deep Bay</td> <td><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow;"></span> Diked Marsh</td> </tr> <tr> <td><span style="display: inline-block; width: 15px; height: 10px; background-color: lightblue;"></span> Shallow Bay</td> <td><span style="display: inline-block; width: 15px; height: 10px; background-color: brown;"></span> Ruderal</td> </tr> <tr> <td><span style="display: inline-block; width: 15px; height: 10px; background-color: pink;"></span> Lagoon</td> <td><span style="display: inline-block; width: 15px; height: 10px; background-color: green;"></span> Coastal Scrub</td> </tr> <tr> <td><span style="display: inline-block; width: 15px; height: 10px; background-color: tan;"></span> Tidal Flat</td> <td><span style="display: inline-block; width: 15px; height: 10px; background-color: grey;"></span> Storage or Treatment Basin</td> </tr> <tr> <td><span style="display: inline-block; width: 15px; height: 10px; background-color: orange;"></span> Tidal Marsh</td> <td><span style="display: inline-block; width: 15px; height: 10px; background-color: darkgrey;"></span> Filled Baylands</td> </tr> <tr> <td><span style="display: inline-block; width: 15px; height: 10px; background-color: red;"></span> Old Tidal Marsh</td> <td></td> </tr> </table>	<span style="display: inline-block; width: 15px; height: 10px; background-color: blue;"></span> Deep Bay	<span style="display: inline-block; width: 15px; height: 10px; background-color: yellow;"></span> Diked Marsh	<span style="display: inline-block; width: 15px; height: 10px; background-color: lightblue;"></span> Shallow Bay	<span style="display: inline-block; width: 15px; height: 10px; background-color: brown;"></span> Ruderal	<span style="display: inline-block; width: 15px; height: 10px; background-color: pink;"></span> Lagoon	<span style="display: inline-block; width: 15px; height: 10px; background-color: green;"></span> Coastal Scrub	<span style="display: inline-block; width: 15px; height: 10px; background-color: tan;"></span> Tidal Flat	<span style="display: inline-block; width: 15px; height: 10px; background-color: grey;"></span> Storage or Treatment Basin	<span style="display: inline-block; width: 15px; height: 10px; background-color: orange;"></span> Tidal Marsh	<span style="display: inline-block; width: 15px; height: 10px; background-color: darkgrey;"></span> Filled Baylands	<span style="display: inline-block; width: 15px; height: 10px; background-color: red;"></span> Old Tidal Marsh		<p style="text-align: center;"> <span style="font-size: 2em;">↑</span>  <b>N</b>  <span style="font-size: 2em;">↓</span> </p> <p style="text-align: center;"><b>1:24,000</b></p> <p style="text-align: center;">1 inch = 2,000 feet</p> <p style="text-align: center;"> <span style="display: inline-block; width: 100px; height: 10px; background: linear-gradient(to right, black 50%, white 50%); border: 1px solid black;"></span> ft  0      900      1,800 </p>
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<span style="display: inline-block; width: 15px; height: 10px; background-color: pink;"></span> Lagoon	<span style="display: inline-block; width: 15px; height: 10px; background-color: green;"></span> Coastal Scrub														
<span style="display: inline-block; width: 15px; height: 10px; background-color: tan;"></span> Tidal Flat	<span style="display: inline-block; width: 15px; height: 10px; background-color: grey;"></span> Storage or Treatment Basin														
<span style="display: inline-block; width: 15px; height: 10px; background-color: orange;"></span> Tidal Marsh	<span style="display: inline-block; width: 15px; height: 10px; background-color: darkgrey;"></span> Filled Baylands														
<span style="display: inline-block; width: 15px; height: 10px; background-color: red;"></span> Old Tidal Marsh															
<p> <b>TRC</b></p> <p style="text-align: right;">9/3/2013</p>															

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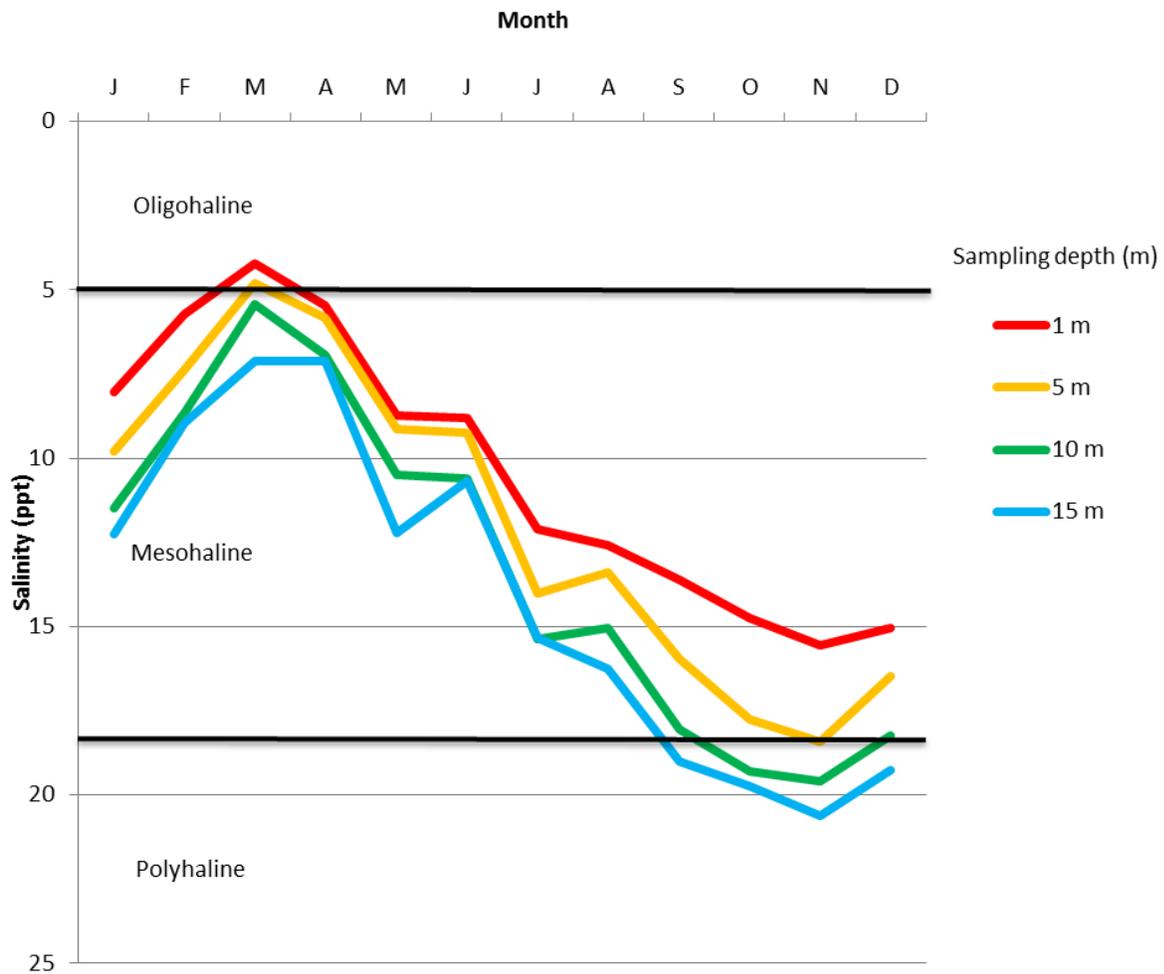
1 Water depths in the lease area range from 15 meters at the lease edge to 3 meters along  
2 the dock. The benthic substrate consists of soft bay sediments over bedrock, also known  
3 as mudstone.

4 Land use in the vicinity of the Amorco Terminal is a mosaic of industrial and open space.  
5 Coastal brackish marsh is present along the shoreline between Bulls Head Point to the  
6 east and the Martinez Marina to the west of the Amorco Terminal. Upland areas  
7 associated with the marshlands are given over to industrial use with the exception of a  
8 small patch of coastal scrub/ruderal vegetation found on the hillside leading up to the  
9 Amorco Tank Farm. Directly west of the Amorco Terminal, Hanson Sand Mining has a  
10 floating pipeline used to transfer sand slurry from vessels to the shore. The Shell Martinez  
11 Marine Terminal is approximately 500 feet west of the Amorco Terminal. The channel  
12 north of the Amorco Terminal is about 4,000 feet wide and is bordered by the Port of  
13 Benicia and Valero's Benicia Refinery.

14 Carquinez Strait is a narrow gap in the Coast Range that connects the San Pablo Bay to  
15 Suisun Bay and the Sacramento-San Joaquin River Delta. Typical river deltas widen from  
16 their source into a fan-shaped, sediment-heavy region. The narrow channel in the  
17 Carquinez Strait, however, restricts the outflow of flood waters and sediment from the  
18 Central Valley to the ocean, causing waters to pool and sediment to slow and settle in  
19 Suisun Bay, and resulting in a rare geological feature known as an inverted river delta.  
20 Upstream of the strait, the channel depth transitions rapidly from the deep channel of  
21 Carquinez Strait into the shallows of Suisun Bay. This area of bathymetric change is  
22 known as the Garnet Sill.

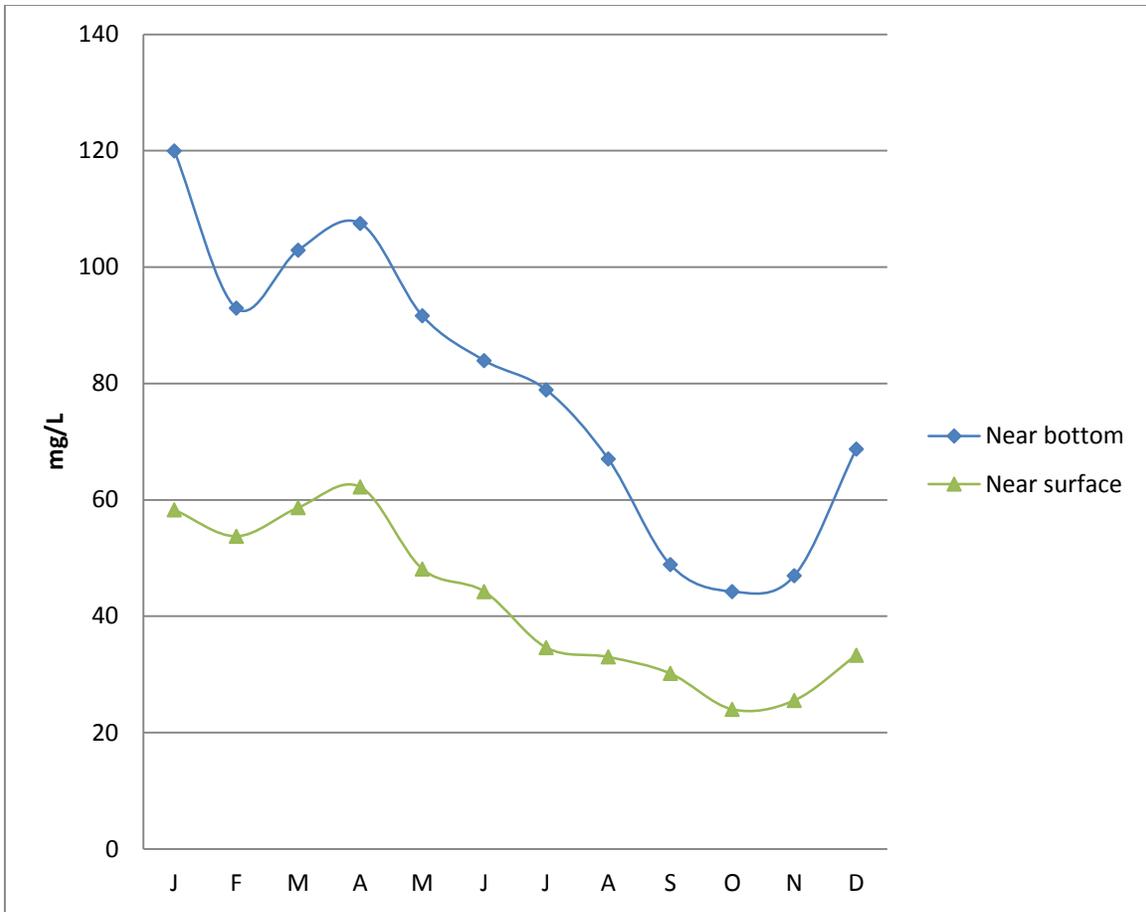
23 The Garnet Sill is the upstream endpoint of a gravitational circulation cell that forms in  
24 response to strong tidal currents that carry salt water upstream along the bottom of the  
25 channel while fresh water flows seaward along the top of the channel. Salinity in the water  
26 column in Carquinez Strait is stratified by depth, with fresh water along the surface and  
27 saline waters along the bottom (see Figure 4.2-4). Salinity stratification is greatest during  
28 neap tides. Following winter storms, the surface waters reach their lowest levels of  
29 salinity, and for a brief time, the upper five meters of the channel become oligohaline.  
30 Once the winter floods have stopped, the channel waters quickly become mesohaline  
31 and then slowly polyhaline.

32 The area where upstream and downstream currents meet and cancel each other out is  
33 known as the null zone; in Carquinez Strait, this zone typically forms near the strait's  
34 upper end, downstream of the Garnet Sill. During spring tide, the strait is the site of the  
35 San Francisco Bay estuarine turbidity maxima; during neap tide, the estuarine turbidity  
36 maximum is found upstream at Middle Ground (Schoellhamer 2002). Suspended  
37 sediment concentration (SSC) is greater near the bottom of the channel than higher in  
38 the water column. SSCs are seasonally dependent and are at their highest in the winter  
39 and spring, and decrease through summer to fall lows (see Figure 4.2-5).



Source: USGS 2001

**Figure 4.2-4: Salinity Stratification in Carquinez Strait**  
 California State Lands Commission  
*Amorco Marine Oil Terminal Lease Consideration Project*



Source: USGS 2007

**Figure 4.2-5: Average Suspended Sediment Concentration at Benicia Bridge, 2003-2007**

California State Lands Commission  
*Amorco Marine Oil Terminal Lease Consideration Project*

Note: Benicia Station is located approximately 0.6 mile north of the Amorco Marine Oil Terminal. Data from this site are considered representative of suspended-solids concentration in the strait.

1 **Terminal Structures**

2 The Amorco Terminal consists of a 1,130-foot-long wharf arm connected to the shore by  
3 1,500 feet of approach trestle. The Amorco Terminal is constructed of wood, concrete,  
4 and metal. The wharf has four small buildings on-site, including two buildings for  
5 personnel, a pump house, and a tool shed. Lights are placed regularly along the wharf  
6 arm and approach trestle, and there is one large light bank under the main loading arm.

7 The Amorco Terminal provides shade and refuge areas for fish, and resting spots and  
8 foraging opportunities for fish, birds, and marine mammals. The Amorco Terminal also  
9 provides nesting habitat for some bird species, including a pair of osprey (*Pandion*  
10 *haliaetus*) that have successfully fledged offspring from a nest atop the main loading arm  
11 since 2009 (Jim Herron pers. comm.). Support pilings provide attachment areas for  
12 sessile invertebrates and a place for fish to spawn.

13 **Subtidal**

14 The water column consists of the area between the benthos and the water surface. The  
15 water column contains both channels, which are areas with strong currents and a deep  
16 rounded bottom, and shoals, or shallow weak-current areas. Channels provide a  
17 connection between marine and freshwater ecosystems, while shoals function as  
18 collection areas for sediment and detritus. In San Francisco Bay Estuary, areas of the  
19 water column less than 18 feet deep are considered shallow bay; areas deeper than 18  
20 feet are considered deep bay. Approximately 238 acres of shallow bay and 1,097 acres  
21 of deep bay are found within 1 mile of the Amorco Terminal. The lease area includes 5.00  
22 acres of shallow bay and 8.93 acres of deep bay. These habitats provide foraging areas  
23 for invertebrates, fish, diving birds, and marine mammals, and nursery and spawning  
24 habitat for invertebrates and fish.

25 Compared to other parts of the San Francisco Bay, the Carquinez Strait is not particularly  
26 rich in phytoplankton (USGS 2013a). Phytoplankton productivity is generally calculated  
27 from measurements of chlorophyll  $\alpha$ . Chlorophyll  $\alpha$  concentrations below about 10  
28 micrograms per liter are known to cause food-limited declines in zooplankton  
29 reproduction. Measurements of water quality in the Carquinez Strait from 2003 to 2013  
30 show that chlorophyll  $\alpha$  levels in the strait rarely exceed this threshold in either spring or  
31 fall (USGS 2013).

32 The benthic substrate at the Project site consists of soft bay sediments over bedrock, also  
33 known as mudstone. Because of the lack of hard surfaces for rooting, few plants are  
34 associated with soft-bottom habitats. However, though mobile, the fine-grained sediment  
35 is both stable and compact enough to support a diverse benthic assemblage. The biotic  
36 assemblage associated with this habitat is known as the benthos. The benthos consists  
37 of bacteria and animals that live in (infauna), on (epifauna), or near (demersal) the bottom  
38 of the water channel.

1 Salinity levels along the substrate are generally polyhaline in summer and fall and  
 2 mesohaline in the winter and spring, leading to fluxation on the benthic habitat and  
 3 community composition.

4 The most common benthic species observed at the Amorco Terminal is *Corbula*  
 5 *amerensis* (see Table 4.2-2).

6 **Table 4.2-2: Common Benthic Invertebrates in Carquinez Strait**

Species	Status	Group	Salinity	Habitat	Relative Frequency
<i>Ampelisca abdita</i>	I	amphipod	polyhaline	channel, shallow subtidal	common, persistent
<i>Ascidia zara</i>	I	tunicate	polyhaline	hard bottom substrate	common, persistent
<i>Corbula amurensis</i>	I	bivalve	oligohaline, mesohaline, polyhaline	channel, channel edge, shallow subtidal	common, persistent
<i>Gemma gemma</i>	I	bivalve	polyhaline	shallow subtidal	common, persistent
<i>Grandidierella japonica</i>	I	amphipod	mesohaline	channel edge	persistent in low numbers
<i>Heteromastus spp.</i>	U	polychaete	mesohaline, polyhaline	channel, shallow subtidal	persistent in low numbers
<i>Macoma petalum</i>	I	bivalve	polyhaline	shallow subtidal	low numbers, persistent
<i>Monocorophium acherusicum</i>	I	amphipod	polyhaline	shallow subtidal	sporadic
<i>Arcuatula senhousia</i>	I	bivalve	polyhaline	channel, shallow subtidal	low numbers, persistent
<i>Mya arenaria</i>	I	bivalve	polyhaline	channel, shallow subtidal	common, persistent
<i>Alitta succinea</i>	I	polychaete	polyhaline	channel	low numbers, persistent
<i>Nippoleucon hinumensis</i>	I	cumacean	mesohaline, polyhaline	channel, channel edge, shallow subtidal	persistent in low numbers in the channel, and peaks in spring/summer at channel edge
<i>Polydora cornuta</i>	C	polychaete	polyhaline	channel	low numbers, persistent
<i>Streblospio benedicti</i>	I	polychaete	polyhaline	channel	low numbers, persistent

Sources: NOAA 2007, Rowan et al. 2011

Status: I = Nonindigenous; U = Unresolved; C = Cryptogenic

## 7 **Tidal Flat**

8 A narrow band of tidal flat habitat is located between the shallow waters of the San  
 9 Francisco Bay and shoreline marsh areas. The Amorco Terminal lease includes  
 10 approximately 0.96 acre of this habitat; approximately 77 acres are found within 1 mile of  
 11 the Amorco Terminal. The tidal flats at the Amorco Terminal are comprised of mudflats,

1 which are formed of fine-grained silts and clays, and typically support a diverse  
2 community of diatoms, worms, shellfish, and algal flora. These creatures are prey for a  
3 wide variety of birds and fish. Wading birds known to use the tidal flats for forage during  
4 low tide include western sandpiper, least sandpiper, willet, and dunlin (*Calidris alpina*)  
5 (eBird 2012). Harbor seals are also known to frequent tidal flats. Other species such as  
6 white pelican (*Pelecanus erythrorhynchos*) rest on the tidal flats between fishing  
7 expeditions. During high tide, the flats provide foraging areas for fish, including longfin  
8 smelt.

### 9 **Tidal Marsh**

10 Approximately 432 acres of tidal marsh are found within 1 mile of the Amorco Terminal,  
11 mainly along the southern shore of the Carquinez Strait where they are surrounded by  
12 heavy industry. The marshes are composed primarily of low/middle tidal brackish marsh,  
13 muted tidal brackish marsh, and diked brackish marsh. Small, discrete areas of high tidal  
14 marsh occur along the north shore of Carquinez Strait and at the southern edge of the  
15 Concord Marshes.

16 Tidal brackish marsh is found along the southern edge of the Carquinez Strait east of the  
17 Benicia-Martinez Bridge and west of the Martinez Marina. East of the bridge, the  
18 predominantly low/middle marsh plain extends up to 3,000 feet from the edge of the tidal  
19 flat; west of Martinez Marina, the marsh plain is approximately 1,000 feet wide and abuts  
20 an area of muted tidal brackish marsh. A narrow band of high marsh is found at its  
21 southern edge. Muted tidal brackish marsh is found west of the Carquinez Bridge, where  
22 the marsh plain varies in width between 300 and 1,500 feet. Both marsh plains are fairly  
23 level. Their tidal channels are a combination of straight channels superimposed on the  
24 marsh for drainage or mosquito control and linear dendritic in areas closest to shore. The  
25 dominant species present are common reed (*Phragmites australis*), cattails, California  
26 tule (*Schoenoplectus californicus*), broad-leaf pepperweed (*Lepidium latifolium*),  
27 pickleweed (*Salicornia pacifica*), Baltic rush (*Juncus balticus*) and gumplant.

28 The muted tidal marsh adjacent to the Amorco Terminal provides habitat for a variety of  
29 rare, threatened, and endangered species. California clapper rail was detected during a  
30 2008 survey of the marsh but appeared to be foraging rather than breeding; California  
31 black rail forage and breed in the marsh (WRA 2011). Based on habitat quality and survey  
32 results from adjacent marshes, saltmarsh harvest mouse are presumed to inhabit this  
33 marsh. Several rare plants have potential to be found in the marshes, including soft bird's-  
34 beak, delta tule pea, Mason's lilaepsis (*Lilaepsis masonii*), and Suisun thistle.

35 Diked brackish marsh is found adjacent to both the tidal brackish marsh and the muted  
36 tidal marsh. Diked marshes may provide important habitat for a variety of wildlife,  
37 especially waterfowl, shorebirds, and small mammals. They may provide high-tide refugia  
38 for small mammals and roosting habitat for shorebirds.

## 1 **Lagoon**

2 A 6-acre lagoon is located at the Martinez Marina approximately 0.75 mile from the  
3 Amorco Terminal. Lagoons support the same species of aquatic invertebrates and fish  
4 found in shallow bays and tidal channels, and provide feeding and resting areas for water  
5 birds. They may also provide protected areas that facilitate early colonization by  
6 nonindigenous aquatic species (Monroe et al. 1999).

## 7 **Special-status Habitats**

### 8 Critical Habitat

9 The Project is located within critical habitat for delta smelt (59 Federal Register 242), the  
10 southern Distinct Population Segment (DPS) of green sturgeon (74 Federal Register  
11 195), winter-run chinook salmon, Central Valley steelhead, and Central California coastal  
12 steelhead (70 Federal Register 170).

13 Primary constituent elements (PCEs) for the delta smelt that are located within the vicinity  
14 of the Project include the physical habitat, water, river flow, and salinity concentrations  
15 required to maintain delta smelt habitat for (1) larval and juvenile transport, (2) rearing  
16 habitat, and (3) adult migration. Because of the fluid nature of the Delta's hydrology, the  
17 quality of the PCEs for the delta smelt fluctuate within the designated area. The final ruling  
18 on the critical habitat identifies marina construction as activities that, depending on the  
19 season of construction and scale of the Project, might result in destruction or adverse  
20 modification of critical habitat that could jeopardize the continuing existence of the delta  
21 smelt and that would require consultation with the USFWS.

22 PCEs for the southern DPS of the green sturgeon in the estuary include food resources  
23 for all life stages, water flows, water quality, migratory corridors, channel depths, and  
24 sediment quality. Dredging, in-water construction, National Pollutant Discharge  
25 Elimination System activities, commercial shipping, and habitat restoration are identified  
26 in the final critical habitat rule as activities that may affect one or more PCEs through  
27 alteration of the physical parameters of the estuary.

28 The Amorco Terminal is located in critical habitat for steelhead. Critical habitat for  
29 steelhead includes the Sacramento River from Keswick Dam in Shasta County to Chipps  
30 Island, and all waters downstream of Chipps Island and north of the San Francisco-  
31 Oakland Bay Bridge.

### 32 California Department of Fish and Wildlife Natural Communities

33 The California Natural Diversity Database shows two natural communities within and  
34 adjacent to the lease area: Coastal Brackish Marsh and Northern Coastal Salt Marsh  
35 (CDFW 2013c). Coastal Brackish Marsh is found along the shoreline at the Amorco  
36 Terminal. The Coastal Brackish Marsh is dominated by perennial, emergent, herbaceous

1 monocots that create a dense cover up to 2 meters tall. The Amorco Terminal is located  
2 approximately 0.3 mile east of Northern Coastal Salt Marsh. Due to the saline and semi-  
3 aquatic environment, plant species diversity in these types of marshes is typically low.  
4 Plant species are stratified by salinity levels. Both marsh types support a diverse biotic  
5 assemblage and provide nursery grounds for numerous organisms, including fish,  
6 mammals, and birds (CERES 1996).

#### 7 **4.2.2 REGULATORY SETTING**

8 Federal and State laws that may be relevant to the Project are identified in Table 4-1.  
9 Regional and local laws, regulations, and policies are discussed below.

#### 10 ***National Estuary Program, Comprehensive Conservation and Management Plan***

11 The San Francisco Estuary Project is a federal-state-local partnership established in 1987  
12 under the CWA Section 320: National Estuary Program. The 1993 plan was mandated  
13 under a reauthorization of the CWA in 1987, and revised in 2007. This plan is  
14 administered by the San Francisco Estuary Project Implementation Committee.

#### 15 ***Contra Costa County***

16 The Amorco Terminal abuts marshes along the shoreline between the Martinez waterfront  
17 and the Concord Naval Weapons Station, an area that has been identified in the *Contra*  
18 *Costa County General Plan* (2005) as a Significant Ecological Resource Area. The  
19 general plan contains goals and policies to recognize and protect sensitive and significant  
20 ecological resources.

#### 21 **4.2.3 IMPACT ANALYSIS**

##### 22 **4.2.3.1 Significance Criteria**

23 For the purposes of this analysis, an impact was considered to be significant and to  
24 require mitigation if it would result in any of the following:

- 25 • Substantially affect threatened or endangered species, or protected species  
26 (including candidate, sensitive, or special-status species)
- 27 • Alter or diminish critical habitat or a special biological habitat, including saltwater,  
28 freshwater, or brackish marsh; major marine mammal haul out or breeding area;  
29 eelgrass; major seabird rookery; or any Area of Special Biological Significance
- 30 • Violate any environmental law or regulation designed to protect wildlife, plants, or  
31 habitat areas
- 32 • Isolate wildlife populations and/or disrupt wildlife migratory or movement corridors,  
33 or use native wildlife nursery sites

# **ATTACHMENT 8**

# **Final Environmental Assessment/ Environmental Impact Report**

## **Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay Fiscal Years 2015–2024**

United States Army Corps of Engineers  
San Francisco District



Regional Water Quality Control Board  
San Francisco Bay Region



April 2015

**URS**



Final  
Environmental Assessment/  
Environmental Impact Report

Maintenance Dredging of the Federal  
Navigation Channels in San Francisco Bay  
Fiscal Years 2015 – 2024

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April 2015

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**ACRONYMS AND ABBREVIATIONS**

AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACHP	Advisory Council on Historic Preservation
AEP	Archaeological Evaluation Plan
Anchor	Anchor Environmental, C.A., L.P.
BAAQMD	Bay Area Air Quality Management District
Basin Plan	Water Quality Control Plan for the San Francisco Basin
Bay Plan	San Francisco Bay Plan
BCDC	San Francisco Bay Conservation and Development Commission
BDCP	Bay Delta Conservation Plan
BMP	best management practice
°C	degrees Celsius
CAA	Clean Air Act
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCMP	California Coastal Management Program
CCSF Planning	City and County of San Francisco Planning Department
CDF	confined disposal facility
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CECW-OD	Headquarters, Civil Works Construction, Operations and Readiness Division
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CEQAnet	online environmental database of the State Clearinghouse
CESA	California Endangered Species Act
CH <sub>4</sub>	methane
CMA	Critical Maneuvering Area
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> e	carbon dioxide-equivalent
72 COLREGS	International Regulations for Preventing Collision at Sea
CRHR	California Register of Historical Resources
CSCC	California State Coastal Conservancy
CSLC	California State Lands Commission
CWA	Clean Water Act
CY	cubic yard
CY/day	cubic yards per day
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibel
DDT	dichloro-diphenyl-trichloroethane
Delta	Sacramento-San Joaquin River Delta
DMMO	Dredged Material Management Office
DMMP	Dredged Material Management Plan
DMMS	Dredged Material Management Site
DoD	United States Department of Defense
DPM	diesel particulate matter
DPS	Distinct Population Segment

DTSC	Department of Toxic Substances Control
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	Endangered Species Act (federal)
Estuary	San Francisco Bay/Delta Estuary
ESU	Evolutionarily Significant Unit
FMP	fisheries management plan
FR	Federal Register
FTA	Federal Transit Administration
FY	fiscal year
GHG	greenhouse gas
gpm	gallons per minute
GWP	measure of the estimated contribution to global warming of a given mass of greenhouse gas
HWRP	Hamilton Wetlands Restoration Project
hp	horsepower
ID	indefinite deferral
IPCC	Intergovernmental Panel on Climate Change
ITM	Inland Testing Manual
lbs/day	pounds per day
LTMS	Long-Term Management Strategy
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MALSF	Marine Aggregate Levy Sustainability Fund
MARPOL 73/78	International Convention for the Prevention of Pollution from Ships, 1973
Master SAP	Master Sampling and Analysis Plan
MET	Modified Elutriate Test
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
mg/L	milligrams per liter
$\text{mg}/\text{m}^3$	milligrams per cubic meter
MHEA	Middle Harbor Enhancement Area
MLD	Most Likely Descendant
MLLW	mean lower low water
mm	millimeter
MPRSA	Marine, Protection, Research and Sanctuaries Act
MSC	Main Ship Channel
MTC	Metropolitan Transportation Commission
MWRP	Montezuma Wetlands Restoration Project
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation
$\text{N}_2\text{O}$	nitrogen dioxide
$\text{NO}_x$	nitrogen oxides
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Unit
NUAD	not suitable for unconfined aquatic disposal
Ocean Beach Onshore	Onshore Ocean Beach placement site
OES	California Office of Emergency Services

OR&R	Office of Response and Restoration
OTM	Ocean Testing Manual
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PBDE	polybrominated diphenyl ether
pH	measure of the acidity or basicity of an aqueous solution
PM	particulate matter
PM <sub>2.5</sub>	particulate matter with a diameter of 2.5 micrometers or less
PM <sub>10</sub>	particulate matter with a diameter of 10 micrometers or less
ppb	parts per billion
ppm	parts per million
Porter-Cologne Act	Porter-Cologne Water Quality Control Act of 1969
PRC	Public Resources Code
PVA	Population Viability Analysis
Regional Water Board	San Francisco Bay Regional Water Quality Control Board
RMP	Regional Monitoring Program
RMS	root mean square
RNA	regulated navigation area
ROG	reactive organic gas
SCC	State Coastal Commission
SF-8	San Francisco Bar Channel Disposal Site
SF-9	Carquinez Strait placement site
SF-10	San Pablo Bay placement site
SF-11	Alcatraz Island placement site
SF-16	Suisun Bay placement site
SF-17	Ocean Beach placement site
SFBAAB	San Francisco Bay Area Air Basin
SF-DODS	San Francisco Deep Ocean Disposal Site
SFEI	San Francisco Estuary Institute
SFEP	San Francisco Estuary Project
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
SPL	sound pressure level
SRDWSC	Sacramento River Deep Water Ship Channel
SVP	Society of Vertebrate Paleontology
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TMDL	Total Maximum Daily Load
tpy	tons per year
TSS	Total suspended solids
U.S. Army ERDC	United States Army Engineer Research and Development Center
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTM	Upland Testing Manual
VTS	Vessel Traffic Service
WDR	waste discharge requirement
WETA	San Francisco Bay Area Water Emergency Transportation Authority
Winter Island	Beneficial reuse site on Delta Island
WQC	water quality certification

## EXECUTIVE SUMMARY

### INTRODUCTION

The United States Army Corps of Engineers (USACE) proposes to continue maintenance dredging of the federal navigation channels in San Francisco Bay to maintain the navigability of the channels. The San Francisco Bay Regional Water Quality Control Board (Regional Water Board) proposes to issue a Clean Water Act (CWA) Section 401 water quality certification (WQC), and may also issue waste discharge requirements (WDRs) pursuant to the state Porter-Cologne Water Quality Control Act, for USACE's continued maintenance dredging operations in San Francisco Bay. This authorization is referenced throughout as "WQC."

The USACE and Regional Water Board have prepared this Environmental Assessment (EA)/Environmental Impact Report (EIR) to address the environmental effects of the maintenance dredging of federal navigation channels in San Francisco Bay and the associated placement of dredged materials for a period of 10 years. This EA/EIR is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. § 4321 et seq.; the Council on Environmental Quality regulations for implementing NEPA, 40 C.F.R. pt. 1500-1508; USACE Procedures for Implementing NEPA (Engineer Regulation 200-2-2); USACE regulations for operation and maintenance of civil works projects (33 C.F.R. pt. 335-338); Section 404 of the CWA (33 U.S.C. § 1344 and 33 C.F.R. pt. 320-330); the California Environmental Quality Act (CEQA) of 1970, California Public Resources Code, Section 21000 et seq., as amended, and the Guidelines for Implementation of CEQA, Title 14, California Code of Regulations, Section 15000 et seq. The USACE is the NEPA lead agency, and the Regional Water Board is the CEQA lead agency.

The dredging process involves the excavation of accumulated sediment from the channel bed, and the subsequent transportation and placement of the sediment at a permitted facility or location in a manner consistent with the permit conditions established by applicable regulatory agencies, after determination of suitability for placement at that site. The environmental impacts of maintenance dredging of the federal navigation channels were initially described in USACE's *Final Composite Environmental Impact Statement for Maintenance Dredging of Existing Navigation Projects, San Francisco Bay Region* in December 1975. The environmental effects of dredged material placement activities associated with dredging the federal navigation channels in San Francisco Bay were analyzed in the *Long-Term Management Strategy for Placement of Dredged Material in the San Francisco Bay Region, Final Policy Environmental Impact Statement/Programmatic Environmental Impact Report* in 1998. Subsequent to the publication of these documents, USACE has conducted NEPA compliance review, and the Regional Water Board has conducted CEQA compliance review, for maintenance dredging activities on an individual channel basis; this NEPA and CEQA<sup>1</sup> compliance has been conducted periodically as warranted by operation and dredging maintenance needs. This document is intended to fulfill USACE's NEPA compliance requirements for maintenance dredging of federal navigation channels it maintains in San Francisco Bay for the federal fiscal years<sup>2</sup> 2015 through 2024. This document is also intended to fulfill the Regional Water Board's CEQA compliance requirements for issuance of a 10-year WQC to USACE. Additionally, for those maintenance dredging projects that involve discharge of dredged or fill material into waters of the United States, this document is intended to serve as the Section 404(b)(1) analysis for maintenance dredging in compliance with the CWA.

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<sup>1</sup> "Maintenance dredging where the spoil is deposited in a spoil area authorized by all applicable state and federal regulatory agencies" is a Class 4 Categorical Exemption under CEQA (CEQA Guidelines, Section 15304). Past WDRs were issued under this Categorical Exemption. The listings of longfin smelt and green sturgeon, noted in the following paragraph, warranted the preparation of an EIR under CEQA.

<sup>2</sup> The federal fiscal year begins October 1 and ends September 30.

Longfin smelt and green sturgeon were not protected under the federal or state Endangered Species Acts at the time the Long-Term Management Strategy (LTMS) Environmental Impact Statement (EIS)/EIR was completed. Longfin smelt is a state-listed threatened species, and the green sturgeon southern distinct population segment is a federally listed threatened species. Delta smelt was addressed in the LTMS Final EIS/EIR as a federally listed and state-listed threatened species; however, the state elevated its listing status from threatened to endangered in 2010. Listed salmonids were addressed in the LTMS EIS/EIR. Subsequent to the completion of the LTMS EIS/EIR and to the listing of longfin smelt, USACE implemented monitoring to determine whether dredging operations were resulting in take of listed fish species. In 2011, there were occurrences of delta smelt and longfin smelt becoming entrained in hopper dredging equipment during USACE maintenance dredging at certain locations. To minimize the potential for future impacts to listed fish species, the proposed project would address aspects of USACE's maintenance dredging and dredged materials placement program that could result in injury or mortality of these species.

The federal navigation channels and associated placement sites are in the San Francisco Bay LTMS Program Planning Area, which spans 11 counties, including Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, Santa Clara, San Francisco, San Mateo, Solano, and Sonoma.<sup>3</sup> However, the geographic scope of potential impacts of the proposed project are limited to 10 federally authorized navigation channels and associated placement sites in San Francisco Bay (Figure ES-1).

## PROJECT PURPOSE, NEED, AND OBJECTIVES

The USACE, as mandated by Congress, is responsible for maintaining navigability of federal navigation channels to authorized depth or lesser regulatory depth.<sup>4</sup> Accumulation of sediment that settles in these channels can impede navigability. Maintenance dredging removes this sediment and returns the channels to regulatory depths to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for the movement of commerce, national security needs, and recreation. Therefore, USACE's purpose of the project is to continue maintenance dredging of the federal navigation channels in San Francisco Bay consistent with the goals and adopted plans of the LTMS, while adequately protecting the environment, including listed species. The Regional Water Board's overall project objective is to ensure USACE's consistency with the water quality objectives and beneficial uses adopted in the Water Quality Control Plan for the San Francisco Bay Basin, as will be addressed through the Section 401 WQC process.

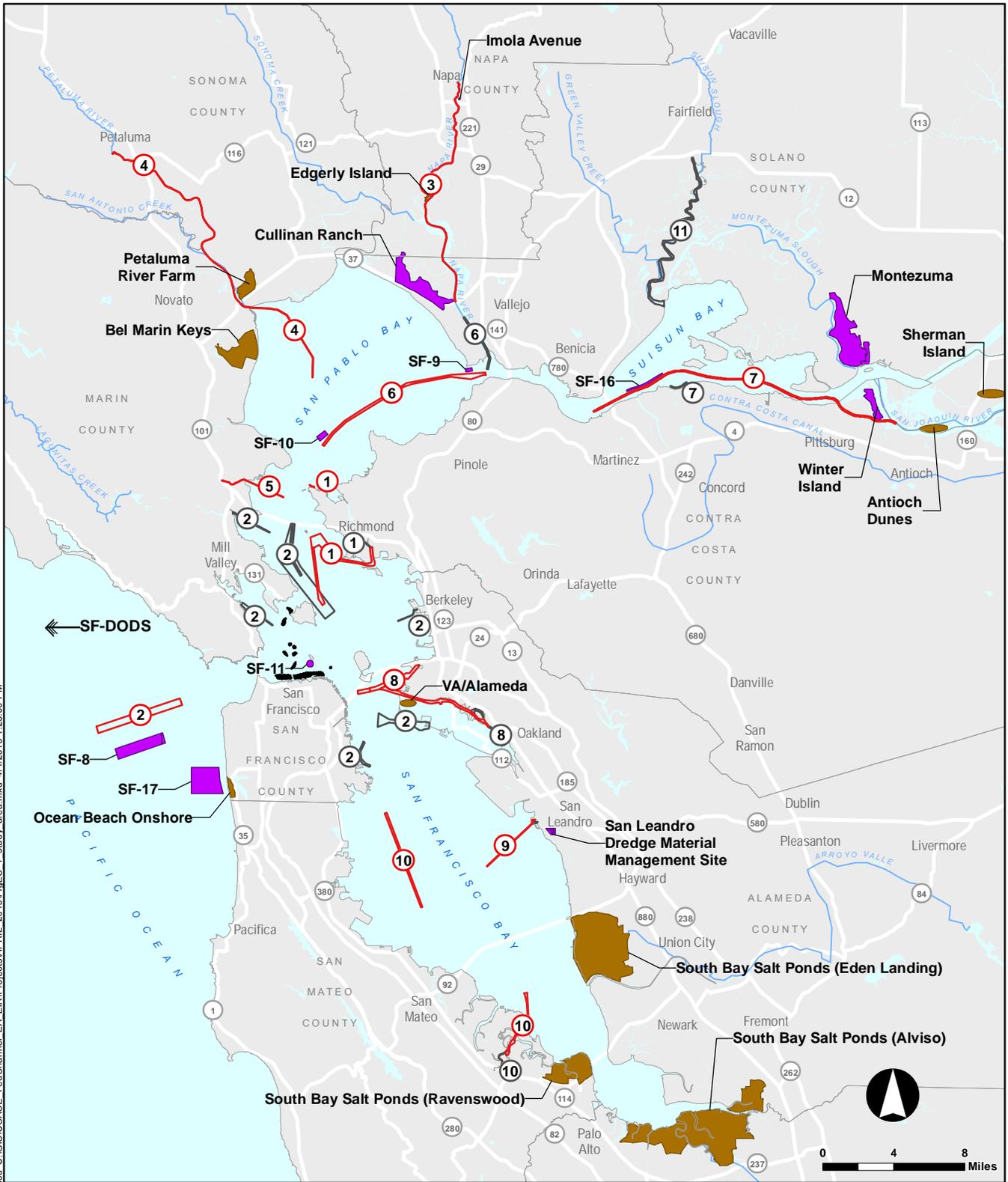
The USACE's specific project objectives are to:

- Provide safe, reliable, and efficient navigation through federal channels in San Francisco Bay in a feasible manner. This objective is considered the underlying fundamental purpose of the proposed project;
- Ensure consistency, to the maximum extent practicable, with the goals of the LTMS program as described in the 1998 LTMS Final EIS/EIR and the 2001 LTMS Management Plan; and
- Conduct dredging in a manner that adequately protects the environment, including listed species.

The Regional Water Board has authority under CWA Section 401 and the Porter-Cologne Act to issue permits governing dredge and fill activities. The Regional Water Board will consider USACE's application for a multi-year WQC for continued maintenance dredging of San Francisco Bay federal channels and associated dredged materials placement. To issue a WQC to USACE, the Regional Water Board, in compliance with CEQA, must analyze and disclose potential water quality and other environmental impacts of the project; consider alternatives that would avoid or substantially reduce

<sup>3</sup> Although portions of Sacramento and San Joaquin counties were part of the Planning Area for the LTMS EIS/EIR, they are not part of the LTMS Program.

<sup>4</sup> Regulatory depth is the depth to which federal environmental compliance has been completed.



Source: URS, 2013.

- |   |  |  |
|---|--|--|
| <span style="display:inline-block; width:15px; height:15px; background-color:purple; border:1px solid black;"></span> Existing Placement Site             | <span style="display:inline-block; width:15px; height:15px; border:1px solid red; border-radius:50%;"></span> 1 Richmond Harbor                  | <span style="display:inline-block; width:15px; height:15px; border:1px solid red; border-radius:50%;"></span> 7 Suisun Bay Channel                             |
| <span style="display:inline-block; width:15px; height:15px; background-color:lightbrown; border:1px solid black;"></span> Potential Future Placement Site | <span style="display:inline-block; width:15px; height:15px; border:1px solid red; border-radius:50%;"></span> 2 San Francisco Harbor             | <span style="display:inline-block; width:15px; height:15px; border:1px solid red; border-radius:50%;"></span> 8 Oakland Harbor                                 |
| <b>Dredge Locations</b>   | <span style="display:inline-block; width:15px; height:15px; border:1px solid red; border-radius:50%;"></span> 3 Napa River Channel               | <span style="display:inline-block; width:15px; height:15px; border:1px solid red; border-radius:50%;"></span> 9 San Leandro Marina (Jack D. Maltester Channel) |
| <span style="display:inline-block; width:15px; height:15px; border:1px solid black;"></span> Included in EA/EIR   | <span style="display:inline-block; width:15px; height:15px; border:1px solid red; border-radius:50%;"></span> 4 Petaluma River Channel           | <span style="display:inline-block; width:15px; height:15px; border:1px solid black;"></span> 10 Redwood City Harbor  |
| <span style="display:inline-block; width:15px; height:15px; border:1px solid gray;"></span> Not Included in EA/EIR  | <span style="display:inline-block; width:15px; height:15px; border:1px solid red; border-radius:50%;"></span> 5 San Rafael Creek Channel         | <span style="display:inline-block; width:15px; height:15px; border:1px solid black;"></span> 11 Suisun Slough Channel  |
| <span style="display:inline-block; width:15px; height:15px; background-color:black;"></span> Shoaling Area—Not included in EA/EIR                         | <span style="display:inline-block; width:15px; height:15px; border:1px solid red; border-radius:50%;"></span> 6 San Pablo Bay/Mare Island Strait |  |

**STUDY AREA**

Federal Navigation Channels EA/EIR  
U.S. Army Corps of Engineers  
Bay Area, California

April 2015

**URS**

**FIGURE ES-1**

potentially significant impacts of the project as approved; adopt or make a condition of approval all feasible mitigation for potentially significant impacts; and demonstrate that all applicable state water quality requirements are met.

## ALTERNATIVES

Typical methods of maintenance dredging include hydraulic or mechanical dredging. Hydraulic dredging usually involves hopper dredges (a ship with a hopper bin to store and transport material dredged) or suction/cutterheads attached to hydraulic pipelines that convey the dredged material to a scow or directly to a placement site. Mechanical dredging usually involves bucket or clamshell dredges, which scoop material directly into a scow for transport to a placement site. Once the material is dredged, it is transported to, and placed at, a designated dredged material placement site.

This EA/EIR evaluates in detail four alternatives for USACE's maintenance dredging of the federal navigation channels in San Francisco Bay: the No Action/No Project Alternative, the Proposed Action/Project, and two action alternatives involving reduced use of hopper dredge equipment (Reduced Hopper Dredge Use Alternatives 1 and 2).

### No Action/No Project Alternative

Under NEPA, in cases where the project involves modification of an existing program or management plan, No Action may be defined as no change from current program implementation, or no change in management direction or intensity. Therefore, the No Action Alternative may be thought of in terms of continuing with the present course of action until that action is changed. Similarly, Section 15126.6 (e)(3)(A) of the CEQA Guidelines states that "when the project is the revision of an existing land use or regulatory plan, policy or ongoing operation, the no project alternative will be the continuation of the existing plan, policy or operation into the future." Therefore, under the No Action/No Project Alternative, USACE would continue current maintenance dredging practices for the projects it maintains in San Francisco Bay, and the Regional Water Board would consider issuing a WQC based on USACE's current dredging practices. Current maintenance dredging practices were determined through a review of maintenance dredging activities for fiscal year 2000 through fiscal year 2012 to determine the typical dredge equipment type, frequency of dredging, volumes dredged, and placement site(s) for each specific maintenance dredging project. Table ES-1 describes maintenance dredging and placement activities that would occur under the No Action/No Project Alternative, based on these current practices.<sup>5</sup>

Under the No Action/No Project Alternative, dredging and placement would be conducted in accordance with previously established permit conditions and minimization measures, as detailed in Chapter 2. Dredging and disposal activities would continue to be limited to the LTMS Program work windows (USFWS, 1999; USFWS, 2004a; NMFS, 1998)<sup>6</sup>, unless through an additional consultation process, the appropriate agencies provide written authorization to work outside these windows.

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<sup>5</sup> Under any alternative, the channels proposed for dredging with a hydraulic dredge could also be dredged with a mechanical dredge, with the exception of the San Francisco Bay Main Ship Channel; however, for the purpose of the analysis in the EA/EIR, use of a hydraulic dredge was assumed because that is the equipment typically used.

<sup>6</sup> NMFS is revising the 1998 LTMS programmatic biological opinion; the updated biological opinion (expected 2015) will supersede the 1998 document. The USACE will comply with the terms and conditions of the updated biological opinion. The revised biological opinion may expand the salmonid work windows to year-round if dredging is conducted with a clamshell dredge and dredged material is placed at a beneficial reuse site that NMFS agrees will provide aquatic habitat benefits, such as a tidal wetlands restoration. Should the updated biological opinion allow for this, USACE may opt to dredge certain federal navigation channels with a clamshell dredge outside the work windows and place sediment at a beneficial reuse site. All other dredging outside the work window (i.e., hydraulic dredging or clamshell dredging with placement at a non-beneficial reuse site) would require consultation with NMFS.

**Table ES-1  
No Action/No Project Alternative Summary**

Channel	Dredge Type	Typical Dredging Frequency (years)	Range of Volume Dredged per Episode (CY) <sup>1</sup>	Median Volume Dredged Per Episode (CY) <sup>2</sup>	Placement Site
Richmond – Inner Harbor Outer Harbor	Clamshell-Bucket	1	11,000 – 631,000	390,000	SF-DODS, SF-11 <sup>3</sup>
	Hopper	1	78,000 – 318,000	190,000	SF-11
San Francisco Harbor – Main Ship Channel	Hopper	1	78,000 – 613,000	306,000	SF-8, SF-17
Napa River Channel*	Cutterhead-Pipeline	6-10	140,000 <sup>4</sup>	140,000 <sup>4</sup>	Upland (Sponsor Provided)
Petaluma River Channel (and Across the Flats*)	Cutterhead-Pipeline (River Channel) Clamshell-Bucket (Across the Flats)	4-7	250,000 <sup>4</sup>	250,000 <sup>4</sup>	Upland (Sponsor Provided) for the River Channel SF-10 for Across the Flats
San Rafael Creek Channel	Clamshell-Bucket	4-7	78,000 – 87,000 <sup>4</sup>	83,000 <sup>4</sup>	SF-11
Pinole Shoal	Hopper	1	80,000 – 487,000	146,000	SF-10
Suisun Bay Channel and New York Slough	Hopper	1	21,000 – 423,000	159,000	SF-16
Oakland Inner and Outer Harbor	Clamshell-Bucket	1	122,000 – 1,055,000 <sup>5</sup>	330,000	SF-DODS, MWRP
San Leandro Marina (Jack D. Maltester Channel)	Cutterhead-Pipeline	4-6	121,000 – 187,000 <sup>4</sup>	154,000 <sup>4</sup>	Upland (Sponsor Provided)
Redwood City Harbor	Clamshell-Bucket (Harbor Channels) Hopper (San Bruno Channel)	1-2	10,000 – 560,000	179,000	SF-11

## Notes:

\* For areas not dredged since 2000, the last dredging event is reported.

<sup>1</sup> Range of volume dredged per fiscal year since 2000 (USACE, 2014). For areas not dredged since 2000, the last dredging event is reported.

<sup>2</sup> Median volume dredged per fiscal year since 2000. For areas not dredged since 2000, the last dredging event is reported.

<sup>3</sup> SF-11 was used for Richmond Inner Harbor during the 2000 to 2012 baseline period but is no longer approved as a placement option for Richmond Inner Harbor.

<sup>4</sup> Due to the lower frequency at which these channels are dredged, future dredge volumes could be greater.

<sup>5</sup> Due to the deepening of Oakland Harbor completed in 2010, future dredge volumes could be greater.

CY = cubic yards

MWRP = Montezuma Wetlands Restoration Project (in Solano County)

SF-8 = San Francisco Bar Channel Disposal Site (ocean site)

SF-10 = San Pablo Bay placement site (in-Bay site)

SF-11 = Alcatraz Island placement site (in-Bay site)

SF-16 = Suisun Bay placement site (in-Bay site)

SF-17 = Ocean Beach placement site (nearshore site, includes the Ocean Beach demonstration site)

SF-DODS = San Francisco Deep Ocean Disposal Site (approximately 55 miles [48 nautical miles] west of Golden Gate)

The USACE would meet all federal environmental compliance requirements (e.g., CWA Section 404, Endangered Species Act), including those federal requirements implemented by state agencies (e.g., Clean Water Act Section 401, Coastal Zone Management Act). The USACE would undertake mitigation, as appropriate, in meeting its compliance requirements.

### Proposed Action/Project

Under USACE's Proposed Action/Project, USACE would perform dredging practices for the projects it maintains in San Francisco Bay. The dredge equipment type, frequency of dredging, and volumes dredged would be the same as under the No Action/No Project Alternative. Table ES-2 identifies the federal standard placement site and proposed alternate placement sites that would be used for each location as well as expected dredge volumes. The USACE would beneficially reuse dredged material to the maximum extent its authorities allow. Although it is assumed, for the purpose of this EA/EIR, that placement would occur at the identified federal standard<sup>7</sup> sites.<sup>8</sup> USACE would place dredged material at beneficial reuse sites when costs are equivalent to the federal standard or a cost-sharing partner is supporting beneficial reuse.

Dredging and placement would be conducted in accordance with the conditions described under the No Action/Project Alternative. In addition, USACE would implement the following best management practices (BMPs) to minimize impacts to longfin smelt and delta smelt:

- Completing hydraulic dredging in the Central Bay later in the year (from August 1 to November 30) during the June-to-November environmental dredging window, to the extent feasible,<sup>9</sup> to allow young-of-the-year longfin smelt to grow large, and spawning adults to return upstream;
- Completing hydraulic dredging in Suisun Bay between August 1 and September 30, to the extent feasible, to avoid impacts to spawning adult longfin and delta smelt;
- Maintaining contact of drag head, cutterheads, and pipeline intakes with the seafloor during suction dredging;<sup>10</sup> and
- Closing the drag head water intake doors in locations most vulnerable to entraining or entrapping smelt. In circumstances when the doors need to be opened to alleviate clogging, the doors would be opened incrementally (i.e., the doors would be opened in small increments and tested to see if the clog is removed) to ensure that doors are not fully opened unnecessarily. It may take multiple iterations to fine tune the exact intake door opening necessary to prevent clogging. For each project, the intake door opening will be different because the sediment in each location is different. The sediment physical characteristics (e.g., sand versus mud) determine how much water is needed to slurry the sediment adequately. Typically, the drag arms do not clog when dredging areas composed mostly of sand.

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<sup>7</sup> The federal standard is defined as the least-costly dredged material disposal or placement alternative consistent with sound engineering practices, and meeting the environmental standards established by the Section 404(b)(1) evaluation process or ocean dumping criteria (33 C.F.R. § 335.7).

<sup>8</sup> The USACE may be forced by logistical constraints to use the alternate placement sites. Examples of logistical constraints include: 1) unsafe condition at the placement site (e.g., weather/wave conditions); 2) an event blocking access to a placement site (this occurred during America's Cup 34); and 3) the federal standard site reaching its monthly disposal limit (as established by the Bay Plan and Basin Plan).

<sup>9</sup> Feasibility is contingent upon the availability of federal funds (e.g., timing of Congressional appropriations) to execute the dredging work, as well as the availability of dredging equipment to perform the dredging work at the referenced time and locations.

<sup>10</sup> The seafloor surface is not uniform and is undulating, which could cause the drag head to temporarily lose contact with the seafloor. The hopper dredge also has to contend with sea state (i.e., swells and wave action) in the bay which also affects the drag head's contact with the channel bottom. The dredge's swell compensator provides an opposing force to maintain contact with the seafloor when the bottom is uneven or there is wave/swell action.

**Table ES-2  
Proposed Action/Project Summary**

<b>Channel</b>	<b>Dredge Type</b>	<b>Typical Dredging Frequency (years)</b>	<b>Range of Volume Dredged per Episode (CY)<sup>1</sup></b>	<b>Median Volume Dredged Per Episode (CY)<sup>2</sup></b>	<b>Federal Standard Placement Site<sup>3</sup></b>	<b>Placement Site Alternate 1<sup>4</sup></b>	<b>Placement Site Alternate 2<sup>4</sup></b>	<b>Placement Site Alternate 3<sup>4</sup></b>
Richmond Inner Harbor	Clamshell-Bucket	1	11,000 – 631,000	390,000	SF-DODS	Upland Beneficial Reuse	Other In-Bay Site	N/A
Outer Harbor	Hopper	1	78,000 – 318,000	190,000	SF-11	Other In-Bay Site	Upland Beneficial Reuse	N/A
San Francisco Harbor – Main Ship Channel	Hopper	1	78,000 – 613,000	306,000	SF-8	SF-17	Ocean Beach Onshore	SF-11
Napa River Channel*	Cutterhead-Pipeline	6-10	140,000 <sup>5</sup>	140,000 <sup>5</sup>	Upland (Sponsor Provided)	Other Upland Site	SF-9 for downstream reach only	N/A
Petaluma River Channel (and Across the Flats*)	Cutterhead-Pipeline (River Channel) Clamshell-Bucket (Across the Flats)	4-7	250,000 <sup>5</sup>	250,000 <sup>5</sup>	Upland (Sponsor Provided) for the River Channel; SF-10 for Across the Flats	Upland Beneficial Reuse	Other In-Bay Site	N/A
San Rafael Creek Channel	Clamshell-Bucket	4-7	78,000 – 87,000 <sup>5</sup>	83,000 <sup>5</sup>	SF-11	Other In-Bay Site	Upland Beneficial Reuse	N/A
Pinole Shoal	Hopper	1	80,000 – 487,000	146,000	SF-10	Other In-Bay Site	Upland Beneficial Reuse	Ocean Beach Onshore
Suisun Bay Channel and New York Slough <sup>6</sup>	Hopper	1	21,000 – 423,000	159,000	SF-16	Other In-Bay Site	Upland Beneficial Reuse	Ocean Beach Onshore for New York Slough only
Oakland Inner and Outer Harbor	Clamshell-Bucket	1	122,000 – 1,055,000 <sup>7</sup>	330,000	SF-DODS	Upland Beneficial Reuse	In-Bay Site	N/A
San Leandro Marina (Jack D. Maltester Channel)	Cutterhead-Pipeline	4-6	121,000 – 187,000 <sup>5</sup>	154,000 <sup>5</sup>	Upland (Sponsor Provided such as San Leandro DMMS)	In-Bay Site	Upland Beneficial Reuse	N/A

**Table ES-2  
Proposed Action/Project Summary (Continued)**

Channel	Dredge Type	Typical Frequency (years)	Range of Volume Dredged per Episode (CY) <sup>1</sup>	Median Volume Dredged Per Episode (CY) <sup>2</sup>	Federal Standard Placement Site <sup>3</sup>	Placement Site Alternate 1 <sup>4</sup>	Placement Site Alternate 2 <sup>4</sup>	Placement Site Alternate 3 <sup>4</sup>
Redwood City Harbor	Clamshell-Bucket (Harbor Channels) Hopper (San Bruno Channel)	1-2	10,000 – 560,000	179,000	SF-11	Other In-Bay Site	Upland Beneficial Reuse except for San Bruno Channel; SF-DODS for San Bruno Channel	Upland Beneficial Reuse for San Bruno Channel only

Notes:

- \* For areas not dredged since 2000, the last dredging event is reported.
- <sup>1</sup> Range of volume dredged per fiscal year since 2000. For areas not dredged since 2000, the last dredging event is reported.
- <sup>2</sup> Median volume dredged per fiscal year since 2000. For areas not dredged since 2000, the last dredging event is reported.
- <sup>3</sup> The federal standard is defined as the least-costly dredged material disposal or placement alternative consistent with sound engineering practices, and meeting the environmental standards established by the 404(b)(1) evaluation process or ocean dumping criteria (33 C.F.R. pt. 335.7).
- <sup>4</sup> The USACE would not use the future placement sites identified in Section 1.5.4 until supplemental environmental review under NEPA and/or CEQA and acquisition of required environmental approvals from resource and regulatory agencies is completed.
- <sup>5</sup> Due to the lower frequency at which these channels are dredged, future dredge volumes could be greater.
- <sup>6</sup> Aside from regularly scheduled maintenance of this navigation project, USACE would take urgent action outside the work window, as needed, to remove the hazardous shoaling at Bulls Head Reach, as described in Section 2.3.3.
- <sup>7</sup> Due to the deepening of Oakland Harbor completed in 2010, future dredge volumes could be greater.

CEQA = California Environmental Quality Act

CY = cubic yards

NEPA = National Environmental Policy Act

Ocean Beach Onshore = Onshore Ocean Beach placement site

San Leandro DMMS = Upland San Leandro Dredged Material Management Site

SF-8 = San Francisco Bar Channel Disposal Site (ocean site)

SF-9 = Carquinez Strait placement site (in-Bay site)

SF-10 = San Pablo Bay placement site (in-Bay site)

SF-11 = Alcatraz Island placement site (in-Bay site)

SF-16 = Suisun Bay placement site (in-Bay site)

SF-17 = Ocean Beach placement site (nearshore site, includes the Ocean Beach demonstration site)

SF-DODS = San Francisco Deep Ocean Disposal Site (approximately 55 miles [48 nautical miles] west of Golden Gate)

USACE = United States Army Corps of Engineers

The USACE would purchase 0.92 acre mitigation credit at the Liberty Island Conservation Bank, or other approved site, annually for potential impacts to listed species. The 0.92 acre mitigation credit was calculated from an equation (3.0 million acre-feet/800 acres = volume dredged/X acres of mitigation habitat) that was developed by resource agencies to determine mitigation requirements for other projects with entrainment impacts as a result of pumping water, including the State Water Project. For volume dredged, available government-hopper-dredge-pumped total sediment and water volumes for 2006 through 2012 were reviewed. The highest volume for each of the in-Bay channels (Pinole Shoal, Richmond Outer Harbor, and Suisun Bay Channel/New York Slough) from this period was used in the calculation. Of the 0.92 acre mitigation credit, 0.19 acre mitigation credit would be for Pinole Shoal, 0.34 acre mitigation credit would be for Richmond Outer Harbor, and 0.39 acre mitigation credit would be for Suisun Bay Channel and New York Slough.

To the extent feasible, hydraulic dredging in the Napa and Petaluma rivers and San Leandro Marina would occur when water temperatures are above 22 degrees Celsius. If hydraulic maintenance dredging occurs when water temperatures are less than 22 degrees Celsius, USACE would coordinate mitigation, as appropriate, with USFWS, NMFS, and CDFW at the times such dredging episodes occur. For hydraulic dredging of San Bruno Shoal, USACE would conduct compensatory mitigation using the equation above; however, because this channel is so rarely dredged and volumes are not known, USACE would determine the amount of mitigation when/if this channel is dredged.

In addition, an approximate ½-mile portion of Bulls Head Reach, just east of the Benicia-Martinez Bridge in Suisun Bay Channel, shoals rapidly and becomes a navigation hazard that requires urgent action by USACE to maintain navigational safety in a critical maneuvering area. In the past, USACE has been requested by the United States Coast Guard to make an emergency<sup>11</sup> declaration to conduct maintenance dredging of this area outside of the LTMS work window, and completed NEPA and other environmental compliance requirements pursuant to the CWA, federal Endangered Species Act, and the Coastal Zone Management Act after the maintenance dredging occurred. Under the Proposed Action, USACE would take urgent<sup>12</sup> action outside the LTMS work window, as needed, to remove the hazardous shoal. Removal of the shoal would likely involve 1 to 5 days of dredging to clear the hazard area. Past critical dredging episodes<sup>13</sup> have not occurred at a regular or predictable frequency; therefore, USACE estimates urgent removal of this shoal may be required in any given year within the 10-year planning horizon. Analysis of impacts related to the removal of this shoal in this EA/EIR is intended to fulfill USACE's NEPA requirements related to these episodes, and preclude emergency declaration. Because the extent and frequency of critical dredging episodes cannot be predicted, appropriate mitigation for these episodes—if warranted based on expected impacts—would be determined in coordination with regulatory agencies at the times they occur.

## Reduced Hopper Dredge Use Alternatives

Two alternatives were considered under which USACE's use of a hopper dredge for maintenance dredging of the federal channels would be reduced, compared to the Proposed Action/Project and No Action/No Project Alternative. The costs for implementing these alternatives are beyond the currently programmed operation and maintenance budget for San Francisco Bay (estimated at an additional \$3 to \$10 million per year). Therefore, before USACE could accomplish the preferred alternatives, should they

<sup>11</sup> As defined in USACE's Raise the Flag Procedure (Headquarters, Civil Works Construction, Operations and Readiness Division [CECW-OD], Revised January 22, 2002), an emergency is a situation that would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action is not undertaken in a time period less than the normal contract procurement process.

<sup>12</sup> As defined in USACE's Raise the Flag Procedure (CECW-OD, Revised January 22, 2002), an urgent dredging requirement is a situation that may be time-sensitive for providing a safe navigation channel that requires prompt action, but does not meet the definition of an emergency.

<sup>13</sup> Critical dredging episodes occur outside the regular annual maintenance dredging of Suisun Bay Channel to remove a hazard to navigation when the channel is less than 35 feet mean lower low water in the area of the shoal.

be adopted by the Regional Water Board, three things typically should occur: first, higher executive branch authority must agree that the increased cost is consistent with the federal standard; second, the additional costs must be included in the annual budget submitted to Congress; and third, Congress must appropriate or reprogram the additional funds. NEPA and CEQA do not restrict consideration of alternatives that are outside the jurisdiction or capability of the lead agency to implement if the alternatives are otherwise reasonable. For the purpose of this EA/EIR, it is assumed that either reduced hopper dredge use alternative would be implemented by fiscal year 2017, as required by a condition of the WQC issued by the Regional Water Board. For both reduced hopper dredge use alternatives, implementation of dredging in fiscal years 2015 and 2016, including purchase of mitigation credit, would be as described under the Proposed Action/Project.

Although it is assumed for the purpose of analysis that the reduced hopper dredge use alternatives could be implemented, it should be noted that if USACE is unable to obtain both the necessary authorization and funding to implement these alternatives, USACE would follow the regulations at 33 C.F.R. pt. 335-338. The process described in these regulations could potentially result in deferred dredging at certain channels (i.e., Richmond Outer, Pinole Shoal, and Suisun Bay Channel and New York Slough). Deferred dredging means that these channels may not be fully maintained by USACE. Funding historically appropriated for dredging the deferred channels may be diverted to other navigation and maintenance projects nationwide, and the USACE San Francisco District may be unable to recover the funding for dredging these channels at future date. In addition, because of scheduling constraints with the government-owned hopper dredges, limiting hopper dredge use to the San Francisco Bay Main Ship Channel (MSC) under Reduced Hopper Dredge Use Alternative 2 could increase the risk that full dredging of the MSC would not be completed within the scheduled availability of the hopper dredge when inclement weather precludes dredging of the MSC.

In the interest of disclosing the potential environmental impacts of deferred or incomplete dredging, such impacts are noted in this EA/EIR. Because it is unknown whether, to what extent, or for how long dredging could be deferred, the impacts of deferred dredging would be speculative and variable. Therefore, discussion of the potential impacts associated with deferred dredging is presented as a brief qualitative assessment in Chapter 3 of this EA/EIR.

### **Reduced Hopper Dredge Use Alternative 1**

Under Reduced Hopper Dredge Use Alternative 1, the government hopper dredge *Essayons*, or similarly sized hopper dredge, would only be used to dredge the MSC, and either the Richmond Outer Harbor or the Pinole Shoal Channel, annually. Because of the strong currents and waves at the MSC, a hopper dredge is the only method that can safely dredge the channel. At times, inclement weather and strong currents at this location create conditions that may preclude safe dredging with a hopper dredge. During such times, dredging at an in-Bay channel would allow for efficient use of the hopper dredge, whereby the dredge would move into San Francisco Bay and work on the identified channel, then return to the MSC as soon as conditions allow. If dredging of the MSC is able to be completed without interruption by inclement weather, then the in-Bay channel (i.e., Richmond Outer Harbor or Pinole Shoal) would be dredged subsequent to the completion of dredging at the MSC. Dredging of the in-Bay channel would occur within the LTMS work window, or after an individual consultation is conducted with the appropriate regulatory agencies to allow dredging to be performed outside the work window.

Selection of the in-Bay channel to be dredged by a hopper, in any given year, would depend on: (a) the amount of shoaled material present at the respective channel; (b) timing and impact to sensitive resources (e.g., compliance with LTMS work windows); and (c) project-specific availability of funds. The additional channel would be identified by USACE in its initial annual maintenance dredging plan, which is prepared at the beginning of each fiscal year, and would be subject to change based on the actual available funds prior to maintenance dredging. Therefore, this alternative would reduce hopper dredge use for maintenance dredging compared to the Proposed Action/Project and No Action/No Project

Alternative, but it would not change the total amount of dredging in the channels, placement sites used, or standard operating procedures.

The MSC is typically dredged in the months of May and June; however, depending on the condition of the channel, equipment availability, and availability of funds, dredging has occurred as late as September. Maintenance dredging of the MSC using a hopper dredge (i.e., the *Essayons*, or similarly sized dredge) typically requires 10 to 14 days. If Pinole Shoal was selected as the additional channel, 5 to 15 days of additional hopper dredge use would occur, for a total of 15 to 29 days of hopper dredge use under this alternative, depending on the duration of dredging at each channel. If Richmond Outer Harbor was selected as the additional channel, 5 to 8 days of additional hopper dredge use would occur, for a total of 15 to 22 days of hopper dredge use under this alternative, depending on the duration of dredging at each channel.

The channel not selected as the additional hopper dredge channel (i.e., either Pinole Shoal or Richmond Outer Harbor) would be dredged with a mechanical dredge. Additionally, Suisun Bay Channel and New York Slough Channel and San Bruno Channel in Redwood City Harbor would be dredged with a mechanical dredge under this alternative, instead of a hopper dredge. The USACE would purchase 0.19 acre mitigation credit at the Liberty Island Conservation Bank annually for potential impacts to listed species if Pinole Shoal is dredged with a hopper. If Richmond Outer Harbor is dredged with a hopper, USACE would purchase 0.34 acre mitigation credit at the Liberty Island Conservation Bank annually for potential impacts to listed species.

All other dredging, placement activities, and BMPs would be as described for the Proposed Action/Project, including urgent action to remove the hazardous shoal at Bulls Head Reach as needed. If feasible, this activity would be completed with a mechanical dredge; however, because of the urgent nature of this activity, a hopper dredge may be used. Regular maintenance dredging of this area would be completed with a mechanical dredge.

## **Reduced Hopper Dredge Use Alternative 2**

Under Reduced Hopper Dredge Use Alternative 2, the government hopper dredge *Essayons*, or similarly sized hopper dredge, would be used to dredge the MSC. The MSC is typically dredged in the months of May and June; however, as stated above, depending on the condition of the channel, equipment availability, and availability of funds, dredging has occurred as late as September. Maintenance dredging of the MSC using a hopper dredge (i.e., the *Essayons*, or similar-sized dredge) typically requires 10 to 14 days; this would be the only hopper dredge use under this alternative, except potential use at Bulls Head Reach as noted below.

Pinole Shoal, Richmond Outer Harbor, Suisun Bay Channel and New York Slough Channel, and San Bruno Channel in Redwood City Harbor would be dredged with a mechanical dredge under this alternative, instead of a hopper dredge. All other dredging, placement activities, and applicable BMPs would be as described for the Proposed Action/Project, including urgent action to remove the hazardous shoal at Bulls Head Reach. If feasible, this activity would be completed with a mechanical dredge; however, because of the urgent nature of this activity, a hopper dredge may be used. Regular maintenance dredging of this area would be completed with a mechanical dredge.

## **ENVIRONMENTAL CONSEQUENCES**

Table ES-3 (at the end of this Executive Summary) presents a summary of impacts for the action alternatives, mitigation measures, and the NEPA and CEQA impact levels for each alternative after mitigation. Impacts of the No Action/No Project Alternative are presented in Chapter 3.0 for comparison to those of the action alternatives. As noted under the reduced hopper dredge use alternatives, the

analysis of impacts is based on the assumption that USACE has obtained the authorization and funding to implement these alternatives by 2017.

## EVALUATION OF ALTERNATIVES

Because the No Action/No Project Alternative represents a continuation of USACE's current maintenance dredging practices, adverse impacts of the No Action/No Project Alternative would be similar to those of the Proposed Action/Project, because both alternatives involve use of the same dredge equipment type. However, adverse impacts to longfin smelt and delta smelt would be greater under the No Action/No Project Alternative, because there would be fewer measures implemented to minimize entrainment impacts to these species; these impacts would be significant under CEQA.

Under the action alternatives, no impacts are expected related to land use plans and hazards and hazardous materials.

Under the Proposed Action/Project and both reduced hopper dredge use alternatives, dredging and placement activities would have equivalent minor adverse impacts on sediments. Although not expected, inadvertent discovery of archaeological or paleontological resources could result in adverse cultural resource impacts under all alternatives; with implementation of the identified mitigation measures, these impacts would not be significant.

All action alternatives would have impacts on water quality, primarily from increased turbidity. Impacts would be greater under the reduced hopper dredge use alternatives compared to the Proposed Action/Project, because mechanical dredging, which would be conducted in place of hopper dredging at certain locations, generates more turbidity than hopper dredging over a longer period of time. Nonetheless, under all alternatives, impacts would be short-term and minor.

Under the reduced hopper dredge use alternatives, there would be a minor increase of emissions compared to the Proposed Action/Project from increased mechanical dredge equipment use; however, the increase would not exceed the Bay Area Air Quality Management District significance thresholds.

All action alternatives would have minor adverse impacts on biological resources including: temporary, localized turbidity impacts on aquatic species and habitat, including eelgrass; temporary, localized disturbance of benthic habitat; temporary adverse effects on fish and marine mammals from underwater noise; temporary, localized interference with the movement or migration of fish and wildlife species (with the exception of entrainment risks discussed below); temporary, and localized impacts on avian foraging and roosting. Under all action alternatives the potential for project activities to result in biotoxicity impacts to aquatic organisms or increase the spread of invasive nonnative species would be minimal. Turbidity impacts on aquatic species from dredging would be longer in duration under the reduced hopper dredge use alternatives than under the Proposed Action/Project, but they would still be less than significant under NEPA and CEQA.

Entrainment of delta smelt and longfin smelt could occur during hopper dredging. Under the Proposed Action/Project, a hopper dredge would be used to dredge three in-bay channels and the Main Ship Channel annually; therefore, of the action alternatives, the Proposed Action/Project would have the greatest potential to result in entrainment impacts. The potential for entrainment impacts would be less under Reduced Hopper Dredge Use Alternative 1 because only one in-Bay channel and the Main Ship Channel would be maintained with a hopper dredge. The potential for entrainment impacts would be largely eliminated under Reduced Hopper Use Dredge Alternative 2 because hopper dredges would not be used for maintaining in-Bay channels after 2016. Under NEPA, project and cumulative impacts to delta smelt and longfin smelt from entrainment would be less than significant under all action alternatives. Under CEQA, project and cumulative impacts to delta smelt and longfin smelt from entrainment would be significant under the Proposed Action/Project, significant but reduced to less than significant with

reduced hopper dredging and minimization and mitigation measures under Reduced Hopper Dredge Use Alternative 1, and less than significant under Reduced Hopper Dredge Use Alternative 2.

Entrainment of other special-status or commercially and recreationally important marine species also could occur during hopper dredging. Under NEPA, these impacts would be less than significant under all alternatives. Under CEQA, these impacts would be significant under all alternatives, but reduced to less than significant with implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment.

Under all action alternatives, dredging activities may occasionally delay or temporarily impede some vessels using the federal navigation channels, resulting in short-term minor impacts on navigation. Mechanical dredges have a greater potential to impact navigation compared to hopper dredges, because they are stationary while operating and involve use of multiple vessels. Therefore, potential navigation impacts would be greatest under Reduced Hopper Dredge Use Alternative 2, because it maximizes use of mechanical dredges, and least under the Proposed Action/Project, but less than significant under any alternative.

In addition to the analysis contained this Environmental Assessment/Environmental Impact Report (EA/EIR), as summarized above, public comments on the Draft EA/EIR related to navigational safety concerns (see Appendix C) were considered in the evaluation and comparison among alternatives.

As noted above, under CEQA, the Proposed Action/Project would have significant cumulative impacts to delta smelt and longfin smelt from entrainment. Under NEPA, the Proposed Action/Project would have less than significant cumulative impacts to delta smelt and longfin smelt from entrainment. Under NEPA and CEQA, the reduced hopper dredge use alternatives would have less than significant cumulative impacts to delta smelt and longfin smelt from entrainment. For all other resource areas under all action alternatives, the project, in combination with other past, present, and reasonably foreseeable future projects, would not contribute to adverse cumulative impacts, or the project's contribution to cumulative impact would not be cumulatively considerable or significant.

## **COORDINATION AND CONSULTATION**

Since early 2013, public and agency participation has occurred as a part of the environmental review process, pursuant to the requirements of the NEPA and CEQA. Stakeholders and public agencies, including those with permitting authority for the project, have been engaged and involved in scoping and alternatives development as detailed in Chapter 4.

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<b>Geology, Soils, and Sediment Quality</b>				
<p><b>Impact 3.3-1: Potential for Dredging, Transport, and Placement Activities to Result in Substantial Soil Erosion</b></p> <p>Minimal erosion of the channel sides from sloughing could occur after the channels are dredged due to the disturbance of sediments. Placement of dredged material at beneficial reuse sites would have beneficial impacts on soil resources.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.3-2: Potential for Dredging, Transport, and Placement Activities to Substantially Degrade Sediment Quality</b></p> <p>The USACE’s conformance with established sediment testing and analysis protocols for dredged material would ensure that dredged material placement activities would not substantially degrade sediment quality at the placement sites.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.3-3: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Sediments and Soils</b></p> <p>The project would not result in adverse cumulative impacts on sediments and soils.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts.</p> <p><b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts.</p> <p><b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts.</p> <p><b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>
<b>Hydrology and Water Quality</b>				
<p><b>Impact 3.4-1: Potential to Substantially Degrade Water Quality through Alteration of Water Temperature, Salinity, pH, and Dissolved Oxygen</b></p> <p>Impacts to water quality temperature, salinity, pH, and dissolved oxygen from project activities would be minor, short-term, and localized.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.4-2: Potential to Substantially Degrade Water Quality Because of Increased Turbidity</b></p> <p>Dredging and placement activities would have minor, short-term, and localized impacts to water quality due to short-term increases in turbidity. Placement of dredged materials at habitat restoration beneficial reuse projects could have long-term beneficial effects on water quality.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.4-3: Potential to Substantially Degrade Water Quality Because of Mobilization of Contaminated Sediments or Release of Hazardous Materials</b></p> <p>Dredging and placement activities would not be expected to increase contaminant concentrations in the water column above baseline conditions, or result in violation of a water quality standard.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.4-4: Potential to Result in Cumulative Impacts to Hydrology or Water Quality</b></p> <p>The project, in combination with other past, present, and reasonably foreseeable future projects, could result in adverse cumulative impacts on water quality; however, the project’s contribution to these cumulative impact would not be cumulatively considerable or significant.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<b>Air Quality and Global Climate Change</b>				
<p><b>Impact 3.5-1: Conflict with or Obstruct BAAQMD Air Quality Plan Implementation, Exceed Applicable Air Quality Standards, or Contribute Substantially to an Air Quality Violation</b></p> <p>The project would not result in emissions level increases that exceed BAAQMD mass significance thresholds. Therefore, the project would not conflict with or obstruct BAAQMD Air Quality Plan Implementation, exceed applicable air quality standards, or contribute substantially to an air quality violation.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.5-2: Expose Sensitive Receptors to Substantial Pollutant Concentrations</b></p> <p>The impacts of short-term intermittent emissions on sensitive receptors from dredging and dredged material placement activities would be minimal.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.5-3: Create Objectionable Odors</b></p> <p>The project would not create objectionable odors affecting a substantial number of people.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.5-4: Result in Cumulatively Considerable Air Quality Impacts</b></p> <p>The project alternatives would not cause mass emission increases above the BAAQMD significance thresholds, would not be cumulatively considerable, and would not result in significant cumulative air quality impacts.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.5-5: Generate Greenhouse Gas Emissions, Either Directly or Indirectly, that May Have a Significant Impact on the Environment or Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases</b></p> <p>The project alternatives would not cause greenhouse gas emission increases above the BAAQMD significance thresholds or conflict with an applicable plan, policy, or regulation for reducing the emissions of greenhouse gases.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Biological Resources</b></p>				
<p><b>Impact 3.6-1: Potential Adverse Effects of Increased Turbidity Resulting from Maintenance Dredging and Dredged Material Placement on Special-Status Species, Critical Habitat, and Commercially Valuable Marine Species</b></p> <p>Localized and temporary increases in turbidity resulting from dredging and the placement of dredged material may affect marine organisms and aquatic wildlife during various life stages. Impacts may include impaired respiration; reduced visibility and the ability to forage or avoid predators; and alteration of movement patterns. Increases in turbidity from the project are not expected to have substantial effects on special-status species, their critical habitat, or EFH.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.6-2: Potential Adverse Effects of Maintenance Dredging Resulting from the Disturbance of Benthic Habitat on Special-Status Species, Critical Habitat, and Commercially Valuable Marine Species</b></p> <p>Dredging would have localized, direct impacts on benthic communities through physical disruption and direct removal of benthic organisms. Effects would be temporary because benthic habitat is quickly recolonized.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-3: Potential Adverse Effects of Underwater Noise Generated During Maintenance Dredging on Special-Status Fish and Marine Mammals</b></p> <p>Underwater noise produced during dredging may have temporary adverse effects on fish and marine mammals, include fleeing, the cessation of feeding, or other behavioral changes; but would not be expected to cause injury to fish and marine mammals.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-4: Potential Adverse Effects from Entrainment on Special-Status or Commercially and Recreationally Important Marine Species, Not Including Delta Smelt and Longfin Smelt</b></p> <p>During dredging, organisms on the dredged material may be entrained, in addition to organisms in the water column near the dredging apparatus. With implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment, effects to special-status and commercially important species, not including delta smelt and longfin smelt, would not be significant.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts, reduced to less than significant with implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts, reduced to less than significant with implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts, reduced to less than significant with implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.6-5: Potential Substantial Adverse Effects and Cumulative Impacts to Delta Smelt from Entrainment</b></p> <p>Entrainment of delta smelt could occur during hopper dredging. Under the Proposed Action/Project, a hopper dredge would be used to dredge three in-bay channels and the Main Ship Channel annually; therefore, this alternative would have the greatest potential to result in entrainment impacts. The potential for entrainment impacts would be less under Reduced Hopper Dredge Use Alternative 1 because only one in-Bay channel and the Main Ship Channel would be maintained with a hopper dredge. The potential for entrainment impacts would be largely eliminated under Reduced Hopper Use Dredge Alternative 2 because hopper dredges would not be used for maintaining in-Bay channels.</p>	<p>Minimization measures proposed as part the project description for all action alternatives. Compensatory mitigation (i.e., conservation credit) proposed as part of the project description for the Proposed Action/Project and Reduced Hopper Dredge Use Alternative 1. No additional measures proposed as mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts, reduced to less than significant with the implementation of reduced hopper dredging.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-6: Potential Substantial Adverse Effects and Cumulative Impacts to Longfin Smelt from Entrainment</b></p> <p>Entrainment of delta smelt could occur during hopper dredging. Under the Proposed Action/Project, a hopper dredge would be used to dredge three in-bay channels and the Main Ship Channel annually; therefore, this alternative would have the greatest potential to result in entrainment impacts. The potential for entrainment impacts would be less under Reduced Hopper Dredge Use Alternative 1 because only one in-Bay channel and the Main Ship Channel would be maintained with a hopper dredge. The potential for entrainment impacts would be largely eliminated under Reduced Hopper Use Dredge Alternative 2 because hopper dredges would not be used for maintaining in-Bay channels.</p>	<p>Minimization measures proposed as part the project description for all action alternatives. Compensatory mitigation (i.e., conservation credit) proposed as part of the project description for the Proposed Action/Project and Reduced Hopper Dredge Use Alternative 1. No additional measures proposed as mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts, reduced to less than significant with the implementation of reduced hopper dredging.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.6-7: Dredging and Placement Activities Could Result in the Disturbance of Essential Fish Habitat and “Special Aquatic Sites,” Including Eelgrass Beds and Mudflats.</b> Eelgrass near the Richmond Inner Harbor Channel and Oakland Inner Harbor may be indirectly impacted by turbidity and increased sedimentation from dredging operations. Turbidity plumes from dredging operations may temporarily reduce light penetration in waters adjacent to the plumes. Sediment near areas of dredging may settle on eelgrass blades and affect the viability of the eelgrass in beds adjacent to dredging operations.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-8: Interference with the Movement of Resident or Migratory Fish or Wildlife Species During Dredging and Placement Activities</b> The noise and in-water disturbance associated with dredging and placement activities could cause fish and wildlife species to temporarily avoid the immediate dredging or placement area when work is being conducted. However, the affected area would be limited to the immediate dredging or placement zone, and would not substantially limit the available habitat or movement of fish, seabirds, or marine mammals.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-9: Dredging and Placement Activities Could Disturb Roosting and Foraging by Avian Species</b> Dredging may disturb avian foraging and resting behaviors, decrease time available for foraging, and increase energetic costs as a result of increased flight times and startling responses. Impacts would be temporary, localized, and minor.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.6-10: Contaminated Sediments Could Become Resuspended During Dredging and Placement Activities, and Could Be Toxic to Aquatic Organisms, Including Plankton, Benthos, Fish, Birds, and Marine Mammals</b> Sediment testing results for previous USACE maintenance dredging episodes indicate that, in general, dredged materials from the subject federal navigation channels have been suitable for unconfined aquatic disposal. Dredging, transport, and placement of dredged material would be conducted in cooperation with the DMMO. This process would identify contaminated sediments and appropriate placement site options for dredged materials, based on the characteristics of the sediment and criteria for each placement site. Adherence to best management practices and conditions in regulatory approvals would minimize the potential for water quality degradation that could impact aquatic organisms.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-11: Dredging and Placement Could Substantially Increase the Spread of Invasive Nonnative Species</b> Dredge equipment would comply with United States Coast Guard regulations for vessels intended to minimize the spread of invasive nonnative species. Beneficial reuse and upland placement site operators are responsible for managing the placement of dredged materials at the placement sites in accordance with conditions of their permits and other regulatory approval, which include measures to minimize the spread of invasive nonnative species. Therefore, project activities would not be expected to substantially increase the spread of invasive nonnative species.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.6-12: Potential to Result in Cumulative Impacts on Biological Resources, Not Including Entrainment Impacts on Delta Smelt and Longfin Smelt</b></p> <p>The project, in combination with other past, present, and reasonably foreseeable future projects, could result in adverse cumulative impacts on biological resources; however, the project’s contribution to these cumulative impacts would not be cumulatively considerable or significant.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Cultural and Paleontological Resources</b></p>				
<p><b>Impact 3.7-1: Substantial Adverse Change to a Historical Resource or Disturb Unique Archaeological Resources</b></p> <p>Although unlikely, given the repeated dredging and dredged material placement activities that have historically occurred at the federal navigation channels and existing placement sites, there remains the potential that archaeological materials could be inadvertently uncovered by project activities. Such inadvertently discovered archaeological materials could represent historical resources or unique archaeological resources, and their disturbance could adversely change their condition. As such, the inadvertent discovery of archaeological materials represents a potential project impact. Implementation of Mitigation Measure CUL-1, Inadvertent Archaeological Discovery Measures, would reduce potential impacts.</p>	<p><b>Mitigation Measure CUL-1: Inadvertent Archaeological Discovery Measures</b></p> <p>Measures will be implemented to avoid potential adverse effects on inadvertently discovered NRHP- and/or CRHR-eligible or unique archaeological resources. Refer to Section 3.7 for complete mitigation measure.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.7-2: Disturb Human Remains, including those Interred Outside of Formal Cemeteries</b></p> <p>There are no known cemeteries, formal or otherwise, or other evidence of human internment in the federal navigation channels or existing placement sites. Although unlikely, given the repeated dredging and dredged material placement activities that have historically occurred at the federal navigation channels and existing placement sites, there remains the potential that previously unidentified human remains could be inadvertently uncovered with project implementation. Such disturbance of human remains represents a potential project impact. Implementation of Mitigation Measure CUL-1, Inadvertent Archaeological Discovery Measures, and Mitigation Measure CUL-2, Treatment of Human Remains, would reduce potential impacts.</p>	<p><b>Mitigation Measure CUL-1: Inadvertent Archaeological Discovery Measures</b> <b>Mitigation Measure CUL-2: Treatment of Human Remains</b></p> <p>The treatment of human remains and associated or unassociated funerary objects discovered during any soil-disturbing activity will comply with applicable state laws. Refer to Section 3.7 for complete mitigation measure.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>
<p><b>Impact 3.7-3: Disturb Unidentified Significant Paleontological Resources</b></p> <p>Disturbance of paleontological resources would not be expected. Although unlikely, there remains the potential that paleontological materials could be inadvertently uncovered by project activities. Such disturbance of paleontological resources represents a potential project impact. Implementation of Mitigation Measure CUL-3, Inadvertent Paleontological Discovery, would reduce potential impacts.</p>	<p><b>Mitigation Measure CUL-3: Inadvertent Paleontological Discovery</b></p> <p>Measures will be implemented to avoid potential adverse effects on inadvertently discovered paleontological resources. Refer to Section 3.7 for complete mitigation measure.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.7-4: Potential to Result in Cumulative Impacts on Archaeological or Paleontological Resources</b></p> <p>Project activities would not result in impacts to known historic or unique archaeological resources or to significant paleontological resources, and therefore would not contribute to any cumulative impact to these resources. If previously undiscovered archaeological resources are inadvertently exposed by the project or other reasonably foreseeable projects, an incremental effect to archaeological resources may occur.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Land Use</b></p>				
<p><b>Impact 3.8-1 Conflict with Applicable Plans and Policies</b></p> <p>The project would not conflict with plans, regulations, or policies considered under the Coastal Zone Management Act, including the California Coastal Management Program and the San Francisco Bay Plan. As a result of the California Coastal Commission and the San Francisco Bay Conservation and Development Commission review of USACE’s consistency determination for the project, the project would be implemented in a manner consistent with applicable plans and policies, and would be consistent with the Coastal Zone Management Act to the maximum extent practicable.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<b>Hazards and Hazardous Materials</b>				
<p><b>Impact 3.9-1: Potential Public or Environmental Exposure from the Transport, Use, and Disposal of Hazardous Materials</b></p> <p>All federal, state, and local regulations regarding the use, transport, and disposal of hazardous materials would be adhered to during project activities. Human health and safety impacts would be avoided through adherence to these procedures, conditions, and regulations. Project activities would not interfere with cleanup activities at contaminated sites.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>
<p><b>Impact 3.9-2: Potential Impacts to Implementation of an Adopted Emergency Response Plan</b></p> <p>The project would not impair implementation of, or interfere with, any emergency operation or evacuation plans in the study area.</p> <p>Dredging would have a long-term beneficial impact by removing shoaled sediment and maintaining the navigability of the federal channels for use by vessels during emergency response operations.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> No adverse impacts; beneficial impacts. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No adverse impacts; beneficial impacts. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No adverse impacts; beneficial impacts. <b>CEQA Finding:</b> No impact.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<b>Transportation</b>				
<p><b>Impact 3.10-1: Potential to Disrupt or Impede Marine Navigation</b></p> <p>Maintenance dredging and placement activities would add to vessel movement in the study area; however, this vessel traffic would be similar to that which has occurred during USACE’s past maintenance dredging operations. Dredging activities may occasionally delay or temporarily impede some vessels. Adverse impacts to navigation would be minimal and short-term.</p> <p>Dredging would have long-term beneficial impacts by removing shoaled sediment and maintaining the navigability of the federal channels.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.10-2: Potential to Create Navigational Safety Risks</b></p> <p>Dredging and placement activities would comply with applicable vessel traffic and safety requirements; therefore, there would be no impacts related to navigational safety risks.</p> <p>Dredging would have long-term beneficial impacts by removing shoaled sediment that could pose a navigation hazard, and allowing for safe navigation in the federal channels.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Beneficial impacts.</p> <p><b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> Beneficial impacts.</p> <p><b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> Beneficial impacts.</p> <p><b>CEQA Finding:</b> No impact.</p>

**Table ES-3  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.10-3: Potential to Result in Cumulative Impacts on Navigation</b> The project would not result in adverse cumulative impacts on navigation.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts. <b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts. <b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts. <b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>

Notes:  
 AB = Assembly Bill  
 AEP = Archaeological Evaluation Plan  
 BAAQMD = Bay Area Air Quality Management District  
 CEQA = California Environmental Quality Act  
 CRHR = California Register of Historical Resources  
 EFH = Essential Fish Habitat  
 MLD = Most Likely Descendant  
 NEPA = National Environmental Policy Act  
 NRHP = National Register of Historic Places  
 PRC = Public Resources Code  
 SVP = Society of Vertebrate Paleontology  
 USACE = United States Army Corps of Engineers



## CHAPTER 1 PURPOSE AND NEED

### 1.1 INTRODUCTION

The United States Army Corps of Engineers (USACE) proposes to continue maintenance dredging of the federal navigation channels in San Francisco Bay to maintain the navigability of the channels. The San Francisco Bay Regional Water Quality Control Board (Regional Water Board) proposes to issue a Clean Water Act (CWA) Section 401 water quality certification (WQC), and may also issue waste discharge requirements (WDRs) pursuant to the state Porter-Cologne Water Quality Control Act, for USACE's continued maintenance dredging operations in San Francisco Bay. This authorization is referenced throughout as "WQC."

The USACE and Regional Water Board have prepared this Environmental Assessment (EA)/Environmental Impact Report (EIR) to address the environmental effects of the maintenance dredging of federal navigation channels in San Francisco Bay and the associated placement of dredged materials for a period of 10 years. This EA/EIR is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. § 4321 et seq.; the Council on Environmental Quality (CEQ) regulations for implementing NEPA, 40 C.F.R., pt. 1500-1508; USACE Procedures for Implementing NEPA (Engineer Regulation 200-2-2); USACE regulations for operation and maintenance of civil works projects (33 C.F.R. pt. 335-338); Section 404 of the CWA (33 U.S.C. § 1344 and 33 C.F.R. pt. 320-330); the California Environmental Quality Act (CEQA) of 1970, California Public Resources Code, Section 21000 et seq., as amended, and the Guidelines for Implementation of CEQA, Title 14, California Code of Regulations, Section 15000 et seq. The USACE is the NEPA lead agency, and the Regional Water Board is the CEQA lead agency. The Proposed Action/Project and alternatives are described in Chapter 2.

The dredging process involves the excavation of accumulated sediment from the channel bed, and the subsequent transportation and placement of the sediment at a permitted facility or location in a manner consistent with the permit conditions established by applicable regulatory agencies, after determination of suitability for placement at that site. The environmental impacts of maintenance dredging of the federal navigation channels were initially described in USACE's *Final Composite Environmental Impact Statement for Maintenance Dredging of Existing Navigation Projects, San Francisco Bay Region* in December 1975. The environmental effects of dredged material placement activities associated with dredging the federal navigation channels in San Francisco Bay were analyzed in the *Long-Term Management Strategy for Placement of Dredged Material in the San Francisco Bay Region, Final Policy Environmental Impact Statement/Programmatic Environmental Impact Report* in 1998. Subsequent to the publication of these documents, USACE has conducted NEPA compliance review, and the Regional Water Board has conducted CEQA<sup>1</sup> compliance review, for maintenance dredging activities on an individual channel basis; this NEPA and CEQA compliance has been conducted periodically as warranted by maintenance dredging needs. This document is intended to fulfill USACE's NEPA compliance requirements for maintenance dredging of federal navigation channels it maintains in San Francisco Bay for the federal fiscal years<sup>2</sup> 2015 through 2024. This document is also intended to fulfill the Regional Water Board's CEQA compliance requirements for issuance of a 10-year WQC to USACE.

Longfin smelt and green sturgeon were not protected under the federal or state Endangered Species Acts at the time the Long-Term Management Strategy (LTMS) Environmental Impact Statement (EIS)/EIR was completed. Longfin smelt is a state-listed threatened species, and the green sturgeon southern distinct population segment is a federally listed threatened species. Delta smelt was addressed in the

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<sup>1</sup> "Maintenance dredging where the spoil is deposited in a spoil area authorized by all applicable state and federal regulatory agencies" is a Class 4 Categorical Exemption under CEQA (CEQA Guidelines, Section 15304). Past WDRs were issued under this Categorical Exemption. The listings of longfin smelt and green sturgeon, noted in the following paragraph, warranted the preparation of an EIR under CEQA.

<sup>2</sup> The federal fiscal year begins October 1 and ends September 30.

LTMS Final EIS/EIR as a federally listed and state-listed threatened species; however, the state elevated its listing status from threatened to endangered in 2010. Listed salmonids were addressed in the LTMS EIS/EIR. Subsequent to the completion of the LTMS EIS/EIR and to the listing of longfin smelt, USACE implemented monitoring to determine whether dredging operations were resulting in take of listed fish species. In 2011, there were occurrences of delta smelt and longfin smelt becoming entrained in hopper dredging equipment during USACE maintenance dredging at certain locations (refer to Section 2.3.1 for a description of hopper dredges). To minimize the potential for future impacts to listed fish species, the proposed project would address aspects of USACE's maintenance dredging and dredged materials placement program that could result in injury or mortality of these species.

Additionally, for those maintenance dredging projects that involve discharge of dredged or fill material into waters of the United States, this document is intended to serve as the Section 404(b)(1) analysis for maintenance dredging in compliance with the CWA.<sup>3</sup> The USACE implements Section 404 of the CWA, and although it does not issue itself permits, USACE must demonstrate compliance with Section 404 of the CWA.

The federal navigation channels and associated placement sites are in the San Francisco Bay LTMS Program Planning Area, which spans 11 counties, including Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, Santa Clara, San Francisco, San Mateo, Solano, and Sonoma.<sup>4</sup> However, the geographic scope of potential impacts of the proposed project are limited to 10 federally authorized navigation channels and associated placement sites in San Francisco Bay.

Chapter 1 of this EA/EIR, Purpose and Need, describes the project need and objectives, the project's relationship to other plans and policies, the federal channels and placement sites, and the regulatory framework. Chapter 2, Alternatives, describes the alternatives development process for the project, and the Proposed Action/Project and its alternatives. Chapter 3, Affected Environment and Environmental Consequences, presents the regulatory and environmental setting for the project, and the environmental impacts of the project alternatives. Chapter 4, Public and Agency Involvement, describes the public scoping and public review process, including agency coordination. Chapter 5, Findings, presents a summary of impacts and mitigations, and a comparison of the project alternatives; it also describes the environmentally superior alternative. Chapter 6, List of Preparers, provides a list of agency and consultant staff who prepared the EA/EIR.

## 1.2 PROJECT PURPOSE, NEED, AND OBJECTIVES

The CEQ's regulations for implementing NEPA require that an EA include a statement of the need to which the federal agency is responding in proposing the project. The CEQA Guidelines require that an EIR contain a "statement of the objectives sought by the proposed project." Under the CEQA Guidelines, "[a] clearly written statement of objectives will help the Lead Agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations. The statement of objectives should include the underlying fundamental purpose of the project" (CEQA Guidelines Section 15124[b]).

The USACE, as mandated by Congress, is responsible for maintaining navigability of federal navigation channels to authorized depth or lesser regulatory depth.<sup>5</sup> Accumulation of sediment that settles in these channels can impede navigability. Maintenance dredging removes this sediment and returns the channels to regulatory depths to provide safe, reliable, and efficient waterborne transportation systems (channels,

<sup>3</sup> Sediment testing will occur in the future, pursuant to the Section 404(b)(1) sediment testing guidelines, per approved sediment sampling and analysis plans.

<sup>4</sup> Although portions of Sacramento and San Joaquin counties were part of the Planning Area for the LTMS EIS/EIR, they are not part of the LTMS Program.

<sup>5</sup> Regulatory depth is the depth to which federal environmental compliance has been completed.

harbors, and waterways) for the movement of commerce, national security needs, and recreation. Therefore, USACE's purpose of the project is to continue maintenance dredging of the federal navigation channels in San Francisco Bay consistent with the goals and adopted plans of the LTMS, while adequately protecting the environment, including listed species. The Regional Water Board's overall project objective is to ensure USACE's consistency with the water quality objectives and beneficial uses adopted in the Water Quality Control Plan for the San Francisco Basin (Basin Plan), as will be addressed through the Section 401 WQC process.

The USACE's specific project objectives are to:

- Provide safe, reliable, and efficient navigation through federal channels in San Francisco Bay in a feasible manner. This objective is considered the underlying fundamental purpose of the proposed project;
- Ensure consistency, to the maximum extent practicable, with the goals of the LTMS program as described in the 1998 LTMS Final EIS/EIR and the 2001 LTMS Management Plan (refer to Section 1.3.1); and
- Conduct dredging in a manner that adequately protects the environment, including listed species.

The Regional Water Board has authority under CWA Section 401 and the Porter-Cologne Act to issue permits governing dredge and fill activities. The Regional Water Board will consider USACE's application for a multi-year WQC for continued maintenance dredging of San Francisco Bay federal channels and associated dredged materials placement. To issue a WQC to USACE, the Regional Water Board, in compliance with CEQA, must analyze and disclose potential water quality and other environmental impacts of the project; consider alternatives that would avoid or substantially reduce potentially significant impacts of the project as approved; adopt or make a condition of approval all feasible mitigation for potentially significant impacts; and demonstrate that all applicable state water quality requirements are met.

### 1.3 RELATIONSHIP TO OTHER PLANS AND POLICIES

The USACE's regulations for its operation and maintenance dredging projects involving the discharge of dredged materials into waters of the United States or ocean waters are detailed in 33 C.F.R. pt. 335-338. The regulations describe the procedures that USACE must follow to conduct dredged material disposal in compliance with Section 404 of the CWA (for disposal in waters of the United States) and the Marine, Protection, Research and Sanctuaries Act (MPRSA) (for disposal in ocean waters). In addition, pursuant to the federal Coastal Zone Management Act (CZMA), USACE's maintenance dredging and dredged material placement needs to be consistent with the state's coastal zone management program and policies to the maximum extent practicable (16 U.S.C. § 1456). The USACE's regulations identify factors to be considered in evaluating the discharge of dredged material into waters of the United States, including navigation and the federal standard;<sup>6</sup> water quality; coastal zone consistency; wetlands; endangered species; and fish and wildlife (35 C.F.R. pt. 336.1[c]). The USACE's evaluation of discharges (i.e., placement) of dredged material in San Francisco Bay and ocean placement sites and compliance with Section 404 of the CWA, the MPRSA, and the CZMA is guided by the LTMS Program, and other plans and policies described in the following sections.

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<sup>6</sup> The federal standard is defined as the least-costly dredged material disposal or placement alternative consistent with sound engineering practices, and meeting the environmental standards established by the Section 404(b)(1) evaluation process or ocean dumping criteria (33 C.F.R. § 335.7).

### 1.3.1 LTMS Planning Context

The LTMS program was formed in the 1990s in response to the public's growing concern over the potential direct, indirect and cumulative effects of dredging and dredged material disposal activities on the already stressed resources of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. The 50-year LTMS program comprises state and federal regulatory agencies with primary authority to review and permit dredging and disposal activities in the San Francisco Bay Area. Participating agencies include USACE, United States Environmental Protection Agency (USEPA), Regional Water Board, State Water Resources Control Board, San Francisco Bay Conservation and Development Commission (BCDC), and State Lands Commission.

The LTMS program spans nine counties, including: Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco. It does not include the mountainous areas or inland areas far removed from navigable waters. The geographic scope of the LTMS program comprises the estuarine waters of the San Francisco Bay region, portions of the Sacramento-San Joaquin Delta west of Sherman Island, and the western portion of the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel. It also includes the wetlands and shallow intertidal areas that form a margin around the San Francisco Bay and the tidal portions of its tributaries. Lastly, it includes the San Francisco Deep Ocean Disposal Site (SF-DODS), the San Francisco Bar Channel Disposal Site (SF-8) and the nearshore zone off Ocean Beach, as well as the waters that are used by vessels en route to these sites. This geographical area defines the region where navigational dredging covered by the LTMS program may occur, and where dredged material placement sites are located. In some cases, dredged material may be transported outside the region for use in landfills, levee repair, or other beneficial reuse projects.

Formal implementation of the LTMS began in 2001 with the adoption of the LTMS Management Plan. The Management Plan was preceded by an extensive 8-year federal and state planning effort that culminated in the LTMS Final EIS/EIR in October 1998. The environmentally preferred alternative identified in the LTMS Final EIS/EIR includes beneficial reuse of at least 40 percent of material dredged in the San Francisco Bay region, no more than 40 percent placement at SF-DODS, and no more than 20 percent placement at in-Bay sites. The Management Plan was based on average annual dredged material disposal volumes from 1991 through 1999. The Management Plan called for reversing the historic practice of disposing 80 percent or more of all material dredged from San Francisco Bay at in-Bay disposal sites, and requires that at least 80 percent of all dredged material be placed at beneficial reuse sites, upland, or at ocean disposal sites, with only limited volumes of material being placed in-Bay. Over the life of the LTMS, the selected alternative aims to:

- Maintain, in an economically and environmentally sound manner, those channels necessary for navigation in San Francisco Bay, and eliminate unnecessary dredging activities;
- Conduct dredged material disposal in the most environmentally sound manner;
- Maximize the use of dredged material as a resource; and
- Maintain the cooperative permitting framework for dredging and disposal applications.

To implement these goals, the LTMS agencies have instituted an aggressive reduction of in-Bay disposal volumes; worked to establish new beneficial reuse options, including habitat creation benefitting sensitive and listed species; encouraged beneficial reuse where practicable; worked with projects to avoid environmental impacts by dredging only during established environmental work windows as much as possible; continuously improved dredged material testing practices to ensure that contaminant-related impacts to the aquatic environment are minimized; and streamlined the permitting process for the dredging community.

The LTMS agencies adopted a program that created a 12-year transition period for reduction of in-Bay disposal and the development of beneficial reuse sites; this transition period ended on December 31,

2012. The in-Bay disposal volume reduction targets were successfully met for each 3-year period of the 12-year transition, despite overall dredging volumes being greater than during the baseline planning period for the LTMS program (LTMS, 2013a).

As part of the implementation of the LTMS, the agencies initiated state and federal Endangered Species Act consultation with the National Marine Fisheries Service (NMFS), the United States Fish and Wildlife Service (USFWS), and the California Department of Fish and Wildlife (CDFW) for maintenance dredging and disposal projects, covering threatened and endangered species and species of special concern, such as the Pacific herring. These consultations reduced the need for individual consultation for dredging projects through the establishment of programmatic work windows. These programmatic work windows are based on presence/absence information for various sensitive species, and establish times and locations wherein dredging and disposal activities may take place without further (formal or informal) consultation.

In the event that a project cannot be completed during the work window, individual consultations with the appropriate resource agencies would occur. The outcome of the individual consultation would determine whether any additional dredging period for that project is appropriate; and if necessary, provide a “take authorization.”

The programmatic biological opinions issued by NMFS and USFWS provide federal endangered or threatened species “incidental take” authorization for projects operating in the environmental work window for their area. This “take authorization” protects the dredger from enforcement action in the event of accidental harm to a listed species as a result of the dredging project. The programmatic biological opinions<sup>7</sup> issued by NMFS and USFWS do not address incidental take of state-listed species. Coordination with CDFW is necessary if take of state-listed species is expected. As a federal agency, USACE is not required to obtain authorization from CDFW for incidental take of state-listed species but would be required to consult with NMFS and USFWS under the federal Endangered Species Act (ESA) if take of federally listed species is expected. Since 2011, USACE has been required to consult on impacts to delta smelt during dredging of Suisun Bay Channel and New York Slough because of documented occurrences of entrainment during monitoring of hopper dredge use.

In 2012, the LTMS agencies completed a comprehensive 12-year review of the program. The review process involved collecting, analyzing, disseminating, and presenting data about the LTMS program’s performance as well as a series of public meetings (each focused on a different key topic suggested by stakeholders) and preparation of a Final 12-Year Review Report summarizing the review findings. Based on this review process, the LTMS agencies concluded that the LTMS goals remain appropriate and largely implementable, and that the program has been successfully implemented to date. The LTMS agencies recommended that the basic program continue. This continuation requires approximately 80 percent of dredged sediment to be targeted for beneficial reuse or out-of-Bay disposal and only 20 percent targeted for in-Bay disposal. Given the changed conditions since establishment of the program, the LTMS agencies recommended adopting increased flexibility and innovation in implementing the program’s goals. Specifically, the LTMS agencies are assessing potential changes in the program’s implementation to accommodate changing or adding flexibility to in-Bay disposal volume limits, encouraging more beneficial reuse and new kinds of beneficial reuse (LTMS, 2013b).

### **LTMS Program Relationship to San Francisco Bay Plan**

The BCDC regulates dredging and dredged material placement in San Francisco Bay. Under authority of the state McAtteer-Petris Act of 1965, the BCDC prepared the San Francisco Bay Plan; and in 1968, adopted regulations and policies regarding dredging and placement in San Francisco Bay. The San

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<sup>7</sup> NMFS is revising the 1998 LTMS programmatic biological opinion; the updated biological opinion (expected 2015) will supersede the 1998 document. USACE would comply with the terms and conditions of the updated biological opinion.

Francisco Bay Plan dredging policies were amended to adopt the LTMS findings, including reducing in-Bay disposal, maximizing beneficial reuse, and an allocation strategy to reduce in-Bay disposal. The BCDC is also the state coastal management agency pursuant to the federal CZMA for the San Francisco Bay segment of the California coastal zone. Under the federal consistency provisions of the CZMA, federal projects need to be determined to be consistent with the state's coastal zone management program and policies to the maximum extent practicable (16 U.S.C. § 1456). The consistency determination is made by the lead federal agency, and concurrence is sought from the CZMA managing agency, which has the ability to concur, condition the project to find consistency, or object to the project. The Commission's law and policies are the basis for its federally approved state coastal management program for San Francisco Bay. Dredging and placement projects must be consistent with all Bay Plan policies, to the maximum extent practicable, and USACE requests BCDC's concurrence on USACE's consistency determination prior to commencing dredging activities.

### **LTMS Program Relationship to Regional Water Quality Control Plan**

The Basin Plan, which can be found at the Regional Water Board's website at [http://www.waterboards.ca.gov/sanfranciscobay/basin\\_planning.shtml](http://www.waterboards.ca.gov/sanfranciscobay/basin_planning.shtml), is the primary document used by the Regional Water Board for the regulation of in-Bay dredging. In 2008, the Basin Plan was amended to identify the LTMS strategy as the key process for addressing dredging operations in San Francisco Bay, and for achieving the LTMS goals. The Basin Plan implements the LTMS Management Plan by setting a long-term overall target for in-Bay disposal of dredged material at designated disposal sites of 1.25 million cubic yards (or less) per year, adopting the guidelines contained in the 1998 USACE/USEPA Inland Testing Manual and local implementation procedures developed through the Dredged Material Management Office (DMMO) as the appropriate framework for evaluating the suitability of dredged material for disposal at in-Bay disposal sites, and providing revised permit conditions to reflect requirements of the resource agencies (CDFG, USFWS, and NMFS).

### **LTMS Program Relationship to the Clean Water Act**

San Francisco Bay, along with its tributary rivers, streams, adjacent wetlands, and the Pacific Ocean out to the 3-mile limit, are "waters of the United States" in CWA Section 404 jurisdiction. The USACE, USEPA, and Regional Water Board regulate placement of dredged material in San Francisco Bay pursuant to the CWA through the LTMS DMMO, as described in Section 1.3.2. The USACE implements Section 404 of the CWA, and the USEPA has oversight authority. Section 404(b)(1) of the CWA establishes procedures for the evaluation of permits for discharge of dredged or fill material into waters of the United States. Guidelines (40 C.F.R. pt. 230) were promulgated specifically pursuant to Section 404(b)(1) of the Act. The Section 404(b)(1) Guidelines govern, in part, the issuance of permits by USACE. The USACE's 1986 Regulation 33 C.F.R. pt. 320.4(a)(1) states, "For activities involving 404 discharges, a permit will be denied if the discharge that would be authorized by such permit would not comply with the Environmental Protection Agency's 404(b)(1) Guidelines." In situations where USACE is proposing work that involves discharge of dredged or fill material into waters of the United States, USACE must comply with the requirements of the Section 404(b)(1) Guidelines, although it does not issue itself permits. Discharge of dredged materials into waters of the United States is regulated under Section 404 of the CWA.

Subpart B of the Section 404(b)(1) Guidelines (40 C.F.R. pt. 230.10) establishes the Alternatives Analysis requirements that must be met. In particular, 40 C.F.R. pt. 230.10(a) states that "[N]o discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences".

In addition to consideration of logistics and existing technology, USACE and USEPA application of the Section 404(b)(1) Guidelines allows for consideration of the reasonableness of the cost of an alternative

relative to the nature of the project, the type of project proponent, and the “market” in which the project exists. The market for different kinds of projects, and therefore the range of alternatives and reasonable costs of doing business in that market, varies widely. For maintenance dredging in the San Francisco Bay region, the range of placement options is limited to those that are relatively near the larger and medium-sized dredge projects, and those that are technically feasible and cost effective for larger and medium-sized operations.

### **1.3.2 Management of Dredged Material**

Authorization to discharge dredged material in the open ocean, enclosed coastal waters, upland sites, or for beneficial reuse is provided through a variety of federal and state permitting processes. The USACE and USEPA jointly regulate the discharge of dredged material into waters of the United States and the transportation of dredged material for the purpose of disposal in ocean waters pursuant to Section 404 of the CWA, and the MPRSA (also refer to Sections 1.4.3 and 1.5.1). The Section 404(b)(1) Guidelines at 40 C.F.R. pt. 230 and ocean dumping criteria at 40 C.F.R. pt. 220 implement the environmental protection provisions of the CWA and MPRSA, respectively. As stated above, USACE does not issue itself a CWA Section 404 permit to authorize its discharges of dredged material into waters of the United States, but does apply the Section 404(b)(1) Guidelines and other substantive requirements of the CWA and other environmental laws.

The CWA requires USACE to seek state water quality certification for discharges of dredged or fill material into waters of the United States. Under Section 401 of the CWA, the Regional Water Board must certify that the activity will not violate state water quality standards and other applicable requirements before USACE is authorized to commence dredging. Pursuant to the consistency provisions of the CZMA, BCDC has authority over dredging and disposal of dredged material in San Francisco Bay.

#### **Dredged Material Management Office**

In 1996, the DMMO was created to establish a comprehensive and consolidated approach to eliminate redundancy and delays in the dredged material disposal permitting process. The DMMO reviews dredging projects to determine if they comply with the applicable federal and state laws (depending on if the applicant is a federal or non-federal agency), including the CWA, CZMA, federal ESA, and the California Endangered Species Act (CESA). The DMMO is a joint program composed of USACE, USEPA, BCDC, Regional Water Board, and the State Lands Commission. Participating agencies include CDFW, NMFS, and USFWS.

#### **Testing Requirements for Placement and Beneficial Reuse of Dredged Material**

Material proposed to be dredged and placed at ocean, inland aquatic, or upland/beneficial reuse sites requires sediment characterization to predict the environmental impacts associated with dredging and dredged material placement activities. The objective of the sediment testing requirements is to determine whether disposal of dredged material at designated disposal sites can occur without causing unreasonable degradation to the surrounding environment. Generally, sediments are tested for physical and chemical attributes and/or the potential for biological toxicity. The extent of sediment characterization necessary to ensure compliance with applicable environmental laws and regulations is generally site-specific. The type and extent of testing depends on the physical characteristics of the sediment, as well as the characteristics of the dredged material placement site. The entire dredge prism, which includes 2 feet of overdepth, is characterized. The DMMO reviews sediment testing plans and results, and determines suitability for placement of dredged material at a given location, based on sediment testing results and the LTMS program goals.

For ocean disposal to take place, the material must be acceptable for deep-ocean placement, as regulated by the MPRSA. The standards under CWA and MPRSA for determining the need for testing differ. The

requirement for testing under the CWA is based on reason to believe that contaminants are present in the proposed discharge, and have the potential to result in unacceptable adverse impact (40 C.F.R. pt. 230.60). Testing under the MPRSA is required when the material does not meet the exclusionary criteria in 40 C.F.R. pt. 227.13(b). Once it is determined that testing is required, the physical, chemical, and biological tests relied on for evaluating the material are similar for in-Bay and ocean placement sites.

For placement of dredged material in inland waters, including San Francisco Bay, Section 404 of the CWA, including the Section 404 (b)(1) Guidelines, and the regulations at 40 C.F.R. pt. 230 define the testing requirements. Current guidance for implementing inland aquatic disposal is provided in *Evaluation of Dredged Material Proposed for Disposal in Waters of the U.S. – Testing Manual for Discharge in Inland and Near Coastal Water – Testing Manual* (USACE and USEPA, 1998), referred to as the *Inland Testing Manual*. The regulations allow some temporary effects to the environment, and these effects are based on water quality criteria and Limiting Permissible Concentrations (concentrations of chemicals of concern present in dredged material must be lower than concentrations that cause significant impacts to certain species).

The Section 404 (b)(1) Guidelines at 40 C.F.R. pt. 230 and ocean dumping criteria at 40 C.F.R. pt. 220(a) provide general regulatory guidance and objectives, but not a specific technical framework for evaluating or managing contaminated sediment that must be dredged. If the USACE District Engineer determines the dredged material to be contaminated, USACE will follow the guidance provided in the most current published version of the technical manual for contaminant testing and controls.

In late 1997, NMFS published regulations requiring consultation for projects or programs that may adversely affect Essential Fish Habitat (EFH). Consequently, in 2004, the LTMS agencies and NMFS began preparing a programmatic EFH consultation for the LTMS program. The programmatic EFH agreement was completed in 2011 (USACE and USEPA, 2011). The EFH agreement includes a number of Conservation Measures that enhance the environmental protectiveness of the LTMS program. Conservation Measures 7 and 8, in particular, further improve the sediment testing program for projects proposing in-Bay disposal. Specifically, these Conservation Measures make the requirements for bioaccumulation testing, and “residual” (post-dredge sediment surface) sampling and characterization, more systematic and predictable. These conservation measures also tie the sediment testing program to San Francisco Bay’s existing Total Maximum Daily Loads for mercury and polychlorinated biphenyls, as well as to the established Regional Monitoring Program for San Francisco Bay. This ensures that dredging and dredged material placement will be managed in a manner that directly complements other key pollution-reduction programs for San Francisco Bay.

In the San Francisco Bay Area, placement of dredged material at upland sites or for beneficial reuse is regulated under California’s Porter-Cologne Act and McAtter-Petris Act. Screening guidance is provided in Regional Water Board’s May 2000 staff summary report, *Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines*, or most current revised version. There are two levels of screening guidelines for beneficial reuse of sediments for wetland restoration: guidelines for cover material; and guidelines for foundation material. Cover material is a class of material that is not expected to pose a threat to water quality or the aquatic environment, even in places where the material is in direct contact with surface waters or aquatic organisms, and is suitable for unconfined aquatic disposal. Wetland foundation material is not of a quality that constitutes a hazardous or listed waste but has a potential for biological effects if directly exposed to organisms. Wetland foundation material is not expected to be a threat to water quality when an adequate amount of cover material is used to reduce the risk of foundation material coming into contact with the aquatic environment. The amount of cover material needed to adequately reduce this risk depends on site-specific characteristics. Placement of dredged sediment at beneficial reuse sites is also often governed by acceptance criteria included in project-specific biological opinions.

### 1.3.3 Overdepth and Advance Maintenance Dredging

The federal navigation channels have Congressionally authorized maximum depths. Not all of the federal navigation channels are dredged to their authorized depth. In these cases, the channels are maintained by USACE to the previously dredged (i.e., regulatory) depth, not the Congressionally authorized depth. Deepening these channels beyond their previously dredged depth would not be considered maintenance dredging, and would require additional regulatory approval. At times, advance maintenance dredging is conducted, which dredges channels slightly deeper than their authorized or regulatory depth, as described below. Overdepth and advance maintenance dredging are part of the USACE's maintenance dredging program and are not considered deepening.

For some projects, overdepth dredging can account for a substantial proportion of the total quantity dredged, while for other projects it may be relatively minor. Overdepth is a total of 2 feet beyond the historically maintained depth for the entirety of the dredged area.<sup>8</sup> The volume represented by overdepth material is fully characterized in pre-dredge sediment testing.

Advance maintenance dredging is dredging to a specified depth and/or width beyond the previously dredged channel dimensions in critical and fast-shoaling areas of a channel to avoid frequent re-dredging, and to ensure the reliability and least overall cost of operating and maintaining the channel's design dimensions. This material is also subject to full characterization as discussed above. The USACE usually decides whether or not to perform advance maintenance after condition surveys are completed in the second quarter of the fiscal year. If the shoaling is light and there is sufficient budget, USACE elects to include advance maintenance. If the shoaling is heavy, USACE typically does not have enough funding for the additional advance maintenance volumes.

## 1.4 USACE MAINTENANCE DREDGING BUDGET PROCESS AND PRIORITIZATION

The USACE has a 3-year budget process for its operations and maintenance program. Year 1 consists of development of the budget within USACE. In Year 2, Congress reviews and appropriates the budget. In Year 3, USACE spends that portion of its Year 1 budget request that has been appropriated by Congress. For example, in spring of 2014, USACE was developing its Fiscal Year (FY) 2016 budget, Congress was reviewing the FY 2015 budget, and USACE was spending the FY 2014 budget.

Various factors are weighed in determining which channels receive funding. Value to the nation in terms of tonnage is considered. In recent years, because of federal budget constraints, Congress has focused appropriation of funding on the highest value projects. In 2012, of 1,067 federally maintained navigation projects nationwide, only 41 received full funding and only 159 projects received partial funding, including 59 high-use projects and 100 moderate-use projects.

Increasing federal fiscal constraints makes maintaining the San Francisco Bay federal navigation channels to their regulatory depths more challenging for USACE. The majority of the San Francisco District's maintenance dredging budget is allotted to high-use annually maintained projects: Oakland Harbor, Richmond Harbor, Pinole Shoal, Suisun Bay Channel and New York Slough, and the Main Ship Channel. Although the San Francisco District has seen an increase in its total maintenance dredging budget over the past decade, the costs of maintenance dredging have also increased. Beginning in 2009, the San Francisco District has only received 32 to 38 percent of its annual maintenance dredging funding needs.

To maximize the effectiveness of its reduced budget nationally (i.e., complete more dredging with appropriated funds), USACE has attempted to increase the use of government-owned hopper dredges in its fleet, as opposed to increasing the use of commercial hopper and clamshell dredges. Government hopper dredges are, on average, 15 to 25 percent less costly than equivalent commercial hopper dredge

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<sup>8</sup> Overdepth dredging is only allowed in areas where sediment is present above the project regulatory depth.

equipment. Also, analysis completed by the San Francisco District indicates the government-owned hopper dredge Essayons can dredge certain channels in San Francisco Bay at approximately one-third the cost of a clamshell dredge.

The USACE also has a process for reprogramming (or transferring) funds appropriated to other operations and maintenance projects. For reprogramming to occur, the USACE must first identify a project with excess funds to serve as the donor project. Congressional approval is typically required for the reprogramming of funds to occur. It is not typical that projects have excess funds available for reprogramming.

## **1.5 LOCATION AND DESCRIPTION OF FEDERAL NAVIGATION CHANNELS AND PLACEMENT SITES**

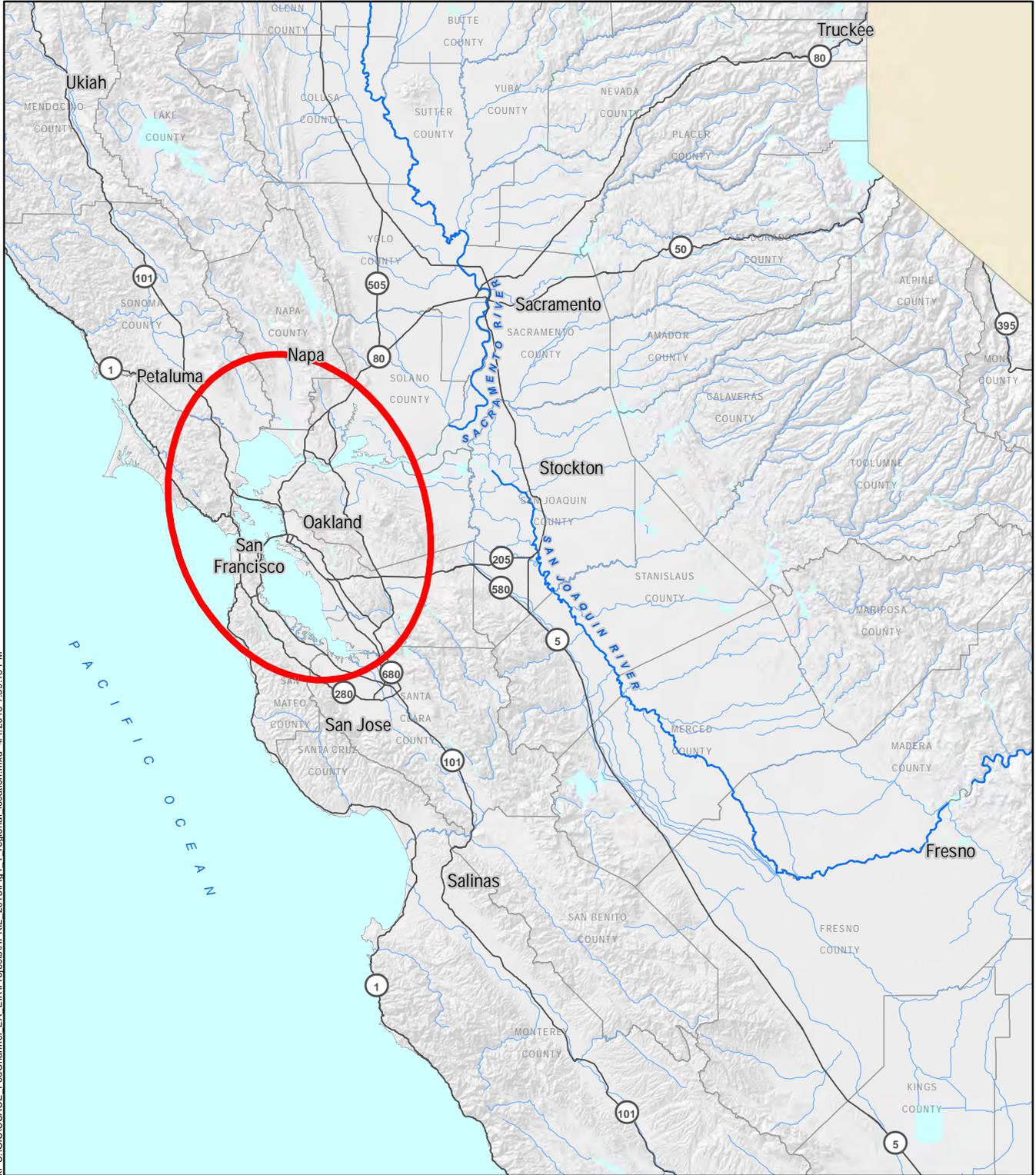
### **1.5.1 Regional Context**

The San Francisco Bay/Delta Estuary (Figure 1-1) is one of the critical maritime thoroughfares in the nation, supporting international trade, commercial and recreational fishing, and recreation. For over a century, navigational channels were created, deepened, and maintained by dredging to enable ships to navigate safely into and out of ports, harbors, and marinas without running aground. A vital USACE mission is to provide a safe, reliable, and efficient waterborne transportation system (federal channels, harbors, and waterways) for the movement of commerce, national security, and recreation. Successfully accomplishing this mission, which requires maintaining the federal channels to their regulatory depths, is critical to the region's maritime trade and to the regional and national economies. In 2010, approximately 63 million tons of commodities, valued at approximately \$68 billion, moved through the federal channels in San Francisco Bay. Dredging the region's channels, ports and associated docking, and berthing and other facilities will continue to be necessary to maintain adequate depths for vessels to maneuver in a safe and efficient manner.

### **1.5.2 Description of USACE Maintained Federal Navigation Channels**

The USACE's maintenance dredging program provides for annual maintenance of six federal channels in the San Francisco Bay Area. The total authorized surface area of these federal channels is 4,866 acres, which is 1.98 percent of the total surface area of San Francisco Bay. There are eleven federal channels in total in San Francisco Bay. They include the six channels dredged annually, and five channels with non-annual dredging cycles, and have a combined surface area of 5,699 acres, which is 2.22 percent of the total surface of San Francisco Bay.

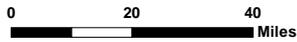
The USACE's Congressionally-authorized maintenance dredging projects in San Francisco Bay are shown on Figures 1-2 and 1-3, and are described below. As further described in Chapter 2, elements of these dredging projects make up USACE's proposed project. Each authorized project comprises individual components, such as channels and turning basins. In general terms, a channel is a deeper course through a river, bay, or other water body. A navigational channel is a deeper channel cut into a river, bay, or other water body to enable vessels to pass through to a port or other destination. Channels are characterized as shallow draft (i.e., equal to or less than 15 feet deep) or deep draft (i.e., greater than 15 feet deep). A turning basin is a wider area of water at the end of a channel to permit vessels to turn around or to enable long barges in a channel to turn a sharp corner.



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Source: URS, 2013.

- Sacramento and San Joaquin Rivers
- Other waterway
- Project vicinity
- County boundary



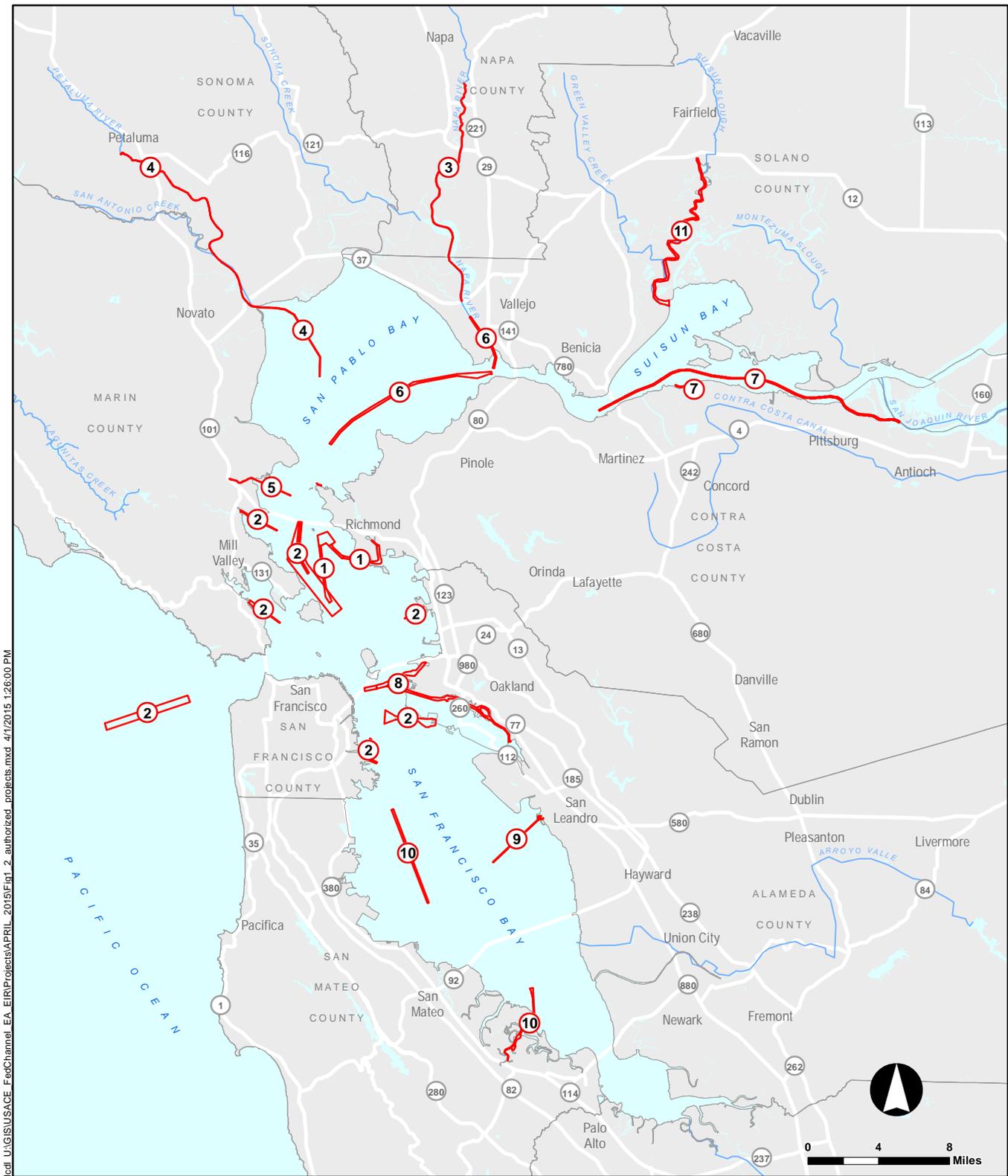
**REGIONAL LOCATION**

Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 Bay Area, California

April 2015



**FIGURE 1-1**



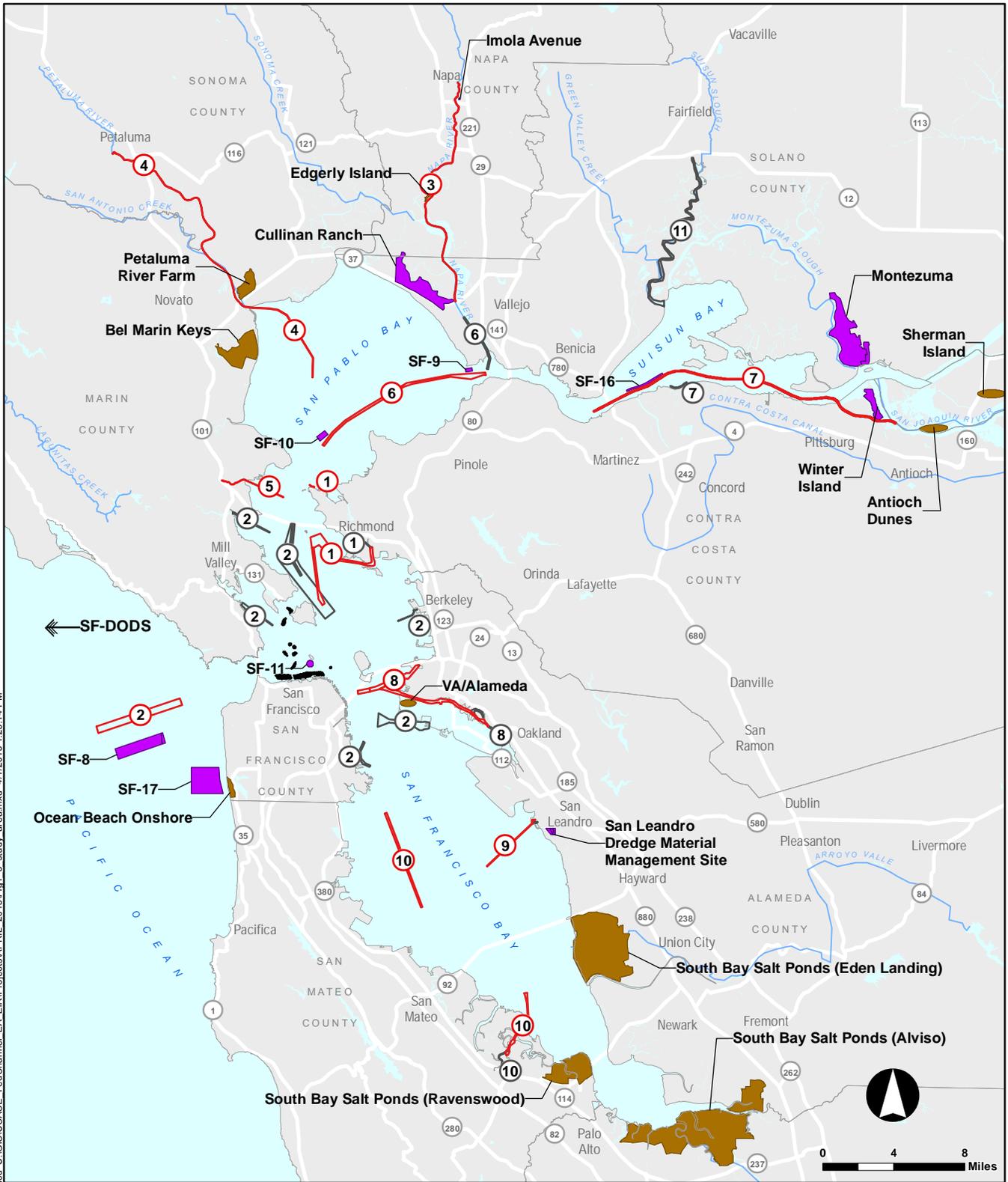
local:\GIS\USACE\_FedChannel\_EA\_EIR\Projects\APRIL\_2015\Fig\_1-2\_authorized\_projects.mxd 4/17/2015 1:26:00 PM  
 Source: URS, 2013.

- |                   |                                    |  |
|-------------------|------------------------------------|--|
| ① Highway         | ① Richmond Harbor                  | ⑦ Suisun Bay Channel                             |
| □ County boundary | ② San Francisco Harbor             | ⑧ Oakland Harbor                                 |
|                   | ③ Napa River Channel               | ⑨ San Leandro Marina (Jack D. Maltester Channel) |
|                   | ④ Petaluma River Channel           | ⑩ Redwood City Harbor                            |
|                   | ⑤ San Rafael Creek Channel         | ⑪ Suisun Slough Channel                          |
|                   | ⑥ San Pablo Bay/Mare Island Strait |  |

**AUTHORIZED PROJECTS**  
 Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 Bay Area, California  
 April 2015



**FIGURE 1-2**



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Source: URS, 2013.

- |   |  |  |
|---|--|--|
| <span style="display: inline-block; width: 15px; height: 10px; background-color: purple; border: 1px solid black;"></span> Existing Placement Site        | <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">1</span> Richmond Harbor                  | <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">7</span> Suisun Bay Channel                             |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: brown; border: 1px solid black;"></span> Potential Future Placement Site | <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">2</span> San Francisco Harbor             | <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">8</span> Oakland Harbor                                 |
| <b>Dredge Locations</b>   | <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">3</span> Napa River Channel               | <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">9</span> San Leandro Marina (Jack D. Maltester Channel) |
| <span style="border: 1px solid red; border-radius: 50%; padding: 2px;"></span> Included in EA/EIR   | <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">4</span> Petaluma River Channel           | <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">10</span> Redwood City Harbor                         |
| <span style="border: 1px solid black; border-radius: 50%; padding: 2px;"></span> Not Included in EA/EIR   | <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">5</span> San Rafael Creek Channel         | <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">11</span> Suisun Slough Channel                         |
| <span style="background-color: black; border: 1px solid black; border-radius: 50%; padding: 2px;"></span> Shoaling Area—Not included in EA/EIR            | <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">6</span> San Pablo Bay/Mare Island Strait |  |

**STUDY AREA**

Federal Navigation Channels EA/EIR  
U.S. Army Corps of Engineers  
Bay Area, California

April 2015

**FIGURE 1-3**

Table 1-1 provides the authorized or regulatory dimensions,<sup>9</sup> type of dredge equipment commonly used, dredging cycle (i.e., frequency of dredging), last fiscal year the project was dredged, and the historic dredged material placement site for each project. Placement sites are described in Sections 1.4.3 and 1.4.4. General descriptions of dredging and disposal practices are presented in Section 2.3.1.

Whether or not dredging is needed at a given site is dependent on shoaling; whether or not dredging is executed is dependent on funding. Shoaling is not constant. Different areas of San Francisco Bay will experience sedimentation at different rates, and sedimentation in any one area will be different from year to year. Similarly, costs and funding for USACE's maintenance dredging program may vary annually. Nationwide, costs for dredging and dredged material management have increased in recent years. USACE's Navigation Construction Index (i.e., measure of cost escalation) has increased by approximately 70 percent since 2000 (LTMS, 2013b), but the cost evaluation conducted for the LTMS 12-year review process did not identify clear patterns or causes for specific costs incurred in the San Francisco Bay Area. For example, USACE's overall costs for contract dredging have followed a trend similar to the national pattern, but there is great variability in costs from project to project, and even from year to year on the same project. Every dredging project has different challenges that can affect cost. Typical issues that can affect cost for any dredging project include design depth; project volume; dredging equipment type; dredge timing; local constraints (such as the ability to work 24 hours per day); competition issues (including equipment availability); distance to disposal or placement sites; and any offloading or placement site costs. A host of other project-specific issues may also be relevant, including, but not limited to, whether sediment rehandling would be involved; special dredging techniques or equipment are needed (e.g., for contaminated sediment or when dredging adjacent to sensitive resources); compensatory mitigation is required (such as when eelgrass is destroyed or take of special status species would occur); or contractors demand a premium for last-minute projects (LTMS, 2013b). Budget availability often affects how early in the dredging window a project can start. Therefore, although USACE's maintenance program includes prescribed dredging cycles for each channel, it is difficult to predict the frequency of dredging for all projects.

## Richmond Harbor

Richmond Harbor consists of the Inner Harbor and Outer Harbor. Construction of the federal channel in Richmond Inner Harbor was authorized by the Rivers and Harbors Act of 1917, as amended. Construction of the Outer Harbor was authorized under the Rivers and Harbors Act of 1935, as amended. The Port of Richmond is the nonfederal sponsor<sup>10</sup> for the Richmond Harbor project.

Richmond Outer Harbor is on the eastern side of central San Francisco Bay within the boundaries of Contra Costa County, with the exception of the Southampton Shoal Channel, which is predominately in San Francisco County. Project maintenance provides for annual dredging of the Outer Harbor Channel 600 feet wide to a depth of 45 feet mean lower low water (MLLW), from Southampton Shoal in central San Francisco Bay to the Richmond Long Wharf, including the Maneuvering Area. Richmond Outer Harbor was last deepened in 1965 to 45 feet MLLW. Richmond Outer Harbor provides deep-draft navigation access to the Richmond Long Wharf and Port of Richmond marine terminals. Deep-draft tankers use the harbor for loading and off-loading petroleum products at the Chevron Long Wharf facility. Last dredged in 2014, Richmond Outer Harbor is typically dredged annually using a hopper dredge, although bucket-clamshell equipment has been used on occasion. Dredged material from the Outer Harbor has typically been less than 80 percent sand, and placed at the Alcatraz Island placement site (SF-11).

<sup>9</sup> Authorized dimensions are the depth and width of the channel authorized by Congress to be constructed and maintained by USACE. These authorized channel dimensions are generally based on maximizing net transportation savings.

<sup>10</sup> The non-federal sponsor is responsible for obtaining the non-federal share of project costs.

<p align="center"><b>Table 1-1</b> <b>USACE Maintenance Dredging Projects in San Francisco Bay</b></p>								
<b>Dredge Location</b>	<b>Authorized or Regulatory Depth (feet below MLLW)<sup>1</sup></b>	<b>Length (feet)</b>	<b>Width (feet)</b>	<b>Area (acre)</b>	<b>Dredge Type</b>	<b>Frequency (years)</b>	<b>Last Dredged (FY)</b>	<b>Historic Placement Site</b>
<b><i>Richmond Harbor</i></b>								
Southampton Shoal	45	6,000	600	550	Hopper/ Clamshell- Bucket	1	2014	SF-11
Outer Harbor at Longwharf	45	Maneuvering area	600	—		1	2014	
Inner Harbor Entrance Channel	41 <sup>2</sup>	20,000	500 – 600	459		1	2014	SF-DODS
Inner Harbor Approach Channel	41 <sup>2</sup>	8,000	500 – 850, plus 1,260-foot radius turning basin at Point Potrero	101		1	2014	
Santa Fe Channel	30	1,000	200	4.6		12	1999	
Point San Pablo Channel <sup>3</sup>	20	2,000	150	6.9		ID	—	
<b><i>San Francisco Harbor</i></b>								
Main Ship Channel (Bar Channel)	55	16,000	2,000	734.6	Hopper	1	2014	SF-8/ SF-17
Marinship Channel (Richardson Bay) <sup>3</sup>	20					ID	1982	
Larkspur Ferry Channel <sup>3</sup>	13	13,500	232			4	2002	
Alameda Point Navigation Channel <sup>3</sup>	37					ID	1994	
Berkeley Marina Channel <sup>3</sup>						ID	—	
Northship Channel <sup>3</sup>	45					ID	—	
West Richmond Channel <sup>3</sup>	45					ID	—	
Islais Creek Shoal <sup>3</sup>	40	2,000	500	23	—	ID	1977	
Presidio Shoal <sup>4</sup>	40	Varying widths and lengths		—	—	—	—	
Black Point Shoal <sup>4</sup>	40		—	—	—	—		
Alcatraz Shoal <sup>4</sup>	40		—	—	—	—		
Point Knox Shoal <sup>4</sup>	35		—	—	—	—		
<b><i>Napa River Channel</i></b>								
Mare Island Strait Causeway to Asylum Slough	15	84,480	100	193.9	Cutterhead- Pipeline	6-10	1999	Upland
Asylum Slough to Third Street	10							

**Table 1-1  
USACE Maintenance Dredging Projects in San Francisco Bay (Continued)**

Dredge Location	Authorized or Regulatory Depth (MLLW) <sup>1</sup>	Length (feet)	Width (feet)	Area (acre)	Dredge Type	Frequency (years)	Last Dredged (FY)	Historic Placement Site
<b><i>Petaluma River Channel</i></b>								
Across the Flats	8	25,000	200	114.8	Cutterhead - Pipeline (River)/ Clamshell – Bucket (Across the Flats)	4-7	1998	SF-10
River Channel	8	77,000	100	353.5		4-7	2003	Upland
<b><i>San Rafael Creek</i></b>								
Across the Flats	8	10,000	100	23.0	Clamshell- Bucket/ Cutterhead- Pipeline	7	2011	SF-11
Inner Canal Channel	6	8,900	60	12.3		4	2011	SF-11/ Winter Island
Turning Basin	6	200	100	0.46		4	2003	
<b><i>San Pablo Bay/Mare Island Strait</i></b>								
Pinole Shoal	35	40,000	600	798.9	Clamshell- Bucket/Hopper	1	2014	SF-10
Mare Island Strait <sup>3</sup>	35	17,000	600 – 1,000	331.7		ID	1994	
<b><i>Suisun Bay Channel (and upper portion of New York Slough)</i></b>								
Main Channel (including Bulls Head Reach)	35	25,000	300-600	594	Hopper	1	2014	SF-16, SF-9
South Seal Island Channel <sup>3</sup>	25	5,600	250	32.1		Infrequent	1994	
New York Slough	35	23,200	400	212		1	2014	
<b><i>Oakland Harbor</i></b>								
Entrance Channel	50	3,600	900	86.9	Clamshell- Bucket	1	2014	SF-DODS/ MWRP/ HWRP
Outer Harbor Channel	50	16,500	900	373.9		1	2014	
Inner Harbor Channel	50	20,000	800	402.1		1	2014	
Brooklyn Basin South Channel	35	14,300	600	186.6	—	—	—	—
Brooklyn Basin North Channel	25	5,000	450	53.5	—	—	—	—
Tidal Canal	18	7,900	300	56.4	—	—	—	—
<b><i>San Leandro Marina (Jack D. Maltester Channel)</i></b>								
Main Access Channel	8	11,088	200	50.9	Cutterhead- Pipeline	4-6	2009	Upland
Interior Access Channel	8	2,112	140	6.8		4-6	2009	Upland
North and Eastern Auxiliary Channels	**De-authorized (Water Resources Development Act, 1992).							

**Table 1-1  
USACE Maintenance Dredging Projects in San Francisco Bay (Continued)**

Dredge Location	Authorized or Regulatory Depth (MLLW) <sup>1</sup>	Length (feet)	Width (feet)	Area (acre)	Dredge Type	Frequency (years)	Last Dredged (FY)	Historic Placement Site
<b>Redwood City Harbor</b>								
Entrance Channel	30	13,900	300 – 350	103.7	Clamshell-Bucket/ Hopper (San Bruno Channel)	2	2014	SF-11
Outer Turning Basin	30	2,200	400 – 900	30.3		2	2014	
Connecting Channel	30	1,300	400	11.9		2	2014	
Inner Turning Basin	30	1,700	900	35.1		2	2014	
Inner Channel <sup>5</sup>	30	7,000	150	24.1		1	2011	
San Bruno Channel	30	1,800	510	21.1		Infrequently	2005	
<b>Suisun Slough Channel</b>								
Suisun Slough Channel <sup>3</sup>	8	68,640	125	197.0	Pipeline and Bucket	ID	1991	Upland
<p>Notes:</p> <p>— = Information not available; however, the San Francisco Bay Long-Term Management Strategy is working to provide missing information.</p> <p>EA/EIR = Environmental Assessment/Environmental Impact Report</p> <p>FY = fiscal year</p> <p>HWRP = Hamilton Wetlands Restoration Project (in Marin County, and currently full and closed)</p> <p>ID = indefinite deferral</p> <p>MLLW = mean lower low water</p> <p>MWRP = Montezuma Wetlands Restoration Project (in Solano County)</p> <p>SF-8 = San Francisco Bar Channel Disposal Site (ocean site)</p> <p>SF-9 = Carquinez Strait placement site (in-Bay site)</p> <p>SF-10 = San Pablo Bay placement site (in-Bay site)</p> <p>SF-11 = Alcatraz Island placement site (in-Bay site)</p> <p>SF-16 = Suisun Bay placement site (in-Bay site)</p> <p>SF-17 = Ocean Beach placement site (nearshore site, includes the Ocean Beach demonstration site)</p> <p>SF-DODS = San Francisco Deep Ocean Disposal Site (approximately 55 miles [48 nautical miles] west of Golden Gate)</p> <p>USACE = United States Army Corps of Engineers</p> <p>Winter Island = Beneficial reuse site on Delta Island</p> <p><sup>1</sup> Some federally authorized channels are not maintained to their authorized depth.</p> <p><sup>2</sup> Channel is authorized to 41 feet MLLW, but, maintained to 38 feet MLLW.</p> <p><sup>3</sup> Represents dredge locations that are not anticipated to require maintenance dredging in the planning horizon and therefore, will not be included in the EA/EIR.</p> <p><sup>4</sup> Shoal location where rocks were removed.</p> <p><sup>5</sup> Channel not presently maintained by USACE.</p>								
Indicates dredge project location that will not be dredged by USACE in the planning horizon of this EA/EIR								

The Richmond Inner Harbor (Figure 1-4) is on the eastern side of central San Francisco Bay within the boundaries of Contra Costa County. The Inner Harbor consists of the Inner Harbor Entrance Channel, Inner Harbor Approach Channel, and Santa Fe Channel. Project maintenance provides for annual dredging of the Inner Harbor Entrance Channel 600 feet wide to 38 feet MLLW to Point Richmond; the Inner Harbor Approach Channel 500 feet wide to 38 feet MLLW to a 1,260-foot-diameter turning basin at Point Potrero, and then 850 feet wide to 38 feet MLLW to the Santa Fe Channel; and the Santa Fe Channel, which is 200 feet wide and 30 feet MLLW deep. Richmond Inner Harbor was last deepened in 1998. The current depth of the entire Inner Harbor is 38 feet MLLW, with an allowable overdepth of 2 feet; the Inner Harbor has not previously been dredged to—nor is it maintained at—its federally authorized depth of 41 feet MLLW. The Inner Harbor Channel provides commercial navigation access to privately owned and City of Richmond-owned marine terminals, including the Point Potrero Marine Terminal. Richmond Inner Harbor, with the exception of the Santa Fe Channel, is typically dredged annually using clamshell-bucket equipment. Richmond Inner Harbor was last dredged in 2014, except for the Santa Fe Channel, which has not been dredged since 1999. Dredged material from the Inner Harbor has typically been less than 80 percent sand, and placed at SF-DODS and SF-11. The Santa Fe Channel is not anticipated to be dredged within the planning horizon (i.e., 2015 through 2024), and therefore is not a part of the proposed project, and not addressed in this EA/EIR.

### **San Francisco Harbor – Main Ship Channel (Bar Channel)**

San Francisco Harbor consists of a deep-draft navigation channel (the Main Ship Channel) immediately offshore San Francisco Bay on the San Francisco Bar; and in-Bay components.

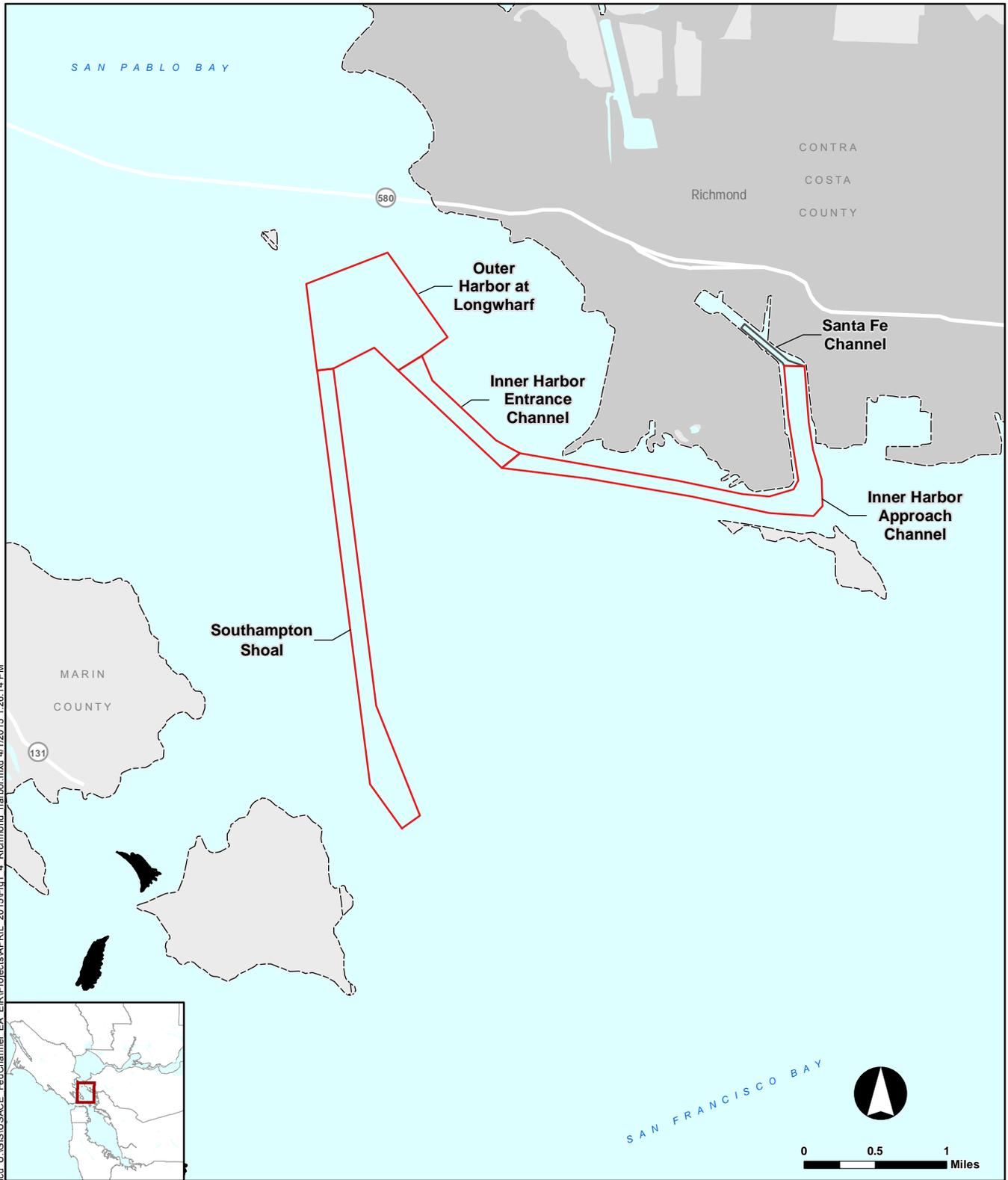
Construction of a federal channel on the San Francisco Bar was authorized by the Rivers and Harbors Act of 1935, as amended, Pub. L. No. 74-409, 49 Stat. 1028 (August 30, 1935). The Main Ship Channel (MSC) was last deepened in 1974. Current project depth is 55 feet MLLW, with an allowable overdepth of 2 feet. As a regional multi-user channel, the MSC does not have a nonfederal sponsor.

The MSC (Figure 1-5) is approximately 5 miles west of the Golden Gate Bridge, and extends across the arc-shaped, submerged, San Francisco Bar in the Gulf of the Farallones. It is approximately 16,000 feet long and 2,000 feet wide. The MSC is the only deep-draft ocean entrance to San Francisco Bay, and is used by all ocean-going shippers to San Francisco Bay and inland ports. It is typically dredged annually, and was last dredged in 2014. The MSC must be dredged with a hopper dredge because it is the only type of dredge that can safely operate at this channel, because of the combination of the depth of the channel and open-sea wave conditions. Even with the hopper dredge, bad weather conditions can preempt dredging of the MSC because of safety considerations. Dredged material from the MSC is greater than 80 percent sand, and has been placed at SF-8 and the nearshore Ocean Beach placement site (SF-17).

In-Bay components of San Francisco Harbor include Marinship Channel in Richardson Bay, Larkspur Ferry Channel, Alameda Point Navigation Channel, Berkeley Marina Channel, Northship Channel, West Richmond Channel, and several shoal areas. These areas are not anticipated to be dredged within the planning horizon, and therefore are not a part of the proposed project, and not addressed in this EA/EIR.

### **Napa River**

The Napa River consists of a downstream reach from Mare Island Strait Causeway to Asylum Slough, and an upstream reach from Asylum Slough to Third Street. This project (Figure 1-6) is a shallow-draft, predominately light commercial and recreational channel. The Rivers and Harbors Acts of August 30, 1935 and July 24, 1946 authorized construction and maintenance of the navigation channel in the Napa River. The Napa County Flood Control and Water Conservation District is the nonfederal sponsor for the Napa River project.



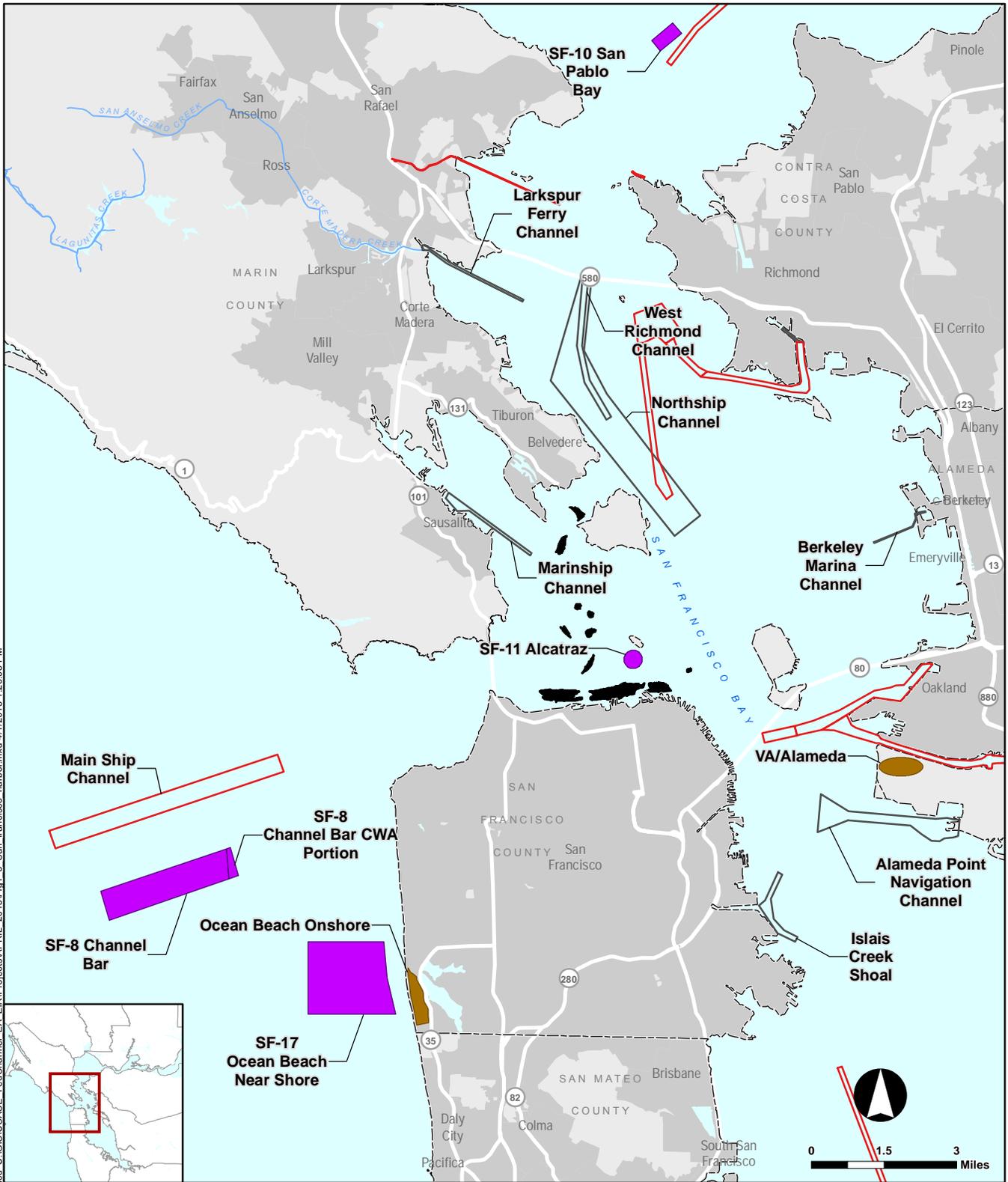
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 Source: URS, 2013.

- ① Highway
- County boundary
- ▭ Dredge Locations Included in EA/EIR
- ▭ Dredge Locations Not Included in EA/EIR
- Shoaling Dredge Area – Not included in EA/EIR

**RICHMOND HARBOR**  
 Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 April 2015  
 Bay Area, California



**FIGURE 1-4**



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 Source: URS, 2013.

- ① Highway
- Existing Placement Site
- Potential Future Placement Site
- County boundary
- Dredge Locations Included in EA/EIR
- Dredge Locations Not Included in EA/EIR
- Shoaling Dredge Area – Not included in EA/EIR

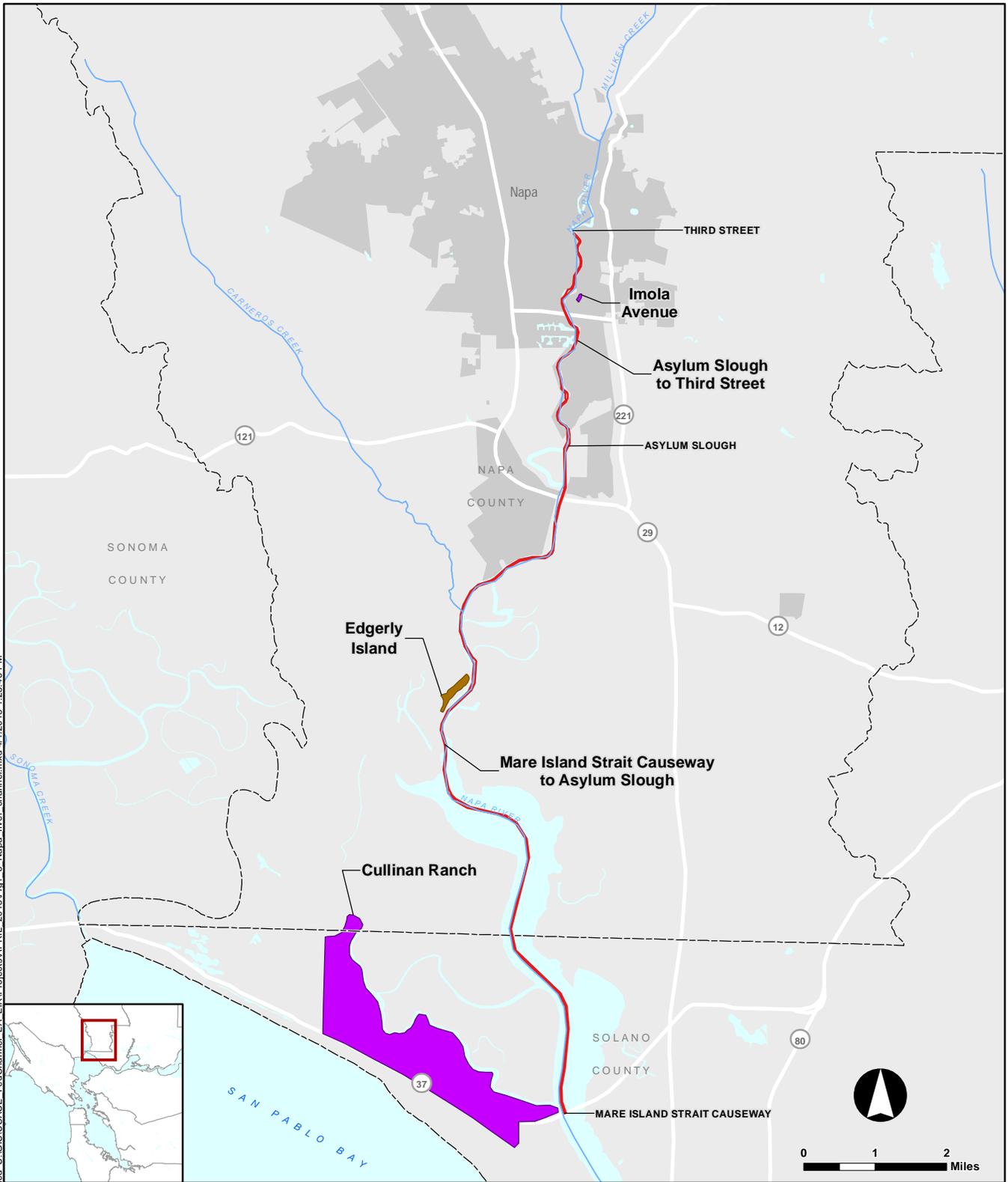
**SAN FRANCISCO HARBOR**

Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 Bay Area, California

April 2015



**FIGURE 1-5**



I:\GIS\USACE\_FedChannel\_EA\_EIR\Projects\APRIL\_2015\Fig1\_6\_Napa\_river\_channel.mxd 4/1/2015 1:25:46 PM  
 Source: URS, 2013.

- ① Highway
- Existing Placement Site
- Potential Future Placement Site
- County boundary
- Dredge Locations Included in EA/EIR

**NAPA RIVER CHANNEL**  
 Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 April 2015  
 Bay Area, California



**FIGURE 1-6**

Project maintenance provides for dredging of the Napa River Channel to a depth of 15 feet MLLW from Mare Island Strait Causeway to Asylum Slough, and to a depth of 10 feet MLLW to the head of navigation at the Third Street Bridge in the City of Napa; the channels were deepened to these depths in 1952. The project is approximately 100 feet wide and 16 miles long. Dredging has historically been conducted using a hydraulic cutterhead dredge. Dredged material from the Napa River has typically been less than 80 percent sand, and placed at the sponsor-provided upland sites. The Napa River is on a 6-year dredging cycle. The Napa River has not been dredged since 1999 because of insufficient funds, and is considered overdue for dredging.

### **Petaluma River**

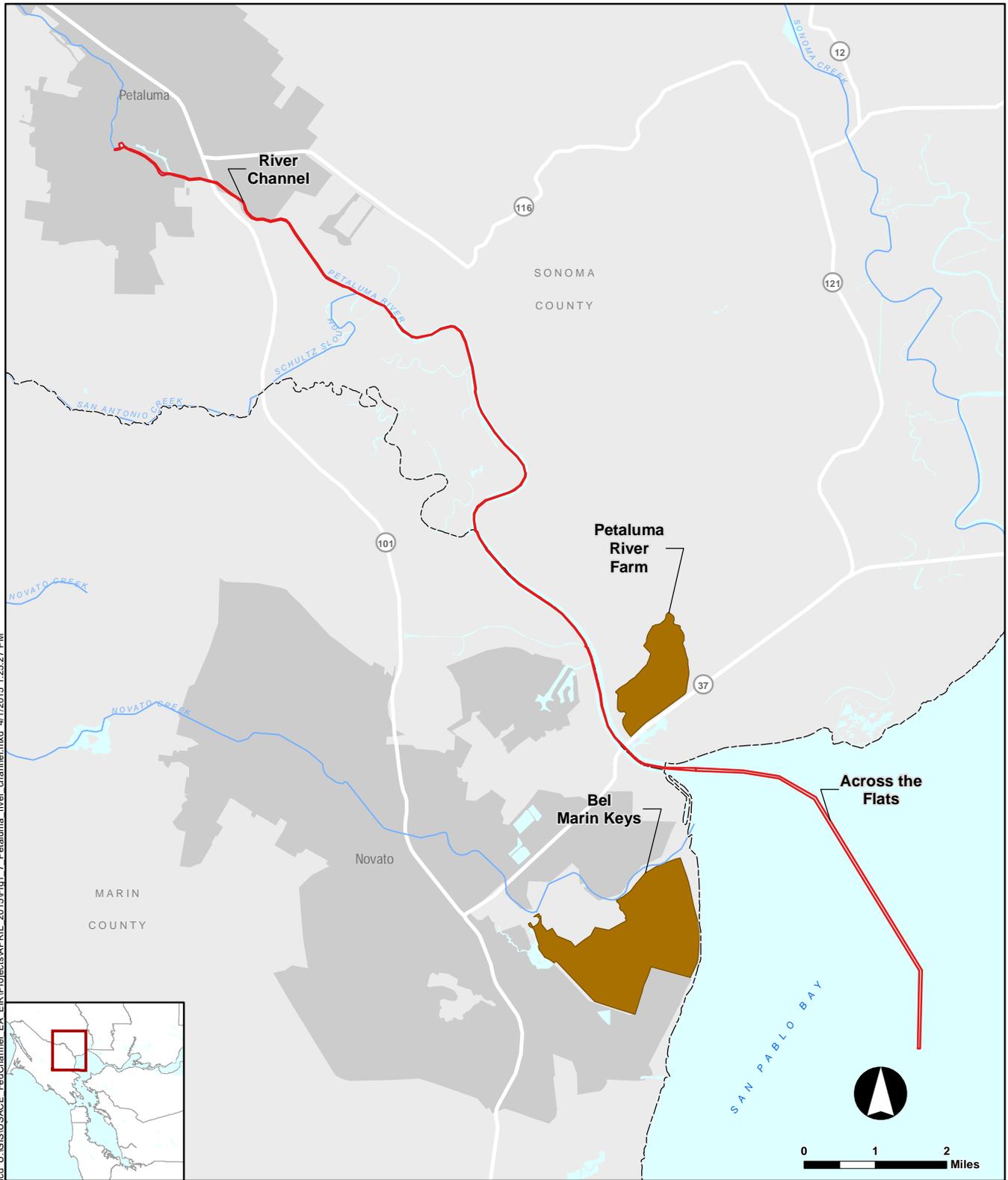
The Petaluma River project consists of two segments: one known as “Across the Flats” starting in San Pablo Bay and going up to the mouth of the river; and another in the river channel. The Petaluma River Channel was authorized by the Rivers and Harbors Act of 1930, as amended. The Petaluma River (Figure 1-7) is in Sonoma and Marin counties, California, on San Pablo Bay. The City of Petaluma is the nonfederal sponsor for the Petaluma River project.

Project maintenance provides for dredging the channel 200 feet wide to a depth of 8 feet MLLW for the Across the Flats segment, and 100 feet wide to 8 feet MLLW thereafter to Western Avenue in Petaluma (River Channel), including a turning basin 300 to 400 feet wide to 8 feet MLLW. Both segments were initially dredged to a depth of 8 feet MLLW in 1933. Dredging has been conducted using clamshell-bucket equipment for Across the Flats, and a hydraulic cutterhead dredge for the upriver channel. Dredged material from Across the Flats has typically been less than 80 percent sand, and placed at the San Pablo Bay placement site (SF-10). Dredged material from the upriver channel has typically been less than 80 percent sand, and placed at sponsor-provided upland sites. The Across the Flats Channel is on a 3-year dredging cycle, and the River Channel is on a 4-year dredging cycle. The Petaluma River Channel has not been dredged since 2003 because of insufficient funds, and Across the Flats has not been dredged since 1998; these areas are considered overdue for dredging.

### **San Rafael Creek**

San Rafael Creek consists of the Across the Flats Channel, Inner Canal Channel, and a 200-foot-wide turning basin near the western terminus of the Inner Canal Channel. San Rafael Creek (Figure 1-8) is north of San Francisco Bay in Marin County. This project is a shallow-draft, predominately light commercial and recreational channel. The existing federal project for the construction and maintenance of the Across the Flats Channel, the Inner Canal Channel, and the turning basin was authorized by the Rivers and Harbors Act of March 2, 1919. The channels were deepened in 1925. The City of San Rafael is the nonfederal project sponsor.

Project maintenance provides for dredging the Across the Flats Channel in San Francisco Bay to the mouth of San Rafael Creek to a depth of 8 feet MLLW (plus 2 feet of allowable overdepth); and 6 feet MLLW (plus 2 feet of allowable overdepth) for the Inner Canal Channel to the head of navigation at the Grand Street Bridge in the City of San Rafael. On average, Across the Flats is dredged every 7 years, and the Inner Canal Channel and turning basin are dredged every 4 years. Across the Flats was last dredged in 2012 to a depth of 5 feet MLLW. The Inner Canal Channel was last dredged in 2011; the turning basin was last dredged in 2003. Dredging has historically been conducted using clamshell-bucket equipment or a hydraulic cutterhead dredge. Dredged material has typically been less than 80 percent sand, and placed at SF-11. In 2002 and 2010, sampling and testing of the shoaled sediment revealed that upstream of Station 175+00 in the Inner Canal Channel, pesticide and PCB concentrations were at levels that are not suitable for in-Bay placement; this material was placed at Winter Island in 2002. Downstream of Station 175+00, the shoaling is relatively “clean,” and deemed suitable for in-Bay placement. Follow-up analysis in June 2011 confirmed that there has been no downstream migration of the contaminated sediment beyond Station 175+00 since the 2010 sampling and testing event.



I:\GIS\USACE\_FedChannel\_EA\_EIR\Projects\APRIL\_2015\Fig1\_7\_Petaluma\_river\_channel.mxd 4/1/2015 1:26:27 PM  
 Source: URS, 2013.

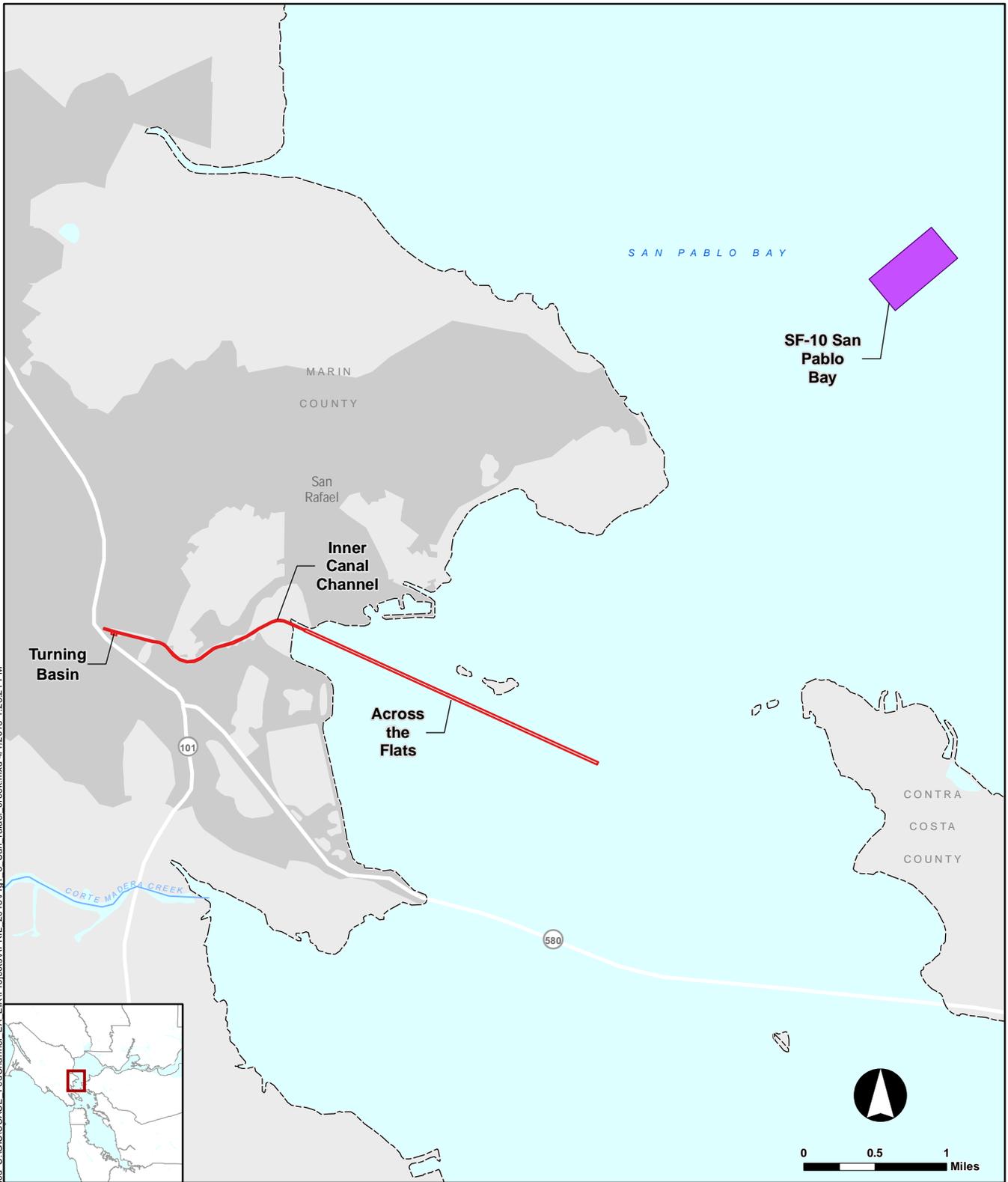
- 1 Highway
- Potential Future Placement Site
- County boundary
- Dredge Locations Included in EA/EIR

### PETALUMA RIVER CHANNEL

Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 April 2015  
 Bay Area, California



**FIGURE 1-7**



I:\GIS\USACE\_FedChannel\_EA\_EIR\Projects\APRIL\_2015\Fig1\_8\_San\_Rafael\_creek.mxd 4/1/2015 1:25:21 PM  
 Source: URS, 2013.

-  Highway
-  County boundary
-  Dredge Locations Included in EA/EIR
-  Existing Placement Site

**SAN RAFAEL CREEK**

Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 April 2015  
 Bay Area, California

**URS**

**FIGURE 1-8**

## San Pablo Bay and Mare Island Strait

The San Pablo Bay and Mare Island Strait project consists of the Pinole Shoal Channel and Mare Island Strait. The Pinole Shoal Channel (Figure 1-9) is in Contra Costa County, in southern San Pablo Bay. The federal Pinole Shoal Channel was authorized by the Rivers and Harbors Act of 1917, as amended. As a regional multi-user channel, the Pinole Shoal project does not have a nonfederal sponsor.

Pinole Shoal Channel provides deep-draft navigation in and through San Pablo Bay, and is an integral part of the San Francisco Bay to Stockton project (i.e., navigation channel). Shipping operations out of the Port of Stockton, Port of Sacramento, Suisun Bay, San Pablo Bay, and Carquinez Strait make the channel a significant waterway. In addition to being a major link in the navigation system to inland ports of Sacramento and Stockton, the Pinole Shoal Channel allows deep-draft access to several oil refineries adjacent in the vicinity of Carquinez Strait. Pinole Shoal Channel is used for commercial traffic, including deep-draft, merchant, and oil tanker vessels. It also provides navigational access for recreational boaters to many marinas and small individual docks.

The San Pablo Bay project provides for maintenance dredging of: (1) a 600-foot-wide channel to a depth of 35 feet MLLW, which is approximately 11 miles long, in San Pablo Bay across Pinole Shoal with a maneuvering area adjacent to Oleum Pier at the mouth of Carquinez Strait (i.e., the Pinole Shoal Channel); (2) a 600-foot-wide channel to 30 feet MLLW through Mare Island Strait, flaring to a turning basin generally 1,000 feet wide, from former dike number 6 to within 75 feet south of the causeway between Mare Island and Vallejo; (3) a channel to 30 feet MLLW up the Napa River, except (4) at the northerly end, at the City of Vallejo Marina, where the project depth is 26 feet MLLW.

The Pinole Shoal Channel is typically dredged annually using a hopper dredge; however, bucket-clamshell equipment has occasionally been used to dredge the channel. Pinole Shoal Channel was last dredged in 2014. The sediment composition of dredged material from Pinole Shoal Channel varies along the channel, with the eastern and western ends of the channel typically being sandy. Dredged material from Pinole Shoal Channel is typically placed at SF-10.

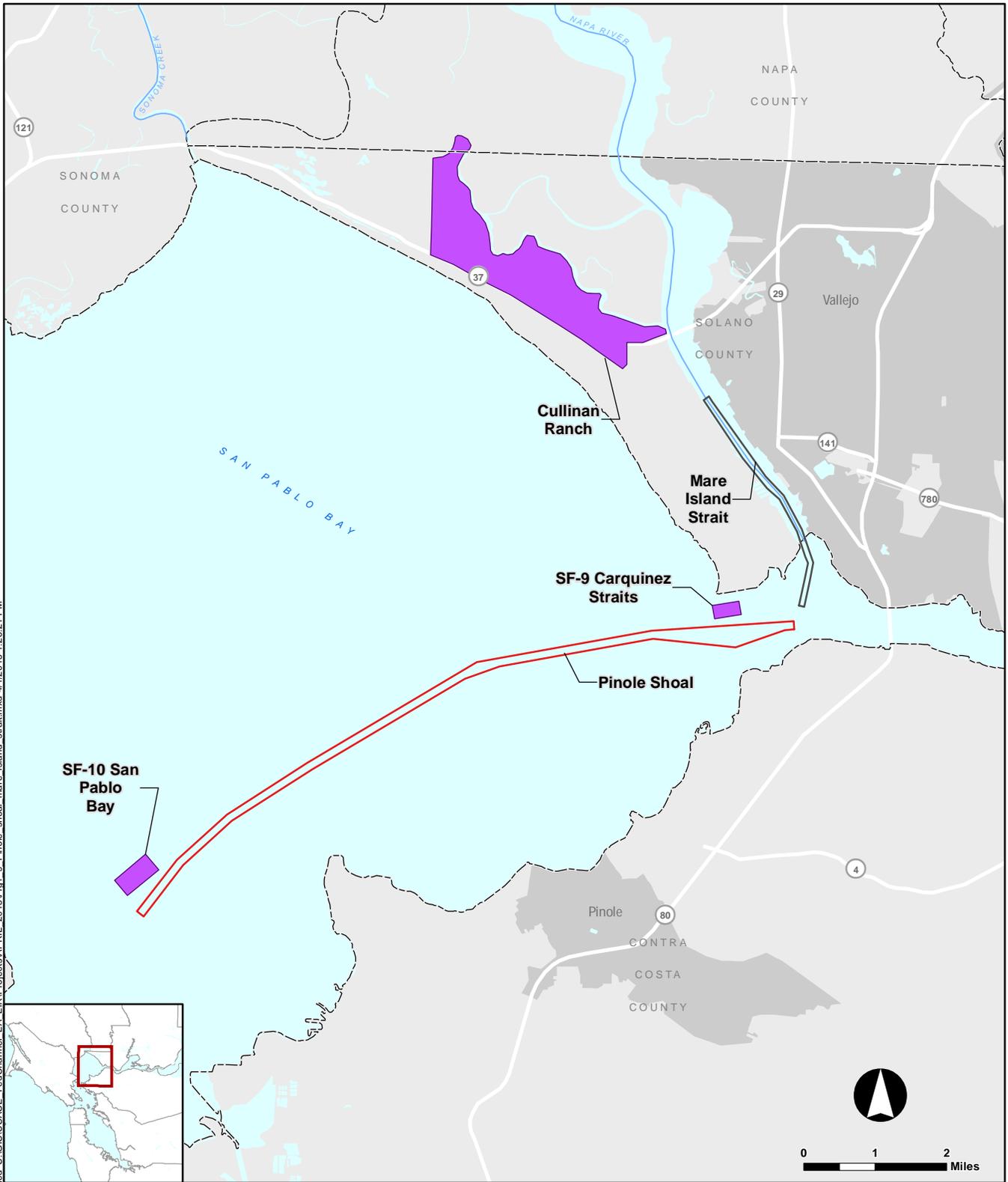
The channel is authorized for a depth of 45 feet MLLW, but is only maintained to a depth of 35 feet MLLW plus 2 feet of allowable overdepth (i.e., total maintained depth of 37 feet MLLW). In 2009 and 2010, USACE conducted 2 feet of advance maintenance in areas that tended to aggressively shoal. This included the southern edge of the channel, between buoy markers 10 and 12; and further east along the northern edge of the channel, starting at buoy marker 11 to just east of buoy 13. The extent of the advance maintenance dredging in these two areas was 200 feet wide and 2 feet deep.

Beginning in 2011, the lower end of Pinole Shoal Channel was slightly realigned to the north. The realigned channel experiences substantially less shoaling than the old alignment, and thus requires less dredging. Since the realignment of the channel, advance maintenance has not been required.

The Mare Island Strait portion of this authorized project is not anticipated to be dredged within the planning horizon, and therefore is not a part of the proposed project, and not addressed in this EA/EIR.

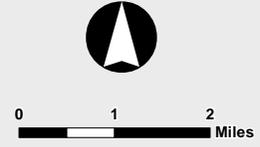
## Suisun Bay Channel and New York Slough

Suisun Bay Channel consists of Bulls Head Reach, Suisun Bay Main Channel, New York Slough, and the South Seal Island Channel. The Suisun Bay Channel (Figure 1-10) is in Suisun Bay, 30 miles northeast of San Francisco, in the counties of Contra Costa and Solano. The Rivers and Harbors Act of 1919 authorized the construction of a federal channel in Suisun Bay. Construction of the New York Slough Channel was authorized by the Rivers and Harbors Act of 1927, as amended. Suisun Bay Channel was deepened to 35 feet MLLW in 1960; Bulls Head Reach and New York Slough were deepened to 35 feet MLLW in 1968. Contra Costa County is the nonfederal project sponsor.



I:\GIS\USACE\_FedChannel\_EA\_EIR\Projects\APRIL\_2015\Fig1\_9\_Pinole\_shoal\_mare\_island\_strait.mxd 4/12/2015 1:26:21 PM  
 Source: URS, 2013.

- 1 Highway
- Placement site
- County boundary
- Dredge Locations Included in EA/EIR
- Dredge Locations Not Included in EA/EIR



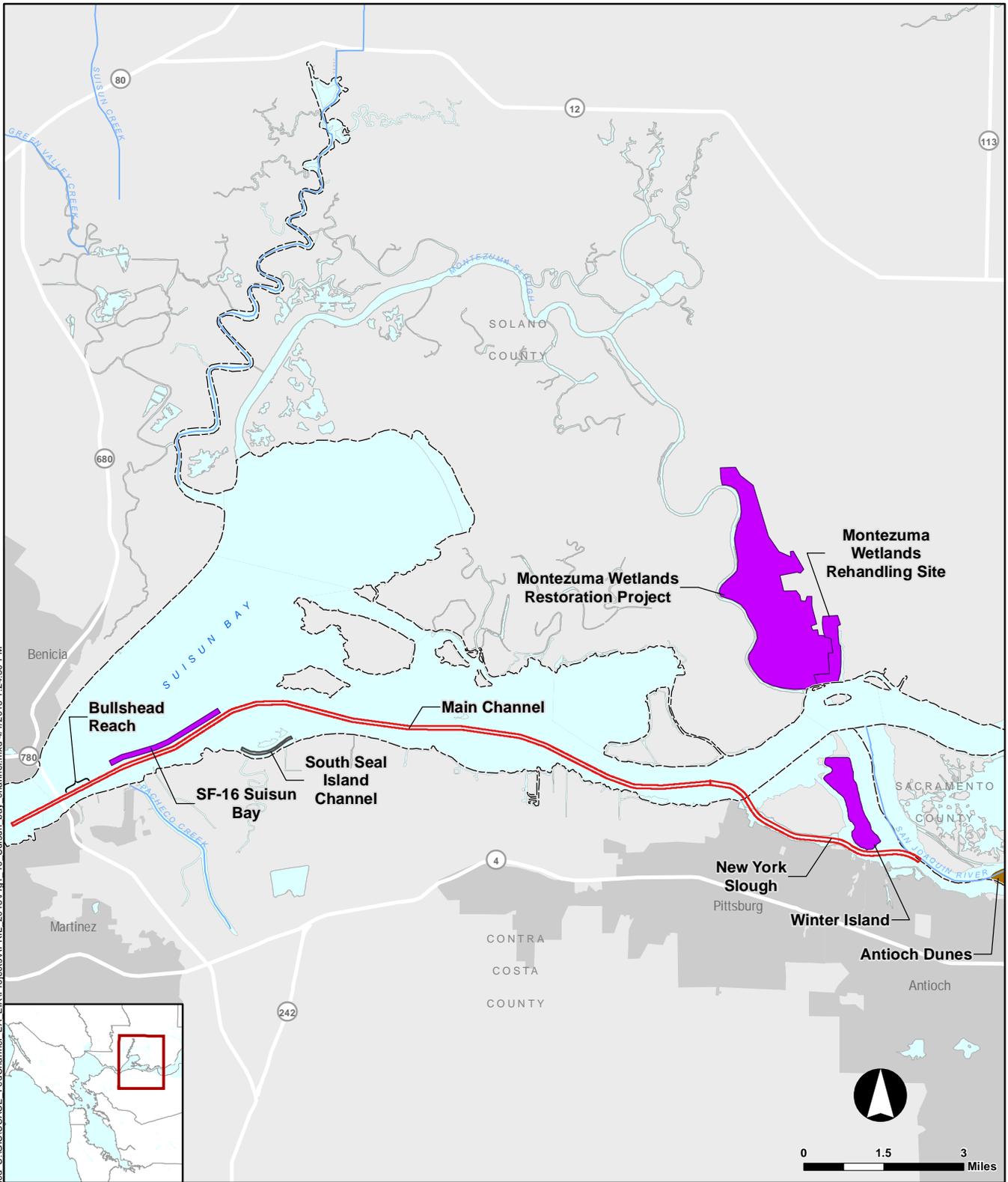
**SAN PABLO BAY AND MARE ISLAND STRAIT**

Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 Bay Area, California

April 2015



**FIGURE 1-9**



I:\GIS\USACE\_FedChannel\_EA\_EIR\Projects\APRIL\_2015\Fig1\_10\_Suisun\_bay\_channel.mxd 4/1/2015 1:24:30 PM  
 Source: URS, 2013.

- ① Highway
- Existing Placement Site
- Potential Future Placement Site
- County boundary
- Dredge Locations Included in EA/EIR
- Dredge Locations Not Included in EA/EIR

**SUISUN BAY CHANNEL**

Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 Bay Area, California

April 2015



**FIGURE 1-10**

The channel is an integral part of the San Francisco Bay to Stockton project, providing deep-draft access to the Pacific Ocean from the inland ports of Stockton and Sacramento. The 300-foot-wide Main Channel runs 25,000 feet along the southern shore of Suisun Bay through Point Edith and Middle Ground Shoals to the mouth of New York Slough at Pittsburg, and includes Bulls Head Reach, which extends from the Benicia Bridge to the Avon Pier. New York Slough stretches from Pittsburg to Antioch, a distance of approximately 4 miles. The Suisun Bay Channel and New York Slough are maintained to a depth of 35 feet MLLW. The Main Channel and New York Slough are typically dredged annually using a hopper dredge and were last dredged in 2014. Dredged material from Suisun Bay Channel has typically been greater than 80 percent sand, and placed at the Suisun Bay placement site (SF-16) and occasionally the Carquinez Strait placement site (SF-9).

At Bulls Head Reach, past maintenance has included dredging up to 4 feet of advance maintenance material to accommodate rapid shoaling. Because of the variable shoaling rate at this location, this practice is reviewed annually to determine if it remains effective. In the case of Bulls Head Reach Shoal, USACE typically elects to perform advance maintenance every year because that area shoals faster than the annual dredging cycle, and it is essential for USACE to maintain the utility of the channel as long as possible before needing to address any shoaling issues outside of the work window. In recent years, advance maintenance at Bulls Head Reach has reduced USACE's critical dredging episodes outside of the work window.

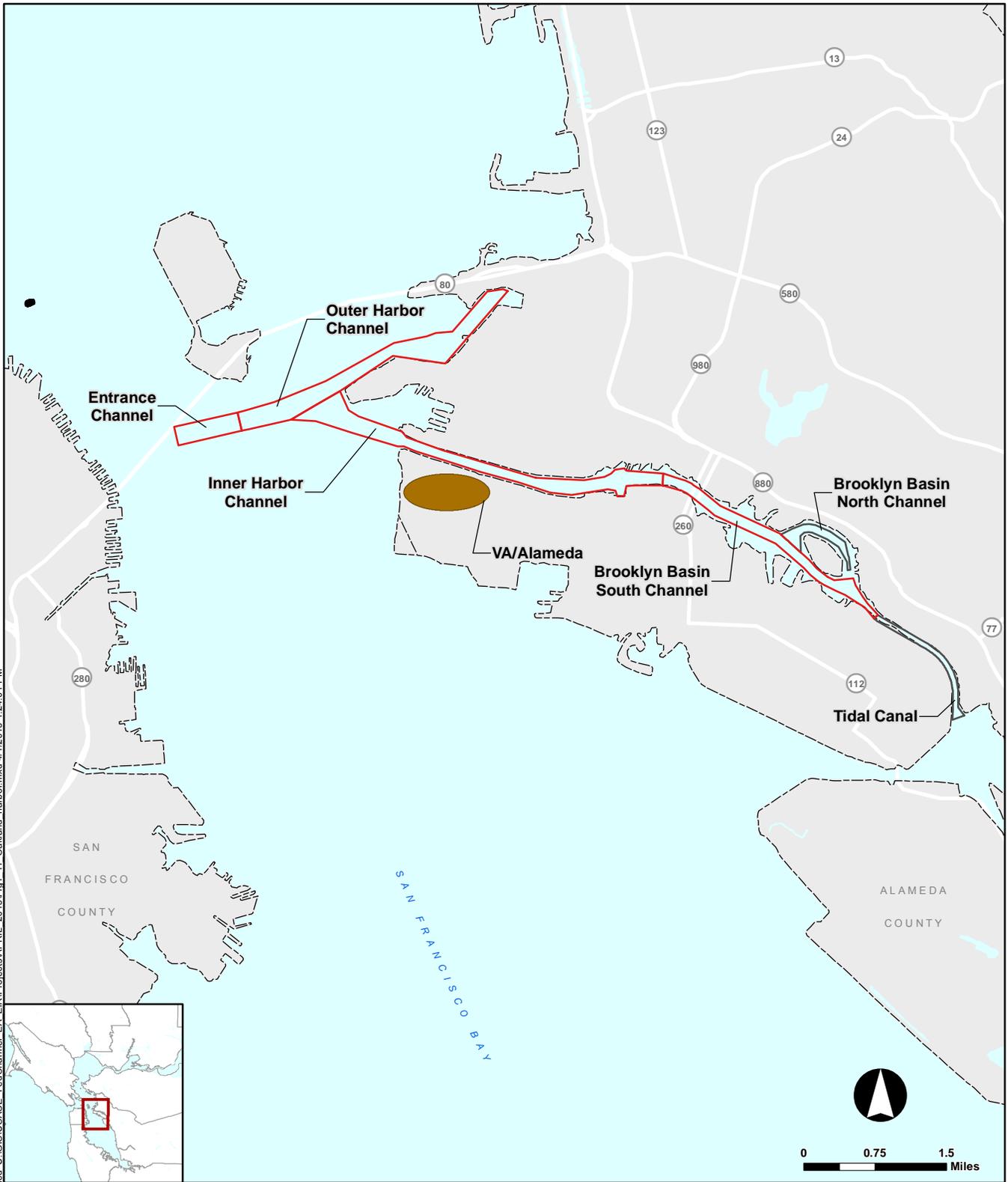
The South Seal Island portion of this project is not anticipated to be dredged within the planning horizon; it therefore is not a part of the proposed project, and not addressed in this EA/EIR.

## **Oakland Harbor**

Oakland Harbor includes the Entrance Channel, Outer Harbor Channel, Inner Harbor Channel, Brooklyn Basin South Channel, Brooklyn Basin North Channel, and Tidal Canal. Oakland Harbor (Figure 1-11) is in the City of Oakland, on the eastern shore of central San Francisco Bay immediately south of the San Francisco-Oakland Bay Bridge. Construction of, improvements to, and maintenance dredging of the federal project were accomplished pursuant to the following authorities: Rivers and Harbors Act of 1910; Rivers and Harbors Appropriations Act of 1917; Rivers and Harbors Act of 1927; Rivers and Harbors Act of 1930; Rivers and Harbor Acts of 1945; Rivers and Harbors Act of 1962; and the Water Resources Development Act of 1986. Deepening of the Entrance Channel, Outer Harbor Channel, and Inner Harbor Channel to 50 feet MLLW was completed early in 2010. The Port of Oakland is the nonfederal sponsor for the Oakland Harbor project.

The Entrance Channel, Outer Harbor Channel, and Inner Harbor Channel are typically dredged annually using clamshell-bucket equipment; these areas were last dredged in 2014. Dredged material from Oakland Harbor has typically been less than 80 percent sand. Prior to 1999, all dredged material from Oakland Harbor was placed at SF-11; since 1999, it has been placed at SF-DODS, Montezuma Wetlands Restoration Project, Hamilton Wetlands Restoration Project and SF-11.

Brooklyn Basin was historically used as a turning basin. It has an authorized depth of 35 feet MLLW. While in use, it required little dredging as a result of the number of ships that used it for turning, which created currents to push sediment out of the area. When the Oakland Channel was deepened to 42 feet MLLW in 1998 and a new turning basin was dredged near Howard Terminal, the use of Brooklyn Basin diminished. The basin has not been used by commercial deep-draft vessels since the Oakland channel was deepened to 50 feet MLLW. As a result, Brooklyn Basin has not required dredging. The primary vessels using the Inner Harbor Channel beyond the Howard Terminal are operated by the U.S. Coast Guard. The U.S. Coast Guard has requested that USACE maintain the Brooklyn Basin South Channel to the authorized depth of 35 feet MLLW in support of the fleet of National Security Cutters. The USACE would dredge Brooklyn Basin based on shoaling and the availability of funding in the 10-year planning horizon.



I:\GIS\USACE\_FedChannel\_EA\_EIR\Projects\APRIL\_2015\Fig1\_11\_Oakland\_harbor.mxd 4/1/2015 1:24:01 PM  
 Source: URS, 2013.

- ① Highway
- Potential Future Placement Site
- County boundary
- Dredge Locations
- ▭ Included in EA/EIR
- ▭ Not Included in EA/EIR
- Shoaling Dredge Area – Not included in EA/EIR

The North Channel and Tidal Canal portions of the Oakland Harbor project are not anticipated to be dredged within the planning horizon, and therefore are not a part of the proposed project, and not addressed in this EA/EIR.

### **San Leandro Marina (Jack D. Maltester Channel)**

The Jack D. Maltester federally authorized channels are located in the San Leandro Marina, on the eastern shore of South San Francisco Bay, in the city of San Leandro, Alameda County (Figure 1-12). The project includes the Main Access Channel and Interior Access Channel. The City of San Leandro is the nonfederal sponsor for the San Leandro Marina project. Authorization to construct the San Leandro Marina federal channels was provided by Section 201 of the Flood Control Act of 1965, 89 Pub. L. No. 298, and approved by resolution adopted by the Committee on Public Works and Transportation of the House of Representatives on June 22, 1971, and by the Committee on Environment and Public Works of the Senate on December 15, 1970; the authorization was modified by Section 102 of the Water Resources Development Act of 1992. The channels were last deepened in 1965. The authorized project depth is 8 feet MLLW. However, because of the sponsor's inability to contribute the full amount of matching funds required to dredge to authorized depths during the initial deepening project, the channels are federally maintained at depths proportionate to the sponsor's matching funds.

Project maintenance provides for dredging of the 200-foot-wide Main Access Channel to 6 and 7 feet MLLW, and the 140-foot-wide Interior Access Channel to 7 feet MLLW. Last dredged in 2009, these channels are typically dredged every 4 to 6 years using a cutterhead dredge. Dredged material has typically been less than 80 percent sand, and placed at a sponsor-provided upland site.

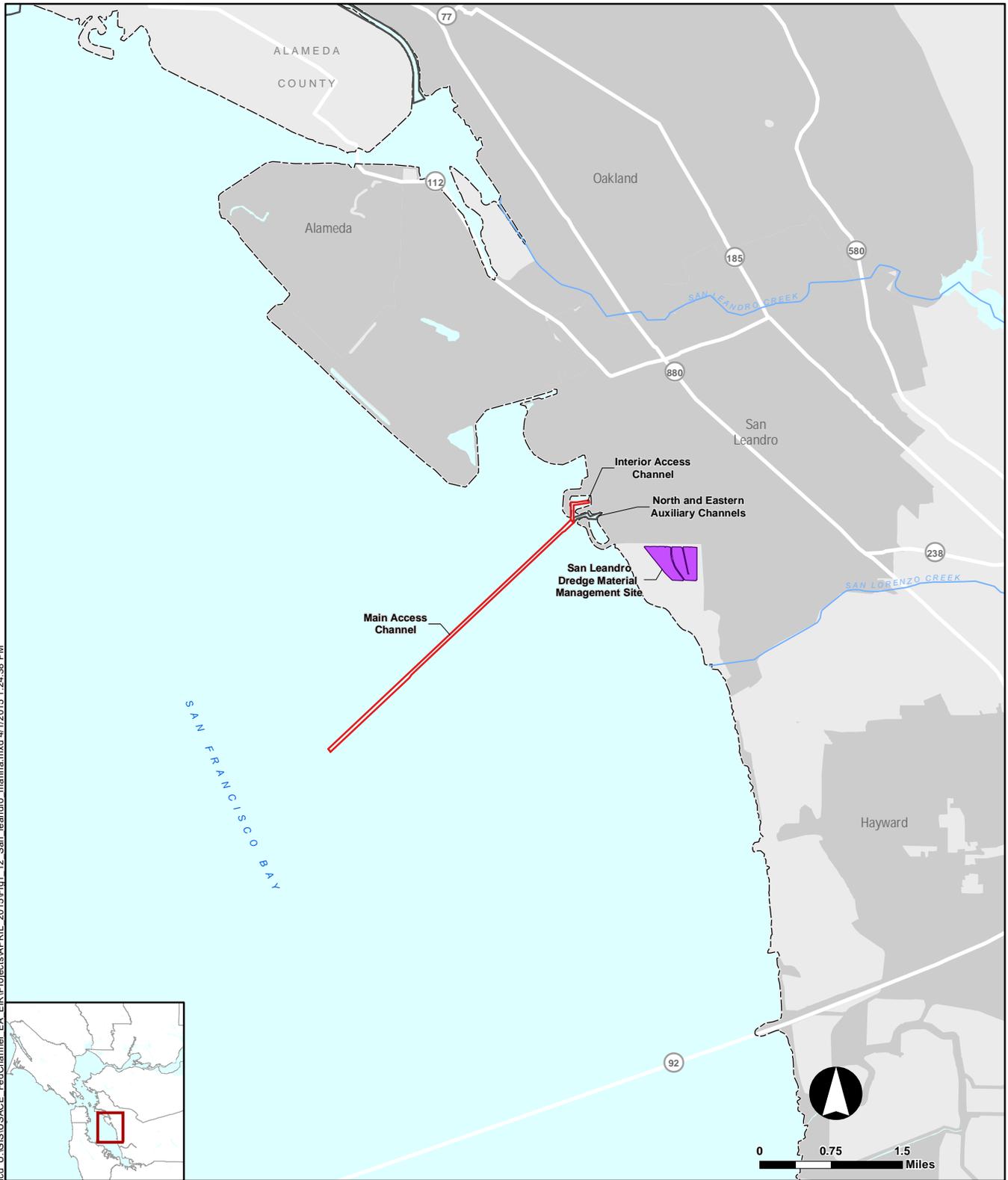
The federally authorized channels provide maintenance access to the 2-mile-long, 8-foot-diameter East Bay Authority sanitary outfall, and provide waterborne search and rescue access to Oakland International Airport. The project area is a designated point of emergency response supporting the combined efforts of the City of San Leandro, County of Alameda, Port of Oakland, and the U.S. Coast Guard Aircraft Accident Readiness Team. In addition, the project provides for recreational boating.

The Jack D. Maltester federally authorized channels originally included the North and Eastern Auxiliary Channels, but these channels were de-authorized in 1992, are not a part of the proposed project, and not addressed in this EA/EIR.

### **Redwood City Harbor**

The Port of Redwood City (Figure 1-13) is approximately 18 nautical miles south of San Francisco on the western side of South San Francisco Bay. It provides deep-draft access to the mid-Peninsula and San Jose metropolitan areas. Redwood City Harbor is situated within the confines of Redwood Creek, and consists of San Bruno Channel, the harbor Entrance Channel, the Outer Turning Basin, Connecting Channel, the Inner Turning Basin, and Inner Channel. The Inner Channel mainly supports recreational craft, and is currently not maintained by the federal government. The federal channels were authorized the Rivers and Harbors Acts of 1884, 1902, 1910, 1930, 1945, and 1950. The Port of Redwood City is the nonfederal project sponsor.

Redwood City Harbor was last deepened in 1962. Project maintenance provides for dredging of the channels and turning basins, which range in width from 300 feet to 900 feet, to 30 feet MLLW. The Entrance Channel, Outer Turning Basin, Connecting Channel, and Inner Turning Basin are typically dredged every 1 to 2 years using clamshell-bucket equipment; these areas were partially dredged in 2014. San Bruno Channel is dredged using a hopper dredge at 10-year intervals or greater, and was last dredged in 2005. Dredged material from Redwood City Harbor has typically been less than 80 percent sand, and placed at SF-11.



I:\GIS\USACE\_FedChannel\_EA\_EIR\Projects\APRIL\_2015\Fig1\_12\_San\_Leandro\_marina.mxd 4/1/2015 1:24:38 PM  
 Source: URS, 2013.

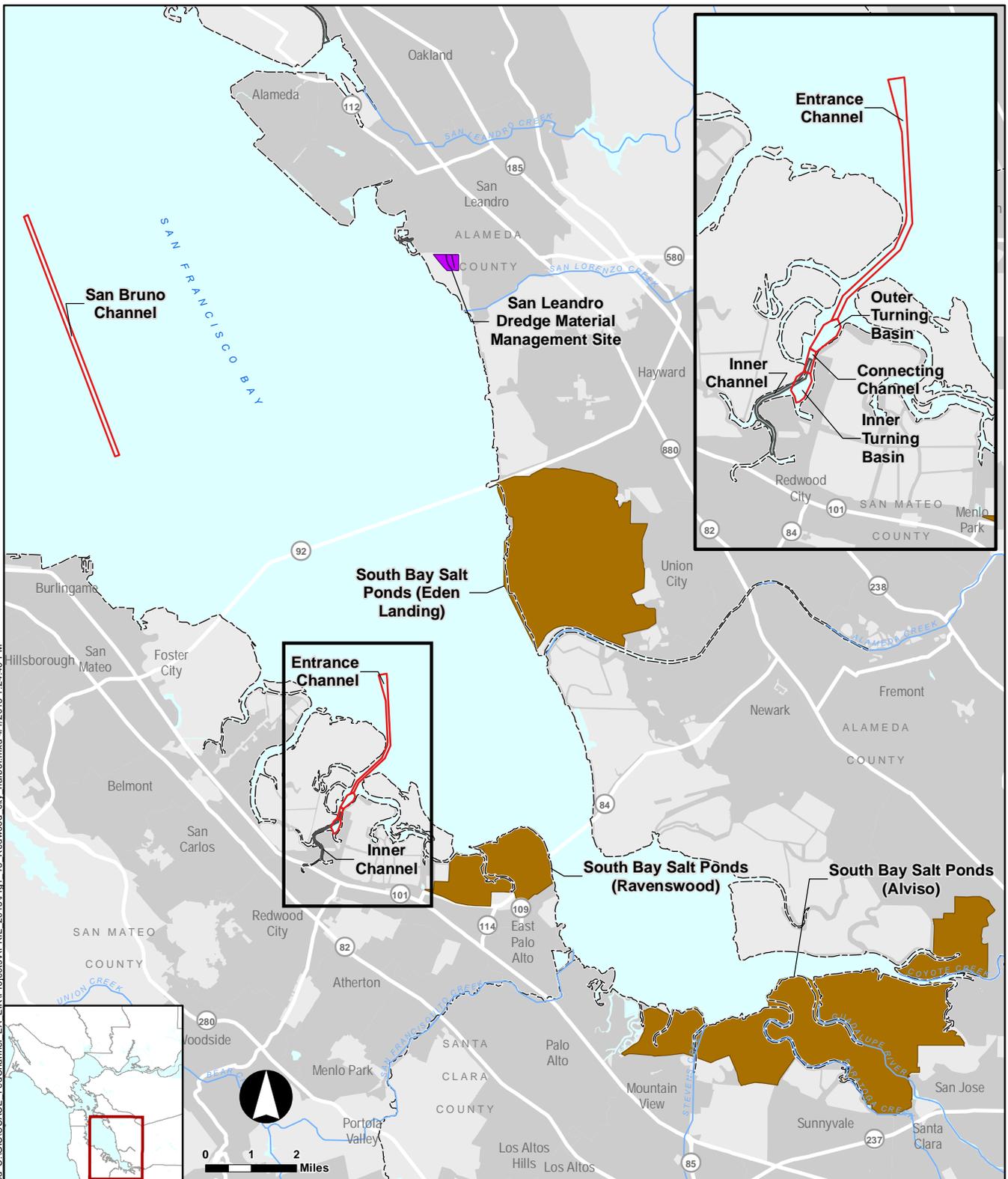
- ① Highway
- Placement site
- County boundary
- Dredge Locations Included in EA/EIR
- Dredge Locations Not Included in EA/EIR

## SAN LEANDRO MARINA (JACK D. MALTESTER CHANNEL)

Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 April 2015  
 Bay Area, California



**FIGURE 1-12**



I:\GIS\USACE\_FedChannel\_EA\_EIR\Projects\APRIL\_2015\Fig1\_13\_Redwood\_civ\_harbor.mxd 4/1/2015 1:24:46 PM  
 Source: URS, 2013.

- ① Highway
- Existing Placement Site
- Potential Future Placement Site
- County boundary
- Dredge Locations Included in EA/EIR
- Dredge Locations Not Included in EA/EIR

**REDWOOD CITY HARBOR**  
 Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 April 2015  
 Bay Area, California



**FIGURE 1-13**

## Suisun Slough Channel

Suisun Slough Channel connects the City of Suisun near Fairfield, California to Grizzly Bay, and then to Suisun Bay 30 miles northeast of San Francisco. Project maintenance provides for an entrance channel in Grizzly Bay that is 13 miles long, 200 feet wide, with a depth of 8 feet MLLW, a channel to the head of navigation at Suisun City that is 100 to 125 feet wide, with a depth of 8 feet MLLW, and a turning basin. Last dredged in 1991, this channel is maintained on an infrequent basis. This project is not anticipated to require dredging within the planning horizon, and therefore is not a part of the proposed project, and not addressed in this EA/EIR.

### 1.5.3 Description of Existing Placement Sites

Descriptions of in-Bay, ocean, and beneficial reuse placement sites that are currently being used (and expected to be used under the proposed project) for USACE's maintenance dredging program during the 10-year planning horizon are provided below. The placement sites in this section are already permitted, and/or sites for which the site owners have completed environmental review.

There are costs associated with use of all sites; these costs vary depending on the dredge equipment used, proximity of the dredged channel to the placement site, and any applicable tipping fees. Typically, the federal standard placement site is used; however, dredging contractors may propose to use other permitted upland locations as an alternative to the disposal site or sites identified in a given solicitation for maintenance dredging contracts, as long as the cost of the site is comparable to the cost of the federal standard. All necessary environmental documentation, including regulatory and resource agency review and approvals, must be completed for a site prior to it receiving any dredged material from the federal channels maintained by USACE.

The open-water disposal that occurs at in-Bay and ocean placement sites is considered unconfined, meaning the dredged materials are in direct contact with aquatic environs. Only dredged material determined suitable for unconfined aquatic disposal may be placed at these sites. Open-water disposal sites can be either predominantly nondispersive (i.e., dredged materials largely remain at the placement location), or predominantly dispersive (i.e., dredged materials disperse from the site during placement or over time). With the exception of SF-DODS, all in-Bay and open water placement sites below are considered dispersive (LTMS, 1998). Confined disposal is placement of dredged material in diked nearshore or upland confined disposal facilities so that dredged materials are not in direct contact with aquatic environs. Some beneficial reuse sites, such as Montezuma, may allow for both unconfined and confined placement, as noted below. Open water/unconfined disposal, confined disposal, and beneficial reuse are further described in Section 2.3.1.

The USEPA and USACE jointly regulate dredged material disposal under federal authorities provided by the MPRSA, which is also known as the Ocean Dumping Act, and Section 404 of the CWA. Section 102 of the MPRSA requires USEPA, in consultation with USACE, to develop environmental criteria that must be met before any proposed ocean disposal activity is allowed to proceed. Section 102 also gives USEPA authority to designate ocean disposal sites in and beyond the territorial sea, and directs USACE to use such EPA-designated sites, as opposed to other ocean disposal locations, to the maximum extent feasible (MPRSA Section 102[c] and Section 103[b]). SF-DODS and SF-8 are designated disposal sites under MPRSA Section 102. The Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 C.F.R. pt. 320) are applicable to the specification of disposal sites for discharges of dredged or fill material into waters of the United States, and authorize the USEPA and USACE to designate disposal sites. SF-9, SF-10, SF-11, and SF-16 are designated disposal sites pursuant to CWA Section 404. SF-9, SF-10, and SF-11 are available to multiple users, while SF-16 is for use by USACE only. The Ocean Beach nearshore placement site (SF-17) is in the process of being formally designated as a disposal site under Section 404 of the CWA. Under Section 103 of the MPRSA, USACE regulates the transportation of dredged material for the purpose of dumping it into ocean waters. USACE

regulations at 33 C.F.R. § 324.4(b) state, in part, “Applications for permits for the transportation of dredged material for the purpose of dumping it in ocean waters will be evaluated to determine whether the proposed dumping will unreasonably degrade or endanger human health, welfare, amenities, or the marine environment, ecological systems or economic potentialities.”

Sediment testing requirements under the CWA and MPRSA, used to determine the suitability of dredged material for ocean disposal, inland aquatic disposal, or upland/beneficial reuse, are described in Section 1.3.2.

The sites are shown on Figure 1-3. The proposed project’s use of placement sites is described under the description of the alternatives in Chapter 2.

## **In-Bay Placement Sites**

### **SF-9 Carquinez Strait Placement Site**

The SF-9 placement site is a 1,000-foot by 2,000-foot rectangle, approximately 10 to 55 feet deep, 0.9 mile west of the entrance to Mare Island Strait in eastern San Pablo Bay in Solano County (Figure 1-9). Disposal is limited to 1.0 million cubic yards (CY) of dredged material per month and a maximum of 3.0 million CY per year during wet or above-normal water flow years; and 2.0 million CY per year during all other years.

### **SF-10 San Pablo Bay Placement Site**

The SF-10 placement site is a 1,500-foot by 3,000-foot rectangle, approximately 30 to 45 feet deep, 3.0 miles northeast of Point San Pedro in southern San Pablo Bay in Marin County (Figure 1-9). Disposal is limited to 500,000 CY of dredged material per year.

### **SF-11 Alcatraz Placement Site**

The SF-11 placement site is a 1,000-foot-radius circular area, approximately 40 to 70 feet deep, approximately 0.3 mile south of Alcatraz Island in the Central Bay (Figure 1-5). Since at least 1972, SF-11 has been the most heavily used disposal site in San Francisco Bay. Placement is currently regulated at a maximum of 400,000 CY per month from October to April; and 300,000 CY per month from May to September. Disposal is limited to 4.0 million CY of dredged material per year.

### **SF-16 Suisun Bay Placement Site**

The SF-16 placement site is a single-user in-Bay unconfined disposal site reserved for sand dredged from the Suisun Channel and New York Slough projects only. SF-16 is a 500-foot by 11,200-foot rectangle adjacent to the northern side of Suisun Bay Channel, approximately 1 mile upstream of the Interstate 680 Bridge (Figure 1-10). The depth at this site is approximately 30 feet MLLW. Currently, the site is authorized to receive 200,000 CY of dredged sand per year.

## **Ocean Placement Sites**

### **San Francisco Deep Ocean Disposal Site**

Approximately 55 miles (48 nautical miles) west of the Golden Gate Bridge, SF-DODS is the farthest offshore and deepest (8,000 to 10,000 feet) dredged material placement site in the United States. SF-DODS is authorized to receive up to 4.8 million CY of dredged material per year; however since 2000, annual disposal at SF-DODS for all dredging projects in San Francisco Bay, not just the federal navigation channels maintained by USACE, has averaged less than 1 million CY (LTMS, 2013b). From 2006 through 2013, the amount of dredged material placed annually at SF-DODS by USACE ranged

from 0 CY to 1,473,200 CY, and averaged 471,590 CY. Annual monitoring by USACE has confirmed that disposal at SF-DODS has occurred without causing significant impacts to the ocean and the marine biology in and around SF-DODS.

Sediment disposed at SF-DODS can have levels of contaminants slightly above that of sediment disposed at in-Bay disposal sites. Therefore, the LTMS EIS/EIR determined disposal at SF-DODS to be environmentally superior to disposal of the same material at the traditional unconfined disposal sites in the more sensitive San Francisco Bay and Delta Estuary.

### **SF-8 San Francisco Bar Channel Disposal Site**

The SF-8 disposal site is a 15,000- by 3,000-foot-wide rectangle 7,500 feet south of the San Francisco Bar Channel in the Pacific Ocean (Figure 1-5). Depths at SF-8 range from approximately 30 to 45 feet MLLW. Disposal is limited to sandy material dredged by USACE from the San Francisco Bar Channel. However, the easternmost portion of SF-8 is within the 3-mile limit, and sand from other San Francisco Bay Area dredging projects can be permitted there as beneficial reuse for beach nourishment. The trapezoidal portion of SF-8 that is within the 3-mile limit is approximately 3,000 feet long by 430 feet at its northern end; and 1,000 feet wide at its southern end. There is no set limit on disposal at SF-8.

It was expected that sand placed at SF-8 would eventually move shoreward to the surf zone and beach; however, surveys indicate that spreading occurs at a much slower rate than expected. Operation reports from the captain of USACE's hopper dredge *Essayons* state that vessel maneuverability is impaired during times of rough seas because sand is being placed faster than it disperses. Instead of dispersing, sand has mounded and remained on site to the point that safe operation of the *Essayons* (and other large hopper dredges) in much of SF-8 is often restricted or precluded during the rough seas that commonly occur on the San Francisco Bar. Shoaling at SF-8 was unexpected because pre-site-designation studies concluded that the area would be dispersive, meaning that waves would spread the sand at such a rate that accumulation would be minimal. SF-8 remains a placement site option; however, because of this shoaling, USACE limits the use of SF-8 to the extent feasible.

### **SF-17 Ocean Beach Nearshore Placement Site and Ocean Beach Demonstration Site**

The Ocean Beach demonstration site, which is encompassed by the SF-17 placement site, is in waters of the Pacific Ocean adjacent to the south-of-Sloat-Boulevard stretch of Ocean Beach, and outside of the southern section of the San Francisco Bar (Figure 1-5). SF-17's eastern boundary is approximately 0.35 mile offshore from the back-beach bluff; its center is 4 miles southwest of SF-8; and the site's area is 3.3 square miles. Water depths along the shoreward boundary range from approximately 25 to 35 feet MLLW, and depths along the seaward boundary ranges from approximately 37 to greater than 50 feet MLLW. Although SF-8 was established to disperse sandy material dredged from the San Francisco Bar Channel within the littoral cell, sufficient material has not reached the southern reach of Ocean Beach to protect infrastructure from storm damage. The Ocean Beach demonstration site was chosen as a demonstration site because it is in a location where waves can potentially feed sediment toward that reach of Ocean Beach, which may ultimately help mitigate ongoing shoreline erosion in the area that threatens expensive municipal infrastructure, including segments of the Great Highway. SF-17 is in the process of being proposed as a beneficial use placement site for sand, primarily from the MSC (i.e., as an alternative to SF-8).

## **Beneficial Reuse Placement Sites**

### **Cullinan Ranch**

The 1,575-acre Cullinan Ranch Restoration Project is part of the San Pablo Bay National Wildlife Refuge (Figure 1-6). The USFWS operates the site for the purpose of increasing habitat for salt marsh harvest

mouse and Ridgway's rail by restoring diked baylands to historic tidal marsh conditions. The southern property boundary is a naturally formed levee that is the base for State Highway 37. Cullinan Ranch is permitted to restore approximately 290 acres of tidal marsh habitat through the importation of approximately 2.8 million cubic yards of dredged material via an offloading facility temporarily located in the Napa River near its confluence with Dutchman Slough, which will accommodate deep draft barges.

### **Montezuma Wetlands Restoration Project**

The Montezuma Wetlands Restoration Project (MWRP) is a privately owned and operated, approximately 1,800-acre site adjacent to Montezuma Slough in Solano County (Figure 1-10); the owner/operator is Montezuma Wetlands LLC. MWRP has a remaining capacity of approximately 12 million CY. Imported material is being used to create wetlands. The site can accept both cover and foundation quality material (as described in Section 1.3.2). The site has deep-water access, as well as a docking area and dredged material off-loading equipment. The offloading equipment can accommodate most dredged material transport scows with 1,000 CY or greater capacity. Montezuma Wetlands LLC cannot guarantee complete offloading of flat-bottom scows or scows with capacity less than 1,000 CY or, and pocket scows are not allowed at this site.

### **Winter Island**

Winter Island is a privately owned and operated site located at the confluence of the Sacramento and San Joaquin rivers and Suisun Bay in Contra Costa County (Figure 1-10). Dredged material suitable for unconfined aquatic disposal is imported onto the site to re-nourish the island and maintain 5 miles of perimeter levees. Winter Island has the capacity to take up to 200,000 CY of material a year, but only 50,000 CY can be sand.

### **Sponsor Provided Upland Placement Sites**

#### **Imola Avenue, Napa**

The Napa County Flood Control and Water Conservation District's Imola Avenue dredged material beneficial reuse site is in the City of Napa (Figure 1-6) on the eastern bank of the Napa River, at the previous location of the Napa Sanitation District. The accumulated dredged material placed at the Imola Avenue site was used by USACE in 2006 as part of the Napa River/Napa Creek Flood Protection Project. The overall capacity of the Imola Avenue site is 60,000 CY. During placement of dredged materials, any decant water is discharged into Tulocay Creek, which is connected to the Napa River to the west.

#### **San Leandro Dredged Material Management Site**

The City of San Leandro owns and operates the San Leandro Dredged Material Management Site (DMMS), a 100-acre onshore facility used for drying sediment dredged from the San Leandro Marina prior to offsite reuse. The DMMS is south of the Estudillo Flood Control Channel, in the Roberts Landing area of southwestern San Leandro (Figure 1-12). It is bordered on the west by the Monarch Bay Golf Course (formerly Tony Lema Golf Course), and on the south and east by restored tidal and nontidal salt marshlands. The DMMS was first used in 1973 for the management of dredged material from the maintenance dredging of the San Leandro Marina, and Jack D. Maltester approach channel. The site was reconfigured in 1993 according to a management plan approved by Regional Water Board staff. In addition to providing adequate capacity to contain and dry the dredged material for ultimate removal and reuse while meeting water quality criteria, a goal of the reconfiguration of the DMMS is to provide resting habitat for migrating shorebirds during high tide periods in San Francisco Bay, when mudflats used by the birds for foraging are unavailable.

#### 1.5.4 Future Placement Sites

The USACE, Regional Water Board, USEPA, and BCDC have identified the following placement sites as reasonably foreseeable future sites. The sites are shown on Figure 1-3. Because the environmental review process has not been completed for these sites, insufficient information was available on these sites to fully analyze the potential impacts of placing dredged materials at these locations in this EA/EIR. Potential impacts related to use of these sites are disclosed on a broad level in Chapter 3 because these sites may become authorized placement sites within the 10-year planning horizon for this document. Use of these sites by USACE would be conditioned upon the completion of supplemental environmental review under NEPA and/or CEQA, and acquisition of required environmental approvals from resource and regulatory agencies.<sup>11</sup> The ability of USACE to use a given site for placement would be dependent on the accessibility of the site to different dredge equipment; types of dredged materials authorized for placement at the site; cost; and other parameters.

##### **Antioch Dunes**

The Antioch Dunes National Wildlife Refuge, managed by the USFWS, is in the San Francisco Bay-Delta area, along the southern shore of the San Joaquin River (Figure 1-3). The sand dunes on the refuge provide habitat for endangered plants and insects. The refuge accepts dredged material to reconstruct the sand dunes in areas where sand was previously mined down to the clay substrate. The dredged material placement area is approximately 10 acres.

##### **Bel Marin Keys Addition to Hamilton Wetland Restoration Project (Beneficial Reuse)**

The roughly 1,000-acre Hamilton Wetland Restoration Project (HWRP) is 25 miles north of San Francisco in the City of Novato, Marin County, on the western shore of San Pablo Bay (Figure 1-7). The former airfield portion of HWRP stopped accepting dredged material in 2011 and the outboard levees were breached in 2014. The adjacent Bel Marin Keys Unit V site, authorized by the Water Resources Development Act of 2007, would expand HWRP by 1,576 acres, for a total of nearly 2,600 acres of restored wetlands. The Bel Marin Keys Unit V site was converted from salt marsh habitat to agricultural use over the past 150 years. The site would add an additional 13 million CY of capacity for dredged material into wetlands.

##### **Edgerly Island (Sponsor-Provided Upland Site)**

The Napa County Flood Control and Water Conservation District's Edgerly Island dredged material beneficial reuse site is in Napa County (Figure 1-6) on the northeastern side of the island. In 1981, the Napa County Flood Control and Water Conservation District developed a 45-acre wetland mitigation site adjacent to the Edgerly Island disposal site. Dredged materials were placed at the site in 1987 and 1988. In 1994, the dredged material was removed. In 2002, the site was reconstructed by raising the levees and increasing the overall capacity of the site to approximately 330,000 CY. During placement of dredged materials, any decant water would be discharged into Mud Slough, which is connected to the Napa River to the south.

##### **Ocean Beach Onshore Placement (Beneficial Reuse)**

The USACE and City and County of San Francisco, in coordination with Golden Gate National Recreation Area, are evaluating beneficially using sediment from maintenance dredging of the San Francisco MSC for direct beach nourishment at Ocean Beach between Sloat Boulevard and Fort Funston, (Figure 1-4). The proposed beach nourishment project includes the construction of a 4,000-foot-long

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<sup>11</sup> The USACE would also consider use of other beneficial reuse sites not identified in Section 1.5.4 that may become available by FY 2024, and that have obtained required environmental approvals from regulatory agencies.

sacrificial dune, using approximately 270,000 to 300,000 CY of dredged sand. Placement of material on the beach is contingent upon availability of funds, approvals from applicable resource and regulatory agencies, and the availability of appropriate dredging equipment.

### **Petaluma River Farm**

Petaluma River Farm, previously known as Carneros River Ranch, is in southern Sonoma County, near the mouth of the Petaluma River, approximately 1,500 feet upstream from the State Highway 37 overpass (Figure 1-7). Dredged material would be hydraulically pumped from barges to a portion of the bermed property, where it would be dried, tilled, and subsequently farmed. Because of significant subsidence and the need for raised elevations required to create a root zone above brackish groundwater (to optimize crop production), the site operator estimates that Petaluma River Farm has a potential sediment capacity of approximately 18 million CY.

### **Sherman Island (Beneficial Reuse)**

Sherman Island is one of eight islands in the Delta on which the Department of Water Resources was directed to develop and implement flood protection projects (Figure 1-3). The Sherman Island Demonstration Project began in late 1990 under a permit from the Central Valley Regional Water Quality Control Board, which required an extensive monitoring and testing program.

### **Shollenberger Park (Sponsor-Provided Upland Site)**

The City of Petaluma (the City) purchased this 165-acre ranch along the Petaluma River for the purpose of using it as a dredged materials placement site. In 1975, an agreement was reached between the City and the former California Department of Fish and Game (now CDFW) regarding management of the site. Pursuant to this agreement, the City dedicated, in perpetuity, the 80-acre Alman Marsh for open space and fish and wildlife uses. The City also executed an open-space deed restriction for approximately 65 acres of the dredged material placement site. The City continues to protect and maintain Alman Marsh and the 65-acre area for the agreed upon uses. In 2002, the City began the formal process to continue using the Shollenberger site as a decant area for dredged materials. In response to resource agency requirements pertaining to salt marsh harvest mouse habitat on the site, the City proposed development and implementation of a management, maintenance, and monitoring plan to operate a 48-acre mitigation site adjacent to the dredged materials placement site. The City prepared the Shollenberger Marsh Plan and constructed a berm to separate the mitigation area from the dredged material placement area.

### **South Bay Salt Ponds (Beneficial Reuse)**

The South Bay Salt Pond Restoration Project (Figure 1-13) proposes to convert 15,100 acres of commercial salt ponds at the southern end of San Francisco Bay to a mix of tidal marsh, mudflat, and other wetland habitats. The property was purchased by the State of California and the federal government from Cargill Salt as part of a larger land transaction which includes 1,400 acres of salt crystallizer ponds on the eastern side of the Napa River; construction of the Napa River restoration portion of the project is complete. The acquisition of the South Bay salt ponds provides an opportunity for landscape-level wetlands restoration, improving the physical, chemical, and biological health of San Francisco Bay. The goals of the project are to restore and enhance a mix of wetland habitats, to provide wildlife-oriented public access and recreation, and to provide for flood management in the South Bay.

### **VA/Alameda (Beneficial Reuse)**

The Department of Veterans Affairs Northern California Health Care System and National Cemetery Administration are seeking to establish a single location at the former Naval Air Station Alameda (Figure 1-11) to construct and operate facilities to serve, care for, honor, and memorialize San Francisco

Bay Area veterans. It is anticipated that more than 400,000 CY of fill material would be needed to prepare the site for construction. The development site, in close proximity to the San Francisco Bay and Oakland Inner Harbor Channel, provides an opportunity for beneficial reuse of dredged material.

## **1.6 REGULATORY AUTHORITIES**

Key federal and state laws applicable to the development of this EA/EIR, the proposed dredging and dredged material placement activities, and the protection of aquatic resources are summarized below. Additional details on these laws, as well as other laws governing the protection of environmental resources, are presented in the Regulatory Setting section for each environmental resource topic analyzed in detail in Chapter 3.

### **1.6.1 Federal Laws**

#### **33 C.F.R. pt. 335-338**

Implementation of USACE's maintenance dredging program is governed by 33 C.F.R. pt. 335-338. Part 335 describes the applicable laws and definitions, including the federal standard. Part 336 outlines factors to be considered in the evaluation of USACE dredging projects involving the discharge of dredged material into waters of the United States and ocean waters, including compliance with Section 404(b)(1) of the CWA, and Section 103 of the MPRSA. Part 337 outlines the procedures to be followed in implementing state requirements, emergency actions, and identification and use of disposal sites. Procedures applicable to other USACE activities (e.g., erosion protection along the banks of navigation channels) are addressed in Part 338.

#### **Clean Water Act**

The federal CWA (33 U.S.C. § 1257 et seq.) requires states to set standards to protect water quality. The objective of the federal CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Specific sections of the CWA control discharge of pollutants and wastes into marine and aquatic environments, as further discussed in Section 3.4.1. Following public review of the Draft EA/EIR, USACE submitted an application to the Regional Water Board for a Section 401 water quality certification.

#### **Coastal Zone Management Act**

The CZMA, established in 1972 and administered by the NOAA's Office of Ocean and Coastal Resource Management, provides for management of the nation's coastal resources through a state and federal partnership. Under the federal consistency provisions of the CZMA, federal projects need to be consistent with the state's coastal zone management program and policies to the maximum extent practicable (16 U.S.C. § 1456); this determination is made by the lead federal agency, and concurrence is requested from the state or local agency responsible for implementing the CZMA. For San Francisco Bay, the BCDC is the state's coastal zone management agency responsible for issuing concurrence with consistency determinations under the CZMA. The San Francisco Bay Plan is BCDC's policy document specifying goals, objectives, and policies for BCDC jurisdictional areas. For portions of the study area outside of San Francisco Bay, concurrence with consistency determinations is issued by the California Coastal Commission. The USACE requests consistency determination concurrence from the BCDC or California Coastal Commission prior to commencing dredging activities. Following public review of the Draft EA/EIR, USACE submitted a CZMA federal consistency determination to BCDC.

## **Endangered Species Act**

Under the federal ESA (16 U.S.C. §§ 1531-1544), all federal agencies shall, in consultation with the Secretary of the Interior or Secretary of Commerce, use their authorities to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of habitat determined under the ESA to be critical. The ESA provides a program for conserving threatened and endangered plants and animals, and the habitats in which they are found. It is designed to protect critically imperiled species from extinction. The ESA is administered by the USFWS and the NMFS. In general, NMFS is responsible for protection of ESA-listed marine species and anadromous fishes, while other species are under USFWS jurisdiction. Under the ESA, USFWS and NMFS must authorize the take of listed species, and the federal action agency must implement all reasonable and prudent measures necessary to minimize the impacts of take. As described in Section 1.3.1, programmatic federal ESA consultation was completed for the LTMS (USFWS, 1999; USFWS, 2004a; NMFS 1998). No further ESA consultation is required for USACE maintenance dredging in San Francisco Bay performed within the work windows established through the formal programmatic federal ESA consultations for the LTMS, with the exception of impacts to delta smelt during dredging of Suisun Bay Channel and New York Slough. The USFWS has indicated that a 10-year programmatic biological opinion would not be provided. Rather, it plans to issue annual biological opinions for each year. Therefore, the USACE will request consultation under Section 7 annually, and the USFWS would issue a biological opinion each year prior to maintenance dredging of Suisun Bay and New York Slough. Pursuant to the ESA, any projects proposing deviation from the work windows for federally listed species are required to undergo consultation with NMFS and/or USFWS, as appropriate.

NMFS is revising the 1998 LTMS programmatic biological opinion; the updated biological opinion (expected 2015) will supersede the 1998 document. USACE will comply with the terms and conditions of the updated biological opinion.

## **Magnuson-Stevens Fishery Conservation and Management Act**

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation mandates the identification, conservation, and enhancement of EFH, which is defined as “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity,” for all managed species. Federal agencies consult with NMFS on proposed actions that may adversely affect EFH. The main purpose of the EFH provisions of the act is to avoid loss of fisheries due to disturbance and degradation of the fisheries habitat. No further EFH consultation is required for USACE maintenance dredging in San Francisco Bay performed in accordance with the provisions established through the formal programmatic federal EFH consultations for the LTMS (USACE and USEPA, 2011).

## **Marine Protection, Resources, and Sanctuaries Act**

The MPRSA is the United States’ implementation of an international treaty, the Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter (also known as the “London Convention”). Section 102 of the MPRSA authorizes USEPA to establish criteria for evaluating all dredged material proposed for ocean dumping. These criteria are published separately in the Ocean Dumping Regulations at 40 C.F.R. pt. 220-228. Section 102 also authorizes the USEPA to designate permanent ocean-dredged material disposal sites in accordance with specific site selection criteria designed to minimize the adverse effects of ocean disposal of dredged material. Section 103 of the MPRSA authorizes USACE to issue permits, subject to USEPA concurrence or waiver, for dumping dredged materials into the ocean waters. It requires public notice, opportunity for public hearings, compliance with criteria developed by the USEPA (unless a waiver is granted), and the use of designated sites whenever feasible. Although USACE does not issue itself permits, USACE and USEPA apply these

standards to USACE projects as well. This EA/EIR evaluates the impacts of the ocean disposal of dredged material from USACE-maintained federal navigation channels in San Francisco Bay, and incorporates impact analysis on ocean disposal from the LTMS EIS/EIR (1998).

### **National Environmental Policy Act**

Under NEPA, federal agencies must consider the environmental consequences of proposed major federal actions. The spirit and intent of NEPA is to protect and enhance the environment through well-informed federal decisions, based on sound science. NEPA is premised on the assumption that providing timely information to the decision maker and the public about the potential environmental consequences of proposed actions would improve the quality of federal decisions. Thus, the NEPA process includes the systematic interdisciplinary evaluation of potential environmental consequences expected to result from implementing a proposed action. The CEQ sets forth regulations implementing NEPA. This document is intended to fulfill the requirements of NEPA, the CEQ regulations (40 C.F.R. pt. 1500-1508), and USACE Procedures for Implementing NEPA (Engineer Regulation 200-2-2).

### **Rivers and Harbors Act**

Rivers and Harbors Act refers to a conglomeration of many pieces of legislation and appropriations passed by Congress since the first such legislation in 1824. The Rivers and Harbors Act of 1899 was the first federal water pollution act in the United States. It focuses on protecting navigation, protecting waters from pollution, and acted as a precursor to the CWA of 1972. Section 10 of the Rivers and Harbors Act of 1899 regulates alteration of and prohibits unauthorized obstruction of navigable waters of the United States. Original construction of the federal navigation channels was authorized under the Rivers and Harbors Act, and USACE's maintenance dredging maintains the navigability of the channels in accordance with their authorized dimensions.

## **1.6.2 State Laws**

### **California Endangered Species Act**

The CESA (California Fish and Game Code 2050-2116) operates in a similar fashion to the federal ESA, but is administered by CDFW. Certain species that are federally listed may not be listed on the CESA or vice-versa, or may have a different listing status. Similar to the federal ESA, CESA and the Native Plant Protection Act authorize CDFW to designate, protect, and regulate the taking of protected species in the State of California. Section 2080 of the California Fish and Game Code prohibits the taking of state-listed plants and animals. CEQA lead agencies considering the approval of proposed projects that may adversely impact state-listed threatened or endangered species must consult with CDFW as a trustee agency. There has been no clear and explicit waiver of federal sovereignty with respect to CESA. Accordingly, as a federal agency, USACE is not seeking incidental take authorization or other authorization under CESA. In issuing a WQC, however, the Regional Water Board must comply with CESA. In addition, pursuant to the Porter-Cologne Act and the CWA, the Regional Water Board's environmental review must give consideration to rare and endangered species, as protected by the Basin Plan in the beneficial uses protecting Preservation of Rare and Endangered Species, and Fish Migration. Similarly, in the NEPA significance criteria, USACE must consider special-status species and whether the action threatens the violation of federal, state, or local law or requirements imposed for the protection of the environment (40 C.F.R. § 1508.27[b][9-10]). For these reasons, this document analyzes impacts to species listed under CESA to facilitate issuance of a WQC.

### **California Environmental Quality Act**

The CEQA was closely modeled on NEPA, and requires public agencies to consider and disclose to the public the environmental implications of proposed actions. CEQA applies to all discretionary activities

that are proposed or approved by California public agencies, including state, regional, county, and local agencies, unless an exemption applies. Unlike NEPA, CEQA imposes an obligation to implement measures or project alternatives to avoid or mitigate significant adverse environmental effects, when feasible. When avoiding or mitigating significant environmental impacts of a proposed project is not feasible, CEQA requires that agencies either disapprove of the project, or prepare a written statement of the overriding considerations with approval of such project. Under the direction of CEQA, the California Natural Resources Agency has adopted regulations, known as the Guidelines for Implementation of the CEQA (CEQA Guidelines, California Code of Regulations Title 14, Section 15000 et seq.), which provide detailed procedures that agencies must follow to implement the law. This document is intended to fulfill the requirements of CEQA and the CEQA Guidelines with respect to the Regional Water Board's issuance of a WQC. As a federal agency, USACE is not required to comply with CEQA.

### **McAteer-Petris Act**

The McAteer-Petris Act (California Government Code Section 66000, et seq.), first enacted in 1965, created the BCDC to prepare a plan to protect the San Francisco Bay and shoreline, and provide for appropriate development and public access. The Act directs BCDC to exercise its authority to issue or deny permit applications for placing fill, dredging, or changing the use of any land, water, or structure in the area of its jurisdiction (San Francisco Bay waters and within 100 feet of the shoreline). As stated above, the BCDC also reviews determinations of consistency with the CZMA for federally sponsored projects. The San Francisco Bay Plan, first adopted in 1969, and most recently updated in 2011, is BCDC's policy document specifying goals, objectives, and policies for BCDC jurisdictional areas. Pursuant to the federal CZMA, USACE is required to be consistent, to the maximum extent practicable, with the enforceable policies of the San Francisco Bay Plan.

### **Porter-Cologne Act**

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act), and associated regulations found in California Code of Regulations Title 23, establish a comprehensive program for the protection of water quality and the beneficial uses of waters of the state. It addresses both point and nonpoint source discharges, to both surface and ground waters. The State Water Resources Control Board and nine regional water quality control boards are the principal state agencies with primary responsibility for water quality control. The Porter-Cologne Act provides for the adoption of water quality control plans to designate beneficial uses of water, set water quality objectives to protect beneficial uses, and provide for a program to achieve those objectives. The plans may include prohibitions against the discharges of waste or certain types of waste, in specified areas or under specified conditions. The Basin Plan is the San Francisco Bay Regional Water Board's master water quality control planning document. Pursuant to the Porter-Cologne Act and Title 23, the Regional Water Board is authorized to issue WDRs and WQCs (i.e., permits) for activities that may affect water quality. These permits must implement the Basin Plan, the Clean Water Act for point source discharges to waters of the United States, and statewide plans and policies, including, but not limited to, Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Water in California," which generally restricts dischargers from degrading water quality. As a federal agency, USACE is not required to apply for WDRs; however, the Regional Water Board may issue WDRs with the WQC.

## **1.7 ADDITIONAL ENVIRONMENTAL COMPLIANCE REQUIREMENTS**

In addition to complying with NEPA and CEQA, USACE and the Regional Water Board, as the lead agencies, are responsible for documenting compliance with relevant federal and state environmental laws and regulations, as well as permit requirements needed to implement the chosen alternative. Table 1-2 lists agencies and their permit and authorizing responsibilities. Coordination with the issuing agencies is discussed below as appropriate.

<b>Table 1-2 Environmental Compliance Requirements</b>	
<b>Permits and Approvals</b>	<b>Agency</b>
Section 404, Clean Water Act	USACE
Section 401, Clean Water Act Water Quality Certification	Regional Water Board
Endangered Species Act Section 7 consultation	United States Fish and Wildlife Service, National Marine Fisheries Service
Essential Fish Habitat consultation; Sections 305(b)(1)(D) and 305(b)(2-4) of the Magnuson-Stevens Fishery Conservation and Management Act	National Marine Fisheries Service
California Endangered Species Act coordination <sup>1</sup>	California Department of Fish and Wildlife
Coastal Zone Management Act Consistency Determination	Bay Conservation and Development Commission
Notes: Regional Water Board = San Francisco Bay Regional Water Quality Control Board USACE = United States Army Corps of Engineers <sup>1</sup> State law that the Regional Water Board is required to comply with, but that USACE is not.	



## CHAPTER 2 ALTERNATIVES

This Environmental Assessment (EA)/Environmental Impact Report (EIR) includes four alternatives for detailed evaluation: the No Action/No Project Alternative, the Proposed Action/Project, and two Reduced Hopper Dredge Use Alternatives. These alternatives are described in Section 2.3. This chapter also describes the alternatives development process and screening criteria, and the alternatives that were considered but not carried forward for detailed evaluation in this EA/EIR.

### 2.1 NEPA AND CEQA REQUIREMENTS FOR EVALUATION OF ALTERNATIVES

Both the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) Guidelines emphasize the need for an evaluation of a range of alternatives. The federal NEPA lead agency and the CEQA lead agency are responsible for selecting the range of alternatives.

NEPA requires that federal agencies explore and objectively evaluate a range of reasonable alternatives to a Proposed Action to provide a clear basis for choice among options by the decision-makers and the public (Title 40 C.F.R. pt. 1502.14). Project alternatives and the No Action Alternative must be evaluated. The No Action Alternative examines the future without project conditions; that is, the future if the Proposed Action is not implemented. The No Action Alternative is used as a point of comparison for the action alternatives, providing a baseline against which the impacts of pursuing a particular action may be compared with the consequences of taking no action, and thereby requires decision-makers to consider not moving ahead with any action.

The CEQA Guidelines (Section 15126.6[c]) state that an EIR should briefly describe the rationale for selecting the alternatives to be discussed; identify any alternatives that were considered by the lead agency but were eliminated as infeasible; and briefly explain the reasons underlying the lead agency's determination.

The CEQA Guidelines (Section 15126.6) require that an EIR “describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects.” Every conceivable alternative does not need to be considered, but a reasonable range of potentially feasible alternatives should be considered to foster informed decision-making and public participation. Similar to NEPA, CEQA requires analysis of the No Project Alternative in an EIR to allow decision-makers to compare the impacts of approving a project against the impacts of not approving a project.

The range of alternatives required to be evaluated in an EIR is governed by a “rule of reason” that requires the EIR to consider only those alternatives necessary to permit a reasoned choice. The EIR need examine in detail only those alternatives that the lead agency determines could avoid or substantially reduce a potentially significant impact of the proposed project while feasibly attaining most of the basic project objectives, taking into account factors that include site suitability; economic viability; availability of infrastructure; general plan consistency; other plans or regulatory limitations; jurisdictional boundaries; and whether the proponent can reasonably acquire, control, or otherwise have access to an alternative site (CEQA Guidelines Section 15126.6[f]).

Consistent with NEPA regulations and the CEQA Guidelines, United States Army Corps of Engineers (USACE) and the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) considered a range of alternatives that: 1) could feasibly attain most of the basic project objectives; and 2) would avoid or substantially lessen any of the potentially significant impacts of the project.

## 2.2 ALTERNATIVES DEVELOPMENT AND SCREENING PROCESS

One of the most important aspects of the environmental review process is the identification and assessment of reasonable alternatives that could potentially avoid or minimize the impacts of a project. The USACE and the Regional Water Board formulated a reasonable range of alternatives that would achieve the specific project objectives through consideration of the following:

- Changes in environmental resource conditions in the study area and the regulatory setting since the publication of the Long-Term Management Strategy (LTMS) Final Environmental Impact Statement/EIR;
- Input from regulatory agencies; and
- Comments received during the public scoping process.

The USACE and Regional Water Board engaged regulatory agencies early in the planning process to obtain input on the development of alternatives. Regulatory agencies were invited to participate in an alternatives development workshop on February 20, 2013. The meeting was attended by representatives of USACE, the Regional Water Board, the United States Environmental Protection Agency, the United States Fish and Wildlife Service (USFWS), the California Department of Fish and Wildlife (CDFW), and the San Francisco Bay Conservation and Development Commission. Discussion at the workshop focused on potential modifications to USACE's equipment use and dredging operations that could be considered in the development of alternatives.

The USACE and Regional Water Board used an assessment framework matrix to refine possible alternatives. The matrix included various equipment, operation, timing, and placement options for each dredge location. Once all the options were identified, a range of alternatives was generated by selecting from the options available for each channel.

Under NEPA, USACE is required to consider in detail a range of alternatives that is considered "reasonable," usually defined as alternatives that are realistic (not speculative), technologically and economically feasible, and that respond to the purpose of and need for the Proposed Action. Similarly, CEQA requires a "reasonable range" of alternatives that is feasible and that satisfies most of the project sponsor's objectives. Section 15126.6(f)(1) of the CEQA Guidelines states that factors to be considered when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, and jurisdictional boundaries.

Alternatives considered by USACE and the Regional Water Board, along with those suggested by the public during the scoping process, were evaluated using the following criteria:

- Does the alternative fulfill the purposes, needs, and objectives identified in Chapter 1?
- Does the alternative avoid or minimize effects on human/environmental resources?
- Is the alternative feasible for USACE to implement?

Alternatives that met the criteria described above were carried forward for analysis, and are detailed in Section 2.3. Those that were eliminated from detailed analysis are described in Section 2.4, along with the reasons for elimination.

## 2.3 PROPOSED ACTION/PROJECT AND ALTERNATIVES

This section provides a general description of dredging and disposal practices that would be implemented under the project alternatives, followed by descriptions of the four alternatives that are analyzed in detail in this EA/EIR.

### 2.3.1 General Description of Dredging and Disposal Practices

Maintenance dredging typically involves four steps: 1) testing for sediment quality; 2) excavating recently shoaled sediment from the dredging site to restore previously dredged channel dimensions; 3) transporting the dredged material via scows, hopper dredges, or pipeline to the disposal, placement, or beneficial reuse site; and 4) placing and managing the dredged material at the designated site for disposal or reuse at that site, or transfer to another permitted location for disposal or reuse.

Prior to conducting dredging activities, sediment sampling is conducted and results are reviewed by the Dredged Material Management Office to determine if the sediment is suitable for aquatic or upland disposal, or beneficial reuse (sediment testing requirements are discussed in Section 1.3.2).

Typical methods of maintenance dredging include hydraulic or mechanical dredging. Hydraulic dredging usually involves hopper dredges (a ship with a hopper bin to store and transport material dredged) or suction/cutterheads attached to hydraulic pipelines that convey the dredged material to a scow or directly to a placement site. Mechanical dredging usually involves bucket or clamshell dredges, which scoop material from the channel bed and place it directly into a scow for transport to a placement site. The various methods of dredging and equipment used are discussed below.

Once the material is dredged, it is transported to, and placed at, a designated dredged material placement site. Dredged material placement in the San Francisco Bay Area includes unconfined aquatic placement at designated in-Bay and ocean disposal sites, beneficial reuse, and transfer or rehandling sites; these sites are described in Sections 1.4.3 and 1.4.4.

Barring and knockdowns may be implemented complementary to dredging, but are not cost-effective practices for large areas. Barring, which involves pulling a weighted bar (e.g., an I-beam) across a channel bottom, may be used as part of a dredging episode to smooth out high-spots as needed after dredging has occurred; during mechanical dredging, the bucket can also be used to smooth out small peaks. Similar to barring, knockdowns (i.e., knocking down isolated shoals or high-spots) provide an additional method to alleviate shoaling in marinas, ports, and in some navigation channels; however, knockdowns are typically conducted to improve channel conditions between dredging episodes. Knockdowns use the same equipment and procedures as barring.

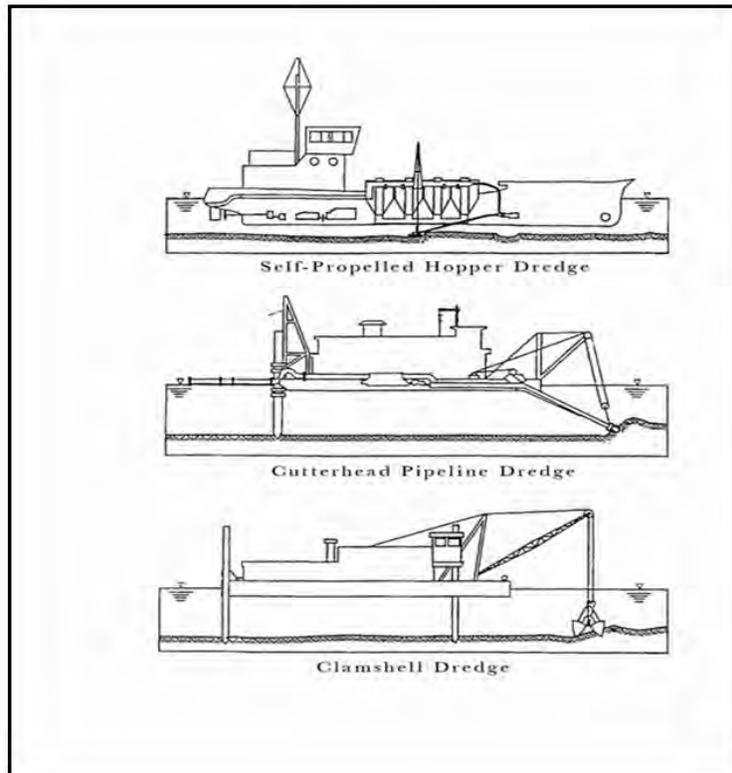
#### Dredge Equipment and Methods

Dredging methods for a specific area are typically based upon site-specific characteristics, such as substrate type, water quality, site bathymetry, wave energy, dredging depth, desired production rate (i.e., cubic yards per hour), method of disposal, distance to disposal area, levels of constituents of concern, and spatial feasibility. Additionally, costs and availability of dredge equipment factor into selection of a type of dredging method. Dredging equipment and techniques vary; however, for the purposes of this EA/EIR, dredging equipment is categorized by two mechanisms:

1. Hydraulic dredging – Removal of loosely compacted materials by cutterheads, dustpans, hoppers, hydraulic pipeline, plain suction, and sidecasters.
2. Mechanical dredging – Removal of loose- or hard-compacted materials by clamshell, bucket, excavator, dipper, or ladder dredges. Unlike hydraulic dredging, mechanical dredges use mechanical systems to remove sediments from the dredging site.

The schematics of the various dredge types are presented on Figure 2-1, and further discussed below.

**Figure 2-1  
Typical Dredge Equipment**



Source: USACE Engineer Research and Development Center

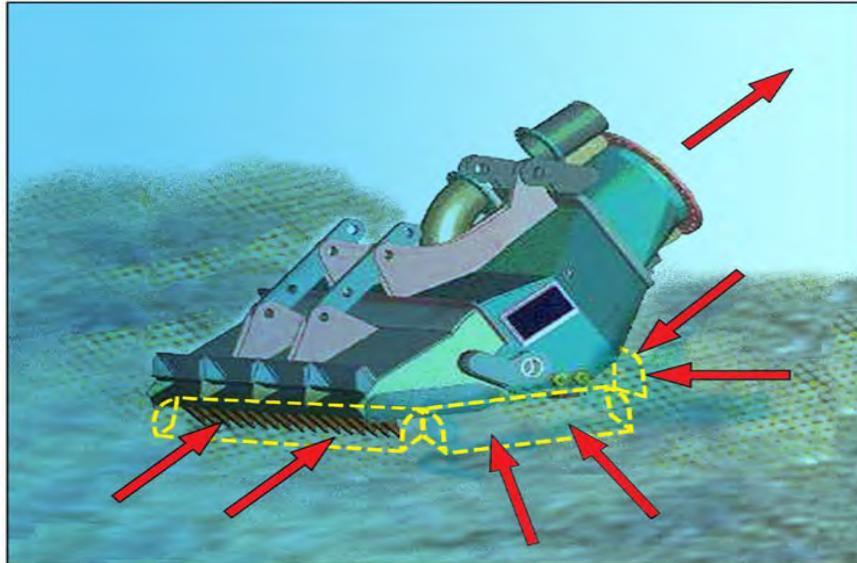
### **Hydraulic Dredges**

Hydraulic dredges remove and transport sediment in liquid slurry form (generally a ratio of 80 percent water and 20 percent sediment by weight). Hopper dredges are included in the category of hydraulic dredges, even though the dredged material is hydraulically pumped into the self-contained hopper in the dredge, rather than through a pipeline or to a scow. Hopper dredges are a type of hydraulic dredge that hydraulically pumps sediment into a self-contained hopper bin for temporary storage and transport. Other hydraulic dredges, including cutterhead dredges, are usually barge-mounted and carry diesel or electric-powered centrifugal pumps with discharge pipes ranging in diameter from 6 to 48 inches. The pump produces a vacuum on its intake side, which forces water and sediments through the suction pipe. The slurry is then transported by a pipeline or scow to the dredged material placement site.

### **Hopper Dredges**

Hopper dredges are seagoing vessels designed to dredge and transport material from navigation channels to open-water disposal areas. Hopper dredges are equipped with a drag arm on each side of the dredge. The drag arms are long suction pipes with drag heads attached to their ends (Figure 2-2). During active dredging, the drag arms are lowered through the water column until the drag heads are on the channel bottom; next the suction is turned on, and the drag heads are slowly dragged across the shoaled material by the forward motion of the vessel. Sediment and water slurry are drawn up through the drag heads and drag arms by on-board pumps, and deposited in the hopper bin, in the vessel's midsection. When the hopper bin is full, the dredge raises the drag arms and moves to a designated disposal area to empty the dredged material through large doors at the bottom of the dredge.

**Figure 2-2  
Hopper Drag Head Schematic**



Source: USACE Engineer Research and Development Center.

Advantages of a hopper dredge include the ability to work in rough, open water; the ability to move quickly to a project site under its own power; and the ability to not interfere with or obstruct vessel traffic during operation. The use of a hopper dredge also generally reduces the sediment resuspension at the dredging site, compared to mechanical dredging. Limitations include draft and maneuvering requirements that preclude use in shallow water and narrow channels; continuously interrupted production while transiting to and from placement sites; and difficulty dredging around structures.

Although USACE sometimes uses contract hopper dredges, USACE primarily uses two federally owned hopper dredges in the San Francisco Bay Area: the *Essayons* and the *Yaquina*. The *Essayons* is the larger of the two dredges, and commonly works in San Francisco Bay. The *Yaquina* does not often dredge in San Francisco Bay, but did dredge in San Francisco Bay in 2012 through 2014. Table 2-1 provides the specifications of USACE's hopper dredges.

Both the *Essayons* and the *Yaquina* function similarly, with only minor differences. When positioned over a shoal, the drag head is slowly lowered to just above the sediment surface. The drag heads are primed, meaning the pumps are turned on and water is hydraulically vacuumed through the drag head, up the drag arm, and into the hopper of the dredge. Once water begins to flow into the hopper, the drag head is immediately lowered into the sediment (often referred to as being buried in the sediment) for active dredging. Priming the dredge takes approximately 15 to 40 seconds, and occurs no more than 3 feet above the surface of the sediment. The purpose of priming is to fill the pipeline from the drag head to the pump with water to remove all of the air from the system. The drag arms on the *Essayons* are self-priming so there is no separate priming pump on the *Essayons*. The *Yaquina* has a priming system, and once the system is full of water, the main pump can be activated, and will have a ready load of water to push against (i.e., pump). On the *Yaquina*, the priming pump continues to operate until the main pump is operating normally. If there is any air in the system when the main pump is activated, a process called cavitation takes place and prevents the main pump from operating smoothly or at all. Cavitation is also harmful to the machinery and can cause the main pump to fail. Given that the priming operation and the main pump activation overlap each other, it does not provide an opportunity to divert any of the priming water before it is picked up by the main pump.

<b>Parameter</b>	<b>Essayons</b>	<b>Yaquina</b>
Length	350 feet	200 feet
Drag arm extension	94 feet MLLW	45 to 55 feet MLLW
Hopper capacity	6,000 CY	1,050 CY
Draft (when fully loaded)	27 feet MLLW	14 feet MLLW
Max speed (when fully loaded)	13.5 knots	10.5 knots
Size of intake pipe	28 inches	20 inches
Size of drag head	100 × 100 inches	54 × 54 inches
Pump size (gpm)	2 at 28,500	2 at 15,000
Water: Sediment <sup>1</sup>	80:20	80:20
Production Rate <sup>2</sup>	43,000 CY/day	13,000 CY/day
Locations dredged Annually	<ul style="list-style-type: none"> <li>▪ San Francisco Harbor (Main Ship Channel)</li> <li>▪ Richmond Outer Harbor</li> <li>▪ Pinole Shoal</li> <li>▪ Suisun Bay Channel and New York Slough</li> </ul>	Varies annually <sup>3</sup>
Volume dredged Annually	800,000 – 1,000,000 CY (annual average)	Varies annually <sup>3</sup>
Notes: <sup>1</sup> Average ratio; actual ratio varies by sediment type. <sup>2</sup> Average Daily Production <sup>3</sup> The <i>Yaquina</i> does not often dredge in the San Francisco Bay Area. At times, it is scheduled to dredge the federal navigation channels in place of the <i>Essayons</i> . As such, volumes of dredged material vary annually. CY = cubic yard CY/day = cubic yards per day FY = fiscal year <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>gpm = gallons per minute</span> <span>MLLW = mean lower low water</span> </div>		

With the drag head buried in the sediment, the dredge moves forward cutting the shoaled sediment, thereby removing the sediment, along with water, in a slurry. The slurry is hydraulically vacuumed through drag arm to the hopper where it is temporarily stored. If the drag head or the drag arm become clogged during dredging, the drag head may be temporarily lifted out of the sediment, allowing water to be pumped through the drag arm to clear the clog. Once a cut is finished, the drag head is lifted out of the sediment, and water is pumped through the drag arm to clear sediment from the drag arm. Similar to priming, clearing clogs and sediment from the drag arm takes approximately 15 to 40 seconds, and occurs no more than 3 feet above the surface of the sediment. If the main pump is run in reverse to back flush a clog, the system will have to be re-primed.

The drag head does not have a watertight door or valve at the end that would prevent water from leaving the pipe. Once the drag head is lifted out of the water and the pipe reaches an angle that lets air into the pipe, the system is no longer closed (i.e., watertight). Sometimes, the drag heads must be lifted out of the water to manually open or close the water intake doors on the drag head; this requires the system to be re-primed before dredging can resume.

Both the *Essayons* and the *Yaquina* are equipped with four water intake doors directly on top of each of the drag heads (Figure 2-3). Each door is approximately 6 inches square. If the drag arms become clogged during dredging, one or more of the doors can be opened to draw water through the drag arm to facilitate flow. Dredging with all of the doors closed is preferable because it results in increased production; therefore, the doors are only temporarily opened to alleviate clogging. The doors are operated manually. To open the doors, the drag heads are lifted out of the water and the doors are tied back. Typically, the drag arms do not clog when dredging areas composed mostly of sand; however, in areas with more silt or mud, one or two doors may need to be opened.

**Figure 2-3**  
***Essayons* Drag Head and Water Intake Doors**



Once the hopper is full, or the 15-minute overflow limitation is met (discussed below), the drag heads are completely raised out of the water and positioned in their resting place on the side of the dredge, and the dredge transits to a placement site.

At the placement site, the hopper doors (at the bottom of the dredge's hull) open, and dredged material falls through the doors and settles on the floor of the placement site. Sandy material settles more quickly than finer-grained material (silts and clays), which tends to stay suspended in the water column longer. Water is used to flush the hopper bin. The water that is taken in at the bottom of the ship<sup>1</sup> and stored in the sea chest<sup>2</sup> is used to both cool the engines and flush the bins. On the *Yaquina* or a contractor hopper dredge, the water to flush the bin could also come from the drag arms. In conditions where the water is drawn from the drag arms, the drag arms are placed in the water just below the surface. In general, for drawing water in, the drag head must be maintained near the surface of the water because lowering it too

<sup>1</sup> The *Essayons* and *Yaquina* have screened water intake ports at the bottom of the hull which draw up water to cool the ship's engines; such water intake ports are typical features on ships for the purpose of obtaining engine cooling water.

<sup>2</sup> A sea chest is a water tank that is used with systems that use more than one pump to move water to flush the hopper and cool the engines. It compensates for the differences in inflow rate versus outflow rate, and allows for water to be pumped out at a constant rate without overrunning the rate at which water enters the tank, or being overrun by the rate at which water is supplied. Sea chests are typical features on ships for pumping engine-cooling water.

deep would compromise the maneuverability of the vessel, and pose a safety concern. The *Yaquina* uses a jetting system with a screened water intake on its sea chest. The *Yaquina* has four sea chests, two forward and two aft. The depth of the sea chests varies because of displacement. On the bow, it can vary from 8 to 16 feet deep, and on the stern, it can vary from 11 to 14 feet deep. The *Essayons* has six sea chests. Four are for flushing the hopper and two are for cooling the engines. The forward location varies from 12 to 25 feet deep, and the aft location varies from 18 to 29 feet deep. For both *Yaquina* and *Essayons*, the hopper is flushed after each in-Bay placement occurrence; this process takes 5 to 10 minutes.

It is often advantageous to overflow, or decant, excess water from hopper dredges to increase the sediment load carried; however, because of water quality concerns near the dredging site, overflow may be restricted. Overflow dredging occurs when the hopper is full of sediment slurry, and pumping continues to fill the hopper with water and sediment. The heavier, coarser material settles out to the bottom of the hopper; and lighter, finer sediments remain suspended in the water. For the first 6 to 7 minutes of dredging, all material dredged is retained in the hopper, then overflow begins. As dredging continues, excess water begins to fall back into San Francisco Bay. This excess water is called overflow, and is where fine material is returned to the water column. The amount of fine-grained material that is returned to the water column depends on the type of sediment being dredged. For hopper maintenance dredging in San Francisco Bay, overflow dredging is limited to 15 minutes at all times for fine-grained sediments; overflow is unrestricted for sandy sediments (i.e., greater than 80 percent sand) because there is little fine-grained material that remains suspended in the overflow.

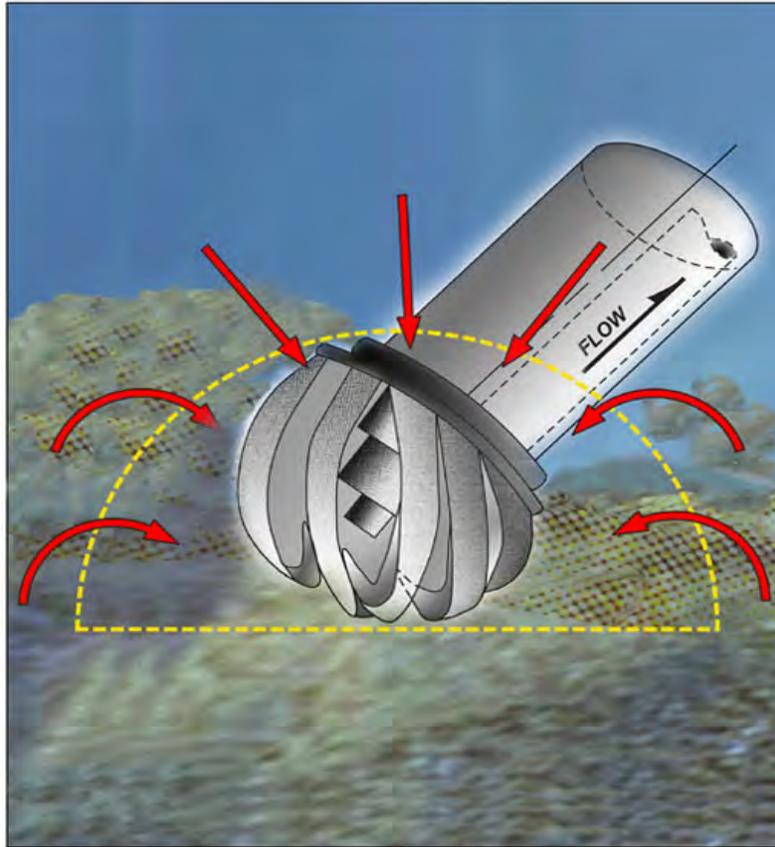
The *Essayons* overflow falls into overflow weirs (tubes that span from the top of the hopper bin to the bottom of the vessel) and into the water column at the level of the draft of the vessel. On the *Yaquina*, a skimmer, or pipe that floats on top of the sediment slurry inside of the sediment collection bin, removes excess water and drains it internally inside the ship's hull and into a collection tank, which then releases the water through a valve in the ship's hull below the surface of the water. Unlike the *Yaquina*, the *Essayons* is equipped with anti-turbidity valves on its overflow weirs, which reduce the water quality impacts caused by the dredging overflow process. Once the hopper is filled with water and sediment slurry, water and fine-grained sediment fall into the overflow weirs. The process of loading the hopper and overflow from the hopper tends to entrap air into the overflowed materials. This entrapment of air causes many fine materials, which might otherwise sink, to become buoyant and rise; or remain on the surface of the water. The anti-turbidity valves are butterfly-type valves that restrict the volume of water that can pass through the overflow tube. The anti-turbidity valves reduce the amount of air that is entrained in the overflow slurry water and cause the water level to back up the tube over the top of the weir. Instead of the water falling uncontrolled down into the overflow tube, the top half of the overflow tube and the weir become filled with water, then the water runs down the side of the overflow tube more evenly, without drawing in large amounts of air. By reducing the quantity of entrapped air in the overflows, the materials will more readily sink below the surface and settle back to the bottom more quickly, reducing turbidity.

When using a diesel-powered hopper dredge in California, the diesel generators on the hopper dredge must be equipped with timing retards and turbo charging to reduce nitrogen oxide emissions. The *Essayons'* and *Yaquina's* engines meet applicable (Tier II) standards. The USACE maintains the necessary air resource agency permits for operation of the *Essayons* and the *Yaquina*.

### **Cutterhead-Pipeline Dredges**

Cutterhead-pipeline dredges are hydraulic dredges that use a cutterhead at the end of a pipeline (Figure 2-4). A cutterhead-pipeline dredge has onboard pumps that suction material through one end, the intake pipe, and then push it out the discharge pipeline directly onto the placement site. Because cutterhead-pipeline dredges pump directly to the placement site, they operate continuously and can be more cost-efficient than other types of dredges.

**Figure 2-4  
Cutterhead Dredge Schematic**



Source: USACE Engineer Research and Development Center.

A cutterhead is a mechanical device that has rotating blades or teeth to break up or loosen the bottom material so that it can be suctioned through the dredge. Some cutterheads are rugged enough to break up and remove rock. Cutterhead-pipeline dredges work best in areas with deep shoals where the cutterhead is buried in the sediment. The pipeline is constructed of durable plastic material and is slightly buoyant, designed to float approximately 2 inches above the water's surface when empty, and to sink to the bottom when filled with the dredge slurry mixture. Water pumped with the dredged material must be contained in the placement site until the solids settle out. It is then discharged, usually back into the waterway. Cutterhead-pipeline dredges are not suitable for use in areas where sediments are contaminated with chemicals that would dissolve in the dredge water, and be spread to the environment during discharge.

Pipeline dredges are mounted on barges. Usually, they are not self-powered, and therefore are towed to the dredging site and secured in place by special anchor pilings, called spuds or pivot pipes. Once the dredge is positioned, the pipeline and cutterhead are lowered to the bottom of the channel by the ladder. The cutterhead then begins to slowly rotate, at about 30 revolutions per minute, breaking up the sediment. As it becomes buried in the sediment, the dredge pumps are on, and sediment slurry is suctioned through the pipeline to the placement site. During operation, the cutterhead swings from side to side, alternately using the port and starboard spuds as a pivot. Cables attached to anchors on either side of the dredge control its lateral movement and help "walk" the dredge forward.

Advantages of a cutterhead-pipeline dredge include the ability to excavate most types of material and pump it long distances; to operate continuously, and therefore economically; and to dredge some rock formations using larger machines without blasting. Limitations include being unsuitable for open, rough water projects; increased turbidity over ambient conditions during dredging; requiring towboats to move between locations; difficulties working in strong currents; and navigation impacts caused by the pipeline from the dredge to the disposal site, especially in areas of confined, heavy traffic.

### **Mechanical Dredges**

Mechanical dredges remove bottom sediments by direct application of mechanical force to dislodge sediments, scooping the sediments from the bottom and placing them into a barge or scow for transport to a dredged material placement site. Mechanical dredges can work in tightly confined areas, because they are mounted on a barge, towed to the dredging site, and secured in place by a system of anchors or anchor piling (i.e., spuds). Mechanical dredges allow for accuracy in the positioning of the equipment and the dredge cut. They are often used in harbors, around docks and piers, and in relatively protected channels, but may be less effective when dredging areas with high traffic or rough seas, because they can become unstable in these conditions. Additionally, mechanical dredges are effective for removal of moderately compacted materials, and are able to pick up large particles and debris; however, they are inefficient and unsuitable for light, free-flowing materials, and are unable to dig in relatively hard material.

Generally, two or more scows or barges are used in conjunction with the mechanical dredge. While one barge is being filled, another is being towed to the dredged material placement site. Using multiple barges, work can proceed continuously, only interrupted by changing scows/barges or moving the dredge. This makes mechanical dredges particularly well-suited for dredging projects where the disposal site is many miles away.

Often, water quality at dredging and disposal sites is a particularly important consideration in the choice of dredge equipment used. Hydraulic dredging can reduce disturbance and resuspension of sediments at the dredging site, and is often the first choice when dredging occurs in enclosed water bodies or in locations near aquatic resources that are especially sensitive to temporary increases in suspended solids or turbidity. However, because hydraulic dredging typically entrains additional water that is many times the volume of sediment removed, water management and water quality must be controlled at the placement site (hopper dredges are an exception). In contrast, mechanical dredging creates little additional water management concern at the disposal site, because little water is entrained by mechanical dredging equipment. However, typical mechanical dredge equipment often creates more disturbance and resuspension of sediment along the bottom of the dredging site as a result of mechanical force against the substrate. In addition, as the dredge is raised through the water column, sediment-laden water can leak from the clamshell, dipper, or other type of bucket, generating increased suspended solids throughout the vertical water column.

### **Clamshell Dredge**

A clamshell dredge employs a vertical-loading grabber connected to a wire rope (see Figure 2-5). Bucket, dipper, and backhoe dredges are also considered mechanical dredges, and operate similarly to clamshell dredges. Clamshells have the capability of using several diverse bucket configurations that optimize removal of different sediment types (e.g., silt, mud, clay, sand, gravel, rock, boulders). The dredge operates by lowering the vertical-loading grabber in the open position; the weight of the grabber penetrates the substrate; and the bucket is closed around the material, then raised above the level of the scow or barge and placed inside.

**Figure 2-5**  
**Clamshell Dredge**



Source: USACE Engineer Research and Development Center.

The loading grabbers/buckets can be sized up to 50 cubic yards (CY); however, most often 10- to 20-CY grabbers are used, and 1-CY buckets can be used for smaller projects. Larger, custom-fabricated sizes exist for special dredging projects. The depth at which a clamshell dredge can operate is determined by the length of the wire rope. Production rate is generally determined by cycle time, bucket size, dredging depth, type of material, thickness of cut, and transport equipment. Based on a study completed by USACE San Francisco District, dredging a channel with a clamshell bucket dredge can take up to ten times longer than dredging with a hopper dredge (USACE, 2013d).

Environmental buckets are used mainly for maintenance dredging because they are not configured for digging or excavating hard material. They resemble and operate like a regular clamshell bucket except they do not have digging teeth. They have a seal where the teeth would be on a normal clamshell bucket. This allows environmental buckets to retain most of the water and fine sediment that would typically escape a normal clamshell bucket. Although typically not required for USACE maintenance dredging contracts in San Francisco Bay, use of environmental buckets on mechanical dredges is at the discretion of the contractor; in some circumstances (e.g., dredging of contaminated sediments), use of environmental buckets may be required.

## **Barring and Knockdown Dredging**

### ***Barring***

The USACE implements “barring” as a routine part of dredging episodes to smooth out high-spots as needed after dredging has occurred. This method involves using a tug to pull a weighted blade across the channel bottom. As the blade encounters material, it scrapes the material into the adjoining areas with deeper depressions, redistributing the shoaled material in each channel. Barring is restricted to the dredging footprint and the project depth, including the over-dredge depth allowance.

### ***Knockdowns***

Separate from barring, which is implemented at the end of dredging episodes, “knockdown” events may be implemented to improve channel conditions between dredging episodes. Knockdowns use the same equipment and procedures as barring, but apply to isolated shoals or high-spots, rather than the entire dredging footprint. Knockdowns are most useful when time constraints may not allow for normal dredging, or when a

shoal threatening navigation covers a small portion of a project area that is otherwise at or below its permitted depth. Conducting separate knockdown operations is often more efficient than mobilizing dredging equipment and transporting the material to a disposal site. Because knockdowns typically create less resuspension than full dredging episodes (especially in the upper water column), they have at times been approved in the San Francisco Bay Area to minimize necessary work outside environmental work windows.

### **Transportation of Dredged Material**

Transportation methods generally used to move dredged material include the following: pipelines, hopper dredges, barges or scows, and rarely trucks or trains. Pipeline transport is the method most commonly associated with cutterhead, dustpan, and other hydraulic dredges. Dredged material may be directly transported by hydraulic dredges through pipelines for distances of up to several miles, depending on a number of conditions. Longer pipeline pumping distances are feasible with the addition of booster pumps, but the cost of transport greatly increases. Hopper dredges are capable of transporting the material for long distances in a self-contained hopper. Hopper dredges normally discharge the material from the bottom of the vessel by opening the hopper doors; however, some hopper dredges are equipped to pump out the material from the hopper,<sup>3</sup> much like a hydraulic pipeline dredge. Barges and scows, used in conjunction with mechanical dredges, are one of the most widely used methods of transporting large quantities of dredged material over long distances. Truck and train transport is typically more expensive than barge transport; it is generally only used for transport of material not suitable for unconfined aquatic disposal that requires rehandling (i.e., movement of the material to a secondary placement site after it has dried).

### **Material Placement or Disposal Operations**

Selection of proper dredging and transport equipment and techniques must be compatible with disposal site and other management requirements. Disposal or placement options are open-water disposal, confined disposal, and beneficial reuse. Although some placement sites are primarily characterized as open-water or confined disposal, they may also provide for beneficial reuse (e.g., the Ocean Beach nearshore placement site [SF-17]). Each of these options involves its own set of unique considerations, and selection of an option is based on environmental, technical, and economic considerations.

#### ***Open-Water Disposal***

Dredged material can be placed in open-water sites using direct pipeline discharge, direct mechanical placement, or release from hopper dredges or scows. The potential for environmental impacts is affected by the physical behavior of the open-water discharge. The physical behavior of the discharge depends on the type of dredging and disposal operation used, the nature of the material (its physical characteristics), and the hydrodynamics of the disposal site. For San Francisco Bay dredging projects, open-water disposal, also referred to as unconfined aquatic disposal, occurs at both designated in-Bay sites and open-ocean locations west of the Golden Gate Bridge.

Open-water disposal sites can be either predominantly nondispersive or predominantly dispersive. At predominantly nondispersive sites, most of the material is intended to remain on the bottom following placement, and may be placed to form mounds. At predominantly dispersive sites, the material may be dispersed either during placement, or eroded from the bottom over time and transported away from the disposal site by currents and/or wave action. However, both predominantly dispersive and predominantly nondispersive sites can be managed in a number of ways to achieve environmental objectives or reduce potential operational conflicts.

#### ***Confined Disposal***

Confined disposal is placement of dredged material in diked nearshore or upland confined disposal facilities (CDFs) by way of pipeline or other means. CDFs may be constructed as upland sites;

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<sup>3</sup> The *Essayons* and *Yaquina* do not currently have pump-out capabilities.

nearshore sites with one or more sides in water (sometimes called intertidal sites); or as an island containment area. There are presently no CDFs in the San Francisco Bay area.

The main objectives inherent in design and operation of CDFs are to provide for adequate storage capacity for meeting dredging requirements; to maximize efficiency in retaining solids; and to control the release of any contaminants present in the dredged material.

When the dredged material is initially deposited in the CDF, it may occupy several times its original volume because of water content. The settling process is a function of time, but the sediment will eventually consolidate to its in situ volume or less if desiccation (drying) occurs. Adequate volume must be provided during the dredging operation to contain both the original volume of sediment to be dredged, and any water added during dredging and placement.

### **Beneficial Reuse**

For a project to be considered a beneficial reuse site, it must demonstrate that what it proposes to accomplish is needed, that its benefits outweigh any environmental impacts or trade-offs, and that these impacts will be mitigated. Generally, beneficial reuse includes habitat development (restoration and enhancement), levee maintenance and rehabilitation, various uses at existing sanitary landfills; agricultural use; development of commercial products (e.g., low-density aggregate, soil supplements), and general construction uses. Use categories other than habitat restoration or levee maintenance and stabilization often require dredged material processing at a rehandling facility prior to reuse. Rehandled/processed dredged material can be used for habitat restoration and levee maintenance and rehabilitation when direct barge access is not possible, or material stockpiling capacity is limited. Beneficial reuse placement sites are present in the uplands, diked former baylands, and wetlands surrounding the margins of San Francisco Bay.

### **2.3.2 No Action/No Project Alternative**

Under NEPA, in cases where the project involves modification of an existing program or management plan, No Action may be defined as no change from current program implementation, or no change in management direction or intensity. As such, the No Action Alternative may be thought of in terms of continuing with the present course of action until that action is changed. Similarly, Section 15126.6 (e)(3)(A) of the CEQA Guidelines states that “when the project is the revision of an existing land use or regulatory plan, policy or ongoing operation, the no project alternative will be the continuation of the existing plan, policy or operation into the future.” Therefore, under the No Action/No Project Alternative, USACE would continue current maintenance dredging practices for the projects it maintains in San Francisco Bay (Table 2-2), and the Regional Water Board would consider issuing a water quality certification (WQC) based on USACE’s current dredging practices. Current maintenance dredging practices were determined through a review of maintenance dredging activities for fiscal year (FY) 2000 through FY 2012 to determine the typical dredge equipment type, frequency of dredging, volumes dredged, and placement site(s) for each specific maintenance dredging project. Table 2-2 and the following sections describe maintenance dredging and placement activities that would occur under the No Action/No Project Alternative, based on these current practices.<sup>4</sup> Some historic placement sites have reached capacity and would not be available for use; these sites are not included under the No Action/No Project Alternative. For all dredged material determined not suitable for unconfined aquatic disposal (NUAD), placement options include upland sites, and in some cases the Montezuma Wetlands Restoration Project (MWRP).

Under the No Action/No Project Alternative, dredging and placement would be conducted in accordance with the following:

- Dredging at each project location would continue to be limited to the design (i.e., regulatory) depth, with no more than 2 feet of over-depth allowance;

<sup>4</sup> Under any alternative, the channels proposed for dredging with a hydraulic dredge could also be dredged with a mechanical dredge, with the exception of the San Francisco Bay Main Ship Channel; however, for the purpose of the analysis in the EA/EIR, use of a hydraulic dredge was assumed because that is the equipment typically used.

Channel	Dredge Type	Typical Dredging Frequency (years)	Range of Volume Dredged per Episode (CY) <sup>1</sup>	Median Volume Dredged Per Episode (CY) <sup>2</sup>	Placement Site
Richmond – Inner Harbor Outer Harbor	Clamshell-Bucket	1	11,000 – 631,000	390,000	SF-DODS, SF-11 <sup>3</sup>
	Hopper	1	78,000 – 318,000	190,000	SF-11
San Francisco Harbor – Main Ship Channel	Hopper	1	78,000 – 613,000	306,000	SF-8, SF-17
Napa River Channel*	Cutterhead-Pipeline	6-10	140,000 <sup>4</sup>	140,000 <sup>4</sup>	Upland (Sponsor Provided)
Petaluma River Channel (and Across the Flats*)	Cutterhead-Pipeline (River Channel) Clamshell-Bucket (Across the Flats)	4-7	250,000 <sup>4</sup>	250,000 <sup>4</sup>	Upland (Sponsor Provided) for the River Channel SF-10 for Across the Flats
San Rafael Creek Channel	Clamshell-Bucket	4-7	78,000 – 87,000 <sup>4</sup>	83,000 <sup>4</sup>	SF-11
Pinole Shoal	Hopper	1	80,000 – 487,000	146,000	SF-10
Suisun Bay Channel and New York Slough	Hopper	1	21,000 – 423,000	159,000	SF-16
Oakland Inner and Outer Harbor	Clamshell-Bucket	1	122,000 – 1,055,000 <sup>5</sup>	330,000	SF-DODS, MWRP
San Leandro Marina (Jack D. Maltester Channel)	Cutterhead-Pipeline	4-6	121,000 – 187,000 <sup>4</sup>	154,000 <sup>4</sup>	Upland (Sponsor Provided)
Redwood City Harbor	Clamshell-Bucket (Harbor Channels) San Bruno Channel (Hopper)	1-2	10,000 – 560,000	179,000	SF-11

## Notes:

\* For areas not dredged since 2000, the last dredging event is reported.

<sup>1</sup> Range of volume dredged per fiscal year since 2000 (USACE, 2014). For areas not dredged since 2000, the last dredging event is reported.

<sup>2</sup> Median volume dredged per fiscal year since 2000. For areas not dredged since 2000, the last dredging event is reported.

<sup>3</sup> SF-11 was used for Richmond Inner Harbor during the 2000 to 2012 baseline period, but is no longer approved as a placement option for Richmond Inner Harbor.

<sup>4</sup> Due to the lower frequency at which these channels are dredged, future dredge volumes could be greater.

<sup>5</sup> Due to the deepening of Oakland Harbor completed in 2010, future dredge volumes could be greater.

CY = cubic yards

MWRP = Montezuma Wetlands Restoration Project (in Solano County)

SF-8 = San Francisco Bar Channel Disposal Site (ocean site)

SF-10 = San Pablo Bay placement site (in-Bay site)

SF-11 = Alcatraz Island placement site (in-Bay site)

SF-16 = Suisun Bay placement site (in-Bay site)

SF-17 = Ocean Beach placement site (nearshore site, includes the Ocean Beach demonstration site)

SF-DODS = San Francisco Deep Ocean Disposal Site (approximately 55 miles [48 nautical miles] west of Golden Gate)

- Knockdowns may be performed in all locations except the San Francisco Main Ship Channel;
- No overflow would be discharged from any barge, with the exception of spillage incidental to clamshell dredge operations;
- Overflow from hopper-type suction dredges would continue to be limited to no longer than 15 minutes at the dredge site during any one excavation action (cut). Overflow would be unrestricted when dredging material is greater than 80 percent sand;
- Dredging and disposal activities would continue to be limited to the work windows set out by CDFW, the National Marine Fisheries Service (NMFS), and the USFWS in their Biological Opinions on the LTMS (USFWS, 1999; USFWS, 2004a; NMFS 1998)<sup>5</sup> (Figure 2-6). Work conducted outside of the work windows would require written approval from the appropriate agencies;
- Dredging would stop immediately following any fuel or hazardous waste leaks or spills, and cleanup actions would be implemented; and
- During dredging and disposal activities, notes to mariners and navigational warning markers would continue to be used as needed to prevent navigational hazards for recreational boaters.

Additionally, as determined through previous coordination with CDFW and USFWS, the following measures would continue to be implemented for hydraulic dredging to protect longfin smelt and delta smelt:

- Dredging may proceed anywhere when water temperature exceeds 22.0 degrees Celsius;<sup>6</sup>
- No dredging would occur in water ranging from 0 to 5 parts per thousand salinity between December 1 and June 30;
- At the beginning and end of each hopper load, pump priming, drag head clearing, and suction of water would be conducted within 3 feet of the seafloor.
- Hopper drag head suction pumps would be turned off when raising and lowering the dragarms from the seafloor when turning the dredge vessel; and
- The USACE would implement a worker education program for listed fish species that could be adversely impacted by dredging. The program would include a presentation to all workers on biology, general behavior, distribution and habitat needs, sensitivity to human activities, legal protection status, and project-specific protective measures. Workers would also be provided with written materials containing this information.<sup>7</sup>

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<sup>5</sup> NMFS is revising the 1998 LTMS programmatic biological opinion; the updated biological opinion (expected 2015) will supersede the 1998 document. The USACE will comply with the terms and conditions of the updated biological opinion. The revised biological opinion may expand the salmonid work windows to year-round if dredging is conducted with a clamshell dredge and dredged material is placed at a beneficial reuse site that NMFS agrees will provide aquatic habitat benefits, such as a tidal wetlands restoration. Should the updated biological opinion allow for this, USACE may opt to dredge certain federal navigation channels with a clamshell dredge outside the work windows and place sediment at a beneficial reuse site. All other dredging outside the work window (i.e., hydraulic dredging or clamshell dredging with placement at a non-beneficial reuse site) would require consultation with NMFS.

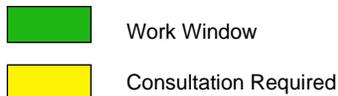
<sup>6</sup> To the extent feasible, hydraulic dredging in the Napa and Petaluma rivers and San Leandro Marina would only occur when water temperatures are above 22 degrees Celsius. If hydraulic maintenance dredging occurs when water temperatures are less than 22 degrees Celsius, USACE would coordinate mitigation, as appropriate, with USFWS, NMFS, and CDFW at the times such dredging episodes occur.

<sup>7</sup> The USACE has implemented this program in compliance with a condition in the San Francisco Bay Conservation and Development Commission's Letter of Agreement for USACE's coastal zone consistency determination for maintenance dredging in San Francisco Bay. Although the condition in the Letter of Agreement was specific to longfin smelt, USACE's worker education program, overseen by a USACE regional fisheries biologist, also includes information on other special-status fish species that could be impacted by dredging activities (i.e., those fish species considered in the LTMS work windows).

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Site	Species	Jan	Jan	Feb	Feb	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sep	Sep	Oct	Oct	Nov	Nov	Dec	Dec
		1-15	16-31	1-15	16-28	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31
SF Bay Bridge to Sherman Island	Chinook Salmon and Steelhead	Yellow										Green													
Carquinez Bridge to Collinsville	Delta Smelt Water ≤ 10' (1)	Yellow																							
	Delta Smelt Water >10' (1)	Yellow												Green											
Napa and Petaluma Rivers, Sonoma Creek	Steelhead	Yellow												Green						Yellow					
Napa River	Delta Smelt	Green		Yellow										Green											
North SF Bay & San Pablo Bay shallow berthing areas	Dungeness Crab	Green								Yellow				Green											
Richardson Bay North and South Bay	Pacific Herring	Yellow				Green																Yellow			
Waters of Marin County from the Golden Gate Bridge to Richmond-San Rafael Bridge	Coho Salmon	Yellow										Green										Yellow			
Berkeley Marina to San Lorenzo Creek within 1 mile of coastline	California Least Tern	Green				Yellow										Green									
Central Bay	Pacific Herring	Yellow				Green																Yellow			
South of Highway 92 Bridge (San Mateo-Hayward)	California Least Tern	Green								Yellow								Green							
In Areas with Eelgrass Beds	California Least Tern	Yellow																							
Baywide in Areas of Salt Marsh Habitat	Ridgway's Rail	Yellow																							
Baywide within 250 feet of Salt Marsh Habitat	Ridgway's Rail	Green		Yellow										Green											
In and Adjacent to Salt Marsh Habitat	Salt Marsh Harvest Mouse	Yellow																							
Within 300' of known roost site	California Brown Pelican	Green										Yellow										Green			

Source: (USFWS, 1999; USFWS, 2004a; NMFS 1998)



Note:  
 This chart is for operations and maintenance dredging of existing navigational facilities.  
 Other species may be affected by work in other areas. For more detailed information, see Appendix F of the LTMS Management Plan or the LTMS EIR/EIS.

(1) Depths are represented in MLLW, and are project depth, not including over dredge allowance.

### LTMS MAINTENANCE DREDGING WORK WINDOWS BY AREA AND SPECIES

Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers

April 2015

Bay Area, California



**FIGURE 2-6**

The USACE would meet all federal environmental compliance requirements (e.g., Clean Water Act Sections 401 and 404, Endangered Species Act), including those federal requirements implemented by state agencies (e.g., Clean Water Act Section 401, Coastal Zone Management Act). The USACE would undertake mitigation, as appropriate, in meeting its compliance requirements. In the past, USACE purchased a total of 1.4 mitigation credits at the Liberty Island Conservation Bank for potential impacts to listed species for 2011 and 2012 maintenance dredging activities in San Francisco Bay.

## **Richmond Harbor**

### ***Inner Harbor (excluding the Santa Fe Channel)***

The inner reaches of Richmond Channel, excluding the Santa Fe Channel, would be dredged annually using clamshell-bucket equipment. Placement of the dredged material normally would occur at the San Francisco Deep Ocean Disposal Site (SF-DODS). Maintenance dredging activities would occur for a period of approximately 45 days between June 1 and November 30, as feasible. Annually, the volume of dredged material generated by the Inner Harbor Channel would range between 11,000 and 631,000 CY; the median volume of dredged material for the 10-year planning horizon would be approximately 390,000 CY. The Santa Fe Channel is not anticipated to be dredged within the planning horizon (i.e., 2015 through 2024).

### ***Outer Harbor Channel (Long Wharf and Southampton Shoal)***

The Long Wharf and Southampton Shoal portions of the Outer Harbor would be dredged annually using a hopper dredge. Placement of the dredged material normally would occur at SF-11. Maintenance dredging activities would occur for a period of approximately 5 to 8 days between June 1 and November 30, as feasible. Annually, the volume of dredged material generated by the Outer Harbor Channel would range between 78,000 and 318,000 CY; the median volume of dredged material for the 10-year planning horizon would be approximately 190,000 CY.

## **San Francisco Harbor – Main Ship Channel**

The San Francisco Harbor Main Ship Channel would be dredged annually using a hopper dredge. Maintenance dredging activities would occur for a period of approximately 10 to 14 days in the months of May and June, but may occur as late as September. Dredging of the Main Ship Channel typically occurs with USACE's hydraulic dredge, *Essayons*, with the precise timing dependent on the sea conditions being such that this large hopper dredge can safely operate. Dredged material normally would be transported to either the San Francisco Bar Channel Disposal Site (SF-8) or SF-17 via a hopper dredge and deposited by open-water dumping. Annually, the volume of dredged material generated by the San Francisco Harbor Main Ship Channel would range between 78,000 and 613,000 CY; the median volume of dredged material for the 10-year planning horizon would be approximately 306,000 CY.

## **Napa River Channel**

The Napa River Channel would be dredged every 6 to 10 years. Dredging normally would be accomplished using a cutterhead attached to hydraulic pipelines that convey the dredged material to a scow, or directly to a permitted upland placement site provided by the project sponsor (e.g., Imola Avenue). Maintenance dredging activities would occur for a period of approximately 40 days between August 1 and October 15, if feasible. The volume of dredged material generated by the Napa River Channel per dredge event would be approximately 140,000 CY; however, because of the lower frequency at which this channel is dredged, future dredge volumes could be greater than historical volumes.

## **Petaluma River Channel (River Channel and Across the Flats)**

The Petaluma River Channel would be dredged every 4 to 7 years. Dredging of the River Channel normally would be accomplished using a cutterhead attached to hydraulic pipelines that convey the

dredged material to a scow, or directly to a permitted upland placement site provided by the project sponsor. Dredging of Across the Flats would be accomplished using a clamshell dredge, and placement would occur at the San Pablo Bay placement site (SF-10). Maintenance dredging of the River Channel would occur for a period of approximately 65 days between August 1 and October 15, if feasible. Maintenance dredging of Across the Flats would occur for a period of approximately 45 days between June 1 and November 30, if feasible. The volume of dredged material generated by the Petaluma River Channel per dredge event would be approximately 250,000 CY; however, because of the lower frequency at which this channel is dredged, future dredge volumes could be greater than historical volumes.

### **San Rafael Creek Channel (Across the Flats Channel and Inner Canal Channel)**

The San Rafael Creek Channel, which includes Across the Flats Channel and Inner Canal Channel, would be dredged every 4 to 7 years using a clamshell dredge. Placement of dredged material normally would occur at SF-11. Maintenance dredging activities would occur for a period of approximately 35 days between June 1 and November 30, if feasible. The volume of dredged material generated by the San Rafael Creek Channel would range between 78,000 and 87,000 CY; the median volume of dredged material for the 10-year planning horizon would be approximately 83,000 CY.

Inner Canal Channel has a known area of NUAD material. If this area is dredged, the NUAD material would be placed at a placement site approved for receipt of NUAD material, as determined by the Dredged Material Management Office. If necessary based on sediment testing results, the NUAD material would ultimately be placed at a landfill.

### **Pinole Shoal Channel**

The Pinole Shoal Channel would be dredged annually using a hopper dredge. Placement of dredged material normally would occur at SF-10. Maintenance dredging activities would occur for a period of approximately 5 to 15 days between June 1 and November 30, if feasible. Annually, the volume of dredged material generated by the Pinole Shoal Channel would range between 80,000 and 487,000 CY; the median volume of dredged material for the 10-year planning horizon would be approximately 146,000 CY.

Advance maintenance may be performed in areas where it has previously been conducted. This includes the southern edge of the channel, between buoy markers 10 and 12; and further east along the northern edge of the channel starting at buoy marker 11 to just east of buoy 13. The extent of the advance maintenance dredging in these two areas would be 200 feet wide and 2 feet deep.

### **Suisun Bay Channel and New York Slough Channel**

The Suisun Bay Channel and New York Slough Channel would be dredged annually using a hopper dredge. Placement of dredged material normally would occur at the Suisun Bay placement site (SF-16). Maintenance dredging activities would occur for a period of up to 30 days between August 1 and November 30, if feasible. Annually, the volume of dredged material generated by the Suisun Bay Channel and the New York Slough Channel would range between 21,000 and 423,000 CY; the median volume of dredged material for the 10-year planning horizon would be approximately 159,000 CY.

At Bulls Head Reach, past maintenance has included dredging up to 4 feet of advance maintenance material to accommodate rapid shoaling. This practice would continue to be reviewed annually, and implemented as warranted during the regularly scheduled maintenance dredging with a hopper dredge. In the case of Bulls Head Reach Shoal, USACE typically elects advance maintenance every year because that area shoals faster than the annual dredging cycle, and it is essential for USACE to maintain the utility of the channel as long as possible before needing to address any shoaling issues outside of the work

window. In recent years, advance maintenance at Bulls Head Reach has reduced USACE's critical dredging episodes<sup>8</sup> outside of the work window.

### **Oakland Harbor (Inner and Outer Harbor)**

The Oakland Inner and Outer Harbor would be dredged annually using a clamshell. Placement of dredged material normally would occur at the SF-DODS and MWRP or other upland beneficial reuse sites. Dredging activities would occur for a period of approximately 60 days between August 1 and November 30, if feasible. Annually, the volume of dredged material generated by the Oakland Harbor would range between 122,000 and 1,055,000 CY; the median volume of dredged material for the 10-year planning horizon would be 330,000 CY.

### **San Leandro Marina (Jack D. Maltester) Channel**

The San Leandro Marina Channel would be dredged every 4 to 6 years using a cutterhead and pipeline. Placement of dredged material normally would occur at a permitted upland location (e.g., San Leandro Dredged Material Management Site), which would likely be provided by the nonfederal sponsor, the City of San Leandro. Maintenance dredging activities would occur for a period of approximately 45 days between August 1 and November 30, if feasible. Annually, the volume of dredged material generated by the San Leandro Marina would range between 121,000 and 187,000 CY; the median volume of dredged material for the 10-year planning horizon would be approximately 154,000 CY.

### **Redwood City Harbor Channel**

The Redwood City Harbor Channel would be dredged every 1 to 2 years, except for the San Bruno Channel, which would be dredged every 10 years. Dredging of the San Bruno Channel would be accomplished using a hopper dredge. Dredging of the remainder of the harbor would be accomplished using a clamshell dredge. Placement of dredged material normally would occur at SF-11. Maintenance dredging activities would occur for a period of approximately 45 days between August 1 and November 30, if feasible, for San Bruno Channel; and between September 16 and November 30, if feasible, for the remainder of the harbor. Annually, the volume of dredged material generated by the Redwood City Harbor Channel would range between 10,000 and 560,000 CY; the median volume of dredged material for the 10-year planning horizon would be approximately 179,000 CY.

### **2.3.3 Proposed Action/Project**

Under USACE's Proposed Action/Project Alternative, USACE would perform dredging practices for the projects it maintains in San Francisco Bay. The dredge equipment type, frequency of dredging, and volumes dredged would be the same as under the No Action/No Project Alternative. Table 2-3 identifies the federal standard placement site and proposed alternate placement sites that would be used for each location, as well as expected dredge volumes. The USACE would beneficially reuse dredged material for to the maximum extent its authorities allow. Although it is assumed, for the purpose of this EA/EIR, that placement would occur at the identified federal standard<sup>9</sup> sites,<sup>10</sup> USACE would place dredged material at beneficial reuse sites when costs are equivalent to the federal standard or a cost-sharing partner is

<sup>8</sup> Critical dredging episodes occur outside the regular annual maintenance dredging of Suisun Bay Channel to remove a hazard to navigation when the channel is less than 35 feet MLLW in the area of the shoal.

<sup>9</sup> The federal standard is defined as the least-costly dredged material disposal or placement alternative consistent with sound engineering practices, and meeting the environmental standards established by the Section 404(b)(1) evaluation process or ocean dumping criteria (33 C.F.R. § 335.7).

<sup>10</sup> The USACE may be forced by logistical constraints to use the alternate placement sites. Examples of logistical constraints include: 1) unsafe condition at the placement site (e.g., weather/wave conditions); 2) an event blocking access to a placement site (this occurred during America's Cup 34); and 3) the federal standard site reaching its monthly disposal limit (as established by the Bay Plan and Basin Plan).

<b>Channel</b>	<b>Dredge Type</b>	<b>Typical Dredging Frequency (years)</b>	<b>Range of Volume Dredged per Episode (CY)<sup>1</sup></b>	<b>Median Volume Dredged Per Episode (CY)<sup>2</sup></b>	<b>Federal Standard Placement Site<sup>3</sup></b>	<b>Placement Site Alternate 1<sup>4</sup></b>	<b>Placement Site Alternate 2<sup>4</sup></b>	<b>Placement Site Alternate 3<sup>4</sup></b>
Richmond Inner Harbor	Clamshell-Bucket	1	11,000 – 631,000	390,000	SF-DODS	Upland Beneficial Reuse	Other In-Bay Site	N/A
Outer Harbor	Hopper	1	78,000 – 318,000	190,000	SF-11	Other In-Bay Site	Upland Beneficial Reuse	N/A
San Francisco Harbor – Main Ship Channel	Hopper	1	78,000 – 613,000	306,000	SF-8	SF-17	Ocean Beach Onshore	SF-11
Napa River Channel*	Cutterhead-Pipeline	6-10	140,000 <sup>5</sup>	140,000 <sup>5</sup>	Upland (Sponsor Provided)	Other Upland Site	SF-9 for downstream reach only	N/A
Petaluma River Channel (and Across the Flats*)	Cutterhead-Pipeline (River Channel) Clamshell-Bucket (Across the Flats)	4-7	250,000 <sup>5</sup>	250,000 <sup>5</sup>	Upland (Sponsor Provided) for the River Channel; SF-10 for Across the Flats	Upland Beneficial Reuse	Other In-Bay Site	N/A
San Rafael Creek Channel	Clamshell-Bucket	4-7	78,000 – 87,000 <sup>5</sup>	83,000 <sup>5</sup>	SF-11	Other In-Bay Site	Upland Beneficial Reuse	N/A
Pinole Shoal	Hopper	1	80,000 – 487,000	146,000	SF-10	Other In-Bay Site	Upland Beneficial Reuse	Ocean Beach Onshore
Suisun Bay Channel and New York Slough <sup>6</sup>	Hopper	1	21,000 – 423,000	159,000	SF-16	Other In-Bay Site	Upland Beneficial Reuse	Ocean Beach Onshore for New York Slough only
Oakland Inner and Outer Harbor	Clamshell-Bucket	1	122,000 – 1,055,000 <sup>7</sup>	330,000	SF-DODS	Upland Beneficial Reuse	In-Bay Site	N/A

**Table 2-3  
Proposed Action/Project Summary (Continued)**

<b>Channel</b>	<b>Dredge Type</b>	<b>Typical Dredging Frequency (years)</b>	<b>Range of Volume Dredged per Episode (CY)<sup>1</sup></b>	<b>Median Volume Dredged Per Episode (CY)<sup>2</sup></b>	<b>Federal Standard Placement Site<sup>3</sup></b>	<b>Placement Site Alternate 1<sup>4</sup></b>	<b>Placement Site Alternate 2<sup>4</sup></b>	<b>Placement Site Alternate 3<sup>4</sup></b>
San Leandro Marina (Jack D. Maltester Channel)	Cutterhead-Pipeline	4-6	121,000 – 187,000 <sup>5</sup>	154,000 <sup>5</sup>	Upland (Sponsor Provided such as San Leandro DMMS)	In-Bay Site	Upland Beneficial Reuse	N/A
Redwood City Harbor	Clamshell-Bucket (Harbor Channels) Hopper (San Bruno Channel)	1-2	10,000 – 560,000	179,000	SF-11	Other In-Bay Site	Upland Beneficial Reuse except for San Bruno Channel; SF-DODS for San Bruno Channel	Upland Beneficial Reuse for San Bruno Channel only

Notes:

- \* For areas not dredged since 2000, the last dredging event is reported.
- <sup>1</sup> Range of volume dredged per fiscal year since 2000. For areas not dredged since 2000, the last dredging event is reported.
- <sup>2</sup> Median volume dredged per fiscal year since 2000. For areas not dredged since 2000, the last dredging event is reported.
- <sup>3</sup> The federal standard is defined as the least-costly dredged material disposal or placement alternative consistent with sound engineering practices, and meeting the environmental standards established by the 404(b)(1) evaluation process or ocean dumping criteria (33 C.F.R. pt. 335.7).
- <sup>4</sup> The USACE would not use the future placement sites identified in Section 1.5.4 until supplemental environmental review under NEPA and/or CEQA and acquisition of required environmental approvals from resource and regulatory agencies are completed.
- <sup>5</sup> Due to the lower frequency at which these channels are dredged, future dredge volumes could be greater.
- <sup>6</sup> Aside from regularly scheduled maintenance of this navigation project, USACE would take urgent action outside the work window, as needed, to remove the hazardous shoaling at Bulls Head Reach, as described in Section 2.3.3.
- <sup>7</sup> Due to the deepening of Oakland Harbor completed in 2010, future dredge volumes could be greater.

CEQA = California Environmental Quality Act

CY = cubic yards

NEPA = National Environmental Policy Act

Ocean Beach Onshore = Onshore Ocean Beach placement site

San Leandro DMMS = Upland San Leandro Dredged Material Management Site

SF-8 = San Francisco Bar Channel Disposal Site (ocean site)

SF-9 = Carquinez Strait placement site (in-Bay site)

SF-10 = San Pablo Bay placement site (in-Bay site)

SF-11 = Alcatraz Island placement site (in-Bay site)

SF-16 = Suisun Bay placement site (in-Bay site)

SF-17 = Ocean Beach placement site (nearshore site, includes the Ocean Beach demonstration site)

SF-DODS = San Francisco Deep Ocean Disposal Site (approximately 55 miles [48 nautical miles] west of Golden Gate)

USACE = United States Army Corps of Engineers

supporting the beneficial reuse. For all NUAD material, placement options include upland sites, and in some cases MWRP. The USACE would not use the future placement sites identified in Section 1.5.4 until supplemental environmental review under NEPA and/or CEQA, and acquisition of required environmental approvals from resource and regulatory agencies is completed.

Dredging and placement would be conducted in accordance with the conditions described under the No Action/Project Alternative. In addition, USACE would implement the following best management practices (BMPs) to minimize impacts to longfin smelt and delta smelt:

- Completing hydraulic dredging in the Central Bay later in the year (from August 1 to November 30) during the June-to-November environmental dredging window, to the extent feasible,<sup>11</sup> to allow young-of-the-year longfin smelt to grow large and spawning adults to return upstream;
- Completing hydraulic dredging in Suisun Bay between August 1 and September 30, to the extent feasible, to avoid impacts to spawning adult longfin and delta smelt;
- Maintaining contact of drag head, cutterheads, and pipeline intakes with the seafloor during suction dredging;<sup>12</sup> and
- Closing the drag head water intake doors in locations most vulnerable to entraining or entrapping smelt. In circumstances when the doors need to be opened to alleviate clogging, the doors would be opened incrementally (i.e., the doors would be opened in small increments and tested to see if the clog is removed) to ensure that doors are not fully opened unnecessarily. It may take multiple iterations to fine tune the exact intake door opening necessary to prevent clogging. For each project, the intake door opening will be different because the sediment in each location is different. The sediment physical characteristics (e.g., sand versus mud) determine how much water is needed to slurry the sediment adequately. Typically, the drag arms do not clog when dredging areas composed mostly of sand.

The USACE would purchase 0.92 acre mitigation credit at the Liberty Island Conservation Bank, or other approved site, annually for potential impacts to listed species. The 0.92 acre mitigation credit was calculated from an equation ( $3.0 \text{ million acre-feet} / 800 \text{ acres} = \text{volume dredged} / X \text{ acres of mitigation habitat}$ ) that was developed by resource agencies to determine mitigation requirements for other projects with entrainment impacts as a result of pumping water, including the State Water Project. For volume dredged, available government-hopper-dredge-pumped total sediment and water volumes for 2006 through 2012 were reviewed. The highest volume for each of the in-Bay channels (Pinole Shoal, Richmond Outer Harbor, and Suisun Bay Channel/New York Slough) from this period was used in the calculation. Of the 0.92 acre mitigation credit, 0.19 acre mitigation credit would be for Pinole Shoal, 0.34 acre mitigation credit would be for Richmond Outer Harbor, and 0.39 acre mitigation credit would be for Suisun Bay Channel and New York Slough.

To the extent feasible, hydraulic dredging in the Napa and Petaluma rivers and San Leandro Marina would only occur when water temperatures are above 22 degrees Celsius. If hydraulic maintenance dredging occurs when water temperatures are less than 22 degrees Celsius, USACE would coordinate mitigation, as appropriate, with USFWS, NMFS, and CDFW at the times such dredging episodes occur. For hydraulic dredging of San Bruno Shoal, USACE would conduct compensatory mitigation using the

<sup>11</sup> Feasibility is contingent upon the availability of federal funds (e.g., timing of Congressional appropriations) to execute the dredging work, as well as by the availability of dredging equipment to perform the dredging work at the referenced time and locations.

<sup>12</sup> The seafloor surface is not uniform and is undulating, which could cause the drag head to lose contact with the seafloor. The hopper dredge also has to contend with sea state (i.e., swells and wave action) in the bay which also affects the drag head's contact with the channel bottom. The dredge's swell compensator provides an opposing force to maintain contact with the seafloor when the bottom is uneven or there is wave/swell action.

equation above; however, because this channel is so rarely dredged and volumes are not known, USACE would determine the amount of mitigation when/if this channel is dredged.

In addition, an approximate 1/2-mile portion of Bulls Head Reach, just east of the Benicia-Martinez Bridge in Suisun Bay Channel, shoals rapidly and becomes a navigation hazard that requires urgent action by USACE to maintain navigational safety in a critical maneuvering area. Knockdown and barring activities in lieu of dredging have not been effective tools in managing the rapid shoaling in this area. Because of the channel configuration, sediment type, and currents, the sediment that is dislodged during knockdown/barring gets trapped in the eddy that creates the shoal and is re-deposited in the same shoal area. If the shoaling is allowed to progress unabated, it would naturally develop into a sand bar that would stretch across the channel. The shoal restricts the available draft and handling of ships that transit to the Ports of Stockton and West Sacramento, and other locations along the channel.

The shoal becomes a hazard to navigation when the channel is shallower than 35 feet mean lower low water (MLLW) because of the increased risk of a ship grounding or allision,<sup>13</sup> which could result in an oil spill or release of other hazardous material into the environment. The shoal has developed to hazardous levels in the spring and early summer, outside the Suisun Bay Channel dredging work window of August 1 through November 30.

The United States Coast Guard considers shoaling in Bulls Head Reach to be a hazard to navigation for deep draft vessels transiting Suisun Bay when the channel is shallower than 35 feet MLLW, particularly because it is in the Benicia-Martinez Railroad Drawbridge Regulated Navigation Area where it is critical for vessels to be in the center of the 350-foot-wide channel to safely pass under the bridge (USCG, 2012a). In the past, USACE has been requested by the United States Coast Guard to make an emergency<sup>14</sup> declaration to conduct maintenance dredging of this area outside of the LTMS work window, and completed NEPA and other environmental compliance requirements pursuant to the Clean Water Act, federal Endangered Species Act, and the Coastal Zone Management Act after the maintenance dredging occurred. Table 2-4 presents the critical dredging episodes at Bulls Head Reach from 2000 through 2012.

Under the Proposed Action, USACE would take urgent<sup>15</sup> action outside the work window, as needed, to remove the hazardous shoal at Bulls Head Reach, in a manner consistent with USACE's Raise the Flag Procedure.<sup>16</sup> Removal of the shoal would likely involve 1 to 5 days of dredging to clear the hazard area to authorized depth (35 feet MLLW) plus 2 feet of overdepth (i.e., total maintained depth of 37 feet MLLW). The dredge equipment used would be based on availability, and could be completed by either mechanical or hopper equipment. Because the extent and frequency of critical dredging episodes cannot be predicted, appropriate mitigation for these episodes, if warranted based on expected impacts, would be determined in coordination with regulatory agencies at the times they occur.

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<sup>13</sup> As defined by maritime law, the running of one vessel against another that is stationary. It is distinguished from collision in that collision means the running of two vessels against each other.

<sup>14</sup> As defined in USACE's Raise the Flag Procedure (Headquarters, Civil Works Construction, Operations and Readiness Division [CECW-OD], Revised January 22, 2002), an emergency is a situation that would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action is not undertaken in a time period less than the normal contract procurement process.

<sup>15</sup> As defined in USACE's Raise the Flag Procedure (CECW-OD, Revised January 22, 2002), an urgent dredging requirement is a situation that may be time-sensitive for providing a safe navigation channel that requires prompt action, but does not meet the definition of an emergency.

<sup>16</sup> The Raise the Flag (CECW-OD, Revised January 22, 2002) procedure provides a systematic method to identify and respond to the nation's urgent or emergency dredging needs. This procedure is applicable to all USACE navigation projects that may be maintained by hopper dredges.

<b>Year</b>	<b>Dredge Type</b>	<b>Volume (CY)</b>
2000	Hopper	21,000
2001, Episode 1	Cutterhead-Pipeline and Clamshell-Bucket	28,000
2001, Episode 2	Hopper	17,000
2009	Clamshell-Bucket	12,000
2010	Hopper	9,000
2012	Hopper	16,000
Notes: CY = cubic yards		

Material dredged from Bulls Head Reach would be placed at either SF-16 or the Carquinez Strait placement site (SF-9). As the baseline data in Table 2-4 indicates, the past critical dredging episodes have not occurred at a regular or predictable frequency; therefore, USACE estimates urgent removal of this shoal may be required in any given year within the 10-year planning horizon. Analysis of impacts related to the removal of this shoal in this EA/EIR is intended to fulfill USACE's NEPA requirements related to these episodes, and possibly preclude emergency declaration. USACE would complete environmental compliance requirements under authorities (e.g., federal Endangered Species Act) separately.

### **2.3.4 Reduced Hopper Dredge Use Alternatives**

This section presents two alternatives under which USACE's use of a hopper dredge for maintenance dredging of the federal channels would be reduced, compared to the Proposed Action/Project and No Action/No Project Alternative. The costs for implementing these alternatives are beyond the currently programmed operation and maintenance budget for San Francisco Bay (estimated at an additional \$3 to \$10 million per year). Therefore, before USACE could accomplish the preferred alternatives, should they be adopted by the Regional Water Board, three things typically should occur: first, higher executive branch authority must agree that the increased cost is consistent with the federal standard; second, the additional costs must be included in the annual budget submitted to Congress; and third, Congress must appropriate or reprogram the additional funds. NEPA and CEQA do not restrict consideration of alternatives that are outside the jurisdiction or capability of the lead agency to implement if the alternatives are otherwise reasonable.

For the purpose of analysis in this EA/EIR, it is assumed that either reduced hopper dredge use alternative would be implemented by FY 2017, as required by a condition of the WQC issued by the Regional Water Board. Because USACE has a 3-year budget process, as described in Section 1.4, the earliest USACE could implement these alternatives would be FY 2017. For both reduced hopper dredge use alternatives, implementation of dredging in FY 2015 and FY 2016, including purchase of mitigation credit, would be as described under the Proposed Action/Project.

Although it is assumed for the purpose of analysis that the reduced hopper dredge use alternatives could be implemented, it should be noted that if USACE is unable to obtain both the necessary authorization and funding to implement these alternatives, USACE would follow the regulations at 33 C.F.R. pt. 335-338. The process described in these regulations could potentially result in deferred dredging at certain channels (i.e., Richmond Outer, Pinole Shoal, and Suisun Bay Channel and New York Slough). Deferred dredging means that these channels may not be fully maintained by USACE. Funding historically appropriated for dredging the deferred channels may be diverted to other navigation and maintenance projects nationwide, and the USACE San Francisco District may be unable to recover the funding for dredging these channels at future date. In addition, because of scheduling constraints with the

government-owned hopper dredges, limiting hopper dredge use to the San Francisco Bay Main Ship Channel (MSC) under Reduced Hopper Dredge Use Alternative 2 could increase the risk that full dredging of the MSC would not be completed within the scheduled availability of the hopper dredge when inclement weather precludes dredging of the MSC.

In the interest of disclosing the potential environmental impacts of deferred or incomplete dredging, such impacts are noted here, and discussed further in Chapter 3 for resources where adverse impacts could result. Because it is unknown whether, to what extent, or for how long dredging could be deferred, the impacts of deferred dredging would be speculative and variable. Therefore, discussion of the potential impacts associated with deferred dredging is presented as a brief qualitative assessment.

### Reduced Hopper Dredge Use Alternative 1

Under Reduced Hopper Dredge Use Alternative 1, the government hopper dredge *Essayons*, or similarly sized hopper dredge, would only be used to dredge the MSC, and either the Richmond Outer Harbor or the Pinole Shoal Channel, annually. As described earlier, because of the strong currents and waves at the MSC, a hopper dredge is the only method which can safely dredge the channel. At times, inclement weather and strong currents at this location create conditions that may preclude safe dredging with a hopper dredge. Conditions that may inhibit USACE's ability to dredge the MSC include rough seas, strong tides, fog, heavy rain, strong winds, heavy vessel traffic, or a combination of these factors. For example, in 2013 and 2014, dredging of the MSC was delayed on four different days, for a total of 25 hours, because of unfavorable wind and sea conditions. During such times, dredging at an in-Bay channel would allow for efficient use of the hopper dredge, whereby the dredge would move into San Francisco Bay and work on the identified channel, then returns to the MSC as soon as conditions allow. If dredging of the MSC is able to be completed without interruption by inclement weather, then the in-Bay channel (i.e., Richmond Outer Harbor or Pinole Shoal) would be dredged subsequent to the completion of dredging at the MSC. Dredging of the in-Bay channel would occur within the LTMS work window (Figure 2-6), or after an individual consultation is conducted with the appropriate regulatory agencies to allow dredging to be performed outside the work window.

Selection of the in-Bay channel to be dredged by a hopper, in any given year, would depend on: (a) the amount of shoaled material present at the respective channel; (b) timing and impact to sensitive resources (e.g., compliance with LTMS work windows); and (c) project-specific availability of funds. The additional channel would be identified by USACE in its initial annual maintenance dredging plan, which is prepared at the beginning of each fiscal year, and would be subject to change based on the actual available funds prior to maintenance dredging. Therefore, this alternative would reduce hopper dredge use for maintenance dredging compared to the Proposed Action/Project and No Action/No Project Alternative, but it would not change the total amount of dredging in the channels, placement sites used, or standard operating procedures.

The MSC is typically dredged in the months of May and June; however, depending on the condition of the channel, equipment availability, and availability of funds, dredging has occurred as late as September. Maintenance dredging of the MSC using a hopper dredge (i.e., the *Essayons*, or similarly sized dredge) typically requires 10 to 14 days. If Pinole Shoal was selected as the additional channel, 5 to 15 days of additional hopper dredge use would occur, for a total of 15 to 29 days of hopper dredge use under this alternative, depending on the duration of dredging at each channel. If Richmond Outer Harbor was selected as the additional channel, 5 to 8 days of additional hopper dredge use would occur, for a total of 15 to 22 days of hopper dredge use under this alternative, depending on the duration of dredging at each channel.

The channel not selected as the additional hopper dredge channel (i.e., either Pinole Shoal or Richmond Outer Harbor) would be dredged with a mechanical dredge. Additionally, Suisun Bay Channel and New

York Slough Channel and San Bruno Channel in Redwood City Harbor<sup>17</sup> would be dredged with a mechanical dredge under this alternative, instead of a hopper dredge. The USACE would purchase 0.19 acre mitigation credit at the Liberty Island Conservation Bank annually for potential impacts to listed species if Pinole Shoal is dredged with a hopper. If Richmond Outer Harbor is dredged with a hopper, USACE would purchase 0.34 acre mitigation credit at the Liberty Island Conservation Bank annually for potential impacts to listed species.

All other dredging, placement activities, and BMPs would be as described for the Proposed Action/Project, including urgent action to remove the hazardous shoal at Bulls Head Reach as needed. If feasible, this activity would be completed with a mechanical dredge; however, because of the urgent nature of this activity, a hopper dredge may be used. Regular maintenance dredging of this area would be completed with a mechanical dredge.

### **Reduced Hopper Dredge Use Alternative 2**

Under Reduced Hopper Dredge Use Alternative 2, the government hopper dredge *Essayons*, or similarly sized hopper dredge, would be used to dredge the MSC. The MSC is typically dredged in the months of May and June; however, as stated above, depending on the condition of the channel, equipment availability, and availability of funds, dredging has occurred as late as September. Maintenance dredging of the MSC using a hopper dredge (i.e., the *Essayons*, or similar-sized dredge) typically requires 10 to 14 days; this would be the only hopper dredge use under this alternative, except potential use at Bulls Head Reach as noted below.

Pinole Shoal, Richmond Outer Harbor, Suisun Bay Channel and New York Slough Channel, and San Bruno Channel in Redwood City Harbor would be dredged with a mechanical dredge under this alternative, instead of a hopper dredge. All other dredging, placement activities, and applicable BMPs would be as described for the Proposed Action/Project, including urgent action to remove the hazardous shoal at Bulls Head Reach. If feasible, this activity would be completed with a mechanical dredge; however, because of the urgent nature of this activity, a hopper dredge may be used. Regular maintenance dredging of this area would be completed with a mechanical dredge.

## **2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION**

Several other alternatives to the Proposed Action were identified and evaluated during project planning and development, but were eliminated from detailed analysis and are therefore not analyzed in detail in this EA/EIR. These alternatives were eliminated from analysis because one or more of the following criteria apply, as discussed for each alternative below:

- It is ineffective (it would not respond to project purpose and need);
- Its implementation would not minimize effects on human/environmental resources;
- It is technologically infeasible; or
- Its implementation is remote or speculative.

### **2.4.1 No Maintenance Dredging**

Under this scenario, USACE would cease all maintenance dredging of the federal navigation channels in San Francisco Bay, which would eventually leave the channels unnavigable for commerce and recreation. This alternative was eliminated from further consideration because it would not meet the purpose and need of the project to maintain safe navigation of all the federal navigation channels, and would be expected to have significant economic and safety impacts.

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<sup>17</sup> San Bruno Channel is dredged at intervals of 10 years or greater.

## 2.4.2 Maintenance Dredging of Select Federal Channels

Under this scenario, USACE would conduct maintenance dredging for some, but not all, of the federal navigation channels in San Francisco Bay during the 10-year planning period to reduce the impacts from maintenance dredging. This would leave the unmaintained channels unusable. Similar to the no maintenance dredging of all channels alternative above, this alternative was eliminated from further consideration because it would not meet the purpose and need of the project to maintain safe navigation of all the federal navigation channels, and would be expected to have significant economic and safety impacts.

## 2.4.3 Eliminate the Use of Hydraulic Dredging

Under this scenario, USACE would cease use of hydraulic equipment for any maintenance dredging. This alternative is not feasible. Primarily, this alternative would not allow for dredging of the Main Ship Channel, which requires use of a hopper dredge because it is the only type of dredge that can safely operate at this channel, as explained under Section 2.3.4. Therefore, this alternative was eliminated because it would not meet the purpose and need of the project to maintain safe navigation of all the federal navigation channels.

## 2.4.4 Eliminate the Use of Mechanical Dredging

Under this scenario, USACE would use hydraulic equipment only for maintenance dredging of the federal navigation channels in San Francisco Bay. This alternative is not feasible because it would limit USACE's ability to complete maintenance dredging of all the channels because of channel features (e.g., depth, sediment characteristics, and environmental conditions), current placement practices, and costs. Increased use of hydraulic dredge equipment could also increase the likelihood of entrainment of protected fish species. Therefore, this alternative was eliminated because it would not meet the purpose and need of the project.

## 2.4.5 Screening Water Intakes on USACE Hopper Dredges

The USACE considered the addition of screening the grating at the bottom of the drag heads and the water intake doors on top of the drag heads on hopper dredges to protect small fish from being entrained. CDFW established velocity criterion of 0.2 foot per second to protect small fish from being impinged.

The USACE's hopper dredges *Essayons* and *Yaquina* use California drag heads. The basic operating principle of a California drag head is erosion (i.e., creating high water velocity at the solid/water interface to entrain solids). The dredge pumps create the pressure difference across the drag head, inducing high entrance velocities around the periphery of the bottom grating and into the intake doors on the drag head (if opened). The pumps are large enough to maintain sufficient velocity of the solids/water mixture once it has passed through the drag head into the dredge suction and discharge piping to keep the solids in suspension. That velocity is called the depositional velocity. For the *Yaquina*, the depositional velocity is 16.4 feet per second; for the *Essayons*, the depositional velocity is 20 feet per second.

For the opened vacuum-relief doors to perform their intended function, the water velocity through them could exceed CDFW's criteria by up to 50 times. Attaching a pipe or screen of sufficient area to the drag head doors to reduce water velocity to meet CDFW's criterion would be extremely impractical or unworkable for the following reasons:

- The dredge operates at varying water depths, in heavy sea states, over undulating bottom contours, all of which change the angle of the drag head with respect to the drag arm, requiring a robust, flexible connection between the screen appendage and drag head.

- The screen appendage would need to be very large to achieve an open area sufficient to reduce water velocity to 0.2 foot per second (i.e., 165 square feet for the *Yaquina* and 595 square feet for the *Essayons*).
- The screen support would need to be of sufficient strength to withstand the severe environment in which the drag arms operate. The drag arms operate in a very physical environment, often physically impacting with the dredge's bottom, sideshell, and/or davit/cradle when being breasted-in/out. The drag arms often experience impact with floating and submerged debris such as logs, rope, cable, chain, etc.
- The appendage would add significant weight to the drag arm, jeopardizing sufficiency of the drag arm lifting infrastructure.
- Sediment would create blockage on the screens, and it would be extremely impractical to create a cross-flow or to stop dredging every few minutes to clean the screens.

Therefore, this alternative was eliminated from further consideration as technologically infeasible.

#### **2.4.6 Modification of the Federal Navigation Channels**

The USACE considered modification of the federal navigation channels, including realignment of the channels to different location(s), and the institution of scouring systems or other structural channel modifications. These alternative options were eliminated because they are outside the current scope of USACE's maintenance program for the existing federally authorized channels. Moreover, such an undertaking would require years of study, modeling, and more funding than USACE currently has available in its budget. Realignment channels and other options considered here would result in an unacceptable level of impact on benthic and aquatic habitats. The degree of environmental impact and the time necessary to implement this alternative were inconsistent with the basic project objectives, so this alternative was eliminated from consideration.

## CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

### 3.1 SCOPE OF ENVIRONMENTAL ANALYSIS

This chapter describes the affected environment and the environmental impacts associated with the alternatives, as well as mitigation—where applicable—to reduce potential impacts.

The affected environment sections provide an environmental baseline of each resource category, describing the conditions in the study area at the time this document was prepared. The environmental conditions described in the affected environment sections constitute the baseline conditions against which impacts are assessed. The California Environmental Quality Act (CEQA) Guidelines, Section 15125, describe the baseline as “the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published.” Because maintenance dredging of the federal navigation channels has occurred on a regular basis for several decades, the action of the United States Army Corps of Engineers’ (USACE’s) maintenance dredging and the environmental impacts that have occurred on a regular basis over time from the maintenance dredging of the federal navigation channels are considered part of the existing conditions that comprise the baseline. Accordingly, USACE’s existing maintenance dredging practices, as represented by the No Action/No Project Alternative, and the environmental impacts of these practices, are part of the baseline conditions to which the impacts of the action alternatives are compared.

The environmental consequences discussion provides an analysis of the potential adverse and beneficial environmental impacts that could result from implementing the Proposed Action/Project and action alternatives<sup>1</sup> compared to the No Action/No Project Alternative. Impacts from dredging, transport of dredged materials, and placement of dredged materials are evaluated. Specific analysis of dredged material placement is limited to the existing placement sites listed in Section 1.5.3. Where possible, potential impacts associated with the use of future placement sites identified in Section 1.5.4 are broadly discussed; however, use of these sites by the USACE would be conditioned upon the completion of separate, site-specific supplemental environmental review under the National Environmental Policy Act (NEPA) and/or CEQA, and acquisition of required environmental approvals from resource and regulatory agencies.

#### 3.1.1 Resources Not Applicable to the Project Alternatives

The following resources were considered, but were not addressed in the detailed impact analysis, because the resources are not present in the federal navigation channels or dredged material placement sites, and therefore have no potential to be adversely impacted by the project alternatives.

#### Forestry

The proposed dredging and dredged material placement activities would be in offshore waters, waters in San Francisco Bay, and at coastal and upland sites approved for the placement of dredged materials. The San Francisco Bay Area has a variety of forest types throughout the region. Forests are generally at higher elevations of the Coastal Range in areas with sufficient moisture. Forest resources are not present in the federal navigation channels or placement sites, and therefore would not be impacted by dredging and placement activities.

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<sup>1</sup> For fiscal years 2015 and 2016, before reduced hopper dredge use is implemented, impacts under the reduced hopper dredge use alternatives would be the same as under the Proposed Action/Project.

### 3.1.2 Resources Not Considered in Detail

The following resources were considered, but were not addressed in the detailed impact analysis, because the project alternatives would have no or negligible impacts on these resources.

#### Agriculture

The proposed dredging and dredged material placement activities would be in offshore waters, waters in San Francisco Bay, and at coastal and upland sites approved for the placement of dredged materials. Agricultural resources are not present in the channels or existing placement areas, and therefore would not be impacted by dredging and placement activities.

Part of one of the potential future placement sites, Bel Marin Keys V, is presently used for agriculture. Additionally, beneficial reuse at Petaluma River Farm would support agricultural production. The USACE would not use this or the other future placement sites identified in Section 1.5.4 until appropriate environmental review is completed, including evaluation of impacts to agricultural resources.

#### Public Services

Evaluation of impacts to public services typically involves determining whether the proposed dredging and dredged material placement activities would affect level of service and the need for facility expansion for fire protection, police enforcement, school capacity, parks, and libraries. Public services are predominately land-based services; however, the waters of San Francisco Bay are used for maritime enforcement and emergency response. The USACE's continued dredging of the federal navigation channels would maintain the safe navigability of the channels, providing a beneficial impact to maritime enforcement or emergency response actions. Refer to Section 3.10, Transportation, for additional detail regarding navigation policy and procedures in San Francisco Bay. The proposed dredging and dredged material placement activities under all action alternatives would not increase the service population in the San Francisco Bay Area, and therefore would not result in increased demand on public services, the need for construction of new public facilities, or the expansion of existing public facilities. Therefore, implementation of the project alternatives would have no adverse impacts on public services, and this resource is not evaluated further in this Environmental Assessment (EA)/Environmental Impact Report (EIR).

#### Minerals

The considered alternatives would not involve construction or operation of any facilities on or adjacent to any land-based mineral resource areas delineated on land use plans, and therefore would not result in the loss of availability of a land-based mineral resource. Sand is mined from the San Francisco Bay for industrial and agricultural uses. Geographically, mining activity occurs in three areas: the Central Bay west of Angel Island; at Middle Ground Shoal just east of Port Chicago; and in the eastern portion of Suisun Channel (USACE, 2012e). The USACE's continued maintenance of the federal navigation channels, and placement of dredged materials under any of the action alternatives would not adversely impact sand mining because it would not interfere with sand mining activities. Sediments in the San Francisco Main Ship, Pinole Shoal, and Suisun Bay channels are primarily sand. The federal standard placement site for each of these channels is in water and adjacent to or very near the channel. Therefore, USACE's continued maintenance dredging and placement activities would not be expected to deplete sand mineral resources, because dredged material would be redeposited relatively close to the location where it was removed. Beneficial impacts could result if USACE contracted maintenance dredging of a federal channel with sand mineral resources (e.g., Suisun Bay Channel) to a sand mining contractor, thereby facilitating mining of this resource. Sand miners would be responsible for meeting all legal requirements, obtaining any necessary permits or licenses, and adhering to all provisions and contractual

obligations in any agreement with USACE. Because the project alternatives would not result in adverse impact on minerals, this resource is not evaluated further in this EA/EIR.

## Noise

The majority of the federal navigation channels are not near sensitive receptors (e.g., residences, schools, and hospitals). Commercial and recreational ship traffic is an ambient noise source at the federal navigation channels. Several of the channels (e.g., Richmond Harbor, Oakland Harbor) are also in areas with surrounding commercial and industrial operations that are additional sources of ambient noise; noise from dredging at these locations would not be expected to exceed ambient conditions. Noise during transport of dredged materials would not be noticeable in the context of other vessel traffic in San Francisco Bay.

However, there are sensitive receptors in close proximity to some of the federal channels, specifically those along the San Rafael Creek, Napa River, and Petaluma River. Sensitive receptors typically include land uses such as recreational areas, residential homes, schools, hospitals, and churches where noise may cause an annoyance and affect daily activities.

Given that project activities could occur in several different jurisdictions, the Federal Transit Administration (FTA) for assessment of noise impacts for construction activity can be used as thresholds. Using the FTA guidelines provides a uniform method for analyzing noise impacts, and is a commonly accepted industry standard for analysis of noise impacts. Under the FTA guidelines, for residential land uses, the daytime noise standard during construction is 90 A-weighted decibels (dBA) equivalent continuous sound level over a 1-hour period and for an industrial area 100 dBA equivalent continuous sound level over a 1-hour period (FTA, 2006).

Noise from dredging equipment such as an excavator and a dredging ship can generate noise levels of approximately 78 to 82 dBA. Based on these levels, construction noise thresholds in the FTA guidelines would not be exceeded (Department for Environment Food and Rural Affairs, 2005). In addition, in consideration of the ambient noise from existing vessel traffic and the lower frequency at which these channels are dredged, the impacts of short-term intermittent noise from dredging would be negligible. The in-Bay and offshore placement sites are over open waters, there are no sensitive receptors in close proximity to these sites. Short-term noise impacts may occur during placement at upland and beneficial re-use site. However, the placement of dredged materials has occurred regularly in the past at these locations, and ongoing noise from placement activities is part of the existing condition. In this context, noise impacts specific to placement of dredged materials from the federal navigation channels would be negligible. The USACE would not use the future placement sites identified in Section 1.5.4 until appropriate environmental review is completed, including evaluation of noise impacts.

Therefore, implementation of the project alternatives would have no adverse impacts on the human noise environment, and this resource is not evaluated further in this EA/EIR. Noise impacts on biological resources are discussed in Section 3.6, Biological Resources.

## Utilities

Evaluation of impacts to public utilities includes analysis of whether the proposed dredging and dredged material placement activities would result in the expansion of landfills or facilities that treat or convey wastewater, stormwater, or potable water. The project alternatives would not create residences or commercial facilities that would increase the service population in the San Francisco Bay Area. The maintenance dredging of the federal channels to previously dredged depths and use of existing approved placement sites would not disturb existing utilities. The USACE would not use the future placement sites identified in Section 1.5.4 until appropriate environmental review is completed, including evaluation of noise impacts.

Placement of dredged material at the Ocean Beach nearshore placement site (SF-17) is ultimately anticipated to have indirect benefits of protecting the infrastructure at Ocean Beach, including the Southwest Ocean Outfall, by providing additional protection to the eroding shoreline.

Therefore, the project alternatives would not adversely impact utilities, and this resource is not evaluated further in this EA/EIR.

## Energy

Although dredging and placement activities do require consumption of nonrenewable energy resources, the project alternatives would not require substantially more energy than USACE's historic and current maintenance dredging operations in San Francisco Bay. Therefore, energy impacts are considered negligible, and this resource is not evaluated further in this EA/EIR.

## Recreational Resources

The proposed dredging and dredged material placement activities would not involve the construction of recreation facilities, would not create demand for new recreational facilities, and would not result in increased use and deterioration of existing recreational facilities.

The project alternatives may occasionally delay or temporarily impede recreational water craft during dredging and placement activities. In most locations, there would be sufficient room for recreational vessels to maneuver around dredge equipment, and therefore, impacts are expected to be negligible. During dredging and placement activities, notes to mariners and navigational warning markers would be used as needed to prevent navigational hazards. In addition, dredging would create a long-term positive effect for small craft by allowing for safe navigation.

The SF-17 placement site boundary is adjacent to the outer boundary of the National Park Service's Golden Gate National Recreation Area, which is one-quarter of a mile seaward of mean sea level. Use of SF-17 as a nearshore beneficial use dredged material placement site would involve either movement of a hydraulic dredge (e.g., USACE-operated *Essayons*) for the purpose of placing thin layer of sand along this nearshore area, or use of an alternate hydraulic dredge with pump-off capabilities. Placement of sandy dredged material at the Ocean Beach Demonstration Site has not shown any adverse impacts or physical degradation of existing recreational resources, change in use of existing recreational resources, or any potential harm to the integrity of the Golden Gate National Recreation Area's cultural and natural resources (USACE, 2013a). Placement of dredged material in a thin layer would not change the existing surf breaks; therefore, no change in wave patterns is expected to occur. Although the surface area of SF-17 is greater than that of the Ocean Beach demonstration site, adverse direct impacts to recreational resources and uses are not expected. Conversely, indirect beneficial effects to recreational activities from the creation of a wider beach area are expected to occur because of the placement of sandy material at this site.

With the exception of SF-17, land-based recreational resources near the existing placement sites identified in Section 1.5.3 are extremely limited; offshore placement at SF-17 would not impact land-based recreation, and nearshore placement of dredged material would have beneficial impacts, as described above. The placement of dredged materials at existing placement sites is an ongoing activity; therefore, dredged material placement at these locations is part of the existing condition, and would not result in any new impacts on recreation.

If onshore placement were to occur at Ocean Beach in the future, beach access may be temporarily restricted during placement activities. Placement activities would be short in duration, and recreationists would have access to other beach areas nearby; therefore, impacts are expected to be negligible. The

USACE would not use Ocean Beach and other the future placement sites identified in Section 1.5.4 until appropriate environmental review is completed, including evaluation of impacts on recreation.

Therefore, the project alternatives would not adversely impact recreational resources, and this resource is not evaluated further in this EA/EIR.

### **Aesthetics and Visual Resources**

Although aesthetic evaluations are inherently subjective, certain views are widely held to be scenic. Such vistas typically comprise or partially encompass natural landscapes and notable landmarks of the built environment. In the project study area, the important natural scenic resources include the Pacific Coast, San Francisco Bay, Mount Tamalpais, and Mount Diablo. Scenic features of the built environment include the San Francisco skyline, several large buildings in the East Bay Hills, and San Francisco Bay Area bridges. To some observers, the aesthetics may be considered to be slightly degraded during dredging and placement activities from the presence of dredge equipment and turbidity produced during dredging and placement activities. These impacts would be temporary and would occur in locations where dredging and placement activities have occurred regularly in the past. In addition, the waters of San Francisco Bay already include similar uses and equipment, such as ferry terminals, ports, barges, and industrial and commercial shipping operations that are part of the existing visual landscape. In this context, impacts to aesthetics and visual resources from the project alternatives would be negligible. The USACE would not use the future placement sites identified in Section 1.5.4 until appropriate environmental review is completed, including evaluation of impacts on visual resources and aesthetics.

Therefore, the project alternatives would not adversely impact aesthetics and visual resources, and this resource is not evaluated further in this EA/EIR.

### **Population and Housing, Socioeconomics, and Environmental Justice**

The proposed dredging and dredged material placement activities would not result in construction or modification of residences or commercial facilities, and would not require a large workforce. Therefore, the project alternatives would have no adverse effect on population and housing or socioeconomics. The USACE's dredging of the federal navigation channels provides a beneficial socioeconomic impact by maintaining navigability of the channels and access to local ports and harbors that is critical to maritime commerce and the regional economy.

Based on the nature and location of the proposed dredging and dredged material placement activities, no adverse impacts resulting from the project alternatives would be disproportionately borne by minority or low-income populations. The project represents a continuation of USACE's current activities, for which there are no known environmental justice impacts. Therefore, no environmental justice impacts would occur under the project alternatives. The USACE would not use the future placement sites identified in Section 1.5.4 until appropriate environmental review is completed, including evaluation of environmental justice impacts.

Therefore, the project alternatives would not adversely impact population and housing, or socioeconomics, and would not result in disproportionately high and adverse impacts to environmental justice populations. Therefore, these resources are not evaluated further in this EA/EIR.

### **Regional Growth**

The proposed dredging and dredged material placement activities would not result in any new residences or infrastructure that could facilitate growth in the San Francisco Bay Area. Maintenance dredging, transport, and placement would not require the expansion of water or energy conveyance, nor would the project alternatives require construction of new roads. The project alternatives would not remove any

existing obstacles to growth. Therefore, the project alternatives would have no impact on regional growth, and this topic is not further evaluated in this EA/EIR.

### 3.1.3 Resources Considered in Detail

The resources discussed in the sections that follow are:

- Geology, soils, and seismicity
- Hydrology and water quality
- Air quality, climate change, and greenhouse gases
- Biological resources
- Cultural and paleontological resources
- Land use
- Hazards and hazardous materials
- Transportation and circulation, including navigation

For each resource section, the analysis is presented as follows:

1. Under “Regulatory Setting,” the federal, state, and local regulatory framework applicable to implementation of the project alternatives is described. Section 1.6 provides an additional overview of legal authorities relevant to the project alternatives.
2. Under “Environmental Setting,” the existing environmental conditions in the study area are described. The region of influence varies by resource, and is defined—where appropriate—for each resource.
3. Under “Methodology and Thresholds for Significance,” there is a discussion of the scope considered in the analysis; the approach to the analysis; and those areas where none of the alternatives would have an impact, and which are therefore not discussed in more detail in that section.
4. Under “Impacts and Mitigation Measures,” direct, indirect, and cumulative impacts are then analyzed, and a full description is provided of the mitigation measures that are recommended or required to reduce project impacts for that resource area.

Direct, indirect, and cumulative impacts were evaluated. Direct impacts are the primary effects that are caused by the alternative, and occur at the same time and place. Indirect impacts are secondary effects that are reasonably foreseeable and caused by the alternative, but occur at a different time or place. Cumulative impacts result from the incremental impact of the proposed project alternatives when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (see below for further discussion of cumulative impacts).

Significance criteria for each resource topic were used to assess the severity of the environmental impacts of the proposed project alternatives and, for CEQA compliance purposes, determine when mitigation measures to avoid or substantially reduce the significant impact may be required. Unlike CEQA, NEPA does not have specific impact thresholds that are used to assess the significance of impacts on a given resource topic, but rather states that when assessing whether a proposed action would significantly affect the quality of the human environment, the environmental impacts should be evaluated in terms of their context, intensity, and duration (40 C.F.R. pt. 1508.27). Context refers to the geographic area (spatial extent) of impact, which varies with the physical setting of the activity and the nature of the resource being analyzed. Intensity refers to the severity of the impact; evaluation of the intensity of an impact considers the sensitivity of the resource, as well as other factors. The duration of the impact is described as short-term or long-term. For CEQA, the mandatory findings of significance (California Public Resources Code Sections 21001(c), 21083; 14 California Code of Regulations Section 15065) and the

Environmental Checklist (Appendix G of the CEQA Guidelines) are the primary tools used to define thresholds for determining significance for each environmental topic.

The significance criteria presented in this chapter were developed to satisfy the requirements of both NEPA and CEQA, when feasible, and are primarily adapted from Appendix G of the CEQA Guidelines and relevant agency thresholds. Where possible, significance criteria are based on state or federal standards. For example, air quality criteria, or thresholds, are based on the state and federal ambient air quality standards. In other cases where there are no formal regulatory standards, such as geology, soils, and seismicity, the analysis is based on professional standards. When warranted, different significance criteria are identified for NEPA and CEQA because of different regulatory standards or compliance requirements for USACE as a federal agency and the Regional Water Board as a state agency. In addition, because of differences between NEPA and CEQA guidance, a significant impact under CEQA does not necessarily equate to significant impact under NEPA (i.e., some impacts determined to be significant under CEQA may not be of sufficient context and intensity to be determined significant under NEPA).

In each resource section, discussion of impacts is organized according to the impact type. Under each impact type title, impacts are analyzed for each alternative, and a determination of the level of the impact pursuant to NEPA and CEQA is presented. Where impacts would be the same for one or more alternatives, the impact discussion for these alternatives is combined to avoid redundancy.

Impacts analyzed pursuant to NEPA are classified as beneficial, negligible, less than significant, or significant, which are defined as follows:

- A beneficial impact would generally be regarded as an improvement over current conditions;
- A negligible impact would cause a slight adverse change in the environment, but one that generally would not be noticeable;
- A less-than-significant impact would cause an adverse change in the environment that would likely be noticeable, but does not meet or exceed the defined significance criteria; and
- A significant impact would cause a substantial adverse change in the environment that would exceed the defined significance criteria;

Impacts analyzed pursuant to CEQA are classified as having no impact, less-than-significant impact, less-than-significant impact with mitigation, or potentially significant impact. CEQA specifically refers to effects and impacts as synonymous referring to them as a “physical change,” and directs the lead agency to focus its analysis on the project’s potential to cause an “adverse change in any of the physical conditions within the area affected by the project” (14 California Code of Regulations Sections 15358, 15378, 15382). CEQA does not specifically recognize beneficial effects as an impact.

Avoidance or mitigation measures are identified to reduce the project’s impacts, where feasible. Mitigation measures in this EA/EIR are formulated to be consistent with the definitions of mitigation found in the Council on Environmental Quality NEPA regulations, Section 1508.20, and the CEQA Guidelines Section 15370.

“Cumulative impacts” refers to two or more individual effects that, when combined, are considerable; or that compound or increase other environmental impacts (CEQA Section 15355). Cumulative impacts can result from individually minor but collectively significant impacts taking place over time (Council on Environmental Quality NEPA regulations, Section 1508.7). The discussion of cumulative impacts provides an analysis of cumulative impacts of the project, taken together with other past, present, and reasonably foreseeable future projects producing related impacts. The goal of this analysis is twofold:

first, to determine whether the overall long-term impacts of all such projects would be cumulatively significant; and second, to determine whether the project itself would cause a “cumulatively considerable” incremental contribution to any such cumulatively significant impacts. In other words, the required analysis first creates a broad context in which to assess the project’s incremental contribution to anticipated cumulative impacts, viewed on a geographic scale beyond the project site itself; and then determines whether the project’s incremental contribution to any significant cumulative impacts from all projects is itself significant (i.e., “cumulatively considerable”).

Table 3.1-1 identifies the other past, present, and reasonably foreseeable projects considered in the cumulative analysis. This list includes projects that are likely to result in impacts similar to those of the project alternatives. The list of projects generally includes those in close proximity to the federal channels and placement site (i.e., those that could result in overlapping impacts, such as navigation and air quality), or other projects along San Francisco Bay that could result in overlapping impacts to resources such as biological resources and water quality.

### 3.1.4 Potential Impacts of Deferred Dredging

For the purpose of analysis in this EA/EIR, it is assumed that either reduced hopper dredge use alternative would be implemented by fiscal year 2017. As explained in Section 2.3.4, the costs for implementing these alternatives are beyond the currently programmed operation and maintenance budget for San Francisco Bay. Therefore, before USACE could accomplish the preferred alternatives, should they be adopted by the Regional Water Board, three things typically should occur: first, higher executive branch authority must agree that the increased cost is consistent with the federal standard; second, the additional costs must be included in the annual budget submitted to Congress; and third, Congress must appropriate or reprogram the additional funds. If USACE was unable to obtain both the necessary authorization and funding to implement these alternatives, USACE would follow the regulations at 33 C.F.R. pt. 335-338. The process described in these regulations could potentially result in deferred dredging at certain channels (i.e., Richmond Outer, Pinole Shoal, and Suisun Bay Channel and New York Slough). Deferred dredging means that these channels may not be fully maintained by USACE. In the interest of disclosing the potential environmental impacts of deferred or incomplete dredging, such impacts are noted here, and discussed further in this chapter for resources where adverse impacts could result. Because it is unknown whether, to what extent, or for how long, dredging could be deferred, the impacts of deferred dredging would be speculative and variable. Therefore, discussion of the potential impacts associated with deferred dredging is presented as a brief qualitative assessment for resources areas where potentially adverse impacts could occur.

Due to an overall reduction in dredging activities in San Francisco Bay with the deferral of dredging, impacts from dredging operations on geology and soils, water quality, air quality and greenhouse gases, biological resources (including listed species), and cultural resources would be reduced, compared to the Proposed Action/Project and No Action/No Project Alternative. However, with the reduced, or lack of, maintenance of certain channels, there would be an increased risk of a navigational hazard that would result in vessel groundings, allisions, or collisions, as well as an oil spill that could result from such incidents. Furthermore, the lack of or reduced maintenance of the Main Ship Channel, Richmond Outer Harbor, Pinole Shoal Channel, and Suisun Bay Channel, and New York Slough could impact access to the ports these channels serve and could result in adverse economic impacts. Refer to Sections 3.9 and 3.10 for additional discussion of potential impacts related to hazards, hazardous materials, navigation, and the economy.

**Table 3.1-1  
Cumulative Scenario – Present and Reasonably Foreseeable Projects**

<b>Project Number</b>	<b>Project Name/ Location</b>	<b>Status/ Anticipated Timeline</b>	<b>Project Summary</b>	<b>Source</b>
1	Nonfederal Maintenance Dredging in San Francisco Bay	Ongoing	More than 100 marinas, ports, and berthing slips are maintenance dredged in the San Francisco Bay/Estuary. Most of the nonfederal maintenance projects are along the shorelines and in the tributaries of the Estuary.	USACE and USEPA, 2009
2	Hamilton-Bel Marin Keys Aquatic Transfer Facility	Planning phase could occur within 10-year planning horizon	The California State Coastal Conservancy and USACE are the project sponsors for a 58-acre in-water basin that would be used for stockpiling and transporting dredged sediment to the Bel Marin Keys Unit V Expansion portion of the Hamilton Wetlands Restoration Project in San Pablo Bay.	CSCC, 2013
3	San Francisco Bay and Delta Sand Mining Project	10-year leases to continue mining sand (until 2022)	The California State Lands Commission action is a 10-year General Lease through December 31, 2022. Hanson Marine Operations proposed new 10-year mineral extraction leases to enable the continuation of dredge mining of construction-grade sand from certain delineated areas of Central San Francisco Bay, Suisun Bay, and the western Sacramento-San Joaquin River Delta area.	CSLC, 2012; CEQAnet, 2013
4	South San Francisco Shoreline Study	Planning phase; construction could begin in 2017	Congressionally authorized study by USACE together with the Santa Clara Valley Water District and the CSCC to identify and recommend flood risk management and ecosystem restoration projects along South San Francisco Bay for federal funding.	South Bay Shoreline, 2013
5	South Bay Salt Pond Restoration	Expected completion of 230 acres of pond reconfiguring in 2014; trail construction and public use slated by 2015	The CSCC, the California Department of Fish and Wildlife, and the United States Fish and Wildlife Service are the project sponsors for this tidal wetland restoration project that, when complete, will restore approximately 15,000 acres of industrial salt ponds to tidal wetlands, mudflats, and other wetland habitats.	South Bay Salt Pond, 2013a and 2013b

**Table 3.1-1  
Cumulative Scenario – Present and Reasonably Foreseeable Projects (Continued)**

<b>Project Number</b>	<b>Project Name/ Location</b>	<b>Status/ Anticipated Timeline</b>	<b>Project Summary</b>	<b>Source</b>
6	Sacramento Deep Water Ship Channel	Planning phase could occur within 10-year planning horizon	The USACE is the project sponsor for the Sacramento River Deep Water Ship Channel, a 43-mile-long channel in Contra Costa, Solano, Sacramento, and Yolo Counties that serves the marine terminal facilities at the Port of West Sacramento. The 30-foot-deep SRDWSC joins the 35-foot-deep John F. Baldwin Ship Channel, allowing access to the San Francisco Bay Area harbors and the Pacific Ocean. The project involves resuming construction of the 35-foot-deep channel, as authorized in 1986. A Limited Reevaluation Report and Supplemental Environmental Impact Statement/Report are being prepared.	USACE, 2013b
7	San Francisco Bay to Port of Stockton John F. Baldwin Ship Channel Phase III Navigation Improvement Project	Planning phase	The USACE is the project sponsor for deepening the original channel to 45 feet MLLW and the Stockton Deep Water Channel to 40 feet MLLW for draft navigation.	USACE, 2012f
8	Stockton Deep Water Ship Channel Operations and Maintenance	Ongoing	Maintenance dredging of the Stockton portion of the channel to 35 MLLW by USACE Sacramento District.	USACE, 2012f
9	Brooklyn Basin (formerly called Oak-to-Ninth District)	Construction planned for 2015	The California Department of Toxic Substances Control is leading the development of the Brooklyn Basin project, which would create 3,100 housing units, 200,000 square feet of retail and commercial space, 30 acres of parks and trails, and a marina with up to 200 boat slips on a 64-acre former marine industrial area. The Port of Oakland owns the property.	DTSC, 2013
10	Marine Ocean Terminal Concord	Planning phase	The U.S. Department of the Navy is the project sponsor for proposed modernization and repair of Piers 2 and 3 of the Military Ocean Terminal Concord due to structural decay, marine borer damage, and fungal decay. Piers 2 and 3 are used to transport military supplies in the Pacific region.	DoD, 2013

**Table 3.1-1  
Cumulative Scenario – Present and Reasonably Foreseeable Projects (Continued)**

<b>Project Number</b>	<b>Project Name/ Location</b>	<b>Status/ Anticipated Timeline</b>	<b>Project Summary</b>	<b>Source</b>
11	Redwood City Deepening Project	Planning phase	Joint studies under way by the Port of Redwood City and USACE to deepen and improve Redwood City Channel and San Bruno Channel to a depth of 34 to 35 feet.	Caltrans, 2013
12	Napa Salt Marsh Restoration Project	Ongoing	USACE, CSLC, and the CDFW are implementing the Napa Sonoma Marsh Restoration project. The first two phases are complete, with the last phase restoring the final 1,900 acres of wetlands and associated habitats in the 10,000-acre project.	Napa Sonoma Marsh, 2013
13	Suisun Marsh Restoration Plan	Planning phase	The United States Department of the Interior is the project sponsor for tidal restoration targets of 5,000 to 7,000 acres and 44,000 to 46,000 acres of managed wetlands during the 30-year implementation period.	U.S. Department of the Interior, USFWS, and CDFW, 2011
14	San Francisco Bay Area Water Emergency Transportation Authority (WETA) Berkeley Ferry Terminal	Planning phase	WETA is the project sponsor. The Locally Preferred Alternative includes the construction of a new ferry pier on the Berkeley waterfront between the existing Berkeley Fishing Pier and Hs Lordships restaurant. The proposed improvements include a pier for berthing two vessels, and for loading and unloading ferry passengers and dredged channels.	WETA, 2013a
15	WETA Downtown San Francisco Ferry Terminal Expansion Project	Planning phase; construction activities as early as 2016 and completed by 2020	WETA is the project sponsor for the proposed expansion of berthing capacity (new gates and overwater berthing facilities, additional passenger waiting and queuing areas, circulation improvements, and other water-transit-related amenities) at the Downtown San Francisco Ferry Terminal to accommodate future planned water transit services between San Francisco and Antioch, Berkeley, Martinez, Hercules, Redwood City, Richmond, and Treasure Island, as well as emergency operation needs.	WETA, 2013b

**Table 3.1-1  
Cumulative Scenario – Present and Reasonably Foreseeable Projects (Continued)**

<b>Project Number</b>	<b>Project Name/ Location</b>	<b>Status/ Anticipated Timeline</b>	<b>Project Summary</b>	<b>Source</b>
16	WETA Central Bay Operations and Maintenance Facility Project	Construction activities as early as 2015	The Central Bay Operations and Maintenance Facility project is being developed by WETA to provide a central San Francisco Bay base for WETA's ferry fleet. The project site is near Pier 3 of the Naval Air Station Base Realignment and Closure area known as Alameda Point. The project would include construction of a multi-story building that would provide for WETA's operational needs such as light repair work, diesel fuel storage, spare parts storage, concession supply, administrative staff office space, records storage and deliveries. The facility will also include a system of floating docks and gangways that would provide daytime and overnight berthing capacity for up to 11 vessels.	WETA, 2013c
17	WETA Richmond Ferry Terminal and Service	Planning phase	WETA is proposing to establish a new ferry route between the existing San Francisco Ferry Terminal and a new ferry terminal on the Ford Peninsula in the City of Richmond. The proposed new terminal would replace an existing ferry facility consisting of a gangway, float, ramping system and piles.	WETA, 2013d
18	WETA Vallejo-Baylink Ferry Maintenance Facility Project	Construction phase	The Vallejo-Baylink Ferry Maintenance Facility Project would replace the existing maintenance facility at a location approximately half a mile downstream from the existing maintenance facility. The project site is in the former Mare Island Naval Shipyard, which is on the western edge of the City of Vallejo. The project includes an administration office, maintenance and fueling facilities, and berthing.	Winzler and Kelly, 2011
19	WETA Treasure Island Terminal	Planning phase	Ferry service between the west side of Treasure Island and the San Francisco Ferry building is planned as part of the project. A new Ferry Terminal would be constructed, including a Ferry Terminal building, a ferry quay and docks, breakwaters, and the ferry basin enclosed by the breakwaters.	CCSF Planning, 2010

**Table 3.1-1  
Cumulative Scenario – Present and Reasonably Foreseeable Projects (Continued)**

<b>Project Number</b>	<b>Project Name/ Location</b>	<b>Status/ Anticipated Timeline</b>	<b>Project Summary</b>	<b>Source</b>
20	Dutra Haystack Landing Asphalt and Recycling Facility	Operations anticipated to commence Summer 2015	Operate an asphalt batch plant, an asphalt and concrete recycling facility, and an aggregate materials off-loading, storage, and distribution facility for Dutra Materials. The proposal includes the construction and operation of new dock facilities in and adjacent to the Petaluma River.	Sonoma County, 2008
21	San Pablo Bay Restoration Project	Ongoing operation	The USACE is the project sponsor for efforts to support construction of replacement wetlands, protection from additional pollution, and creation of habitats to increase the biodiversity and habitat values in the watershed in the San Pablo Bay area.	USACE, 2013c
22	Sears Point Wetland and Watershed Restoration Project	First phase: September 2012 through September 2015	The 2,327-acre Sears Point property is in southern Sonoma County, just north of San Pablo Bay. The Sonoma Land Trust, in cooperation with CDFW and the USFWS, proposes to restore tidal wetlands and rehabilitate diked wetlands and upland habitats, and to develop public access and educational opportunities.	USFWS, 2012a
23	San Leandro Shoreline Development	Planning phase; construction anticipated to start in May 2016	The City of San Leandro is proposing to develop an approximately 40-acre portion of the 1,800-acre publically owned shoreline, which would include a 250,000-square-foot office campus, 225 room hotel, 15,000-square-foot conference center, 188 units of housing, three new restaurants (total 21,000 square feet), 40,000 square feet of mixed-use office and retail, a library, and a parking structure.	City of San Leandro, 2013a; 2013b
24	Cullinan Ranch Tidal Restoration Project	Construction phase	The USFWS and the CDFW propose to construct a levee for portions of Highway 37, provide erosion protection on highway embankment slopes, construct access improvements, construct public use facilities (trails, a fishing pier, and a kayak launching dock), and breach and lower of tidal levees.	Restore Cullinan, 2013

**Table 3.1-1  
Cumulative Scenario – Present and Reasonably Foreseeable Projects (Continued)**

Project Number	Project Name/ Location	Status/ Anticipated Timeline	Project Summary	Source
25	WesPac Energy Pittsburg Marine Terminal Renovation	Construction planned for late 2014	WesPac Energy proposes to modernize and reactivate an existing oil storage and transfer facility at the Pittsburg Generating Station. The project site is at 696 West 10th Street in Pittsburg, and consists of approximately 125 acres of land stretching from the existing West 10th Street north, to the southern shoreline of the Suisun Bay. In addition, approximately 39 acres of submerged tidelands would be leased from the City of Pittsburg for the marine terminal portion of the facility.	City of Pittsburg, 2012 and CSLC, 2013b
26	Brooklyn Basin Deepening	Planning phase	The Brooklyn Basin Deepening project would likely entail widening and deepening of the segment of Oakland Inner Harbor from Washington Bridge to Park Street to a depth of 35 feet MLLW. In addition, the deepening project could include deepening and widening of the North Channel to 25 feet and 35 feet MLLW in various locations. The Brooklyn Basin Harbor is primarily used by USCG for use by the National Security Cutters. In the 1980s when the environmental documentation for the deepening the entire Oakland Inner Harbor was evaluated, deepening of the Brooklyn Basin Harbor was not carried through mainly because of the lack of economic justification. As of this writing, deepening of the Brooklyn Basin Harbor remains a project with low probability of occurrence due to lack of funding and environmental documents. However, because national security needs for this portion of the Inner Oakland Harbor may change abruptly, the project is considered for cumulative impact analysis.	USACE San Francisco District

Notes:

CDFW = California Department of Fish and Wildlife  
 CEQA = California Environmental Quality Act  
 CSCC = California State Coastal Conservancy  
 CSLC = California State Lands Commission  
 EIR = Environmental Impact Report  
 MLLW = mean lower low water

SRDWSC = Sacramento River Deep Water Ship Channel  
 WETA = San Francisco Bay Area Water Emergency Transportation Authority  
 USACE = United States Army Corps of Engineers  
 USCG = United States Coast Guard  
 USFWS = United States Fish and Wildlife Service

### 3.2 DOCUMENTS INCORPORATED BY REFERENCE

Incorporation of previous analysis by reference is encouraged by both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). For NEPA, the Council on Environmental Quality regulations (40 C.F.R. §§ 1500.4, 1502.21) state that agencies shall incorporate material by reference when the effect will be to reduce bulk without impeding agency and public review of the project alternatives. The incorporated material shall be cited, and its content summarized. No material may be incorporated by reference unless it is reasonably available for inspection by potentially interested persons within the time allowed for comment. Material based on proprietary data which are themselves not available for review and comment shall not be incorporated by reference. Under CEQA, incorporation by reference is authorized (California Public Resources Code Sections 21093 and 21094; State CEQA Guidelines Section 15150).

This Environmental Assessment (EA)/Environmental Impact Report (EIR) incorporates by reference information contained in the following documents:

- *The Final Composite Environmental Statement for Maintenance Dredging of Existing Navigation Projects, San Francisco Bay Region* was issued by the San Francisco District in 1975 (USACE, 1975). This document analyzed the environmental impacts associated with maintenance dredging of 20 federal navigation projects in San Francisco Bay, including the ten federal navigation projects that are the subject of this EA/EIR.
- *Final Policy Environmental Impact Statement/Programmatic Environmental Impact Report (EIS/EIR), Long Term Management Strategy (LTMS) for the Placement of Dredged Material in the San Francisco Bay Region* (LTMS, 1998). The LTMS EIS/EIR was jointly published by the LTMS agencies to select the overall long-range approach to conduct necessary dredging and dredged material disposal in an environmentally sound and economically prudent manner, to maximize the beneficial reuse of dredged material, and to develop a coordinated permit review process for dredging projects. Three alternative long-term approaches were evaluated in the LTMS EIS/EIR that would achieve the LTMS goals to various extents.
- *Record of Decision, LTMS for the Placement of Dredged Material in the San Francisco Bay Region* (USACE et al., 1999). The Record of Decision identified, from the alternatives considered in the LTMS EIS/EIR, the alternative selected by the United States Army Corps of Engineers (USACE) and United States Environmental Protection Agency to guide dredged material placement decisions in the San Francisco Bay Region for a period of 50 years.
- *Final Long Term Management Strategy Management Plan for Placement of Dredged Materials in the San Francisco Bay Region* (USACE et al., 2001). This document describes the detailed measures by which the LTMS agencies are implementing the EIS/EIR's long-term plan.
- *LTMS National Marine Fisheries Service Biological Opinion* (NMFS, 1998). This document transmits the National Marine Fisheries Service (NMFS) biological opinion for the LTMS Program and its effects on federally listed species under NMFS' jurisdiction at the time the consultation was completed. The biological opinion outlines implementing procedures and minimization measures. NMFS is revising the 1998 biological opinion; the updated biological opinion (expected 2015) will supersede the 1998 document.
- *LTMS U.S. Fish and Wildlife Service Biological Opinion* (USFWS, 1999). This document transmits the United States Fish and Wildlife Service Biological (USFWS) biological opinion for the LTMS Program and its effects on federally listed species under USFWS' jurisdiction at the time the consultation was completed. The biological opinion outlines criteria for inclusion of projects under the programmatic consultation, implementing procedures, and minimization measures. The

biological opinion was amended in 2004 to modify certain restrictions and minimization measures (USFWS, 2004).

- *LTMS California Department of Fish and Game Concurrence on Biological Opinions* (CDFG, 1998). In this document, the California Department of Fish and Game (now the California Department of Fish and Wildlife) concurred with the USFWS and NMFS biological opinions on the LTMS Program.
- *Delta Smelt: 2004 Formal Programmatic Consultation with the U.S. Fish and Wildlife Service* (USFWS, 2004). The USFWS issued a programmatic biological opinion on the issuance of Rivers and Harbors Act Section 10 permits and Clean Water Act Section 404 permits for projects with relatively small effects on delta smelt and its critical habitat in the jurisdiction of USFWS' Sacramento Field Office. It should be noted that since 2011, USACE has been required to consult on impacts to delta smelt during dredging of Suisun Bay Channel and New York Slough because of documented occurrences of entrainment during monitoring of hopper dredge use. Since 2011, USACE has received nonjeopardy opinions from USFWS to maintain Suisun Bay Channel with a hopper or clamshell dredge.
- *Programmatic Essential Fish Habitat (EFH) Assessment for the Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region* (USACE and USEPA, 2009). Pursuant to Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (16 U.S.C. § 1855[b]), USACE and USEPA submitted a Programmatic EFH Assessment to NMFS for the San Francisco Bay Region LTMS. This document provides an assessment of the potential effects to EFH from the ongoing dredging and dredged material placement activities of all federal and nonfederal maintenance dredging projects in the San Francisco Bay Region.
- *Agreement on Programmatic EFH Conservation Measures for Maintenance Dredging Conducted Under the LTMS Program* (USACE and USEPA, 2011). This document identified a comprehensive suite of EFH conservation measures developed in coordination with NMFS and completed the programmatic EFH consultation covering all maintenance dredging projects under the LTMS Program.

Relevant portions of all documents incorporated by reference into this EA/EIR are summarized throughout this EA/EIR where specifically noted.

### 3.3 GEOLOGY, SOILS, AND SEDIMENT QUALITY

This section evaluates the project alternatives' potential effects related to erosion and sediment quality. Sediment-related impacts on water quality (e.g., turbidity, contaminant suspension) from dredging and placement activities are discussed in Section 3.4, Hydrology and Water Quality. Potential impacts associated with sediment quality impacts on fisheries and other aquatic species are addressed in Section 3.6, Biological Resources.

#### 3.3.1 Regulatory Setting

As detailed in Section 1.3.2, authorization to discharge dredged material in the open ocean, enclosed coastal waters, upland sites, or for beneficial reuse is provided through a variety of federal and state permitting processes. The United States Army Corps of Engineers (USACE) and United States Environmental Protection Agency (USEPA) jointly regulate the discharge of dredged material into waters of the United States and the transportation of dredged material for the purpose of disposal of ocean waters pursuant to Section 404 of the Clean Water Act (CWA), and the Marine Protection, Research and Sanctuaries Act (MPRSA) (also refer to Sections 1.4.3 and 1.5.1). Under Section 401 of the CWA, the Regional Water Board must certify that the disposal will not violate state water quality standards and other applicable requirements; and the state further has the authority to regulate disposal of dredged material into state waters under the Porter-Cologne Act. In addition, pursuant to the federal Coastal Zone Management Act, USACE's maintenance dredging and dredged material placement needs to be consistent with the state's coastal zone management program and policies to the maximum extent practicable (16 U.S.C. § 1456).<sup>1</sup> In San Francisco Bay, state and regional regulations also apply to dredged material disposal. In 1996, the Dredged Material Management Office (DMMO) was created as part of the Long Term Management Strategy (LTMS) Program to establish a comprehensive and consolidated approach to eliminate redundancy and delays in the dredged material placement permitting process in the San Francisco Bay Area. Sediment testing requirements are dictated by a combination of federal and state guidance, as overseen by the DMMO.

#### Dredged Material Management Office

The DMMO is a joint program of USACE, USEPA, the Regional Water Board, San Francisco Bay Conservation and Development Commission, and California State Lands Commission. Participating agencies include the California Department of Fish and Wildlife, National Marine Fisheries Service, and the U.S. Fish and Wildlife Service. The purpose of the DMMO is to cooperatively review sediment quality sampling plans, analyze the results of sediment quality sampling, and make suitability determinations for material proposed for placement in San Francisco Bay, ocean placement, and beneficial reuse. The DMMO promotes use of beneficial reuse sites in support of the LTMS goals of beneficial reuse of at least 40 percent of material dredged in the San Francisco Bay region; no more than 40 percent placement at the San Francisco Deep Ocean Disposal Site (SF-DODS); and no more than 20 percent placement at in-Bay sites.

The process for obtaining approvals for dredging or dredged materials placement has three phases: (1) suitability determination; (2) permit process; and (3) episode approval. The suitability determination phase occurs at the DMMO level. The DMMO provides a venue for group discussion regarding material suitability for reuse or disposal based on sediment testing data.

The applicant must submit results from recent sediment testing, or provide sufficient data to support a finding by the agencies that the subject sediments are suitable for the proposed placement environment.

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<sup>1</sup> Pursuant to the federal Coastal Zone Management Act, USACE is required to be consistent to the maximum extent practicable with the enforceable policies of the California Coastal Act and the San Francisco Bay Plan, including those on water quality and dredging. The proposed project's consistency with the Coastal Zone Management Act is discussed in Section 3.8, Land Use.

The applicant submits to the DMMO either a sediment Sampling and Analysis Plan and Quality Assurance Project Plan, or a written request (with supporting information) for an exclusion from testing requirements based on factors such as previous testing history, and physical characteristics of the material proposed for dredging (e.g., Tier I analysis). The applicant must submit the sampling results to the DMMO for review, and the DMMO will make a determination regarding suitability for placement at the proposed placement site, or recommend alternate sites.

Although the DMMO provides initial review of permit applications and suitability recommendations, applicants must obtain separate approval from the appropriate DMMO member agencies (such as a CWA Act Section 401 Water Quality Certification from the Regional Water Board); each agency issues permit conditions and specific requirements associated with how the project is to be performed.

In February 2004, the DMMO adopted a Master Sampling and Analysis Plan (Master SAP) to streamline the process for composing and reviewing sampling and analysis plans for individual USACE maintenance dredging projects. The Master SAP describes the manner in which material should be collected, shipped, stored, handled, and tested for certain physical, chemical, and biological analyses. An updated Master SAP was approved by the DMMO in 2014.

### **Sediment Testing Requirements**

Material proposed to be dredged and placed in ocean, inland aquatic, or upland/beneficial reuse sites requires sediment characterization to predict the environmental impacts associated with dredging and dredged material placement activities. The objective of the sediment testing requirement is to determine whether placement of dredged material at designated placement sites can occur without causing unacceptable degradation to the surrounding environment. Most sediments undergo physical, chemical, and biological (i.e., benthic and water column toxicity) testing. The extent of sediment characterization necessary to ensure compliance with applicable environmental laws and regulations is generally site-specific.

For ocean placement, the material must be acceptable for deep-ocean placement, as regulated by the MPRSA. Section 102 of the MPRSA authorizes USEPA to establish criteria for evaluating all dredged material proposed for ocean dumping. These criteria are published separately in the Ocean Dumping Regulations at 40 C.F.R. pt. 220-228. Section 103 of the MPRSA authorizes USACE to issue permits, subject to USEPA concurrence or waiver, for dumping dredged materials into the ocean waters. The Ocean Testing Manual (OTM) (USACE and USEPA, 1991), commonly referred to as the Green Book, provides national guidance for determining the suitability of dredged material for ocean disposal.

For placement of dredged material in inland waters, including San Francisco Bay, Section 404 of the CWA and the regulations at 40 C.F.R. pt. 230 define the testing requirements. Current guidance for implementing inland aquatic dredged material placement is provided in *Evaluation of Dredged Material Proposed for Disposal in Waters of the U.S. – Testing Manual for Discharge in Inland and Near Coastal Water – Testing Manual* (USACE and USEPA, 1998), referred to as the Inland Testing Manual (ITM). In 2001, the DMMO released *Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region* (USACE, 2001). The DMMO agencies apply these guidelines, or the most current version, when determining the dredged material testing that will be required for dredging projects proposing disposal at designated sites in waters of the United States in San Francisco Bay. These local guidelines supplement the more detailed information in the ITM, and are not intended to be used on their own.

In the San Francisco Bay Area, screening guidance for placement of dredged material at upland sites or for beneficial reuse is provided in the Regional Water Board's May 2000 staff summary report, *Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines*, or most current revised version. For upland placement that is not beneficial reuse, or for material not suitable for aquatic placement, guidance may also come from the Upland Testing Manual (UTM) (USACE, 2003). Other criteria for upland beneficial reuse are contained in the permit conditions for each placement site.

Sediment testing is conducted in accordance with a tiered sampling framework for projects ranging from low- to high-potential impacts. Testing requirements increase from Tier I up to Tier IV. The terms Tier I, Tier II, Tier III and Tier IV are defined in the OTM, ITM and UTM; however, the DMMO also uses the terms.

The term Tier I is an evaluation system used by the DMMO to determine suitability of sediment for unconfined aquatic placement without additional testing. This determination is granted when the existing sediment data are sufficient for regulatory agencies to determine placement suitability. Criteria that may preclude the need for further testing include:

- 1) The dredged material is composed predominantly of sand, gravel, rock, or any other naturally occurring bottom material with particle sizes larger than silt, and the material is found in areas of high current or wave energy; or
- 2) The dredged material is for beach nourishment or restoration and is composed predominantly of sand, gravel, or shell with particle sizes compatible with material on the receiving beaches; or
- 3) When:
  - a. The material proposed for dumping is substantially the same as the substrate at the proposed site; and
  - b. The proposed dredging site is far removed (by distance or depth) from known existing and historical sources of pollution so as to provide reasonable assurance that such material has not been contaminated by such pollution.

Tier II testing typically requires physical and chemical analysis such as total solids, total organic carbon, grain size, metals, butyltins, pesticides, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons. Tier III testing may require biological evaluations, such as water column toxicity, benthic toxicity, and benthic bioaccumulation tests, in addition to physical and chemical analysis. Tier IV testing requires more comprehensive, case-specific evaluations. The programmatic essential fish habitat agreement for the LTMS program also includes requirements for bioaccumulation testing (USACE and USEPA, 2011, Item E7).

Additional testing requirements may include confirmatory grain size analysis, and the Modified Elutriate Test. Confirmatory grain size analysis is a physical analysis of sediment grain size, total organic carbon, and total solids. The Modified Elutriate Test is designed to measure and predict the release of contaminants from sediment into the water column, and any toxicity associated with decant water that could be discharged from upland placement sites to adjacent surface waters..

### **3.3.2 Environmental Setting**

#### **Study Area**

The study area is the geologic and tectonic setting of the San Francisco Bay Area. From the edge of the continental shelf near the Farallon Islands, it extends inland to the western margin of the Sacramento-San Joaquin Valley; and from the southern end of the Santa Clara Valley, it extends northward to the northern end of the Sonoma Valley. This region incorporates the major tectonic elements that define the structure and geologic characteristics of, or affecting, the San Francisco Bay Area.

#### **Regional Geological Setting**

The San Francisco Bay Area has a structurally controlled topography that consists primarily of north- to northwest-trending mountain ranges and intervening valleys that are characteristic of the Coast Ranges geomorphic province. The Coast Ranges are composed of a thick sequence of late Mesozoic (200 to 70 million years old) and Cenozoic (less than 70 million years old) sedimentary strata. The northern part of the Coast Range is dominated by the Franciscan assemblage.

San Francisco Bay is a topographic trough formed by a combination of warping and faulting, and is underlain by a down-dropped or tilted block (the Bay Block) (Olson and Zoback, 1998). This trough in the Coast Ranges allows the San Joaquin and Sacramento rivers to drain to the ocean. San Francisco Bay is about 55 miles long, and from 3 to 5 miles wide. Constrictions divide San Francisco Bay into Suisun, San Pablo, and the Central and South San Francisco bays.

The geology of the San Francisco Bay Area is made up primarily of three different geologic provinces: the Salinian block, the Franciscan complex, and the Great Valley sequence. The Salinian block is west of the San Andreas Fault. It is composed primarily of granitic plutonic rocks, which are similar to those found in the Sierra Nevada, and are believed to be rocks of the Sierra Nevada Batholith that have been displaced along the San Andreas Fault. To the east of the San Andreas Fault, and bounded on the east by the Hayward Fault, is the Mesozoic Franciscan complex. The Franciscan rocks represent pieces of former oceanic crust that have accreted to North America by subduction and collision. These rocks are primarily deep marine sandstone and shale. However, chert and limestone are also found in the assemblage. To the east of the Hayward Fault is the Great Valley sequence. This is composed primarily of Cretaceous and Tertiary marine sedimentary rocks in the San Francisco Bay Area.

The trough-like depression that underlies San Francisco Bay has been nearly filled with sediments, some of which have come from erosion of surrounding hills, and some of which consist of later marine deposits. For example, the marine clay-silt deposit termed “Bay Mud” is present throughout most of San Francisco Bay, several feet beneath the soft, more recently deposited muds. An ancient fine-grained sand deposit known as Merritt Sand occurs in the vicinity of Oakland and Alameda, in places relatively close to the sediment surface. Also, natural peat deposits can be found underlying more recent San Francisco Bay sediments in some areas of the San Pablo Bay, Suisun Bay, and the Delta. The thickness of the various historic sediment formations varies throughout the Estuary, but they can be several hundred feet thick overall. The upper several feet of the sediment profile in most locations consists of more recently deposited marine and riverine sediments. Sediments in the Estuary fall into three categories: sandy bottoms in the channels; shell debris over a wide expanse of the South Bay (derived from remnants of oyster beds); and soft deposits (known as Bay Mud) underlying the vast expanses of shallow water. Regions of the Estuary where currents are strong, including the deep channels of San Francisco Bay and the central channels of the major rivers in the Delta, generally have coarser sediments (i.e., fine sand, sand, or gravel). Areas where current velocities are lower, such as the shallow fringes of each subembayment of San Francisco Bay, are covered with Bay Mud (LTMS, 1998).

### **Recent Geologic History**

The present Estuary formed less than 10,000 years ago as the global climate warmed and sea levels rose. Marine water re-entered San Francisco Bay approximately 10,000 years ago, and by about 4,000 years ago had reached its present level. With the establishment of estuarine conditions, sedimentation in San Francisco Bay changed from alluvial sands and silts to dark-colored estuarine clays and silts, commonly called Bay Mud. Deposition of sandier sediment was confined to channels.

Since approximately 1850, human activities have made significant modifications to San Francisco Bay, causing changes in the patterns of circulation and sedimentation. Between 1856 and 1900, hydraulic mining in the Sierra foothills deposited several feet of sediment throughout San Francisco Bay. Starting in the 1800s, the construction of levees and dikes altered the patterns of drainage and annual flooding in the Sacramento River Delta. Also, the placement of fill at numerous localities around the San Francisco Bay margins has dramatically altered the shoreline profile during historic time.

In general, the surficial sediments in San Francisco Bay have been deposited since industrialization began in California, and therefore may have been exposed to anthropogenic sources of pollutants. These “industrial age” sediments can be encountered in maintenance dredging. Recent sand deposits—either riverine sand in portions of San Pablo and Suisun bays and the lower Sacramento River, or sand bars maintained by strong currents in central San Francisco Bay and the San Francisco Bar—also may be exposed to anthropogenic

sources of pollutants, but typically do not accumulate significant concentrations of them. There have been several programs in San Francisco Bay that have monitored concentrations of contaminants in sediments from various embayments. Data indicate that, overall, the peripheral industrialized areas indeed have higher mean contaminant concentrations than do the central basins (LTMS, 1998).

Whether of terrestrial or marine origin, the older deposits that pre-date European settlement in California generally are very hard-packed, low in moisture content, low in organic carbon (except for peat deposits), and have low concentrations of chemicals such as heavy metals and organic compounds. The chemical levels that are measurable in these historic deposits represent natural concentrations for the sediment type. These deposits are not typically dredged during maintenance dredging (LTMS, 1998).

### Regional Sediment Quality

**San Francisco Bay.** Since 1993, the San Francisco Estuary Institute has administered a Regional Monitoring Program (RMP) for the Regional Water Board and major San Francisco Bay dischargers. The San Francisco Estuary Institute's RMP includes sampling and testing of sediments from San Francisco Bay since 1993. Sediment samples are collected during the wet season and the dry season in alternating years, and analyzed for conventional sediment quality, trace metals, and trace organics. Samples are collected from the near surface (top 2 inches of sediment). Additional information on the RMP related to water quality is presented in Section 3.4, Hydrology and Water Quality.

RMP monitoring results indicate that sediment toxicity in San Francisco Bay has consistently been observed in a large proportion of samples tested, but varies over time (SFEI, 2006). These variations probably reflect changes in sediment contamination and toxicity related to seasonal and annual changes in run-off, salinity, and contaminant loadings.

The Bay Protection and Toxic Cleanup section of the California Water Code (Division 7, Sections 13390-13396.5) established a program to identify and plan remediation of toxic hot spots in bays and estuaries. The Consolidated Toxic Hot Spots Cleanup Plan (SWRCB, 2003) identified sediments in the entire San Francisco Bay as a high-priority toxic hot spot for mercury, selenium, polycyclic aromatic hydrocarbons, and dieldrin.

The continual re-suspension of sediments in the San Francisco Estuary system also means it can be expected that sediments accumulating in navigation channels may have been exposed to pollutant sources in several locations, far removed from the dredging site. This helps to explain why almost all maintenance dredging projects from throughout San Francisco Bay show at least some degree of elevated (above ambient or "background") concentrations of trace contaminants. However, particles carrying pollutants also may get diluted with particles from other areas that settle in the same location that have lower concentrations of associated contaminants. Thus, the sediment from many dredging projects, even when trace pollutants are present, is not contaminated to a degree that causes toxicity, or that otherwise represents any significant environmental risk (LTMS, 1998).

**Offshore.** Based on sampling conducted between 1996 and 2007, measured chemical concentrations in the sediment at SF-DODS have generally not exceeded those background values found either at the site prior to disposal or at a SF-DODS reference area; the few chemical compounds whose concentrations have exceeded background values have still been well below any value to cause any potential concern for biological effects (Germano and Associates, 2008).

### Sediments in the Federal Navigation Channels

Sediment dredged from most of the federal navigation channels is typically characterized as Bay Mud—the exceptions being the San Francisco Main Ship Channel (MSC), Suisun Bay Channel and New York Slough, and portions of Pinole Shoal Channel, which have historically been greater than 80 percent sand.

Sediments in all remaining channels (Richmond Harbor, San Rafael Creek, Oakland Harbor, Napa River, Petaluma River, San Leandro Marina, Redwood City Harbor, and remaining portions of Pinole Shoal) contain less than 80 percent sand.

DMMO requirements for sediment testing conducted prior to each maintenance dredging episode are based on a tiered structure, and depend on the placement sites being considered, and past testing results. Table 3.3-1 presents the DMMO-approved 5-year sediment testing schedule through 2018 for the federal shipping channels in and around San Francisco Bay. The schedule only includes channels that are dredged annually, not those dredged at less-frequent intervals. Assuming future sediment testing results are consistent with historic results, it is expected that the schedule represented in Table 3.3-1 would continue through the 2024 planning horizon for this EA/EIR.

<b>Table 3.3-1 2013-2018 Sampling and Testing Schedule for Federal Navigation Channels Maintained by USACE Annually</b>						
<b>Channel</b>	<b>2013 Completed</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Oakland Outer Harbor*	<b>Tier III, MET (3-year cycle, samples collected prior to 2012 dredging)</b>	Tier I (No testing)	Tier I (No testing)	<b>Tier III, MET (3-year cycle)</b>	Tier I (No testing)	Tier I (No testing)
Oakland Inner Harbor*		Tier I (No testing)	Tier I (No testing)	<b>Tier III, MET (3-year cycle)</b>	Tier I (No testing)	Tier I (No testing)
Richmond Inner Harbor*	Tier I (No testing)	Tier I (No testing)	<b>Tier III, MET (3-year cycle)</b>	Tier I (No testing)	Tier I (No testing)	<b>Tier III, MET (3-year cycle)</b>
Richmond Outer Harbor*	<b>Tier III, MET (Only for material in the Longwharf Area)</b>	Tier I (No testing)	<b>Tier III, MET (3-year cycle)</b>	Tier I (No testing)	Tier I (No testing)	<b>Tier III, MET (3-year cycle)</b>
Suisun Bay	Tier I (No testing)	<b>Confirmatory Grain Size Analysis (5-year cycle)</b>	Tier I (No testing)	Tier I (No testing)	Tier I (No testing)	Tier I (No testing)
New York Slough	Tier I (No testing)	<b>Confirmatory Grain Size Analysis (5-year cycle)</b>	Tier I (No testing)	Tier I (No testing)	Tier I (No testing)	Tier I (No testing)
SF Main Ship	Tier I (No testing)	Tier I (No testing)	Tier I (No testing)	Tier I (No testing)	Tier I (No testing)	<b>Confirmatory Grain Size Analysis (8-year cycle)</b>
Redwood City Harbor*	Tier I (No testing)	<b>Tier III, MET (3-year cycle, depending on dredging cycle)</b>	Tier I (No testing)	Tier I (No testing)	<b>Tier III, MET (3-year cycle, depending on dredging cycle)</b>	Tier I (No testing)
Pinole Shoal (San Pablo Bay)*	Tier I (No testing, Testing Cycle Extended 1 Year)	<b>Tier III, MET (3-year cycle)</b>	Tier I (No testing)	Tier I (No testing)	<b>Tier III, MET (3-year cycle)</b>	Tier I (No testing)
Notes:						
Tier III = Physical/Chemical Analysis, Benthic and Water Column Toxicity Tests and Bioaccumulation when necessary. Inland Testing Manual (ITM) or Ocean Testing Manual (OTM) requirements will be determined based on placement locations.						
Confirmatory Grain Size Analysis = Physical Analysis (grain size, total organic carbon, and total solids)						
MET = Modified Elutriate Test						
* These projects have potential placement at upland wetland restoration projects. If placement at a wetland restoration project is being proposed, then the sediments shall be analyzed for the constituents required by those projects' permits.						

Recent sampling results are summarized for each of the federal navigation projects below. Results are reported with respect to whether or not they were determined to be suitable for placement at the placement site(s) being considered that year. Because the Petaluma River Channel and Napa River Channel have not been dredged in over 10 years, no recent sampling results are available for these channels; USACE would conduct sediment testing prior to dredging these channels.

The summary for each federal navigation project below only presents the most recent results for the baseline evaluation period (2000 through 2012) based on analysis conducted for placement sites USACE was considering for the year reported. Table 1-1 in Chapter 1 provides a review of the type of dredge equipment commonly used, dredging cycle (i.e., frequency of dredging), last fiscal year the project was dredged, and the historic dredged material placement site for each navigation project, which includes additional sites for which dredged materials from each navigation project have been found suitable for placement.

### **Richmond Harbor**

Based on sediment testing conducted for the 2012 calendar year dredging episode, the DMMO determined that material to be dredged from Richmond Inner Harbor was suitable for placement at SF-DODS, the Montezuma Wetlands Restoration Project site, and Winter Island. Sediment from the Richmond Inner Harbor federal channel has historically been 73 percent to 99 percent fines (USACE, 2012c).

Based on the 2012 sediment testing, dredged material from Richmond Outer Harbor was determined suitable to be placed at one or a combination of the following locations: the Alcatraz Island placement site (SF-11), the San Pablo Bay placement site (SF-10), Cullinan Ranch, or at other upland sites with criteria similar to or less-stringent than Cullinan Ranch. Sediment grain size from the Richmond Outer Harbor has historically varied between 10 percent and 67 percent sand and gravel, depending on sample location and the sampling year (USACE, 2012c).

The United Heckathorn Superfund site is in Richmond Harbor, and includes 5 acres of land and approximately 15 acres of marine sediments in the Parr and Lauritzen channels. Unacceptable levels of dichloro-diphenyl-trichloroethane (DDT) and dieldrin remain in the waters and sediments of the Lauritzen channel (refer to Section 3.9, Hazards and Hazardous Materials). During the baseline evaluation period (2000-2012), USACE avoided dredging portions of the federal channel adjacent to the Heckathorn site.

### **San Francisco Main Ship Channel**

Sediment collected from MSC in 2010 ranged from 93 percent to 99 percent sand, which is consistent with the historical results of 90 percent to 99 percent sand. The total organic carbon levels in composite samples (total of two composites) ranged from 0.11 percent to 0.35 percent for samples collected in 2010. This is considered to be low, and in the highly suitable range for beneficial reuse. Throughout the years that MSC has been tested for maintenance dredging purposes, the sediment has been determined to be suitable for unconfined aquatic placement at the San Francisco Bar Channel Disposal Site (SF-8) or the Ocean Beach Demonstration Site. Based on the 2010 testing results, the DMMO's determination and recommendations for suitability determination of MSC sediments has been that a Tier I exclusion from testing is appropriate for the sediment proposed for dredging of the MSC (USACE, 2013).

Sediment sampling by the U.S. Geological Survey in 2010 indicated that the mean grain size in most of the San Francisco Bight (i.e., coastal and offshore area) falls in the fine-sand range (0.125 to 0.250 millimeters [mm]) with fine to medium sand (0.250 to 0.500 mm) occurring along Ocean Beach and on the inner part of the bar. Coarse sand (0.500 to 1.000 mm) was restricted to areas closest to the Golden Gate, where strong tidal currents effectively wash away finer sand. The physical characteristics of material dredged from the MSC are generally compatible with the sand in the Ocean Beach nearshore environment (USACE, 2013).

## **San Rafael Creek**

In 2002 and 2010, sampling and testing of the shoaled sediment revealed that upstream of Station 175+00 (Figure 3.3-1) in the Inner Canal Channel, pesticide and PCB concentrations were at levels that rendered the sediment not suitable for in-Bay placement. Downstream of Station 175+00, the sediment was deemed suitable for in-Bay placement. The 2011 sampling event confirmed that, at that time, there was no downstream migration of the contaminated sediment beyond Station 175+00, and sediments were determined to be suitable for unconfined aquatic placement at SF-10 and SF-11 (USACE, 2011a). Dredged material has typically been less than 80 percent sand.

## **Pinole Shoal**

Testing of the Pinole Shoal took place in 2010, and sediments were determined to be suitable for unconfined aquatic placement at the Carquinez Strait placement site (SF-9) and SF-10. Historically, physical analysis of the channel bottom sediments has determined a highly varied sand content, ranging between 10 percent and 98 percent. Sandier sediment is generally found along the eastern portion of the channel and in the maneuvering area, closer to where high-energy currents flow out of the Carquinez Strait (USACE, 2012d).

## **Suisun Bay Channel and New York Slough**

Grain-size testing of Suisun Bay Channel and New York Slough sediments has historically shown that shoaling in these areas ranges between 94 percent and 99 percent sand. Historically, the sediment has been deemed suitable for in-Bay placement at SF-9 and Suisun Bay placement site (SF-16). In 2009, confirmatory chemistry tests were run, in addition to the usual grain-size testing; these tests showed that no potential contaminant exceeded acceptable limits. Since 2009, USACE has sought—and annually received—a Tier I exclusion from sediment testing from the DMMO for its annual maintenance dredging of these channels (USACE, 2012e).

## **Oakland Harbor**

Sediment testing for the Oakland Inner and Outer Harbors channels for the 2009, 2010, and 2011 dredging episodes indicated that dredged material from these channels was suitable for placement at SF-11, SF-DODS, and certain upland beneficial reuse sites for which the placement criteria were met (USACE, 2012b). Dredged material from Oakland Harbor has typically been less than 80 percent sand.

## **San Leandro Marina (Jack D. Maltester Channel)**

Sediment testing for the San Leandro Marina/Jack D. Maltester Channel was last conducted in 2009. Sediment in this channel is composed of silt and clay, and has been demonstrated to be suitable for upland placement since 1978, and for in-Bay placement in 1997. Because in-Bay placement was not considered in 2009, it was only evaluated for upland placement at that time (USACE, 2009).

## **Redwood City Harbor**

Testing of the Redwood City Harbor channels took place in 2011, and sediments were determined to be suitable for unconfined aquatic placement at SF-11 and SF-DODS. The sediment is predominantly silt and clay, with 2 percent or less sand and gravel (USACE, 2011b).

### **3.3.3 Methodology and Thresholds of Significance**

The project alternatives neither propose construction of new structures nor introduce elements that would increase potential risks related to rupture of a known earthquake fault; seismic shaking; or seismic-related



loc: U:\GIS\USACE\_FedChannel\_EA\_EIR\Projects\APRIL\_2015\Fig3\_3\_1\_San\_rafael\_creek\_stationing.mxd, 4/1/2015 1:24:52 PM  
 Source: URS, 2013.

**SAN RAFAEL CREEK**

Federal Navigation Channels EA/EIR  
 U.S. Army Corps of Engineers  
 Bay Area, California

April 2015



**FIGURE 3.3-1**

- ① Highway
- ▭ Dredge Locations Included in EA/EIR

ground failure, including liquefaction; or landslides. Similarly, because channels would be dredged to previously maintained depths, the project alternatives would not involve activities that would cause geologic units or soils to become unstable, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse; this excludes minor erosion of the channel sides from sloughing that may occur after the channels are dredged (see Impact 3.3-1). Placement of dredged material at existing permitted placement sites would not be expected to result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse because the placement of dredged material at these sites is managed and monitored to avoid such impacts. Because the project alternatives would have no potential impacts related to seismic risks or unstable geologic resources, these topics are not further addressed in this section. Additionally, as described in Section 3.1.2, because the proposed project would not result in adverse impact on minerals, this resource is not evaluated further in this EA/EIR.

Therefore, the analysis considers whether the proposed project would:

- Result in substantial soil erosion, or
- Substantially degrade sediment quality (i.e., substantially increase sediment contaminant concentrations above ambient conditions).

### 3.3.4 Impacts and Mitigation Measures

#### ***Impact 3.3-1: Potential for Dredging, Transport, and Placement Activities to Result in Substantial Soil Erosion***

##### **No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

Under all alternatives, dredging would remove sediment that has accumulated since the prior dredging event. The design dimensions of the channels are intended to preclude sloughing of the channel sides. Although the alternatives may result in minimal erosion of the channel sides from sloughing after the channels are dredged due to the disturbance of sediments, historic patterns of erosion and sediment accumulation would not be expected to change. Transport of dredged materials would not disturb sediments, and therefore would not result in any erosion impacts.

The potential for erosion impacts due to placement activities would be minimal. Open-water placement sites can be either predominantly nondispersive (i.e., dredged materials largely remain at the placement location), or predominantly dispersive (i.e., dredged materials disperse from the site during placement or over time). With the exception of SF-DODS, all of the other open-water placement sites, both inside and outside San Francisco Bay, are considered dispersive (LTMS, 1998). Therefore, although sediments placed at in-Bay locations may disperse, no erosion impacts would be expected. As noted in Section 1.5.3, some shoaling has occurred at SF-8; however, USACE limits the use of SF-8 to the extent feasible. The disposition of dredged material at beneficial reuse and upland placement sites is managed by site operators so that substantial erosion impacts do not occur. Furthermore, at beneficial reuse sites, placement of dredged material would have beneficial impacts on soil resources by providing sediments needed to implement the site-specific intended beneficial reuse (e.g., habitat restoration, flood protection).

Additional beneficial impacts would result from the placement of dredged material at Ocean Beach nearshore placement site (SF-17), which includes the Ocean Beach demonstration site and Ocean Beach. Sand placed in SF-17 is expected to stay in the nearshore, slowly moving shoreward while dispersing, and creating shallower depths. This scenario could lead to a slowing of bluff erosion as more wave energy is dissipated further offshore. Also, having a larger volume of sand at or inside the breaker zone (i.e., where wave and tidal currents can drive shore-normal and shore-parallel sand transport) is expected to extend the length of time sand remains on the beach. This is because each storm has the potential to erode a

given volume of sand from the nearshore, beach, and bluffs; therefore, having more sand in the nearshore would likely result in a smaller cross-shore transport potential for beach erosion and bluff failure (USACE, 2013). Newly placed sand at both SF-17 and the Ocean Beach nourishment site would immediately start dispersing. Post-placement surveys show that the elevation of the mound above the pre-placement bottom decreases by 1 to 2 feet in the year between placements. Consequently, placement of additional sand in the littoral zone would temporarily change existing erosion and accretion patterns offshore and along the beaches of Ocean Beach. However, those changes are not considered to be significant given the small placement footprint. Overall, the purpose of placement at SF-17 and Ocean Beach is to alleviate the beach erosion occurring along Ocean Beach by having more sand in the littoral system off of the south of Sloat Boulevard stretch of Ocean Beach. The changes to erosion and accretion patterns from both options are considered to be temporary and not significant (USACE, 2013), and would be outweighed by the beneficial effects on shoreline stabilization.

**NEPA Determination:** Under all alternatives, erosion impacts would be less than significant. The placement of dredged material at beneficial reuse sites would have beneficial impacts on soil resources.

**CEQA Determination:** Under all alternatives, erosion impacts would be less than significant.

### ***Impact 3.3-2: Potential for Dredging, Transport, and Placement Activities to Substantially Degrade Sediment Quality***

#### **No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

Generally, based on historic sediment testing data, dredged material from the federal navigation channels has been determined suitable for placement at the federal standard, and proposed potential alternate placement sites identified for each channel in Chapter 2. Over time, some isolated areas in, or adjacent to, the channels have been identified as containing sediment that is not suitable for unconfined aquatic disposal (NUAD); USACE would continue to avoid dredging areas (e.g., portions of the Richmond Harbor federal channel adjacent to the United Heckathorn site) that it has been able to avoid dredging in the past. Under all alternatives, USACE would continue to conduct testing following guidelines in the Master SAP, OTM, ITM, UTM, and the *Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region*; obtain suitability determinations from the DMMO for the placement of dredged materials; and conduct placement in accordance with the LTMS goals to ensure beneficial reuse, as appropriate and feasible. If future testing identifies NUAD material that must be dredged, all NUAD dredged material would be placed at upland sites, and in some cases Montezuma Wetlands Restoration Project, as determined during DMMO review. Conformance with the above processes would ensure that dredged material placement activities would not substantially degrade sediment quality at the placement sites.

The USACE would also implement sediment bioaccumulation testing as detailed in the *Agreement on Programmatic EFH Conservation Measures for Maintenance Dredging Conducted Under the LTMS Program* (USACE and USEPA, 2011). Per this agreement, if residual layer contamination that would be exposed after maintenance dredging is greater than that in the overlying sediment, and exceeds the bioaccumulation trigger values established in the agreement, consideration of the need for potential management actions to address the residual contamination would be taken on a case-by-case basis.

**NEPA Determination:** Under all alternatives, impacts to sediment quality would be less than significant.

**CEQA Determination:** Under all alternatives, impacts to sediment quality would be less than significant.

**Impact 3.3-3: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Sediments and Soils****No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

The reasonably foreseeable actions in Table 3.1-1 include several projects that would involve dredging and dredged material placement that could result in the same type of impacts on sediments and soils as the proposed project. The cumulative effect of dredging activities in San Francisco Bay, particularly new dredging projects and deepening of channels, could impact sediment volume and transport in San Francisco Bay by modifying historic patterns of sediment movement. As stated under Impact 3.3-1, USACE's maintenance dredging would not be expected to change historic patterns of erosion and sediment accumulation. In addition, it is expected that other dredging projects would comply with the guidelines of the DMMO for dredged material testing and placement. Therefore, there would be no adverse cumulative impacts to sediments and soils.

**NEPA Determination:** The project alternatives would not result in cumulative impacts on sediments and soils.

**CEQA Determination:** The project alternatives would not result in cumulative impacts on sediments and soils.

### 3.4 HYDROLOGY AND WATER QUALITY

This section describes the existing hydrologic and water quality regulatory and environmental setting of San Francisco Bay and the offshore ocean environment, and analyzes the potential impacts of the project alternatives on water resources. Existing conditions and potential impacts associated with plans and water quality policies pursuant to compliance with the Coastal Zone Management Act (CZMA) are addressed in Section 3.8, Land Use. Existing conditions and potential impacts associated with water quality impacts on fisheries and other aquatic species are addressed in Section 3.6, Biological Resources.

#### 3.4.1 Regulatory Setting

##### Federal

##### Clean Water Act

The federal Clean Water Act (CWA) (33 U.S.C. § 1257 et seq.) requires states to set standards to protect water quality. The objective of the federal CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Specific sections of the CWA control discharge of pollutants and wastes into marine and aquatic environments, as further discussed below.

**Section 303 – Water Quality Standards and Implementation Plans.** Title 40 of the C.F.R. pt. 131.2, describes water quality standards as the water quality goals for a particular water body. These water quality goals are the designated uses for the water and the criteria to protect those uses.

A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water, and by setting criteria necessary to protect the uses. States adopt water quality standards to protect public health or welfare, enhance the quality of water, and serve the purposes of the CWA. To serve the purposes of the CWA, as defined in sections 101(a)(2) and 303(c), means that water quality standards should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish, and wildlife, and provide water quality for recreation in and on the water. The standards should consider the use and value of public water supplies, propagation of fish, shellfish, and wildlife, recreation in and on the water, and agricultural, industrial, and other uses including navigation. Such standards serve the dual purposes of both establishing the water quality goals for a specific water body and also serving as the regulatory basis for the establishment of water-quality-based treatment controls and strategies beyond the technology-based levels of treatment required by sections 301(b) and 306 of the CWA.

Title 40 of the C.F.R. § 131.4, states: “Water quality standards consist of a designated use and water quality criteria for such waters based upon such uses.” CWA Section 303 states that water quality standards adopted by the state and approved by the United States Environmental Protection Agency (USEPA) govern actions that affect navigable waters. Pursuant to the CWA, the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) adopted the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan). The Basin Plan includes rare and endangered species as a protected beneficial use, stating that: “The water quality criteria to be achieved that would encourage development and protection of rare and endangered species should be the same as those for protection of fish and wildlife habitats generally. However, where rare or endangered species exist, special control requirements may be necessary to assure attainment and maintenance of particular quality criteria, which may vary slightly with the environmental needs of each particular species. Criteria for species using areas of special biological significance should likewise be derived from the general criteria for the habitat types involved, with special management diligence given where required.” The Basin Plan also includes fish migration as a beneficial use, defined as: “Uses of water that support habitats necessary for migration, acclimatization between fresh water and salt water, and protection of aquatic organisms that are temporary inhabitants of waters within the region.”

Finally, the Basin Plan's water quality objective relating to population and community ecology states: "[T]he health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors."

**Section 303 – Impaired Water Bodies and Total Maximum Daily Loads.** Under Section 303(d) of the CWA, each state is required to identify those waters within its boundaries for which effluent limits required by Section 301 are not stringent enough to meet water quality standards. The state must establish priority rankings for these waters, and develop Total Maximum Daily Loads (TMDLs) to maintain beneficial uses and improve water quality. Seasonal variations in loading and a margin of safety are considered when TMDLs are established. In California, the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards prepare the CWA Section 303(d) List of Water Quality Limited Segments Requiring TMDLs.

San Francisco Bay is listed as impaired for pesticides (e.g., chlordane, dichloro-diphenyl-trichloroethane (DDT), dieldrin, dioxin, and furan compounds), mercury, invasive species, polychlorinated biphenyls (PCBs), selenium, and trash. In greater San Francisco Bay, Suisun Bay and San Pablo Bay are listed for these same parameters, except for trash. The Napa River is listed as impaired for nutrients, pathogens, and sedimentation/siltation. The tidal portion of the Petaluma River, which extends upstream of the City of Petaluma's urban core to the confluence of the river with Lynch Creek, is listed as impaired for diazinon, nutrients, pathogens, and nickel (SWRCB, 2010).

**Section 311 – Oil Pollution Act.** CWA Section 311, as amended by the Oil Pollution Act of 1990, provides for spill prevention requirements, spill reporting obligations, and spill response planning and authorities. It regulates the prevention of, and response to, accidental releases of oil and hazardous substances into navigable waters, on adjoining shorelines, or affecting natural resources belonging to or managed by the United States. The United States Coast Guard is responsible for regulations and enforcement related to vessels and marine transportation, and the USEPA is responsible for non-transportation-related facilities and onshore operations.

**Section 313(a) – Federal Facilities Pollution Control.** Congress expressly authorizes state regulation of federal activities that result in discharge or water pollution.

**Section 401 – Water Quality Certification.** Under Section 401 of the CWA, water quality certification (WQC) is required for any activity that requires a federal permit or license, and that may result in discharge into navigable waters. To receive certification under Section 401, an application must demonstrate that activities or discharges into waters are consistent with state effluent limitations (CWA Section 301), water quality effluent limitations (CWA Section 302), water quality standards and implementation plans (CWA Section 303), national standards of performance (CWA Section 306), toxic and pretreatment effluent standards (CWA Section 307), and "any other appropriate requirements of State law set forth in such certification" (CWA Section 401). In California, the authority to grant water quality certification is delegated to the SWRCB, and in the San Francisco Bay area, applications for certification under CWA Section 401 are processed by the Regional Water Board. The CWA and United States Army Corps of Engineers (USACE) regulations (33 C.F.R. § 336.1[a][1]) require USACE to seek state WQC for discharges of dredged or fill material into waters of the United States.

The Regional Water Board reviews a proposed project before granting or denying certification. Pursuant to 33 C.F.R. § 337.8(a)(4), action is required by the USACE Division Engineer or Chief of Engineers when "...the state denies or unreasonably delays a water quality certification or issues the certification with conditions or controls not related to maintenance or enforcement of state water quality standards or significantly exceeding the federal standard." Based on a report prepared by the District, the Chief of Engineers would make a determination as to whether to defer the dredging and seek Congressional appropriations for the added expense. Alternatively, the issue could be referred to the Secretary of the

Army to determine whether it is appropriate to maintain navigation, as provided by sections 511(a) and 404(t) of the CWA.

**Section 404 – Discharge of Dredged or Fill Material.** Section 404 of the CWA regulates the discharge of dredged or fill material (e.g., fill, pier supports, and piles) into waters of the United States, which includes San Francisco Bay. The USACE implements Section 404 of the CWA, and USEPA has oversight authority. Section 404(b)(1) of the CWA establishes procedures for the evaluation of permits for discharge of dredged or fill material into waters of the United States. In situations where USACE is proposing work that involves discharge of dredged or fill material into waters of the United States, USACE must comply with the requirements of the Section 404(b)(1) Guidelines, although it does not issue itself permits.

### **Marine Protection, Resources, and Sanctuaries Act**

The Marine Protection, Resources, and Sanctuaries Act (MPRSA) is the United States' implementation of an international treaty, the Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter (also known as the "London Convention"). Section 102 of the MPRSA authorizes USEPA to establish criteria for evaluating all dredged material proposed for ocean dumping. These criteria are published separately in the Ocean Dumping Regulations at 40 C.F.R. pt. 220-228. Section 102 also authorizes USEPA to designate permanent ocean-dredged material disposal sites in accordance with specific site selection criteria designed to minimize the adverse effects of ocean disposal of dredged material. Section 103 of the MPRSA authorizes USACE to issue permits, subject to USEPA concurrence or waiver, for the transport and placement of dredged material at a designated ocean disposal site. It requires public notice, opportunity for public hearings, compliance with criteria developed by USEPA (unless a waiver has been granted), and the use of designated sites whenever feasible. Although USACE does not issue itself permits, USACE and USEPA apply these standards to USACE projects as well.

### **Rivers and Harbors Act**

Rivers and Harbors Act refers to a conglomeration of many pieces of legislation and appropriations passed by Congress since the first such legislation in 1824. The Rivers and Harbors Act of 1899 was the first federal water pollution act in the United States. It focuses on protecting navigation, protecting waters from pollution, and acted as a precursor to the CWA of 1972. Section 10 of the Rivers and Harbors Act of 1899 regulates alteration of, and prohibits unauthorized obstruction of, navigable waters of the United States. Original construction of the federal navigation channels was authorized under the Rivers and Harbors Act, and USACE's maintenance dredging maintains the navigability of the channels in accordance with their authorized dimensions. The USACE, as the implementing authority of Section 10 of Rivers and Harbors Act, ensures its work or structures do not impede navigation in waters of the United States, and, therefore, does not need to issue itself a permit pursuant to Section 10.

### **International Convention for the Prevention of Pollution from Ships**

Prevention of pollution from ships is regulated under Prevent Pollution from Ships, 1980 (33 U.S.C. §§ 1901–1911); and the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (referred to as MARPOL 73/78). The regulations cover the prevention of pollution by oil, noxious liquids, harmful substances, and garbage from operational measures, as well as from accidental discharges. The U.S. Coast Guard is the responsible enforcement agency.

### **Coastal Zone Management Act**

The CZMA, established in 1972 and administered by the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management, provides for management of the nation's coastal resources, including water quality. The overall purpose of the act is to balance competing

land and water issues in the coastal zone. For San Francisco Bay, the San Francisco Bay Conservation and Development Commission (BCDC) is the regional coastal zone management agency, and is responsible for issuing concurrence with consistency determinations under the CZMA. The San Francisco Bay Plan (Bay Plan), first adopted in 1969 and most recently updated in 2011, is BCDC's policy document specifying goals, objectives, and policies for BCDC jurisdictional areas. Pursuant to the federal CZMA, USACE is required to be consistent to the maximum extent practicable with the enforceable policies of the Bay Plan. For activities outside of the Golden Gate, consistency determinations are issued by the California Coastal Commission. The proposed project's consistency with the CZMA is discussed in Section 3.8, Land Use.

### **Floodplain Management**

Executive Order 11988 requires that federal agency construction, permitting, or funding of a project must avoid incompatible floodplain development, be consistent with the standards and criteria of the National Flood Insurance Program, and restore and preserve natural and beneficial floodplain values. As described in Section 3.4.3, the project alternatives are not expected to result in adverse impacts on floodplain management.

### **State**

#### **Porter-Cologne Act**

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act), and associated regulations found in California Code of Regulations Title 23, establish a comprehensive program for the protection of water quality and the beneficial uses of waters of the state. It addresses both point and nonpoint source discharges, to both surface and ground waters. The SWRCB and nine regional water quality control boards are the principal state agencies with primary responsibility for water quality control. The Porter-Cologne Act provides for the adoption of water quality control plans to designate beneficial uses of water, set water quality objectives to protect beneficial uses, and provide for a program to achieve those objectives. The plans may include prohibitions against the discharges of waste or certain types of waste, in specified areas or under specified conditions. The Basin Plan is the Regional Water Board's master water quality control planning document. Pursuant to the Porter-Cologne Act and Title 23, the Regional Water Board is authorized to issue waste discharge requirements (WDRs) and WQCs (i.e., permits) for activities that may affect water quality. These permits must implement the Basin Plan, the Clean Water Act for point source discharges to waters of the United States, and statewide plans and policies, including, but not limited to, Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Water in California," which generally restricts dischargers from degrading water quality. As a federal agency, USACE is not required to apply for WDRs; however, the Regional Water Board may issue WDRs with the WQC.

### **Regional**

#### **McAteer-Petris Act**

The McAteer-Petris Act (California Government Code Section 66000, et seq.), first enacted in 1965, created BCDC to prepare a plan to protect the San Francisco Bay and shoreline, and provide for appropriate development and public access. The Act directs BCDC to exercise its authority to issue or deny permit applications for placing fill, dredging, or changing the use of any land, water, or structure in the area of its jurisdiction (i.e., San Francisco Bay waters and within 100 feet of the shoreline). As stated above, BCDC also carries out determinations of consistency with the CZMA for federally sponsored projects. As noted above, the Bay Plan is BCDC's policy document specifying goals, objectives, and policies for BCDC jurisdictional areas. Pursuant to the federal CZMA, USACE is required to be

consistent to the maximum extent practicable with the enforceable policies of the Bay Plan. The proposed project's consistency with the Bay Plan is discussed in Section 3.8, Land Use.

### **Dredged Material Management Office**

The Dredged Material Management Office (DMMO) is a joint program of USACE, USEPA, the Regional Water Board, BCDC, and California State Lands Commission. Participating agencies include the California Department of Fish and Wildlife, National Marine Fisheries Service, and the U.S. Fish and Wildlife Service. The purpose of the DMMO is to cooperatively review sediment quality sampling plans, analyze the results of sediment quality sampling, and make suitability determinations for material proposed for placement in San Francisco Bay.

Applicants must submit results from recent sediment testing, or submit sufficient data to support a finding by the agencies that the sediments are suitable for the proposed placement environment. An applicant submits to the DMMO either a sediment Sampling and Analysis Plan and Quality Assurance Project Plan, or a written request (with supporting information) for an exclusion from testing requirements. The exclusion request can be based on the exclusion criteria in the testing manuals and DMMO guidelines or existing data sufficient to make a determination (refer to Section 3.3, Geology, Soils, and Sediment Quality for additional information on sediment testing requirements). The applicant must submit the sampling results to the DMMO for review, and the DMMO will make a determination about where the materials can be disposed.

Although the DMMO provides initial review of permit applications, applicants must eventually obtain separate approval from the appropriate DMMO member agencies (e.g., CWA Section 401 WQC from the Regional Water Board); each agency issues permit conditions and specific requirements about how the project is to be performed.

## **3.4.2 Environmental Setting**

### **Study Area**

The study area for hydrology and water quality is the San Francisco Bay hydrologic region, which covers an area of approximately 4,603 square miles, extending from southern Santa Clara County north to Tomales Bay in Marin County, and inland to the confluence of the Sacramento and San Joaquin rivers (Regional Water Board, 2010). Rivers and streams in the region flow to San Francisco Bay or directly to the Pacific Ocean. The dominant feature is the San Francisco Bay/Delta Estuary (Estuary), where fresh water from the Central Valley mixes with saline water from the Pacific Ocean.

San Francisco Bay is composed of distinct hydrographic regimes: the South Bay, which extends from the Bay Bridge to the southern terminus of San Francisco Bay in San Jose; and the Central, Suisun, and San Pablo bays, which connect the Delta and the Pacific Ocean.

Outside of the Golden Gate, the study area includes the San Francisco Main Ship Channel, the San Francisco Bar Channel Disposal Site (SF-8), and the nearshore zone off Ocean Beach, as well as the waters that are used by vessels en route to these sites. The Main Ship Channel is approximately 5 miles west of the Golden Gate Bridge, and extends across the arc-shaped, submerged, San Francisco Bar in the Gulf of the Farallones. Further offshore, the study area also includes waters in the proximity of the San Francisco Deep Ocean Disposal Site (SF-DODS). The SF-DODS is in the open ocean on the lower continental slope approximately 55 miles (48 nautical miles) west of San Francisco. The SF-DODS is approximately 6 nautical miles west of the outer boundary of the Gulf of Farallones National Marine Sanctuary, and approximately 25 nautical miles west of the Farallon Islands. Water depth at the site ranges between approximately 2,500 meters and 3,000 meters (LTMS, 1998).

The existing hydrologic setting and water quality conditions for San Francisco Bay and the offshore ocean environment are described below.

### **Hydrologic Setting**

**San Francisco Bay.** The northern reach of the San Francisco Bay (comprising Suisun Bay, Carquinez Strait, and San Pablo Bay) is geographically and hydrologically distinct from the Central and South bays. The South Bay is a tidally oscillating, lagoon-type estuary, where variations are determined by water exchange between the northern reach and the ocean. Water residence times are much longer in the South Bay than in Suisun and San Pablo bays. The northern reach is a partially to well-mixed estuary (depending on the season) that is dominated by seasonally varying river inflow. The timing and magnitude of the highly seasonal river inflow modulates permanent estuarine circulation, which is largely maintained by salinity controlled density differences between river and ocean waters. Water flows in the Estuary follow complex daily and seasonal patterns. Circulation is affected by tides, local winds, basin bathymetry, and the local salinity field (LTMS, 1998).

Suisun and San Pablo bays receive the majority of freshwater input, where density/salinity-driven currents show ebb dominance of the surface water and flood dominance of the bottom water. Thus, waters in these embayments are characterized as being oxygenated, of low to moderate salinity, and high in suspended solids. Central Bay is most strongly influenced by tidal currents because of its proximity to the Pacific Ocean. The Central Bay is characterized by Pacific waters that are cold, saline, and low in total suspended sediment. The South Bay receives less than 10 percent of the freshwater budget of San Francisco Bay. It also receives the majority of wastewater discharged to San Francisco Bay (greater than 75 percent). Because the South Bay receives only minor amounts of freshwater in-flow from the surrounding watershed, it is essentially a tidal lagoon with a relatively constant salinity (LTMS, 1998).

The bathymetry of San Francisco Bay is an important factor affecting sediment dynamics. San Pablo Bay, Suisun Bay, and the South Bay are characterized by broad shallows that are incised by narrow channels, which are typically 33 to 66 feet deep. These shallower areas are more prone to wind-generated currents and sediment resuspension than deeper areas such as the Central Bay. Net circulation patterns in San Francisco Bay are influenced by Delta inflows, gravitational currents, and by tide- and wind-induced horizontal circulation (LTMS, 1998).

**Offshore Ocean Environment.** Outside of San Francisco Bay, the California Current is a broad offshore flow that transports cold, low-salinity, subarctic waters toward the equator. However, because of the proximity of Point Reyes, two northerly flows—the Coastal Countercurrent and the California Undercurrent—dominate the flow regime in the vicinity of the Farallon Islands throughout most of the year. The Coastal Countercurrent generally moves nutrient-poor surface water over the continental shelf northward. The California Undercurrent is a strong northerly flow over the slope that dominates in depths ranging from 100 to 1,000 meters. Semidiurnal and diurnal tides together account for 35 to 60 percent of the total variability in the currents on the shelf. These tidal currents can affect the resuspension of material deposited on the seabed and dispersion of material suspended in the water column. However, studies by USEPA indicate that the ocean bottom in the vicinity of SF-DODS (and generally across the region at depths greater than 600 to 800 meters) is depositional. In addition, currents in the vicinity of SF-DODS are generally slow, which aids in minimizing the spread of water column plumes during and immediately following placement events. The wave climate is seasonally variable. Wave heights are usually greater during the late fall, winter, and spring because of the presence of storms and generally stronger, sustained winds (LTMS, 1998).

## Water Quality

### Physical and Chemical Characteristics

**San Francisco Bay.** Temperature exerts a major influence on biological activity and growth in San Francisco Bay. Temperature is also important because of its influence on water chemistry. The seasonal range of water temperature in San Francisco Bay is from about 8 degrees Celsius to about 23 degrees Celsius. At a given location, there can be small, irregular temperature changes with depth.

The salinity of the Estuary's northern reach varies considerably, and increases along a gradient from the Delta to Central Bay. In the southern reach, salinities remain at near-ocean concentrations (i.e., 32 parts per thousand) during much of the year. However, during the summer, high evaporation rates may cause salinity in South Bay to actually exceed that of ocean water. The pH (measure of the acidity or basicity of an aqueous solution) of waters in San Francisco Bay is relatively constant and typically ranges from 7.8 to 8.2 (LTMS, 1998; SFEI, 2013).

The water in San Francisco Bay is considered to be generally well oxygenated, except during the summer in the extreme southern end of the South Bay, where concentrations are reduced by poor tidal mixing and high water temperature. Typical concentrations of dissolved oxygen in most of San Francisco Bay range from 9 to 10 milligrams per liter (mg/L) during high periods of river flow, 7 to 9 mg/L during moderate river flow, and 6 to 9 mg/L during the late summer months, when flows are lowest (SFEI, 2008).

**Offshore Ocean Environment.** Offshore surface waters show a great deal of variability in temperature-salinity properties. Water discharged from San Francisco Bay into the Gulf of the Farallones has a higher temperature and lower salinity, and therefore lower density, than water in the Gulf (LTMS, 1998).

Dissolved oxygen concentrations in surface waters are approximately 8 mg/L. Concentrations decline through the mixed layer, and reach minimum values of about 0.5 mg/L at a depth of 800 meters. Below 800 meters, dissolved oxygen concentrations increase to over 3 mg/L at depths greater than 2,000 meters (LTMS, 1998).

### Suspended Sediments/Turbidity

**San Francisco Bay.** Turbidity is an optical property related to clarity of water; it causes light to be scattered and absorbed rather than transmitted in straight lines. Turbidity is caused by the presence of suspended and dissolved matter such as clay, silt, finely divided organic matter, plankton, other microscopic organisms, organic acids, and dyes. Factors affecting turbidity include shape, size, refractive index, color, and absorption spectra of particles. Turbidity is expressed in Nephelometric Turbidity Units (NTUs).

Total suspended solids, on the other hand, are a measure of the amount of dry-weight mass of nondissolved solids suspended per unit of water (often measured in mg/L). Total suspended solids include inorganic solids (clay, silt, and sand) and organic solids (algae and detritus). Increased suspended solids affect aquatic ecosystems in three ways: (1) physical impacts related to the physical properties of suspended sediments (i.e., reduced light transmission-or increased turbidity-and biological effects); (2) chemical impacts, related to the chemicals associated with suspended solids (including effects on biological receptors); and (3) resettling effects that can smother aquatic benthic habitats and organisms. Fine sediments (clay and silt) remain suspended in the water column longer than coarse sediments (sand).

Sources of new sediment into the Estuary system include the Sacramento River, which flows through the Carquinez Strait into the northeastern end of San Pablo Bay; the Napa, Sonoma, and Petaluma rivers; and a variety of smaller streams and other drainages (including storm drains and flood control channels). As observed in a study from 1995-2010, small tributaries adjacent to San Francisco Bay, supply 61 percent

of the new suspended sediment to San Francisco Bay (McKee et al., 2013). This represents a shift in the primary source of new sediment to the Estuary, which had previously been the Sacramento River. The shift likely reflects the effect of dams on the Sacramento-San Joaquin watershed. The dams effectively block sediment transport from nearly half of the watershed area and reduce peak flows during floods (McKee et al., 2013). Recent research also reinforces that episodic sediment loads, primarily during storm events, dominate the sediment supply to San Francisco Bay (Barnard et al, 2013). Over the last half-century, sediment loss trends have been documented in San Pablo Bay, Suisun Bay, and Central Bay, while the South Bay has shown net accretion (Barnard et al, 2013). An overall decrease in suspended sediment concentrations in the Estuary has been broadly attributed to a reduction in sources of erodible sediment due to the cessation of hydraulic mining, urbanization, river bank protection, and sediment trapping behind dams and flood control by-passes (Barnard et al, 2013). Aside from new sediment, existing deposits of typical fine-grained surface sediments in the extensive shallow areas of the Estuary are subject to hydraulic movement (resuspension) by riverine, tidal, and wind-driven currents, and are the primary source of suspended particulate matter and turbidity throughout the Estuary.

Total suspended solids (TSS) levels in the Estuary vary greatly, ranging from 10 mg/L to over 100 mg/L (SFEI, 2011). In general, higher TSS results in more turbid water. There is also variability in TSS concentrations, depending on the specific location in the Estuary, with shallow areas—and channels adjacent to shallow areas—having the highest suspended sediment concentrations. TSS levels vary throughout the Estuary, depending on season, tidal stage, and depth. The Central Bay generally has the lowest TSS concentrations; however, wind-driven wave action and tidal currents, as well as dredged material placement and sand mining operations, cause elevations in suspended solids concentrations throughout the water column (LTMS, 1998).

**Offshore Ocean Environment.** Turbidity conditions on the continental shelf near the Golden Gate are affected by seasonal and tidal flows of turbid waters from San Francisco Bay. In the vicinity of SF-DODS, the background TSS values are variable, but mean values range from 1 to 3 mg/L (LTMS, 1998).

### Contaminants

Suspension of sediment can mobilize sediment-bound contaminants into the water column, where they have the potential to become dissolved into the water itself. However, most contaminants bind to finer sediment, such as silt, clay, and organic matter, and are not readily water soluble (LTMS, 1998).

**San Francisco Bay.** Since 1993, the San Francisco Estuary Institute (SFEI) has administered a Regional Monitoring Program (RMP) for the Regional Water Board and major San Francisco Bay dischargers. In order to comply with the receiving water monitoring requirements of their permits, most dischargers to San Francisco Bay, including dredgers, choose to participate in the RMP. SFEI conducts monitoring to assess spatial patterns and long-term trends in contamination. The RMP measures concentrations of various constituents in water, sediment, bivalves, bird eggs, and fish at various locations in the Estuary.

To assess water quality, trace metals (including copper, mercury, nickel, selenium, silver, and zinc) and trace organics are measured in water samples collected during the dry season. Water samples have been analyzed for polybrominated diphenyl ethers (PBDEs) annually, and all other organic parameters (e.g., pesticides, polycyclic aromatic hydrocarbons [PAHs], and PCBs) on a biennial basis; however, beginning in 2014, monitoring to evaluate open Bay status and trends will be conducted at a reduced frequency of sampling for selected parameters in the various matrices. According to the 2011 Pulse of the Estuary (SFEI, 2011), results of the RMP show significant improvements in basic water quality conditions due to investments in wastewater treatment. Contamination due to toxic chemicals has also generally declined since the 1950s and 1960s.

Other trends noted by SFEI (SFEI, 2011; 2012) include:

- In addition to historic industrial sources along the San Francisco Bay margins, increasing population and motor vehicle use in the San Francisco Bay Area suggest that PAH concentrations could increase over the next 20 years, as a result of deposition of combustion products from the air directly into San Francisco Bay, and from roadway runoff and into San Francisco Bay via stormwater.
- Small tributaries are the dominant loading pathway for suspended sediments, PCBs, and mercury.
- Mercury concentrations in striped bass, a key mercury indicator species for the Estuary, have shown little change since 1970.
- Average PCB concentrations in San Francisco Bay sediment have been highest in the southern reach of the Estuary (Central Bay, South Bay, and Lower South Bay).
- Concentrations of DDT, chlordane, and other legacy pesticides have declined. On the other hand, concentrations of chemicals used in more recent years, such as pyrethroid insecticides and PBDEs, have increased; however, the rate of increase appears to be leveling off.
- Sediment cores from open-water sites exhibited total mercury and PCB concentrations in deeper sediments that were generally similar to surface sediments, suggesting diminished concern for prolonged recovery due to erosion of contaminated subsurface material.

Since the LTMS Management Plan took effect, new limitations on discharges of mercury and PCBs into San Francisco Bay have been instituted by the Regional Water Board and approved by the USEPA. The LTMS agencies worked with the Regional Water Board to clarify how the TMDLs would apply to dredged material management. Through this process, the Regional Water Board recognized that dredging projects managed under the LTMS program were “net removers” of mercury and PCBs from San Francisco Bay. As a result, dredging does not have a waste load allocation for these pollutants; rather, dredged material containing mercury and PCBs is regulated based on current “ambient” levels in San Francisco Bay sediment (LTMS, 2013b).

**Offshore Ocean Environment.** Studies have documented trace amounts of contaminants, including PAHs, PCBs, pesticides, and trace metals in waters over the continental shelf and shelf edge (LTMS, 1998); however, waters offshore typically contain low concentrations of contaminants compared to sites along the California coast near urban areas or discrete sources of pollutants.

### **Sea Level Rise**

Sea levels along California’s coast have risen about 7 inches over the past century (CEC, 2008 and 2009). Sea level rise occurred at a rate of approximately 0.07 inch per year from 1961 to 2003, with an accelerated average rate of about 0.12 inch per year during the last decade (CEC, 2009).

Studies that account for climate change as a result of global warming predict that sea level rise will accelerate and proceed at significantly higher rates than previously thought. The Intergovernmental Panel on Climate Change (IPCC) published projections on global sea level rise in 2001, and refined estimates in 2007. The projections considered thermosteric sea level change (expansion of sea water as it warms), and eustatic sea level changes due to increased freshwater inflows from melting sea and glacial ice, under a range of emission scenarios. These earlier studies had estimated that sea level would rise by as much as 20 inches by 2100, which corresponds to an average rate of approximately 0.2 inch per year, or about twice the historical average rate.

Recent studies focus on two of the emission scenarios from the earlier studies, and include adjustments that consider the effects of dams on sea level rise. These current studies predict that sea level rise may accelerate faster than the earlier IPCC studies had indicated (BCDC, 2009; CEC, 2009). In addition, an Independent Science Board contracted by the State of California has recommended that the state adopt conservative estimates for sea level rise to account for accelerating contributions from ice sheet melting, and use the most conservative methodologies. Based on these emission scenarios, sea level rise estimates range from 20 to 55 inches by 2100. It should be noted that the estimated increase of 55 inches is more than 2.5 times the IPCC's 2007 estimate.

Beneficial reuse that has occurred at some of the existing placement sites provides protection against sea level rise. For example, the beneficial reuse of dredged material for wetland restoration provides additional protection against rising water levels because wetlands function as natural sponges that trap and slowly release surface and flood waters.

### 3.4.3 Methodology and Thresholds of Significance

This section includes an analysis and determination of the impacts of the project alternatives on hydrology and water quality. Water quality variables that can be affected by dredging operations include turbidity, suspended solids, and other variables that affect light transmittance; dissolved oxygen; nutrients; salinity; temperature; pH; and concentrations of trace metals and organic contaminants if they are present in the sediments.

The analysis considered whether the project would:

- Substantially degrade water quality through alteration of temperature, salinity, pH, and dissolved oxygen;
- Substantially degrade water quality because of increased turbidity; or
- Violate any water quality standards, or substantially degrade water quality because of mobilization of contaminated sediments or release of hazardous materials during dredging and placement activities.

Actions required under existing regulations and programs, and best management practices (BMPs) that address potential water resource impacts, are described as appropriate.

Because of the nature of the proposed project, there would be no project impacts that would:

- Substantially deplete groundwater supplies or interfere with groundwater recharge. The alternatives would not involve excavation to depths that would affect aquifer systems or groundwater movement, and would not involve the construction of substantial new impervious surfaces that would impede groundwater recharge. Therefore, no impacts related to groundwater would occur.
- Substantially alter currents or existing drainage patterns. Given the frequent modifications to current and circulation from large-vessel traffic, the project alternatives would not significantly impact existing currents or circulation patterns. Maintenance dredging would not alter the course of any of the waterways. Dredged material placement at existing placement sites would not impact existing current and circulation patterns. Additionally, data collection and modeling results demonstrate placement of dredged sand at the Ocean Beach nearshore placement site (SF-17), or beach nourishment would not significantly alter nearshore current and circulation patterns (USACE, 2013). The alternatives would not involve the construction of substantial new impervious surfaces that would increase the amount of runoff, resulting in erosion or siltation, or affecting flooding on or off placement sites. Therefore, impacts related to alteration of existing drainage patterns are not discussed further.

- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems. The alternatives would not involve the construction of substantial new impervious surfaces that would increase the amount of runoff, and would not result in any new sources of runoff.
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including future flood risks (sea level rise induced by climate change). The project would not place within a 100-year flood hazard area structures that would impede or redirect flood flows which could result in increased risk of flooding. The beneficial reuse of dredged material for wetland restoration (e.g., Cullinan Ranch, Montezuma Wetlands Restoration Project) or levee protection (e.g., Winter Island) would have beneficial impacts by providing additional protection against rising water levels. As stated above, wetlands function as natural sponges that trap and slowly release surface and flood waters. Although the primary function of levees is to provide flood protection, they could also serve as a physical barrier against rising sea levels.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map. The project would not include the construction of housing.
- Expose people or structures to a significant risk of loss, injury, or death involving mudflow, inundation by tsunami, failure of a levee, or failure of a dam. The project is not near geologic or topographic conditions that would generate mudflows. The project would not involve the construction of any new structures or public use areas that result in increased risk of inundation by a tsunami. The alternatives would not involve any activities that would potentially result in the failure of a levee or dam.
- Substantially degrade water quality because of nutrient loading. Based on current scientific understanding, in-Bay dredged material placement is not a significant contributor to San Francisco Bay nutrient loading relative to other sources. However, the Regional Water Board, in conjunction with other agencies and interested parties, is further evaluating this contribution as a part of the ongoing Bay Nutrient Science Strategy, initiated in 2011.

#### 3.4.4 Impacts and Mitigation Measures

##### ***Impact 3.4-1: Potential to Substantially Degrade Water Quality through Alteration of Water Temperature, Salinity, pH, and Dissolved Oxygen***

##### **No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

Studies have shown placement of dredged material from hopper, cutterhead, and clamshell-bucket dredges into the water column does not cause substantial short- or long-term changes in salinity, temperature, or pH (USACE, 1976a; 1976b). A USACE study (USACE, 1976a) found that changes in these parameters were localized and short in duration; ambient concentrations of these parameters were usually regained within 10 minutes following material release (USACE, 1998).

Localized minor and temporary dissolved oxygen level reductions (1 to 2 parts per million) may occur during dredging, including barring and knockdown practices, and placement; however, the ambient conditions are shortly regained following settlement of the suspended sediment (USACE, 1976a).

The movement of vessels for transport of dredged materials would not be expected to impact water temperature, salinity, pH, or dissolved oxygen.

**National Environmental Policy Act (NEPA) Determination.** The project alternatives' impact to water quality temperature, salinity, pH, and dissolved oxygen would be short-term and less than significant.

**California Environmental Quality Act (CEQA) Determination.** The project alternatives' impact to water quality temperature, salinity, pH, and dissolved oxygen would be short-term and less than significant.

### **Impact 3.4-2: Potential to Substantially Degrade Water Quality Because of Increased Turbidity**

#### **No Action/No Project Alternative and Proposed Action/Project**

Under all project alternatives, dredging would cause a local resuspension of sediments, and a temporary decrease in water clarity. Fine sediments (clay and silt) remain suspended in the water column longer than coarser sediments (sand); therefore, turbidity returns to ambient levels more quickly during dredging of sandy materials. Increased turbidity effects from dredging are short term, minor, and greatly diminish with distance from the activity. Generally, hydraulic dredging (i.e., hopper and cutterhead-pipeline dredges) reduces disturbance and resuspension of sediments at a dredging site compared to mechanical dredges.

Because hydraulic dredges operate by suction, sediment resuspension at the channel bottom is minimized. Both hopper and cutterhead-pipeline dredges contain sediment as it is pumped to the surface. With hopper dredges, turbidity may increase during overflow operations as fine sediment is returned to the water column in the overflow (refer to the description of hopper dredge operations in Section 2.3.1). The USACE's hopper dredge *Essayons* is equipped with an anti-turbidity valve on its overflow weirs, which reduces the water quality impacts caused by the dredging overflow process. Because cutterhead-pipeline dredges pump directly to the placement site and the pipeline is monitored to avoid leakage; typically, turbidity from this method of dredging primarily occurs from sediment resuspension caused by bottom disturbance.

During mechanical dredging, sediments may become suspended because of the clamshell bucket's impact to the channel bottom, material washing from the top and side of the bucket as it passes through the water column, sediment spillage as it breaks the water surface, spillage of material during barge loading, and intentional overflow in an attempt to increase the barge's effective load (permissible only for material that is 80 percent or more sand). A study characterizing the spatial extent of turbidity plumes during mechanical dredging operations in Oakland Harbor (MEC Analytical Systems, 2004) found that in both ebb and flood surveys, plumes were distinct above background TSS concentrations for distances up to 400 meters from the source. Ambient concentrations varied throughout the study area, but were generally less than 50 mg/L. TSS concentrations exceeding 275 mg/L were measured only in immediate proximity (within 110 meters) to the source. TSS concentrations tended to decay fairly rapidly with increasing distance. In general, TSS concentrations above 100 mg/L were distributed in small pockets that primarily flowed just above the channel bottom, but occasionally dispersed into midwater depths (MEC Analytical Systems, 2004). Generally, mechanical dredges result in greater suspended sediment during dredging activities than hydraulic dredges, and therefore result in greater increases in turbidity (Anchor, 2003).

Short-term increases in turbidity generated by knockdown and barring operations are typically concentrated in the lower portion of the water column in the local area of disturbance (U.S. Army ERDC and Weston Solutions, 2005).

Because sediment resuspension from dredging vessel movement would be limited, the movement of vessels for transport of dredged materials would not be expected to increase turbidity above ambient ranges generated by natural hydrologic processes, weather, and existing vessel traffic.

Some degree of increased turbidity will occur with placement of dredged material in any of the placement environments, and at any placement volume. Water quality effects from ocean or in-Bay placement could be associated with plumes from the initial placement event; or in some cases, from subsequent

resuspension (from dispersive sites). In most cases, such effects would be limited to the area of the plume following placement, and would be temporary and localized. The USACE studies show turbidity plumes at placement sites last only 20 minutes, and plume duration is even less during placement of sandy material because there coarse sediments settle out of the water column more quickly than fine sediments (USACE 1976a; LTMS, 1998; Anchor, 2003). Therefore, effects on turbidity from placement of dredged material would be minor and temporary.

Both computer modeling and real-time field monitoring of dredged material placement at SF-DODS have shown that sediment plumes dissipate quickly to background levels, and that this occurs entirely within the boundaries of the placement site. Because SF-DODS is a depositional site (in contrast to in-Bay sites), disposed material is not expected to resuspend into the water column, and therefore would not continue to affect water quality after its initial placement. All of the existing in-Bay placement sites are dispersive sites in shallow, estuarine waters, so dredged material may resuspend in the water column following initial placement. Therefore, compared to in-water placement at SF-DODS, there is greater potential for turbidity impacts to be associated with placement at any of the in-Bay sites (LTMS, 1998).

Placement of dredged materials at habitat restoration beneficial reuse projects (particularly wetland restoration) could result in a net benefit to water quality by increasing sediment retention, filtration of pollutants, and shoreline stabilization over the long term. However, short-term, localized increases in turbidity levels could result during placement activities.

**NEPA Determination.** The No Project/No Action Alternative and Proposed Action/Project's impact to water quality due to short-term increases in turbidity would be less than significant. Placement of dredged materials at habitat restoration beneficial reuse projects could have long-term beneficial effects on water quality.

**CEQA Determination.** The No Project/No Action Alternative and Proposed Action/Project's impact to water quality due to short-term increases in turbidity would be less than significant.

### **Reduced Hopper Dredge Use Alternatives 1 and 2**

Water quality impacts resulting from increased turbidity during dredging would be greater under Reduced Hopper Dredge Use Alternatives 1 and 2, as compared to the No Action/No Action Alternative and Proposed Action/Project, because there would be increased use of mechanical dredges. Under Reduced Hopper Dredge Use Alternative 1, Suisun Bay Channel/New York Slough and either Pinole Shoal or Richmond Outer Harbor would be dredged with clamshell-bucket equipment instead of a hopper dredge. Under Reduced Hopper Dredge Use Alternative 2, Suisun Bay Channel/New York Slough, Pinole Shoal and Richmond Outer Harbor would all be dredged with clamshell-bucket equipment instead of a hopper dredge. Under both alternatives, San Bruno Channel in Redwood City Harbor would also be dredged with clamshell-bucket equipment instead of a hopper dredge.<sup>1</sup> Short-term increases in turbidity at Pinole Shoal, Richmond Outer Harbor, and San Bruno Channel would be higher when they are dredged with a clamshell-bucket dredge instead of a hopper dredge because mechanical dredging generates more turbidity than hopper dredging, as described above. In addition, turbidity impacts would be longer in duration at these locations because dredging a channel with a clamshell bucket dredge can take up to ten times longer than dredging with a hopper dredge (USACE, 2013d). Nonetheless, as described under the No Action/No Project Alternative and Proposed Action/Project, impacts from dredging would be temporary and minor. Dredging Suisun Bay Channel/New York Slough with a mechanical dredge instead of a hopper dredge would not be expected to result in a noticeable increase in turbidity because the material is greater than 80 percent sand.

<sup>1</sup> San Bruno Channel is dredged at intervals of 10 years or greater.

Impacts from the transport and placement of dredged material would be similar to those under the No Action/No Project Alternative and Proposed Action Project.

**NEPA Determination.** The Reduced Hopper Dredge Use Alternatives 1 and 2 impacts to water quality due to short-term increases in turbidity would be less than significant. Placement of dredged materials at habitat restoration beneficial reuse projects could have long-term beneficial effects on water quality.

**CEQA Determination.** The Reduced Hopper Dredge Use Alternatives 1 and 2 impacts to water quality due to short-term increases in turbidity would be less than significant.

***Impact 3.4-3: Potential to Substantially Degrade Water Quality Because of Mobilization of Contaminated Sediments or Release of Hazardous Materials***

**No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

Dredging of contaminated sediments does present the potential for release of contaminants to the water column. However, most contaminants are tightly bound in the sediments and are not easily released during short-term resuspension. Sediments are tested prior to dredging, and the results are reviewed by the DMMO prior to dredging and placement, including evaluation of the potential for water quality impacts. As in Section 3.3.2, sediment testing results for previous USACE maintenance dredging episodes indicate that, in general, dredged materials from the subject federal navigation channels have been suitable for unconfined aquatic disposal. Over time, some isolated areas in, or adjacent to, the channels have been identified as containing sediment that is not suitable for unconfined aquatic disposal (NUAD); USACE would continue to avoid dredging areas (e.g., portions of the Richmond Harbor federal channel adjacent to the United Heckathorn site) that it has been able to avoid dredging in the past. If future testing identifies NUAD material that must be dredged, USACE would place all NUAD material at would be placed at upland sites, and in some cases the Montezuma Wetlands Restoration Project, as determined during DMMO review. Therefore, dredging and placement activities would not be expected to increase contaminant concentrations in the water column above baseline conditions, or result in violation of a water quality standard.

Dredging, transport, and placement of dredged material would be conducted in cooperation with the DMMO. This process would identify contaminated sediments and appropriate placement site options for dredged materials based on the characteristics of the sediment and criteria for each placement site. Additionally, USACE would implement BMPs and comply with water quality protection measures included as conditions to the WQC issued by the Regional Water Board and the letter of agreement issued by the BCDC for USACE's consistency determination. Adherence to these measures and BMPs would minimize the potential for water quality degradation.

Vessels would be operated in compliance with all applicable regulations related to the prevention of water pollution by fuel, harmful substances, and garbage, as well as from accidental discharges. During transport, the dredged material would be secured, with precautions in place to minimize any risk of spills. Therefore, the potential for the release of hazardous substances from vessel operations during dredging, transport, and placement activities would be minimal.

**NEPA Determination.** The project alternatives' impact to water quality as a result of potential mobilization of contaminated sediments or hazardous materials release would be less than significant.

**CEQA Determination.** The project alternatives' impact to water quality as a result of potential mobilization of contaminated sediments or hazardous materials release would be less than significant.

**Impact 3.4-4: Potential to Result in Cumulative Impacts to Hydrology or Water Quality****No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

Any alternative would result in minor, short-term water quality impacts during dredging and placement activities due to short-term turbidity increases or the potential for releases of contaminants from sediments or vessel into the water. Other dredging projects and waterfront construction projects listed in Table 3.1-1 would also involve activities that could result in similar short-term impacts. Cumulative water quality impacts could include increases in turbidity; disturbance and release of contaminated sediments; or accidental release of hazardous materials such as diesel fuel from vessels. As stated above, the proposed project's potential impacts on water quality due to mobilization of contaminated sediments and release of hazardous materials would be minimal. Although USACE's maintenance dredging and placement activities could overlap with other projects that would disturb sediments and result in increased turbidity, impacts would be isolated and short-term, and would not be substantial in the greater geographic context of the study area. Additionally, other projects involving dredging and construction in the marine environment would be subject to permitting/regulatory approval processes similar to those for the proposed project, and would be required to implement similar measures to minimize water quality impacts.

**NEPA Determination.** The project alternatives would not contribute to significant cumulative water quality impacts.

**CEQA Determination.** The project alternatives would not contribute to significant cumulative water quality impacts.



### 3.5 AIR QUALITY AND GLOBAL CLIMATE CHANGE

This section describes the air quality and climate change regulations applicable to the proposed project; summarizes the existing air quality conditions in the local air basin; identifies the analysis methodology; and discusses the potential impacts that the project alternatives may have on air quality and climate change.

#### 3.5.1 Regulatory Setting

##### Federal

##### Federal Clean Air Act

At the federal level, the United States Environmental Protection Agency (USEPA) has been charged with implementing national air quality programs. USEPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA).

The CAA required the USEPA to establish primary and secondary National Ambient Air Quality Standards (NAAQS). The CAA also required each state to prepare an air quality control plan, referred to as a State Implementation Plan (SIP). The CAA Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins, as reported by their jurisdictional agencies. USEPA has responsibility to review all state SIPs for conformity with the mandates of the CAA, and to determine whether implementation will achieve air quality goals (BAAQMD, 2012a).

The Bay Area Air Quality Management District (BAAQMD) prepares plans to attain ambient air quality standards in the San Francisco Bay Area Air Basin (SFBAAB). The BAAQMD implements programs and regulations required by the CAA, CAA amendments, and the California Clean Air Act (CCAA) (BAAQMD, 2012a). The clean air strategy of the BAAQMD includes preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, and issuing permits for stationary sources of air pollution. As part of these plans, BAAQMD developed project-level thresholds and guidance for use during the California Environmental Quality Act (CEQA) evaluation process such that projects would not violate the CAA, as discussed in more detail below.

##### *General Conformity Regulations*

The USEPA promulgated the General Conformity Regulations to implement Section 176(c) of the CAA. Under the General Conformity Regulations, federal agencies must work with state, tribal, and local governments in a nonattainment or maintenance area to ensure that federal actions conform to the air quality plans established in the applicable state or tribal implementation plan. Federal actions that are exempt from the General Conformity Regulations include (USEPA, 2012a):

- Actions covered by transportation conformity;
- Actions with emissions clearly at or below *de minimis* levels;
- Actions listed as exempt in the rule; or
- Actions covered by a Presumed-to-Conform approved list.

Title 40 of the C.F.R. § 51.853(c)(2)(ix) states that "Maintenance dredging and debris disposal where no new depths are required, applicable permits are secured, and disposal will be at an approved disposal site" is exempt from conformity analyses. In accordance with 40 C.F.R. § 51.853(c)(2)(ix), USACE has determined the proposed agency action is exempt from the requirement to prepare a conformity

determination with the SIP under the CAA because the project consists of maintenance dredging, no new depths are required, and placement would be at approved placement sites.

### **National Environmental Policy Act**

On February 18, 2010, the Council on Environmental Quality released, for public consideration and comment, draft guidance on the ways in which federal agencies can improve their consideration of the effects of greenhouse gas (GHG) emissions and climate change in their evaluation of proposals for federal actions under the National Environmental Policy Act (NEPA). The memorandum (CEQ, 2010) stated that if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of carbon dioxide-equivalent (CO<sub>2</sub>e) GHG emissions on an annual basis, agencies should consider this an indication that a quantitative and qualitative assessment may be meaningful to decision makers and the public; this threshold was also included in the Council on Environmental Quality's revised guidance for analyzing GHG emissions and climate change, dated December 18, 2014. For long-term actions that have annual direct emissions of less than 25,000 metric tons of CO<sub>2</sub>e, the Council on Environmental Quality encourages federal agencies to consider whether the action's long-term emissions should receive similar analysis. Section 3.5.5 includes analysis of the GHG emission effects of the project alternatives.

### **Supreme Court Ruling on California Clean Air Act Waiver**

On April 2, 2007, the U.S. Supreme Court ruled that carbon dioxide (CO<sub>2</sub>) is an air pollutant as defined under the CAA, and that the USEPA has the authority to regulate emissions of GHGs. However, there are no federal thresholds regarding GHG emissions directly applicable to the proposed project. In June 2009, the USEPA granted California a waiver under the CAA, allowing the state to impose its own, stricter GHG regulations for vehicles beginning in 2009.

### **State Regulations**

#### **California Clean Air Act**

The California Air Resources Board (CARB) is the agency responsible for coordination and oversight of state and local air pollution control programs in California, and for implementing the CCAA. The CCAA requires that all air districts in the state endeavor to achieve and maintain the California Ambient Air Quality Standards by the earliest practical date. The act specifies that districts should focus particular attention on reducing the emissions from transportation and area-wide emission sources, and provides districts with the authority to regulate indirect sources.

CARB is primarily responsible for developing and implementing air pollution control plans to achieve and maintain the NAAQS. CARB is primarily responsible for statewide pollution sources, and produces a major part of the SIP. Local air districts are still relied on to provide additional strategies for sources under their jurisdiction. CARB combines these data and submits the completed SIP to the USEPA.

Other CARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control and air quality management districts); establishing the California Ambient Air Quality Standards (CAAQS), which in many cases are more stringent than the NAAQS; determining and updating area designations and maps; and setting emissions standards for new mobile sources, consumer products, small utility engines, and off-road vehicles (BAAQMD, 2012a).

#### **Executive Order S-3-05**

Executive Order S-3-05 sets forth a series of target dates by which statewide GHG emissions would be progressively reduced: by 2010, reduce emissions to 2000 levels; by 2020, reduce emission to 1990

levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels. Section 3.5.5 includes analysis of the GHG emission effects of the project alternatives.

### **Assembly Bill 32 and the California Climate Change Scoping Plan**

The California Global Warming Solutions Act of 2006 and Assembly Bill (AB) 32 establish a cap on statewide GHG emissions, and set forth the regulatory framework to achieve the corresponding reduction in statewide emission levels. Under AB 32, GHG are defined as CO<sub>2</sub>, methane (CH<sub>4</sub>), nitrogen dioxide (N<sub>2</sub>O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Pursuant to AB 32, CARB adopted a Scoping Plan in 2008, outlining measures to meet the 2020 GHG reduction limits (CARB, 2008). To meet these goals, California must reduce its GHG emissions by 30 percent below projected 2020 business-as-usual emission levels, or about 15 percent from today's levels. The Scoping Plan estimates a reduction of 174 million metric tons of CO<sub>2</sub>e from the transportation, energy, agriculture, forestry, and high global warming potential (GWP) sections. Section 3.5.5 includes analysis of the GHG emission effects of the project alternatives.

### **Executive Order S-1-07**

Executive Order S-1-07 established a goal of reducing the carbon intensity of transportation fuels sold in California by 10 percent by 2020. CARB determined that a Low Carbon Fuel Standard could be adopted as a discrete, early-action measure to meet the mandates in AB 32. CARB adopted the Low Carbon Fuel Standard on April 23, 2009.

### **Senate Bill 97**

Senate Bill 97 acknowledges that climate change is an important environmental issue that requires analysis under CEQA. The bill directed the California Office of Planning and Research to prepare and develop guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, and transmit those guidelines to the California Natural Resources Agency by July 1, 2009. The California Natural Resources Agency certified those CEQA guidelines on December 30, 2009, and they became effective March 18, 2010 (CNRA, 2012). Section 3.5.5 includes analysis of the GHG emission effects of the project alternatives.

## **Regional Regulations**

### **Bay Area Air Quality Management District Air Quality Regulations**

The BAAQMD manages air quality conditions in the SFBAAB through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the BAAQMD includes preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, and issuing permits for stationary sources of air pollution. The BAAQMD also inspects stationary sources of air pollution and responds to citizen complaints; monitors ambient air quality and meteorological conditions; and implements programs and regulations required by the CAA, CAA amendments, and the CCAA (BAAQMD, 2012a).

As stated above, the BAAQMD prepares plans to attain ambient air quality standards in the SFBAAB. The BAAQMD prepares ozone attainment plans for the national ozone standard, and clean air plans for the California standard, in coordination with both the Metropolitan Transportation Commissions (MTC) and the Association of Bay Area Governments. As part of these plans, BAAQMD developed project-level thresholds and guidance for use during the CEQA evaluation process as discussed in more detail below.

## BAAQMD CEQA Guidelines

On June 2, 2010, the BAAQMD's Board of Directors unanimously adopted thresholds of significance to assist in the review of projects under CEQA. These thresholds are designed to establish the level at which the BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA, and were posted on BAAQMD's website and included in the BAAQMD's May 2011 updated CEQA Guidelines (BAAQMD, 2012b).

On March 5, 2012, the BAAQMD's Air Quality CEQA Thresholds of Significance were challenged by an order issued in *California Building Industry Association v. BAAQMD*, Alameda Superior Court Case No. RGI0548693. The order requires the BAAQMD thresholds to be subject to further environmental review. The claims made in the case concerned the CEQA impacts of adopting the thresholds (i.e., how the thresholds would affect land use development patterns), and petitioners argued that the thresholds for Health Risk Assessments encompassed issues not addressed by CEQA. On August 13, 2013, a court of appeal rejected the challenge to the BAAQMD's Air Quality CEQA Thresholds of Significance. This decision is under further appeal. The California Supreme Court is reviewing this matter and an opinion may be issued prior to the conclusion of this Environmental Assessment/Environmental Impact Report.

In response to the court's order, BAAQMD stated that lead agencies will need to determine appropriate air quality thresholds of significance based on substantial evidence in the record. BAAQMD has indicated that although lead agencies may rely on the May 2011 updated CEQA Guidelines for assistance in calculating air pollution emissions, obtaining information regarding the health impacts of air pollutants, and identifying potential mitigation measures, BAAQMD has been ordered to set aside the thresholds, and is no longer recommending that these thresholds be used as a general measure of a project's significant air quality impacts. Lead agencies may continue to rely on the Air District's 1999 Thresholds of Significance, and they may continue to make determinations regarding the significance of an individual project's air quality impacts based on the substantial evidence in the record for that project (BAAQMD, 2012b). However, as discussed in more detail below, in Section 3.5.3, Methodology and Thresholds of Significance, the BAAQMD's significance thresholds and recommended analysis methodologies were used in this analysis. The vacated guidelines included conventional air quality (i.e., criteria pollutants and toxic air contaminants [TACs]), GHG, and odor thresholds. The thresholds include: mass emission thresholds of criteria pollutants, a risk-based threshold for TACs, a mass or efficiency metric for GHGs, and a screening threshold for odors.

### 3.5.2 Environmental Setting

For the purpose of this analysis, the project's study area is the SFBAAB, which encompasses all or portions of the following nine counties: Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco. The study area is within the jurisdiction of the BAAQMD. BAAQMD is the primary agency responsible for air quality regulation in the nine-county SFBAAB. While the Long Term Management Strategy program planning area included small portions of Sacramento and San Joaquin counties, the study area is limited to the SFBAAB because almost all project activities would occur within the SFBAAB. Sherman Island, which is in San Joaquin County and outside the SFBAAB, could be used by USACE as a placement site in the future. However, USACE would not use Sherman Island or the other future placement sites identified in Section 1.5.4 until appropriate environmental review is completed, including evaluation of air quality and GHG impacts. Therefore, this assessment does not include the potential use of Sherman Island and other future placement sites identified in Section 1.5.4.

This section describes the air quality setting in the study area. Meteorological data are discussed, including temperature and precipitation; and ambient concentrations for the appropriate criteria pollutants are summarized. TACs are also discussed.

The environmental setting constitutes the baseline physical conditions used to determine whether implementation of the proposed project would cause changes in air pollutant emissions that would result in significant air quality impacts according to applicable thresholds. It is important to note that because the project alternatives involve continuation of an existing operation, the projected impacts are compared to the impacts that have occurred under the existing dredging program, which are the same as the No Action/No Project Alternative, as further described in Section 3.5.5.

## **Air Quality Setting in the Study Area**

### ***Climate and Meteorology***

The SFBAAB is characterized by complex terrain consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The Coast Range splits wind flows, resulting in a western coast gap (Golden Gate) and an eastern coast gap (Carquinez Strait), which allows air to flow in and out of the SFBAAB and the Central Valley.

The air flowing in from the coast to the Central Valley, called the sea breeze, begins developing at or near ground level along the coast in late morning or early afternoon. As the day progresses, the sea breeze layer deepens and increases in velocity while spreading inland. The depth of the sea breeze depends in large part upon the height and strength of the inversion. If the inversion is low and strong (and hence stable), the flow of the sea breeze will be inhibited, and stagnant conditions are likely to result.

The climate is dominated by the strength and location of a semi-permanent, subtropical high-pressure cell. During the summer, the Pacific high-pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. In the winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore, curtailing upwelling, and causing storms. Weak inversions, coupled with moderate winds, result in low air pollution potential.

The SFBAAB is characterized by moderately wet winters and dry summers. Winter rains account for about 75 percent of the average annual rainfall. The amount of annual precipitation can vary greatly from one part of the SFBAAB to another, even within short distances. In general, total annual rainfall can reach 40 inches in the mountains, but it is often less than 16 inches in sheltered valleys (BAAQMD, 2012a).

### ***Ambient Air Quality – Criteria Air Pollutants***

Table 3.5-1 lists the state and federal ambient air quality standards. Table 3.5-2 shows the current attainment status for each criteria air pollutant. A description of each criteria pollutant is provided below.

#### **Ozone**

Ozone, or smog, is not emitted directly into the environment, but is formed in the atmosphere by complex chemical reactions between reactive organic gases (ROG) and nitrogen oxides (NO<sub>x</sub>) in the presence of sunlight. Ozone formation is greatest on warm, windless, sunny days. The main sources of NO<sub>x</sub> and ROG, often referred to as ozone precursors, are combustion processes (including motor vehicle engines); the evaporation of solvents, paints, and fuels; and biogenic sources. Automobiles are the single largest source of ozone precursors in the SFBAAB. For ozone, the SFBAAB is classified as a nonattainment area for the state and federal standards.

Pollutant	Averaging Time	California Standards <sup>1</sup>	Federal Standards <sup>2</sup>	
		Concentration <sup>3</sup>	Primary <sup>3,4</sup>	Secondary <sup>3,5</sup>
Ozone	1-Hour	0.09 ppm (180 µg/m <sup>3</sup> )	—	Same as Primary Standard
	8-Hour	0.070 ppm (137 µg/m <sup>3</sup> )	0.075 ppm (147 µg/m <sup>3</sup> )	
Respirable Particulate Matter (PM <sub>10</sub> ) <sup>6</sup>	24-Hour	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m <sup>3</sup>	—	
Fine Particulate Matter (PM <sub>2.5</sub> ) <sup>6</sup>	24-Hour	No Separate State Standard	35 µg/m <sup>3</sup>	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>
Carbon Monoxide	8-Hour	9.0 ppm (10 mg/m <sup>3</sup> )	9 ppm (10 mg/m <sup>3</sup> )	—
	1-Hour	20 ppm (23 mg/m <sup>3</sup> )	35 ppm (40 mg/m <sup>3</sup> )	
Nitrogen Dioxide	Annual Arithmetic Mean	0.030 ppm (57 µg/m <sup>3</sup> )	53 ppb (100 µg/m <sup>3</sup> ) <sup>7</sup>	Same as Primary Standard
	1-Hour	0.18 ppm (339 µg/m <sup>3</sup> )	100 ppb (188 µg/m <sup>3</sup> ) <sup>7</sup>	—
Sulfur Dioxide	24-Hour	0.04 ppm (105 µg/m <sup>3</sup> )	—	—
	3-Hour	—	—	0.5 ppm (1,300 µg/m <sup>3</sup> ) <sup>8</sup>
	1-Hour	0.25 ppm (655 µg/m <sup>3</sup> )	75 ppb (196 µg/m <sup>3</sup> ) (see footnote 8)	—
Lead <sup>9</sup>	30-Day Average	1.5 µg/m <sup>3</sup>	—	Same as Primary Standard
	Calendar Quarter	—	1.5 µg/m <sup>3</sup>	
	Rolling 3-Month Average <sup>9</sup>	—	0.15 µg/m <sup>3</sup>	
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07 — 30 miles or more for Lake Tahoe). Method: Beta Attenuation and Transmittance through Filter Tape.	No Federal Standards	
Sulfates	24-Hour	25 µg/m <sup>3</sup>		
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m <sup>3</sup> )		
Vinyl Chloride <sup>8</sup>	24-Hour	0.01 ppm (26 µg/m <sup>3</sup> )		

**Table 3.5-1  
Relevant Federal and California Ambient Air Quality Standards (Continued)**

Pollutant	Averaging Time	California Standards <sup>1</sup>	Federal Standards <sup>2</sup>	
		Concentration <sup>3</sup>	Primary <sup>3,4</sup>	Secondary <sup>3,5</sup>
Source: CARB, 2013a.				
Notes:				
<sup>1</sup> California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter—PM <sub>10</sub> , PM <sub>2.5</sub> , and visibility-reducing particles—are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.				
<sup>2</sup> National standards (other than ozone, particulate matter (PM <sub>10</sub> and PM <sub>2.5</sub> ), and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth-highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM <sub>10</sub> , the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m <sup>3</sup> is equal to or less than 1. For PM <sub>2.5</sub> , the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact USEPA for further clarification and current federal policies.				
<sup>3</sup> Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 °C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25 °C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.				
<sup>4</sup> National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.				
<sup>5</sup> National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.				
<sup>6</sup> On December 14, 2012, the national annual PM <sub>2.5</sub> primary standard was lowered from 15 µg/m <sup>3</sup> to 12.0 µg/m <sup>3</sup> . The existing national 24-hour PM <sub>2.5</sub> standards (primary and secondary) were retained at 35 µg/m <sup>3</sup> , as was the annual secondary standard of 15 µg/m <sup>3</sup> . The existing 24-hour PM <sub>10</sub> standards (primary and secondary) of 150 µg/m <sup>3</sup> also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.				
<sup>7</sup> To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010). Note that the USEPA standards are in ppb. California standards are in ppm. To directly compare the national standards to the California standards, the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.				
<sup>8</sup> On June 2, 2010, a new 1-hour SO <sub>2</sub> standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO <sub>2</sub> national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. Note that the 1-hour national standard is in units of ppb. California standards are in units of ppm. To directly compare the 1-hour national standard to the California standard, the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.				
<sup>9</sup> The California Air Resources Board has identified lead and vinyl chloride as “toxic air contaminants,” with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.				
<sup>10</sup> The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m <sup>3</sup> as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.				
°C = degrees Celsius µg/m <sup>3</sup> = micrograms per cubic meter mg/m <sup>3</sup> = milligrams per cubic meter PM <sub>2.5</sub> = particulate matter equal to or less than 2.5 micrometers in diameter PM <sub>10</sub> = particulate matter equal to or less than 10 micrometers in diameter ppb = parts per billion ppm = parts per million SO <sub>2</sub> = sulfur dioxide USEPA= United States Environmental Protection Agency				

**Table 3.5-2  
Federal and State Attainment Status for the San Francisco Bay Area**

<b>Pollutant</b>	<b>Averaging Time</b>	<b>California Attainment Status<sup>1</sup></b>	<b>Federal Attainment Status<sup>2,3</sup></b>
Ozone	8-Hour	Nonattainment <sup>9</sup>	Nonattainment <sup>4</sup>
	1-Hour	Nonattainment	N/A <sup>5</sup>
Carbon Monoxide	8-Hour	Attainment	Attainment <sup>6</sup>
	1-Hour	Attainment	Attainment
Nitrogen Dioxide	1-Hour <sup>11</sup>	Attainment	Unclassified
	Annual Arithmetic Mean	N/A	Attainment
Sulfur Dioxide <sup>12</sup>	24-Hour	Attainment	Attainment
	1-Hour	Attainment	Attainment
	Annual Arithmetic Mean	N/A	Attainment
Particulate Matter	Annual Arithmetic Mean	Nonattainment <sup>7</sup>	N/A
	24-Hour	Nonattainment	Unclassified
Particulate Matter – Fine	Annual Arithmetic Mean	Nonattainment <sup>7</sup>	Attainment
	24-Hour	N/A	Nonattainment <sup>10</sup>
Sulfates	24-Hour	Attainment	N/A
Lead <sup>13</sup>	30-day Average	N/A	Attainment
	Calendar Quarter	N/A	Attainment
	Rolling 3-Month Average <sup>14</sup>	N/A	N/A <sup>14</sup>
Hydrogen Sulfide	1-Hour	Unclassified	N/A
Vinyl Chloride (chloroethene)	24-Hour	No information available	N/A
Visibility-Reducing particles <sup>8</sup>	8-Hour (10:00 to 18:00 PST)	Unclassified	N/A

Source: CARB, 2013a.

Notes:

- <sup>1</sup> California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter – PM<sub>10</sub>, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour, or 24-hour average (i.e., all standards except for lead and the PM<sub>10</sub> annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average.
- <sup>2</sup> National standards shown are the "primary standards" designed to protect public health. National standards other than for ozone, particulates, and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent 3-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the fourth highest daily concentrations is 0.075 ppm (75 ppb) or less. The 24-hour PM<sub>10</sub> standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m<sup>3</sup>. The 24-hour PM<sub>2.5</sub> standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m<sup>3</sup>.

**Table 3.5-2  
Federal and State Attainment Status for the San Francisco Bay Area (Continued)**

Notes: (Continued)

Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM<sub>10</sub> is met if the 3-year average falls below the standard at every site. The annual PM<sub>2.5</sub> standard is met if the 3-year average of annual averages, spatially averaged across officially designed clusters of sites, falls below the standard.

<sup>3</sup> National air quality standards are set by USEPA at levels determined to be protective of public health, with an adequate margin of safety.

<sup>4</sup> Final designations effective July 20, 2012.

<sup>5</sup> The national 1-hour ozone standard was revoked by USEPA on June 15, 2005.

<sup>6</sup> In April 1998, the San Francisco Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.

<sup>7</sup> In June 2002, CARB established new annual standards for PM<sub>2.5</sub> and PM<sub>10</sub>.

<sup>8</sup> Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze, and is equivalent to a 10-mile nominal visual range.

<sup>9</sup> The 8-hour California ozone standard was approved by the CARB on April 28, 2005 and became effective on May 17, 2006.

<sup>10</sup> USEPA lowered the 24-hour PM<sub>2.5</sub> standard from 65 µg/m<sup>3</sup> to 35 µg/m<sup>3</sup> in 2006. The USEPA designated the San Francisco Bay Area as nonattainment of the PM<sub>2.5</sub> standard on October 8, 2009. The effective date of the designation is December 14, 2009, and the Air District has 3 years to develop a plan, the SIP, that demonstrates the San Francisco Bay Area will achieve the revised standard by December 14, 2014. The SIP for the new PM<sub>2.5</sub> standard must be submitted to the USEPA by December 14, 2012.

<sup>11</sup> To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

<sup>12</sup> On June 2, 2010, the USEPA established a new 1-hour SO<sub>2</sub> standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO<sub>2</sub> NAAQS must continue to be used until 1 year following USEPA initial designations of the new 1-hour SO<sub>2</sub> NAAQS. The USEPA expects to designate areas by June 2012.

<sup>13</sup> CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure below which there are no adverse health effects determined.

<sup>14</sup> National lead standard, rolling 3-month average: final rule signed October 15, 2008. Final designations effective December 31, 2011.

CARB = California Air Resources Board

µg/m<sup>3</sup> = micrograms per cubic meter

N/A = not applicable

NAAQS = National Ambient Air Quality Standards

PM<sub>2.5</sub> = particulate matter equal to or less than 2.5 micrometers in diameter

PM<sub>10</sub> = particulate matter equal to or less than 10 micrometers in diameter

ppb = parts per billion

ppm = parts per million

PST = Pacific Standard Time

SIP = State Implementation Plan

SO<sub>2</sub> = sulfur dioxide

USEPA = U.S. Environmental Protection Agency

VRP = visibility-reducing particle

### **Particulate Matter**

Particulate matter (PM) refers to a wide range of solid or liquid particles in the atmosphere, including smoke, dust, aerosols, and metallic oxides. Respirable PM with an aerodynamic diameter of 10 micrometers or less is referred to as PM<sub>10</sub>. PM<sub>2.5</sub> includes a subgroup of finer particles that have an aerodynamic diameter of 2.5 micrometers or less. Some PM, such as pollen, are naturally occurring. In the SFBAAB, most PM is caused by combustion, factories, construction, grading, demolition, agricultural activities, and motor vehicles. Motor vehicles are currently responsible for about half of particulates in the SFBAAB. Wood burning in fireplaces and stoves is another large source of fine particulates (BAAQMD, 2012a). As indicated in Table 3.5-2, the SFBAAB is classified as a nonattainment area for the state and federal PM<sub>10</sub> and PM<sub>2.5</sub> standards.

### **Carbon Monoxide**

Carbon monoxide (CO) is an odorless, colorless gas. It is formed by the incomplete combustion of fuels. The single largest source of CO in the SFBAAB is motor vehicles. The SFBAAB is classified as an attainment area for the state and federal CO standards.

### **Nitrogen Dioxide**

Nitrogen dioxide (NO<sub>2</sub>) is a reddish-brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO<sub>2</sub>. NO<sub>2</sub> may be visible as a coloring component of a brown cloud on high pollution days, especially in conjunction with high ozone levels (BAAQMD, 2012a). In 2010, the USEPA implemented a new 1-hour NO<sub>2</sub> standard, which is presented in Table 3.5-1. The SFBAAB has been designated as an unclassified area<sup>1</sup> for the new federal NO<sub>2</sub> standard (BAAQMD, 2013).

### **Sulfur Dioxide**

Sulfur dioxide (SO<sub>2</sub>) is a colorless acid gas with a pungent odor. It is produced by the combustion of sulfur-containing fuels, such as oil, coal, and diesel. As indicated in Table 3.5-2, the SFBAAB is classified as an attainment area for the state and federal SO<sub>2</sub> standards.

### **Lead**

Lead is a metal found naturally in the environment, as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers. As indicated in Table 3.5-2, the SFBAAB is classified as an attainment area for the federal lead standards. There is no additional state standard.

### **Hydrogen Sulfide, Vinyl Chloride (chloroethene), and Visibility-Reducing particles**

As indicated in Table 3.5-2, the SFBAAB is either unclassified, or there is no information available for ambient levels of these three pollutants. There are no federal attainment standards associated with these three pollutants.

### **Toxic Air Contaminants**

In addition to the criteria air pollutants listed above, another group of pollutants, commonly referred to as TACs or hazardous air pollutants, can result in health effects that can be quite severe.

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<sup>1</sup> An unclassified area is an area in which compliance with the NAAQS cannot be determined with current information.

Industrial facilities and mobile sources are significant sources of TACs. Various common urban facilities produce TAC emissions, such as gasoline stations (benzene), hospitals (ethylene oxide), and dry cleaners (perchloroethylene). Automobile exhaust also contains TACs such as benzene and 1,3-butadiene. Most recently, diesel particulate matter (DPM) was identified as a TAC by CARB. DPM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. BAAQMD research indicates that mobile-source emissions of DPM, benzene, and 1,3-butadiene represent a substantial portion of the ambient background risk from TACs in the SFBAAB.

Ambient standards have not been developed for TACs. Instead, the BAAQMD uses a risk-based approach to regulate TACs. In addition to monitoring criteria pollutants, both the BAAQMD and CARB operate TAC monitoring networks in the SFBAAB.

### **Sensitive Receptors**

Sensitive receptors refer to those segments of the population most susceptible to poor air quality: children, the elderly, and those with pre-existing serious health problems affected by air quality. Examples of receptors include people at residences, schools and school yards, parks and playgrounds, daycare centers, nursing homes, and medical facilities.

A majority of the federal navigation channels and existing placement sites are not located near sensitive receptors. The USACE would not use any of the future placement sites identified in Section 1.5.4 until appropriate environmental review is completed. Commercial and recreational ship traffic is an ambient air emissions source at the federal navigation channels and throughout the study area. Several of the channels (e.g., Richmond Harbor, Oakland Harbor) are also located in areas with surrounding commercial and industrial operations, which are additional sources of ambient emissions. There are sensitive receptors in close proximity (i.e., within 1,000 feet) to portions of some of the federal channels, including San Rafael Creek, Napa River, Petaluma River, Oakland Harbor, and Richmond Inner Harbor.

### **Global Climate Change Setting**

This section describes the causes and consequences of global climate change.

#### **Causes of Climate Change**

Global climate change is caused by anthropogenic emissions of GHGs released into the atmosphere through combustion of fossil fuels, and other GHG-producing activities such as deforestation and land use change.

GHGs play a critical role in the Earth's radiation budget by trapping infrared radiation emitted from the Earth's surface and which could have otherwise escaped to space. The "greenhouse effect" keeps the Earth's atmosphere near the surface warmer than it would be otherwise, and allows for successful habitation by humans and other forms of life.

Prominent GHGs contributing to this process include CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and fluorocarbons. Emissions of CO<sub>2</sub> and N<sub>2</sub>O are byproducts of fossil fuel combustion, among other sources. CH<sub>4</sub>, a highly potent GHG, results from off-gassing associated with agricultural practices and landfills. Fluorocarbons are commonly used in refrigeration systems.

GWP is a measure of the estimated contribution to global warming of a given mass of GHG. It is a relative scale that compares the gas in question to that of the same mass of CO<sub>2</sub> (whose GWP is by definition 1). For example, emitting 1 ton of CH<sub>4</sub> causes the same amount of global warming as emitting 25 tons of CO<sub>2</sub>; therefore the CH<sub>4</sub> GWP is 25. To account for the GWP of GHGs, GHG emissions are often required to be multiplied by their GWP and then reported as CO<sub>2</sub>e. As such, emissions of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O are typically converted into CO<sub>2</sub>e by multiplying their emissions by their respective GWP.

### **Effects of Climate Change**

The combustion of fossil fuels releases carbon that has been stored underground into the active carbon cycle, thus increasing concentrations of GHGs in the atmosphere. Emissions of GHGs in excess of natural ambient concentrations are theorized to be responsible for the enhancement of the greenhouse effect, and contribute to what is termed “global warming,” a trend of unnatural warming of the Earth’s natural climate. Increases in these gases lead to more absorption of radiation, and warm the lower atmosphere further, thereby increasing evaporation rates and temperatures near the surface. Climate change is a global problem, and GHGs are global pollutants, unlike criteria pollutants (such as ozone, CO, and PM) and TACs, which are pollutants of regional and local concern.

Climate change could affect California’s natural environment in the following ways (CEC, 2005):

- Rising sea levels along the California coastline, particularly in San Francisco and the Sacramento-San Joaquin River Delta, due to ocean expansion;
- Extreme heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent;
- An increase in heat-related human deaths and infectious diseases, and a higher risk of respiratory problems caused by deteriorating air quality;
- Reduced snow pack and stream flow in the Sierra Nevada mountains, affecting winter recreation and water supplies;
- Potential increase in the severity of winter storms, affecting peak stream flows and flooding;
- Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield; and
- Changes in distribution of plant and wildlife species due to changes in temperature, competition of colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate-related effects.

These changes in California’s climate and ecosystems could occur at a time when California’s population is expected to increase from approximately 37 million in 2010 to 50 million by the year 2050 (California Department of Finance, 2012).

Transportation generates 38 percent of California’s GHG emissions, followed by the industrial sector (21 percent), in-state electricity generation (12 percent), imported electricity generation (11 percent), residential (7 percent), agriculture and forestry (7 percent), commercial (3 percent), and other sources (3 percent) (CARB, 2013b). Sinks of CO<sub>2</sub> include uptake by vegetation, and dissolution into the ocean. In 2010, California generated 451 million metric tons of GHG, measured as CO<sub>2</sub>e emissions (CARB, 2013c).

#### **3.5.3 Thresholds of Significance**

Maintenance dredging under any alternative would be conducted with mechanical dredges, hopper dredges, and cutterhead-pipeline dredges. Methods used to transport dredged materials would include pipelines, hopper dredges, barges, and scows. The analysis considered CEQA Appendix G thresholds, as well as the BAAQMD thresholds, when evaluating significance. Based on these thresholds, the impacts would be significant if the project would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

In addition, a project would have a potentially significant GHG or global climate change impact if it:

- Generates GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflicts with an agency's applicable plan, policy, or regulation designed to reduce GHG emissions.

The BAAQMD's Air Quality CEQA Thresholds of Significance provide reference thresholds for considering whether a project would have an air quality impact, and recommend procedures for evaluating potential air quality impacts. The issues identified in the BAAQMD *CEQA Air Quality Guidelines* court case are not considered relevant to the scientific soundness of the BAAQMD's analysis of the level at which a pollutant would potentially significantly affect air quality or human health. Therefore, even though the guidelines have been suspended by the BAAQMD until the issues identified in the case are resolved, the analysis in this Environmental Assessment/Environmental Impact Report was conducted in accordance with the BAAQMD *CEQA Air Quality Guidelines*. The lead agencies have reviewed and agree with BAAQMD's criteria pollutant and GHG thresholds and are using them for this Environmental Assessment/Environmental Impact Report analysis.

A project's emissions would constitute a less-than-significant air quality impact if they meet the mass thresholds of criteria pollutants. The BAAQMD thresholds for criteria pollutants emissions from construction and operation of projects are summarized in Table 3.5-3.

<b>Table 3.5-3 Mass Thresholds of Criteria Pollutants</b>				
	<b>ROG</b>	<b>NO<sub>x</sub></b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>
Average Daily Emissions (lbs/day)	54	54	82	54
Maximum Annual Emissions (tpy)	10	10	15	10
Notes: lbs/day = pounds per day NO <sub>x</sub> = nitrogen oxides PM <sub>10</sub> = particulate matter less than or equal to 10 microns in diameter PM <sub>2.5</sub> = particulate matter less than or equal to 2.5 microns in diameter ROG = reactive organic gas tpy = tons per year				

The BAAQMD has also adopted CEQA thresholds for GHGs. A project's GHG emissions would constitute a less-than-significant GHG impact if they meet any one of these criteria:

- Complies with a qualified GHG Reduction Strategy;
- For stationary source projects, has operational emissions of less than 10,000 metric tons CO<sub>2</sub>e units per year;
- For land-use projects, has operational emissions of less than 1,100 metric tons CO<sub>2</sub>e units per year; or

- For land-use projects, has average emission of less than 4.6 metric tons per service population per year (where service population refers to the total number of residents and employees for the project).

The lead agencies agree with BAAQMD's guidance regarding treatment of existing emissions; therefore, if a proposed project involves the removal of existing emission sources, the existing emissions levels are subtracted from the emissions levels estimated for the new proposed land use. This net calculation is permissible only if the existing emission sources were operational at the time that the Notice of Preparation (NOP) for the CEQA project was circulated, or in the absence of an NOP when environmental analysis begins, and would continue if the proposed redevelopment project is not approved. This net calculation is not permitted for emission sources that ceased to operate, or where the land uses were vacated and/or demolished, prior to circulation of the NOP or the commencement of environmental analysis. This approach is consistent with the definition of baseline conditions pursuant to CEQA (BAAQMD, 2012a).

Per the requirements of NEPA and CEQA, the proposed project is compared to baseline conditions, which is equivalent to the conditions under the No Action/No Project Alternative. The federal standard placement site and amount dredged for each navigation channel would remain the same under all alternatives. Additionally, the type of dredge equipment that would be used to dredge each navigation channel would be the same under the No Action/No Project Alternative and Proposed Action/Project. Therefore, the difference in dredge equipment type (i.e., replacement of hopper dredges with mechanical dredges and tugs under the Reduced Hopper Dredge Use Alternatives) was the basis for evaluating differences in emissions among the action alternatives. The analysis included calculations to determine the change in total air pollutant emissions resulting from dredging material and transporting the dredged material, using a mechanical dredge compared to using a hopper dredge in certain channels in the San Francisco Bay Area. The difference in emissions between the two proposed methods was estimated, and was compared to CEQA thresholds to determine level of significance. Because the type of dredge equipment for each channel would be the same under the No Action/No Project Alternative and Proposed Action/Project, the difference in emissions between these alternatives would be zero. The use of alternative placement sites could affect the distances traveled by vessels, and therefore result in differing emission amounts. The use of these sites is not expected to result in a substantial net change in air emissions because some of the sites are closer to the areas dredged, while others are farther away. Under USACE's operations and maintenance program, USACE regulations require dredged materials to be placed at the federal standard site, which is defined as the least-costly dredged material disposal or placement alternative consistent with sound engineering practices, and meeting the environmental standards established by the Clean Water Act Section 404(b)(1) evaluation process or ocean dumping criteria (33 C.F.R. § 335.7). Transport costs factor largely into determining the federal standard; therefore, generally placement sites closest to the dredge site are the federal standard unless environmental considerations dictate selection of another location. The USACE would make every effort to use the federal standard disposal locations, but may be forced by logistical constraints to use the alternate locations. However, because deviation from the federal standard placement sites are expected to be infrequent, and cost, and therefore transport distance, would factor into the selection of an alternate placement site, the use of alternate placement sites would not result in substantial differences in transport emissions. The USACE would continue to generally minimize distances traveled in an effort to minimize operational costs; therefore, emissions are not expected to increase or decrease because the same cost and distance minimizing drivers would still be in place.

### 3.5.4 Methodology

Because the lead agencies are using BAAQMD guidance, this analysis addressed project emissions of the following air pollutants: ROG, NO<sub>x</sub>, PM, and CO<sub>2</sub>. To quantify the difference in emissions under the two Reduced Hopper Dredge Use Alternatives, the analysis quantitatively assessed emissions from dredging and transit operations associated with hopper and mechanical dredge equipment.

The analysis converted calculations for emissions per unit of material dredged for each dredge equipment type to total annual pollutant emissions from dredging activities and compared them to local and federal annual air quality pollutant thresholds (i.e., the BAAQMD's air quality pollutant thresholds).

### Data Sources

The analysis identified potential air pollutant emission sources (engines/pumps) for each dredge type (hopper and mechanical). Because comparative data for USACE's hopper dredge *Essayons* and a representative mechanical dredge (i.e., the *Paula Lee*) were available, the analysis was performed using specifications and data from those two ships.

The *Essayons* has two main engines, three ship service engines, and two pump engines (USACE, n.d.). The analysis used the *Paula Lee* mechanical barge as a representative model for mechanical barge specifications; the *Paula Lee* has two different main engines, one deck engine, and four deck winch engines (USACE, n.d.). In addition, mechanical dredging operations are supported by a tug boat that has one main engine. Emissions from the tug boat that is used to position the barge were also included in this analysis. The dredge-specific inputs used to calculate each dredge type's emissions include engine horsepower, engine load, and barge dredging rate (i.e., amount of material dredged per pumping hour). Engine load varies depending on the activity being performed, such as pumping versus transport of pumped material. Therefore, equipment specifications and calculations are shown for both the pumping portion of dredging activities as well as the transit portion. Table 3.5-4 provides the mechanical and hopper dredges' specifications.

<b>Dredge Type</b>	<b>Engine</b>	<b>Horsepower<sup>1</sup></b>	<b>Number of Engines Per Barge<sup>1</sup></b>	<b>Dredge Rate (Cubic Yards / Hour)<sup>2</sup></b>	<b>Load<sup>3</sup></b>	<b>Year<sup>1</sup></b>
Hopper ( <i>Essayons</i> ) – Pumping	Main engine	4,640	2	2,657	0.1	2007
	Ship service	1,207	3	2,657	0.6	2007
	Pump	4,640	2	2,657	0.8	2007
Mechanical ( <i>Paula Lee</i> ) – Pumping	Tug – main engine <sup>3</sup>	1,800	1	257	0.1	1970
	Main	1,200	1	257	0.1	2007
	Main	895	1	257	0.1	2002
	Deck	300	1	257	0.8	2004
	Deck Winch	300	4	257	0.8	2007

Sources: USACE, n.d.; USACE, 2013d.

Notes:

- The horsepower, year, and quantity of each hopper dredge engine were obtained from the specifications sheet for the *Essayons*. The horsepower, year and quantity of each mechanical dredge engine, except for the tug boat, were obtained from the specifications sheet for the *Paula Lee*. Both specification sheets were provided by USACE.
- Cubic yards dredged per hour (dredging rate) is an average rate that was calculated from data provided in a mechanical versus hydraulic dredge study provided by USACE.
- Load of all engines and all tug boat specifications were provided by USACE. Zero load indicates that the activity is not part of the corresponding phase (e.g., pumping is not used in transport of material).

Emission factors of ROG, NO<sub>x</sub>, PM, and CO<sub>2</sub> were other inputs used in the calculations of the total annual emissions for each engine. Emission factors associated with a piece of equipment could vary depending on the model year assumed. The emission factors of ROG, NO<sub>x</sub>, PM and CO<sub>2</sub> used in calculations are included in Appendix B; the calculations are further explained below.

### Calculation Methodology

Under the action alternatives, the maximum amount of material to be dredged by a mechanical dredge, as opposed to the currently operated hopper barge, is 575,000 cubic yards per year.<sup>2</sup> Under Reduced Hopper Dredge Use Alternative 1, Suisun Bay Channel and New York Slough, plus either Richmond Outer Harbor or Pinole Shoal Channel, would be dredged with a mechanical dredge as opposed to the currently operated hopper dredge, which would be used under the No Action/No Project Alternative and Proposed Action/Project; therefore, approximately 375,000 cubic yards per year would be dredged with a mechanical dredge instead of a hopper dredge under Reduced Hopper Dredge Alternative 1. Under Reduced Hopper Dredge Use Alternative 2, Richmond Outer Harbor, Pinole Shoal Channel, Suisun Bay Channel and New York Slough would be all dredged with a mechanical dredge as opposed to the currently operated hopper dredge; therefore, approximately 575,000 cubic yards per year would be dredged with a mechanical dredge instead of a hopper dredge under Reduced Hopper Dredge Alternative 2. These alternatives are summarized in Table 3.5-5.

<b>Alternative</b>	<b>Dredging Area</b>	<b>Dredging Method</b>	<b>Volume of Material Dredged (Cubic Yards per Year)</b>
No Action and Proposed Action	Suisun Bay Channel and New York Slough; Richmond Outer Harbor; Pinole Shoal Channel	Hopper	575,000
Reduced Hopper Dredge Use Alternative 1	Suisun Bay Channel and New York Slough; plus either Richmond Outer Harbor or Pinole Shoal Channel	Mechanical	375,000
	Richmond Outer Harbor or Pinole Shoal Channel	Hopper	200,000
Reduced Hopper Dredge Use Alternative 2	Suisun Bay Channel and New York Slough; Richmond Outer Harbor; Pinole Shoal Channel	Mechanical	575,000

Using the engine specification inputs and emission factors described above, maximum pollutant emissions during annual dredging activities were calculated for No Action and Proposed Action, and for Reduced Hopper Alternative 2 because this alternative represents the maximum replacement of hopper dredges with mechanical dredges. The average dredging rate for pumping activities of each barge was calculated using data from a recent study in the Richmond Harbor, in which the average amount of material dredged per pumping hour was recorded daily. The *Essayons* pumped, on average, 2,657 cubic yards per hour, and the *Paula Lee* dredged, on average, 257 cubic yards per hour (USACE, 2013d). The transit activities of each barge were based on the standard capacity of dredges with comparable engine sizes, and an estimated average speed (10 miles per hour) and transport distance (4.5 miles one-way).

<sup>2</sup> Based on estimated volumes for the federal navigation channels that are typically dredged annually.

Based on these assumptions, the *Essayons* and the scow that accompanies the *Paula Lee* are each able to transport, on average, 5,000 cubic yards per hour (USACE, n.d.).

To calculate emissions from dredging a specified amount of material, emission factors were converted to the units of pounds per cubic yard of dredged material. First, as shown in Table 3.5-6, engine specifications, along with the average dredging rate of each barge type, were used to convert engine power to the units of horsepower-hour/cubic yard.

<b>Dredge Type</b>	<b>Engine</b>	<b>hp</b>	<b>Number of Engines Per Barge</b>	<b>Load<sup>1</sup></b>	<b>Dredge Rate<sup>2</sup> (Cubic yards/hour)</b>	<b>Horsepower-Hour/ Cubic Yard)<sup>1,3</sup></b>
Hopper ( <i>Essayons</i> ) – Pumping	Main engine	4,640	2	0.1	2,657	0.35
	Ship service	1,207	3	0.6	2,657	0.82
	Pump	4,640	2	0.8	2,657	2.79
Mechanical ( <i>Paula Lee</i> ) - Pumping	Tug – main engine	1,800	1	0.1	257	0.70
	Main	1,200	1	0.1	257	0.47
	Main	895	1	0.1	257	0.35
	Deck	300	1	0.8	257	0.93
	Deck Winch	300	4	0.8	257	3.74
Hopper ( <i>Essayons</i> ) – Transit	Main engine	4,640	2	0.8	5,000	1.48
	Ship service	1,207	3	0.5	5,000	0.36
	Pump	4,640	2	0	5,000	0
Mechanical ( <i>Paula Lee</i> ) - Transit	Tug – main engine	1,800	1	0.8	5,000	0.29
	Main	1,200	1	0.2	5,000	0.05
	Main	895	1	0.2	5,000	0.04
	Deck	300	1	0	5,000	0
	Deck Winch	300	4	0	5,000	0
Notes:						
<sup>1</sup> Zero value indicates that the activity is not part of the corresponding phase.						
<sup>2</sup> Cubic yards per hour for pumping specifications (dredging rate) is an average rate that was calculated from data provided in a mechanical versus hydraulic dredge study provided by USACE. Cubic yards per hour for transit specifications, is an average rate based on 5,000-cubic-yard capacity for either the <i>Essayons</i> or the scow that accompanies the <i>Paula Lee</i> filled to 90 percent and a 0.9-hour round trip time.						
<sup>3</sup> Calculation: [(hp) * (number of engines per barge) * (load)]/(cubic yards/hour)						
hp = horsepower						

Subsequently, pounds of emissions per cubic yard of dredged material were calculated by multiplying the emission factors [grams per horsepower-hour] by [horsepower-hour/cubic yard]. Appendix B includes the conversion of emission factors from the units provided in the specification sheets to the units of pounds per cubic yard dredged material.

Finally, total emissions of each pollutant from each dredge were calculated by multiplying the emissions per cubic yard dredged by the 575,000 cubic yards of material per year, as shown in Table 3.5-7 below.

	<b>ROG</b>	<b>NO<sub>x</sub></b>	<b>PM<sub>10</sub></b>	<b>CO<sub>2</sub><sup>1</sup></b>
Hopper ( <i>Essayons</i> ) – Pumping	0.8	15	0.5	1,296
Mechanical ( <i>Paula Lee</i> ) – Pumping	1.3	23	0.9	2,024
Hopper ( <i>Essayons</i> ) – Transit	0.4	7	0.2	604
Mechanical ( <i>Paula Lee</i> ) – Transit	0.3	3	0.1	122
Hopper ( <i>Essayons</i> ) – Total	1.2	22	0.7	1,900
Mechanical ( <i>Paula Lee</i> ) – Total	1.6	26	1	2,146
Difference in Emissions Between Hopper and Mechanical Dredging Methods <sup>2</sup>	0.4	4	0.3	246
Significance Threshold (BAAQMD)	10	10	15	1,100 (N/A – land use) 10,000 (N/A – stationary)
Exceeds Thresholds?	No	No	No	No
Notes: BAAQMD = Bay Area Air Quality Management District CO <sub>2</sub> = carbon dioxide N/A = not applicable NO <sub>x</sub> = nitrogen oxides PM <sub>10</sub> = particulate matter equal to or less than 10 micrometers in diameter ROG = reactive organic gas <sup>1</sup> . CO <sub>2</sub> emissions and thresholds are presented in metric tons per year. <sup>2</sup> . This is the difference in emissions between the Proposed Action (equivalent to No Action) and the Reduced Hopper Alternative 2 (equivalent to the maximum impact), and indicates that emissions would increase slightly with the increased use of mechanical dredges.				

Analysis for SO<sub>2</sub> was not included because the area is in attainment for federal and state ambient air quality standards (i.e., NAAQS and CAAQS) for SO<sub>2</sub> and therefore, BAAQMD does not have any mass emissions significance thresholds for SO<sub>2</sub>. Furthermore, the use of ultra-low sulfur diesel fuel requirement makes SO<sub>2</sub> emissions adequately low to be considered negligible for impact analyses.

The major sources of lead emissions have historically been from fuels in on-road motor vehicles (such as cars and trucks) and industrial sources. The major sources of lead emissions to the air today are ore and metals processing and piston-engine aircraft operating on leaded aviation gasoline. The project area is in attainment for lead based on the NAAQS and CAAQS, and BAAQMD does not have any mass emissions significance thresholds for lead. The proposed project alternatives do not include any major sources of airborne lead, and lead emissions from diesel fuel combustion are considered to be negligible.

Because SO<sub>2</sub> and lead emissions would be negligible, they are not further discussed in the analysis.

### 3.5.5 Impacts and Mitigation Measures

#### ***Impact 3.5-1: Conflict with or Obstruct BAAQMD Air Quality Plan Implementation, Exceed Applicable Air Quality Standards, or Contribute Substantially to an Air Quality Violation***

##### **No Action/No Project Alternative**

Dredging and the associated transport and placement activities have occurred in the waters of San Francisco Bay for decades, and the No Action/No Project Alternative would involve continuation of USACE's current maintenance dredging program for the federal navigation channels in San Francisco Bay. Although dredge equipment and vessel use produce ROG, NO<sub>x</sub>, PM, and CO<sub>2</sub> emissions, these activities would only occur for short durations. The No Action/No Project Alternative would allow for the same level of dredging and vessel traffic in the San Francisco Bay that currently occurs. There are no construction activities associated with the No Action/No Project Alternative. Thus, there are no expected increases in annual emissions due to the No Action/No Project Alternative.

Project-level emission increases above the BAAQMD mass significance thresholds would potentially conflict with or obstruct the BAAQMD Air Quality Plan Implementation. Because there are no expected increases in annual emissions due to the No Action/No Project Alternative, the emissions level increase is less than the BAAQMD mass significance thresholds. Therefore, the project would not conflict with or obstruct BAAQMD Air Quality Plan Implementation, exceed applicable air quality standards, or contribute substantially to an air quality violation.

**NEPA Determination.** The No Action Alternative's potential to conflict with or obstruct BAAQMD Air Quality Plan Implementation, exceed applicable air quality standards, or contribute substantially to an air quality violation would be less than significant.

**CEQA Determination.** The No Project Alternative's potential to conflict with or obstruct BAAQMD Air Quality Plan Implementation, exceed applicable air quality standards, or contribute substantially to an air quality violation would be less than significant.

##### **Proposed Action/Project**

Implementation of the Proposed Action/Project would be very similar to the No Action/No Project Alternative; it would involve use of the same type of dredge equipment for each channel, the same volume of dredged material, and the same dredging frequency and durations. Further, there are no construction activities associated with the Proposed Action/Project. However, the use of alternative placement sites could affect the distances traveled by vessels, and thus result in differing emissions amounts. The use of these sites is not expected to result in a substantial net change in air emissions because some of the sites are closer to the areas dredged, while others are further away. As described above (Section 3.5.3), USACE would continue to generally minimize distances traveled in an effort to minimize operational costs; therefore, emissions are not expected to increase or decrease because the same cost and distance minimizing drivers would still be in place.

**NEPA Determination.** The Proposed Action's potential to conflict with or obstruct BAAQMD Air Quality Plan Implementation, exceed applicable air quality standards, or contribute substantially to an air quality violation would be less than significant.

**CEQA Determination.** The proposed project's potential to conflict with or obstruct BAAQMD Air Quality Plan Implementation, exceed applicable air quality standards, or contribute substantially to an air quality violation would be less than significant.

## Reduced Hopper Dredge Use Alternatives 1 and 2

Under Reduced Hopper Dredge Use Alternatives 1 and 2, certain channels would be dredged with a mechanical dredge instead of a hopper dredge, but the overall volume of dredging would not change, and the increase of emissions from reduced hopper/increased mechanical dredge equipment use is not expected to exceed the BAAQMD significance thresholds, as shown in Table 3.5-7. There are no construction activities associated with Reduced Hopper Dredge Use Alternatives 1 and 2.

**NEPA Determination.** The Reduced Hopper Dredge Use Alternatives 1 and 2 potential to conflict with or obstruct BAAQMD Air Quality Plan Implementation, exceed applicable air quality standards, or contribute substantially to an air quality violation would be less than significant.

**CEQA Determination.** The Reduced Hopper Dredge Use Alternatives 1 and 2 potential to conflict with or obstruct BAAQMD Air Quality Plan Implementation, exceed applicable air quality standards, or contribute substantially to an air quality violation would be less than significant.

### ***Impact 3.5-2: Expose Sensitive Receptors to Substantial Pollutant Concentrations***

#### **No Action/No Project Alternative**

Dredging and the associated transport and placement activities have occurred in the waters of San Francisco Bay for decades, and the No Action/No Project Alternative would involve continuation of USACE's current maintenance dredging program.

As stated above, most of the federal navigation channels and existing placement sites are not located near sensitive receptors. The in-Bay and offshore placement sites are located over open waters, and there are no sensitive receivers in close proximity to these sites. Placement would also occur at existing upland at beneficial re-use sites. However, the placement of dredged materials has occurred regularly in the past at these locations, and ongoing emission from placement activities is part of the existing condition. In this context, emissions increases specific to placement of dredged materials from the federal navigation channels compared to baseline conditions would be negligible. There are sensitive receptors in close proximity to portions of some of the federal channels, including San Rafael Creek, Napa River, Petaluma River, Oakland Harbor, and Richmond Inner Harbor. Because dredges move along a channel, the duration a dredge would be operating in close proximity to any one sensitive receptor would be limited. There are no construction activities associated with the No Action/No Project Alternative. Therefore, the impacts of short-term intermittent emissions on sensitive receptors would be minimal.

**NEPA Determination.** The No Action Alternative's potential to expose sensitive receptors to substantial pollutant concentrations would be less than significant.

**CEQA Determination.** The No Project Alternative's potential to expose sensitive receptors to substantial pollutant concentrations would be less than significant.

#### **Proposed Action/Project**

Implementation of the Proposed Action/Project would be very similar to the No Action/No Project Alternative; it would involve use of the same type of dredge equipment for each channel, the same volume of dredged material, and the same dredging frequency and durations. The USACE would not use any of the future placement sites identified in Section 1.5.4 until appropriate environmental review and permitting is completed. There are no construction activities associated with the Proposed Action/Project. Therefore, the potential to expose sensitive receptors to substantial pollutant concentrations would be the same as described above for the No Action/No Project Alternative.

**NEPA Determination.** The Proposed Action's potential to expose sensitive receptors to substantial pollutant concentrations would be less than significant.

**CEQA Determination.** The Project's potential to expose sensitive receptors to substantial pollutant concentrations would be less than significant.

### **Reduced Hopper Dredge Use Alternatives 1 and 2**

Under Reduced Hopper Dredge Use Alternatives 1 and 2, certain channels would be dredged with a mechanical dredge instead of a hopper dredge, but the overall volume of dredging would not change, and the amount of emissions produced by different dredge equipment types is not expected to differ substantially from those under the No Action/No Project Alternative and Proposed Action/Project, as summarized in Table 3.5-7. There are no construction activities associated with the Reduced Hopper Dredge Use Alternative. Therefore, the potential to expose sensitive receptors to substantial pollutant concentrations would be minimal.

**NEPA Determination.** The Reduced Hopper Dredge Use Alternatives 1 and 2 potential to expose sensitive receptors to substantial pollutant concentrations would be less than significant.

**CEQA Determination.** The Reduced Hopper Dredge Use Alternatives 1 and 2 potential to expose sensitive receptors to substantial pollutant concentrations would be less than significant.

### **Impact 3.5-3: Create Objectionable Odors**

#### **No Action/No Project Alternative, Proposed Action, and Reduced Hopper Dredge Use Alternatives 1 and 2**

Dredging and the associated transport and placement activities have occurred in the waters of San Francisco Bay for decades. These past activities are not known to have had any confirmed odor complaints. Additionally, the activities are not listed as BAAQMD source types that are likely to have odor impacts.

**NEPA Determination.** The potential for the No Action Alternative Action, the Proposed Action, or the Reduced Hopper Dredge Use Alternatives to create objectionable odors affecting a substantial number of people would be less than significant.

**CEQA Determination.** The potential for the No Project Alternative, Project, or the Reduced Hopper Dredge Use Alternatives to create objectionable odors affecting a substantial number of people would be less than significant.

### **Impact 3.5-4: Result in Cumulatively Considerable Air Quality Impacts**

The cumulative air quality impacts considered are:

- A net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to cumulatively substantial pollutant concentrations;
- Create cumulatively considerable objectionable odors.

In developing thresholds of significance for air pollutants, BAAQMD has established limits for pollutant emission levels, above which a project's individual emissions would be cumulatively considerable.

Based on BAAQMD guidance, if a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions.

As described under Impacts 3.5-1 through 3.5-3, the emissions from dredge equipment and vessel use under all alternatives would have minimal adverse impacts on air quality. The reasonably foreseeable actions in Table 3.1-1 include activities that would produce construction and/or operational emissions that could overlap with USACE's maintenance dredging activities and contribute to cumulative air quality impacts in the study area. Under any of the alternatives, emissions from USACE's dredging, transport, and placement activities would not cause mass emission increases above the BAAQMD significance thresholds (see Table 3.5-7) from those that resulted from past operations and contributed to baseline conditions, and significance thresholds would not be exceeded. Therefore, the project alternatives' emissions would not be cumulatively considerable, and would not result in significant cumulative air quality impacts.

**NEPA Determination.** Under the project alternatives, cumulative air quality impacts would be less than significant.

**CEQA Determination.** The potential for the project alternatives to result in cumulatively considerable impacts would be less than significant.

***Impact 3.5-5: Generate Greenhouse Gas Emissions, Either Directly or Indirectly, that May Have a Significant Impact on the Environment or Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases***

**No Action/No Project Alternative**

Dredging and the associated transport and placement activities have occurred in the waters of San Francisco Bay for decades, and the No Action/No Project Alternative would involve continuation of USACE's current maintenance dredging program. Although dredge equipment and vessel use produce emissions, these activities would only occur for short durations. The No Action/No Project Alternative would allow for the same level of dredging and vessel traffic in the San Francisco Bay that currently occurs. There are no construction activities associated with the No Action/No Project Alternative. Thus, there are no expected increases in annual emissions due to the No Action/No Project Alternative.

**NEPA Determination.** The No Action Alternative's GHG emissions impacts would be less than significant.

**CEQA Determination.** The No Project Alternative's GHG emissions impacts would be less than significant.

**Proposed Action/Project**

Implementation of the Proposed Action/Project would be very similar to the No Action/No Project Alternative; it would involve use of the same type of dredge equipment for each channel, the same volume of dredged material, and the same dredging frequency and durations. However, the use of alternative placement sites could affect the distances traveled by vessels, and therefore emissions amounts.

The use of these sites is not expected to result in a substantial net change in air emissions because some of the sites are closer to the areas dredged, while others are further away. Generally, USACE would minimize distances traveled in an effort to minimize operational costs; therefore, any increases in

emissions would be expected to be minimal. There are no construction activities associated with the Proposed Action/Project.

**NEPA Determination.** The Proposed Action's GHG emissions impacts would be less than significant.

**CEQA Determination.** The Project's GHG emissions impacts would be less than significant.

### **Reduced Hopper Dredge Use Alternatives 1 and 2**

Under Reduced Hopper Dredge Use Alternatives 1 and 2, certain channels would be dredged with a mechanical dredge instead of a hopper dredge, but the overall volume of dredging would not change, and increase of emissions from reduced hopper/increased mechanical dredge equipment is not expected to exceed the BAAQMD significance thresholds, as shown in Table 3.5-7. There are no construction activities associated with Reduced Hopper Dredge Use Alternatives 1 and 2.

**NEPA Determination.** The Reduced Hopper Dredge Use Alternatives 1 and 2 GHG emissions impacts would be less than significant.

**CEQA Determination.** The Reduced Hopper Dredge Use Alternatives 1 and 2 GHG emissions impacts would be less than significant.



## 3.6 BIOLOGICAL RESOURCES

This section describes the existing regulatory and environmental setting in the study area for biological resources. Existing species, including special-status species, and habitats, including designated critical habitat, are described. The potential impacts of the project alternatives on these resources are analyzed.

### 3.6.1 Regulatory Setting

#### Federal

##### *Endangered Species Act*

Under the Endangered Species Act (ESA) (16 U.S.C. §§ 1531-1544), all federal agencies shall, in consultation with the Secretary of the Interior, use their authority to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of habitat determined under the ESA to be critical. The ESA provides a program for conserving threatened and endangered plants and animals, and the habitats in which they are found. It is designed to protect critically imperiled species from extinction. The ESA is administered by the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). In general, NMFS is responsible for protection of ESA-listed marine species and anadromous fishes, while other species are under USFWS jurisdiction.

The ESA provides protection for federally listed special-status species, and requires conservation of the critical habitat for those species. An “endangered” species is a species in danger of extinction throughout all or a significant portion of its range. A “threatened” species is one that is likely to become “endangered” in the foreseeable future without further protection. Other federally listed special-status species include “proposed” and “candidate” species. Proposed species are those that have been officially proposed (in the Federal Register) for listing as threatened or endangered. Candidate species are those for which enough information is on file to propose listing as endangered or threatened. A “delisted” species is one whose population has reached its recovery goal and is no longer in jeopardy.

Areas of habitat considered essential to the conservation of a listed endangered or threatened species may be designated as critical habitat (referred to above), which is protected under the ESA. Critical habitat designations are the USFWS and NMFS method of identifying, for federal agencies, those physical or biological features believed to be essential to the conservation of the species (such as space, food, cover, and protected habitat), focusing on the principal biological or physical constituent elements in an area considered essential (such as roost sites, nesting grounds, seasonal wetlands, water quality, tide, and soil type). Primary constituent elements are the elements of physical or biological features that—when laid out in the appropriate quantity and spatial arrangement to provide for a species’ life-history processes—are considered to be essential to the conservation of the species. Critical habitat designations are intended as a tool to be used by the USFWS and NMFS in helping federal agencies comply with their obligations under Section 7 of the ESA.

Section 9 of the ESA prohibits the “take” of federally listed endangered or threatened species. Section 7 of this act requires federal agencies to formally consult with USFWS or NMFS for projects that may affect those species that are either listed as or proposed for listing as endangered or threatened, to ensure that the proposed action will not jeopardize the continued existence of federally listed species or destroy or adversely modify designated critical habitat. The Section 7 consultation process provides a means of authorizing the “take” of federally listed special-status species. Taking is defined by the ESA (Section 3[19]) to mean “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.”

As part of the implementation of the Long-Term Management Strategy (LTMS), the LTMS agencies initiated ESA consultation with NMFS and USFWS for maintenance dredging and disposal projects. These consultations reduced the need for individual consultation for maintenance dredging projects through the establishment of programmatic work windows (refer to Figure 2-6 in Chapter 2). These programmatic work windows are based on presence/absence information for various sensitive species, and establish times and locations wherein dredging and disposal activities may take place without further (formal or informal) consultation.

Pursuant to the ESA, any projects proposing deviation from the work windows for federally listed species are required to undergo consultation with NMFS and/or USFWS, as appropriate. The outcome of the individual consultation would determine whether any additional dredging period for that project is appropriate; and if necessary, provide a “take authorization.”

In addition, the programmatic biological opinions issued by NMFS and USFWS provide federal endangered or threatened species “incidental take” authorization for projects operating within the environmental work window for their area. This “take authorization” protects the dredger from enforcement action in the event of accidental harm to a listed species as a result of the dredging project.

Since 2011, the United States Army Corps of Engineers (USACE) has been required to consult on impacts to delta smelt during dredging of Suisun Bay Channel and New York Slough because of documented occurrences of entrainment during monitoring of hopper dredge use. Since 2011, USACE has received non-jeopardy opinions from USFWS to maintain Suisun Bay Channel with a hopper or clamshell dredge. The USACE will continue to complete annual consultations for hopper dredging of Suisun Bay Channel and New Slough, as required by USFWS.

NMFS is revising the 1998 LTMS programmatic biological opinion; the updated biological opinion (expected 2015) will supersede the 1998 document. USACE would comply with the terms and conditions of the updated biological opinion.

### ***Magnuson-Stevens Fishery Conservation and Management Act***

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation mandates the identification, conservation, and enhancement of essential fish habitat (EFH), which is defined as “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity,” for all managed species. The Amended Magnuson-Stevens Fishery Conservation and Management Act of 1996, also known as the Sustainable Fisheries Act (Public Law 104-297), requires all federal agencies to consult with the Secretary of Commerce on proposed projects authorized, funded, or undertaken by that agency that may adversely affect EFH. The main purpose of the EFH provisions of the Sustainable Fisheries Act is to avoid loss of fisheries due to disturbance and degradation of the fisheries habitat.

In late 1997, NMFS published regulations requiring consultation for projects or programs that may adversely affect EFH. Consequently, in 2004, the LTMS agencies and NMFS began preparing a programmatic EFH consultation. The programmatic EFH agreement was completed in 2011 (USACE and USEPA, 2011). The EFH agreement includes a number of Conservation Measures that enhance the environmental protectiveness of the LTMS program. No further EFH consultation is required for USACE maintenance dredging in San Francisco Bay performed in accordance with the provisions established through the formal programmatic federal EFH consultations for the LTMS.

### ***Migratory Bird Treaty Act***

The Migratory Bird Treaty Act (16 U.S.C. §§ 703-712) established special protection for migratory birds by regulating hunting or trade in migratory birds. Furthermore, this act prohibits anyone to take, possess,

buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. pt. 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. pt. 21). Definition of “take” includes any disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young), and such activity is potentially punishable by fines and/or imprisonment. As described in Section 3.6.4, the project alternatives are not expected to result in the “take” of migratory birds.

### **Marine Mammal Protection Act**

The Marine Mammal Protection Act (16 U.S.C. §§ 1361-1421h), adopted in 1972, makes it unlawful to take or import any marine mammals and/or their products. Under Section 101(a)(5)(D) of this act, an incidental harassment permit may be issued for activities other than commercial fishing that may impact small numbers of marine mammals. An incidental harassment permit covers activities that extend for periods of not more than 1 year, and that will have a negligible impact on the impacted species. Amendments to this act in 1994 statutorily defined two levels of harassment. Level A harassment is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal in the wild. Level B harassment is defined as harassment having potential to disturb marine mammals by causing disruption of behavioral patterns including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. As described in Section 3.6.4, the project alternatives are not expected to result in impacts to marine mammals that would require an incidental harassment permit.

### **Clean Water Act Section 404**

Under Section 404 of the Clean Water Act (CWA), USACE regulates the discharge of dredged and fill materials into “waters of the United States,” which include intrastate lakes, rivers, streams (including intermittent streams), bayflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, and wetlands adjacent to any water of the United States [33 C.F.R. pt. 328]. In areas subject to tidal influence, Section 404 jurisdiction extends to the high tide line or boundary of any adjacent wetlands.

The USACE implements Section 404 of the CWA, and the U.S. Environmental Protection Agency (USEPA) has oversight authority. Section 404(b)(1) of the CWA establishes procedures for the evaluation of permits for discharge of dredged or fill material into waters of the United States. The 1980 USEPA Guidelines (40 C.F.R. pt. 230) were promulgated specifically pursuant to Section 404(b)(1) of the CWA. The Section 404(b)(1) Guidelines govern, in part, the issuance of permits by USACE. The USACE’s 1986 Regulation 33 C.F.R. § 320.4(a)(1) states, “[F]or activities involving 404 discharges, a permit will be denied if the discharge that would be authorized by such permit would not comply with [USEPA’s] 404(b)(1) Guidelines.” In situations where USACE is proposing work that involves discharge of dredged or fill material into waters of the United States, USACE must comply with the requirements of the Section 404(b)(1) Guidelines, although it does not issue itself permits.

Subpart B of the Section 404(b)(1) Guidelines (40 C.F.R. § 230.10) establishes the Alternatives Analysis requirements that must be met. In particular, 40 C.F.R. § 230.10(a) states in relevant part that “[N]o discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.”

### **Clean Water Act Section 401**

Under Section 401 of the CWA, water quality certification (WQC) is required for any activity which requires a federal permit or license that may result in discharge into navigable waters. To receive certification under Section 401, an application must demonstrate that activities or discharges into waters are consistent with state effluent limitations (CWA Section 301), water quality effluent limitations (CWA

Section 302), water quality standards and implementation plans (CWA Section 303), national standards of performance (CWA Section 306), toxic and pretreatment effluent standards (CWA Section 307), and “any other appropriate requirements of State law set forth in such certification” (CWA Section 401), including protection of the beneficial use of state waters for uses such as special status species habitat and fish migration. In California, the authority to grant WQCs is delegated to the State Water Resources Control Board, and in the San Francisco Bay Area, applications for certification under CWA Section 401 are processed by the San Francisco Bay Regional Water Quality Control Board (Regional Water Board). The CWA and USACE regulations (33 C.F.R. § 336.1[a][1]) require USACE to seek a state WQC for discharges of dredged or fill material into waters of the United States.

The Regional Water Board reviews a proposed project before granting or denying certification. Pursuant to 33 C.F.R. § 337.8(a)(4), action is required by the USACE Division Engineer or Chief of Engineers when “...the state denies or unreasonably delays a WQC or issues the certification with conditions or controls not related to maintenance or enforcement of state water quality standards or significantly exceeding the federal standard.” Based on a report prepared by the District, the Chief of Engineers would make a determination as to whether to defer the dredging and seek Congressional appropriations for the added expense. Alternatively, the issue could be referred to the Secretary of the Army to determine whether it is appropriate to maintain navigation, as provided by sections 511(a) and 404(t) of the CWA.

#### ***Executive Order 11990: Protection of Wetlands***

This order (42 Federal Register [FR] 26961, May 25, 1977) requires federal agencies to minimize destruction of wetlands when managing lands, when administering federal programs, or when undertaking construction. Agencies are also required to consider the effects of federal actions on the health and quality of wetlands. As described in Section 3.6.4, the project alternatives are not expected to result in adverse impacts on wetlands.

#### ***Executive Order 13112: Invasive Species***

The purpose of this order is to prevent the introduction of invasive species, and to provide control for the spread of invasive species that have already been introduced. This order states that the federal government “shall, to the extent practicable and permitted by law, not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.” As described in Section 3.6.4, the project alternatives are not expected to cause the introduction or substantial spread of invasive nonnative plants or wildlife.

### **State**

#### ***California Endangered Species Act***

Similar to the federal ESA, the California Endangered Species Act (CESA) (California Fish and Game Code 2050-2116), along with the Native Plant Protection Act, authorizes the California Department of Fish and Wildlife (CDFW) to designate, protect, and regulate the taking of special-status species in the state of California. CESA defines “endangered” species as those whose continued existence in California is jeopardized. State-listed “threatened” species are those not currently threatened with extinction, but which may become endangered if their environments change or deteriorate. Any proposed projects that may adversely impact state-listed threatened or endangered species must formally consult with CDFW as a trustee agency.

Section 2080 of the California Fish and Game Code prohibits the taking of state-listed plants and animals. The CDFW also designates “fully protected” or “protected” species as those that may not be taken or possessed. Species designated as fully protected or protected may or may not be listed as endangered or threatened.

In addition to state-listed special-status species, CDFW also maintains a list of “Species of Special Concern,” most of which are species whose breeding populations in California may face extirpation. To avoid the future need to list these species as endangered or threatened, CDFW recommends consideration of these species, which do not as yet have any legal status, during analysis of the impacts of proposed projects.

The programmatic biological opinions issued by NMFS and USFWS for the LTMS Program do not address incidental take of state-listed species. There has been no clear and explicit waiver of federal sovereignty with respect to CESA. Accordingly, as a federal agency, USACE is not required to seek incidental take authorization or other authorization under CESA. In issuing a WQC, however, the Regional Water Board must comply with CESA.

### **3.6.2 Environmental Setting**

For the purpose of this analysis, the project’s study area in San Francisco Bay encompasses the shoreline and in-water areas in the following 11 counties: Marin, Sonoma, Napa, Solano, Sacramento, San Joaquin, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco. The geographic scope of the study area includes the estuarine waters of the San Francisco Bay region (including the tidally influenced portion of tributaries of San Francisco Bay), portions of the Sacramento-San Joaquin River Delta (Delta) west of Sherman Island, and the western portion of the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel. Outside of the Golden Gate, the study area includes the San Francisco Deep Ocean Disposal Site (SF-DODS), the San Francisco Main Ship Channel (MSC), San Francisco Bar Channel Disposal Site (SF-8), and the nearshore zone off Ocean Beach, as well as the waters that are used by vessels en route to these sites.

The following sections describe habitat types, fauna, and special-status species for both the San Francisco Bay Estuary and the offshore portions of the study area.

#### **Habitat Types**

##### ***San Francisco Bay Estuary***

Estuarine habitats around San Francisco Bay include the tidally influenced fringe of San Francisco Bay, such as mud flats, rocky shores, tidal marshes, and subtidal mud, sand, and cobble, as well as the open Bay itself. For the purposes of this discussion, the San Francisco Bay Estuary (the Estuary) includes the tidally influenced portions of its tributaries, such as the Petaluma and Napa rivers. The habitat types around the Estuary often blend with one another and with nearby upland habitats in transition zones called ecotones. Species found in these areas often occur in more than one habitat type.

**Mud Flats, Sand Flats, and Beaches.** Mud flats and sand flats are sparsely vegetated intertidal areas that occur from approximately mean lower low water (MLLW) to mean tide level. Beaches occur where sand flats extend above the mean tide level. In the Estuary, mud flats are far more common than sand flats or beaches. They provide banks and upland shoreline with protection from wave energy and capture suspended sediment. Mud flats, sand flats, and beaches around the Estuary provide habitat for many types of invertebrates, including diatoms (microscopic algae), polychaetes (marine bristleworms), oligochaetes (earthworms and relatives), amphipods (shrimp-like organisms), isopods (sow bugs and relatives), and crustaceans (shrimps, crabs, barnacles, etc.).

During low tide, mud flats, sand flats, and beaches provide crucial foraging and roosting areas for almost one million shorebirds that use the Estuary during the spring migration. Shorebirds frequently found on mud flats, sand flats, and beaches in the Estuary include western sandpiper (*Calidris mauri*), least sandpiper (*Calidris minutilla*), dunlin (*Calidris alpina*), long- and short-billed dowitcher (*Limnodromus griseus*, and *L. scolopaceus*, respectively), long-billed curlews (*Numenius americanus*), whimbrels (*Numenius phaeopus*), and American avocet (*Recurvirostra americana*). During high tide, mud flats, sand flats, and beaches provide foraging habitat for fish, including longfin smelt (*Spirinchus thaleichthys*), staghorn sculpin (*Leptocottus armatus*), starry flounder (*Platichthys stellatus*), and leopard shark (*Triakis semifasciata*). One of the few mammals occasionally present on mudflats, sand flats, and beaches is the Pacific harbor seal (*Phoca vitulina*).

**Rocky Intertidal and Subtidal Habitat.** The rock intertidal and subtidal habitat in the Estuary occurs around the margins of Central and San Pablo bays, and is primarily found around Yerba Buena, Angel, and Alcatraz islands, and the shoreline of the Tiburon peninsula and the Golden Gate. Rocky intertidal and subtidal habitat supports a wide diversity of wildlife, which varies with depth and the intensity of wave action and tidal currents. Invertebrates such as bryozoans, tunicates, anemones, and sponges, as well as algae, colonize these habitats in high densities. Mussels and many species of gastropods (snails and limpets) are common in these rocky habitats.

Rocky habitat is used as foraging and shelter habitat by rockfish (*Sebastes* sp.), surfperch (*Embiotocidae*), and other fishes. Pacific herring (*Clupea harengus*) spawn on rocky habitat and the algae attached to rocky substrates (SCC, 2010). Other wildlife species that use these habitats include shorebirds, brown pelican (*Pelecanus occidentalis*), double-crested cormorants (*Phalacrocorax auritus*), gulls (*Larus* sp.), and harbor seals, which often haul out on rock shores.

**Subtidal Mud, Sand, and Cobble.** The majority of the subtidal habitat in the Estuary is associated with mobile sediments, which range in size from clay (0.001 to 0.0039 millimeters [mm]) to silt (0.0039 to 0.0625 mm) to sand (0.0625 to 2 mm) to gravel (2 to 64 mm) and cobble (64 to 256 mm), and also includes deposits of shell fragments. “Mud” refers to clay and silt dominated substrate. All of these substrates can be moved and are sorted by tidal currents as they move through the estuary, as it takes more tidal current to move larger particles. Sandy subtidal habitat is generally limited to the deepwater channels of San Francisco Bay, and around the Golden Gate Bridge where current velocities are higher (SCC, 2010). Sandy subtidal habitat is generally limited to the deepwater channels of San Francisco Bay, and around the Golden Gate Bridge where current velocities are higher (SCC, 2010). Mud (including silt and clay) deposits make up the majority of the subtidal habitat in the Estuary. Shell deposits are mostly limited to a few areas in the south-central bay, and gravel and cobble deposits are found in the vicinity of Angel Island and the Golden Gate Bridge (SCC, 2010). The size, depth, and position of subtidal substrate in the Estuary determine the community of organisms present (SCC, 2010), which may include a variety of marine worms, amphipods, mollusks, crustaceans, and fish. Recreationally important species that use these habitats include halibut (*Paralichthys californicus*), white sturgeon (*Acipenser transmontanus*), striped bass (*Morone saxatilis*), and leopard shark. These habitats are also used as foraging areas for marine mammals such as harbor seal and California sea lion (*Zalophus californianus*), and fish such as green sturgeon (*Acipenser medirostris*) and bat ray (*Myliobatis californica*). Many of the invertebrate species that use subtidal mud, sand, and gravel are species that have been introduced to the Estuary (SCC, 2010).

**Tidal Marshes.** Tidal marshes are extremely productive and diverse ecological communities that provide important habitat and resources, both to organisms that live solely in the marsh and to species more commonly found in upland and aquatic areas. Tidal marshes occur at scattered locations along the margins of the South Bay, along the waterways of the delta, at the mouths of the Petaluma and Napa rivers, at the margins of San Pablo Bay, and in Suisun Marsh. These marshes can be segregated into salt, brackish, and freshwater types based on water and soil salinity. The vegetative cover in tidal marshes is

largely controlled by salinity. Saltwater tidal marshes are dominated by saltgrass (*Distichlis spicata*) and pickleweed (*Salicornia virginica*), while freshwater tidal marshes are dominated by cattails (*Typha* sp.) and tules (*Schoenoplectus acutus*).

The composition of the invertebrate community in tidal marsh habitats is primarily influenced by salinity, the frequency and duration of tidal inundation, and the type and density of emergent vegetation. Common invertebrate species in tidal marsh habitats include the ribbed horse mussel (*Geukensia demissa*); clams (including Baltic clams [*Macoma balthica*], *Tapes japonica*, *Potamocorbula amurensis*, and soft-shelled clams [*Mya arenaria*]); isopods such as (*Sphaeroma quoyana*); amphipods such as (*Corophium spinicorne* and *Grandidierella japonica*); snails (such as California hornsnailed [*Cerithidea californica*], *Assiminea californica*, and *Ovatella myosotis*); polychaete worms; and the yellow shore crab (*Hemigrapsus oregonensis*). Of these species, only Baltic clams, the yellow shore crab, and the three snail species are native (LTMS, 1998).

The sloughs and tidal channels in tidal marshes provide critical cover, forage, and nursery areas for adults and juveniles of a number of sportfish and special-status fishes. The distribution of fish communities in tidal marsh habitats is influenced by the same factors that influence the composition of invertebrate communities. Common fishes include native species such as arrow goby (*Clevelandia ios*), topsmelt (*Atherinops affinis*), staghorn sculpin, and tule perch (*Hysterothorax traskii*); and introduced species such as yellowfin goby (*Acanthogobius flavimanus*), inland silverside (*Menidia beryllina*), and mosquitofish (*Gambusia affinis*). Commercially important species that rear and forage in these habitats include native Chinook salmon (*Oncorhynchus tshawytscha*) and the introduced striped bass. Certain life stages of special-status species that use tidal marshes include winter-run Chinook salmon, steelhead (*Oncorhynchus mykiss*), delta smelt (*Hypomesus transpacificus*), longfin smelt, Sacramento splittail (*Pogonichthys macrolepidotus*), and green sturgeon.

Tidal marshes also provide a variety of resources for birds and other terrestrial wildlife, including resting, nesting, escape cover, and—most importantly—foraging habitat. A diversity of wildlife, including reptile, bird, and mammal species use tidal marshes. In addition to other habitat types, tidal marshes in the study area are very important for migratory birds, providing foraging habitat and roosting sites. Special-status birds and mammals that use tidal marshes include Ridgway's rail (*Rallus longirostris obsoletus*), black rail (*Laterallus jamaicensis*), and salt marsh harvest mouse (*Reithrodontomys raviventris*).

**Open Bay.** The Goals Report (Goals Project, 1999) subdivides the open bay habitats into two habitat subunits: deep bay and shallow bay. Deep bay habitat is defined as those portions of San Francisco Bay deeper than 18 feet below MLLW, including the deepest portions of San Francisco Bay and the largest tidally influenced channels. Shallow bay, which includes the vast majority of San Francisco Bay, is defined as that portion of San Francisco Bay between 18 feet below MLLW and MLLW.

Species that use the deep bay habitat include several species of free-swimming invertebrates such as California Bay shrimp (*Crangon franciscorum*), and fishes such as brown rockfish (*Sebastes auriculatus*), halibut, and sturgeon (*Asipenser* sp.), delta smelt, and longfin smelt. This habitat provides important roosting and “loafing” habitat for waterbirds, especially in areas protected from intense wind fetch or wave action. Waterbirds, such as surf scoter (*Melanitta perspicillata*), scaups (*Aythya* spp.), brown pelican, and terns (*Sterna* spp.), and marine mammals, such as Pacific harbor seal and California sea lion, can be found using this habitat type. Anadromous fish, such as Chinook salmon and steelhead, use the deep bay habitat as a migratory pathway to and from upstream spawning areas.

The shallow bay habitat is a feeding area for Pacific herring, northern anchovy (*Engraulis mordax*), bat ray, and jacksmelt (*Atherinopsis californiensis*), as well as at least 40 other species of fish, crabs, and shrimp. Pacific herring spawn on hard substrates and eelgrass (*Zostera marina*) along the shallow margins of the Central Bay. Shallow bay habitat is also a nursery area for juvenile halibut and sanddabs

(*Citharichthys stigmaeus*), shiner perch (*Cymatogaster aggregata*), herring, and other fishes. Anadromous fish use the shallow bay area as migratory pathways to and from upstream spawning areas. This habitat is in the depth range of many diving birds, and therefore provides important avian foraging habitat. Marine mammals such as Pacific harbor seals also forage in this habitat type. Eelgrass, San Francisco Bay's only rooted seagrass, is present in some areas of this habitat type. Eelgrass is particularly important to many species of fish such as Pacific herring, which deposit eggs on the blades of this plant; and to the endangered least tern (*Sterna antillarum browni*), which can forage on small fishes associated with the eelgrass. It is also considered an EFH habitat area of particular concern.

### **Ocean Environment**

The MSC is west of Golden Gate in deep subtidal waters (greater than 50 feet MLLW) of the Pacific Ocean. The MSC comprises subtidal habitats of the open coastal waters off the San Francisco coast. The Ocean Beach nearshore placement site (SF-17) and SF-8 also consist of subtidal habitats of the Pacific Ocean, with depths ranging from 20 to 50 feet MLLW. The habitat of the beach nourishment site, along beaches of Ocean Beach, consists of both terrestrial and aquatic environments (i.e., sandy beach and cliff, as well as intertidal habitat). The subtidal habitat of the MSC, SF-17, and SF-8, as well as the intertidal and beach habitat of Ocean Beach support communities of benthic (bottom-dwelling) invertebrates, plankton (drifting organisms in the water column), fish, birds, and marine mammals.

The SF-DODS is in the open ocean on the lower continental slope, approximately 55 miles (48 nautical miles) west of San Francisco; approximately 6 nautical miles west of the outer boundary of the Gulf of Farallones National Marine Sanctuary; and approximately 25 nautical miles west of the Farallon Islands. Water depth at the site ranges between approximately 2,500 meters and 3,000 meters (LTMS, 1998). Biological resources in the SF-DODS can be separated into three basic communities: the shallow pelagic community, the deep water pelagic community, and the continental slope benthic community. Each community contains numerous species with different life history strategies, and each community is interlinked with the others in the overall food web. The shallow pelagic community includes various sea birds that forage in the open waters of the ocean, as well as marine mammals, migratory fish, and pelagic invertebrates. The deepwater pelagic community includes fish and invertebrates such as squid that are adapted to deepwater conditions, as well as some marine mammals that dive to great depths while foraging. The continental slope benthic community is sparsely populated by fish and invertebrates that are adapted to the harsh conditions of the deep sea.

### **Fauna**

#### **Plankton**

Representing the lower levels of the food chain, plankton is important to many marine community members, including benthic organisms, fish, and mammals. As described below, there are three major groups of plankton: phytoplankton, zooplankton, and ichthyoplankton.

**San Francisco Bay.** Phytoplankton are simple, often microscopic, plants or algae suspended in the water column that represent the base of the marine food web. The dominant species found in San Francisco Bay are diatoms, dinoflagellates, and cryptophytes (Cloern and Dufford, 2005). Studies have shown that plankton growth and distribution in San Francisco Bay can be attributed to the amount of sunlight, turbidity, and influx of fresh water (Cloern et al., 1985; Alpine and Cloern, 1988; Cloern, 1999; Jassby et al., 2002; May et al., 2003; NOAA, 2007). The productivity of other organisms, including clams, worms, mussels, and zooplankton, depends on the growth of phytoplankton (SFEP, 1992). Phytoplankton, which rely on photosynthesis for energy generation, are vulnerable to light attenuation caused by turbidity plumes.

Zooplankton consist of microscopic and macroscopic animals that either free-float or feebly swim in open water. Their distribution is controlled largely by tides, current, and wind. Common zooplankton found in San Francisco Bay include species of copepods, rotifers, tintinnids, and meroplankton (larval forms of gastropods, bivalves, barnacles, polychaetes, and crustaceans such as the Dungeness crab [*Cancer magister*]) (Ambler et al., 1985; NOAA, 2007). Zooplankton also provide an ecologically important food source for many types of fish, such as anchovies, smelt, and striped bass.

Ichthyoplankton are the eggs and larval forms of marine fishes, such as Pacific herring, northern anchovy, goby (family *Gobiidae*), white sea bass (*Cynoscion nobilis*), staghorn sculpin, and diamond turbot (*Hypsopsetta guttulata*). Seasonal abundance and distribution of individual ichthyoplankton species are dependent on the reproductive cycles of the adult fish species and their circulation in San Francisco Bay.

**Ocean Environment.** During the upwelling season in March through August, phytoplankton abundance increases dramatically in the ocean in response to higher nutrient levels. Nutrient input from San Francisco Bay also leads to high primary production in the area. The phytoplankton community in the open ocean primarily comprises diatoms, silicoflagellates, coccolithophores (*Chrysophyta*), and dinoflagellates. Zooplankton are an extremely important component of the food web in the epipelagic zone. More than 1,000 species of ichthyoplankton are known to occur in the California current systems. The abundance of larval fish changes substantially on a seasonal and annual basis. However, in general, higher densities of larval fish are found in shallower water than occurs at the SF-DODS (LTMS, 1998).

### **Benthic Communities**

Benthic communities are largely composed of macro-invertebrates, such as mollusks and crustaceans. These organisms inhabit the bottom substrates of aquatic habitats, and play a vital role in maintaining sediment and water quality. They are also an important food source for bottom-feeding fish, invertebrates, and birds. Communities of benthic organisms are important indicators of environmental stress because they are particularly sensitive to pollutant exposure. This sensitivity arises from the close relationship between benthic organisms and sediments that accumulate contaminants over time, and the fact that these organisms receive prolonged exposure to contaminants because they live in the sediment and filter sediment-laden water.

**San Francisco Bay Estuary.** Three major benthic species assemblages (groups of organisms that inhabit a location or locations at a certain time or over a period of time) are present in the Estuary: fresh-brackish, estuarine, and marine assemblages. Assemblage characteristics, such as species composition and abundance, are affected by many physical factors, including salinity and sediment grain size, or by biological factors such as competition and predation (Thompson et al., 2000). In general, diversity is lowest in the delta (LTMS, 1998). In Suisun Bay and the western part of the delta, the benthos found are mostly fresh-brackish assemblages, with a transition assemblage extending into Suisun Bay. Fresh-brackish water species include oligochaetes, chironomids (midges), soft-shelled clams, so-called Asian clam species in the genus *Corbicula*, and amphipods (SFEP, 1992; Thompson et al., 2000). Farther west into San Pablo Bay, more estuarine conditions exist, and intertidal mud flats and marshes are extensive. Here, estuarine assemblages are prevalent. Common benthic species include ribbed mussels, Baltic clams, the introduced clam *Potamocorbula amurensis*, California hornsnaills, yellow shore crabs, amphipods, polychaete worms, and Bay mussels (*Mytilus* spp.). In the Central Bay marine conditions exist. Benthic species common in these areas consist of clams (including the overbite clam, *C. Amurensis* or *Corbula*), amphipods such as *Monocorophium* and *Ampelisca*, polychaete worms, and Bay mussels (SFEP, 1992). *Corbula* has a higher salinity tolerance, and is found throughout the Bay. The less saline-tolerant Asian clam, *Corbicula*, is often the most abundant, and often dominant in the eastern and fresher water areas of the Delta and Suisun Bay. In the South Bay, where there are several substrate types, diversity is even greater. Mollusks comprise the greatest biomass of larger benthic species in the Bay (LTMS, 1998).

Some benthic invertebrates also live on hard substrates, which are much less common in the Estuary compared to sedimentary habitats. Structures such as piers, breakwaters, rip rap, and other hard substrates function as habitat for colonization of benthic invertebrates. These artificial intertidal habitats are populated by algae, barnacles (*Balanus glandula* and *Chthamalus fissus*), mussels, tunicates, bryozoans, cnidarians, and crabs. Additionally, these structures can serve as habitat for invasive species such as the alga (*Undaria pinnatifida*) (California Coastal Conservancy, 2010).

Several of the more common benthic species in the Estuary today were accidentally or intentionally introduced species (SFEP, 1992). Some of these nonindigenous species serve ecological functions similar to those of the native species that they have displaced. Examples of these include the eastern oyster (*Crassostrea virginica*), the Japanese littleneck clam (*Tapes philippinarum*), and the soft-shelled clam, all of which have supported commercial or sport fisheries. However, other species, such as the introduced clam *C. amurensis*, have reduced phytoplankton populations, and have consequently impacted the zooplankton populations and organisms that depend on them. The benthos also provide an important food source for many species of fish, birds, and mammals in the marine environment.

**Ocean Environment.** In the shallower sand and mud bottom, the benthic fauna includes various assemblages of polychaete worms, crustaceans (amphipods, crabs, and ostracods), molluscs (pelecypods, gastropods, and scaphopods); echinoderms (starfish, brittle stars, heart urchins, sea cucumber, and sea pens). Other phyla that may be present include nematodes, coelenterates, echiuridans, and rhychoceols. Overall, the benthic community in the ocean portion of the study area is similar to those typically found in high-energy environments along the coast of Northern California.

Seasonal epibenthic surveys conducted in late winter and fall off Ocean Beach showed arthropods, such as crabs, dominated the intertidal and subtidal habitat, while echinoderms, mainly sand dollar (*Dendraster exentricus*), were the dominant species in the benthic surveys (USACE, 2013a). The surveys found the most characteristic infaunal species of the beach and intertidal habitat are great beach hopper (*Orchistoidea corniculata*), mole crab (*Emerita analoga*), Pismo clam (*Tivela stultorum*), razor clam (*Siliqua patula*), short-spined starfish, a nephtyid polychaete worm (*Nephtys californensis*), and various species of jellyfish (USACE, 2013a).

The benthic community in the SF-DODS is composed of invertebrates that burrow in the substrate (benthic infauna), invertebrates that live on the surface of the substrate (epifauna), and fish that are closely associated with the substrate (demersal fish). The benthic community in the SF-DODS is found in depths ranging between 2,500 meters and 3,000 meters, where environmental conditions are relatively harsh due to low oxygen, low food abundance, no light, high pressure, and low temperature. As a result, the number of species and overall abundance of organisms in this area is relatively low compared to shallower areas on the continental shelf (LTMS, 1998). Benthic infauna at SF-DODS is dominated by polychaete worms and crustaceans such as amphipods. The epibenthic community is predominately composed of sea cucumbers, brittlestars, seastars (*echinoderms*), and sea pens (*cnidarians*). Fifteen species of demersal fish have been collected in the SF-DODS region (LTMS, 1998). The most common species are rattails (*Macrouridae*), thornyheads (*Sebastolobus* sp.), finescale codling (*Antimora microlepis*), and eelpouts (*Zoarcidae*). Monitoring of stations within the SF-DODS boundary that are affected by large volumes of dredged material has shown that these areas are recolonized rapidly, and by the same taxa that are normally found in the adjacent ambient sediments (Germano and Associates, 2008).

### **Shrimp and Crabs**

**San Francisco Bay Estuary.** The Estuary is home to many species of shrimp and crab that are important for their recreational fishery and ecological values. The California bay shrimp is the most common shrimp reported by CDFW in San Francisco Bay (Baxter et al., 1999). Shrimp species are an important food source for virtually all species of fish, marine mammals, and water birds.

Although distributed widely throughout the Estuary, the various species of shrimp have differing centers of distribution. For example, *C. franciscorum* are more commonly collected in the northern reach of the Estuary (San Pablo to the west Delta) than in the Central or South bays, while *C. nigromaculata* are usually found in the Central and South bays (Baxter et al., 1999).

Crabs are both recreationally and ecologically important in the Estuary. The most common species is the Dungeness crab, which supports an important commercial fishery. Other commonly found species include the red rock crab (*C. productus*), Pacific rock crab (*C. antennarius*), and the graceful rock crab (*C. gracilis*). These species are typically abundant in the more marine waters of the Central Bay, but are also found in the South Bay and San Pablo Bay (Baxter et al., 1999).

**Ocean Environment.** SF-DODS does not support populations of commercially important crabs or shrimp, such as Dungeness crab. Deep water species of crab and shrimp are expected to be present in low numbers.

## **Fish**

**San Francisco Bay Estuary.** More than 100 species of fish inhabit the Estuary. The majority of species are native, but there are also many introduced species. Many complete all stages of life in the Estuary; a smaller portion, anadromous fish, migrate from ocean waters, through the Estuary, and into a series of freshwater streams where they spawn. As adults or young-of-the-year, they migrate back to the ocean. Most of the anadromous species spend 4 to 8 months in San Francisco Bay before entering the ocean. Four anadromous species—steelhead, Chinook salmon, striped bass, and green sturgeon—are known to occur in San Francisco Bay. Other common fish species include the Pacific sardine (*Sardinops sagax*), northern anchovy, topsmelt, jacksmelt, striped bass, white croaker (*Genyonemus lineatus*), and Pacific herring (NOAA, 2007). Some of these species spawn offshore and are carried into San Francisco Bay by currents (i.e., Pacific sardine), or spawn directly in San Francisco Bay (i.e., Pacific herring).

Pacific herring are of note, because they are an important component of the San Francisco Bay ecosystem, and support one of the few remaining urban fisheries on the Pacific Coast. Although the Pacific herring is neither a protected species under the ESA or CESA nor a managed fish species under the Magnuson-Stevens Act, as a state fishery it is regulated under Sections 8550-8559 of the California Fish and Game Code. Pacific herring spawn in San Francisco Bay, broadcasting their adhesive eggs over kelp, rocks, or other structures. In past years, peak spawning has occurred along the San Francisco shore from December to March (USFWS, 1988).

Fish species typically found in Suisun and San Pablo bays include sharks, rays, white sturgeon, halibut, longfin smelt, staghorn sculpin, starry flounder, topsmelt, arrow goby, yellowfin goby, stickleback (*Gasterosteus* sp.), mosquitofish, green sunfish (*Lepomis cyanellus*), Pacific herring, Chinook salmon, and steelhead. Typical fish species occurring in the Central Bay include Chinook salmon, striped bass, white croaker, Pacific herring, and northern anchovy (Baxter et al., 1999; SFEP, 1992). Typical fish species occurring in the South Bay include staghorn sculpin, arrow goby, yellowfin goby, stickleback, Pacific herring, jacksmelt, topsmelt, and northern anchovy (Hobbs et al., 2012).

A discussion of fish species with either federal or state protection status is provided below under Special-Status Species.

**Ocean Environment.** The ocean area off the coast at Ocean Beach provides habitat to 50 to 100 species of fish in a given period. Fish sampling conducted 3 to 4 miles offshore of Ocean Beach show species of sharks, skates, ratfish, midshipman (*Porichthys* sp.), pipefish (*Syngnathidae*), poachers, sculpins, surfperch, goby, ling cod (*Ophiodon elongates*), snailfish (*Liparis* sp.), rockfish, halibut, sole, flounder, and turbot (*Scophthalmus maximus*) (USACE, 2013a). Other surveys have found demersal fish species such as speckled sanddab (*Citharichthys stigmaeus*), redbait surfperch (*Amphistichus rhodoterus*), English

sole (*Parophrys vetulus*), shiner surfperch (*Cymatogaster aggregate*), and Pacific sanddab (*Citharichthys sordidus*) (USACE, 2013a).

Some of the planktivorous pelagic fish that may occur in the vicinity of the SF-DODS include Pacific herring, Northern anchovy, Pacific sardine, pacific mackerel (*Scomber australasicus*), market squid (*Doryteuthis opalescens*), and juvenile rockfish. Migratory pelagic species such as anchovy and sardine spawn in Southern California Bight and migrate into waters off Central and Northern California. Predatory fish moving into the area to feed on schools of planktivorous fish include tuna, mackerel, and salmon. Members of the family of deep-sea smelt (*Bathylagidae*), lanternfish (*Myctophidae*), and viperfishes (*Stomiidae*) commonly migrate into the upper surface waters at night to feed on plankton and planktivorous fish (LTMS, 1998).

## **Birds**

**San Francisco Bay Estuary.** Roughly 120 waterbird species from 16 families occur in the Estuary. Of these birds, approximately two-thirds are represented by three families: *Anatidae* (waterfowl), *Laridae* (gulls and terns), and *Scolopacidae* (sandpipers and phalaropes).

The Estuary serves as an important staging and wintering ground on the Pacific Flyway for numerous species of waterbirds, both common and uncommon. The Pacific Flyway is a bird migration corridor along the Pacific Coast that stretches as far north as northern Canada and Alaska, and as far south as the southern tip of South America (SFEP, 1992). In San Francisco Bay region, the greatest waterbird abundance and species diversity is seen in winter, as birds migrate along the flyway. Each year, nearly one million waterfowl and more than one million shorebirds pass through this area.

Some of the most common birds in the open waters of the Estuary are diving ducks, including canvasback (*Aythya valisineria*), scoters, and scaup. The Estuary supports the largest population of canvasback along the Pacific coast; 46 percent of the midwinter population in the Pacific Flyway (Goals Project, 2000). Additionally, the Estuary provides crucial wintering habitat for surf scoter (Goals Project, 2000). Any of these species has the potential to occasionally be found in the project area. The project area could also be used for foraging by brown pelicans, double-crested cormorant, and Forester's tern (*Sterna forsteri*); and other fish-eating birds, such as osprey (*Pandion haliaetus*) and belted kingfisher (*Megaceryle alcyon*).

Tidal flats are a primary foraging habitat for shorebirds in the Estuary. The North Bay supports approximately 20 percent of the shorebirds in the Estuary, while the South Bay supports the majority of shorebirds because of its extensive tidal flats and salt ponds (SFEP, 1992). Western sandpipers and dunlins comprise the majority of shorebirds in the Estuary, but dowitchers, marbled godwits (*Limosa fedoa*), willets (*Tringa semipalmata*), and American avocets also occur in large numbers.

**Ocean Environment.** Waterbird species in the vicinity of Ocean Beach and the MSC include many of the species present in the open San Francisco Bay, such as brown pelican, western gulls (*Larus occidentalis*), surf scooters, and cormorants.

The Farallon Islands are the most important marine bird breeding site on the west coast of the continental United States. There are 16 species of marine birds known to breed along the Pacific coast. Twelve of these species, including the American black oystercatcher (*Haematopus bachmani*), ashy storm-petrel (*Oceanodroma homochroa*), Brandt's cormorant (*Phalacrocorax penicillatus*), Cassin's auklet (*Ptychoramphus aleuticus*), common murre (*Uria aalge*), double-crested cormorant, Leach's storm-petrel (*Oceanodroma leucorhoa*), pelagic cormorant (*Phalacrocorax pelagicus*), pigeon guillemot (*Cephus columba*), rhinoceros auklet (*Cerorhinca monocerata*), tufted puffin (*Fratercula cirrhata*), and western gull, have colonies on the Farallon Islands. The Farallon Islands serve as the nesting grounds for a significant portion (up to 85 percent) of the world populations of ashy storm-petrels, Brandt's cormorants, and western gulls, as well as 80 percent of California's nesting Cassin's auklets. In addition, large

numbers of California brown pelicans roost on the Farallon Islands regularly during summer and autumn. Endangered peregrine falcons (*Falco peregrinus*) also winter on the islands. Aquatic birds also are found in the Sanctuary's lagoon, coastal bay, and four estuaries. Breeding species include the American coot (*Fulica americana*), cinnamon teal (*Anas cyanoptera*), gadwall (*Anas strepera*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), killdeer (*Charadrius vociferus*), mallard (*Anas platyrhynchos*), pied-billed grebe (*Podilymbus podiceps*), and snowy plover (*Charadrius nivosus*). An additional 20 aquatic bird species summer in the region, and seven species occur as spring and fall migrants (LTMS, 1998). The majority of these bird species feed in the coastal and open waters of the Pacific Ocean, including SF-DODS. They forage for a variety of prey in near surface waters.

### **Marine Mammals**

**San Francisco Bay Estuary.** The most common marine mammals in the Estuary are the Pacific harbor seal, harbor porpoise (*Phocoena phocoena*), and the California sea lion. Other marine mammal species that have been seen occasionally in San Francisco Bay include the gray whale (*Eschrichtius robustus*), northern elephant seal (*Mirounga angustirostris*), Steller sea lion (*Eumetopias jubatus*), northern fur seal (*Callorhinus ursinus*), and, less frequently, the southern sea otter (*Enhydra lutris*). On rare occasions, individual humpback whales (*Megaptera novaeangliae*) have entered San Francisco Bay.

Pacific harbor seals are nonmigratory and use the Estuary year-round, where they engage in limited seasonal movements associated with foraging and breeding activities (Kopec and Harvey, 1995). Harbor seals haul out (come ashore) in groups ranging in size from a few individuals to several hundred. Habitats used as haul-out sites include tidal rocks, bayflats, sandbars, and sandy beaches (Zeiner et al., 1990). No haul-out sites are located in the federal navigation channels or placement sites.

Pacific harbor porpoises have been regularly sighted in San Francisco Bay in recent years, indicating that the species has likely recolonized the area after a long absence. Studies are currently underway to determine the size and status of this population. The majority of the sightings have occurred near the Golden Gate, with some sightings occurring in the vicinity of Angel Island and Alcatraz (Keener, 2011). Harbor porpoises feed on fishes such as herring, sardines, and whiting, and on squid.

California sea lions breed in Southern California and along the Channel Islands. After the breeding season, males migrate up the Pacific Coast and enter the Estuary. In San Francisco Bay, sea lions are known to haul out at Pier 39 in the Fisherman's Wharf area. During anchovy and herring runs, approximately 400 to 500 sea lions (mostly immature males) feed almost exclusively in the North and Central bays (USFWS, 1992).

**Offshore Ocean Environment.** Species of marine mammals such as Pacific harbor seals, northern elephant seals, California sea lions, Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), and harbor porpoise are present offshore Ocean Beach and in the vicinity of the MSC. Blue whales (*Balaenoptera musculus*), humpback whales, and gray whales have been observed offshore Ocean Beach in their migration route through the Gulf of the Farallones.

Seventeen species of cetaceans (whales, dolphins, and porpoises) are frequently observed near the SF-DODS in the Gulf of the Farallones. Of these, Dall's porpoise (*Phocoenoides dalli*), harbor porpoise, and Pacific white-sided dolphin are considered common resident species. In general, the highest densities of cetaceans occur in the continental slope waters at depths between 200 meters and 2,000 meters, whereas the depth at the SF-DODS ranges from 2,500 meters to 3,000 meters. The highest densities of cetaceans in the vicinity of SF-DODS occur from March through May. This time period corresponds to the period of upwelling in the overall region when high phytoplankton and zooplankton production attracts many fish (LTMS, 1998).

## Sea Turtles

Sea turtles are pelagic species but may forage in coastal waters. The Loggerhead turtle (*Carretta caretta*) and green sea turtle (*Chelonia mydas*) have the potential to occur in the study area; however, they are generally found in warmer waters. The leatherback turtle (*Dermochelys coriacea*) has the potential to occur near the Gulf of Farallones; though its occurrence is typically in deep waters (greater than 55 feet MLLW). The nesting of these species occurs in temperate waters; therefore, juveniles and eggs would not occur in the study area. Adult leatherback sea turtles occurrence in the study area is rare.

## Aquatic Plants

**San Francisco Bay Estuary.** Substrate in much of San Francisco Bay consists of soft mud, making it difficult for many macroalgal species to colonize. Some types can initially attach to a hard substrate such as a small rock or piece of shell, and, as they become larger, move with the small attachment (Josselyn and West, 1985). Common plant species of the Estuary include the green algae *Enteromorpha clathrata*, *E. intestinalis*, *U. lactuca*, and *Cladophora sericea*, and the aquatic plant eelgrass.

Eelgrass is a native marine vascular plant indigenous to the soft-bottom bays and estuaries of the Northern Hemisphere. The species is found from middle Baja California and the Sea of Cortez to northern Alaska along the west coast of North America and is common in healthy shallow bays and estuaries. Eelgrass serves as a food source for a number of invertebrates, fish, and some migratory birds. It also provides habitat for many commercially and recreationally important finfish and shellfish species. Pacific herring regularly spawn on eelgrass leaves, and juvenile salmonid and smelt often spend extensive amounts of time in eelgrass habitats prior to heading for the open ocean (Wyllie-Echeverria and Rutten, 1989).

Distribution of eelgrass in the Estuary is limited by sediment in the water (turbidity) and the depth to which light can penetrate at levels high enough to sustain eelgrass growth. In San Francisco Bay, eelgrass is limited to depths of about 10 feet or less along the shoreline.

Eelgrass is protected under the CWA Section 404(b) (1) "Guidelines for Specification of Disposal Sites for Dredged or Fill Material," Subpart E, "Potential Impacts on Special Aquatic Sites."

Eelgrass has also been identified as EFH for various life stages of fish species managed by fisheries management plans (FMPs) under the Magnuson-Stevens Act, as established by NMFS.

Although eelgrass does exist near the Richmond Inner Harbor Channel and Oakland Inner Harbor, there is no known eelgrass in any of the channel boundaries.

The Richmond Inner Harbor channels are 38 feet deep and protected by a training wall. There is eelgrass adjacent to the channel along the training wall. In 2010, 2011, and 2012, USACE conducted three sets of eelgrass surveys both before and after maintenance dredging. A reduction in the density of turions (i.e., new shoots) in eelgrass along the channel margin near the training wall was detected; the survey crews, however, did not find excessive sedimentation or any other evidence that it was the dredging that had caused loss of eelgrass. Losses during winter months, known as seasonal diebacks, are, in fact, common in eelgrass meadows. Examination of surveys done over the last 15 years indicates that eelgrass has persisted in essentially the same locations and densities around Richmond Harbor (USACE, 2012c).

Pre-dredge eelgrass surveys conducted in 2009 for Oakland Harbor revealed several patches of eelgrass along the channel of the Inner Harbor within the 200-foot zone of the federal channel. The USACE did not dredge the Inner Harbor in 2009, and therefore did not conduct post-dredge surveys (USACE, 2010). Pre- and post-dredge surveys of eelgrass were conducted at Oakland Harbor in 2010 and 2011. The pre- and post-dredge surveys found an increase in eelgrass habitat area and in the density of existing beds, in comparison with several reference sites (USACE, 2012b).

**Ocean Environment.** The depth of SF-DODS (2,500 to 3,000 meters) precludes the establishment of any aquatic plants or kelp, because the benthic environment is in complete darkness.

The substrate at the MSC consists of shifting sands, which largely prohibit the establishment of aquatic plants. Cyanobacteria or blue-green algae may be rarely present where rocks or debris provide an attachment site.

### **Terrestrial Habitat and Organisms**

The upland and non-tidal environment in the study area includes beneficial reuse and other upland dredged material placement sites. This section describes the habitats and resources in these upland and non-tidal aquatic areas.

**San Francisco Bay Region.** Upland and non-tidal aquatic environments in the San Francisco Bay portion of the study area include managed wetlands, sand dunes at the Antioch Dunes National Wildlife Refuge, and delta levees. Like tidal marshes described earlier in this section, managed wetlands provide an important habitat for wildlife, particularly migratory birds, but receive no tidal influence from the Estuary. In the delta levees, wildlife species and population differ by location and from island to island, varying with the extent of remnant natural habitat and extent and type of past agricultural cultivation. The sand dunes at the Antioch Dunes National Wildlife Refuge provide habitat for endangered plants and insects, including the Lange's metalmark butterfly (*Apodemia mormo langei*) and Antioch Dunes Evening Primrose (*Oenothera deltoides* spp. *howellii*), and Contra Costa wallflower (*Erysimum capitatum*) (USFWS, 2013).

**Outside of the Bay.** Shoreward of SF-17 is the thin strand of Ocean Beach with steep cliffs leading to the fully urbanized City of San Francisco. The sandy beach consists of rocky or sandy shores above the intertidal zone. The sandy beaches of the Ocean Beach in the project area are immediately abutted by steep sandy cliffs or dunes. Portions of the beach are covered by rock or rubble mounds placed mainly for protection of the cliffs and the infrastructure. Because of these human and natural disturbances, the majority of the dunes are sparsely vegetated and degraded. Vegetation on the dunes mainly consists of the introduced European beach grass (*Ammophila arenaria*); however, native dune vegetation may also be found on this portion of the dunes. Despite the disturbed nature of this area, Ocean Beach provides habitat to a number of terrestrial and avian species. Terrestrial mammals in the proposed dune nourishment area of Ocean Beach are not diverse or abundant. The most common of these species include California ground squirrel (*Otospermophilus beecheyi*), western gray squirrel (*Sciurus griseus*), and house mouse (*Mus musculus*). Reptiles and amphibians such as western toad (*Anaxyrus boreas*), western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis catenifer*), and common garter snake (*Thamnophis sirtalis*) may also inhabit the dune area. Both the open coastal waters of the Pacific Coast and the intertidal habitat along the beach serve as foraging habitat for shorebirds and waterbirds.

An important component of biological resources in the SF-DODS and in adjacent areas are marine mammals and birds whose activities are centered around the Farallon Islands. The Farallon Islands are commonly used for nesting or resting habitat. In years when juvenile rockfish are highly abundant, most foraging activity of marine birds is concentrated around breeding and resting sites on the Farallon Islands, far from the SF-DODS. In years when juvenile rockfish are less abundant, marine birds are more widely scattered throughout the gulf. The Farallon Islands are important haul-out areas for many species of pinnipeds (sea lions and seals); these species have rarely been observed in the vicinity of the SF-DODS (LTMS, 1998).

### **Special-Status Species, Critical Habitat, and Essential Fish Habitat**

Special-status species, designated critical habitat, and EFH with the potential to occur in the areas where dredging and placement activities would occur are described below. Because of the large geographic

extent of the study area, only species that likely inhabit areas in or adjacent to the federal navigations channels or placement sites (and which therefore would be potentially impacted by the project alternatives) are discussed, rather than all special-status species that may occur in the greater San Francisco Bay area.

There are no state-listed or federally listed benthic epifauna and infauna<sup>1</sup> likely to occur in the federal navigation channels and in-water placement sites.

Special-status reptiles and amphibians (e.g., Alameda whipsnake (*Masticophis lateralis*) and California red-legged frog (*Rana draytonii*)) could inhabit certain land-based placement sites. These species are not expected to be impacted by placement activities because dredged materials would be placed in a sterile area scraped clean of all growth and possible habitat. In accordance with their permits for receiving dredged materials, site operators are responsible for coordinating protected species issues with resources agencies, and managing the placement of dredged materials at the placement sites in accordance with conditions of their permits and other regulatory approval. For these reasons, these species are not further discussed in this section.

As described in earlier sections, marine mammals may occasionally be found in the vicinity of project dredging and placement areas. Marine mammals are frequently exposed to vessel traffic, are highly mobile, and can easily avoid dredging and placement activities. As discussed in Section 3.6.4, no impact is expected to these species; therefore, profiles for federally listed and state-listed marine mammals are not presented in this section. The impact analysis in Section 3.6.4 addresses marine mammals in general terms as a group (i.e., not on an individual species-specific basis).

## **Fish**

**Central California Coast Steelhead Distinct Population Segment (DPS) and Central Valley Steelhead DPS.** Central California Coast steelhead was federally listed as threatened on August 18, 1997, and is a CDFW species of concern. The Central Valley steelhead was initially listed as threatened under the ESA by National Oceanic and Atmospheric Administration (NOAA) Fisheries on March 19, 1998 (63 Fed. Reg. 13,347); this listing was reaffirmed on January 5, 2006 (71 Fed. Reg. 834).

Steelhead historically ranged throughout the northern Pacific Ocean, from Baja California to Kamchatka Peninsula. Currently, their range extends from Malibu Creek in southern California to Kamchatka Peninsula (Busby et al., 1996). San Francisco Bay and its tributary streams support migrating steelhead populations. *O. mykiss* can be either anadromous or can complete their entire life cycle in fresh water. Those fish that remain in fresh water are referred to as rainbow trout. Steelhead, the anadromous form of *O. mykiss*, can spend several years in fresh water prior to smoltification, and can spawn more than once before dying, unlike most other salmonids (Busby et al., 1996). Adult steelhead typically migrate from the ocean to fresh water between December and April, peaking in January and February (Fukushima and Lesh, 1998). Juvenile steelhead migrate as smolts to the ocean from January through May, with peak migration occurring in April and May (Fukushima and Lesh, 1998). Central California Coast Steelhead DPS spawns in tributaries of San Francisco Bay, including the watersheds of the Petaluma and Napa rivers, and several tributaries of the South Bay. Central Valley steelhead DPS spawn in the Sacramento and San Joaquin watersheds.

**Sacramento Winter-Run, Central Valley Spring-Run, and Central Valley Fall/Late-Fall-Run Chinook Salmon Evolutionarily Significant Units (ESUs).** Three Chinook salmon ESUs migrate through San Francisco Bay: Sacramento River winter-run, Central Valley spring-run, and Central Valley fall/late-fall-run. The Sacramento River winter-run Chinook salmon was initially listed as endangered under the ESA on January 4, 1994 (59 Fed. Reg. 440); this listing was reaffirmed on June 28, 2005

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<sup>1</sup> Epifauna live attached on a surface and infauna live in the substrate.

(70 Fed. Reg. 37,160). The CDFW listed the Sacramento River winter-run Chinook salmon as endangered under CESA on September 22. The Central Valley spring-run Chinook salmon ESU was initially listed as threatened under the ESA by NOAA Fisheries on September 16, 1999 (64 Fed. Reg. 50,394) and re-listed as threatened on June 28, 2005 (70 Fed. Reg. 37,160). The CDFW designated the Central Valley spring-run Chinook salmon as threatened under CESA on February 5, 1999. The fall/late-fall-run is a state-listed and federally listed species of special concern.

The species historically ranged from the Ventura River in California to Point Hope, Alaska, on the eastern edge of the Pacific; and in the western portion of the Pacific Ocean from Hokkaido, Japan, to the Anadyr River in Russia (Healey, 1991). Factors used in determining ESUs include spatial, temporal, and genetic isolation, maturation rates, and other life history traits. Chinook salmon have been categorized into 17 ESUs. Each ESU is considered a distinct race and has been given its own management status.

Both winter-run and spring-run Chinook salmon tend to enter freshwater as immature fish, migrate far upriver, and delay spawning for weeks or months. For comparison, fall-run Chinook salmon enter fresh water at an advanced stage of maturity, move rapidly to their spawning areas on the main stem or lower tributaries of rivers, and spawn within a few days or weeks of freshwater entry (Healey, 1991).

The winter-run enter San Francisco Bay from November through June and spawn in the spring and summer, primarily in the Sacramento River. The fall/late-fall-run spawns in the Sacramento and San Joaquin River basins (Myers et al., 1998). Central Valley spring-run Chinook salmon spawn in the Sacramento River Basin. All three runs are most commonly found migrating through the northern and central portions of San Francisco Bay (CDFG, 1987).

**Central California Coast Coho Salmon ESU.** Central California Coast coho salmon (*Oncorhynchus kisutch*) are listed as endangered under the ESA and endangered under the CESA. This species ranges from Baja California, Mexico, north to Alaska, and southwest to Japan (McGinnis, 1984). This species exhibits a simple 3-year anadromous life cycle (Federal Register, 1999), rearing in fresh water for up to 15 months before migrating to the ocean. Coho salmon typically spend two growing seasons in the ocean before returning to their natal streams to spawn (Federal Register, 1996). The Central California Coast coho salmon ESU occurs from Punta Gorda in Northern California south to, and including, the San Lorenzo River in central California (Weitkamp et al., 1995). Coho generally return to their natal streams between November and December. This species has been extirpated from tributaries of San Francisco Bay; therefore, coho are rare in San Francisco Bay.

**North American Green Sturgeon Southern DPS.** On April 7, 2006, the Southern DPS of the North American green sturgeon was listed as threatened under the ESA by NOAA Fisheries (71 Fed. Reg. 17,757). Green sturgeon is also considered a species of special concern by CDFW. Green sturgeon are not abundant along the Pacific Coast, but are known to exist in the Estuary (Pycha, 1956; Skinner, 1962; Moyle, 2002). Green sturgeon are anadromous fish that spend most of their lives in estuarine or marine waters, and return to natal rivers to spawn. Adult southern DPS green sturgeon spawn in the reaches of the Sacramento River watershed with swift currents and large cobble. Adult green sturgeon enter San Francisco Bay between late February and early May, as they migrate to spawning grounds in the Sacramento River (Heublein et al., 2009). Post-spawning adults may be present in San Francisco Bay Estuary during the spring and early summer for months prior to migrating to the ocean. Green sturgeon larvae begin feeding approximately 10 to 15 days after hatching, and approximately 35 days later metamorphose into juveniles. After hatching, young-of-the-year (i.e., first-year juvenile) green sturgeon move into the Delta and Estuary where they may remain for 2 to 3 years before migrating to the ocean (Allen and Cech, Jr., 2007; Kelly et al., 2007). Sub-adult and nonspawning adult green sturgeon use both ocean and estuarine environments for rearing, foraging, and feeding on benthic invertebrates, crustaceans, and fish (Moyle, 2002).

**Longfin Smelt.** Longfin smelt are listed as threatened under the CESA, and a candidate species under the ESA. The longfin smelt is a relatively small plantivorous fish in the family Osmeridae, with adults measuring 3.5 to 5.9 inches long. It is adapted to a wide range of salinities, and travels from fresh to marine waters over its life cycle (i.e., anadromous). The geographic range of the species extends from Alaska to California, with longfin smelt in the Estuary representing the southernmost spawning population in the species range (Robinson and Greenfield, 2011).

Longfin smelt usually live for 2 years, spawn, and then die, although some individuals may spawn as 1- or 3-year-old fish before dying (Moyle, 2002). In the Bay-Delta, longfin smelt are believed to spawn primarily in freshwater in the lower reaches of the Sacramento and San Joaquin rivers (USFWS, 2012b). Longfin smelt in the Bay-Delta may spawn as early as November and as late as June, although spawning typically occurs from January to April (USFWS, 2012b).

Larval longfin smelt less than 12 mm (0.5 inch) in length are buoyant because they have not yet developed an air bladder; as a result, they occupy the upper one-third of the water column (USFWS, 2012b). Longfin smelt develop an air bladder at approximately 12 to 15 mm (0.5 to 0.6 inch) in length, and are able to migrate vertically in the water column. At this time, they shift habitat and begin living in the bottom two-thirds of the water column (CDFG, 2009a).

Water quality must support longfin smelt growth, maturity, and successful reproduction. Water quality in the Sacramento-San Joaquin Delta and Suisun Bay is most critical for the San Francisco Estuary population, because those are longfin smelt incubation and early nursery areas. Longfin smelt larvae and small juveniles are rarely found in water warmer than 22 degrees Celsius (°C). Competent-swimming young juveniles disperse toward more-saline and deeper-water habitats. Mature longfin smelt require cool-to-cold (less than 16°C) freshwater habitats for spawning (CDFG, 2009b).

In the Bay-Delta, most young-of-the-year longfin smelt are in Suisun Bay and Marsh, although surveys conducted by the City of San Francisco collected some young-of-the-year longfin in coastal waters (USFWS, 2012b). Because of their anadromous life cycle, the distribution and abundance of the species in the Estuary varies seasonally. During the winter and spring months (December through May), larval longfin smelt are concentrated in Suisun and San Pablo bays, but are present in the Central and South bays in lower densities. Second-year juveniles and adults are present throughout the Estuary at all times of year, but the majority is concentrated in the Suisun, San Pablo, and Central bays, as well as nearshore waters outside of the Golden Gate during the summer months (June through August) (Robinson and Greenfield, 2011). In the autumn months (September through November), sexually mature adults head up into the Delta to spawn (Robinson and Greenfield, 2011). As a result, the densities of longfin smelt in the Estuary are lowest in the autumn, when spawning adults have moved upstream and before larval smelt have moved down into the Estuary.

The longfin smelt has experienced significant declines in abundance in the Estuary and throughout California in the past two decades (CDFG, 2009a). Population estimates for this species are generally measured in terms of an abundance index as measured by yearly fish sampling studies (e.g., CDFW Bay Study Midwater and Otter Trawl surveys). Actual population size for this species naturally fluctuates widely from year to year, with freshwater outflow through the delta being an important factor in abundance (USFWS, 2012b). Determining the numeric size of the population is an inexact process, but the population been estimated to be around 3 million adults on average in San Francisco Bay (ERDC, 2013). Based on data from 1975 through 2004 from the fall midwater trawl survey, the abundance of juvenile longfin smelt declined by 90 percent during that time period (USFWS, 2012b). In addition to other factors, the introduction of the overbite clam (*C. amurensis*) in 1987 is considered to have negatively influenced abundance of the species (USFWS, 2012b). The most recent abundance index (for the 2012 sampling year) found the abundance index of longfin smelt to be at a near-record low (CDFW, 2014a). Water export facilities in the delta may also be partially responsible for decline of this species. These facilities entrain 5,000 to 150,000 longfin smelt when delta outflow is low (approximately 1 out of

3 years), but do not entrain many longfin smelt on years with high delta outflow (Rosenfield, 2010). The majority of the entrained longfin smelt are young-of-the-year, but some of the entrained fish are adults, which reduces not only fecundity but survivorship of all age classes.

On March 4, 2009, longfin smelt was listed as threatened under the CESA (CESA; Fish and Game Code §§ 2050 et seq.). Under the CESA listing, the species is protected throughout its range in California. In response to the state listing of this species, CDFW has stated that longfin smelt “take” assessments must be conducted for dredging projects in San Francisco Bay.

Previously the USFWS declined to list the Estuary population of the longfin smelt, citing a lack of evidence demonstrating the population’s genetic distinction from other populations within the species range (USFWS, 2012b). In November 2009, a suit was filed by the Center for Biological Diversity, The Bay Institute, and the Natural Resources Defense Council to challenge the federal decision not to list the longfin smelt (Robinson and Greenfield, 2011).

In February 2011, USFWS agreed to conduct a range-wide 12-month review of the longfin smelt status, to determine if the population met the criteria of a DPS under the ESA, and if listing of the population is warranted under the ESA.

On April 2, 2012, the USFWS released the 12-month review of longfin smelt, determining that the San Francisco Bay-Delta Population meets the requirements of a DPS. The USFWS found that the limited swimming capabilities of the longfin smelt, existing ocean current patterns, and the great distances between the Bay-Delta and other known breeding populations, make it unlikely that regular interchange occurs between the Bay-Delta and other longfin smelt breeding populations (USFWS, 2012b).

Additionally, the USFWS determined that the population meets the criterion of significance because it resides in a unique environment and the loss of the population would result in a significant gap in the range of the species. The temperature and geography associated with the San Francisco Bay-Delta are unique to estuaries where the longfin smelt resides, and the loss of the San Francisco Bay-Delta longfin smelt would result in a loss of the southernmost population of the species (USFWS, 2012b).

In the 12-month review findings, the USFWS concluded that the listing of the longfin smelt as a threatened species is warranted, but is currently precluded by other higher priority listing actions. As a result, the longfin smelt is currently a candidate species (USFWS, 2012b).

**Delta Smelt.** The planktivorous delta smelt occurs only in the upper portion of the San Francisco Bay Estuary. This species is listed as threatened under the ESA and endangered under the CESA. This euryhaline species primarily inhabits the open surface waters of the Delta and Suisun Bay (USFWS, 1995). The delta smelt population is centered in Suisun Bay, Grizzly Bay, Suisun Marsh, and the Sacramento River, but delta smelt also occur in lower numbers in San Pablo Bay and the Lower Napa River (Merz et al., 2011). The species is found in the highest concentrations near the fresh and salt water-mixing zone. Abundance is generally higher on the freshwater side of the mixing zone, in salinity of less than 2 parts per thousand. The position of the mixing zone changes seasonally and annually, depending on outflow through the Delta. In dry years, the mixing zone can be found near the confluence of the Sacramento and San Joaquin Rivers; in wet years, the mixing zone usually is in Suisun Bay, but it can occur as far downstream as San Pablo Bay. Although delta smelt tolerate a wide range of temperatures (8 to 25°C), warmer water temperatures restrict their distribution more than colder water temperatures (USFWS, 2004b).

Delta smelt have an unusual life history pattern relative to other fishes because they have a small geographic range compared with other smelt, generally live only one year, have relatively low fecundity, and have pelagic larvae (Moyle, 2002). Their short life span and low reproductive output makes them especially sensitive to inter-annual perturbation (i.e., variability).

Adult delta smelt migrate upstream in the fall to spawn in the upper Delta. Spawning takes place between February and July, peaking in early April through May. Most spawning occurs at temperatures between 12 and 18°C (USFWS, 2014). Delta smelt spawn in sloughs and shallow edge water habitat in channels in the upper Delta and in the Sacramento River above Rio Vista (Moyle, 2002). Spawning has also been recorded in Montezuma Slough and Suisun Slough in Suisun Bay, as well as in the Napa River estuary. Spawning takes place primarily at night during a full or new moon, presumably at low tide (Moyle, 2002). Females lay 1,200 to 2,600 eggs, which are broadcast over the substrate in a single spawning event. The eggs are laid near the bottom and are adhesive, using a stalk to attach to hard substrates (Moyle, 2002). The majority of delta smelt die after spawning. However, a small number of adults survive and continue to grow, reaching lengths of 90 to 120 mm. These second year adults then die after spawning the following year.

Newly hatched larvae are semi-buoyant, allowing them to remain just off the bottom until their swim bladder and fins are fully developed. Within a few weeks, the swim bladder and fins develop; the smelt are able to move up into the water column, and are then washed downstream into the freshwater/saltwater mixing zone or the area immediately above it. They remain in the general vicinity of the mixing zone, migrating vertically in the water column in response to day/night cycles along with their zooplankton prey (Moyle, 2002). The location of this mixing zone varies depending on the volume of freshwater output from the Sacramento and San Joaquin Rivers, as well as the volume of freshwater exports from the Delta.

The USFWS listed the delta smelt as threatened on March 5, 1993 (58 Fed. Reg. 12,863) and designated critical habitat for this species on December 19, 1994 (59 Fed. Reg. 65,256). On April 7, 2010, the USFWS submitted a 12-month petition finding to reclassify the delta smelt as endangered. They found that reclassification is warranted, but precluded by other higher priority listing actions (75 Fed. Reg. 17,667). The CDFW listed the delta smelt as threatened under CESA on December 9, 1993, and reclassified it as endangered on January 20, 2010. Although research interest has increased substantially since the species was listed, many aspects of delta smelt biology are still not well understood. The threats or combinations of threats that are directly responsible for the decrease in abundance and possible danger of extinction are still yet to be determined.

Information on the current status of delta smelt abundance is limited; however, the short form 5-Year Review released on March 25, 2009, stated that delta smelt abundance indices decreased since 2002 (USFWS, 2009). Like the longfin smelt, population estimates for this species are generally measured in terms of an abundance index as measured by yearly fish sampling, which varies widely from year to year. The 2009 fall midwater trawl abundance index was less than one-tenth the level of the 2003 fall midwater trawl, making the 2009 index the lowest ever recorded (USFWS, 2009). Determining the numeric size of the population is an inexact process, but the population has been estimated to be around 400,000 adults on average (Bennett, 2005). The population had not recovered greatly as of 2011, and continues to be well below recovery goal levels set by USFWS (Adib-Samii, 2011). The most recent abundance index (for the 2012 sampling year) found the abundance index to be at a near-record low (CDFW, 2014b). Water export facilities in the delta are likely contributing to the decline of this species. These facilities entrain, on average, 2,500 to 10,000 delta smelt, depending on delta outflow and time of spawning (Bennett, 2005; Kimmerer, 2008). For delta smelt, adult losses due to entrainment in water export facilities have been estimated at 4 to 50 percent of the population (Kimmerer, 2008). As a result of these entrainment rates, water export facilities have been identified as “the most conspicuous and controversial factor contributing to mortality in delta smelt” (Bennett, 2005).

**Sacramento Splittail.** The Sacramento splittail is a large, endemic minnow found in the San Joaquin Valley River system that is a California species of special concern, but is not listed as under the ESA or CESA. The species is tolerant of brackish water and can be found in Suisun Bay, San Pablo Bay, the Napa River, and the Carquinez Strait following high fresh water outflows from the Delta Region. The Sacramento splittail was formerly widespread in the Sacramento-San Joaquin river system, and occurred in various parts of San Francisco Bay as well. At present, its range includes the main channel of the

Sacramento River, the lower part of the Delta, the Napa and Petaluma Rivers, and sloughs adjoining Suisun Bay and San Pablo Bay (USFWS, 2010).

Sacramento splittail are benthic foragers that mainly feed in the daytime. Composition of gut contents has revealed that they feed almost exclusively on aquatic invertebrates. Since the introduction of the Asian overbite clam into the Estuary, Sacramento splittail have shifted their diet from prey items such as mysid shrimp to a diet increasingly focused on bi-valves, in particular the overbite clam. Sacramento splittail spawn over submerged vegetation in flooded areas, typically where the water depth is at least 3 feet. Spawning habitat includes the natural and newly restored floodplains of the Cosumnes River, managed floodplains such as the Yolo and Sutter bypasses, and disjunct segments of floodplain adjacent to the Sacramento and San Joaquin rivers and tributaries (USFWS, 2010).

In October of 2010, the USFWS issued a 12-month finding, determining that listing of the Sacramento splittail under the ESA was not warranted at the time (USFWS, 2010).

### **Mammals**

**Salt Marsh Harvest Mouse.** The salt marsh harvest mouse was listed by the federal government as endangered on October 13, 1970 (35 Fed. Reg. 16,047). The CDFG listed the salt marsh harvest mouse as endangered under CESA on June 27, 1971. In addition, the state considers the salt marsh harvest mouse a fully protected species. Two subspecies of the harvest mouse are endemic to the salt and brackish marshes bordering San Francisco Bay. The northern subspecies (*R. r. halicoetes*) inhabits saline emergent wetlands bordering Suisun and San Pablo bays, while the southern subspecies (*R. r. raviventris*) occurs in central and south San Francisco Bay.

Trapping efforts in 1997, 1998, and 1999 verified the presence of the salt marsh harvest mouse in the San Leandro Shoreline Marshlands, immediately south and southeast and adjacent to the San Leandro Dredged Materials Management Site. Although a lack of nesting and foraging habitat (in particular, a lack of pickleweed) makes the disposal site unsuitable for this species, individual harvest mice may occasionally stray into the Dredged Materials Management Site (USACE, 2009).

Extensive salt marsh harvest mouse habitat exists in Phases II through IV of the Montezuma Wetlands Restoration Project (MWRP), and surveys conducted between 2000 and 2009 have confirmed the presence of salt marsh harvest mouse habitat in these areas (Acta Environmental, 2011). Salt marsh harvest mouse may also be present at Cullinan Ranch, because this placement site is adjacent to a known source population (i.e., the Guadalcanal Village Marsh Restoration).

### **Birds**

**California Least Tern.** The California least tern (*Sterna antillium*) is a federally listed and state-listed endangered species. This species feeds primarily in shallow estuaries or lagoons where small fish are abundant. The least tern breeds in California from mid-May to August. Nesting sites for least terns exist along the runway apron at the former Naval Air Station Alameda in the city and county of Alameda. Least terns have been observed to forage primarily along the breakwaters and shallows of the southern shoreline of Naval Air Station Alameda and in Ballena Bay during May through August. Least terns are known to use a restoration site (i.e., the Middle Harbor Enhancement Area [MHEA]) in the middle harbor area of Oakland Harbor for foraging and roosting. The least tern generally migrates from the San Francisco Bay Area in August and winters south of the United States.

Documented sightings of the tern in the Suisun Bay area are relatively recent. In 2005, least terns were observed at MWRP site for the first time. Since this sighting, Montezuma Wetlands, LLC, has been working with CDFW and USFWS staff to create suitable nesting habitat for the tern outside of areas of the site that would be impacted by planned restoration activities (USACE, 2012b). It is the sole

responsibility of Montezuma Wetlands, LLC, to coordinate with CDFW and USFWS on least tern issues for MWRP. Proposed dredged material placement actions for the site must first be in compliance with the ESA, and with other federal, state, and local wildlife protection laws, before USACE can use MWRP as a beneficial use site for dredged material.

**Western Snowy Plover.** The western snowy plover (*Charadrius alexandrinus nivosus*) is listed as threatened under the ESA. Western snowy plovers are one of two recognized subspecies of snowy plovers in North America. The coastal population, about 2,000 birds, breeds along the Pacific coast from southern Washington to southern Baja California, Mexico. Plovers forage for invertebrates on wet sand areas of intertidal zones, in dry, sandy areas above high tide lines, on salt pans and along the edges of salt marshes and salt ponds. They nest on coastal sand spits, dune-packed beaches, gravel bars, beach strands with little or no vegetation, open areas around estuaries, and on beaches at river mouths and gravel bars from early March to the third week in July. Both eggs and nests are extremely difficult to see even at close range. Chicks leave the nest within hours of hatching, but cannot fly for about a month. Western snowy plovers are site-faithful nesters, returning to successful nesting sites year after year.

Habitat for the western snowy plover is found on Ocean Beach, but it is not designated critical habitat. In 2008, the National Park Service, through formal rulemaking, established a Snowy Plover Protection Area on Ocean Beach, providing a protection zone for western snowy plovers overwintering on Ocean Beach (no known nesting of snowy plover occurs on Ocean Beach) (SFPUC, 2012).

**Ridgway's Rail.** Ridgway's rail (previously known as the California Clapper rail) was listed as endangered under the ESA by the USFWS on October 13, 1970 (35 Fed. Reg. 16047). Ridgway's rail is also listed as endangered under CESA by CDFW, and is considered a fully-protected species. The species formerly occurred in salt marshes along the California coast from Humboldt Bay to San Luis Obispo County, but at present it is only found in salt marshes around San Francisco, San Pablo, and Suisun bays. Ridgway's rail inhabits tidal salt marshes, especially where they include tidal channel, which are preferred foraging habitat during low tides. This species feeds mainly on invertebrates. Breeding occurs from March to August.

Ridgway's rail is a permanent resident of salt and brackish marshes around San Francisco Bay. The only remaining populations occur in San Francisco Bay. Since the mid-1800s, about 80 percent of San Francisco Bay's marshlands have been eliminated through filling, diking, or conversion to salt evaporation ponds. As a result, Ridgway's rail lost most of its former habitat, and the population declined severely. These birds also require shallow areas or mudflats for foraging, particularly channels with overhanging banks and vegetation (Goals Project, 2000). Ridgway's rails forage on crabs, mussels, clams, snails, insects, spiders, worms, and occasionally mice and dead fish. As a refuge from extreme high tides and as a supplementary foraging area, rails move to the upper marsh vegetation where it intergrades with upland vegetation. These birds have no requirement for fresh water. Ridgway's rails nest from early March through August in the tallest vegetation along tidal sloughs, particularly in California cordgrass and marsh gumplant. They are nonmigratory, although juveniles disperse during late summer and autumn.

Individual Ridgway's rails may nest near the San Leandro Marina, in the adjacent salt marsh, and wander into or along Estudillo Canal immediately north of the Dredged Materials Management Site (USACE, 2009). In addition, Ridgway's rails are known to be present within a tidal marsh near the San Rafael Creek Inner Canal Channel (USACE, 2011a). The USFWS has indicated that Ridgway's rail may be sensitive to loud noise while it is nesting if the noise intensity is unusually high. For this reason, the USFWS Biological Opinion for the LTMS program specifies that dredging shall not occur within 250 feet of potential habitat for this species from February 1 through August 31. The USFWS considers all potential habitat to actually be occupied by this species unless surveys that year document its absence.

**Bank Swallow.** The CDFG listed the bank swallow (*Riparia riparia*) as threatened under CESA on June 11, 1989. The bank swallow occurs as a breeding species in California in a hundred or so widely

distributed nesting colonies in alluvial soils along rivers, streams, lakes, and ocean coasts. There are nesting colonies in vertical banks or bluffs in friable soils, and these colonies can support dozens to thousands of nesting birds. Nesting habitat is particularly prone to erosion. Bank swallows arrive on their breeding grounds in California beginning in late March and early April, and the bulk of breeding birds arrive in late April and early May. Birds vacate their breeding grounds as soon as juveniles begin dispersing from the colonies around late June and early July. The bank swallow forages predominantly on flying or jumping insects that it captures almost exclusively on the wing (Garrison, 1998).

Bank swallows are known to breed on the sandy bluffs in the southern portion of the beach nourishment site at Ocean Beach; the Fort Funston colony of bank swallows is in this area. A survey conducted in 2010 showed the southernmost 1,000 feet of the proposed beach nourishment area coinciding with this colony (USACE, 2013a). In 2009, the City and County of San Francisco constructed a revetment to protect its infrastructure from the imminent storm damage. The 2010 survey showed the bank swallow colony residing on top half of this revetment in the sandy areas of the cliff.

### ***Invertebrates***

**Monarch Butterfly.** The monarch butterfly (*Danaus plexippus*) is not a federal or state protected species; however, overwintering grounds are considered significant and unique by the State of California, and the City of San Leandro Municipal Code prohibits interference with these butterflies during the entire time they remain in the areas of the San Leandro Marina, Tony Lema Golf Course, and Marina Golf Course, in whatever spot therein they may choose to stop. There is a monarch overwintering site at the eastern end of the Monarch Bay Golf complex, west of the San Leandro Dredged Material Management site, where they congregate in large numbers from October through January (USACE, 2009).

### ***Critical Habitat***

**Steelhead.** Critical habitat was established for the Central California Coast steelhead DPS on September 2, 2005 (70 C.F.R. pt. 52488-52626). Designated critical habitat for this species includes all portions of San Francisco Bay below the ordinary high water line. The designation includes natal spawning and rearing waters, migration corridors, and estuarine areas that serve as rearing areas. In tidally influenced waters, the lateral extent of this critical habitat is defined by the mean higher high water line (NOAA, 2005).

**Chinook Salmon.** Critical habitat for the Sacramento River winter-run Chinook salmon was designated by the NMFS (50 C.F.R. pt. 226) in 2005. The designation includes natal spawning and rearing waters, migration corridors, and estuarine areas that serve as rearing areas. Designated critical habitat for this species includes the waters of San Francisco Bay north of the San Francisco – Oakland Bay Bridge. The lateral extent of this critical habitat is defined by the mean higher high water line (NOAA, 2005).

**Delta Smelt.** Critical habitat was established for the delta smelt on January 18, 1995 (50 C.F.R. pt. 65256-65279). Designated critical habitat for this species includes all water and submerged lands below ordinary high water, and the entire water column bounded by and contained in Suisun Bay (including the contiguous Grizzly and Honker bays); the length of Goodyear, Suisun, Cutoff, First Mallard (Spring Branch), and Montezuma sloughs; and the existing contiguous waters contained in the Delta, as defined in Section 12220 of the California Water Code. The downstream limit of critical habitat for delta smelt is the Carquinez Bridge.

**Green Sturgeon.** On October 9, 2009, the NMFS issued a final designation of critical habitat for green sturgeon (74 C.F.R. pt. 52300-52351). This includes the designation of specific rivers, estuaries, and coastal areas as critical habitat for this species. Under this ruling, the entire San Francisco Bay below mean higher high water is designated as critical habitat, which includes the portion of San Francisco Bay in the project area (NMFS, 2009).

**Leatherback Turtle.** In 1979, NMFS designated critical habitat for leatherback turtles to include the coastal waters adjacent to Sandy Point, St. Croix, U.S. Virgin Islands. In January 2012, NMFS designated additional critical habitat to provide protection for endangered leatherback sea turtles along the west coast of the United States (77 FR 4170). This designation includes approximately 16,910 square miles (43,798 square kilometers) stretching along the California coast from Point Arena to Point Arguello, east of the 3,000-meter depth contour. A portion of this critical habitat lies in the ocean portion of the study area.

### **Essential Fish Habitat**

San Francisco Bay and the portions of the project area in the Pacific Ocean (including SF-DODS) are classified as EFH under the Magnuson-Stevens Act. The project area serves as habitat for species of commercially important fish and sharks that are federally managed under three FMPs: the Pacific Groundfish FMP, the Coastal Pelagic FMP, and the Pacific Coast Salmonid FMP.

The Pacific Groundfish FMP is designed to protect habitat for more than 90 species of fish, including rockfish, flatfish, groundfish, some sharks and skates, and other species that associate with the underwater substrate. This includes both rocky and soft substrates.

The Coastal Pelagic FMP is designed to protect habitat for a variety of fish species that are associated with open coastal waters. Fish managed under this plan include planktivores and their predators.

The Pacific Salmon FMP is designed to protect habitat for commercially important salmonid species, including Chinook salmon, and coho salmon.

The Estuary, including any eelgrass beds contained within, is identified as a “habitat of particular concern” under these FMPs. These habitats are of particular importance to certain life stages of species managed under the FMPs, and are more sensitive to degradation.

Although they are not a state-listed or federally listed species, native oysters (*Ostrea conchaphila*) are considered a historical keystone species for San Francisco Bay, and contribute to EFH where oyster beds occur. A century ago, native oysters were a highly visible component of San Francisco Bay ecosystems, supporting industries from cement-making to gourmet dining. Oysters require hard substrate for larval settlement, preferably other oyster shells, and this settling habit led to the formation of oyster reefs, the nooks and crannies of which support communities of fish, crab, and other invertebrates. By the early 1900s, however, overfishing, habitat degradation, and the introduction of nonnative shellfish led to the decline of native oysters. Oyster beds are not known to occur in the federal navigation channels or in-water placement sites.

### **Other Special Designated Habitat Areas**

There are two approved regional conservation plans that apply to locations of dredging and placement activities: the Suisun Marsh Habitat Management, Preservation, and Restoration Plan; and the Bay Delta Conservation Plan (BDCP).

The Suisun Marsh Habitat Management, Preservation, and Restoration Plan (Bureau of Reclamation et al., 2011) is being implemented by the Suisun Principal Agencies, a group of agencies with primary responsibility for Suisun Marsh management. The 30-year plan is intended to balance the benefits of tidal wetland restoration with other habitat uses in Suisun Marsh by achieving certain specific changes in marsh-wide land uses affecting values such as salt marsh harvest mouse habitat, managed wetlands, public use, and upland habitat. This involves implementing a broad array of activities covering ESA and CESA compliance, managed wetland activities, restoration activities, and maintenance activities related to certain State Water Project and Central Valley Project mitigation commitments. The central component of the plan is the restoration of 7,000 acres of tidal salt marsh in Suisun Bay.

The BDCP sets out a comprehensive conservation strategy for the Delta, designed to restore and protect ecosystem health, water supply, and water quality within a stable regulatory framework. The BDCP reflects the outcome of a multiyear collaboration between public water agencies; state and federal fish and wildlife agencies; nongovernment organizations; agricultural interests; and the general public. The BDCP is intended to result in a permit decision concerning long-term regulatory authorizations under state and federal endangered species laws for the operations of the State Water Project and the Central Valley Project. The BDCP will further provide the basis for durable regulatory assurances. Specifically, the BDCP serves as a natural community conservation plan under the state's Natural Community Conservation Planning Act, and a habitat conservation plan under Section 10 of the ESA. The BDCP will support the issuance of permits from CDFW under Section 2835 of the Natural Community Conservation Planning Act, and permits from the USFWS and the NMFS pursuant to Section 10 of the ESA. The BDCP will also provide the basis for a biological assessment that supports new ESA Section 7 consultations between the U.S. Department of the Interior, Bureau of Reclamation, USFWS, and NMFS.

### 3.6.3 Methodology and Thresholds of Significance

Under the National Environmental Policy Act (NEPA), the analysis of potential impacts considered whether the project alternatives would have a substantial adverse effect on any species identified as a proposed, threatened, or endangered species under the ESA. The Council on Environmental Quality's NEPA Regulations, 40 C.F.R. § 1508.27(b)(9), generally equate whether an action significantly affects the quality of the human environment with "the degree to which the action may adversely affect an endangered or threatened species." Therefore, an alternative may result in a significant impact if it would directly or indirectly (e.g., through habitat modification) result in a substantial population decline of any proposed, threatened, or endangered species protected under the ESA. Furthermore, a project impact may be significant if it would result in the decline of a non-federally listed species such that populations would fall below self-sustaining levels.

Under the California Environmental Quality Act (CEQA), the analysis of potential impacts of the proposed project considered whether the project alternatives would have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, proposed, or listed species under, or otherwise protected by, the ESA or the CESA, or where they would otherwise meet the CEQA Guidelines' definition of "endangered or threatened" (14 California Code of Regulations 15380). In addition, Section 15065 of the CEQA Guidelines states that a project would have a significant effect if it has the potential to "substantially reduce the habitat of a fish or wildlife species," "cause a fish or wildlife population to drop below self-sustaining levels," "threaten to eliminate a plant or animal community," or "substantially reduce the number or restrict the range of an endangered, rare or threatened species."

In addition, under both NEPA and CEQA, the analysis of the potential effects of the proposed project on biological resources considered whether the project alternatives would:

- Alter or diminish critical habitat, EFH, or a special aquatic site, including eelgrass beds, mudflats, and wetlands;
- Interfere substantially with the movement of resident or migratory fish or wildlife species;
- Cause the introduction or substantial spread of invasive nonnative plants or wildlife; or
- Cause substantial or sustained impact to spawning habitat of commercially important species (e.g., Pacific herring);

Discussions are provided below for direct impacts (e.g., entrainment) and indirect impacts (e.g., turbidity and other water quality effects). These impacts are evaluated by comparing proposed project methods with impacts observed and reported in scientific literature.

Because of the nature of the proposed project, there would be no project impacts that would:

- Result in the reduction of protected wetland habitat as defined in Section 404 of the CWA, or result in alteration of desirable functions and values through direct removal, filling, hydrological interruption, or other means. Maintenance dredging of the federal channels would not result in a reduction of protected wetland habitat or alteration of desirable functions. Placement of dredged material at wetland restoration beneficial reuse sites (e.g., Cullinan Ranch, MWRP) would provide beneficial impacts by increasing wetlands in the study area, creating additional habitat for fish and wildlife, including special-status species and migratory birds, that depend on wetlands.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other applicable Habitat Conservation Plan. The project alternatives only include dredging within the established federal shipping channels, and placement at permitted placement sites. Additionally, the LTMS strategy for dredged material management, which would be used under all project alternatives, includes the beneficial reuse of dredged materials for restoration and conservation projects such as those included in the above plans. Therefore, no conflicts with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other applicable Habitat Conservation Plan would occur.

Potential impacts associated with California Coastal Act and Bay Plan policies protecting biological resources are addressed in Section 3.8, Land Use.

#### **3.6.4 Impacts and Mitigation Measures**

Maintenance dredging would disturb bottom sediments, which would temporarily increase turbidity; disturb benthic habitat and associated communities of organisms living in or on the mud bottom; and generate underwater noise. This disturbance could result in the temporary loss or reduction of habitat suitable for fish foraging for sensitive species such as steelhead, Chinook salmon, green sturgeon, delta smelt, and longfin smelt, as well as fish managed under the Magnuson-Stevens Act. In addition, entrainment of fish in dredging equipment could occur. Pacific herring, a commercially important species, could also be affected if spawning had occurred in the area just before or during maintenance dredging activities. The behavior of marine mammals, such as harbor seals and sea lions, is not likely to be affected by dredging activities. Dredged material placement also would result in temporary increases in turbidity, which could result in similar effects on habitat, benthic habitat, and wildlife behavior. These effects are discussed in more detail below.

Because sediment resuspension from dredging vessel movement would be limited, the movement of vessels for transport of dredged material would not be expected to increase turbidity above ambient ranges generated by natural hydrologic processes, weather, and existing vessel traffic. Vessel traffic for transport of dredged material would be similar to that which has occurred during USACE's past maintenance dredging operations, would occur in areas with frequent vessel movement, and would be negligible considering the existing volume of vessel movement in the study area. Therefore, the transport of dredged material is not expected to impact biological resources.

##### ***Impact 3.6-1: Potential Adverse Effects of Increased Turbidity Resulting from Maintenance Dredging and Dredged Material Placement on Special-Status Species, Critical Habitat, and Commercially Valuable Marine Species***

During any type of dredging operations, the interaction of the dredge equipment with the dredged material resuspends sediment into the water column. The placement of dredged material in the aquatic environment also creates a plume of turbidity as the material travels downward. The turbidity resulting from dredging and the placement of dredged material may affect marine organisms and aquatic wildlife during various life stages by affecting respiration (clogging gills); reducing visibility and the ability to forage or avoid predators; and altering movement patterns (due to avoidance of turbid waters). Suspended sediments have

been shown to affect fish behavior, including avoidance responses, territoriality, feeding, and homing behavior. Wilber and Clarke found that suspended sediments result in cough reflexes, changes in swimming activity, and gill flaring. Suspended sediments can have other impacts, including abrasion to the body and gill clogging (Wilber and Clarke, 2001). Generally, bottom-dwelling fish species are the most tolerant of suspended solids, and filter feeders are the most sensitive. The effect of dredging on fish can vary with life stage; early life stages tend to be more sensitive than adults. For example, pelagic eggs and larvae of fishes and shellfishes depend on local hydrodynamic conditions for transport into and out of dredging activity areas, and have limited avoidance capabilities. Demersal eggs (eggs sinking to the bottom) and sessile, or nonmotile life history stages, are perceived as particularly susceptible because of their longer exposure to elevated suspended sediments or due to smothering by increased sedimentation. Motile organisms can generally avoid unsuitable conditions in the field (Clarke and Wilber, 2000).

Pacific herring, a commercially important species, could be affected if spawning occurred in the area just before or during maintenance dredging activities. Exposure of Pacific herring eggs to suspended San Francisco Bay dredged sediments at ecologically relevant concentrations of 250 or 500 milligrams per liter (mg/L) within their first 2 hours of contact with water has been documented to result in higher percentages of abnormal larvae, as well as an increase in larval mortality (Griffin et al., 2009).

It should be noted that the eggs or larval life stages of steelhead, Chinook salmon, or green sturgeon are not expected to be present in any of the federal navigation channel or placement locations. Large adult and juvenile fish (including steelhead, Chinook, and green sturgeon) as well as marine mammals would be motile enough to avoid areas of high turbidity plumes caused by dredging. The USACE Waterways Experiment Station Technical Report DS-78-5 (Effects of Dredging on Aquatic Organisms) reports that: “Most organisms tested are very resistant to the effects of sediment suspensions in the water, and aside from natural systems requiring clear water such as coral reefs and some aquatic plant beds, dredging induced turbidity is not a major ecological concern” (Hirsch et al., 1978).

Brief plumes caused by in-water placement has the potential to reduce food availability and foraging success for fish and marine mammals that might be in the vicinity of the placement sites. It is expected that these species will avoid the plumes, which are ephemeral in nature (LTMS, 1998). Species that might be affected can forage in the unaffected areas surrounding the placement site, so any temporary reduction in food supply and foraging success would be minor. No significant long-term effects to pelagic-based food resources are expected, because of the fairly rapid recovery expected in these communities and the small area affected.

Increased turbidity and activity during dredging may disturb marine mammal foraging activities by temporarily decreasing visibility or causing the relocation of mobile prey from the area affected by the sediment plume. Marine mammals would not be substantially affected by dredging operations because they forage over large areas of San Francisco Bay and the ocean, and can avoid areas of temporarily increased turbidity and dredging disturbance.

Total suspended solids levels in the Estuary vary greatly, ranging from 10 mg/L to more than 100 mg/L (SFEI, 2011). In general, higher total suspended solids result in more turbid water. Waters in the study area are naturally turbid because of the resuspension of sediments from wind, waves, and tides. Light penetration is generally limited to a few feet from the surface, which in turn limits phytoplankton productivity. Increased sediment concentrations in the upper water column can reduce sunlight penetration, and therefore reduce phytoplankton productivity. Turbid plumes from dredging that could limit productivity would be localized, and would be small in relation to surrounding areas of similar habitat, as well as short in duration. The impact of turbidity on phytoplankton productivity due to decreased light transmission would depend largely on the difference between background turbidity and increased turbidity from dredged material when dredging takes place. Increased turbidity effects from dredging are short term, minor, and greatly diminished with distance from the activity. In San Francisco Bay, turbidity plumes would be quickly diluted to near or within background particulate concentrations.

Generally, hydraulic dredging (i.e., hopper and cutterhead-pipeline dredges) reduces disturbance and resuspension of sediments at a dredging site compared to mechanical dredges. The USACE studies show that turbidity plumes at placement sites last only 20 minutes, and plume duration is even less during placement of sandy material, because their coarse sediments settle out of the water column more quickly than fine sediments (USACE 1976a; LTMS, 1998; Anchor, 2003). Increased turbidity from dredging and placement activities is expected to have a negligible effect on plankton productivity.

Although leatherback turtle designated critical habitat along the west coast of the United States also coincides with part of the ocean portion of the study area, occurrence of leatherback turtle in the study area is rare. For this reason, impacts to this species and its critical habitat are not expected.

### **No Action/No Project Alternative, Proposed Action/Proposed Project**

Under the No Action/No Project Alternative and Proposed Action/Project, the amount and effects of increased turbidity as a result of dredging and placement would be similar because the dredge equipment type, frequency of dredging, volumes dredged, and federal standard placement site would be the same. As described in Chapter 2, USACE would continue to implement standard practices intended to minimize increases in turbidity from dredging and placement activities. Dredging and placement would continue to be limited to the work windows for the LTMS program, including the work window for Pacific herring. In the past, dredging schedules have occasionally slipped for logistical or financial reasons, and dredging occurred outside of the LTMS work window for one or more species. In the event that this should occur in any year covered by this Environmental Assessment (EA)/Environmental Impact Report (EIR), USACE would initiate an additional consultation process with the appropriate agencies to obtain written authorization to work outside these windows, and implement consultation recommendations as necessary.

Dredging would result in localized and temporary increases in turbidity at both the dredge locations and placement sites. As described above, this is not expected to have substantial effects on special-status species, their critical habitat, or EFH.

**NEPA Determination.** Under the No Action Alternative and Proposed Action, impacts on special-status species, critical habitat, and commercially valuable marine species from localized and temporary increases in turbidity would be less than significant.

**CEQA Determination.** Under the No Project Alternative and Project, impacts on special-status species, critical habitat, and commercially valuable marine species from localized and temporary increases in turbidity would be less than significant.

### **Reduced Hopper Dredge Use Alternatives 1 and 2**

Impacts to marine organisms and aquatic wildlife resulting from increased turbidity during dredging would be slightly greater under Reduced Hopper Dredge Use Alternatives 1 and 2 in comparison with the No Action/No Project Alternative and Proposed Action/Project, because there would be increased use of mechanical dredges. Impacts from the placement of dredged material would be similar to those under the No Action/No Project Alternative and Proposed Action/Project. Under Reduced Hopper Dredge Use Alternative 1, Suisun Bay Channel/New York Slough and either Pinole Shoal or Richmond Outer Harbor would be dredged with clamshell-bucket equipment instead of a hopper dredge. Under Reduced Hopper Dredge Use Alternative 2, Suisun Bay Channel/New York Slough, Pinole Shoal, and Richmond Outer Harbor would all be dredged with clamshell-bucket equipment instead of a hopper dredge. Under both alternatives, San Bruno Channel in Redwood City Harbor would also be dredged with clamshell-bucket equipment instead of a hopper dredge.<sup>2</sup> Short-term increases in turbidity at Pinole Shoal, Richmond Outer Harbor, and San Bruno Channel would be higher when they are dredged with a clamshell-bucket dredge

<sup>2</sup> San Bruno Channel is dredged at intervals of 10 years or longer.

instead of a hopper dredge, because mechanical dredging generates more turbidity than hopper dredging, as described in Section 3.3, Hydrology and Water Quality, and can take up to ten times longer than hopper dredging (USACE, 2013d). Nonetheless, as described above, impacts from increased turbidity during dredging and placement would be temporary and minor. Dredging Suisun Bay Channel/New York Slough with a mechanical dredge instead of a hopper dredge would not be expected to result in a noticeable increase in turbidity, because sandy material settles out of the water column quickly (Anchor, 2003).

These alternatives would reduce hopper dredge use for maintenance dredging compared to the No Action/No Project Alternative and Proposed Action/Project, but it would not change the volume of material dredged, standard placement sites used, or standard operating procedures. As noted above under the No Action/No Project Alternative and Proposed Action/Project, in the event USACE should need to dredge outside the LTMS work windows, USACE would initiate an additional consultation process with the appropriate agencies to obtain written authorization to work outside these windows, and implement consultation recommendations as necessary.

**NEPA Determination.** Under Reduced Hopper Dredge Use Alternatives 1 and 2, turbidity increases during dredging are expected to be greater than under the No Action Alternative and Proposed Action; however, impacts on special-status species, critical habitat, and commercially valuable marine species from localized and temporary increases in turbidity would still be considered less than significant.

**CEQA Determination.** Under Reduced Hopper Dredge Use Alternatives 1 and 2, turbidity increases during dredging are expected to be greater than under the No Project Alternative and Project; however, impacts on special-status species, critical habitat, and commercially valuable marine species from localized and temporary increases in turbidity would still be considered less than significant.

### ***Impact 3.6-2: Potential Adverse Effects of Maintenance Dredging Resulting from the Disturbance of Benthic Habitat on Special-Status Species, Critical Habitat, and Commercially Valuable Marine Species***

Dredging would directly impact benthic communities through physical disruption and direct removal of benthic organisms, resulting in the potential loss of most, if not all, organisms in the dredged area. Generally, benthic habitat within the federal channels is highly disturbed because of regular maintenance dredging and the propeller wash of ship traffic. Organisms immediately adjacent to the dredged channels may be also be lost because of smothering or burial from sediments resuspended in the water column during the dredging. Similarly, organisms in or immediately adjacent to the placement sites may be also be lost because of smothering or burial from sediments during dredged material placement.

As described in Section 3.6.2, critical habitat for steelhead, Chinook salmon, delta smelt, green sturgeon, and leatherback turtle overlaps with some or all of the estuarine/marine portions of the project areas. Benthic habitat can be an important part of critical habitat for some species by providing foraging areas, especially for steelhead, Chinook salmon, and green sturgeon. Because delta smelt feed in the water column, benthic habitat provides less of a function. Similarly, leatherback turtles forage in open waters and do not rely on benthic habitat. The loss of benthic invertebrates during dredging activities may decrease the forage value of critical habitat at the dredge location. There are no state listed or federally listed benthic epifauna and infauna likely to occur in the federal navigation channels and in-water placement sites.

The proposed activities may impact two primary constituent elements<sup>3</sup> of delta smelt critical habitat: rearing habitat and adult migration. Rearing habitat includes shallow water river and tributary habitat

<sup>3</sup> A physical or biological feature essential to the conservation of a species for which its designated or proposed critical habitat is based on, such as space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and habitats that are protected from disturbance or are representative of the species historic geographic and ecological distribution.

extending eastward from Carquinez Strait, including Suisun Bay, Grizzly Bay, Honker Bay, Montezuma Slough and its tributary sloughs, up the Sacramento River to its confluence with Three Mile Slough, and south along the San Joaquin River including Big Break. Protection of this habitat is most important from February through the summer. The entire action area is within the rearing habitat primary constituent element. With the exception of August, the work window (August 1 through November 30) is mostly protective of the delta smelt rearing life stage. However, rearing delta smelt may be affected by the proposed action. With respect to adult migration, adults must be provided unrestricted access to suitable spawning habitat from December through July. Spawning areas include areas of the Sacramento and San Joaquin Rivers and tributaries, Cache Slough, Montezuma Slough, and tributaries. Although spawning habitat is not found in the action area, adult delta smelt begin migrating from the action area to spawning grounds September and October. The proposed action may affect adults migrating from the action area to spawning grounds during this timeframe; however, the affected area would be limited to the immediate dredging or placement zone, and would not substantially limit the available habitat or movement of fish (see also Impact 3.6-8).

Following sediment-disturbing activities such as dredging or the placement of dredged materials, disturbed areas are usually recolonized quickly by benthic organisms (Newell et al., 1998). The species that recolonize first are usually characterized by rapid growth and reproduction rates. Marine benthic invertebrates often colonize disturbed sedimentary habitats via pelagic larvae that settle from the water column. Crustaceans, such as amphipods that are abundant in San Francisco Bay, brood young to much more advanced stages than pelagic larvae, releasing what are essentially miniature adults into the sediment, and can rapidly colonize adjacent disturbed areas. Recovery may be slower in deep water channels; therefore, there is potential for some loss of habitat and forage to organisms that use deep water channels. This potential is minimal, because the federal deep-draft navigation channels are in a constant state of disturbance by deep-draft vessels that travel through the channels at a maximum of 15 knots under their own power. At a minimum, oil tankers can be as close as 3 feet to the channel bottom, and other vessels as close as 2 feet. Annually, approximately 3,800 vessel trips occur on Oakland Harbor channels; 2,300 vessel trips occur on Richmond Harbor channels; 2,300 to 4,000 vessel trips occur on Pinole Shoal Channel; 800 vessel trips occur on Suisun Bay and New York Slough channels; and 250 vessel trips occur on Redwood City Harbor channels. Under these conditions, the benthos of these highly-used channels, which are dredged annually, is in a constant state of disruption. The potential for habitat loss in channels that are dredged less frequently would be slightly greater, but still small due to disruption of benthos from frequent vessel traffic.

Studies have indicated that even relatively large areas disturbed by dredging activities are usually recolonized by benthic invertebrates within 1 month to 1 year, with original levels of biomass and abundance developing within a few months to between 1 and 3 years (Newell et al., 1998). Following dredging, disturbed areas are recolonized, beginning with mobile and opportunistic species (Oliver et al., 1977; Lenihan and Oliver, 1995). These species, characterized by rapid growth and reproduction, may or may not be the same species that were present in the area prior to the disturbance. San Francisco Bay harbors more nonindigenous benthic invertebrate species than any other aquatic ecosystem in North America (Cohen and Carlton, 1995). The introduced species range from approximately 20 to 80 percent of all species present (Lee et al., 1999), depending on the area of San Francisco Bay; recolonization would likely include nonindigenous species already present in the area.

During in-water placement in San Francisco Bay, benthic organisms would suffer burial followed by prolonged exposure to anaerobic conditions after the dumping has ceased. This would result in mortality of most of the organisms in the burial footprint; however, this would be a short-term effect because benthic habitat is quickly recolonized. The existing benthic communities at the in-Bay disposal sites have, over the years, reached an equilibrium that adjusts to the periodic disposal of dredged material.

Similarly, placement of dredged material (i.e., sand) at SF-17, SF-8, and along beach and intertidal habitat of Ocean Beach would cause temporary disturbance to benthic organisms; however, both the nearshore and the

shore environment along the coast of Ocean Beach are dynamic and high-energy environments that experience rapid sediment flux. Organisms that inhabit sandy intertidal and subtidal habitat have adaptations for surviving in areas of high sediment flux. Although placement operations would cause burial of the less mobile benthic community, the impact of those operations will be episodic and short term. Since 1972, similar types of impacts to the benthic community and other communities have been regularly occurring at SF-8; and at the Ocean Beach Disposal Sites since 2005. Studies on impacts of beach nourishment activities on the invertebrate community have shown that recovery of the benthic community at the beach and intertidal habitat generally takes place in on the order of a few weeks to months (USACE, 2013a).

At SF-DODS, physical alterations to benthic habitat at the disposal site could result from deposition of dredged sediments whose grain size and other physical characteristics differ from the native sediments at the site. These physical changes ultimately alter the community of benthic infaunal species at the site. However, these changes would not affect any unique or limiting habitats, would only occur within the boundaries of SF-DODS, and would affect only a very small proportion of the extensive, similar habitat throughout the region (LTMS, 1998). Therefore, benthic habitat effects at SF-DODS are considered to be negligible and would be similar to those that have occurred historically. Annual monitoring by USACE has confirmed that this disposal has occurred without causing significant impacts to the ocean and the marine biology in and around SF-DODS.

### **No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

Under all alternatives, USACE would continue maintenance dredging and dredged material placement for the projects it maintains in San Francisco Bay, and the frequency of dredging, volumes dredged, and federal standard placement site would be the same. Regardless of the dredging methods used, similar amounts of benthic habitat would be disturbed by dredging and dredged material placement. The USACE would continue to implement standard practices described in Chapter 2 that are intended to minimize the impacts of dredging and placement on the marine environment. As described above, the potential effects of benthic habitat disturbance would be short term and localized.

**NEPA Determination.** Under all alternatives, impacts on special-status species, critical habitat, and commercially valuable marine species from localized and temporary disturbances of benthic habitat would be less than significant.

**CEQA Determination.** Under all alternatives, impacts on special-status species, critical habitat, and commercially valuable marine species from localized and temporary disturbances of benthic habitat would be less than significant.

### **Impact 3.6-3: Potential Adverse Effects of Underwater Noise Generated During Maintenance Dredging on Special-Status Fish and Marine Mammals**

Mechanical and hydraulic dredges produce a complex combination of repetitive sounds that may be intense enough to cause adverse effects on fish and marine mammals, though the intensity, periodicity, and spectra of emitted sounds differ among the dredge types and the substrate being dredged. Clamshell dredges have a repetitive sequence of sounds generated by the winches, bucket impact with the substrate, closing and opening the bucket, and sounds associated with dumping the dredged material into the barge. The most intense sound impacts are produced during the bucket's impact with the substrate, with peak sound pressure levels (SPL) of 124 decibels (dB) measured 150 meters from the bucket strike location (Reine et al., 2002; Dickerson et al., 2001). Underwater noise is generated by hydraulic dredging equipment, including rotating cutter heads, pumps, propellers, suction pipes, and the drag head contacting the channel bottom. Noise produced by hopper dredges fluctuates; the most intense sounds are produced during loading or unloading. While underway, continuous noise from hopper dredges operating in a variety of environments has been measured to range from 125 to 150 dB (Reine et al., 2012). A hydraulic

cutterhead dredge can produce continuous noise in the range of 150 to 170 dB when measured 10 meters from the cutterhead (California Department of Water Resources, 2013), with noise levels varying with dredge size and sediment type. This is comparable to underwater noise levels of 160 to 180 dB root mean square (RMS)<sup>4</sup> produced by small boats and ships (MALSF, 2009).

The scientific knowledge of the effects of dredge-generated noise and sound waves on fishes is limited, and varies depending on the species. Effects may include behavioral changes, neurological stress, and temporary shifts in hearing thresholds. Studies on the effects of noise on anadromous Pacific coast fishes are primarily related to pile-driving activities. The interagency Fisheries Hydraulic Working Group has established interim criteria for noise impacts from pile driving on fishes. A peak SPL of 206 dB is considered injurious to fishes. Accumulated SPLs of 187 dB for fishes that are greater than 2 grams, and 183 dB for fishes below that weight, are considered to cause temporary shifts in hearing, resulting in temporarily decreased fitness (i.e., reduced foraging success, reduced ability to detect and avoid predators). The NMFS uses 150 dB as the threshold for adverse behavioral effects.

For marine mammals, NMFS criteria define exposure to underwater noises from impulse sounds at or above 160 dB RMS and continuous sounds at or above 120 dB as constituting harassment to marine mammals. NMFS has also determined that noises with SPLs above 180 dB RMS can cause injury to cetaceans (whales, dolphins, and porpoises), and SPLs above 190 dB RMS can cause injury to pinnipeds (seals and sea lions).

Injury to fish from peak noise (e.g., rupture of swim bladder) is not expected to occur, but behavioral effects (e.g., changes in feeding behavior, fleeing, startle responses) could occur. All fish, listed or otherwise, would experience the same effects. In comparison, commercial shipping vessels can produce continuous noise in the range of 180 to 189 dB (Reine and Dickerson, 2013). Although dredging could produce underwater noise that is considered to be harassment for marine mammals, it is comparable to that produced by commercial shipping vessels, which are common in the study area. Marine mammals are highly motile and would likely avoid areas of noise and disturbance from dredging operations.

The project alternatives' potential impact on the movement or migration of fish or wildlife species is addressed under Impact 3.6-7.

### **No Action/No Project Alternative and Proposed Action/Project**

As discussed above, underwater noise produced during dredging may have temporary adverse effects on fish and marine mammals, but would not be expected to cause injury to fish and marine mammals. These effects include fleeing, the cessation of feeding, or other behavioral changes. Additionally, fish exposed to underwater noise above the NMFS sound exposure level thresholds may experience temporary hearing threshold shifts. All dredging activities would take place in the federal navigation channels, which receive regular boat traffic, and therefore have high background levels of underwater noise.

**NEPA Determination.** Under the No Action Alternative and Proposed Action, temporary adverse effects to special-status fish and marine mammals from underwater noise would be less than significant.

**CEQA Determination.** Under the No Project Alternative and Project, temporary adverse effects to special-status fish and marine mammals from underwater noise would be less than significant.

### **Reduced Hopper Dredge Use Alternatives 1 and 2**

Impacts on fish and marine mammals from underwater noise during dredging would be lower in intensity but longer in duration under Reduced Hopper Dredge Use Alternatives 1 and 2, in comparison with the

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<sup>4</sup> Root-mean-square measures the average noise energy measured over a 35-millisecond period. Note that this is a different type of measurement than the peak sound or sound exposure level used to measure impacts to fish (NOAA, 2012).

No Action/No Project Alternative and Proposed Action/Project, because there would be increased use of mechanical dredges. As discussed above, mechanical dredges usually generate lower levels of underwater noise than hydraulic dredges; however, because dredging with a mechanical dredge and can take up to ten times longer than dredging with a hopper dredge, impacts would be longer in duration (USACE, 2013d). Under Reduced Hopper Dredge Use Alternative 1, Suisun Bay Channel/New York Slough and either Pinole Shoal or Richmond Outer Harbor would be dredged with clamshell-bucket equipment instead of a hopper dredge. Under Reduced Hopper Dredge Use Alternative 2, Suisun Bay Channel/New York Slough, Pinole Shoal, and Richmond Outer Harbor would all be dredged with clamshell-bucket equipment instead of a hopper dredge. Under both alternatives, San Bruno Channel in Redwood City Harbor would also be dredged with clamshell-bucket equipment instead of a hopper dredge.<sup>5</sup> All dredging activities would take place in the federal navigation channels, which receive regular boat traffic, and therefore have high background levels of underwater noise.

**NEPA Determination.** Under Reduced Hopper Dredge Use Alternatives 1 and 2, temporary adverse effects to fish and marine mammals from underwater noise would be less than significant.

**CEQA Determination.** Under Reduced Hopper Dredge Use Alternatives 1 and 2, temporary adverse effects to fish and marine mammals from underwater noise would be less than significant.

***Impact 3.6-4: Potential Adverse Effects from Entrainment on Special-Status or Commercially and Recreationally Important Marine Species, Not Including Delta Smelt and Longfin Smelt***

All forms of dredging have the potential to incidentally remove organisms from the environment with the dredged material, a process referred to as entrainment. Organisms on the dredged material may be entrained, in addition to organisms in the water column near the dredging apparatus. In general, smaller organisms with limited or no swimming capabilities are more susceptible to dredge entrainment. Mechanical dredging is generally accepted to entrain far fewer fish than hydraulic dredging, because little water is removed along with the sediment; but it still may remove demersal fish and crustaceans that live in or on the sediment. Entrained fish are likely to suffer mechanical injury or suffocation during dredging, resulting in mortality. Organisms that can survive entrainment, such as small crustaceans, would be transported and released with the dredged material, which may be at an upland location or in habitat unsuitable for the species.

**No Action/No Project Alternative and Proposed Action/Project**

Under the No Action/No Project Alternative, dredging and placement would continue to be limited to the work windows set out by NMFS, USFWS, and CDFW for the LTMS program—unless, through an additional consultation process, the appropriate agencies provide written authorization to work outside these windows. The agreed-upon LTMS work windows include seasonal avoidance of Dungeness crab, Pacific herring, delta smelt, steelhead, coho salmon, and Chinook salmon for dredging conducted in various portions of San Francisco Bay (Figure 2-6). The work windows have been established to avoid sensitive periods for these species (i.e., migration periods, spawning periods). In the past, dredging schedules have occasionally slipped for logistical or financial reasons, and dredging occurred outside of the LTMS work window for one or more species. In the event that this should occur in any year covered by this EA/EIR, USACE would initiate an additional consultation process with the appropriate agencies to obtain written authorization to work outside these windows.

Dredging would be conducted in accordance with the standard practices described in Section 2.3.2, which include measures to reduce the potential for entrainment. The USACE would also implement appropriate measures to minimize impacts to EFH, as detailed in the *Agreement on Programmatic EFH Conservation Measures for Maintenance Dredging Conducted Under the LTMS Program* (USACE and USEPA, 2011).

<sup>5</sup> San Bruno Channel is dredged at intervals of 10 years or greater.

There is currently no work window approved for green sturgeon; this species is presumed present throughout the Estuary year-round. Green sturgeon spawn in the Sacramento River, which is outside the study area. Although juvenile and adult green sturgeon are expected to be present in the Estuary during dredging, it is generally believed they would be motile enough to avoid entrainment. The LTMS agencies are in the process of updating the LTMS Programmatic ESA consultation with NMFS to include green sturgeon. The updated consultation would satisfy ESA compliance for green sturgeon for USACE future maintenance dredging under the LTMS program.

Demersal fish species (e.g., Pacific staghorn sculpin, Pacific sanddab), which live and feed on and near the bottom, have a higher potential to be entrained with the sediment. Although some of these fish may be entrained, these are not special-status species. The minimum mortality to these bottom species, if any, would have no significant effect on their population numbers or species survival.

Under the Proposed Action/Project, USACE would dredge a ½-mile portion of Bulls Head Reach (just east of the Benicia-Martinez Bridge in Suisun Bay Channel) outside the LTMS work window, as warranted by conditions, to remove the hazardous shoal that can form quickly at this location. Removal of the shoal would likely involve 1 to 5 days of dredging to clear the hazard area to the authorized depth (35 feet MLLW), plus 2 feet of overdepth. The dredge equipment used would be based on availability, and dredging could be completed by either mechanical or hopper equipment. Dredging that occurs outside of the LTMS windows is more likely to result in entrainment, or to have other adverse effects on special-status or commercially important species. The potential for entrainment would be reduced with the use of a mechanical dredge. All other maintenance dredging under the Proposed Action would be scheduled to occur during the LTMS work windows.

**NEPA Determination.** With implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment, effects to special-status and commercially important species resulting from entrainment would be less than significant under the No Action Alternative and Proposed Action.

**CEQA Determination.** Effects to special-status and commercially important species resulting from entrainment would be significant under the No Project Alternative and Project, but would be reduced to less than significant with implementation of the LTMS work windows, and other standard practices intended to reduce the potential for entrainment.

### **Reduced Hopper Dredge Use Alternatives 1 and 2**

Impacts to special-status and commercially valuable marine species resulting from entrainment during dredging would be slightly lower under Reduced Hopper Dredge Use Alternatives 1 and 2, in comparison with the No Action/No Project Alternative and Proposed Action/Project, because there would be a decreased use of hopper dredges. Mechanical dredges are less likely to entrain fish and other animals when compared to hopper dredges. Under Reduced Hopper Dredge Use Alternative 1, Suisun Bay Channel/New York Slough and either Pinole Shoal or Richmond Outer Harbor would be dredged with clamshell-bucket equipment instead of a hopper dredge. Under Reduced Hopper Dredge Use Alternative 2, Suisun Bay Channel/New York Slough, Pinole Shoal, and Richmond Outer Harbor would all be dredged with clamshell-bucket equipment instead of a hopper dredge. Under both alternatives, San Bruno Channel in Redwood City Harbor would also be dredged with clamshell-bucket equipment instead of a hopper dredge.<sup>6</sup>

As described under the No Action/No Project Alternative and Proposed Action/Project, impacts to special-status and commercially valuable marine species from entrainment during dredging would be

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<sup>6</sup> San Bruno Channel is dredged at intervals of 10 years or longer.

minor with implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment.

**NEPA Determination.** With implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment, effects to special-status and commercially important species resulting from entrainment would be less than significant under Reduced Hopper Dredge Use Alternatives 1 and 2. The potential for impacts would be reduced compared to the No Action Alternative and Proposed Action.

**CEQA Determination.** Effects to special-status and commercially important species resulting from entrainment would be significant under Reduced Hopper Dredge Use Alternatives 1 and 2, but would be reduced to less than significant with implementation of reduced hopper dredge use, the LTMS work windows, and other standard practices intended to reduce the potential for entrainment. Impacts would be less than under the No Project Alternative and Project.

### ***Impact 3.6-5: Potential Substantial Adverse Effects and Cumulative Impacts to Delta Smelt from Entrainment***

Delta smelt are not strong swimmers, and are presumed susceptible to entrainment in the flow fields created around drag heads of trailing suction dredges. There is also a potential for entrainment during water intake for flushing of hopper dredges. Although entrainment may impact the numbers of delta smelt, because entrainment does not permanently impact or remove habitat, dredging is not likely to impact the species' range. All dredge areas that are part of the proposed project are currently maintained for boat traffic, have been maintained for several decades, and therefore are regularly disturbed. For this reason, continued dredging is not expected to further reduce habitat quality for the species.

As described in Section 3.6.2, delta smelt have potential to occur in the portions of the Estuary that include the Napa River Channel, San Pablo Bay/Mare Island Strait, and Suisun Bay Channel dredge areas during certain seasons. Delta smelt occur in San Pablo Bay in lower numbers than in the Napa River or Suisun Bay; however, they may be present in San Pablo Bay in increased numbers during high water outflow years. Delta smelt are not expected to occur in the other federal channels. Entrained fish would likely be killed either through physical injury during entrainment or suffocation in the collected dredged material. Because delta smelt typically occur in the upper portion of the water column, entrainment is more likely when dredging in shallow waters or when the drag head is lifted from the bottom (Sweetnam and Stevens, 1993). To reduce delta smelt entrainment, LTMS uses a depth of 10 feet to distinguish between "shallow" and deeper waters when implementing work windows for delta smelt.

Overall abundances of delta and longfin smelt in the environment were analyzed for spatial and temporal patterns using CDFW monitoring database from 2002 to 2011. CDFW conducts monthly otter trawls (San Francisco Bay Study) and midwater trawl (San Francisco Bay Study and Fall Midwater Trawl Study) surveys at both channel and shoal stations throughout San Francisco Estuary. This trawl data is used to build yearly abundance indices for delta smelt. Delta smelt abundance in San Francisco Bay was relatively high in 2011 when the smelt entrainment study, discussed below, was conducted,<sup>7</sup> compared to data from recent years (ERDC, 2013). The delta smelt abundance index for 2011 was 234, more than ten times higher than the preceding 6 years (CDFW 2014b). The 2012 monitoring data indicated a population drop, with an abundance index of 42 (CDFW 2014b). The 2011 entrainment levels could be

<sup>7</sup> The ERDC study was based on entrainment data collected during a year (i.e., 2011) with higher than normal outflow, pushing the low salinity zone further downstream into the Suisun Bay region. Between January and March 2011, the mean water outflow was approximately 57,200 cubic feet per second, which was significantly higher than previous years, except 2006 (ERDC, 2013). The mean outflow during September and October was also high, averaging 12,200 cubic feet per second. The high outflows resulted in approximately 8,366 hectares of low salinity zone habitat and an increased habitat suitability index (USGS, 2014), compared to typical years with less outflow.

correlated to the higher overall abundance of delta smelt in Suisun Bay. In years with normal or below average outflow, delta smelt entrainment could be lower.

**Entrainment Estimates.** An entrainment modeling study of delta and longfin smelt in San Francisco Bay by hydraulic dredges was prepared by the United States Army Engineer Research and Development Center (ERDC) (ERDC, 2013). In the study, the risk of smelt entrainment was assessed by comparing fish abundances in the environment (CDFW monthly trawls described above) to fish collections in entrainment monitoring samples (screened sub-samples of dredged material). Fish entrainment samples were collected during dredging in San Francisco Bay in 2010 and 2011. In June 2010, 62 samples were collected from 32 hopper loads during dredging of Pinole Shoal in San Pablo Bay by the hopper dredge *Essayons* (McGowan, 2010). In 2011, 228 samples were collected during dredging by the hopper dredge *Essayons* in the Central Bay (Richmond Harbor), San Pablo Bay (Pinole Shoal), and Suisun Bay (Suisun Bay Channel and New York Slough) (Gold et al., 2011).

Four delta smelt were collected in entrainment samples (each consisting of less than one percent of the total sediment in a load) from four hopper loads in 2011, all of which occurred in Suisun Bay. No delta smelt were collected during the 2010 entrainment sampling. There were no obvious associations between the collection of delta smelt in entrainment samples and environmental parameters; as noted in the study, a larger sample size of dredged sediment, including any entrained fish, may allow clearer associations between environmental factors and entrainment susceptibility (ERDC, 2013).

As part of the entrainment modeling study, the number of delta smelt entrained in 2011 was extrapolated using a variety of analytical techniques<sup>8</sup> based on the number of smelt collected in the 2011 entrainment samples and the percentage of hopper loads that were monitored; the 2010 monitoring results were not used in the modeling study.

Although the numbers of fish collected in the entrainment monitoring are fixed values, the appropriate volume of dredged material used to extrapolate the entrainment rate estimate varies depending on what dredging and environmental scenarios are considered relevant. For this reason, a range of entrainment rate estimates (low, moderate, and high entrainment scenarios) were calculated using the 2011 entrainment monitoring data. Low, moderate, and high entrainment rate estimate calculations are defined as:

- Low – number of smelt collected divided by the total volume of all entrainment samples (includes zero catches) in each embayment for the month of sampling
- Moderate (i.e., Medium) – number of smelt collected divided by the total volume sampled on days delta smelt were entrained (includes zero catches) for each embayment.
- High – number of smelt collected divided by the volume of that sample.

Many factors are associated with the accuracy of these projections. The small sample size of entrained fish (18 longfin smelt and 4 delta smelt), combined with the overall low percentage of dredge material sampled result in uncertainty as to the accuracy of the entrainment estimates. In addition, there may be unidentified factors that influence entrainment. Modeled estimates of delta smelt entrainment during hydraulic dredging in 2011 based on 2011 abundance indices are 394 for the low entrainment scenario, 1,444 for the medium entrainment scenario, and 3,694 for the high entrainment scenario.

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<sup>8</sup> The ERDC's study assesses entrainment risk using three methods: 1) dredged material volume extrapolation based on the number of fish entrained during the 2011 entrainment monitoring and percentage of material sampled; 2) flow-field models using hopper suction velocities at varying distances from the drag head and smelt swimming performance; and 3) a Poisson distribution analysis.

**Population-Level Effects.** As part of the entrainment modeling study, the impact of the low, medium, and high levels of entrainment on the future of the delta smelt population was further modeled using Population Viability Analysis (PVA). This technique is often used to forecast the probability of future declines in population size, taking into consideration the significant variability of natural processes and substantial knowledge gaps. Case histories show that PVA-predicted results do not differ significantly from observed trends in population trajectories (Brook et al., 2000). Because dredging of the federal channels has been ongoing for many years, population projections with losses due to dredging entrainment are considered to be the baseline. The baseline is compared to projections with reduced losses due to dredge entrainment, either through the cessation of dredging or successful implementation of entrainment reduction measures. The difference between these projections provides an estimate of the population level effects of dredging over the next 30 years. With baseline conditions (dredging continues as it has in the past), the modeling predicts a 50 percent chance that delta smelt populations will be reduced by more than 60 percent in 30 years. If a high level of current entrainment (3,694 delta smelt) is assumed, and entrainment was completely eliminated in future dredging, the modeling predicts a 38 percent chance that delta smelt populations will still be reduced by more than 60 percent in 30 years (ERDC, 2013).

For delta smelt, dredging impacted abundance and probability of decline under the medium and high estimates of entrainment. For low estimates of entrainment, reductions in population numbers were less than 2 percent, and there was no increase in the probability of a population decline. For medium and high estimates of entrainment, dredging resulted in a 9 to 29 percent reduction in median population abundance and increased the probability of observed decline (greater than 60 percent over 30 years) by 3 to 12 percent. However, for medium and high estimates of entrainment, the proposed entrainment reduction measures reduced impacts to abundance by approximately one third, and probability of decline by approximately half; additional entrainment reduction measures have been included under the action alternatives.

Because inter-annual variation in population size is high, in both nature and in the model simulations, and is highly correlated with freshwater flow, changes in median abundance less than 60 percent may not be functionally significant because abundance naturally fluctuates more than an order of magnitude (ERDC, 2013). Importantly, the results of the entrainment study highlight that the risk of populations decline is due to factors other than dredging-related entrainment. For delta smelt, under any estimate of entrainment, abundance declines greater than 75 percent are attributable to factors other than dredging.

In its 2014 biological opinion for maintenance dredging the Suisun Bay Channel using a hopper dredge, the USFWS analyzed the ERDC entrainment risk assessment and concluded that the high entrainment levels are potentially overstated because delta smelt are patchily distributed in the Estuary, which would limit their exposure. The risk assessment assumed fish are uniformly distributed in the dredged material and process water. Furthermore, the risk assessment used all 2011 dredge samples to extrapolate the number of entrained delta smelt, rather than only the Suisun Bay Channel samples where the fish are most likely to be present. The USFWS concluded that the 2014 dredging of the Suisun Bay Channel would not jeopardize the continued existence of delta smelt and provided measures to further minimize potential entrainment, including:

- Lowering the drag head to at least 3 feet from the bottom of the channel prior to turning on pumps (which is included as a best management practice [BMP] under all alternatives), and
- Keeping the drag head water intake doors closed to the maximum extent practicable (this measure is included under the action alternatives) (USFWS, 2014).

**Potential Impacts from Cutterhead Dredging.** Cutterhead dredges would be used to dredge the Napa River Channel, Petaluma River Channel, and San Leandro Marina. Cutterheads used to dredge the federal navigation channels in San Francisco Bay are small—with a pipe diameter of only 10 inches

(ERDC, 2013). The entrainment study assumed, because the volume of entraining flow generated by a cutterhead dredge is 1 to 2 orders of magnitude lower than that generated by a hopper dredge, that entrainment of smelt by cutterhead is inconsequential (ERDC, 2013). This contention is supported by a 2006 monitoring study conducted in a smaller body of water (i.e., Port Sonoma Marina), in which smelt were present and rate of entrainment by a 10-inch cutterhead dredge was negligible (ERDC, 2013). During that study, entrainment of a single longfin smelt was documented in 2006, and no longfin smelt were entrained in 2007, during a fourfold increase in the sampling effort. The conclusion by the researchers was that “risk of longfin smelt entrainment is very low” from cutterhead dredging. In addition, entrainment impacts from cutterhead dredging in the Napa and Petaluma rivers and San Leandro Marina would be avoided by conducting hydraulic dredging in these locations when water temperatures are above 22 degrees Celsius, in accordance with the existing avoidance measure identified in coordination with CDFW, to the extent feasible. Therefore, potential entrainment during cutterhead dredging operations is not further analyzed in this EA/EIR.

### **No Action/No Project Alternative**

Under the No Action/No Project Alternative, USACE would continue current maintenance dredging practices for the projects it maintains in San Francisco Bay, as described in Section 2.3.2. These practices include the following measures to reduce the potential for entrainment of delta smelt from hydraulic dredging:

- Dredging may proceed anywhere when water temperature exceeds 22.0°C;<sup>9</sup>
- No dredging would occur in water ranging from 0 to 5 parts per thousand salinity between December 1 and June 30;
- At the beginning and end of each hopper load, pump priming, drag head clearing, and suction of water would be conducted within 3 feet of the seafloor;
- Hopper drag head suction pumps would be turned off when raising and lowering the drag arms from the seafloor when turning the dredge vessel; and
- The USACE would implement a worker education program for listed fish species that could be adversely impacted by dredging. The program would include a presentation to all workers on biology, general behavior, distribution and habitat needs, sensitivity to human activities, legal protection status, and project-specific protective measures. Workers would also be provided with written materials containing this information.<sup>10</sup>

These measures reduce the likelihood of delta smelt being present during dredging, and reduce the potential for delta smelt to become entrained through the drag heads.

The USACE would undertake mitigation, as appropriate, in meeting its compliance requirements. In the past, USACE purchased a total of 1.4 mitigation credits at the Liberty Island Conservation Bank for potential impacts to listed species for 2011 and 2012 maintenance dredging activities in San Francisco Bay.

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<sup>9</sup> If hydraulic maintenance dredging occurs when water temperatures are less than 22 degrees Celsius, USACE would coordinate mitigation, as appropriate, with USFWS, NMFS, and CDFW at the times such dredging episodes occur.

<sup>10</sup> The USACE has implemented this program in compliance with a condition in the San Francisco Bay Conservation and Development Commission’s Letter of Agreement for USACE’s coastal zone consistency determination for maintenance dredging in San Francisco Bay. Although the condition in the Letter of Agreement was specific to longfin smelt, USACE’s worker education program, overseen by a USACE regional fisheries biologist, also includes information on other special-status fish species that could be impacted by dredging activities (i.e., those fish species considered in the LTMS work windows).

Dredging and placement would continue to be limited to the work windows set out by NMFS, USFWS, and CDFW for the LTMS program—unless, through an additional consultation process, the appropriate agencies provide written authorization to work outside these windows. The agreed-upon LTMS work windows include seasonal avoidance of delta smelt for dredging conducted between the Carquinez Bridge and Collinsville and in the Napa River (Figure 2-6). Although USACE would dredge Suisun Bay Channel and New York Slough during the LTMS work window for delta smelt in this area (August 1 through November 30), because entrainment of delta smelt has been documented during past USACE maintenance dredging, USACE would consult annually with USFWS to address incidental take of delta smelt during dredging of Suisun Bay Channel and New York Slough.

**NEPA Determination.** Under the No Action Alternative, hopper dredging would continue in Richmond Outer Harbor, Pinole Shoal, and Suisun Bay Channel and New York Slough using BMPs and mitigation identified above.<sup>11</sup> ERDC's entrainment study was modeled on the No Action Alternative, which concludes that entrainment impacts to the population would not be significant. The ERDC study was based on entrainment data collected during a year with higher-than-normal outflow, pushing the low-salinity zone further downstream into the Suisun Bay region, and delta smelt abundances were also higher in Suisun Bay during the entrainment monitoring. It is likely that during typical outflow years, delta smelt entrainment risk would be reduced because fish are likely to be congregating further upstream. The entrainment study also likely overstates the levels of entrainment, because delta smelt are patchily distributed in the Estuary, which would limit their exposure; and because the risk assessment uses all 2011 dredge samples to extrapolate the number of entrained delta smelt, rather than only the Suisun Bay Channel samples where the fish are most likely to be present.

In addition to continuing to employ BMPs to reduce entrainment risk, the USACE proposes to continue purchasing compensatory mitigation credits at the Liberty Island Conservation Bank, or other approved site, to mitigate for fish entrainment. As noted above, USACE purchased a total of 1.4 mitigation credits at the Liberty Island Conservation Bank for potential impacts to listed species for 2011 and 2012 maintenance dredging activities in San Francisco Bay.

Based on ERDC's conclusion that entrainment impacts under the No Action Alternative would result in negligible impacts to delta smelt populations, and with the continued purchase of compensatory mitigation credits, the potential entrainment impacts on delta smelt are expected to be less than significant. Although the project could contribute to cumulative impacts on delta smelt, the project's contribution, compared to that from water export facilities and other factors, to cumulative impacts would not be significant.

**CEQA Determination.** The ERDC entrainment modeling study, using 2011 entrainment monitoring data, estimated the annual range of entrainment due to hopper dredging to be 394 to 3,694 delta smelt, or up to approximately 29 percent of the median annual population abundance. The study also concluded that the medium and high estimates of dredging entrainment increased the probability of observed population decline by 3 to 12 percent. Over the past decade, abundance indices for various life stages of delta smelt have hit record lows as indicated by CDFW survey data.<sup>12</sup> Based on this survey data indicating that the species is in imminent danger of extinction, the state elevated its listing status from threatened to endangered in 2010.

Based on the administrative record and the discussion above, there is a significant impact to delta smelt under CEQA. In addition, the No Project Alternative includes 10 years of dredging operations, which, as proposed, and as summarized above, are likely to substantially reduce the number of delta smelt. In

<sup>11</sup> Although San Bruno Channel in Redwood City Harbor would also be dredged with a hopper dredge under the No Action Alternative, this channel is outside the range of delta smelt.

<sup>12</sup> Annual abundance indices of delta smelt from 20 mm survey (larvae and juveniles, 1995-2012); summer townet survey (juveniles; 1959-2012); and fall midwater trawl survey (subadults; 1967-2012).

addition to the project's impacts being individually significant, other activities are also causing significant take of delta smelt, as described above. Therefore, the cumulative impacts of this project, considered with the impacts of other projects causing related impacts, are significant.

### Proposed Action/Project

Under the Proposed Action/Project, the dredge equipment type, frequency of dredging, and volumes dredged would be the same as under the No Action/No Project Alternative. Over the next 10 years, dredging and placement of dredged materials would be conducted in accordance with the conditions described under the No Action/Project Alternative to protect delta smelt, as well as the following additional conditions identified in Section 2.3.3:

- Completing hydraulic dredging in Suisun Bay between August 1 and September 30, to the extent feasible, to avoid impacts to spawning adult longfin and delta smelt;
- Maintaining contact of drag head, cutterheads, and pipeline intakes with the seafloor during suction dredging;<sup>13</sup> and
- Closing the drag head water intake doors in locations most vulnerable to entraining or entrapping smelt. In circumstances when the doors need to be opened to alleviate clogging, the doors would be opened incrementally (i.e., the doors would be opened in small increments and tested to see if the clog is removed) to ensure that doors are not fully opened unnecessarily. It may take multiple iterations to fine tune the exact intake door opening necessary to prevent clogging. For each project, the intake door opening will be different because the sediment in each location is different. The sediment physical characteristics (e.g., sand versus mud) determine how much water is needed to slurry the sediment adequately. Typically, the drag arms do not clog when dredging areas composed mostly of sand.

These measures would further reduce the likelihood of delta smelt being present during dredging, and the potential for delta smelt to become entrained compared to the No Action/No Project Alternative.

The USACE would purchase 0.92 acre mitigation credit at the Liberty Island Conservation Bank annually for potential impacts to listed species. The 0.92 acre mitigation credit was calculated from CDFW formula (3.0 million acre-feet/800 acres = volume dredged\*/X acres of mitigation habitat) used by the Central Valley Water Project and State Water Project to determine the mitigation requirements for hydraulically pumping water from the Delta, which is considered adequate mitigation for the water projects. For volume dredged, available government-hopper-dredge-pumped water volumes for 2006 through 2012 were reviewed. The highest volume for each of the in-Bay channels (Pinole Shoal, Richmond Outer Harbor, and Suisun Bay Channel/New York Slough) from this period was used in the calculation. Of the 0.92 acre mitigation credit, 0.19 acre mitigation credit would be for Pinole Shoal, 0.34 acre mitigation credit would be for Richmond Outer Harbor, and 0.39 acre mitigation credit would be for Suisun Bay Channel and New York Slough. The 0.92 acre mitigation credit per year is expected to be more than the credit needed based on actual future annual maintenance dredging volumes.

The Bulls Head Reach is located in critical habitat for the delta smelt, and delta smelt are expected to occur in that location, at least seasonally. Because urgent action dredging of the Bulls Head Reach may occur at any time of year and would not conform to the LTMS work windows for delta smelt, it is likely that some delta smelt would be entrained during some dredging episodes when a hopper dredge is used. The potential for entrainment would be reduced with the use of a mechanical dredge. Because the extent

<sup>13</sup> The seafloor surface is not uniform and is undulating, which could cause the drag head to lose contact with the seafloor. The hopper dredge also has to contend with sea state (i.e., swells and wave action) in the bay which also affects the drag heads contact with the channel bottom. The dredge's swell compensator provides an opposing force to maintain contact with the seafloor when the bottom is uneven or there is wave/swell action.

and frequency of critical dredging episodes cannot be predicted, appropriate mitigation for these episodes, if warranted based on expected impacts, would be determined in coordination with regulatory agencies at time they occur.

**NEPA Determination.** Although delta smelt could be entrained by hopper dredging, the anticipated entrainment is not expected to result in substantial declines in populations. Impacts would be reduced, compared to the No Action Alternative, by the additional minimization measures and compensatory mitigation under the Proposed Action. The entrainment study was based on existing hopper dredging practices in San Francisco Bay (i.e., not the Proposed Action); therefore, it does not account for the avoidance and minimization measures identified by USFWS, or for additional minimization measures identified in the ERDC report to further reduce the risk of entrainment. The Proposed Action includes these avoidance and minimization measures to reduce the risk of delta smelt entrainment. The ERDC study also does not account for compensatory mitigation proposed in the Draft EA/EIR. In its March 14, 2014, letter to the Regional Water Board, CDFW indicated that the proposed 0.92 acre mitigation credit of restored and managed tidal wetlands per year as compensatory mitigation to reduce impacts to fish is generally consistent with mitigation to other projects that cause take of delta smelt associated with water diversions or extractions. Therefore, with the proposed minimization measures and compensatory mitigation, it is expected that the Proposed Action would result in a less-than-significant impact on delta smelt. Although the project could contribute to cumulative impacts on delta smelt, the project's contribution, compared to that from water export facilities and other factors, to cumulative impacts would not be significant.

**CEQA Determination.** The ERDC entrainment modeling study, using 2011 entrainment monitoring data, estimated the annual range of entrainment due to hopper dredging to be 394 to 3,694 delta smelt, or up to approximately 29 percent of the median annual population abundance. The study also concluded that the medium and high estimates of dredging entrainment increased the probability of observed population decline by 3 to 12 percent. Over the past decade, abundance indices for various life stages of delta smelt have hit record lows, as indicated by CDFW survey data.<sup>14</sup> Based on survey data indicating that the species is in imminent danger of extinction, the state elevated its listing status from threatened to endangered in 2010. In a letter to the Regional Water Board dated March 14, 2014, the CDFW noted the above figures concerning entrainment, and stated that "the Project, as proposed, would substantially reduce the number of an endangered, rare, or threatened species."

Based on the administrative record and the discussion above, there is a significant impact to delta smelt under CEQA. In addition, the Proposed Action/Project includes 10 years of dredging operations, which, as proposed, and as summarized above, are likely to substantially reduce the number of delta smelt. In addition to the project's impacts being individually significant, other activities are also causing significant take of delta smelt, as described above. Therefore, the cumulative impacts of this project, considered with the impacts of other projects causing related impacts, are significant.

### **Reduced Hopper Dredge Use Alternative 1**

Under this alternative, use of a hopper dredge for maintenance dredging of the federal navigation channels would be reduced, compared to the No Action/No Project Alternative and Proposed Action/Project. Under Reduced Hopper Dredge Use Alternative 1, a hopper dredge would only be used to dredge the MSC, and either the Richmond Outer Harbor or the Pinole Shoal Channel, annually. Dredging of the in-Bay channel would occur within the LTMS work window (Figure 2-6), or after an individual consultation is conducted with the appropriate regulatory agencies to allow dredging to be performed outside the work window.

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<sup>14</sup> Annual abundance indices of delta smelt from 20 mm survey (larvae and juveniles, 1995-2012); summer townet survey (juveniles; 1959-2012); and fall midwater trawl survey (subadults; 1967-2012).

The channel not selected as the additional hopper dredge channel (i.e., either Pinole Shoal or Richmond Outer Harbor) would be dredged with a mechanical dredge. Because Richmond Outer Harbor is outside the range of delta smelt, the potential for impacts would be less when this channel is dredged with hopper dredge than when Pinole Shoal is dredged with a hopper dredge, especially during high outflow years when delta smelt may be present in San Pablo Bay in increased numbers. In addition, Suisun Bay Channel and New York Slough Channel would be dredged with a mechanical dredge under this alternative, instead of a hopper dredge; the potential exception being urgent action dredging of the Bulls Head Reach, which could be conducted with either a mechanical or hopper dredge. All other dredging, placement activities, and minimization measures would be as described for the Proposed Action/Project.

Because reduced hopper use would not be implemented until fiscal year 2017, as described in Section 2.3.4, USACE would purchase 0.92 acre mitigation credit at Liberty Island Conservation Bank for potential impacts to listed species in fiscal years 2015 and 2016. Beginning in fiscal year 2017, the USACE would purchase 0.19 acre mitigation credit at the Liberty Island Conservation Bank annually for potential impacts to listed species if Pinole Shoal is dredged with a hopper. If Richmond Outer Harbor is dredged with a hopper, USACE would purchase 0.34 acre mitigation credit at the Liberty Island Conservation Bank annually for potential impacts to listed species. This is expected to be more than the credit needed based on actual future annual maintenance dredging volumes.

As discussed above, mechanical dredges are unlikely to cause entrainment of delta smelt, and hopper dredges are expected to entrain delta smelt. A reduction in the use of hopper dredges in the Suisun Bay Channel/New York Slough, which is within the range of delta smelt, would further reduce the effects to delta smelt resulting from dredge entrainment compared to the Proposed Action/Project. Because the MSC, Pinole Shoal Channel, and Richmond Outer Harbor are not within the typical range of the delta smelt, the potential adverse effects to delta smelt resulting from dredge entrainment would be largely eliminated under this alternative. Because urgent action dredging of the Bulls Head Reach may occur at any time of year and would not conform to the LTMS work windows for delta smelt, it is likely that some delta smelt would be entrained during some dredging episodes when a hopper dredge is used. The potential for entrainment would be reduced with the use of a mechanical dredge. Because the extent and frequency of critical dredging episodes at Bulls Head Reach cannot be predicted, appropriate mitigation for these episodes, if warranted based on expected impacts, would be determined in coordination with regulatory agencies at time they occur.

**NEPA Determination.** Although delta smelt could be entrained by hopper dredging, the anticipated entrainment is not expected to result in substantial declines in populations. In its March 14, 2014, letter to the Regional Water Board, CDFW indicated that USACE's proposed compensatory mitigation is generally consistent with mitigation to other projects that cause take of delta smelt. Therefore, with the proposed minimization measures and compensatory mitigation, it is expected that the Proposed Action would result in a less-than-significant impact on delta smelt. Although the project could contribute to cumulative impacts on delta smelt, the project's contribution, compared to that from water export facilities and other factors, would not be significant. Under Reduced Hopper Dredge Use Alternative 1, any project and cumulative impacts would be reduced compared to the No Action Alternative and Proposed Action.

**CEQA Determination.** This Alternative reduces hopper dredging to one in-Bay channel per year, implements specific minimization measures, and provides compensatory mitigation for the one channel that is hopper-dredged. Hopper dredging of Richmond Outer Harbor as the sole in-Bay channel, which is outside the normal range of delta smelt, would result in greater impact reduction than hopper dredging in Pinole Shoal Channel, which is near the western extent of their range. Hopper dredging in Pinole Shoal could result in a significant and unavoidable impact to delta smelt, both individually and cumulatively with other activities causing take of delta smelt over the 10-year life of the Project. This impact, however, would be mitigated to a less-than-significant level with minimization of hopper dredge use, as

contemplated by this alternative, and successful implementation of the proposed minimization measures and compensatory mitigation described above.

### **Reduced Hopper Dredge Use Alternative 2**

Under Reduced Hopper Dredge Use Alternative 2, a hopper dredge would only be used to dredge the MSC. Pinole Shoal, Richmond Outer Harbor, Suisun Bay Channel, and New York Slough would be dredged with a mechanical dredge under this alternative, instead of a hopper dredge; the potential exception being urgent action dredging of the Bulls Head Reach in Suisun Bay Channel, which could be conducted with either a mechanical or hopper dredge. All other dredging, placement activities, and minimization measures would be as described for the Proposed Action/Project. Because reduced hopper use would not be implemented until fiscal year 2017, as described in Section 2.3.4, USACE would purchase 0.92 acre mitigation credit at Liberty Island Conservation Bank for potential impacts to listed species in fiscal years 2015 and 2016.

As discussed above, mechanical dredges are unlikely to cause entrainment of delta smelt, although hopper dredges are expected to entrain delta smelt. Because the MSC is not within the range of the delta smelt, the potential adverse effects to delta smelt resulting from dredge entrainment would be largely eliminated under this alternative. Therefore, no compensatory mitigation is proposed for fiscal years 2017 through 2024.

Because urgent action dredging of the Bulls Head Reach may occur at any time of year and would not conform to the LTMS work windows for delta smelt, it is likely that some delta smelt would be entrained during some dredging episodes when a hopper dredge is used. The potential for entrainment would be reduced with the use of a mechanical dredge. Because the extent and frequency of critical dredging episodes at Bulls Head Reach cannot be predicted, appropriate mitigation for these episodes, if warranted based on expected impacts, would be determined in coordination with regulatory agencies at time they occur.

**NEPA Determination.** With the elimination of hopper dredging inside San Francisco Bay, the potential for entrainment of delta smelt would be largely eliminated under Reduced Hopper Dredge Use Alternative 2. Project and cumulative impacts would be less than significant.

**CEQA Determination.** This alternative eliminates hopper dredging inside San Francisco Bay, thus largely eliminating the potential for entrainment of delta smelt. Project and cumulative impacts would be less than significant.

### **Impact 3.6-6: Potential Substantial Adverse Effects and Cumulative Impacts to Longfin Smelt from Entrainment**

Smelt are not strong swimmers, and longfin smelt in particular are known to occur near the bottom of the water column (CDFG, 2009a). As a result, they are presumed susceptible to entrainment in the flow fields created around drag heads of trailing suction dredges. Longfin smelt have potential to occur, at least in low numbers, in any of the project dredge areas during any season. Although entrainment may impact the numbers of longfin smelt, because entrainment does not permanently impact or remove habitat, dredging is not likely to impact the species' range.

As described in Section 3.6.2, longfin smelt have potential to occur throughout much of the San Francisco Bay Estuary, and populations are seasonally concentrated in certain portions of the estuary. The densities of longfin smelt in Estuary are lowest in the autumn, when spawning adults have moved upstream and before larval smelt have moved down into the Estuary. During the winter and spring months, larval longfin smelt are concentrated in Suisun and San Pablo bays, but are present in the Central and South bays in lower densities. Juveniles and adults are present throughout the Estuary at all times of year, but

the majority of the population is concentrated in the Suisun, San Pablo, and Central bays, as well as nearshore waters during the summer months. As described under Impact 3.6-5, a study of entrainment of delta and longfin smelt in San Francisco Bay by hydraulic dredges was prepared by the ERDC (ERDC, 2013).

As described under Impact 3.6-5, abundances of delta and longfin smelt in the environment were analyzed for spatial and temporal patterns using CDFW monitoring trawl data from 2002 to 2011. This trawl data is used to build yearly abundance indices for longfin smelt. Longfin smelt abundances in San Francisco Bay were relatively high in 2011 and low in 2010 when the smelt monitoring study was conducted (ERDC, 2013), which is consistent with the corresponding high and low delta outflows for the respective years.

**Entrainment Estimates.** As described under Impact 3.6-5, an entrainment modeling study of delta and longfin smelt in San Francisco Bay by hydraulic dredges was prepared by the ERDC (ERDC, 2013). Entrainment sampling was conducted in 2010 and 2011, though no smelt were collected in the 2010 sampling. During the 2011 entrainment sampling, 228 hopper loads were sampled. Eighteen longfin smelt were collected from 12 hopper loads. For the each load sampled, including the 12 hopper loads where smelt were entrained, less than 1 percent of the total load was sampled. Entrainment of approximately one-third of the individuals during the 2011 monitoring occurred when the pumps were running with the drag heads at mid water column; typically, the dredge is only suctioning when the drag heads are just above (within 3 feet) of the bottom or on the bottom. Longfin smelt were collected in the 2011 entrainment samples in the Central Bay, San Pablo Bay, and Suisun Bay, but only during the portion of the tidal cycle when tidal currents are strongest. The majority were entrained in the Central Bay (12 fish), while three fish were entrained in San Pablo Bay, and three fish in Suisun Bay. No correlations were found between tidal direction (ingoing or outgoing) or time of day (day versus night) and the incidence of longfin smelt entrainment. The percentages of samples with entrained fish of any species were positively correlated with daily tidal range in Central Bay, with more fish being entrained on days where the tidal range is greatest (i.e., spring tides) and tidal currents strongest; it should be noted that this result is based on only one sampling year(2011). Fish may respond to stronger tidal currents by orienting to bottom habitat, therefore becoming more susceptible to entrainment. Alternatively, more fish may be carried into channels from shallow water habitat during outgoing spring tides.

As part of the entrainment study, the projected number of longfin smelt entrained was extrapolated using a variety of analytical techniques based on the number of smelt collected in the 2011 entrainment samples and the percentage of hopper loads that monitored; the 2010 monitoring results were not used in the modeling study. Although the numbers of fish collected in the entrainment monitoring are fixed values, the appropriate volume of dredged material used to extrapolate the entrainment rate estimate varies depending on what dredging and environmental scenarios are considered relevant. For this reason, a range of entrainment rate estimates (low, moderate, and high entrainment scenarios) were calculated using 2011 entrainment monitoring data. Low, moderate, and high entrainment rate estimate calculations are defined as:

- Low – number of smelt collected divided by the total volume of all entrainment samples (includes zero catches) in each embayment for the month of sampling
- Moderate (i.e., Medium) - number of smelt collected divided by the total volume sampled on days longfin smelt were entrained (includes zero catches) for each embayment.
- High – number of smelt collected divided by the volume of that sample.

As with the modeling for delta smelt entrainment, many factors are associated with the accuracy of these projections. The small sample size of entrained fish (18 longfin smelt and 4 delta smelt), combined with the overall low percentage of dredge material sampled result in uncertainty as to the accuracy of the

entrainment estimates. Additionally, there may be yet unidentified factors that influence entrainment. Modeled estimates of longfin smelt entrainment during hydraulic dredging in 2011 based on 2011 abundance indices are 3,848 for the low entrainment scenario, 6,528 for the medium entrainment scenario, and 10,260 for the high entrainment scenario.

**Population-Level Effects.** As with delta smelt, the implications of the low, medium, and high levels of entrainment on the future of the longfin smelt population was further modeled using PVA. As the dredging of the federal channels has been ongoing for many years, population projections with losses due to dredging entrainment are considered to be the baseline. The baseline is compared to projections with reduced losses due to dredge entrainment, either through the cessation of dredging or successful implementation of entrainment reduction measures. The difference between these two projections provides an estimate of the population-level effects of dredging over the next 22 years. Low and medium estimates of entrainment resulted in less than 5 percent reduction in median population abundance. The high estimate of entrainment indicated greater reductions of median population abundance, but this was still less than 9 percent. For low, medium, and high estimates of entrainment, the study found that successful implementation of entrainment reduction measures would reduce impacts to abundance by approximately one third (ERDC, 2013); additional entrainment reduction measures have been included under the action alternatives. With baseline conditions (dredging continues as it has in the past), the modeling predicts a 50 percent chance that longfin smelt populations will be reduced by more than 90 percent in 22 years. Even if a high current level of entrainment (10,260 longfin smelt) is assumed, and entrainment were completely eliminated in future dredging, the probability that longfin smelt populations would be reduced by 90 percent in 22 years remains the same; therefore, the study concluded that future dredging would have no effect on the probability of longfin smelt population decline (ERDC, 2013).

Because inter-annual variation in population size is high, in both nature and in the model simulations and highly correlated with freshwater flow, changes in median abundance less than 30 percent may not be functionally significant because abundance naturally fluctuates more than an order of magnitude (ERDC, 2013). Importantly, the results of the entrainment study highlight that the risk of population decline risk is largely due to factors other than dredging-related entrainment. Under any estimate of entrainment, decline in abundance of longfin smelt is more than 90 percent attributable to factors other than dredging.

### **No Action/No Project Alternative**

Under the No Action/No Project Alternative, USACE would continue current maintenance dredging practices for the projects it maintains in San Francisco Bay as described in Section 2.3.2, which include the following measures to reduce the potential for entrainment of longfin smelt from hydraulic dredging:

- Dredging may proceed anywhere when water temperature exceeds 22.0°C;<sup>15</sup>
- No dredging would occur in water ranging from 0 to 5 parts per thousand salinity between December 1 and June 30;
- At the beginning and end of each hopper load, pump priming, drag head clearing, and suction of water would be conducted within 3 feet of the seafloor;
- Hopper drag head suction pumps would be turned off when raising and lowering the drag arms from the seafloor when turning the dredge vessel; and

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<sup>15</sup> To the extent feasible, hydraulic dredging in the Napa and Petaluma rivers and San Leandro Marina would only occur when water temperatures are above 22 degrees Celsius. If hydraulic maintenance dredging occurs when water temperatures are less than 22 degrees Celsius, USACE would coordinate mitigation, as appropriate, with USFWS, NMFS, and CDFW at the times such dredging episodes occur.

- The USACE would implement a worker education program for listed fish species that could be adversely impacted by dredging. The program would include a presentation to all workers on biology, general behavior, distribution and habitat needs, sensitivity to human activities, legal protection status, and project-specific protective measures. Workers would also be provided with written materials containing this information.<sup>16</sup>

These measures reduce the likelihood of longfin smelt being present during dredging, and reduce the potential for longfin smelt to become entrained through the drag heads.

The USACE would undertake mitigation, as appropriate, in meeting its compliance requirements. In the past, USACE purchased a total of 1.4 mitigation credits at the Liberty Island Conservation Bank for potential impacts to listed species for 2011 and 2012 maintenance dredging activities in San Francisco Bay.

The LTMS work windows do not currently include seasonal avoidance measures for longfin smelt.

**NEPA Determination.** Under the No Action Alternative, hopper dredging would continue in Richmond Outer Harbor, Pinole Shoal, and Suisun Bay Channel and New York Slough using BMPs identified above.<sup>17</sup> ERDC's entrainment study was modeled on the No Action Alternative, which concludes that entrainment impacts to the population would not be significant.

ERDC concluded that longfin smelt entrainment impacts occurred only at the highest estimated level of entrainment, yet the impacts are still negligible, and that the probability of population declines resulting from dredging is not anticipated.

ERDC noted that longfin smelt abundances in the Central Bay (where most longfin smelt were entrained in 2011) were relatively high, which was consistent with the corresponding high delta outflows. Therefore, ERDC determined that the level of entrainment estimated is a very conservative estimate and is likely higher than during typical outflows.

Based on ERDC's conclusion that entrainment impacts under the No Action Alternative would result in negligible impacts to delta smelt populations and with the continued purchase of compensatory mitigation credits, the potential entrainment impacts on longfin smelt are expected to be less than significant. Although the project could contribute to cumulative impacts on longfin smelt, the project's contribution, compared to that from water export facilities and other factors, to cumulative impacts would not be significant.

**CEQA Determination.** The ERDC entrainment modeling study, using 2011 entrainment monitoring data, estimated the annual range of entrainment due to hydraulic hopper dredging to be 3,848 to 10,260 longfin smelt, or approximately 3 to 8 percent of the median annual population abundance. In a letter to the Regional Water Board dated March 14, 2014, CDFW found this take to be a significant impact to a special-status species. According to CDFW annual abundance indices from the fall midwater trawl surveys from 1967 to 2013, the population of longfin smelt has declined 99 percent or more in the last 45 years, with record lows in the past decade.

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<sup>16</sup> The USACE has implemented this program in compliance with a condition in the San Francisco Bay Conservation and Development Commission's Letter of Agreement for USACE's coastal zone consistency determination for maintenance dredging in San Francisco Bay. Although the condition in the Letter of Agreement was specific to longfin smelt, USACE's worker education program, overseen by a USACE regional fisheries biologist, also includes information on other special-status fish species that could be impacted by dredging activities (i.e., those fish species considered in the LTMS work windows).

<sup>17</sup> Under the No Action/No Project Alternative and Proposed Action/Project, San Bruno Channel in Redwood City Harbor would also be dredged with a hopper dredge; however, this channel is dredged at intervals of 10 years or greater and is in South San Francisco Bay, where longfin smelt occur in lower densities. The analysis focuses on the federal navigation channels that are dredged annually and where longfin smelt are more likely to occur.

Based on the administrative record and the discussion above, there is a significant impact to longfin smelt under CEQA. In addition, the Project includes 10 years of dredging operations, which, as proposed, and as summarized above, are likely to substantially reduce the number of longfin smelt. In addition to the project's impacts being individually significant, other activities are also causing significant take of longfin smelt, as described above. Therefore, the cumulative impacts of the No Project Alternative, considered with the impacts of other projects causing related impacts, are significant.

### Proposed Action/Project

Under the Proposed Action/Project, the dredge equipment type, frequency of dredging, and volumes dredged would be the same as under the No Action/No Project Alternative. Over the next 10 years, dredging and placement of dredged materials would be conducted in accordance with the conditions described under the No Action/Project Alternative to protect longfin smelt, as well as the following additional conditions identified in Section 2.3.3:

- Completing hydraulic dredging in the Central Bay later in the year (from August 1 to November 30) during the June-to-November environmental dredging window, to the extent feasible, to allow young-of-the-year longfin smelt to grow large and spawning adults to return upstream;
- Completing hydraulic dredging in Suisun Bay between August 1 and September 30, to the extent feasible, to avoid impacts to spawning adult longfin and delta smelt;
- Maintaining contact of drag head, cutterheads, and pipeline intakes with the seafloor during suction dredging;<sup>18</sup> and
- Closing the drag head water intake doors in locations most vulnerable to entraining or entrapping smelt. In circumstances when the doors need to be opened to alleviate clogging, the doors would be opened incrementally (i.e., the doors would be opened in small increments and tested to see if the clog is removed) to ensure that doors are not fully opened unnecessarily. It may take multiple iterations to fine tune the exact intake door opening necessary to prevent clogging. For each project, the intake door opening will be different because the sediment in each location is different. The sediment physical characteristics (e.g., sand versus mud) determine how much water is needed to slurry the sediment adequately. Typically, the drag arms do not clog when dredging areas composed mostly of sand.

These measures would reduce the likelihood of longfin smelt being present during dredging, and the potential for longfin smelt to become entrained compared to the No Action/No Project Alternative.

The USACE would purchase 0.92 acre mitigation credit at the Liberty Island Conservation Bank annually for potential impacts to listed species. The 0.92 acre mitigation credit was calculated from CDFW formula ( $3.0 \text{ million acre-feet} / 800 \text{ acres} = \text{volume dredged} * X \text{ acres of mitigation habitat}$ ) used by the Central Valley Water Project and State Water Project to determine the mitigation requirements for hydraulically pumping water from the Delta, which is considered adequate mitigation for the water projects. For volume dredged, available government-hopper-dredge-pumped water volumes for 2006 through 2012 were reviewed. The highest volume for each of the in-Bay channels (Pinole Shoal, Richmond Outer Harbor, and Suisun Bay Channel/New York Slough) from this period was used in the calculation. Of the 0.92 acre mitigation credit, 0.19 acre mitigation credit would be for Pinole Shoal, 0.34 acre mitigation credit would be for Richmond Outer Harbor, and 0.39 acre mitigation credit would

<sup>18</sup> The seafloor surface is not uniform and is undulating, which could cause the drag head to loose contact with the seafloor. The hopper dredge also has to contend with sea state (i.e., swells and wave action) in the bay which also affects the drag heads contact with the channel bottom. The dredge's swell compensator provides an opposing force to maintain contact with the seafloor when the bottom is uneven or there is wave/swell action.

be for Suisun Bay Channel and New York Slough. The 0.92 acre mitigation credit per year is expected to be more than the credit needed based on actual future annual maintenance dredging volumes.

The LTMS work windows do not currently include seasonal avoidance measures for longfin smelt. Longfin smelt is not a federally listed species under the ESA.

Because dredging of the Bulls Head Reach may occur at any time of year, longfin smelt would likely be entrained during some dredging episodes when a hopper dredge is used. The potential for entrainment would be reduced with the use of a mechanical dredge. Because the extent and frequency of critical dredging episodes cannot be predicted, appropriate mitigation for these episodes, if warranted based on expected impacts, would be determined in coordination with regulatory agencies at time they occur.

**NEPA Determination.** Although longfin smelt could be entrained by hopper dredging, the anticipated entrainment is not expected to result in substantial declines in longfin smelt populations. Impacts would be reduced, compared to the No Action Alternative, by the additional minimization measures and compensatory mitigation under the Proposed Action. In its March 14, 2014, letter to the Regional Water Board, CDFW indicated that the proposed 0.92 acre mitigation credit of restored and managed tidal wetlands per year as compensatory mitigation to reduce impacts to fish is generally consistent with mitigation to other projects that cause take of longfin smelt associated with water diversions and extraction. Therefore, with the proposed minimization measures and compensatory mitigation, it is expected that the Proposed Action would result in a less-than-significant impact on longfin smelt. Although the project could contribute to cumulative impacts on longfin smelt, the project's contribution, compared to that from water export facilities and other factors, to cumulative impacts would not be significant.

**CEQA Determination.** The ERDC entrainment modeling study, using 2011 entrainment monitoring data, estimated the annual range of entrainment due to hydraulic hopper dredging to be 3,848 to 10,260 longfin smelt, or approximately 3 to 8 percent of the median annual population abundance. According to CDFW annual abundance indices from the fall mid-water trawl surveys from 1967 to 2013, the population of longfin smelt has declined 99 percent or more in the last 45 years, with record lows in the past decade. In a letter to the Regional Water Board dated March 14, 2014, the CDFW noted the above figures concerning entrainment, and stated that "the Project, as proposed, would substantially reduce the number of an endangered, rare, or threatened species."

Based on the administrative record and the discussion above, there is a significant impact to longfin smelt under CEQA. In addition, the Proposed Action includes ten years of dredging operations, which, as proposed, and as summarized above, are likely to substantially reduce the number of longfin smelt. In addition to the project's impacts being individually significant, other activities are also causing significant take of longfin smelt, as described above. Therefore, the cumulative impacts of this project, considered with the impacts of other projects causing related impacts, are significant.

### **Reduced Hopper Dredge Use Alternative 1**

Under this alternative, use of a hopper dredge for maintenance dredging of the federal navigation channels would be reduced, compared to the No Action/No Project Alternative and Proposed Action/Project. Under Reduced Hopper Dredge Use Alternative 1, a hopper dredge would only be used to dredge the MSC, and either the Richmond Outer Harbor or the Pinole Shoal Channel, annually.

The channel not selected as the additional hopper dredge channel (i.e., either Pinole Shoal or Richmond Outer Harbor) would be dredged with a mechanical dredge. Additionally, Suisun Bay Channel and New York Slough Channel would be dredged with a mechanical dredge under this alternative, instead of a hopper dredge; the potential exception being urgent action dredging of the Bulls Head Reach, which

could be conducted with either a mechanical or hopper dredge. All other dredging, placement activities, and minimization measures would be as described for the Proposed Action/Project.

Because reduced hopper use would not be implemented until fiscal year 2017, as described in Section 2.3.4, USACE would purchase 0.92 acre mitigation credit at Liberty Island Conservation Bank for potential impacts to listed species in fiscal years 2015 and 2016. Beginning in fiscal year 2017, the USACE would purchase 0.19 acre mitigation credit at the Liberty Island Conservation Bank annually for potential impacts to listed species if Pinole Shoal is dredged with a hopper. If Richmond Outer Harbor is dredged with a hopper, USACE would purchase 0.34 acre mitigation credit at the Liberty Island Conservation Bank annually for potential impacts to listed species. This is expected to be more than the credit needed based on actual future annual maintenance dredging volumes.

As discussed above, mechanical dredges are unlikely to cause entrainment of longfin smelt, although hopper dredges are expected to entrain longfin smelt. A reduction in the use of hopper dredges in the Estuary under this alternative would reduce the effects to longfin smelt resulting from dredge entrainment. Because dredging of the Bulls Head Reach may occur at any time of year, longfin smelt would likely be entrained during some dredging episodes when a hopper dredge is used. The potential for entrainment would be reduced with the use of a mechanical dredge. Because the extent and frequency of critical dredging episodes cannot be predicted, appropriate mitigation for these episodes, if warranted based on expected impacts, would be determined in coordination with regulatory agencies at time they occur.

**NEPA Determination.** Although longfin smelt could be entrained by hopper dredging, the anticipated entrainment is not expected to result in substantial declines in populations. In its March 14, 2014, letter to the Regional Water Board, CDFW indicated that USACE's proposed compensatory mitigation is generally consistent with mitigation to other projects that cause take of longfin smelt. Therefore, with the proposed minimization measures and compensatory mitigation, it is expected that the proposed project would result in a less-than-significant impact on longfin smelt. Although the project could contribute to cumulative impacts on longfin smelt, the project's contribution, compared to that from water export facilities and other factors, to cumulative impacts would not be significant. Under Reduced Hopper Dredge Use Alternative 1, any project and cumulative impacts could be reduced compared to the No Action Alternative and Proposed Action, depending upon where longfin smelt are congregating when dredging occurs.

**CEQA Determination.** This Alternative reduces hopper dredging to one in-Bay channel per year, implements specific minimization measures, and provides compensatory mitigation for the one channel that is hopper-dredged. Hopper dredging of either Richmond Outer Harbor or Pinole Shoal as the sole in-Bay channel could result in a significant and unavoidable impact to longfin smelt, both individually and cumulatively with other activities causing take of longfin smelt over the 10-year life of the Project. This impact, however, would be mitigated to a less-than-significant level with minimizing hopper dredge use, as contemplated by this alternative, and with successful implementation of the proposed minimization measures and compensatory mitigation described above.

### **Reduced Hopper Dredge Use Alternative 2**

Under Reduced Hopper Dredge Use Alternative 2, a hopper dredge would only be used to dredge the MSC. Pinole Shoal, Richmond Outer Harbor, Suisun Bay Channel, and New York Slough Channel would be dredged with a mechanical dredge under this alternative, instead of a hopper dredge; the potential exception being urgent action dredging of the Bulls Head Reach in Suisun Bay Channel, which could be conducted with either a mechanical or hopper dredge. All other dredging, placement activities, and minimization measures would be as described for the Proposed Action/Project. Because reduced hopper use would not be implemented until fiscal year 2017, as described in Section 2.3.4, USACE would

purchase 0.92 acre mitigation credit at Liberty Island Conservation Bank for potential impacts to listed species in fiscal years 2015 and 2016.

As discussed above, mechanical dredges are unlikely to cause entrainment of longfin smelt, although hopper dredges are expected to entrain longfin smelt. Limiting the use of hopper dredges to the MSC would largely eliminate the potential adverse effects to longfin smelt resulting from dredge entrainment. Therefore, no compensatory mitigation is proposed for fiscal years 2017 through 2024.

Because urgent action dredging of the Bulls Head Reach may occur at any time of year, it is likely that some longfin smelt would be entrained during some dredging episodes when a hopper dredge is used. The potential for entrainment would be reduced with the use of a mechanical dredge. Because the extent and frequency of critical dredging episodes cannot be predicted, appropriate mitigation for these episodes, if warranted based on expected impacts, would be determined in coordination with regulatory agencies at time they occur.

**NEPA Determination.** With the elimination of hopper dredging inside San Francisco Bay, the potential for entrainment of longfin smelt would be largely eliminated under Reduced Hopper Dredge Use Alternative 2. Project and cumulative impacts would be less than significant.

**CEQA Determination.** This alternative eliminates hopper dredging inside San Francisco Bay, thus largely eliminating the potential for entrainment of longfin smelt. Project and cumulative impacts would be less than significant.

***Impact 3.6-7: Dredging and Placement Activities Could Result in the Disturbance of Essential Fish Habitat and "Special Aquatic Sites," Including Eelgrass Beds and Mudflats.***

**No Action/No Project Alternative, Proposed Action/Project, Reduced Hopper Dredge Use Alternatives 1 and 2**

All portions of the project area in the Estuary or Pacific Ocean are designated as EFH under one or more FMPs. The programmatic EFH agreement completed in 2011 includes a number of Conservation Measures that enhance the environmental protectiveness of the LTMS program. No further EFH consultation is required for USACE maintenance dredging in San Francisco Bay performed in accordance with the provisions established through the formal programmatic federal EFH consultations for the LTMS.

Eelgrass beds and mudflats are considered special aquatic sites, and are subject to jurisdiction under Section 404 of the CWA, and San Francisco Bay Conservation and Development Commission (BCDC) jurisdiction under Section 66605 of the McAttee-Petris Act. Additionally, eelgrass beds and estuarine areas such as San Francisco Bay are considered "habitat areas of particular concern" with regard to EFH designations.

Mudflats serve as important foraging areas for shorebirds species, and provide shallow water habitat for juvenile fish. No loss of mudflat acreage would occur as a result of maintenance dredging and placement activities. Sensitive habitats (such as marshes and mud flats) that occur in the vicinity of some of the federal navigation channels (e.g., Napa River) would not be disturbed.

Eelgrass in San Francisco Bay provides spawning habitat for herring, and serves as a nursery ground and shelter for juvenile fish, among other functions. Eelgrass has been identified as EFH for various life stages of fish species managed by FMPs under the Magnuson-Stevens Act, as established by NMFS. Although eelgrass does exist near the Richmond Inner Harbor Channel and Oakland Inner Harbor, there is no known eelgrass in any of the channel boundaries. Because these two locations would be dredged mechanically under all alternatives, there would be no difference in the turbidity generated by dredging, and impacts under all alternatives would be the same.

Eelgrass may be indirectly impacted by turbidity and increased sedimentation in areas adjacent to, or down current from, dredging operations. Turbidity plumes from dredging operations may temporarily reduce light penetration in waters adjacent to the plumes. Sediment near areas of dredging may settle on eelgrass blades and affect the viability of the eelgrass in beds adjacent to dredging operations. Eelgrass beds are easily affected by changes in water quality and turbidity, because their growth and survival is a direct function of light penetration in the water column. However, as discussed under Impact 3.6-1, turbidity effects from dredging are expected to be localized and short-term.

Examination of surveys done over the last 15 years indicates that eelgrass has persisted in essentially the same locations and densities around Richmond Harbor (USACE, 2012c). Pre- and post-surveys of eelgrass conducted at Oakland Harbor in 2010 and 2011 found an increase in eelgrass habitat area and in the density of existing beds, in comparison with several reference sites (Merkel & Associates, 2011 and 2012). These results indicate that there does not appear to be any adverse effect to, or decline in, eelgrass habitat as a result of annual maintenance dredging activities Richmond Harbor and Oakland Harbor.

Placement of dredged materials would not impact the Gulf of Farallones National Marine Sanctuary if placement takes place at SF-DODS; the barge route is south of the Sanctuary boundary to preclude scow spillage in the special aquatic site.

**NEPA Determination.** The project alternatives' potential impact on EFH or special aquatic sites, including eelgrass beds and mudflats, would be less than significant.

**CEQA Determination.** The project alternatives' potential impact on EFH or special aquatic sites, including eelgrass beds and mudflats, would be less than significant.

### ***Impact 3.6-8: Interference with the Movement of Resident or Migratory Fish or Wildlife Species During Dredging and Placement Activities***

#### **No Action/No Project Alternative, Proposed Action/Project, Reduced Hopper Dredge Use Alternatives 1 and 2**

No solid structures, such as breakwaters, are proposed; therefore, the project would not permanently interfere with the movement of resident or migratory fish or other wildlife species. To the extent that dredging activities impede migration because of entrainment, those impacts are discussed above in Impacts 3.6-4 through 3.6-6.

The noise and in-water disturbance associated with dredging and placement activities could cause fish and wildlife species to temporarily avoid the immediate dredging or placement area when work is being conducted. Placement activities can cause temporary displacement of fish from the vicinity of the placement site, especially during high-frequency placement activity (whether due to cumulative water quality effects or due to the physical disturbance of placement). Fish tend to exhibit avoidance behavior for about 2 to 3 hours after dredged material placement, and fish community densities generally return to pre-disposal levels after about 3 hours (ECORP, 2009). Localized effects of this type have been documented around the Alcatraz Island placement site (SF-11), where behavioral avoidance of the area by some fish species was seen to last from 2 to 3 hours following dredged material placement events (LTMS, 1998). Portions of the study area are major corridors used by fish and marine mammals as they move between different habitats in the open ocean, San Francisco Bay, and upstream tributaries. However, the affected area would be limited to the immediate dredging or placement zone, and would not substantially limit the available habitat or movement of fish, seabirds, or marine mammals. Impacts would be slightly greater, but still less than significant, under the reduced hopper dredge use alternatives, because mechanical dredges would be present up to ten times longer in areas previously typically dredged with a hopper, potentially causing migrating species to avoid the areas of dredging and the associated turbidity plumes for a longer period of time.

Salt marsh harvest mouse has been documented at MWRP and may be present at Cullinan Ranch. This species is not expected to be impacted by placement activities at these sites because dredged materials would be placed in a sterile area scraped clean of all growth and possible habitat. In accordance with their permits for receiving dredged materials, site operators for MWRP and Cullinan Ranch are responsible for coordinating protected species issues with resources agencies, and managing the placement of dredged materials at the placement sites in accordance with conditions of their permits and other regulatory approval.

Also, although it is highly unlikely that any salt marsh harvest mice occur at the upland Dredged Material Management Site near the San Leandro Marina, the dredge contractor would be trained to identify salt marsh harvest mice, and to do a spot check for these endangered mice when beginning each day's work; before moving or repositioning any materials or machinery; and before beginning to pipe the slurry into a settling pond. In the unlikely event that a salt marsh harvest mouse is found at the Dredged Material Management Site, work would be stopped until authorized personnel has removed the mouse from the project area. These are standard practices that USACE has implemented at the Dredged Material Management Site. No impacts are anticipated.

The City of San Leandro Municipal Code prohibits interference with monarch butterflies during the entire time they remain in the areas of the San Leandro Marina, Tony Lema Golf Course, and Marina Golf Course, in whatever spot therein they may choose to stop. There is a monarch overwintering site at the eastern end of the Monarch Bay Golf complex, where they congregate in large numbers from October through January. Project activities would not occur at the time of butterfly migration, or at the time of overwintering. However, consistent with USACE standard practices, the contractor would be instructed to ensure that dredging and disposal operations do not interfere with the monarch butterflies. Therefore, no impacts are anticipated.

**NEPA Determination.** The project alternatives' potential impact on the movement or migration of fish or wildlife species would be less than significant.

**CEQA Determination.** The project alternatives' potential impact on the movement or migration of fish or wildlife species would be less than significant.

### ***Impact 3.6-9: Dredging and Placement Activities Could Disturb Roosting and Foraging by Avian Species***

#### **No Action/No Project Alternative, Proposed Action/Project, Reduced Hopper Dredge Use Alternatives 1 and 2**

San Francisco Bay is an important stopover for many species of migratory waterfowl in the Pacific Flyway. Several of the federal navigation channels and existing placement sites are in areas where human activity is consistent and ongoing. Birds in these areas are accustomed to human activity and noise, including that from vessel traffic. Dredging temporarily may disturb foraging and resting behaviors, decrease time available for foraging, and increase energetic costs as a result of increased flight times and startling responses. Birds that might be found in or near the federal navigation channels or placement sites are highly mobile and can avoid the open water project activity. Indirect effects on waterbirds and shorebirds would occur from the temporary loss of intertidal community from dredged material placement in the nearshore zone at Ocean Beach, where temporary disruption to foraging patterns could occur. Any impact on food availability and foraging success as a result of increased turbidity in the water column and burial of the benthic community caused from placement will be short term and localized. Sediment placement (both in SF-8 and the Ocean Beach Disposal Site) has been a regular occurrence in the past four decades, and there has been very minimal disturbance to avian species recorded in this time period (USACE, 2013a). Additionally, it is expected that waterbirds and shorebirds would be able find other forage resources nearby. Therefore, birds are not expected to be adversely affected by dredging and placement activities.

**Least Tern.** There is insufficient monitoring data of California least tern use in Oakland Outer Harbor. It is known, however, that terns use a restoration site (i.e., the MHEA) in the middle harbor area of Oakland Harbor for foraging and roosting. Dredging the Oakland Entrance Channel and Outer Harbor shipping channels is not expected to impact tern activity in MHEA, but may temporarily deter terns from foraging in the Outer Harbor and Entrance Channel. The noise associated with the dredging would not be expected to substantially impact least terns, due to the ambient noise levels associated with the activity at the Port of Oakland (H.T. Harvey and Associates, 2012). Interviews with Alameda tern colony site biologists and researchers revealed that, based on observations, least tern adults and fledglings use MHEA in July annually for foraging and roosting (USACE, 2010). The LTMS work window for California least tern from within 1 mile of the coastline from the Berkeley Marina south to San Lorenzo Creek is August 1 through March 15 each year. In the event that USACE should need to dredge outside the LTMS work window for least tern in any year covered by this EA/EIR, USACE would initiate additional consultation with USFWS to obtain written authorization to work outside this window.

Because Montezuma Wetlands, LLC, is managing potential nesting habitat for the least tern outside of areas of MWRP that would be impacted by planned restoration activities, placement of dredged material at MWRP would not be expected to impact least tern. As stated in Section 3.6.2, it is the sole responsibility of Montezuma Wetlands, LLC, to coordinate with CDFW and USFWS on least tern issues for MWRP. Proposed dredged material placement actions for the site must first be in compliance with the ESA, and with other federal, state, and local wildlife protection laws before USACE can use MWRP as a beneficial use site for dredged material.

**Western Snowy Plover.** Beach nourishment at Ocean Beach would be designed not to interfere with the Snowy Plover Protection Area. If placement activities were to occur during the snowy plover season (July 1 through May 15), haul activities would be limited to a narrow corridor along the eastern edge of the Snowy Plover Protection Area—within 50 feet of the O’Shaughnessy Seawall between Stairwells 21 and 28. This travel corridor was determined by National Park Service biologist and Golden Gate Audubon Society representative Dan Murphy to be the best location for truck haul traffic to minimize interaction with snowy plovers (and other shorebirds), based on historical monitoring information and habitat preferences (SFPUC, 2012).

**Ridgway’s Rail.** Individual Ridgway’s rails may nest near the San Leandro Marina, in the adjacent salt marsh, and wander into or along Estudillo Canal immediately north of the Dredged Materials Management Site. In addition, Ridgway’s rails are known to be present within a tidal marsh near the San Rafael Creek Inner Canal Channel. The USFWS has indicated Ridgway’s rail may be sensitive to loud noise while it is nesting if the noise intensity is unusually high. For this reason, the USFWS Biological Opinion the LTMS Program specifies that dredging shall not occur within 250 feet of potential habitat for this species from February 1 through August 31. The USFWS considers all potential habitat to actually be occupied by this species unless surveys that year document its absence.

The proposed upland placement at the Dredged Materials Management Site would require laying pipe across an area that has the potential to house Ridgway’s rail nesting sites. Prior to dredging and placement activities, consistent with USACE standard practices, USACE will contract with ornithologists to conduct a survey for Ridgway’s rail nests. The survey would begin in February and be completed by mid-March, and would determine the best route for the pipe to go over the levee into the containment and overflow ponds without impacting any Ridgway’s -rail nesting sites. Installation of the dredged material pipeline would take place prior to the dredging episode. The pipe would be submerged, except for the portion that will cross the marsh into the containment pond. The contractor will adhere to all applicable environmental laws, regulations, and procedures specified in the contract with USACE. Therefore, no impacts to Ridgway’s rail are expected.

**Bank Swallow.** Beach nourishment at Ocean Beach would be designed not to interfere with nesting of the bank swallow. For instance, the sand would be placed to cover the existing revetment, and not extend to the

top of this bluff where the bank swallow nests may occur. In general, placement of dredged material at SF-17 is not expected to have differing effects from those annually occurring at SF-8 or the Ocean Beach Demonstration Site. Although the bankswallow colony overlaps with the southern 1,000 feet segment of the beach nourishment site, no sand is expected to be placed above the revetment area where the bank swallows nest. According to the National Park Service, bank swallows forage for invertebrates mainly over Lake Merced; therefore, no impacts to this species' foraging is expected (USACE, 2013a).

**NEPA Determination.** The project alternatives' impacts on avian roosting and foraging would be less than significant.

**CEQA Determination.** The project alternatives' impacts on avian roosting and foraging would be less than significant.

***Impact 3.6-10: Contaminated Sediments Could Become Resuspended During Dredging and Placement Activities, and Could Be Toxic to Aquatic Organisms, Including Plankton, Benthos, Fish, Birds, and Marine Mammals***

**No Action/No Project Alternative, Proposed Action/Project, Reduced Hopper Dredge Use Alternatives 1 and 2**

Dredging can disturb aquatic habitats by resuspending bottom sediments, thereby recirculating toxic metals, hydrocarbons, pesticides, pathogens, and nutrients into the water column. Any toxic metals and organics, pathogens, and viruses, absorbed or adsorbed to fine-grained particulates in the sediment may become biologically available to organisms either in the water column or through food chain processes. However, most contaminants are tightly bound in the sediments, and are not easily released during short-term resuspension. Most available studies suggest that there is no significant transfer of metal concentrations into the dissolved phase during dredging, even though release of total metals associated with the suspended matter may be large (Jabusch et al., 2008). Organic contaminants such as pesticides, polychlorinated biphenyls, and polyaromatic hydrocarbons are generally not very soluble in water, and direct toxicity by exposure to dissolved concentrations in the water column is not very likely (Jabusch et al., 2008).

Sediments are tested prior to dredging, and the results are reviewed by the Dredged Material Management Office (DMMO) prior to dredging and placement, including evaluation of the potential for impact to aquatic organisms. As described in Section 3.3.2, sediment testing results for previous USACE maintenance dredging episodes indicate that, in general, dredged materials from the subject federal navigation channels have been suitable for unconfined aquatic disposal. Over time, some isolated areas in or adjacent to the channels have been identified as containing sediment that is not suitable for unconfined aquatic disposal (NUAD); USACE would continue to avoid dredging areas (e.g., portions of the Richmond Harbor federal channel adjacent to the United Heckathorn site) that it has been able to avoid dredging in the past. If future testing identifies NUAD material that must be dredged, USACE would place all NUAD material at upland sites, and in some cases MWRP, as determined during DMMO review. The USACE would also implement sediment bioaccumulation testing, as detailed in the *Agreement on Programmatic EFH Conservation Measures for Maintenance Dredging Conducted Under the LTMS Program* (USACE and USEPA, 2011). Therefore, dredging and placement activities would not be expected to increase contaminant concentrations in the environment above baseline conditions.

As directed by the LTMS agencies, a study on the short-term water quality impacts of dredging and dredged material placement on sensitive fish species in San Francisco Bay was completed by the San Francisco Estuary Institute (Jabusch et al., 2008). The review considered five fish species: Chinook salmon, coho salmon, delta smelt, steelhead trout, and green sturgeon. Water quality impacts of concern include dissolved oxygen reduction, pH decrease, and releases of toxic components such as heavy metals, hydrogen sulfide, ammonia, and organic contaminants (including polyaromatic hydrocarbons, polychlorinated biphenyls, and pesticides). Potential short-term effects include acute toxicity, subacute toxicity, and biological and other

indirect effects, such as avoidance. The study concluded that direct short-term effects on sensitive fish by contaminants associated with dredging plumes are minor. The study identified a need to better study the potential of ammonia releases during dredging in San Francisco Bay.

Ammonia toxicity studies have been done in freshwater, but none have been done replicating estuarine conditions. Under freshwater conditions, swimming performance was adversely affected. Slower swimming speeds and reaction times would make fish more vulnerable to predation. Saltwater-adapted species are believed to be more susceptible to ammonia, because their gills are more permeable to ammonia (Jabusch et al., 2008). Ammonia found in sediments is mostly attributable to bacterial action on decaying organic matter. Aside from the natural production of ammonia by decomposition of organic material, there are other contributors, such as waste water treatment facilities, fertilizers, and livestock wastes, that enter into San Francisco Bay. Since 1968, the United States Geological Survey (USGS) has been studying ammonia concentrations in San Francisco Bay. The results of these studies show ammonia concentrations declining dramatically after implementation of improved wastewater-treatment methods mandated by state and federal legislation. One result of the implementation of these improved methods has been a large reduction in the input of ammonia-nitrogen from some municipal wastewater-treatment facilities. According to the USGS, advanced wastewater treatment in 1979 immediately reduced the input of ammonia-nitrogen to South San Francisco Bay (USGS, 1997). In prior decades, the South San Francisco Bay had repeated episodes of oxygen depletion and animal die-offs. USGS measurements have shown a complete cessation of these episodes since 1980 (USGS, 1997). Yearly dredging activities have likely limited the accumulation of organic material in the federal navigation channels, therefore limiting the amount of ammonia produced by the decomposition actions of microorganisms. Considering the facts that San Francisco Bay no longer suffers from the condition of elevated background levels of ammonia; most aqueous ammonia is metabolized to nitrates and used by microorganisms; and the federal channels are regularly dredged, limiting the accumulation of organic material, the amount of ammonia released by maintenance dredging is expected to be minimal and the consequent effects short term and minor.

Dredging, transport, and placement of dredged material would be conducted in cooperation with the DMMO. This process would identify contaminated sediments and appropriate placement site options for dredged materials, based on the characteristics of the sediment and criteria for each placement site. Additionally, USACE would implement BMPs and comply with water quality protection measures included as conditions to the Water Quality Certification issued by the Regional Water Board and the letter of agreement issued by the BCDC for USACE's consistency determination. The USACE would also implement sediment bioaccumulation testing in accordance with the LTMS Programmatic EFH agreement. Adherence to these measures and BMPs would minimize the potential for water quality degradation that could impact aquatic organisms.

**NEPA Determination.** The project alternatives' potential impacts would be less than significant.

**CEQA Determination.** The project alternatives' potential impacts would be less than significant.

### ***Impact 3.6-11: Dredging and Placement Could Substantially Increase the Spread of Invasive Nonnative Species***

#### **No Action/No Project Alternative, Proposed Action/Project, Reduced Hopper Dredge Use Alternatives 1 and 2**

Under all alternatives, dredging vessels would come from areas outside of the study area. There is the potential that nonnative species could be introduced to San Francisco Bay. Larval forms of nonnative species can be carried in the ballast water of vessels, and if ballast water is released in San Francisco Bay, larvae can be introduced into the San Francisco Bay ecosystem. The United States Coast Guard has mandatory regulations in effect that require ships carrying ballast water to have a ballast water management and reporting program in place and, without jeopardizing the safety of the crew, exchange ballast water with

mid-ocean water or use an approved form of ballast water treatment, prior to releasing any ballast water in a port in the United States. Dredge equipment would comply with these regulations, as applicable.

Beneficial reuse and upland placement site operators are responsible for managing the placement of dredged materials at the placement sites in accordance with conditions of their permits and other regulatory approval, which include measures to minimize the spread of invasive nonnative species.

Therefore, project activities would not be expected to substantially increase the spread of invasive nonnative species.

**NEPA Determination.** The project alternatives' potential to substantially increase the spread of invasive nonnative species would be less than significant.

**CEQA Determination.** The project alternatives' potential to substantially increase the spread of invasive nonnative would be less than significant.

### Cumulative Impacts

#### ***Impact 3.6-12: Potential to Result in Cumulative Impacts on Biological Resources, Not Including Entrainment Impacts on Delta Smelt and Longfin Smelt<sup>19</sup>***

Under all alternatives, maintenance dredging and placement of dredged materials would have adverse effects on biological resources, including temporary impacts to foraging and species health due to temporary increases in turbidity; disturbance of benthic habitat; temporary loss or reduction of habitat suitable for sensitive fish species; alteration of behavior of marine mammals and birds; and potential exposure to contaminants in resuspended sediments. Other dredging projects and waterfront construction projects listed in Table 3.1-1 would also involve activities that could result in similar impacts. These activities could cumulatively impact biological resources by impacting water quality and habitat. The USACE would comply with existing regulations, requirements, and conditions in permits approvals from NMFS, USFWS, the Regional Water Board, and BCDC for dredging, which would minimize and/or avoid adverse impacts associated with dredging. Additionally, other projects involving dredging and construction in the marine environment would be subject to permitting/regulatory approval processes similar to those for the proposed project, and would be required to implement similar measures to minimize water quality and biological impacts.

**NEPA Determination.** The proposed project would not contribute to significant cumulative impacts on biological resources.

**CEQA Determination.** The proposed project would not contribute to significant cumulative impacts on biological resources.

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<sup>19</sup> Cumulative impacts related to entrainment of delta smelt and longfin smelt are discussed under Impacts 3.6-5 and 3.6-6, respectively.

### **3.7 CULTURAL AND PALEONTOLOGICAL RESOURCES**

This section describes existing conditions for cultural and paleontological resources, including applicable plans and policies, and evaluates the potential impacts to these resources from implementation of the alternatives. Because the project alternatives neither propose demolition of existing structures nor introduce elements that could affect the historic setting of the built environment, only the potential effects of project implementation to archaeological and paleontological resources are considered in this analysis.

#### **3.7.1 Regulatory Setting**

##### **Federal**

##### **National Historic Preservation Act, as Amended**

The National Historic Preservation Act (NHPA) declares federal policy to protect historic sites and values, in cooperation with other nations, states, and local governments. Subsequent amendments designated the State Historic Preservation Officer as the individual responsible for administering state-level programs. The act also created the President's Advisory Council on Historic Preservation (ACHP). Federal agencies are required to consider the effects of their undertakings on historic resources, and to give the ACHP a reasonable opportunity to comment on those undertakings. Federal agencies are required by statute to "take into account" the effects of their actions and undertakings on "historic properties." A historic property is the federal term that refers to cultural resources (e.g., prehistoric or historical archaeological sites, maritime historical resources including shipwrecks, buildings and structures on the shore or in the water, and cultural artifacts) that are 50 or more years old, possess integrity, and meet the criteria of the National Register of Historic Places (NRHP). The NRHP eligibility criteria are found at 36 C.F.R. § 60.4. A lead federal agency is responsible for project compliance with Section 106 of the NHPA and its implementing regulations, set forth by the ACHP at 36 C.F.R. pt. 800. As detailed further in this section, because there are no known historical resources at the federal navigation channels or existing placement sites that could be impacted by the project alternatives, the United States Army Corps of Engineers (USACE) has no further obligations under Section 106 of the NHPA.

##### **National Environmental Policy Act**

Under the National Environmental Policy Act, 42 U.S.C. §§ 4321-4327, federal agencies are required to consider potential environmental impacts—including those to cultural resources—and appropriate mitigation measures for projects with federal involvement. This document has been prepared in compliance with National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations.

##### **Submerged Lands Act**

The Submerged Lands Act established state jurisdiction over offshore lands within 3 miles of shore (or 3 marine leagues for Texas and the Gulf Coast of Florida). The act did reaffirm the federal claim to the Outer Continental Shelf, which consists of those submerged lands seaward of state jurisdiction. However, the act limited states' claims to the submerged lands inside the landward boundary of the Outer Continental Shelf. Several federal courts rejected, for various reasons, state positions on historic preservation laws that pertained to shipwrecks within this 3-mile zone. Judicial conclusions from cases involving the Submerged Lands Act were inconsistent, yet shipwrecks in state waters were still at risk from damage and destruction. These circumstances provided the momentum for the passage of the Abandoned Shipwreck Act, which largely superseded the Submerged Lands Act. In compliance with this act, the California State Land Commission (CSLC) will receive a copy of this Environmental Assessment/

Environmental Impact Report and will have the opportunity to comment on its potential impacts to submerged lands.

### **Abandoned Shipwreck Act**

The Abandoned Shipwreck Act, 43 U.S.C. §§ 2101–2106, is a federal legislative act, but does protect shipwrecks found in state waters. The Abandoned Shipwreck Act also states that the laws of salvage and finds do not apply to abandoned shipwrecks protected by the act. Under the Abandoned Shipwreck Act, the United States asserts title to abandoned shipwrecks in state waters that are either:

- Embedded in state-submerged lands;
- Embedded in the coralline formations protected by a state on submerged lands; or
- Resting on state-submerged lands and are either included in or determined eligible for the NRHP.

The Abandoned Shipwreck Act also has a provision for the simultaneous transfer, by the federal government, of title for those abandoned shipwrecks to the state(s) in whose waters the wrecks are located. As detailed further in this section, because there are no known shipwrecks within the federal navigation channels or existing placement sites, no impacts are expected to result from the project alternatives.

## **State**

### **California Environmental Quality Act**

In California, cultural resources include archaeological and historical objects, sites and districts, historic buildings and structures, cultural landscapes, and sites and resources of concern to local Native American and other ethnic groups. Compliance procedures are set forth in California Environmental Quality Act (CEQA) Sections 15064.5 and 15126.4.

Section 15064.5 of CEQA also assigns special importance to human remains, and specifies procedures to be used when Native American remains are discovered. These procedures are detailed under California Public Resources Code (PRC) Section 5097.98.

CEQA also requires evaluation if a project will directly or indirectly destroy a unique paleontological resource, site, or unique geological feature. This document is intended to fulfill the requirements set forth in the CEQA Guidelines.

### **California Public Resources Code, Section 5097.9**

PRC Section 5097.9 details procedures to be followed for whenever Native American remains are discovered. It states that no public agency, and no private party using or occupying public property, or operating on public property, under a public license, permit, grant, lease, or contract made on or after July 1, 1977, shall interfere with the free expression or exercise of Native American religion as provided in the United States Constitution and the California Constitution. It further states that no such agency or party shall cause severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine on public property, except on a clear and convincing showing that the public interest and necessity so require. This document recognizes the potential for inadvertent discovery of such resources, and proposes mitigation for the treatment of human remains and associated or unassociated funerary objects discovered during any soil-disturbing activity.

### **California Public Resources Code, Section 7050.5**

Every person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a

misdeemeanor, except as provided in Section 5097.99 of the PRC. In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, the PRC states that there shall be no further excavation or disturbance of the site, or any nearby area reasonably suspected to overlie adjacent remains, until the coroner of the county in which the human remains are discovered has determined the remains to be archaeological. If the coroner determines that the remains are not subject to his or her authority, and if the coroner recognizes the human remains to be those of a Native American or has reason to believe that they are those of a Native American, he or she shall contact the Native American Heritage Commission by telephone within 24 hours. This document recognizes the potential for inadvertent discovery of human remains, and proposes mitigation for the treatment of human remains discovered during any soil-disturbing activity.

### **California Public Resources Code, Section 7051**

PRC Section 7051 states that it is a public offense to remove any part of any human remains from any place where it has been interred, or from any place where it is deposited while awaiting interment or cremation, with intent to sell it or to dissect it, without authority of law, or written permission of the person or persons having the right to control the remains under Section 7100, or with malice or wantonness. This document recognizes the potential for inadvertent discovery of human remains, and proposes mitigation for the treatment of human remains discovered during any soil-disturbing activity.

### **Administrative Code, Title 14, Section 4307**

Under this state preservation law, no person shall remove, injure, deface, or destroy any object of paleontological, archaeological, or historical interest or value. As detailed further in this section, because there are no known paleontological, archaeological, or historical resources within the federal navigation channels or existing placement sites, no impacts are expected to result from the project alternatives.

## **3.7.2 Environmental Setting**

The USACE has established policy and procedures for conducting underwater surveys for maintenance dredging and disposal activities (Dredging Guidance Letter No. 89-01, USACE, March 13, 1989). The USACE is directed to make a reasonable and good faith effort to identify submerged cultural resources that may be affected by project implementation. Typically, the review of project documents and research of historical records and other sources is sufficient to determine what the potential is for submerged sites to be present and whether there would be an effect. The policy states that underwater surveys to identify archaeological sites are not required within the boundaries of previously dredged channels or previously used disposal areas unless USACE determines that there is a good reason to believe that such resources exist, and that they would be altered or destroyed as a result of project implementation.

There are two types of cultural resources of interest for the project: (a) archaeological sites from Native American settlement that may be situated on the shoreline or submerged beneath the waters of San Francisco Bay, or on the continental shelf as a result of post-Ice Age rise in sea levels, and (b) vessels that have sunk offshore, and shoreline structures associated with the historic-era maritime industry. The investigation for this project consisted of reviewing the environmental documents from previous dredging projects, reviewing archaeological literature and survey reports, and reviewing information on shipwrecks produced by the CSLC.

### **Historic Maritime Background**

In San Francisco Bay, the study area spans the shoreline and marine areas of the following 11 counties: Marin, Sonoma, Napa, Solano, Sacramento, San Joaquin, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco. It does not include the landside areas far removed from navigable waters. The geographic scope of the study area comprises the estuarine waters of the San Francisco Bay region,

portions of the Sacramento-San Joaquin Delta west of Sherman Island, and the western portion of the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel. Outside the Golden Gate, the study area includes the San Francisco Deep Ocean Disposal Site (SF-DODS), the San Francisco Bar Channel Disposal Site (SF-8), and the nearshore zone off Ocean Beach, as well as the waters that are used by vessels en route to these sites. As such, the cultural setting is presented with a maritime focus. Although it is well-documented that aboriginal inhabitants of the region used watercraft constructed of tule (Levy, 1978:406), given the poor preservation qualities of this material, it is not anticipated that such craft remain preserved in the submarine environment. As such, only a discussion of historic-period maritime activities that could manifest in the archaeological record is provided.

**The Hispanic Period.** Jose de Ortega may have observed the entrance to San Francisco Bay in 1769; however, the first undisputed identification of the entrance by nonnative peoples occurred on November 28, 1770, by the expedition of Pedro Fages. Entry into San Francisco Bay from the sea first occurred in August of 1775, when Juan Manuel de Ayala began his 2-month-long nautical survey of San Francisco Bay aboard the San Carlos (Beck and Haase, 1974:17).

With Mexico's independence from Spain in 1821, previous trade restrictions enforced by the Spanish were relaxed. Merchant vessels from the United States and Europe began freely entering San Francisco Bay. In addition to the merchant vessels, an occasional whaler or man-of-war would enter San Francisco Bay to restock provisions, including wood, food, and water (Kemble, 1957:1).

**American Period.** With the discovery of gold at Sutter's Mill in 1848, ship traffic into San Francisco Bay increased dramatically. By July 1850, more vessels entered San Francisco Bay than departed. Some 500 ships, inside and outside the anchorage, lay abandoned by their crews, who had deserted them in hopes of finding a better life, mostly in the gold fields.

San Francisco became a major city and port almost overnight, and grew at a phenomenal rate, replacing Monterey as the coast's principal port. Maritime traffic arrived through three major shipping channels approaching San Francisco. These lanes converge outside the Golden Gate to form the single channel entering San Francisco Bay. Through this channel came lumber schooners from the Mendocino coast, along with sealers, whalers, fishermen, traders, and passenger ferries. Large docks were built so that cargo could be discharged directly onto the wharves instead of being ferried to shore by rowboats. From those docks, the cargo was distributed and sometimes reloaded onto smaller vessels to transport to various settlements.

In the 1850s, commercial fishing in San Francisco Bay began with whaling and salmon fishing. Throughout California's coastal waters, shrimp were harvested and sold. After 1870, shrimp fishing evolved into a major industry along the shores of San Pablo and San Francisco bays. Approximately 26 fishing camps or villages have been recorded in this region. During the 1870s, a significant expansion of the fishing industry occurred due to the increased immigration of fisherman from Italy, Greece, China, and Portugal (Hart, 1978).

Ferry enterprises traveling to Oakland, San Pablo Bay, and San Francisco flourished during the late nineteenth century and the first half of the twentieth century. San Francisco Bay was a transportation corridor for both local and international traffic. During the early part of the American period, the ferries united the sparsely populated rural communities and ranches with San Francisco. By the early 1870s, the railroad companies owned the ferries operating on San Francisco Bay. As communities in the area grew larger, local trade produced a demand for more frequent ferry schedules and for inter-urban lines to feed the ferry terminals. Despite all this success, the needs of the San Francisco Bay Area were rapidly changing. Most ferry service ceased in 1939 with the completion of several bridges spanning San Francisco Bay, and the opening of the Bay Bridge to electric trains.

## Shipwrecks

The title to all abandoned shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CSLC. The online CSLC Shipwreck Database is a list of shipwrecks by county, and is based primarily on historical accounts of these incidents. It should be noted that most of the location data thus refer to where the ship went down, and not necessarily where it came to rest on the sea floor, which may be in a different location. These data are therefore not to be interpreted as definitive resource locations, only potential resource locations in the vicinity of various project components. The database indicates 43 shipwrecks in the vicinity of several of the project components (Table 3.7-1). Figure 3.7-1 depicts the location of the reported shipwrecks.

It should be noted that the CSLC database does not indicate whether the wrecked vessel was ultimately salvaged. Vessels close to the shoreline would likely have been salvaged or demolished, to minimize navigational hazards to the ship traffic. Furthermore, repeated dredging has historically taken place in the study area to accommodate facilities and historic ship traffic; this dredging would have likely dislodged any remnants of these vessels.

## Paleontological Setting

Paleontological resources are fossils (the remains of ancient plants and animals) and trace fossils (such as burrows or tracks) that can provide scientifically significant information on the history of life on earth. Assessments of the scientific significance of these remains are based on whether they can provide data on the taxonomy and phylogeny of ancient organisms, the paleoecology and nature of paleoenvironments in the geologic past, or the stratigraphy and age of geologic units.

The San Francisco Bay region contains a diverse record of geologic and biologic history, which spans more than 100 million years, dating from the Upper Cretaceous period. Under the combined influences of regional tectonic events ranging from creation of the Sacramento Basin to uplift of the Coast Range foothill region, deposition of sedimentary sequences and fluctuating worldwide sea level changes, fossils of marine and terrestrial organisms have accumulated to produce a significant record of prehistoric life.

Much of the paleontological interest in San Francisco Bay stems from the well-known discoveries of Pleistocene age (10,000 to 1 million years ago) fossil vertebrate faunas derived from Quaternary age units (present to 1 million years ago) in other parts of the San Francisco Bay region. Identification and scientific description of both of these diverse fossil vertebrate assemblages provides one of the best-known records of Pleistocene faunas in California (Stirton, 1939, 1951; Savage, 1951; Wolf, 1971; and Jefferson, 1991). Preservation of specimens buried by estuarine and river sediments and other continental volcanoclastic deposits provided favorable conditions for preserving vertebrate fossil remains in these geologic units.

### 3.7.3 Methodology and Thresholds of Significance

This section presents federal and state criteria used to determine the significance of cultural resources; federal and state criteria used to evaluate impacts to cultural resources; and criteria for evaluating impacts to paleontological resources.

## Significance Criteria for Evaluation of Cultural Resources

### Federal Significance Criteria

The four evaluation criteria to determine a resource's eligibility to the NRHP, in accordance with the regulations outlined in 36 C.F.R. pt. 800, are identified at 36 C.F.R. § 60.4. These evaluation criteria, listed below, are used to determine what properties should be considered for protection from destruction or impairment resulting from project-related activities (36 C.F.R. § 60.2).

**Table 3.7-1  
Shipwreck Data from the State Lands Commission Database**

<b>Channel/ Placement Site</b>	<b>Ship Name</b>	<b>Year Sunk</b>	<b>County</b>	<b>Latitude</b>	<b>Longitude</b>
Oakland Harbor	<i>Whitesboro</i>	NA	Alameda	37deg 47'20"N	122deg 15'40"W
	<i>Ranger</i>	1854	Alameda	37deg 46'30"N	122deg 15'00"W
	<i>Friedeberg</i>	1881	Alameda	37deg 47'40"N	122deg 16'30"W
	<i>Great Western</i>	1882	Alameda	37deg 47'40"N	122deg 16'30"W
	<i>Trilby</i>	1911	Alameda	37deg 47'40"N	122deg 16'30"W
	<i>Herald</i>	1912	Alameda	37deg 48'00"N	122deg 22'00"W
	<i>Ruth</i>	1924	Alameda	37deg 47'10"N	122deg 15'09"W
	<i>Alven Besse</i>	1929	Alameda	37deg 47'10"N	122deg 15'09"W
	<i>Edwin May</i>	1929	Alameda	37deg 47'10"N	122deg 15'09"W
	<i>Golden Gate</i>	1929	Alameda	37deg 47'10"N	122deg 15'09"W
	<i>James Rolph Jr.</i>	1929	Alameda	37deg 47'10"N	122deg 15'09"W
	<i>Simla</i>	1930	Alameda	37deg 47'10"N	122deg 15'09"W
	<i>Star of Vancouver</i>	1938	Alameda	37deg 47'10"N	122deg 15'09"W
Petaluma River Channel <sup>1</sup>	<i>Agnes Jones</i>	1889	Sonoma	38deg 14'08"N	122deg 38'15"W
	<i>Gold</i>	1920	Sonoma	38deg 14'08"N	122deg 38'15"W
Redwood City Harbor	<i>City of Glendale</i>	1921	San Mateo	37deg 31'00"N	122deg 12'20"W
Richmond Harbor	<i>Buenos Dias</i>	1867	Contra Costa	37deg 55'35"N	122deg 25'30"W
	<i>Alpha</i>	1869	Contra Costa	37deg 54'30"N	122deg 22'30"W
	<i>Adele Hobson</i>	1934	Contra Costa	37deg 54'30"N	122deg 23'20"W
	<i>Associated Oil 8</i>	1952	Contra Costa	37deg 54'30"N	122deg 23'20"W
San Pablo Bay/Mare Island Strait	<i>Harry</i>	1904	Contra Costa	38deg 03'20"N	122deg 15'20"W
San Rafael Creek Channel	<i>Novato</i>	1884	Marin	37deg 58'00"N	122deg 29'16"W
	<i>Maryland</i>	1913	Marin	37deg 58'00"N	122deg 29'16"W
	<i>Annie</i>	1920	Marin	37deg 58'00"N	122deg 29'16"W
Suisun Bay Channel	<i>Leader</i>	1893	Contra Costa	38deg 01'42"N	121deg 51'24"W
	<i>Golden Shore</i>	1922	Contra Costa	38deg 02'10"N	121deg 52'50"W
	<i>Charles B Kennedy</i>	1926	Contra Costa	38deg 02'10"N	121deg 52'50"W
	<i>Golden Shore</i>	1928	Contra Costa	38deg 02'10"N	121deg 52'50"W
	<i>E A Bryan</i>	1944	Contra Costa	38deg 03'30"N	122deg 01'00"W
	<i>Quinault Victory</i>	1944	Contra Costa	38deg 03'30"N	122deg 01'00"W

<b>Channel/ Placement Site</b>	<b>Ship Name</b>	<b>Year Sunk</b>	<b>County</b>	<b>Latitude</b>	<b>Longitude</b>
Suisun Bay Channel and SF-17	<i>Alden Anderson</i>	1924	Contra Costa	38deg 03'00"N	122deg 05'30"W
SF-8	<i>Albert Harris</i>	1850	San Francisco	37deg 45'00"N	122deg 35'00"W
	<i>Relief</i>	1863	San Francisco	37deg 45'00"N	122deg 35'00"W
	<i>Lina Simpson</i>	1872	San Francisco	37deg 45'00"N	122deg 35'00"W
	<i>Laura May</i>	1873	San Francisco	37deg 45'00"N	122deg 35'00"W
	<i>Minnie G Atkins</i>	1873	San Francisco	37deg 45'00"N	122deg 35'00"W
SF-11	<i>Thomas Burnett</i>	1850	San Francisco	37deg 49'36"N	122deg 25'18"W
	<i>Bialchi</i>	1947	San Francisco	37deg 49'05"N	122deg 25'10"W
SF-17	<i>King Philip</i>	1878	San Francisco	37deg 44'00"N	122deg 31'00"W
	<i>Reporter</i>	1902	San Francisco	37deg 44'00"N	122deg 31'00"W
	<i>James A Garfield</i>	1904	San Francisco	37deg 44'00"N	122deg 31'00"W
	<i>Maggie</i>	1904	San Francisco	37deg 44'00"N	122deg 31'00"W
	<i>Trifolicum</i>	1914	San Francisco	37deg 44'00"N	122deg 31'00"W

Source: CSLC, 2013a.

Notes:

<sup>1</sup> This table presents shipwrecks that are near, but not necessarily in, the federal navigation channels. According to the City of Petaluma, the shipwrecks are not in the federal navigation channel (City of Petaluma, 2015).

deg = degrees

N = North

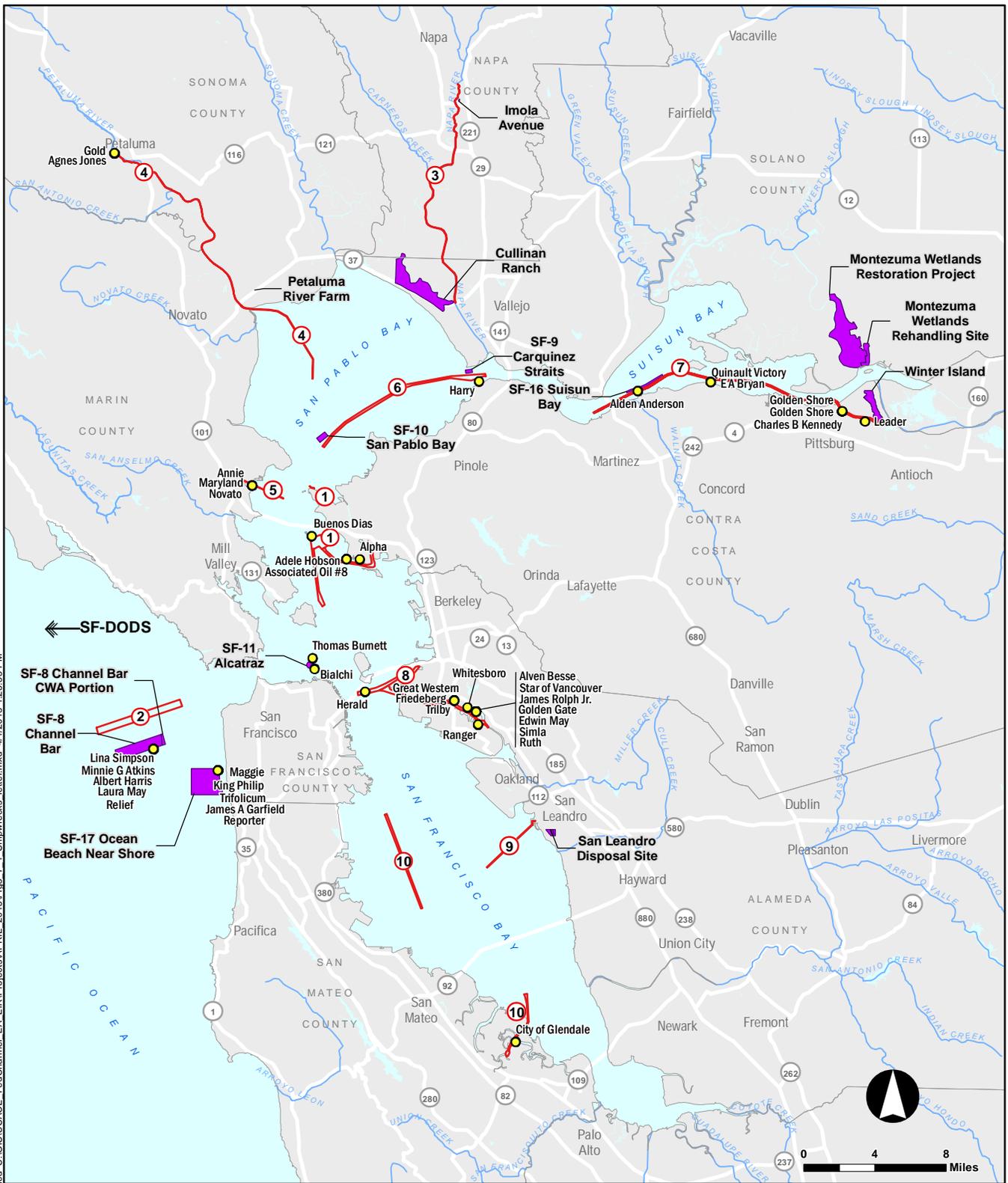
NA = not available

SF-8 = San Francisco Bar Channel Disposal Site (ocean site)

SF-11 = Alcatraz Island placement site (in-Bay site)

SF-17 = Ocean Beach placement site (nearshore site)

W = West



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Source: URS, 2013.

- Shipwreck Within 1/4-mile of Channel
  - Existing Placement Site
  - ▭ Dredge Locations Included in EA/EIR
- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>① Richmond Harbor</li> <li>② San Francisco Harbor</li> <li>③ Napa River Channel</li> <li>④ Petaluma River Channel</li> <li>⑤ San Rafael Creek Channel</li> </ul> | <ul style="list-style-type: none"> <li>⑥ San Pablo Bay/ Mare Island Strait</li> <li>⑦ Suisun Bay Channel</li> <li>⑧ Oakland Harbor</li> <li>⑨ San Leandro Marina (Jack D. Maltester Channel)</li> <li>⑩ Redwood City Harbor</li> </ul> |
|---|--|

**SHIPWRECKS**

Federal Navigation Channels EA/EIR  
U.S. Army Corps of Engineers  
Bay Area, California

April 2015

**URS**

**FIGURE 3.7-1**

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- a. Resources that are associated with events that have made a significant contribution to the broad patterns of our history; or
- b. Resources that are associated with the lives of persons significant in our past; or
- c. Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- d. Resources that have yielded, or may be likely to yield, information important in prehistory or history (36 C.F.R. § 60.4).

### **State Significance Criteria**

At the state level, consideration of significance as a “historical resource” is measured by cultural resource provisions considered under CEQA Sections 15064.5 and 15126.4, and the criteria regarding resource eligibility to the California Register of Historical Resources (CRHR).

Generally under CEQA, a historical resource (these include built-environment historic and prehistoric archaeological resources) is considered significant if it meets the criteria for listing on the CRHR. These criteria are set forth in CEQA Section 15064.5 and defined as any resource that:

- a. Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;
- b. Is associated with lives of persons important in our past;
- c. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- d. Has yielded, or may be likely to yield, information important in prehistory or history.

Section 15064.5 of CEQA also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are detailed under California PRC Section 5097.98.

“Unique” archaeological resources are also considered under CEQA, as described under PRC 21083.2. A unique archaeological resource implies an archaeological artifact, object, or site about which it can be clearly demonstrated that—without merely adding to the current body of knowledge—there is a high probability that it meets one of the following criteria:

- a. The archaeological artifact, object, or site contains information needed to answer important scientific questions, and there is a demonstrable public interest in that information;
- b. The archaeological artifact, object, or site has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
- c. The archaeological artifact, object, or site is directly associated with a scientifically recognized important prehistoric or historic event or person.

A nonunique archaeological resource indicates an archaeological artifact, object, or site that does not meet the above criteria. Impacts to nonunique archaeological resources and resources that do not qualify for listing on the CRHR receive no further consideration under CEQA.

### Conformity of Federal and State Evaluation Criteria

The criteria for eligibility for the CRHR are very similar to those that qualify a property for the NRHP. A property that is eligible for the NRHP is also eligible for the CRHR. All potential impacts to significant resources under a federal agency must be assessed and addressed under the procedures of Section 106 of the NHPA, set forth at 36 C.F.R. pt. 800.

### Criteria for Evaluation of Cultural Resource Impacts

The criteria for determining an adverse effect under Section 106 of the NHPA are applied to assess what impacts a federal undertaking (i.e., federal action) would have on the historic integrity of a historic property, and how the undertaking would affect those features of a historic property that contribute to its eligibility for listing in the NRHP. Similarly, the criteria of significant impacts to historic resources under CEQA are applied to assess a project's impacts on the historic integrity of a historical resource, and whether the project impacts would materially impair the historical significance of the resource.

The federal definition of effect is contained in 36 C.F.R. pt. 800: “*Effect* means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register.” An *adverse effect* occurs “when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association . . . Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.”<sup>1</sup>

The California Code of Regulations, beginning with 15064.5(b), defines significant impacts for historical resources as: “[S]ubstantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired.”

In addition to those cultural resources determined eligible for listing to the NRHP and/or CRHR, CEQA (Section 15064.5) also contains provisions for the treatment of human remains (PRC Section 5097.98) and “unique” archaeological resources (PRC Section 21083.2).

Therefore, the analysis of impacts to cultural resources considers whether the project would:

- Result in a substantial adverse change in the significance of a historical resource (NRHP and/or CRHR Listed, or Eligible to be Listed), or a unique archaeological resource as defined under California PRC Section 21083.2; or
- Result in disturbance of any human remains, including those interred outside of formal cemeteries as considered under PRC Section 5097.9.

As stated at the beginning of this section, the project alternatives neither propose demolition of existing structures nor introduce elements that could affect the historic setting of the built environment. Therefore, there would be no potential for impacts to historic architectural resources, and such impacts are not further addressed in this analysis.

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<sup>1</sup> 36 C.F.R. § 800.5(a)(1).

## Criteria for Evaluation of Paleontological Resource Impacts

Assessments of the scientific significance of paleontological remains are based on whether they can provide data on the taxonomy and phylogeny of ancient organisms, the paleoecology and nature of paleoenvironments in the geologic past, or the stratigraphy and age of geologic units. Significant paleontological resources are defined in this analysis to include the interpretation outlined by the Society of Vertebrate Paleontology (SVP) (SVP, 1994), wherein vertebrate fossils are considered significant.

The evaluation of impacts on paleontological resource is conducted consistent with the standards and guidelines recommended for the assessment and mitigation of impacts to paleontological resources recommended by the SVP (SVP, 1995). Therefore, the analysis of impacts to paleontological resources considers whether the project would result in disturbance or destruction of a sensitive and/or unique paleontological resource or site.

### 3.7.4 Impacts and Mitigation Measures

Under all alternatives, USACE would continue to conduct maintenance dredging, transport of dredged materials, and placement of dredged materials. Dredged material transport would not involve sediment disturbance, and would therefore not be expected to disturb archaeological or paleontological resources. Therefore, the area of potential effects is limited to the federal navigation channels and placement sites.

#### ***Impact 3.7-1: Substantial Adverse Change to a Historical Resource or Disturb Unique Archaeological Resources***

#### **No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

It has been generally accepted that the initial construction of shipping lanes and maneuvering areas and the repeated maintenance dredging of these areas alter the seafloor to a point that submerged cultural resources, if present prior to the work, would be severely damaged or destroyed. Maintenance dredging that would occur under all alternatives would be confined to the removal of sediments accumulated since the last dredging effort. Sediments deposited since the previous dredging activities would not contain *in situ* archaeological resources. Furthermore, given the extent of past dredging in the channels, the likelihood of any intact remains in these areas is negligible.

The dredged material would be placed at existing placement sites on previously placed dredged material. Therefore, placement activities would not result in impacts to historical resources or unique archaeological resources, because the underlying native deposits would not be disturbed. The USACE would not use future placement sites identified in Section 1.5.4 until appropriate environmental review is completed, including evaluation and mitigation of archaeological impacts.

Per 36 C.F.R. pt. 800.3(1), because there are no known historical resources at the federal navigation channels or existing placement sites that could be impacted by the project alternatives, USACE has no further obligations under Section 106 of the NHPA.

Although unlikely, given the repeated dredging and dredged material placement activities that have historically occurred at the federal navigation channels and existing placement sites, there remains the potential that archaeological materials could be inadvertently uncovered by project activities. Such inadvertently discovered archaeological materials could represent historical resources or unique archaeological resources, and their disturbance could adversely change their condition. As such, the inadvertent discovery of archaeological materials represents a potential project impact. Implementation of Mitigation Measure CUL-1, Inadvertent Archaeological Discovery Measures, would reduce potential

impacts to archaeological material by identifying the procedures to be followed by USACE in the event archaeological resources are inadvertently exposed during project activities.

**Mitigation Measure CUL-1: Inadvertent Archaeological Discovery Measures**

To avoid potential adverse effects on inadvertently discovered NRHP- and/or CRHR-eligible or unique archaeological resources, should any indication of an archeological resource, including—but not limited to—encountering fragments of bone, stone tools, structural remains, ship remnants, or historic refuse during any soil-disturbing activity of the project, USACE will immediately suspend any soils-disturbing activities in the vicinity of the discovery.

In the event of such a discovery, USACE will consult a qualified archaeologist. The archaeologist will advise USACE as to whether the discovery is an archaeological resource that retains sufficient integrity and is of potential scientific/historical/cultural significance. If an archaeological resource is present, the archaeologist will identify and evaluate the archaeological resource. The archaeologist will make a recommendation to USACE as to what action or additional measures, if any, are warranted.

Measures might include: an archaeological monitoring program, or an archaeological evaluation program. If an archaeological resource cannot be avoided by project activities, the archaeologist will prepare an Archaeological Evaluation Plan (AEP). The AEP will create a program to determine the potential of the expected resource to meet the NRHP and CRHR criteria, and the archaeologist will submit this plan to USACE for approval. The archaeologist will then conduct an evaluation consistent with the USACE-approved AEP. The methods and findings of the evaluation will be presented in an Archaeological Evaluation and Effects Report, which will be submitted to USACE for review upon completion.

**NEPA Determination:** Under all alternatives, the inadvertent discovery of archaeological materials during project activities represents a potential impact; however, implementation of Mitigation Measure CUL-1 would reduce the potential to result in impacts to archaeological resources to a less-than-significant level.

**CEQA Determination:** Under all alternatives, the inadvertent discovery of archaeological materials during project activities represents a potential impact; however, implementation of Mitigation Measure CUL-1 would reduce the potential to result in impacts to archaeological resources to a less-than-significant level.

***Impact 3.7-2: Disturb Human Remains, including those Interred Outside of Formal Cemeteries***

**No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

There are no known cemeteries, formal or otherwise, or other evidence of human internment in the federal navigation channels or existing placement sites. Furthermore, USACE would not use the future placement sites identified in Section 1.5.4 until appropriate environmental review and permitting are completed. Although unlikely, given the repeated dredging and dredged material placement activities that have historically occurred at the federal navigation channels and existing placement sites, there remains the potential that previously unidentified human remains could be inadvertently uncovered with project implementation. Such disturbance of human remains represents a potential project impact. Implementation of Mitigation Measure CUL-1, Inadvertent Archaeological Discovery Measures (above) and Mitigation Measure CUL-2, Treatment of Human Remains, would reduce potential impacts by identifying the procedures to be followed by the applicant in the event human remains are inadvertently exposed during project implementation.

**Mitigation Measure CUL-2: Treatment of Human Remains**

The treatment of human remains and associated or unassociated funerary objects discovered during any soil-disturbing activity will comply with applicable state laws. In the event the discovery is composed entirely of—or includes—human skeletal remains, construction activities will immediately cease and USACE’s project representative will immediately contact the local coroner (county in which discovery is made) to evaluate the remains, and follow the procedures and protocols set forth in Section 15064.5 (e)(1) of the CEQA Guidelines. If the coroner determines that the remains are Native American, USACE will contact the Native American Heritage Commission, who will appoint a Most Likely Descendant (MLD), in accordance with Health and Safety Code Section 7050.5, subdivision (c), and PRC 5097.98 (as amended by AB 2641). In accordance with PRC 5097.98, USACE shall ensure that, according to generally accepted cultural or archaeological standards or practices, the immediate vicinity of the Native American human remains is not damaged or disturbed by further development activity until USACE has discussed and conferred, as prescribed in this section (PRC 5097.98), with the MLD regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The USACE and the MLD will make all reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (CEQA Guidelines Sec. 15064.5[d]). The agreement should take into consideration the appropriate recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. PRC allows 48 hours to reach agreement on these matters. If the MLD and the other parties do not agree on the reburial method, the project will follow Section 5097.98(b) of the PRC, which states, “the landowner or his or her authorized representative will re-inter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance.”

**NEPA Determination:** Under all alternatives, the inadvertent disturbance of human remains represents a potential impact; however, implementation of Mitigation Measures CUL-1 and CUL-2 would reduce the potential to result in impacts to human remains to a less-than-significant level.

**CEQA Determination:** Under all alternatives, the inadvertent disturbance of human remains represents a potential impact; however, implementation of Mitigation Measures CUL-1 and CUL-2 would reduce the potential to result in impacts to human remains to a less-than-significant level.

**Impact 3.7-3: Disturb Unidentified Significant Paleontological Resources****No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

As described under Impact 3.7-1, maintenance dredging and placement at existing placement sites would not disturb native sediments; therefore, disturbance of paleontological resources would not be expected. The USACE would not use the future placement sites identified in Section 1.5.4 until appropriate environmental review and permitting are completed. Although unlikely, there remains the potential that paleontological materials could be inadvertently uncovered by project activities. Such disturbance of paleontological resources represents a potential project impact. Implementation of Mitigation Measure CUL-3, Inadvertent Paleontological Discovery, would reduce potential impacts due to disturbance of paleontological resources by identifying the procedures to be followed by USACE in the event human remains are inadvertently exposed.

**Mitigation Measure CUL-3: Inadvertent Paleontological Discovery**

In the event that paleontological resources are discovered during sediment-disturbing activities, work will be temporarily halted or diverted. The USACE will consult a qualified paleontologist (in accordance with SVP standards). The paleontologist will document the discovery as needed,

evaluate the potential resource, and assess the significance of the find under the criteria set forth in CEQA Guidelines Section 15064.5. The paleontologist will consult USACE to determine procedures that would be followed before work is allowed to resume at the location of the find. If USACE determines that avoidance is not feasible, the paleontologist will prepare a salvage plan in accordance with the SVP and CEQA Guidelines for mitigating the effect of the project on the qualities that make the resource important. The plan will be submitted to USACE for review and approval prior to implementation.

**NEPA Determination:** Under all alternatives, with implementation of proposed Mitigation Measure CUL-3, the potential to result in impacts to paleontological resources would be reduced to a less-than-significant level.

**CEQA Determination:** Under all alternatives, with implementation of proposed Mitigation Measure CUL-3, the potential to result in impacts to paleontological resources would be reduced to a less-than-significant level.

***Impact 3.7-4: Potential to Result in Cumulative Impacts on Archaeological or Paleontological Resources***

Under all alternatives, project activities would not result in impacts to known historic or unique archaeological resources or to significant paleontological resources, and therefore would not contribute to any cumulative impact to these resources. Dredging and placement activities could result in the inadvertent discovery of a buried archaeological resource, buried human remains, or paleontological resources. The other ongoing and reasonably foreseeable projects shown in Table 3.1-1, which include dredging to deepen channels, would also have the potential to inadvertently uncover previously unidentified buried archaeological resources, buried human remains, or paleontological resources.

If previously undiscovered archaeological resources are inadvertently exposed during construction activities, an incremental effect to archaeological resources may occur. However, other ongoing and reasonably foreseeable future projects would be subject environmental review under NEPA and/or CEQA, and would be required to consider mitigation for impacts to historical or unique archaeological resources and paleontological resources. If these resources are properly evaluated and managed according to mitigation measures, no adverse cumulative impact to archaeological resources is expected to occur.

**NEPA Determination.** Cumulative impacts to archaeological and paleontological resources would be less than significant.

**CEQA Determination.** Cumulative impacts to archaeological and paleontological resources would be less than significant.

### **3.8 LAND USE**

This section describes the land use planning context, including applicable plans and policies, and evaluates the potential land use impacts from implementation of the alternatives. The proposed dredging, transport, and placement activities would not require any new land-based construction or facilities, and would not result in any new residences or infrastructure that could indirectly induce growth or development in the study area. Therefore, this land use evaluation focuses on land use policies that affect shoreline development and the waters in the study area. Habitat conservation plans are addressed in Section 3.6, Biological Resources.

#### **3.8.1 Regulatory Setting**

##### **Federal**

##### **Coastal Zone Management Act**

The Coastal Zone Management Act (CZMA), established in 1972 and administered by the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management, provides for management of the nation's coastal resources. The overall purpose is to balance competing land and water issues in the coastal zone. The CZMA encourages states to develop coastal management programs. The federal government certified the California Coastal Management Program (CCMP) in 1977. Under the CZMA, any federal agency conducting or supporting activities directly affecting the coastal zone must proceed in a manner consistent with the federally approved state coastal zone management programs, to the maximum extent practicable. The processes established to implement this requirement are called a consistency determination for federal activities and development projects; and a consistency certification for federal permits and licenses and federal support to state and local agencies (CCC, 2012a). In lieu of a consistency determination, pursuant to 15 C.F.R. § 930.35, a federal agency may submit a negative determination for an activity that "is the same as or is similar to activities for which consistency determinations have been prepared in the past." The enforceable policies of the CCMP are in Chapter 3 of the California Coastal Act of 1976. However, as described below, the California Coastal Act covers a much broader jurisdiction beyond implementation of the federal CZMA.

##### **Commerce Clause of the Constitution**

Navigable servitude is a United States constitutional doctrine that gives the federal government the right to regulate navigable waterways as an extension of the Commerce Clause of the Constitution. The federal navigational servitude entitles the government to exert a dominant servitude in all lands below the ordinary high water mark of navigable waters.

Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce (33 C.F.R. § 329.4). For rivers, lakes and marshlands, federal regulatory jurisdiction and powers of improvement for navigation extend laterally to the entire water surface and bed of a navigable waterbody, which includes all the land and waters below the ordinary high water mark (33 C.F.R. § 329.11).

##### **Submerged Lands Act**

The Submerged Lands Act of 1953 (43 U.S.C. § 1301 et seq.) grants states title to all submerged navigable lands within their boundaries. This includes navigable waterways, such as rivers, as well as marine waters within the state's boundaries, generally three geographical miles from the coastline. Section 1311(d) of the Submerged Lands Act provides that nothing in the act shall affect the use, development, improvement, or control by or under the constitutional authority of the United States for the

purposes of navigation or be construed as the release or relinquishment of any rights of the United States arising under the constitutional authority of Congress to regulate or improve navigation. In compliance with this act, the California State Land Commission will receive a copy of this Environmental Assessment/Environmental Impact Report and will have the opportunity to comment on its potential impacts to submerged lands.

## **State**

### **California Environmental Quality Act**

The California Environmental Quality Act (CEQA) (California Public Resources Code Sections 21000-21178) and the CEQA Guidelines (14 California Code of Regulations 15000-15387) are the primary policies that require projects to analyze potential impacts to land use, as well as to analyze the project's consistency with land use planning policies applicable to the project. This document is intended to fulfill the requirements of CEQA and the CEQA Guidelines.

### **Public Trust Doctrine (California State Lands Commission)**

The California State Lands Commission (CSLC) manages lands in California according to the Public Trust Doctrine. Several of the guiding principles of the Public Trust are:

- I. Lands under the ocean and under navigable streams are owned by the public and held in trust for the people by government. These are referred to as public trust lands, and include filled lands formerly under water. Public trust lands cannot be bought and sold like other state-owned lands. Only in rare cases may the public trust be terminated, and only where consistent with the purposes and needs of the trust.
- II. Uses of trust lands, whether granted to a local agency or administered by the state directly, are generally limited to those that are water dependent or related, and include commerce, fisheries, and navigation, environmental preservation and recreation. Public trust uses include, among others, ports, marinas, docks and wharves, buoys, hunting, commercial and sport fishing, bathing, swimming, and boating. Public trust lands may also be kept in their natural state for habitat, wildlife refuges, scientific study, or open space. Ancillary or incidental uses are also permitted—that is, uses that directly promote trust uses; are directly supportive and necessary for trust uses; or that accommodate the public's enjoyment of trust lands. Although trust lands cannot generally be alienated from public ownership, uses of trust lands can be carried out by public or private entities by lease from the CSLC or a local agency grantee.
- III. Because public trust lands are held in trust for all citizens of California, they must be used to serve statewide, as opposed to purely local, public purposes (CSLC, 2010).

### **California Coastal Act**

The California Coastal Act includes specific policies (Division 20 of the California Public Resources Code) for planning and regulatory decisions made by the California Coastal Commission (CCC) and local governments. The CCC works with coastal cities and counties to regulate the use of land and water in the coastal zone. The California Coastal Act regulates development activities, such as the construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters. On land, the coastal zone varies in width from several hundred feet in highly urbanized areas up to 5 miles in certain rural areas; offshore, the coastal zone includes a 3-mile-wide band of ocean. The coastal zone established by the California Coastal Act does not include San Francisco Bay, where development is regulated by the San Francisco Bay Conservation and Development Commission (BCDC) (CCC, 2012a), as further described below.

The CCC developed the CCMP, pursuant to the requirements of the CZMA, described above. If a proposed activity affects water use in the coastal zone (i.e., the territorial sea and inland), the federal agency must determine that its project is consistent—to the maximum extent practicable—with the CCMP. The BCDC, further described below, is the state’s coastal zone management agency responsible for reviewing consistency determinations under the CZMA in San Francisco Bay. For activities outside of the Golden Gate, consistency determinations are reviewed by the CCC.

Article 4 of the California Coastal Act requires that marine resources be maintained, enhanced, and where feasible, restored. The act also requires that special protection be given to areas and species of special biological or economic significance. It further requires that uses of marine environments be such that habitat function, biological productivity, healthy species populations, and fishing and recreational interests of coastal waters are maintained for long-term commercial, recreational, scientific, and educational purposes; and that marine resources are protected against the spillage of crude oil, gas, petroleum products, and hazardous substances.

### **McAteer-Petris Act**

The McAteer-Petris Act (California Government Code Section 66000, et seq.), first enacted in 1965, created the BCDC to prepare a plan to protect the San Francisco Bay and shoreline, and provide for appropriate development and public access. This act directs BCDC to exercise its authority to issue or deny permit applications for placing fill; dredging; or changing the use of any land, water, or structure in the area of its jurisdiction. The BCDC also reviews determinations of consistency with the CZMA for federally sponsored projects. The San Francisco Bay Plan (Bay Plan) is BCDC’s policy document specifying goals, objectives, and policies for BCDC jurisdictional areas. Pursuant to the federal CZMA, USACE is required to be consistent to the maximum extent practicable with the enforceable policies of the Bay Plan.

### **Regional**

#### **San Francisco Bay Conservation and Development Commission San Francisco Bay Plan**

BCDC has permit authority over development of San Francisco Bay and the shoreline pursuant to the McAteer-Petris Act (California Government Code Section 66000 et seq.). The act requires BCDC to prepare a “comprehensive and enforceable plan for the conservation of the water of San Francisco Bay and the development of its shoreline.” BCDC’s jurisdiction includes all tidal areas of San Francisco Bay up to the line of mean high tide; all areas formerly subject to tidal action that have been filled since September 17, 1965; and the “shoreline band,” which extends 100 feet inland from and parallel to the San Francisco Bay shoreline.

BCDC is also the regional coastal zone management agency for San Francisco Bay. Therefore, under the provisions of Section 307 of the federal CZMA, federal agencies must assess whether their actions are consistent with BCDC’s regulations and policies to the maximum extent practicable. BCDC has jurisdiction over all filling, dredging, and changes in use in San Francisco Bay.

The Bay Plan, first adopted in 1969, and last updated in 2011, is BCDC’s policy document specifying goals, objectives, and policies for BCDC jurisdictional areas (BCDC, 2007). Policies in the Bay Plan applicable to the proposed project include those in the following categories: Dredging; Fish, Other Aquatic Organisms, and Wildlife; Water Quality; Tidal Marshes and Tidal Flats; Subtidal Areas; and Navigational Safety and Oil Spill Prevention.

Dredging policies in the Bay Plan relevant to the proposed project are summarized below:

**Dredging Policy 1.** Dredging and dredged material disposal should be conducted in an environmentally and economically sound manner. Dredgers should reduce disposal in San Francisco Bay and certain waterways over time to achieve the Long-Term Management Strategy (LTMS) goal of limiting in-Bay disposal volumes to a maximum of one million cubic yards per year. The LTMS agencies should implement a system of disposal allotments to individual dredgers to achieve this goal only if voluntary efforts are not effective in reaching the LTMS goal. In making its decision regarding disposal allocations, the BCDC should confer with the LTMS agencies and consider the need for the dredging and the dredging projects, environmental impacts, regional economic impacts, efforts by the dredging community to implement and fund alternatives to in-Bay disposal, and other relevant factors.

**Dredging Policy 2.** Dredging should be authorized when the BCDC can find: (a) the applicant has demonstrated that the dredging is needed to serve a water-oriented use or other important public purpose, such as navigational safety; (b) the materials to be dredged meet the water quality requirements of the Regional Water Board; (c) important fisheries and Bay natural resources would be protected through seasonal restrictions established by the California Department of Fish and Wildlife (CDFW), the United States Fish and Wildlife Service (USFWS), and/or the National Marine Fisheries Service (NMFS), or through other appropriate measures; (d) the siting and design of the project will result in the minimum dredging volume necessary for the project; and (e) the materials would be disposed of in accordance with Policy 3.

**Dredging Policy 3.** Dredged materials should, if feasible, be reused or disposed outside San Francisco Bay and certain waterways. Except when reused in an approved fill project, dredged material should not be disposed in San Francisco Bay and certain waterways unless disposal outside these areas is infeasible and the BCDC finds: (a) the volume to be disposed is consistent with applicable dredger disposal allocations and disposal site limits adopted by the BCDC by regulation; (b) disposal would be at a site designated by the BCDC; (c) the quality of the material disposed of is consistent with the advice of the Regional Water Board and the Dredged Material Management Office; and (d) the period of disposal is consistent with the advice of the CDFW, the USFWS, and the NMFS.

**Dredging Policy 4.** If an applicant proposes to dispose dredged material in tidal areas of San Francisco Bay and certain waterways that exceeds either disposal site limits or any disposal allocation that the BCDC has adopted by regulation, the applicant must demonstrate that the potential for adverse environmental impact is insignificant, and that nontidal and ocean disposal is infeasible because there are no alternative sites available or likely to be available in a reasonable period, or because the cost of disposal at alternate sites is prohibitive. In making its decision whether to authorize such in-Bay disposal, the BCDC should confer with the LTMS agencies and consider the factors listed in Policy 1.

**Dredging Policy 5.** To ensure adequate capacity for necessary Bay dredging projects and to protect Bay natural resources, acceptable nontidal disposal sites should be secured and the San Francisco Deep Ocean Disposal Site should be maintained. Furthermore, dredging projects should maximize use of dredged material as a resource consistent with protecting and enhancing Bay natural resources, such as creating, enhancing, or restoring tidal and managed wetlands, creating and maintaining levees and dikes, providing cover and sealing material for sanitary landfills, and filling at approved construction sites.

**Dredging Policy 6.** Dredged materials disposed in San Francisco Bay and certain waterways should be carefully managed to ensure that the specific location, volumes, physical nature of the material, and timing of disposal do not create navigational hazards; adversely affect Bay

sedimentation, currents, or natural resources; or foreclose the use of the site for projects critical to the economy of the San Francisco Bay Area.

Policies in the Bay Plan pertaining to Fish, Other Aquatic Organisms, and Wildlife that are relevant to the proposed project are summarized below:

**Fish, Other Aquatic Organisms, and Wildlife Policy 1.** To assure the benefits of fish, other aquatic organisms, and wildlife for future generations, to the greatest extent feasible, San Francisco Bay's tidal marshes, tidal flats, and subtidal habitat should be conserved, restored, and increased.

**Fish, Other Aquatic Organisms, and Wildlife Policy 2.** Specific habitats that are needed to conserve, increase, or prevent the extinction of any native species, species threatened or endangered, species that the CDFW has determined are candidates for listing as endangered or threatened under the California Endangered Species Act, or any species that provides substantial public benefits, should be protected, whether in San Francisco Bay or behind dikes.

**Fish, Other Aquatic Organisms, and Wildlife Policy 4.** The BCDC should not authorize projects that would result in the "taking" of any plant, fish, other aquatic organism or wildlife species listed as endangered or threatened pursuant to the state or federal endangered species acts, or the federal Marine Mammal Protection Act, or species that are candidates for listing under the California Endangered Species Act, unless the project applicant has obtained the appropriate "take" authorization from the USFWS, NMFS, or CDFW. The BCDC should give appropriate consideration to the recommendations of the CDFW, NMFS, or USFWS to avoid possible adverse effects of a proposed project on fish, other aquatic organisms, and wildlife habitat.

Water Quality policies in the Bay Plan relevant to the proposed project are summarized below:

**Water Quality Policy 1.** Bay water pollution should be prevented to the greatest extent feasible. The Bay's tidal marshes, tidal flats, and water surface area and volume should be conserved, and whenever possible, restored and increased to protect and improve water quality.

**Water Quality Policy 2.** Water quality in San Francisco Bay should be maintained at a level that will support and promote the beneficial uses of San Francisco Bay as identified in the Regional Water Board's Water Quality Control Plan for the San Francisco Bay Basin, and should be protected from all harmful or potentially harmful pollutants. The policies, recommendations, decisions, advice, and authority of the State Water Resources Control Board and the Regional Water Board should be the basis for carrying out the BCDC's water quality responsibilities.

Policies in the Bay Plan pertaining to Tidal Marshes and Tidal Flats relevant to the proposed project are summarized below:

**Tidal Marshes and Tidal Flats Policy 1.** Tidal marshes and tidal flats should be conserved to the fullest possible extent. Filling, diking, and dredging projects that would substantially harm tidal marshes or tidal flats should be allowed only for purposes that provide substantial public benefits, and only if there is no feasible alternative.

**Tidal Marshes and Tidal Flats Policy 2.** Any proposed fill, diking, or dredging project should be thoroughly evaluated to determine the effect of the project on tidal marshes and tidal flats, and designed to minimize—and if feasible—avoid any harmful effects.

Policies for Subtidal Areas in the Bay Plan that are relevant to the proposed project are summarized below:

**Subtidal Areas Policy 1.** Any proposed filling or dredging project in a subtidal area should be thoroughly evaluated to determine the local and Bay-wide effects of the project on: (a) the possible introduction or spread of invasive species; (b) tidal hydrology and sediment movement; (c) fish, other aquatic organisms, and wildlife; (d) aquatic plants; and (e) San Francisco Bay's bathymetry. Projects in subtidal areas should be designed to minimize—and if feasible—avoid any harmful effects.

**Subtidal Areas Policy 2.** Subtidal areas that are scarce in San Francisco Bay or have an abundance and diversity of fish, other aquatic organisms, and wildlife (e.g., eelgrass beds, sandy deep water, underwater pinnacles) should be conserved. Filling, changes in use; and dredging projects in these areas should therefore be allowed only if: (a) there is no feasible alternative; and (b) the project provides substantial public benefits.

Navigational Safety and Oil Spill Prevention policies in the Bay Plan relevant to the proposed project are summarized below:

**Navigational Safety and Oil Spill Prevention Policy 1.** Physical obstructions to safe navigation, as identified by the U.S. Coast Guard and the Harbor Safety Committee of the San Francisco Bay Region, should be removed to the maximum extent feasible when their removal would contribute to navigational safety, and would not create significant adverse environmental impacts. Removal of obstructions should ensure that any detriments arising from a significant alteration of Bay habitats are clearly outweighed by the public and environmental benefits of reducing the risk to human safety; or the risk of spills of hazardous materials, such as oil.

**Navigational Safety and Oil Spill Prevention Policy 3.** To ensure navigational safety and help prevent accidents that could spill hazardous materials, such as oil, the BCDC should encourage major marine facility owners and operators, USACE and the National Oceanic and Atmospheric Administration to conduct frequent, up-to-date surveys of major shipping channels, turning basins, and berths used by deep-draft vessels and oil barges. Additionally, the frequent, up-to-date surveys should be quickly provided to the U.S. Coast Guard Vessel Traffic Service San Francisco, masters and pilots.

### 3.8.2 Environmental Setting

For the purpose of this analysis, the project's study area in San Francisco Bay encompasses the shoreline and in-water areas in the following 11 counties: Marin, Sonoma, Napa, Solano, Sacramento, San Joaquin, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco. The geographic scope of the study area includes the estuarine waters of the San Francisco Bay region, portions of the Sacramento-San Joaquin Delta west of Sherman Island, and the western portion of the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel. Outside of the Golden Gate, the study area includes the San Francisco Deep Ocean Disposal Site, the San Francisco Main Ship Channel (MSC), San Francisco Bar Channel Disposal Site (SF-8) and the nearshore zone off Ocean Beach, as well as the waters that are used by vessels en route to these sites.

BCDC's jurisdiction extends over most of the in-Bay portion of the study area, with the exception of a small portion of the eastern extent of the study area east of Pittsburg. The Winter Island, Antioch Dunes, and Sherman Island placement sites are outside of BCDC's jurisdictional boundary. Outside of San Francisco Bay, the coastal zone extends approximately 3,000 feet into the eastern end of the Main Ship Channel and includes the SF-8 and the Ocean Beach nearshore placement site (SF-17) in-water placement

sites and Ocean Beach onshore beach nourishment placement area; this area of the coastal zone is under the jurisdiction of the CCC.

### 3.8.3 Methodology and Thresholds of Significance

The proposed project would involve the maintenance dredging of existing federal navigation channels and placement of dredged materials at existing placement sites. These activities would have no potential to divide an existing community or substantially affect existing land uses and land use patterns in the study area, because no new land uses, types of activities, or improvements would be implemented. In addition, the use of future placement sites identified in Section 1.5.4 would be unlikely to result in such impacts based on their location and existing surrounding land uses; however, USACE would not use the future placement sites identified in Section 1.5.4 until appropriate environmental review is completed, including evaluation of impacts on land use.

Therefore, this land use evaluation focuses on consistency with coastal land use policies and plans. The analysis considered whether the project would conflict with applicable land use plans, policies, or regulations that an agency with jurisdiction over the project has adopted to avoid or mitigate environmental effects.

### 3.8.4 Impacts and Mitigation Measures

#### ***Impact 3.8-1 Conflict with Applicable Plans and Policies***

##### **No Action/No Project Alternative**

Under the No Action/No Project Alternative, dredging and placement activities would be similar to numerous USACE annual maintenance dredging operations previously concurred with by the CCC and BCDC. Therefore, for the most part, continuation of these activities would not be expected to conflict with plans, regulations, or policies considered under the CZMA, including the CCMP and the Bay Plan; the exception being policies pertaining to the protection of listed species due to the entrainment of delta smelt and longfin smelt during hopper dredging operations at in-Bay locations. Pursuant to the CZMA, the BCDC and the CCC would review USACE's consistency determination for dredging and placement activities that occur within each agency's jurisdictional boundaries. The No Action/No Project Alternative's consistency with the applicable policies from each plan is evaluated below.

**Bay Plan.** The USACE's dredging, transport, and placement activities would be consistent with Bay Plan Dredging Policies and Water Quality Policies as described below:

- Per Dredging Policy 1, USACE would conduct dredging and dredged material placement in an environmentally and economically sound manner in accordance with LTMS goals, to the extent that funding and authority allows. The USACE, as one of the LTMS managing agencies, is committed to the LTMS goal of reducing the placement of dredged material at in-Bay placement sites. Dredged material placement by USACE would support the goals of the Bay Plan.
- Per Dredging Policy 2 and Water Quality Policies 1 and 2, maintenance dredging is needed for safe navigation; USACE would abide by the conditions of the Water Quality Certification issued by the Regional Water Board; Bay fisheries and natural resources would be protected; only the minimum volumes necessary would be dredged; and the sediment would be disposed of in accordance with the Policy 3 guidelines. The dredging activities would maintain the navigational safety of federal channels for commercial and recreational vessels, all serving valuable water-oriented uses.
- Per Dredging Policy 3, dredged materials placed in BCDC's jurisdiction would be placed in accordance with the Bay Plan guidelines unless it is found infeasible to comply with established

regulations. The volumes proposed for placement at each designated site would be within placement site target values; the material would be determined suitable by the Dredged Material Management Office (which includes the Regional Water Board); and the dredging of sediments would be completed within the LTMS work windows, or USACE would consult with the appropriate resource agencies for work outside the windows. Because the use of in-Bay sites would continue for some projects, site-management strategies and monitoring activities for placement sites would continue to be implemented to lessen the cumulative impacts on San Francisco Bay's aquatic habitats, and to ensure that the dispersion of dredged material is maximized.

- Per Dredging Policy 4, the total volume of dredged material placed at in-Bay sites would fall within the LTMS target limits for in-Bay sites, and would not exceed disposal site limits.
- Per Dredging Policy 5, USACE would maximize, to the extent feasible, the use of dredged sediment as a resource, in accordance with the goals of the LTMS Management Plan. In addition, adequate placement capacity for these dredging projects is continually being researched by USACE. For example, following a pilot project at the Ocean Beach Demonstration Site, SF-17 was proposed as a placement site and is presently undergoing the designation process.
- Per Dredging Policy 6, all in-Bay sites would continue to be carefully managed (by performing regular bathymetric surveys) to ensure that the amount and timing of placement do not create navigational hazards, adversely affect Bay currents or natural resources of San Francisco Bay, or foreclose the use of the sites by projects critical to the economy of the San Francisco Bay Area.

The USACE's dredging, transport, and placement activities would be consistent with Bay Plan Fish, Other Aquatic Organisms, and Wildlife Policies:

- For Fish, Other Aquatic Organisms, and Wildlife Policy 1, USACE would place dredged materials in the most cost-efficient and environmentally responsible fashion. Dredged material would continue to be evaluated for—and used in the restoration of—tidal wetlands, or other habitat types wherever possible.
- For Fish, Other Aquatic Organisms, and Wildlife Policies 2 and 4, the schedule for maintenance dredging projects in San Francisco Bay would be developed and followed in a manner protective of threatened or endangered species and special-status species in accordance with LTMS work windows. The dredging and disposal of sediments would be completed within these work windows, or USACE would consult with the appropriate resource agencies. The USACE would meet all federal environmental compliance requirements (e.g., Clean Water Act Section 404, Endangered Species Act), including those federal requirements implemented by state agencies (e.g., Clean Water Act Section 401). The USACE would undertake mitigation, as appropriate, in meeting its compliance requirements.

The USACE's dredging, transport, and placement activities would be consistent with Bay Plan Tidal Marshes and Tidal Flats Policies:

- Per Tidal Marshes and Tidal Flats Policy 1, USACE maintenance dredging would remove only the minimum volume necessary to ensure safe navigation in San Francisco Bay and the continuance of economic development benefiting the public.
- Per Tidal Marshes and Tidal Flats Policy 2, USACE has and would continue to minimize and avoid to the extent feasible potentially harmful effects on tidal marshes.

For the two projects that are dredged through tidal mudflat—Petaluma River Across the Flats, and San Rafael Across the Flats—only the minimum material necessary to ensure safe navigation would be

dredged. Although these projects cross the tidal mudflats, the channels are not considered to be tidal mudflat because of the channel depths.

No known tidal marsh habitat exists within the current channel boundaries; however, several projects may require work in, or near enough, to potentially impact tidal marsh areas. Projects that may require work in the tidal marsh habitats are Redwood City Harbor, San Leandro Marina, Petaluma River, and the Napa River channels. The dredging of these channels would provide public benefits of navigational safety and economic benefits to the communities who use them, and proposed dredging and placement activities would not substantially harm tidal marshes. These projects have nearby upland placement sites that may require transport of the material through the marsh habitat. This transport is typically accomplished through pipelines temporarily crossing the habitat to place the material. Through coordinated efforts, USACE has avoided impacts to special-status species in these habitats in the past; these efforts have included surveying for the species of concern, and then implementing the project in a manner that does not affect them. The USACE would continue to coordinate with the appropriate resource agencies on any work that may affect the tidal marsh habitat or its species.

Although eelgrass does exist near the Richmond Inner Harbor Channel, there is no known eelgrass within any of the channel boundaries. In 2010, 2011, and 2012 USACE conducted three sets of eelgrass surveys, conducted both before and after maintenance dredging. A reduction in the density in eelgrass along the channel margin was detected; the survey crews, however, did not find excessive sedimentation or any other evidence indicating that dredging had caused loss of eelgrass. Losses during winter months, known as seasonal diebacks, are, in fact, common in eelgrass meadows. Examination of surveys done over the last 15 years indicates that eelgrass has persisted in essentially the same locations and densities around Richmond Harbor. Minimization measures are always included in contract specifications. For Richmond Inner Harbor, a closed or “environmental” clamshell bucket is required, and contractors are prohibited from anchoring or placing any equipment in locations that could possibly disturb eelgrass habitat (USACE, 2012a). The USACE would also comply with the programmatic Essential Fish Habitat conservation measures for the LTMS Program (June 2011).

Therefore, the dredging, transport, and placement activities would be consistent, to the maximum extent feasible, with Tidal Marshes and Tidal Flats Policies 1 and 2.

The USACE’s dredging, transport, and placement activities would be consistent with Bay Plan Subtidal Areas Policies:

- Per Subtidal Areas Policy 1, only short-term impacts result from the maintenance dredging and placement actions. There is no feasible alternative to maintaining the federal navigation channels through dredging and placement. The maintenance of these channels is essential to providing safe navigation and access to the ports and recreational marinas in San Francisco Bay.
- Per Subtidal Areas Policy 2, the federal channels are not considered scarce or unique habitat in San Francisco Bay, and there is no feasible alternative to maintaining them through dredging and placement.

The USACE’s dredging, transport, and placement activities would be consistent with Bay Plan Navigational Safety and Oil Spill Prevention Policies:

- Per Navigational Safety and Oil Spill Prevention Policy 1, USACE’s maintenance dredging program would remove obstructions to safe navigation, thereby ensuring the safe movement of maritime vessels, the protection of the surrounding habitat, and the continuation of the economic well-being and national defense of the nation.

- Per Navigational Safety and Oil Spill Prevention Policy 3, USACE would continue to perform surveys of all maintenance dredging project areas, and make these surveys available for public use.

The BCDC would review USACE's consistency determination for dredging and placement activities that would occur within BCDC's jurisdiction, to verify that the activities would be consistent, to the maximum extent practicable, with the Bay Plan.

**California Coastal Management Plan.** The MSC is the only federal navigation channel addressed in this Environmental Assessment/Environmental Impact Report that is within the jurisdiction of the CCC. Of the placement sites, SF-17 and a portion of SF-8 are within CCC's jurisdiction. In 2012, USACE submitted a negative determination to the CCC for maintenance dredging at the MSC and placement of dredged material at SF-8, SF-17, and onshore at Ocean Beach for a 5-year period from 2012 through 2016. As stated in Section 3.8.1, a federal agency may submit negative determination for an activity that "is the same as or is similar to activities for which consistency determinations have been prepared in the past." The negative determination demonstrated that the proposed dredging and placement activities for the MSC would be consistent—to the maximum extent practicable—with the CCMP and Article 4 of the California Coastal Act; and that the proposed activities were consistent with the annual maintenance dredging program for the MSC implemented by USACE, and previously concurred with by the CCC (USACE, 2012a). The CCC concurred with USACE's negative determination on May 9, 2012. For dredging of the MSC from 2017 through 2024, USACE would request concurrence from the CCC on a negative determination to verify that continuing activities would be consistent, to the maximum extent practicable, with the CCMP and California Coastal Act. The dredging and placement activities under the No Action/No Project Alternative would be the same as those previously proposed by USACE for 2012 through 2016, and therefore would continue to be consistent with the CCMP and Article 4 of the California Coastal Act.

Because the federal navigation channels addressed in this Environmental Assessment/Environmental Impact Report are congressionally authorized navigation projects, dredging and placement activities would not require a lease agreement from the CSLC for use of public trust lands based on the navigational servitude provisions of the Submerged Lands Act. Although the Submerged Land Act grants CSLC title to all submerged navigable lands in the state, the act provides that nothing in the act shall affect the federal government's constitutional authority for the purposes of navigation.

**NEPA Determination:** The No Action Alternative would not conflict with applicable land use plans and policies.

**CEQA Determination:** The No Project Alternative would not conflict with applicable land use plans and policies.

### **Proposed Action/Project**

Implementation of the Proposed Action/Project would be very similar to the No Action/No Project Alternative; it would involve use of the same type of dredge equipment for each channel, the same volume of dredged material, and the same dredging frequency and durations. As described in Section 2.3.3, USACE would implement additional best management practices to minimize impacts to longfin smelt and delta smelt. Dredging and placement activities would not require a lease agreement from the CSLC for use of public trust lands.

**Bay Plan.** Under the Proposed Action/Project, USACE may use alternate placement sites for in-Bay Channels than those identified under the No Action/No Project Alternative; however, placement would still be conducted in support of the goals of the LTMS, and therefore consistent with the Bay Plan. The USACE would not use any of the future placement sites identified in Section 1.5.4 until appropriate environmental review and permitting is completed. Under the Proposed Action/Project, consistency with

Bay Plan Policies would be the same as described for the No Action/No Project Alternative. The USACE would meet all federal environmental compliance requirements (e.g., Clean Water Act Section 404, Endangered Species Act), including those federal requirements implemented by state agencies (e.g., Clean Water Act Section 401). The USACE would purchase 0.92 mitigation credit at the Liberty Island Mitigation Bank annually for potential impacts to listed species. The BCDC would review USACE's consistency determination for dredging and placement activities that would occur within BCDC's jurisdiction, to verify that the activities would be consistent, to the maximum extent practicable, with the Bay Plan.

**California Coastal Management Plan.** Under the Proposed Action/Project, dredging and placement activities for the MSC would be the same as under the No Action/No Project Alternative, and therefore would be consistent with the CCMP and California Coastal Act. Dredging through 2016 would be covered under the existing negative determination and CCC concurrence. For dredging of the MSC from 2017 through 2024, USACE would request concurrence from the CCC on a negative determination to verify that the activities would be consistent, to the maximum extent practicable, with the CCMP and California Coastal Act.

**NEPA Determination.** The Proposed Action would not conflict with applicable land use plans and policies.

**CEQA Determination.** The Project would not conflict with applicable land use plans and policies.

### **Reduced Hopper Dredge Use Alternative 1**

Implementation of the Reduced Hopper Dredge Use Alternative 1 would be very similar to the Proposed Action/Project Alternative, except that Suisun Bay Channel, New York Slough Channel, San Bruno Channel in Redwood City Harbor,<sup>1</sup> and either Pinole Shoal or Richmond Outer Harbor, would be dredged with a mechanical dredge instead of a hopper dredge. Dredging and placement activities would not require a lease agreement from the CSLC for use of public trust lands.

**Bay Plan.** Reducing in-Bay hopper dredge use would likely reduce occurrences of entrainment of longfin smelt and delta smelt, pursuant to Fish, Other Aquatic Organisms, and Wildlife Policy 4. Consistency with Bay Plan Policies would be the same as described for the No Action/No Project Alternative and Proposed Action/Project. The USACE would meet all federal environmental compliance requirements (e.g., Clean Water Act Section 404, Endangered Species Act), including those federal requirements implemented by state agencies (e.g., Clean Water Act Section 401). The USACE would purchase 0.19 mitigation credit at the Liberty Island Mitigation Bank annually for potential impacts to listed species if Pinole Shoal is dredged with a hopper. If Richmond Outer Harbor is dredged with a hopper, USACE would purchase 0.34 mitigation credit at the Liberty Island Mitigation Bank annually for potential impacts to listed species. The BCDC would review USACE's consistency determination for dredging and placement activities that would occur within BCDC's jurisdiction, to verify that the activities would be consistent, to the maximum extent practicable, with the Bay Plan.

**California Coastal Management Plan.** Under Reduced Hopper Dredge Alternative 1, dredging and placement activities for the MSC would be the same as under the No Action/No Project Alternative, and therefore would be consistent with the CCMP and California Coastal Act. Dredging through 2016 would be covered under the existing negative determination and CCC concurrence. For dredging of the MSC from 2017 through 2024, USACE would request concurrence from the CCC on a negative determination to verify that the activities would be consistent, to the maximum extent practicable, with the CCMP and California Coastal Act.

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<sup>1</sup> San Bruno Channel is dredged at intervals of 10 years or greater.

**NEPA Determination.** Reduced Hopper Dredge Use Alternative 1 would not conflict with applicable land use plans and policies.

**CEQA Determination.** Reduced Hopper Dredge Use Alternative 1 would not conflict with applicable land use plans and policies.

### **Reduced Hopper Dredge Use Alternative 2**

Implementation of the Reduced Hopper Dredge Use Alternative 2 would be very similar to the Proposed Action/Project Alternative, except a hopper dredge would not be used for the regular maintenance dredging of in-Bay channels.

**Bay Plan.** Under this alternative, the potential for hopper dredge entrainment impacts to longfin smelt and delta smelt would be minimized. The USACE would meet all federal environmental compliance requirements (e.g., Clean Water Act Section 404, Endangered Species Act), including those federal requirements implemented by state agencies (e.g., Clean Water Act Section 401). Because no in-Bay channels would be dredged with a hopper dredge, the purchase of mitigation credit at the Liberty Island Mitigation Bank would not be warranted. Consistency with Bay Plan Policies would be the same as described for the No Action/No Project Alternative and Proposed Action/Project. The BCDC would review USACE's consistency determination for dredging and placement activities that would occur within BCDC's jurisdiction, to verify that the activities would be consistent, to the maximum extent practicable, with the Bay Plan.

**California Coastal Management Plan.** Under Reduced Hopper Dredge Alternative 2, dredging and placement activities for the MSC would be the same as under the No Action/No Project Alternative, and would be consistent with the CCMP and California Coastal Act. Dredging through 2016 would be covered under the existing negative determination and CCC concurrence. For dredging of the MSC from 2017 through 2024, USACE would request concurrence from the CCC on a negative determination to verify that the activities would be consistent, to the maximum extent practicable, with the CCMP and California Coastal Act.

**NEPA Determination.** Reduced Hopper Dredge Use Alternative 2 would not conflict with applicable land use plans and policies.

**CEQA Determination.** Reduced Hopper Dredge Use Alternative 2 would not conflict with applicable land use plans and policies.

### **Cumulative Impacts**

Because the project would not result in any land use impacts (i.e., the project would not conflict with applicable land use plans and policies), it would not contribute to cumulative land use impacts.

**NEPA Determination.** The project would not contribute to cumulative land use impacts.

**CEQA Determination.** The project would not contribute to cumulative land use impacts.

### **3.9 HAZARDS AND HAZARDOUS MATERIALS**

This section describes the existing conditions for hazards, including emergency planning, and hazardous materials in the San Francisco Bay Area region, and evaluates the potential hazard and hazardous materials impacts related to human health. Potential hazardous materials impacts on sediments are addressed in Section 3.3, Geology, Soils, and Sediment Quality. Potential hazardous materials impacts on water quality are addressed in Section 3.4.4 under Hydrology and Water Quality. Hazards related to marine navigation are evaluated in Chapter 3.10, Transportation and Circulation.

#### **3.9.1 Regulatory Setting**

##### **Federal**

##### **United States Environmental Protection Agency**

The United States Environmental Protection Agency (USEPA) is the lead agency responsible for enforcing federal laws and regulations governing hazardous materials that affect public health or the environment. The major federal laws and regulations enforced by the USEPA include: the Resource Conservation and Recovery Act; the Toxic Substances Control Act; the Comprehensive Environmental Response, Compensation, and Liability Act; and the Superfund Amendments and Reauthorization Act. In California, the USEPA has granted most enforcement authority over federal hazardous materials regulations to the California Environmental Protection Agency.

##### **United States Army Corps of Engineers**

The United States Army Corps of Engineers (USACE) regulates water quality and potentially hazardous discharges through the Rivers and Harbors Acts of 1890 (superseded) and 1899 (33 U.S.C. § 401, et seq.), and the Clean Water Act (33 U.S.C. § 1257, et seq.). The provisions of each are described in Section 3.4, Hydrology and Water Quality.

##### **Oil Pollution Act**

The Oil Pollution Act, Title 33 U.S.C. § 2701 et seq., establishes a liability system for oil spills into navigable waters or adjacent shorelines that injure or are likely to injure natural resources, and/or the services that those resources provide to the ecosystem or humans. Pursuant to this act, federal and state agencies and Indian tribes may act as Trustees on behalf of the public to assess the injuries, scale restoration to compensate for those injuries, and implement restoration.

##### **U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Response and Restoration**

The National Oceanic and Atmospheric Administration (NOAA) Office of Response and Restoration (OR&R) is charged with responding to oil spills, chemical accidents, and other emergencies in coastal areas. Under the National Contingency Plan, NOAA is responsible for providing scientific support to the Federal On-Scene Coordinator for oil and hazardous material spills. To support this mandate, OR&R provides 24-hour, 7-day-a-week response to spills. During an oil spill in coastal waters, OR&R's role is to provide scientific support to the U.S. Coast Guard officers in charge of response operations. In addition to spill response software and mapping tools, OR&R provides standard techniques and publishes guidelines for observing oil, assessing shoreline impact, and evaluating accepted cleanup technologies (NOAA, 2013a).

## **Transportation of Hazardous Materials and Waste**

Transportation of hazardous materials and hazardous waste is carried out by individuals or entities that move hazardous materials and waste from one site to another by highway, rail, water, or air (refer to 40 C.F.R. § 260.10). This includes transporting hazardous waste from a generator's site to a facility that can recycle, treat, store, or dispose of the waste. It can also include transporting treated hazardous waste to a site for further treatment or disposal. Transportation of hazardous materials is required by law to occur in accordance with the Hazardous Waste Manifest System, which is a set of forms, reports, and procedures that track hazardous waste from the time it leaves the generator facility until it reaches the waste management facility that receives it.

Transportation of hazardous materials by truck and rail is regulated by the United States Department of Transportation). The United States Department of Transportation regulations establish criteria for safe handling procedures.

### **State**

#### **California Environmental Protection Agency**

Under the authority of the California Environmental Protection Agency, the Department of Toxic Substances Control and the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) are responsible for overseeing the cleanup of contaminated sites in the San Francisco Bay Area. The Department of Toxic Substances Control also regulates disposal of hazardous wastes under California's Hazardous Waste Control Law. This law requires the filing of a Hazardous Waste Manifest detailing the hauling and disposal of the hazardous waste materials.

#### **Oil Spill Prevention and Response Programs in California**

In 1990, California passed the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (California Government Code 8670.1 et seq., California Public Resources Code 8750 et seq.) in response to lessons learned from the 1989 Exxon Valdez oil spill offshore Alaska and the 1990 American Trader oil spill offshore Orange County, California. Pursuant to this act, California has developed a comprehensive oil spill prevention and response program that requires all marine facilities and vessels to comply with an integrated system of statewide regulations, operation manuals, inspections, training and drill programs in order to provide the "best achievable protection" of the state's coastal and marine resources through the use of "best achievable technologies" and practices.

The California Coastal Commission (CCC) staff works in partnership with seven other California state agencies and five federal agencies to ensure that California and federal regulations and programs for safe oil and gas exploration and development operations, and for oil spill prevention and response, are consistent with California Coastal Act policies.

The California Office of Spill Prevention and Response is the state's lead agency for oil spill prevention, preparedness, response, and natural resource damage assessment. The Office of Spill Prevention and Response's responsibilities include development and enforcement of California's regulations and programs for oil spill prevention and response planning requirements for marine facilities; identification of sensitive shoreline areas and response strategies; oil spill drill and training requirements for vessels and marine facilities; and natural resource damage assessment requirements for the restoration of ecological and human use losses caused by an oil spill.

The CCC Oil Spill Program is part of the Energy, Ocean Resources, and Federal Consistency Division of the CCC. Under this program, the CCC reviews regulations for oil spill prevention and response, and provides input on these regulations' consistency with California Coastal Act regulations and policies;

reviews oil spill contingency plans for marine facilities in the coastal zone, and oil spill response plans for facilities on the outer continental shelf; and participates in the State Interagency Oil Spill Committee (CCC, 2012b).

The San Francisco Bay Conservation and Development Commission (BCDC) has responsibilities for oil spill prevention and response in San Francisco Bay. The Lempert-Keene-Seastrand Oil Spill Prevention and Response Act specified that BCDC must carry out certain responsibilities critical to the achievement of the goals of the state oil spill act. BCDC actively participates in planning to reduce the risk of oil spills in California waters through its membership on the San Francisco Bay Harbor Safety Committee (navigation safety), and to better respond if a spill does occur by its participation on the San Francisco Bay Delta Area Committee (contingency planning). Through its statutory permit authority, BCDC can condition a project in its jurisdiction to meet the objectives of the McAteer-Petris Act and policies of the San Francisco Bay Plan equivalent to achieving “best achievable protection” against an oil spill for San Francisco Bay. During a spill event, BCDC assists the response by monitoring activities and providing technical expertise. When required, BCDC can authorize emergency response activities that meet its laws and policies.

### **California Office of Emergency Services**

The California Office of Emergency Services was established as part of the Governor’s Office on January 1, 2009, merging the duties, powers, purposes, and responsibilities of the former Governor’s Office of Emergency Services with those of the Governor’s Office of Homeland Security. The California Office of Emergency Services is responsible for the coordination of overall State agency response to major disasters in support of local government. The Agency is responsible for assuring the State’s readiness to respond to, and recover from, all hazards—natural, man-made, and war-caused emergencies and disasters—and for assisting local governments with emergency preparedness, response, recovery, and hazard mitigation efforts (OES, 2011).

Each county has a local Office of Emergency Services, which coordinates with the State during emergency situations. When local and mutual aid resources are exhausted, the State coordinates its emergency resources through its State Operations Center in Sacramento, and its multiple Emergency Operations Centers throughout the region.

## **Regional**

### **Dredged Material Management Office**

The Long-Term Management Strategy program for San Francisco Bay provides the basis for uniform federal and state dredged material disposal policies and regulations. The Dredged Material Management Office (DMMO) was established as part of the Long-Term Management Strategy program to consolidate the processing of dredging permit applications. The process for obtaining approvals for dredging or dredged material disposal has three phases: (1) suitability determination; (2) permit process; and (3) episode approval. The suitability determination process occurs at the DMMO level.

The applicant must submit results from recent sediment testing, or submit sufficient data to support a finding by the agencies that the sediments are suitable for the proposed disposal environment. The applicant should submit to the DMMO either a sediment Sampling and Analysis Plan and Quality Assurance Project Plan, or a written request (with supporting information) for an exclusion from testing requirements based on factors such as previous testing history and physical characteristics of the material proposed for dredging. The applicant must submit the sampling results to the DMMO for review, and the DMMO will make a determination about where the materials can be disposed.

Although the DMMO provides initial review of permit applications and suitability recommendations, applicants must eventually obtain separate approval from the appropriate DMMO member agencies (such as a Clean Water Act Section 401 Certification from the Regional Water Board); each agency issues permit conditions and specific requirements about how the project is to be performed.

### **San Francisco Bay Area Water Emergency Transportation Authority**

The San Francisco Bay Area Water Emergency Transportation Authority (WETA) was established by Senate Bill 976 in 2007 to replace the San Francisco Bay Water Transit Authority, which was created in 1999. WETA has been authorized by the State of California to oversee and operate a public water transit system in the San Francisco Bay Area. WETA created and adopted an Emergency Water Transportation System Management Plan for the San Francisco Bay Area in 2009. This plan integrates and complements the emergency plans of other agencies, to ensure mobility in the San Francisco Bay Area following a major disaster.

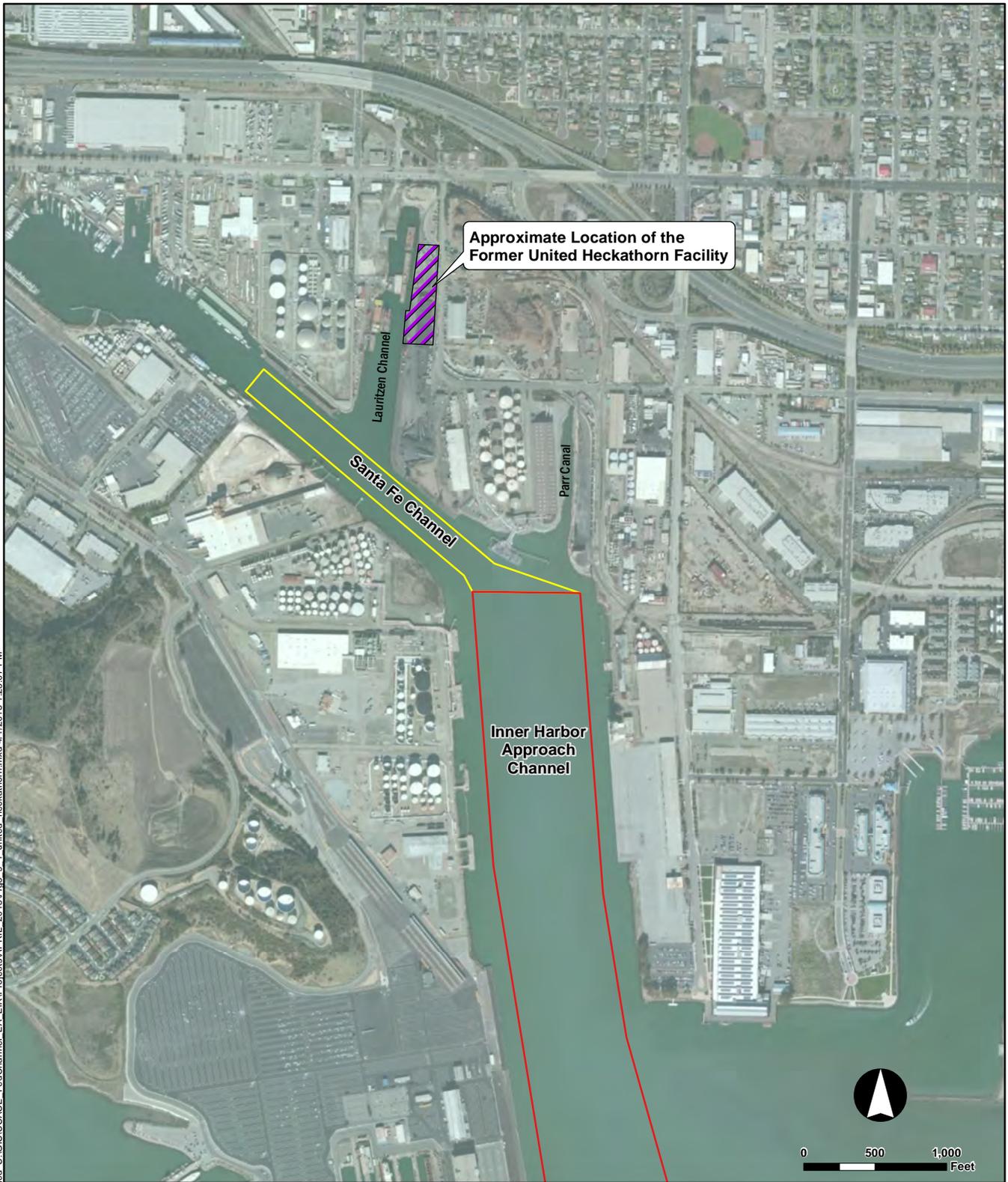
## **3.9.2 Environmental Setting**

### **Study Area**

In San Francisco Bay, the study area spans the shoreline and marine areas of the following 11 counties: Marin, Sonoma, Napa, Solano, Sacramento, San Joaquin, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco. The geographic scope of the study area comprises the estuarine waters of the San Francisco Bay region, portions of the Sacramento-San Joaquin Delta west of Sherman Island, and the western portion of the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel. Outside the Golden Gate, the study area includes the San Francisco Deep Ocean Disposal Site (SF-DODS), the San Francisco Bar Channel Disposal Site (SF-8), and the nearshore zone off Ocean Beach, as well as the waters that are used by vessels en route to these sites.

The NOAA Office of Response and Restoration “At Work Where You Live” database provides information regarding oil spills, chemical spills, ship grounding, hazardous waste sites, and marine debris projects for marine areas in the United States (NOAA, 2013b). The following hazard sites are in the study area:

- **Cosco Busan, CA:** The container ship Cosco Busan struck one of the towers of the San Francisco-Oakland Bay Bridge in San Francisco Bay on November 7, 2007. The impact created a gash in the hull of the vessel, and 53,000 gallons of fuel oil were released into the water. The oil quickly spread to other parts of San Francisco Bay. Wind and currents carried some of the oil contamination outside of the San Francisco Bay, where it impacted the outer coast from approximately Half Moon Bay to Point Reyes. Inside the San Francisco Bay, the oil contamination impacted waters and shoreline in the central portion of San Francisco Bay, from Tiburon to San Francisco on the western side, and from Richmond to Alameda on the eastern side (CDFW et al., 2012). A Final Restoration Plan was approved in 2012, and restoration is under way.
- **United Heckathorn Company:** The United Heckathorn Superfund site (Superfund Site EPA # CAD981436363) is in Richmond Harbor, and includes 5 acres of land and approximately 15 acres of marine sediments in the Parr and Lauritzen channels. The Parr channel is immediately north of the Richmond Inner Harbor dredging channel; and the Lauritzen channel is slightly northwest of the Richmond Inner Harbor dredging channel (Figure 3.9-1). The historical use of the Heckathorn Superfund site was to package and ship pesticides. Since 1997, the removal of contaminated soils and sediments has greatly reduced the potential for exposure to pesticide contaminants from the United Heckathorn site. However, unacceptable levels of dichloro-diphenyl-trichloroethane (DDT) and dieldrin remain in the waters and sediments of the Lauritzen channel. Because these pesticides



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Source: URS, 2013; superfund site, EPA 2012.

- Dredge Locations Included in EA/EIR
- Dredge Locations Not Included in EA/EIR

**PROXIMITY OF  
UNITED HECKATHORN SUPERFUND  
SITE TO RICHMOND HARBOR**

Federal Navigation Channels EA/EIR  
U.S. Army Corps of Engineers  
April 2015  
Bay Area, California



**FIGURE 3.9-1**

bio-accumulate in fish, people who fish in the area run the risk of exposure to unacceptably high levels of DDT and dieldrin. As such, the state of California issued an advisory against eating fish from the Lauritzen channel. In October 2012, the USEPA installed a flap gate on the stormwater outfall in the Lauritzen channel to prevent DDT and dieldrin-contaminated sediment from moving in and out of the system during high tide. The USEPA also completed multiple phases of field work in 2013 to further delineate the contamination, investigate sources, and assess sediment movement in the channel. The USEPA is currently preparing a Focused Feasibility Study to evaluate additional cleanup options, and expects to propose a cleanup plan in 2015 (Thompson, 2014).

- **Suisun Bay Reserve Fleet:** The U.S. Maritime Administration historically moored a fleet of vessels north of the Suisun Bay Channel to serve as a reserve of ships for national defense and national emergency purposes (NOAA, 2013b). In response to concerns about heavy metals and anti-fouling agents in paint peeling off the decaying vessels, as well as other hazardous materials that may have been released, NOAA completed a year-long study to characterize contaminant levels in sediments, and in tissues of mussels and clams, near the Reserve Fleet. NOAA's findings concluded that contaminant concentrations in the vicinity of the Reserve Fleet are comparable to those at other locations throughout the greater San Francisco Bay. Consequently, NOAA scientists did not recommend specific cleanup actions (NOAA, 2013c). In 2010, the Maritime Administration conceded to a consent decree with the Regional Water Board and coplaintiffs San Francisco Baykeeper, Natural Resources Defense Council, and ArcEcology, that required a strict schedule for the removal and recycling of the vessels, and the aggressive management of the discharges associated with exfoliating paint containing heavy metals. The Maritime Administration has succeeded in practically eliminating the paint discharges, and has removed and recycled all but five of the 54 polluting vessels. At this rate, they will complete their obligations regarding ship removal years ahead of their 2017 deadline.

### 3.9.3 Methodology and Thresholds of Significance

The following analysis evaluates the proposed project's potential effects related to hazards and hazardous materials. The project alternatives would involve maintenance dredging of federal navigation channels, transport of dredged materials, and placement of dredged materials at permitted placement sites. Based on the nature of these activities and the locations at which they would occur, the following California Environmental Quality Act (CEQA) Appendix G thresholds do not apply to the project alternatives, because there would be no potential for impacts relative to these thresholds:

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 1/4 mile of an existing or proposed school;
- Be on a site that is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5; and as a result, create a significant hazard to the public or the environment;
- Result in a safety hazard for people residing and working in the vicinity of a public-use airport;
- Result in a safety hazard for people residing and working in the vicinity of a private airstrip; and
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

The analysis evaluated whether the alternatives would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or wastes;

- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; and
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

Placement of dredged material not suitable for unconfined aquatic disposal would only occur at locations permitted to accept such material. Contaminated dredged sediments that do not meet the criteria for placement at permitted beneficial re-use or upland placement sites ultimately would be disposed at a facility approved by the DMMO, and permitted for the receipt of such material (e.g., a landfill); therefore, the potential impacts related to release of hazardous materials to land are anticipated to not be adverse, and are not further evaluated.

Because dredging, transport, and placement activities would take place over open water, releases of hazardous materials could adversely affect water quality in the study area; these potential effects are discussed in Section 3.4.4 under Hydrology and Water Quality. Therefore, impact analysis in this section focuses on potential adverse effects to human health associated with hazardous materials handling.

### 3.9.4 Impacts and Mitigation Measures

#### ***Impact 3.9-1: Potential Public or Environmental Exposure from the Transport, Use, and Disposal of Hazardous Materials***

#### **No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

Under all alternatives, the DMMO would require sediment analysis and approval. Requirements would include development of a sampling plan, sediment characterization, a sediment removal plan, and handling and disposal in accordance with applicable permit conditions. All federal, state, and local regulations regarding the use, transport, and disposal of hazardous materials would be adhered to during project activities. Human health and safety impacts would be avoided through adherence to these procedures, conditions, and regulations.

Although existing hazard sites exist in the study area, these releases or potential releases are considered not adverse because the proposed dredge and placement operations would not interfere with cleanup activities at the Cosco Busan and Heckathorn hazard sites. In addition, the project alternatives do not involve fishing operations or waterborne recreation in contaminated areas; therefore, the project alternatives would not pose a human health risk.

Dredged material is not usually transported by land because this method is more expensive and inefficient compared to in-water transport. Transport of dredged material by truck or train would only occur in rare circumstances, where dredged material that is not suitable for unconfined aquatic disposal is initially placed via dredge or barge at a rehandling site, and requires land-based transport for secondary placement at a land-based facility, such as a landfill, after the material has dried. The transport of dried sediment via truck or train is not expected to result in emissions of hazardous materials that would pose a human health concern, because in a dried state, the sediment would be easily contained, and there be no expected release of contaminants. Therefore, impacts from land transport would be negligible.

**National Environmental Policy Act (NEPA) Determination:** The No Action Alternative, Proposed Action, and Reduced Hopper Dredge Use Alternatives 1 and 2 would have no impact on hazards and hazardous materials.

**CEQA Determination:** The No Project Alternative, Project, and Reduced Hopper Dredge Use Alternatives 1 and 2 would have no impact on hazards and hazardous materials.

**Note Regarding Potential Impacts of the Reduced Hopper Dredge Use Alternatives:** In the event that the budget process does not include a funding request, or Congress does not authorize additional funding or reprogramming of funding for these alternatives, then there is a possibility that certain channels (i.e., Richmond Outer, Pinole Shoal, and Suisun Bay Channel and New York Slough) would not be dredged at all or would not be fully maintained. As discussed in Section 3.10, with the reduced or lack of maintenance of certain channels, there would be an increased risk in groundings, allisions, or collisions of vessels, including those transporting hazardous materials. Navigational regulations and controls would reduce the potential for such incidents, but the agencies acknowledge that there would be an increased risk under this scenario. Because the risk of these incidents is speculative, the agencies do not evaluate it in any detail beyond this qualitative notation.

### ***Impact 3.9-2: Potential Impacts to Implementation of an Adopted Emergency Response Plan***

#### **No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Use Alternatives 1 and 2**

None of the alternatives would be expected to impair implementation of, or interfere with, any emergency operation or evacuation plans in the study area. In the event of an emergency, dredge equipment would be removed from the federal navigation channel(s), or positioned in such a manner as to not impede the navigation of emergency response or evacuation vessels.

Under all alternatives, dredging would have a long-term beneficial impact by removing shoaled sediment and maintaining the navigability of the federal channels for use by vessels during emergency response operations.

**NEPA Determination:** The No Action Alternative, Proposed Action, and Reduced Hopper Dredge Use Alternatives 1 and 2 would have a beneficial impact on emergency operation.

**CEQA Determination:** The No Project Alternative, Project, and Reduced Hopper Dredge Use Alternatives 1 and 2 would have no impact on emergency operation.

**Note Regarding Potential Impacts of the Reduced Hopper Dredge Use Alternatives:** In the event that the budget process does not include a funding request, or Congress does not authorize additional funding or reprogramming of funding for these alternatives, then there is a possibility that certain channels (i.e., Richmond Outer, Pinole Shoal, and Suisun Bay Channel and New York Slough) would not be dredged at all or would not be fully maintained. Because Richmond Outer, Pinole Shoal, and Suisun Bay Channel and New York Slough are deep water channels and have project depths of 35 feet mean low lower water or greater, these channels would likely remain navigable to most emergency response or evacuation vessels, depending on the extent accumulation of sediment, under a deferred dredging scenario. However, there is a possibility that some adverse impacts on emergency response operations, and consequently on public safety, could occur.

### ***Cumulative Impacts***

Because the project would not cause adverse impacts related to hazards and hazardous materials, it would not contribute to cumulative hazards and hazardous materials use impacts.

**NEPA Determination.** The project would not contribute to cumulative hazards and hazardous materials impacts.

**CEQA Determination.** The project would not contribute to cumulative hazards and hazardous materials impacts.

### 3.10 TRANSPORTATION

As described in Chapter 2, Alternatives, the project alternatives would involve maintenance dredging of the federal navigation channels, and transport and placement of the dredged materials, at a combination of in-water and adjacent landward placement sites.

Dredged material is rarely transported by land, because this method is more expensive and inefficient compared to in-water transport. Transport of dredged material by truck or train would only occur in circumstances where dredged material that is not suitable for unconfined aquatic disposal requires secondary placement. For example, not suitable for unconfined aquatic disposal material would be placed initially by way of dredge or barge at a rehandling site, and then transported by truck or train for secondary placement at a land-based facility, such as a landfill, after the material has dried. Based on United States Army Corps of Engineers (USACE) data regarding sediment quality in the federal navigation channels, it is anticipated that occurrences of secondary transport of dredged material by way of truck or train would be rare. As discussed in Section 3.3.2, sediment testing results for previous USACE maintenance dredging episodes indicate that, in general, dredged materials from the subject federal navigation channels have been suitable for unconfined aquatic disposal. Land-based transport of dredged material from USACE's maintenance dredging projects in San Francisco Bay did not occur during the 2000-2012 baseline period. Considering the extensive roadway and railway infrastructure in the study area, and existing levels of vehicle traffic and rail use, the project alternatives would not result in noticeable impacts on vehicle traffic or rail use, especially because occurrences of land-based transport of dredged material would be rare. Additionally, no impacts to pedestrian and bicycle movement would be expected because land-based transport would be infrequent and would not be expected to impact pedestrian and bicycle facilities. Because impacts on land-based transportation and transit would be negligible, these modes of transportation are not further discussed in this section.

Therefore, this section evaluates the potential impact of the project alternatives on marine navigation in the study area.

#### 3.10.1 Regulatory Setting

This section provides a regulatory framework describing the federal, state, and regional policies and plans applicable to navigation in the study area.

##### **Federal**

##### **United States Coast Guard**

Under 14 U.S.C. and 33 U.S.C., and other portions of the Code of Federal Regulations, the United States Coast Guard (USCG) has authority for maritime law enforcement on the navigable waters of the United States, as well as responsibilities for search and rescue. Title 33: Navigation and Navigable Waters, Part 162: Inland Waters Navigation Regulations identifies regulations for navigation by both commercial and noncommercial vessels.

##### **Inland Navigational Rules Act of 1980**

The Inland Navigational Rules Act of 1980 (Public Law 96-591, 94 Stat. 3415, 33 C.F.R. pt. 83), more commonly known as the Inland Rules, governs many rivers, lakes, harbors, and inland waterways. Directly applicable to the proposed project is Rule 27 – Vessels Not Under Command or Restricted in Their Ability to Maneuver, which specifies lighting and safety requirements for vessels engaged in dredging or underwater operations that are restricted in their ability to maneuver (USCG, 1980). In addition, Title 33 C.F.R. § 88.15 contains requirements for lighting on floating or supported dredge pipelines that must be displayed at night and in periods of restricted visibility.

## **Regulated Navigation Areas**

The USCG has established regulated navigation areas (RNAs) in the San Francisco Bay region to reduce vessel congestion where maneuvering room is limited. These RNAs increase navigational safety by organizing traffic flow patterns; reducing meeting, crossing, and overtaking situations between large vessels in constricted channels; and limiting vessel speed (USCG, 2013a). The RNAs apply to all large vessels (defined as any power-driven vessels of 1,600 or more gross tons, or tugs with a tow of 1,600 or more gross tons).

## **Ports and Waterways Safety Act of 1972**

The Ports and Waterways Safety Act of 1972 (Title 33, Chapter 25, Section 1221) authorized the USCG to establish, operate, and maintain vessel traffic services for ports, harbors, and other waters subject to congested vessel traffic. As a result, in 1972, the USCG established the Vessel Traffic Service (VTS) for San Francisco Bay and designated traffic lanes for inbound and outbound vessel traffic, specified separation zones between vessel traffic lanes, and set up rules to govern vessels entering and leaving ports (USCG, 2012b). The VTS, which is on Yerba Buena Island, controls marine traffic throughout the San Francisco Bay Area. Although some small and private vessels are not required to coordinate their movements by contacting the VTS, the USCG monitors all commercial, United States Navy, and private marine traffic in San Francisco Bay and local coastal waters. VTS San Francisco is responsible for the safe movement of approximately 133 miles of waterway from offshore to the ports of Stockton and Sacramento. VTS San Francisco averages 250 vessel movements a day (USCG, 2013b).

## **The International Regulations for Preventing Collision at Sea**

The International Regulations for Preventing Collision at Sea (Public Law 95-75, 91 Stat. 308, 33 U.S.C. §§ 1-8), also known as the Rules of the Road or International Navigation Rules, or 72 COLREGS, govern open bodies of water in which foreign shipping traffic is possible, and are a set of statutory requirements designed to promote navigational safety. The most recently adopted version of these regulations took effect on July 15, 1977. These rules include requirements for navigation lights, dayshapes, and steering, as well as sound signals for both good and restricted visibility. The boundaries between where the Inland Rules and the International Rules apply are displayed as Demarcation Lines on navigational charts.

## **Energy Independence and Security Act of 2007**

The Energy Independence and Security Act of 2007 established The America's Marine Highway Program, which is a Department of Transportation initiative to expand the use of waterborne transportation to relieve landside congestion and to reduce carbon emissions. The Marine Highway Program was fully implemented in April 2010 through publication of a Final Rule in the Federal Register. The Secretary's designations were made pursuant to the Final Rule, as required by the Energy Independence and Security Act of 2007. The Energy Independence and Security Act defines America's Marine Highways as navigable waterways that have demonstrated the ability to provide additional capacity to relieve congested landside routes serving freight and passenger movement (USDOT, 2013a). The study area includes the Marine Highway 580 Connector, which includes the San Joaquin River, Sacramento River, and connecting commercial navigation channels, ports, and harbors in Central California from Sacramento to Oakland. The Marine Highway 580 Connector also connects to the Marine Highway 5 Corridor at Oakland, which spans Washington, Oregon, and California along the West Coast (USDOT, 2013b).

## **America's Marine Highway Program**

The Marine Highway Program was established by Section 1121 of the Energy Independence and Security Act of 2007 to reduce landside congestion through the designation of Marine Highway Routes. Section 405 of the Coast Guard and Maritime Transportation Act of 2012 further expanded the scope of the program beyond reducing landside congestion to efforts that generate public benefits by increasing the use or efficiency of domestic freight or passenger transportation on Marine Highway Routes between ports in the United States. The Marine Highway Program does not develop or operate Marine Highway services. The private sector or state/local governments develop and operate Marine Highway services.

### **State**

#### **California Harbors and Navigation Code**

The California Harbors and Navigation Code vests authority with the Department of Boating and Waterways to regulate matters of navigational safety for the state's boating public. The California Department of Boating and Waterways was formed in 1979 through the consolidation of functions previously held by a number of divisions in the Departments of Natural Resources, Motor Vehicles, and Parks and Recreation. The code established a comprehensive set of state laws and regulations governing the equipment and operation of vessels on all waters of the state.

### **Regional**

#### **The San Francisco Bay Area Seaport Plan**

The San Francisco Bay Area Seaport Plan, first adopted in 1996 and last amended in 2012, is the product of a cooperative planning effort of the Metropolitan Transportation Commission (MTC) and the San Francisco Bay Conservation and Development Commission (BCDC). The Seaport Plan constitutes the maritime element of MTC's Regional Transportation Plan, and is incorporated into BCDC's San Francisco Bay Plan, where it is the basis of the Bay Plan port policies. The MTC uses the Seaport Plan to assist in making project funding decisions and managing the metropolitan transportation system; and BCDC uses the Seaport Plan to help guide its regulatory decisions on permit applications, consistency determinations, and related matters.

#### **San Francisco Bay Area Water Emergency Transportation Authority**

The San Francisco Bay Area Water Emergency Transportation Authority (WETA) was established by Senate Bill 976 in 2007 to replace the San Francisco Bay Water Transit Authority, which was created in 1999. WETA has been authorized by the State of California to oversee and operate a public water transit system in the San Francisco Bay Area. WETA created and adopted an Emergency Water Transportation System Management Plan for the San Francisco Bay Area in 2009. This plan integrates and complements the emergency plans of other agencies, to ensure mobility in the San Francisco Bay Area following a major disaster.

### **3.10.2 Environmental Setting**

#### **Study Area**

In San Francisco Bay, the study area spans the shoreline and marine areas of the following 11 counties: Marin, Sonoma, Napa, Solano, Sacramento, San Joaquin, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco. It does not include the landside areas far removed from navigable waters. The geographic scope of the study area comprises the estuarine waters of the San Francisco Bay region, portions of the Sacramento-San Joaquin Delta west of Sherman Island, and the western portion of the

Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel. Outside the Golden Gate, the study area includes the San Francisco Deep Ocean Disposal Site (SF-DODS), the San Francisco Bar Channel Disposal Site (SF-8) and the nearshore zone off Ocean Beach, as well as the waters that are used by vessels en route to these sites.

### Vessel Movement in the Study Area

Vessel traffic in the San Francisco Bay consists of inbound and outbound vessels and wholly in-Bay vessel movements. This vessel traffic includes tugs, government vessels, passenger ferry ships, commercial shipping vessels, recreational boats, commercial and sport fishing boats, board sailors, and personal watercraft.

Water transit is a small but growing part of the San Francisco Bay Area's transportation network. Although it carries only a fraction of the total San Francisco Bay Area travelers, water transit plays a meaningful role in reducing congestion and providing mobility in the key transbay bridge corridors throughout the San Francisco Bay Area. Existing ferry service is summarized in Table 3.10-1. Services to Oakland and Vallejo use the federal navigation channels.

<b>Corridor/Ferry Route</b>	<b>Operator(s)</b>
San Francisco – Alameda (Harbor Bay Island)	WETA (Blue and Gold Fleet) <sup>1</sup>
San Francisco – Oakland – Alameda (Main Street)	WETA (Blue and Gold Fleet) <sup>1</sup>
San Francisco – Angel Island	Blue and Gold Fleet
Oakland – Alameda – Angel Island	Blue and Gold Fleet
Tiburon – Angel Island	Angel Island-Tiburon Ferry Company
San Francisco – Larkspur	Golden Gate Bridge, Highway, and Transportation District
San Francisco – Sausalito	Blue and Gold Fleet Golden Gate Bridge, Highway, and Transportation District
San Francisco – Tiburon	Blue and Gold Fleet
San Francisco – Vallejo	WETA (Blue and Gold Fleet) <sup>1</sup>
South San Francisco – Oakland – Alameda	WETA (Blue and Gold Fleet) <sup>1</sup>
Source: 511 Transit, 2013; WETA, 2013d.	
Note:	
<sup>1</sup> Blue & Gold Fleet operates these services under an Operations and Maintenance contract with WETA.	
WETA = San Francisco Bay Area Water Emergency Transportation Authority	

The Bay Area is served by five seaports. The Port of Oakland, the largest of the five, is the third largest seaport on the West Coast of the United States. Other seaports in the San Francisco Bay Area include the Port of San Francisco, the Port of Richmond, the Port of Benicia, and the Port of Redwood City (MTC and ABAG, 2013). The federal navigation channels are used for commercial traffic, including deep-draft, merchant, and oil tanker vessels. Waterborne transportation through the Petaluma River, Suisun Bay and Redwood City is important for the regional movement of aggregates, gravel, oyster shell and building materials. In addition, the proposed dredging activities would support the continued operation of the Port of Sacramento and the Port of Stockton. Individual barges are able to transport larger quantities of materials than individual tractor trailer trucks; therefore, use of the above seaports avoids a substantial number of truck trips on the regional roadway network.

Regionally, the Marine Highway Initiative is an effort to establish a “container on barge” service stretching from West Sacramento to Oakland, with stops in Stockton, to provide a viable marine highway that facilitates short sea shipping service between regional ports to improve goods movement throughout Northern California. In addition, this initiative will decrease congestion on major roadways, and significantly reduce the number of truck emissions associated with the current distribution system. Service started in July 2013 between the Port of Stockton and the Port of Oakland (Port of Oakland, 2013). The Port of Stockton anticipates six to eight trips per week by the end of 2013 (Wingfield, 2013).

Deep-draft vessels in San Francisco Bay are often constrained to navigate only within the main shipping channels. Groundings have been reported in many areas of the region, in part due to the narrow width of many of the channels. Groundings can result in damage to vessels and property, with the potential for serious environmental consequences. A ship aground in a channel can block the transit of other vessels or create new shoaling, and may cause serious delays to commerce. Maneuvering deep-draft ships in narrow channels with minimal underkeel clearance poses high navigational risks, given the complexities of tides, currents, and weather conditions in the Bay (HSC, 2014).

Critical Maneuvering Areas (CMAs) are areas within the Bay where additional standards of care are required due to the restrictive nature of the channel, proximity of hazards, or the prevalence of adverse currents. Tugs with tows should not transit through CMAs when visibility is less than 0.25 nautical mile. Tugs with tows in petroleum service should not transit through CMAs when visibility is less than 0.5 nautical mile. Locations in the Bay identified as CMAs are Redwood Creek, San Mateo-Hayward Bridge, Oakland Bar Channel, Islais Creek Channel, Richmond Inner Harbor, the east span of Richmond-San Rafael Bridge, Union Pacific Bridge, up-bound New York Slough, and Rio Vista Lift Bridge (HSC, 2014).

### 3.10.3 Methodology and Thresholds of Significance

Maintenance dredging would be conducted with clamshell-bucket dredges, hopper dredges, and cutterhead-pipeline dredges. Methods used to transport dredged materials would include pipelines, hopper dredges, barges, and scows. Because this transportation evaluation focuses on marine navigation, many of the California Environmental Quality Act (CEQA) Appendix G thresholds for transportation/traffic, as written, do not apply to the project alternatives because they are focused on land-based or air transportation. Therefore, the following project-specific thresholds were established to evaluate the potential for navigation impacts under the National Environmental Policy Act (NEPA) and CEQA, considering the topics addressed in the transportation/traffic CEQA thresholds that could be applied to navigation:

- a) Would the project alternatives disrupt or substantially impede marine navigation? For the purposes of this analysis, a marine traffic disruption would occur if dredging or placement activities substantially interfered with vessel navigation, and/or substantially increased the volume of vessel movement in the study area.
- b) Would the project alternatives create substantial navigational safety risks?

### 3.10.4 Impacts and Mitigation Measures

#### ***Impact 3.10-1: Potential to Disrupt or Impede Marine Navigation***

##### **No Action/No Project Alternative**

Dredging—and the associated transport and placement activities—have occurred in the waters of San Francisco Bay for decades; the No Action/No Project Alternative would be a continuation of USACE’s current maintenance dredging program for the federal navigation channels in San Francisco Bay.

Dredging is a temporary activity that varies in duration depending on the amount of shoaled sediment in each channel, the frequency at which a channel is dredged, and the equipment used for dredging and dredged material transport. The typical duration of dredging for each channel varies, and ranges from 5 to 65 days for the federal channels addressed in this Environmental Assessment/Environmental Impact Report; however, because dredges move along a channel, the duration a dredge would be operating in any one specific location would be limited. The federal navigation channels are generally wide enough to accommodate dredge equipment and allow passage of other vessel traffic, and dredges would move out of the way to allow passage of larger vessels. However, the dredging activities may occasionally delay or temporarily impede some vessels. Hopper dredges generally have less impact on navigation because they are continually moving, while clamshell-bucket dredges and cutterhead-pipeline dredges are stationary during operation, and may need to temporarily cease dredging activities to move out of the way of larger passing vessels. Compared to a hopper dredge, which is self-propelled, clamshell-bucket dredge and cutterhead-pipeline dredge operations may occupy more space in a channel, because these methods require the use of support vessels to tow and position the dredge. Cutterhead and clamshell-bucket dredge operations require the use of a dredge plant, on which the dredge equipment is located, plus four to five support vessels in the immediate dredge area for maneuvering the dredge plant and providing equipment support. Clamshell-bucket dredging also involves the use of one or two dredged material transport placement vessel, whereas hopper dredges store and transport the dredged material. Cutterhead dredging does not involve transport of dredged material by vessel. As described above, the USCG is responsible for organizing vessel traffic and maintaining RNAs to reduce vessel congestion where maneuvering room is limited. The dredging and placement activity for this alternative would comply with all applicable vessel traffic and safety requirements, including specifications for dredge pipelines.

Maintenance dredging and placement activities would add to vessel movement in the study area, particularly during transport to placement sites; however, this vessel traffic would be similar to that which has occurred during USACE's past maintenance dredging operations, and would be negligible considering the existing volume of vessel movement in the study area.

Therefore, adverse impacts to navigation under No Action/No Project Alternative would be minimal and short-term.

Dredging would have a long-term beneficial impact by removing shoaled sediment and maintaining the navigability of the federal channels.

**NEPA Determination:** The No Action Alternative would have a short-term, less-than-significant adverse impact and long-term beneficial impact on navigation.

**CEQA Determination:** The No Project Alternative would have a less-than-significant impact on navigation.

### **Proposed Action/Project**

Implementation of the Proposed Action/Project would be very similar to the No Action/No Project Alternative; it would involve use of the same type of dredge equipment for each channel, the same volume of dredged material, and the same dredging frequency and durations. This alternative would also comply with applicable vessel traffic and safety requirements. Therefore, impacts related to disruption of navigation from dredging would be the same as under the No Action/No Project Alternative.

Depending on the placement site selected for each channel, patterns of vessel movement could differ from the No Action/No Project Alternative, but the overall volume of vessel traffic would be similar to that under the No Action/No Project Alternative. Hopper dredging only involves the use of one vessel (i.e., the hopper dredge) to transport dredged material to the placement site. Clamshell-bucket dredging involves the use of one or two scows to transport dredged material from the federal channel to the

placement site. Cutterhead dredging does not involve transport of dredged material by vessel. The effect of this small amount of vessel movement would be negligible, considering the existing volume of vessel movement in the study area, and historic vessel traffic to existing placement sites. The USACE would not use the future placement sites identified in Section 1.5.4 until appropriate environmental review is completed, including evaluation of impacts on navigation.

As under the No Action/No Project Alternative, dredging would have a long-term beneficial impact by removing shoaled sediment and maintaining the navigability of the federal channels.

**NEPA Determination:** The Proposed Action would have a short-term, less-than-significant adverse impact and long-term beneficial impact on navigation.

**CEQA Determination:** The Project would have a less-than-significant impact on navigation.

### **Reduced Hopper Dredge Use Alternative 1**

Implementation of Reduced Hopper Dredge Use Alternative 1 would be very similar to the Proposed Action/Project Alternative, except that either Richmond Outer Harbor or Pinole Shoal and Suisun Bay Channel would be dredged with a clamshell-bucket dredge instead of a hopper dredge. San Bruno Channel in Redwood City Harbor would also be dredged with a clamshell-bucket dredge instead of a hopper dredge; however, this channel is dredged at intervals of 10 years or longer. As noted above, clamshell-bucket dredges have a greater potential to impact navigation compared to hopper dredges because they are stationary while operating. Clamshell-bucket dredge operations also involve the use of multiple vessels in the dredge area, whereas hopper dredge operations only require one vessel, so there would be four to five additional vessels in or near the federal channel during dredging. In addition, dredging a channel with a clamshell bucket dredge can take up to ten times longer than dredging with a hopper dredge (USACE, 2013d). Although clamshell-bucket dredges would stop dredging and move out of the way of larger vessels as necessary, impacts to navigation related to temporary delays of other vessel traffic could be slightly greater than under the No Action/No Project Alternative or the Proposed Action/Project at the channels where a mechanical dredge would be used instead of a hopper dredge. Moving clamshell-bucket dredges out of the way of deep draft vessels would take longer, because the dredges are mounted on barges and secured into the bay floor by spuds; moving mechanical dredges would require removing the spuds and moving the barge buy tugs. Under this alternative, USACE would also comply with all applicable vessel traffic and safety requirements.

As under the other alternatives, dredging would have a long-term beneficial impact by removing shoaled sediment and maintaining the navigability of the federal channels.

**NEPA Determination:** Reduced Hopper Dredge Use Alternative 1 would have a short-term, less-than-significant adverse impact and long-term beneficial impact on navigation.

**CEQA Determination:** Reduced Hopper Dredge Use Alternative 1 would have a less-than-significant impact on navigation.

### **Reduced Hopper Dredge Use Alternative 2**

Under Reduced Hopper Dredge Use Alternative 2, impacts would be very similar to the Proposed Action/Project Alternative, except that Richmond Outer Harbor, Pinole Shoal, and Suisun Bay Channel would be dredged with a clamshell-bucket dredge instead of a hopper dredge. San Bruno Channel in Redwood City Harbor would also be dredged with a clamshell-bucket dredge instead of a hopper dredge; however, this channel is dredged at intervals of 10 years or longer. As noted above, clamshell-bucket dredges have a greater potential to impact navigation compared to hopper dredges, because they are stationary while operating and clamshell-bucket dredges typically take longer than hopper dredges to dredge a particular

channel. Clamshell-bucket dredge operations also involve the use of multiple vessels in the dredge area, whereas hopper dredge operations only require one vessel, so there would be four to five additional vessels in or near the federal channel during dredging. Although mechanical dredges would stop dredging and move out of the way of larger vessels as necessary, temporary impacts to navigation related to temporary delays of other vessel traffic could be slightly greater than under the No Action/No Project Alternative or the Proposed Action/Project at these channels. Impacts could also be greater than under Reduced Hopper Dredge Alternative 1, because both Pinole Shoal and Richmond Outer Harbor would be dredged with a mechanical dredge instead of a hopper dredge. Under this alternative, USACE would also comply with applicable vessel traffic and safety requirements.

As under the other alternatives, dredging would have a long-term beneficial impact by removing shoaled sediment and maintaining the navigability of the federal channels.

**NEPA Determination:** Reduced Hopper Dredge Use Alternative 2 would have a short-term, less-than-significant adverse impact and long-term beneficial impact on navigation.

**CEQA Determination:** The Reduced Hopper Dredge Use Alternative 2 would have a less-than-significant impact on navigation.

**Note Regarding Potential Impacts of the Reduced Hopper Dredge Use Alternatives:** In the event that the budget process does not include a funding request, or Congress does not authorize additional funding or reprogramming of funding for these alternatives, then there is a possibility that certain channels (i.e., Richmond Outer, Pinole Shoal, and Suisun Bay Channel and New York Slough) would not be dredged at all or would not be fully maintained. Cargo ships are loaded to maximize the amount of cargo transported. If the federal channels in San Francisco Bay are not fully maintained and cannot be safely navigated by larger cargo vessels, commercial shippers may have to use more ships with lighter loads. There could be additional deep draft traffic, including tankers, bulk, and containerized vessels, navigating a constrained channel to carry the same amount of cargo. Because it is not expected that traffic would significantly increase above current vessel traffic volumes, the agencies do not evaluate it in any detail beyond this qualitative notation.

CEQA does not require consideration of economic impacts; however, such impacts are considered under NEPA. If commercial shippers have to use more ships with lighter loads, this may increase the cost of transporting cargo. An increase in cargo transportation costs could result in an adverse impact on the regional economy.

### ***Impact 3.10-2: Potential to Create Navigational Safety Risks***

#### **No Action/No Project Alternative, Proposed Action/Project, and Reduced Hopper Dredge Alternatives 1 and 2**

Under all of the alternatives, dredging and placement activities would comply with applicable vessel traffic and safety requirements, including specifications for dredge pipelines. Notes to mariners and navigational warning markers would be used as needed to prevent navigational hazards. Therefore, there would be no impacts related to navigational safety risks.

Dredging would have a long-term beneficial impact by removing shoaled sediment that could pose a navigation hazard, and allowing for safe navigation in the federal channels.

**NEPA Determination:** The No Action Alternative, Proposed Action, and Reduced Hopper Dredge Use Alternatives 1 and 2 would have a beneficial impact on navigational safety.

**CEQA Determination:** The No Project Alternative, Project, and Reduced Hopper Dredge Use Alternatives 1 and 2 would not impact navigational safety.

**Note Regarding Potential Impacts of the Reduced Hopper Dredge Use Alternatives:** In the event that the budget process does not include a funding request, or Congress does not authorize additional funding or reprogramming of funding for these alternatives, then there is a possibility that certain channels (i.e., Richmond Outer, Pinole Shoal, and Suisun Bay Channel and New York Slough) would not be dredged at all or would not be fully maintained. With the reduced or lack of maintenance in these channels, there would be an increased risk of a navigational hazard that could result in vessel groundings, allisions, or collisions. Navigational regulations and controls would reduce the potential for such incidents, but the agencies acknowledge that there would be an increased risk under this scenario. Because the risk of these incidents is speculative, the agencies do not evaluate it in any detail beyond this qualitative notation.

***Impact 3.10-3: Potential to Result in Cumulative Impacts on Navigation***

The project alternatives would have minimal, short-term, adverse impacts on navigation due to the presence of dredge equipment in the federal channels, which may temporarily delay or impede other vessels. Although the reasonably foreseeable actions in Table 3.1-1 may result in vessel use of the federal channels, most of the vessels associated with these actions would be mobile, and therefore would not be expected to result in cumulative impacts related to disruption of navigation. Other activities that are included on the cumulative project list include dredging to deepen channels, including the Redwood City and San Bruno channels. Although deepening of a federal channel would involve the presence of dredge equipment in the channel, maintenance dredging and dredging for deepening of a channel would not be conducted concurrently, and therefore would not result in cumulative impacts to navigation.

**NEPA Determination:** The project alternatives would not result in cumulative impacts on navigation.

**CEQA Determination:** The project alternatives would not result in cumulative impacts on navigation.



## **CHAPTER 4 PUBLIC AND AGENCY INVOLVEMENT**

Since early 2013, public and agency participation has occurred as a part of the environmental review process, pursuant to the requirements of the National Environmental Policy Act and the California Environmental Quality Act (CEQA). Stakeholders and public agencies, including those with permitting authority for the project, have been engaged and involved as described below.

### **4.1 ALTERNATIVES DEVELOPMENT**

On February 20, 2013, the United States Army Corps of Engineers (USACE) and San Francisco Bay Regional Water Quality Control Board (Regional Water Board) conducted an alternatives workshop to provide natural resource agencies with an opportunity to provide input on the alternatives to be analyzed in the Environmental Assessment (EA)/Environmental Impact Report (EIR). Representatives of the United States Environmental Protection Agency, United States Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and San Francisco Bay Conservation and Development Commission (BCDC) participated in the workshop. Although invited, the National Marine Fisheries Service was unable to participate in the workshop.

### **4.2 SCOPING**

As required by CEQA for the preparation of an EIR, the Regional Water Board submitted a Notice of Preparation to the California State Clearinghouse on February 26, 2013. The purpose of the notice was to alert potentially interested parties of the project, and to invite participation in the environmental review process.

On February 26, 2013, copies of the notice were sent to 63 interested parties, which included agencies, landowners, and residents in the project vicinity; community organizations; public agencies and representatives; and interested parties from a list developed in coordination with the Regional Water Board and USACE. A scoping meeting was held on March 12, 2013, at 1333 Broadway, Suite 800, in Oakland, California. Two members of the public and two agency staff representatives attended the scoping meeting. Comments were received at the meeting and throughout the scoping period, which ended on March 27, 2013.

The USACE and Regional Water Board received four e-mail messages and ten letters during the scoping period. Four correspondents were property owners or businesses in the project vicinity. Eight correspondents were public resource agencies. Two correspondents were nongovernmental organizations. All comments received were considered in the preparation of the EA/EIR. Table 4-1 provides a summary of all comments received, organized by applicable resource area. Although all comments were considered, some comments pertained to items beyond the scope of this EA/EIR, and therefore were not addressed in the content of this document.

### **4.3 SMELT WORKING GROUP**

Agency coordination to minimize impacts to longfin smelt and delta smelt commenced prior to the initiation of this EA/EIR. In an April 2010 letter to USACE, CDFW requested that USACE convene a working group to develop and standardize minimization, mitigation, funding, and effectiveness monitoring measures by July 31, 2010. The measures developed were to minimize and fully mitigate the impacts of the taking of longfin smelt. The mitigation was to be proportional in extent to the impact of the taking, and measures should be capable of successful implementation.

<b>Table 4-1 Summary of Comments Received</b>		
<b>Resource Area</b>	<b>Agency/Nongovernmental Organization Comments</b>	<b>Public Comments</b>
Aesthetics	None	None
Air Quality and Greenhouse Gases	<ul style="list-style-type: none"> <li>• Evaluate the project's contribution to greenhouse gases.</li> <li>• Consider the potential effects on sea level rise.</li> <li>• Consider air quality impacts between tug traffic and the CO<sub>2</sub> sequestered in tidal marshes.</li> <li>• Consider air quality impacts of hydraulic versus mechanical dredging.</li> <li>• Analyze emissions for deep ocean disposal, in-Bay disposal, and transport to restoration sites.</li> <li>• Assess carbon offset programs.</li> </ul>	<ul style="list-style-type: none"> <li>• Analyze emissions for deep ocean disposal, in-Bay disposal, and transport to restoration sites.</li> </ul>
Alternatives	<ul style="list-style-type: none"> <li>• Consider including the Edgerly Island and Imola Avenue placement sites in the EA/EIR.</li> <li>• Reexamine the result of the 1998 LTMS EIR, which picked as a preferred alternative a mix of ocean disposal and beneficial reuse.</li> <li>• Consider a smaller scope other than the no project alternative, which may entail fewer channels.</li> </ul>	<ul style="list-style-type: none"> <li>• Request dredging of Richardson Bay</li> <li>• Consider including the Edgerly Island and Imola Avenue placement sites in the EA/EIR.</li> <li>• Consider the institution of scouring systems to reduce the costs of maintaining the channels.</li> </ul>
Biological Resources	<ul style="list-style-type: none"> <li>• Evaluate seasonal work windows.</li> <li>• Evaluate the impact on aquatic and marine species and habitat, including special-status species likely to be present in the project areas.</li> <li>• Consider the potential impact of encouraging the establishment or proliferation of aquatic invasive species.</li> <li>• Evaluate the potential for dredging activities to create noise and vibration that could impact fish and birds.</li> <li>• Consider studies of fish movement and fish entrainment with respect to dredging projects and disposal sites.</li> <li>• Analyze the beneficial use of dredged material to construct new habitat for federal and state listed species.</li> <li>• Consider re-initiating Section 7 consultation to obtain a more current biological opinion.</li> </ul>	None
Cultural Resources	<ul style="list-style-type: none"> <li>• Evaluate archaeological sites, historic resources, and cultural resources, including submerged wharves or shipwrecks.</li> </ul>	None
Economic Impacts	<ul style="list-style-type: none"> <li>• Evaluate the cost of the alternative dredge methods and the related impacts.</li> <li>• Consider that scouring systems in San Francisco Bay Ports/Marina/Terminal facilities could result in cost reductions to maintain the channels over dredging.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide economic valuation on the alternatives, dredge methods, and impacts assessed.</li> </ul>

<b>Table 4-1 Summary of Comments Received (Continued)</b>		
<b>Resource Area</b>	<b>Agency/Nongovernmental Organization Comments</b>	<b>Public Comments</b>
Energy	<ul style="list-style-type: none"> <li>Consider the trade-offs between suction and clamshell in terms of energy use.</li> </ul>	None
Environmental Justice	None	None
Flood Protection	<ul style="list-style-type: none"> <li>Consider beneficial reuse of soil for wetland restoration as a strategy to minimize the effects of climate-change-related storm surges on private property and key infrastructure projects.</li> <li>Analyze the need for dredged material in construction of new flood management levees and structures.</li> </ul>	None
Geology/Soils	<ul style="list-style-type: none"> <li>Evaluate how the removal of sediments affects the San Francisco Bay sediment deficit.</li> <li>Evaluate the nutrient content of disposed materials.</li> </ul>	None
Land Use	<ul style="list-style-type: none"> <li>Determine if USACE needs a lease from the CSLC.</li> </ul>	None
Noise and Vibration	<ul style="list-style-type: none"> <li>None</li> </ul>	None
Recreation	<ul style="list-style-type: none"> <li>Evaluate potential impacts to recreation and public access from project activities.</li> </ul>	None
Utilities	<ul style="list-style-type: none"> <li>Requested project activities not impact San Bruno Water Quality Control Plant outfall.</li> </ul>	None
Transit Service Impacts	None	None
Water Quality	<ul style="list-style-type: none"> <li>Consider measures to minimize the potential release of contaminants into waterways.</li> <li>Analyze contaminant loading from San Francisco Bay aquatic disposal in light of TMDLs and sediment disposal criteria implemented since 1998.</li> </ul>	None
<p>Notes:</p> <p>CO<sub>2</sub> = carbon dioxide            CSLC = California State Lands Commission            EA = Environmental Assessment            EIR = Environmental Impact Report            LTMS = Long-Term Management Strategy            TMDL = Total Maximum Daily Load            USACE = United States Army Corps of Engineers</p>		

Following this request, the USACE convened a longfin smelt and delta smelt working group, consisting of CDFW, USFWS, BCDC, Regional Water Board, and USACE. The group assisted in the development of the hopper dredging entrainment monitoring conducted in 2010 (McGowan, 2010) and 2011 (Gold et al., 2011). They also participated in the development of the Engineer Research and Development Center 2012-2013 entrainment monitoring risk assessment. In addition, the group agreed that hopper dredge smelt fish entrainment would be fully mitigated by using the CDFW-developed fish entrainment mitigation ratio equation, which is used by other projects that entrain fish through pumping of water, including the State Water Project (see Section 2.3.3). Since then, the USACE has continued to provide mitigation based on the previous year's hydraulic pumping ratio.

#### 4.4 REVIEW OF THE DRAFT EA/EIR

The Draft EA/EIR was published on December 5, 2014. On that date, the Notice of Availability (NOA) for the Draft EA/EIR was published in the *Contra Costa Times* and *Oakland Tribune*, mailed to the project mailing list, and emailed to the Long-Term Management Strategy stakeholders email distribution list and the Harbor Safety Committee of the San Francisco Bay Region email distribution list. In addition, the NOA and CEQA Notice of Completion were submitted to the State Clearinghouse on December 5, 2014.

The Draft EA/EIR was made available for download on USACE's website (<http://www.spn.usace.army.mil/Missions/ProjectsandPrograms/Navigation.aspx>) and the Regional Water Board's website ([http://www.waterboards.ca.gov/sanfranciscobay/public\\_notices/](http://www.waterboards.ca.gov/sanfranciscobay/public_notices/)). Printed copies of the Draft EA/EIR were made available for public review at the following locations during normal business hours:

- Regional Water Quality Control Board, San Francisco Region, 1515 Clay Street, Oakland;
- Napa Main Library, 580 Coombs Street, Napa;
- Petaluma Regional Library, 100 Fairgrounds Drive, Petaluma;
- Oakland Public Library, 125 14th Street, Oakland;
- Pittsburg Library, 80 Power Avenue, Pittsburg;
- Redwood City Public Library, 1044 Middlefield Road, Redwood City;
- Richmond Public Library, 325 Civic Center Plaza, Richmond; and
- San Francisco Public Library, 100 Larkin Street, San Francisco.

Agencies and the general public had the opportunity to review and comment on the Draft EA/EIR during a formal 45-day comment period, which ended on January 20, 2015.

A public meeting was held on January 7, 2015, at 1333 Broadway, Suite 800, Oakland, to receive comments on the Draft EA/EIR. The public meeting was announced in the NOA and through the same notifications described above. At the public meeting, an overview of the proposed project and the findings of the Draft EA/EIR were presented and the public was given the opportunity to provide verbal comments or submit written comments on comment cards. Appendix C, Response to Comments, includes a summary of comments provided at the public meeting, written comments received on the Draft EA/EIR, and responses to comments received.

#### 4.5 LIST OF AGENCIES AND ORGANIZATIONS CONTACTED

The following federal, state, and local agencies, and other organization were contacted during the preparation of this EA/EIR.

##### Federal Agencies

- National Marine Fisheries Service
- United States Coast Guard

- United States Environmental Protection Agency
- USFWS
- United States Geological Survey

### **State Agencies**

- California Department of Boating and Waterways
- CDFW
- California Department of Water Resources
- California Coastal Conservancy
- California State Lands Commission
- Central Valley Regional Water Quality Control Board

### **Local Agencies**

- Alameda County
- Association of Bay Area Governments
- BCDC
- City and County of San Francisco Planning Department
- City of Alameda
- City of American Canyon
- City of Antioch
- City of Belvedere
- City of Benicia
- City of Berkeley
- City of Emeryville
- City of Fairfield
- City of Foster City
- City of Larkspur
- City of Martinez
- City of Napa
- City of Oakland
- City of Petaluma
- City of Pittsburg
- City of Redwood City
- City of San Leandro
- City of San Rafael
- City of Sausalito
- City of Suisun City
- City of Tiburon
- City of Vallejo
- Contra Costa County Department of Public Works
- Marin County Department of Public Works
- Napa County
- Napa County Flood Control and Water Conservation District
- Port of Oakland
- Port of Redwood City
- Port of Richmond
- Port of San Francisco
- Port of Stockton
- Sacramento County
- San Francisco Bay Area Water Emergency Transportation Authority

- San Francisco Public Utilities Commission
- San Joaquin County
- San Mateo County
- Santa Clara County Board of Supervisors
- Santa Clara County Planning Office
- Solano County Department of Environmental Management
- Sonoma County Department of Public Works

**Other Organizations**

- Bay Area Council
- Bay Planning Coalition
- Delta Stewardship Council
- Harbor Safety Committee of the San Francisco Bay Region

## CHAPTER 5 SUMMARY OF IMPACTS AND OTHER REQUIRED ANALYSES

This chapter presents a summary of impacts and mitigation measures, and a comparison of the project alternatives. It also includes additional analysis required under the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA).

### 5.1 COMPARISON OF THE ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

As stated in Section 3.1, the project would have no or negligible impacts on forestry, agriculture, public services, minerals, noise, utilities, energy, recreation, aesthetic and visual resources, population and housing, socioeconomics, environmental justice, and regional growth.

For each resource topic evaluated in detail, Table 5-1 presents a summary of impacts for the action alternatives, mitigation measures, and the NEPA and CEQA impact levels for each alternative after mitigation.

Impacts of the No Action/No Project Alternative are presented in Chapter 3.0 for comparison to those of the action alternatives. Because the No Action/No Project Alternative represents a continuation of the United States Army Corps of Engineers' (USACE) current maintenance dredging practices, adverse impacts of the No Action/No Project Alternative would be similar to those of the Proposed Action/Project, because both alternatives involve use of the same dredge equipment type. However, adverse impacts to longfin smelt and delta smelt would be greater under the No Action/No Project Alternative, because there would be fewer measures implemented to minimize entrainment impacts to these species; these impacts would be significant under CEQA.

Under the action alternatives, no impacts are expected related to land use plans and hazards and hazardous materials.

Under the Proposed Action/Project and both reduced hopper dredge use alternatives, dredging and placement activities would have equivalent minor adverse impacts on sediments. Although not expected, inadvertent discovery of archaeological or paleontological resources could result in adverse cultural resource impacts under all alternatives; with implementation of the identified mitigation measures, these impacts would not be significant.

All action alternatives would have impacts on water quality, primarily from increased turbidity. Impacts would be greater under the reduced hopper dredge use alternatives compared to the Proposed Action/Project, because mechanical dredging, which would be conducted in place of hopper dredging at certain locations, generates more turbidity than hopper dredging over a longer period of time. Nonetheless, under all alternatives, impacts would be short-term and minor.

Under the reduced hopper dredge use alternatives, there would be a minor increase of emissions compared to the Proposed Action/Project from increased mechanical dredge equipment use; however, the increase would not exceed the Bay Area Air Quality Management District significance thresholds.

All action alternatives would have minor adverse impacts on certain biological resources, including: temporary, localized turbidity impacts on aquatic species and habitat; temporary, localized disturbance of benthic habitat; temporary adverse effects on fish and marine mammals from underwater noise; temporary, localized interference with the movement or migration of fish and wildlife species (with the exception of entrainment risks discussed below); and temporary, and localized impacts on avian foraging and roosting. Under all action alternatives, the potential for project activities to result in biotoxicity impacts to aquatic organisms or increase the spread of invasive nonnative species would be minimal. Turbidity impacts on aquatic species from dredging would be longer in duration under the reduced hopper dredge use alternatives than under the Proposed Action/Project, but they would still be less than significant under NEPA and CEQA.

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<b>Geology, Soils, and Sediment Quality</b>				
<p><b>Impact 3.3-1: Potential for Dredging, Transport, and Placement Activities to Result in Substantial Soil Erosion</b></p> <p>Minimal erosion of the channel sides from sloughing could occur after the channels are dredged due to the disturbance of sediments. Placement of dredged material at beneficial reuse sites would have beneficial impacts on soil resources.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.3-2: Potential for Dredging, Transport, and Placement Activities to Substantially Degrade Sediment Quality</b></p> <p>The USACE’s conformance with established sediment testing and analysis protocols for dredged material would ensure that dredged material placement activities would not substantially degrade sediment quality at the placement sites.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.3-3: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Sediments and Soils</b></p> <p>The project would not result in adverse cumulative impacts on sediments and soils.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts.</p> <p><b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts.</p> <p><b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts.</p> <p><b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>
<b>Hydrology and Water Quality</b>				
<p><b>Impact 3.4-1: Potential to Substantially Degrade Water Quality through Alteration of Water Temperature, Salinity, pH, and Dissolved Oxygen</b></p> <p>Impacts to water quality temperature, salinity, pH, and dissolved oxygen from project activities would be minor, short-term, and localized.</p>	No mitigation necessary.	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.4-2: Potential to Substantially Degrade Water Quality Because of Increased Turbidity</b></p> <p>Dredging and placement activities would have minor, short-term, and localized impacts to water quality due to short-term increases in turbidity. Placement of dredged materials at habitat restoration beneficial reuse projects could have long-term beneficial effects on water quality.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.4-3: Potential to Substantially Degrade Water Quality Because of Mobilization of Contaminated Sediments or Release of Hazardous Materials</b></p> <p>Dredging and placement activities would not be expected to increase contaminant concentrations in the water column above baseline conditions, or result in violation of a water quality standard.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.4-4: Potential to Result in Cumulative Impacts to Hydrology or Water Quality</b></p> <p>The project, in combination with other past, present, and reasonably foreseeable future projects, could result in adverse cumulative impacts on water quality; however, the project’s contribution to these cumulative impact would not be cumulatively considerable or significant.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<b>Air Quality and Global Climate Change</b>				
<p><b>Impact 3.5-1: Conflict with or Obstruct BAAQMD Air Quality Plan Implementation, Exceed Applicable Air Quality Standards, or Contribute Substantially to an Air Quality Violation</b></p> <p>The project would not result in emissions level increases that exceed BAAQMD mass significance thresholds. Therefore, the project would not conflict with or obstruct BAAQMD Air Quality Plan Implementation, exceed applicable air quality standards, or contribute substantially to an air quality violation.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.5-2: Expose Sensitive Receptors to Substantial Pollutant Concentrations</b></p> <p>The impacts of short-term intermittent emissions on sensitive receptors from dredging and dredged material placement activities would be minimal.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.5-3: Create Objectionable Odors</b></p> <p>The project would not create objectionable odors affecting a substantial number of people.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.5-4: Result in Cumulatively Considerable Air Quality Impacts</b></p> <p>The project alternatives would not cause mass emission increases above the BAAQMD significance thresholds, would not be cumulatively considerable, and would not result in significant cumulative air quality impacts.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.5-5: Generate Greenhouse Gas Emissions, Either Directly or Indirectly, that May Have a Significant Impact on the Environment or Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases</b></p> <p>The project alternatives would not cause greenhouse gas emission increases above the BAAQMD significance thresholds or conflict with an applicable plan, policy, or regulation for reducing the emissions of greenhouse gases.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Biological Resources</b></p>				
<p><b>Impact 3.6-1: Potential Adverse Effects of Increased Turbidity Resulting from Maintenance Dredging and Dredged Material Placement on Special-Status Species, Critical Habitat, and Commercially Valuable Marine Species</b></p> <p>Localized and temporary increases in turbidity resulting from dredging and the placement of dredged material may affect marine organisms and aquatic wildlife during various life stages. Impacts may include impaired respiration; reduced visibility and the ability to forage or avoid predators; and alteration of movement patterns. Increases in turbidity from the project are not expected to have substantial effects on special-status species, their critical habitat, or EFH.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.6-2: Potential Adverse Effects of Maintenance Dredging Resulting from the Disturbance of Benthic Habitat on Special-Status Species, Critical Habitat, and Commercially Valuable Marine Species</b></p> <p>Dredging would have localized, direct impacts on benthic communities through physical disruption and direct removal of benthic organisms. Effects would be temporary because benthic habitat is quickly recolonized.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-3: Potential Adverse Effects of Underwater Noise Generated During Maintenance Dredging on Special-Status Fish and Marine Mammals</b></p> <p>Underwater noise produced during dredging may have temporary adverse effects on fish and marine mammals, include fleeing, the cessation of feeding, or other behavioral changes, but would not be expected to cause injury to fish and marine mammals.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-4: Potential Adverse Effects from Entrainment on Special-Status or Commercially and Recreationally Important Marine Species, Not Including Delta Smelt and Longfin Smelt</b></p> <p>During dredging, organisms on the dredged material may be entrained, in addition to organisms in the water column near the dredging apparatus. With implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment, effects to special-status and commercially important species, not including delta smelt and longfin smelt, would not be significant.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts, reduced to less than significant with implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts, reduced to less than significant with implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts, reduced to less than significant with implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.6-5: Potential Substantial Adverse Effects and Cumulative Impacts to Delta Smelt from Entrainment</b></p> <p>Entrainment of delta smelt could occur during hopper dredging. Under the Proposed Action/Project, a hopper dredge would be used to dredge three in-bay channels and the Main Ship Channel annually; therefore, this alternative would have the greatest potential to result in entrainment impacts. The potential for entrainment impacts would be less under Reduced Hopper Dredge Use Alternative 1 because only one in-Bay channel and the Main Ship Channel would be maintained with a hopper dredge. The potential for entrainment impacts would be largely eliminated under Reduced Hopper Use Dredge Alternative 2 because hopper dredges would not be used for maintaining in-Bay channels.</p>	<p>Minimization measures proposed as part the project description for all action alternatives. Compensatory mitigation (i.e., conservation credit) proposed as part of the project description for the Proposed Action/Project and Reduced Hopper Dredge Use Alternative 1. No additional measures proposed as mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts, reduced to less than significant with the implementation of reduced hopper dredging.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-6: Potential Substantial Adverse Effects and Cumulative Impacts to Longfin Smelt from Entrainment</b></p> <p>Entrainment of delta smelt could occur during hopper dredging. Under the Proposed Action/Project, a hopper dredge would be used to dredge three in-bay channels and the Main Ship Channel annually; therefore, this alternative would have the greatest potential to result in entrainment impacts. The potential for entrainment impacts would be less under Reduced Hopper Dredge Use Alternative 1 because only one in-Bay channel and the Main Ship Channel would be maintained with a hopper dredge. The potential for entrainment impacts would be largely eliminated under Reduced Hopper Use Dredge Alternative 2 because hopper dredges would not be used for maintaining in-Bay channels.</p>	<p>Minimization measures proposed as part the project description for all action alternatives. Compensatory mitigation (i.e., conservation credit) proposed as part of the project description for the Proposed Action/Project and Reduced Hopper Dredge Use Alternative 1. No additional measures proposed as mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Significant adverse impacts, reduced to less than significant with the implementation of reduced hopper dredging.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.6-7: Dredging and Placement Activities Could Result in the Disturbance of Essential Fish Habitat and “Special Aquatic Sites,” Including Eelgrass Beds and Mudflats.</b> Eelgrass near the Richmond Inner Harbor Channel and Oakland Inner Harbor may be indirectly impacted by turbidity and increased sedimentation from dredging operations. Turbidity plumes from dredging operations may temporarily reduce light penetration in waters adjacent to the plumes. Sediment near areas of dredging may settle on eelgrass blades and affect the viability of the eelgrass in beds adjacent to dredging operations.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-8: Interference with the Movement of Resident or Migratory Fish or Wildlife Species During Dredging and Placement Activities</b> The noise and in-water disturbance associated with dredging and placement activities could cause fish and wildlife species to temporarily avoid the immediate dredging or placement area when work is being conducted. However, the affected area would be limited to the immediate dredging or placement zone, and would not substantially limit the available habitat or movement of fish, seabirds, or marine mammals.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-9: Dredging and Placement Activities Could Disturb Roosting and Foraging by Avian Species</b> Dredging may disturb avian foraging and resting behaviors, decrease time available for foraging, and increase energetic costs as a result of increased flight times and startling responses. Impacts would be temporary, localized, and minor.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.6-10: Contaminated Sediments Could Become Resuspended During Dredging and Placement Activities, and Could Be Toxic to Aquatic Organisms, Including Plankton, Benthos, Fish, Birds, and Marine Mammals</b> Sediment testing results for previous USACE maintenance dredging episodes indicate that, in general, dredged materials from the subject federal navigation channels have been suitable for unconfined aquatic disposal. Dredging, transport, and placement of dredged material would be conducted in cooperation with the DMMO. This process would identify contaminated sediments and appropriate placement site options for dredged materials, based on the characteristics of the sediment and criteria for each placement site. Adherence to best management practices and conditions in regulatory approvals would minimize the potential for water quality degradation that could impact aquatic organisms.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.6-11: Dredging and Placement Could Substantially Increase the Spread of Invasive Nonnative Species</b> Dredge equipment would comply with United States Coast Guard regulations for vessels intended to minimize the spread of invasive nonnative species. Beneficial reuse and upland placement site operators are responsible for managing the placement of dredged materials at the placement sites in accordance with conditions of their permits and other regulatory approval, which include measures to minimize the spread of invasive nonnative species. Therefore, project activities would not be expected to substantially increase the spread of invasive nonnative species.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.6-12: Potential to Result in Cumulative Impacts on Biological Resources, Not Including Entrainment Impacts on Delta Smelt and Longfin Smelt</b></p> <p>The project, in combination with other past, present, and reasonably foreseeable future projects, could result in adverse cumulative impacts on biological resources; however, the project’s contribution to these cumulative impacts would not be cumulatively considerable or significant.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Cultural and Paleontological Resources</b></p>				
<p><b>Impact 3.7-1: Substantial Adverse Change to a Historical Resource or Disturb Unique Archaeological Resources</b></p> <p>Although unlikely, given the repeated dredging and dredged material placement activities that have historically occurred at the federal navigation channels and existing placement sites, there remains the potential that archaeological materials could be inadvertently uncovered by project activities. Such inadvertently discovered archaeological materials could represent historical resources or unique archaeological resources, and their disturbance could adversely change their condition. As such, the inadvertent discovery of archaeological materials represents a potential project impact. Implementation of Mitigation Measure CUL-1, Inadvertent Archaeological Discovery Measures, would reduce potential impacts.</p>	<p><b>Mitigation Measure CUL-1: Inadvertent Archaeological Discovery Measures</b></p> <p>Measures will be implemented to avoid potential adverse effects on inadvertently discovered NRHP- and/or CRHR-eligible or unique archaeological resources. Refer to Section 3.7 for complete mitigation measure.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.7-2: Disturb Human Remains, including those Interred Outside of Formal Cemeteries</b></p> <p>There are no known cemeteries, formal or otherwise, or other evidence of human internment in the federal navigation channels or existing placement sites. Although unlikely, given the repeated dredging and dredged material placement activities that have historically occurred at the federal navigation channels and existing placement sites, there remains the potential that previously unidentified human remains could be inadvertently uncovered with project implementation. Such disturbance of human remains represents a potential project impact. Implementation of Mitigation Measure CUL-1, Inadvertent Archaeological Discovery Measures, and Mitigation Measure CUL-2, Treatment of Human Remains, would reduce potential impacts.</p>	<p><b>Mitigation Measure CUL-1: Inadvertent Archaeological Discovery Measures</b> <b>Mitigation Measure CUL-2: Treatment of Human Remains</b></p> <p>The treatment of human remains and associated or unassociated funerary objects discovered during any soil-disturbing activity will comply with applicable state laws. Refer to Section 3.7 for complete mitigation measure.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>
<p><b>Impact 3.7-3: Disturb Unidentified Significant Paleontological Resources</b></p> <p>Disturbance of paleontological resources would not be expected. Although unlikely, there remains the potential that paleontological materials could be inadvertently uncovered by project activities. Such disturbance of paleontological resources represents a potential project impact. Implementation of Mitigation Measure CUL-3, Inadvertent Paleontological Discovery, would reduce potential impacts.</p>	<p><b>Mitigation Measure CUL-3: Inadvertent Paleontological Discovery</b></p> <p>Measures will be implemented to avoid potential adverse effects on inadvertently discovered paleontological resources. Refer to Section 3.7 for complete mitigation measure.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts with mitigation. <b>CEQA Finding:</b> Less-than-significant adverse impacts with mitigation.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<p><b>Impact 3.7-4: Potential to Result in Cumulative Impacts on Archaeological or Paleontological Resources</b></p> <p>Project activities would not result in impacts to known historic or unique archaeological resources or to significant paleontological resources, and therefore would not contribute to any cumulative impact to these resources. If previously undiscovered archaeological resources are inadvertently exposed by the project or other reasonably foreseeable projects, an incremental effect to archaeological resources may occur.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts. <b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<b>Land Use</b>				
<p><b>Impact 3.8-1 Conflict with Applicable Plans and Policies</b></p> <p>The project would not conflict with plans, regulations, or policies considered under the Coastal Zone Management Act, including the California Coastal Management Program and the San Francisco Bay Plan. As a result of the California Coastal Commission and the San Francisco Bay Conservation and Development Commission review of USACE’s consistency determination for the project, the project would be implemented in a manner consistent with applicable plans and policies, and would be consistent with the Coastal Zone Management Act to the maximum extent practicable.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<b>Hazards and Hazardous Materials</b>				
<p><b>Impact 3.9-1: Potential Public or Environmental Exposure from the Transport, Use, and Disposal of Hazardous Materials</b></p> <p>All federal, state, and local regulations regarding the use, transport, and disposal of hazardous materials would be adhered to during project activities. Human health and safety impacts would be avoided through adherence to these procedures, conditions, and regulations. Project activities would not interfere with cleanup activities at contaminated sites.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No impact. <b>CEQA Finding:</b> No impact.</p>
<p><b>Impact 3.9-2: Potential Impacts to Implementation of an Adopted Emergency Response Plan</b></p> <p>The project would not impair implementation of, or interfere with, any emergency operation or evacuation plans in the study area.</p> <p>Dredging would have a long-term beneficial impact by removing shoaled sediment and maintaining the navigability of the federal channels for use by vessels during emergency response operations.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> No adverse impacts; beneficial impacts. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No adverse impacts; beneficial impacts. <b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> No adverse impacts; beneficial impacts. <b>CEQA Finding:</b> No impact.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

Impact	Mitigation Measure	Proposed Action	Reduced Hopper Dredge Use Alternative 1	Reduced Hopper Dredge Use Alternative 2
<b>Transportation</b>				
<p><b>Impact 3.10-1: Potential to Disrupt or Impede Marine Navigation</b></p> <p>Maintenance dredging and placement activities would add to vessel movement in the study area; however, this vessel traffic would be similar to that which has occurred during USACE’s past maintenance dredging operations. Dredging activities may occasionally delay or temporarily impede some vessels. Adverse impacts to navigation would be minimal and short-term.</p> <p>Dredging would have long-term beneficial impacts by removing shoaled sediment and maintaining the navigability of the federal channels.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>	<p><b>NEPA Finding:</b> Less-than-significant adverse impacts; beneficial impacts.</p> <p><b>CEQA Finding:</b> Less-than-significant adverse impacts.</p>
<p><b>Impact 3.10-2: Potential to Create Navigational Safety Risks</b></p> <p>Dredging and placement activities would comply with applicable vessel traffic and safety requirements; therefore, there would be no impacts related to navigational safety risks.</p> <p>Dredging would have long-term beneficial impacts by removing shoaled sediment that could pose a navigation hazard, and allowing for safe navigation in the federal channels.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Beneficial impacts.</p> <p><b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> Beneficial impacts.</p> <p><b>CEQA Finding:</b> No impact.</p>	<p><b>NEPA Finding:</b> Beneficial impacts.</p> <p><b>CEQA Finding:</b> No impact.</p>

**Table 5-1  
Summary of Impacts, Mitigation Measures, and NEPA and CEQA Findings for the Action Alternatives (Continued)**

<b>Impact</b>	<b>Mitigation Measure</b>	<b>Proposed Action</b>	<b>Reduced Hopper Dredge Use Alternative 1</b>	<b>Reduced Hopper Dredge Use Alternative 2</b>
<p><b>Impact 3.10-3: Potential to Result in Cumulative Impacts on Navigation</b> The project would not result in adverse cumulative impacts on navigation.</p>	<p>No mitigation necessary.</p>	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts. <b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts. <b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>	<p><b>NEPA Finding:</b> Project would not contribute to adverse cumulative impacts. <b>CEQA Finding:</b> Project would not contribute to adverse cumulative impacts.</p>

Notes:  
 AB = Assembly Bill  
 BAAQMD = Bay Area Air Quality Management District  
 CEQA = California Environmental Quality Act  
 CRHR = California Register of Historical Resources  
 EFH = Essential Fish Habitat  
 LTMS = Long-Term Management Strategy  
 NEPA = National Environmental Policy Act  
 NRHP = National Register of Historic Places  
 USACE = United States Army Corps of Engineers

Entrainment of delta smelt and longfin smelt could occur during hopper dredging. Under the Proposed Action/Project, a hopper dredge would be used to dredge three in-bay channels and the Main Ship Channel annually; therefore, of the action alternatives, the Proposed Action/Project would have the greatest potential to result in entrainment impacts. The potential for entrainment impacts would be less under Reduced Hopper Dredge Use Alternative 1 because only one in-Bay channel and the Main Ship Channel would be maintained with a hopper dredge. The potential for entrainment impacts would be largely eliminated under Reduced Hopper Use Dredge Alternative 2 because hopper dredges would not be used for maintaining in-Bay channels after 2016. Under NEPA, project and cumulative impacts to delta smelt and longfin smelt from entrainment would be less than significant under all action alternatives. Under CEQA, the project and cumulative impacts to delta smelt and longfin smelt from entrainment would be significant under the Proposed Action/Project; significant but reduced to less than significant with reduced hopper dredging and minimization and mitigation measures under Reduced Hopper Dredge Use Alternative 1; and less than significant under Reduced Hopper Dredge Use Alternative 2.

Entrainment of other special-status or commercially and recreationally important marine species also could occur during hopper dredging. Under NEPA, these impacts would be less than significant under all alternatives. Under CEQA, these impacts would be significant under all alternatives, but reduced to less than significant with implementation of the LTMS work windows and other standard practices intended to reduce the potential for entrainment.

Under all action alternatives, dredging activities may occasionally delay or temporarily impede some vessels using the federal navigation channels, resulting in short-term minor impacts on navigation. Mechanical dredges have a greater potential to impact navigation compared to hopper dredges, because they are stationary while operating and involve use of multiple vessels. Therefore, potential navigation impacts would be greatest under Reduced Hopper Dredge Use Alternative 2 because it maximizes use of mechanical dredges, and least under the Proposed Action/Project, but less than significant under any alternative.

In addition to the analysis contained in this Environmental Assessment/Environmental Impact Report (EA/EIR), as summarized above, public comments on the Draft EA/EIR related to navigational safety concerns (see Appendix C) were considered in the evaluation and comparison among alternatives.

As noted above, under CEQA, the Proposed Action/Project would have significant cumulative impacts to delta smelt and longfin smelt from entrainment. Under NEPA, the Proposed Action/Project would have less-than-significant cumulative impacts to delta smelt and longfin smelt from entrainment. Under both NEPA and CEQA, the reduced hopper dredge use alternatives would have less than significant cumulative impacts to delta smelt and longfin smelt from entrainment. For all other resource areas under all action alternatives, the project, in combination with other past, present, and reasonably foreseeable future projects, would not contribute to adverse cumulative impacts, or the project's contribution to cumulative impacts would not be cumulatively considerable or significant.

## **5.2 ENVIRONMENTALLY PREFERABLE/SUPERIOR ALTERNATIVE**

### **5.2.1 NEPA Environmentally Preferable Alternative**

Section 1505.2(b) of the NEPA regulations (40 C.F.R. § 1505.2) requires that a Record of Decision for an Environmental Impact Statement identify the environmentally preferred alternative; however, NEPA does not require that an Environmental Assessment and Finding of No Significant Impact identify the environmentally preferred alternative. Regardless, the environmentally preferred alternative under NEPA is presented here. Under NEPA, the environmentally preferred alternative is the alternative that "...promotes the national environmental policy as expressed in NEPA's Section 101" (42 U.S.C. § 4331). Section 101 of NEPA outlines Congress' policy of restoring and maintaining environmental quality for the overall welfare and development of man, and to create and maintain conditions under which man and

nature can exist in productive harmony. NEPA also allows lead agencies to consider "...relevant factors including economic and technical considerations and agency statutory missions" (33 C.F.R. pt. 1505.2). One of the USACE's statutory missions is to maintain navigation.

As described in Section 5.1, the type and degree of environmental impacts among all the alternatives is similar; differences in impacts are directly correlated to the degree of hopper dredge use versus mechanical dredging use under each alternative. Adverse impacts of the No Action/No Project Alternative would be similar to those of the Proposed Action/Project, because both alternatives would use the same dredge equipment. However, adverse impacts to longfin smelt and delta smelt would be greater under the No Action/No Project Alternative, because there would be fewer measures implemented to minimize entrainment impacts to these species. Increased use of mechanical dredges under the reduced hopper dredge use alternatives would have greater impacts on water quality, air quality, navigation, and underwater noise as a result of the increased duration of dredging operations (up to ten times longer), when compared to the Proposed Action/Project Alternative. Comparing the overall impacts of each alternative, rather than a single impact area, the Proposed Action/Project and reduced hopper dredge use alternatives could result in similar overall impacts to the environment. Therefore, the NEPA environmentally preferred alternative could be any one of the action alternatives (i.e., Proposed Action/Project, Reduced Hopper Dredge Alternative 1, or the Reduced Hopper Dredge Alternative 2). Because of the increased cost and time required to dredge the federal navigation channels with a mechanical dredge, the preferred alternative under NEPA is the Proposed Action/Project. The Proposed Action/Project provides a necessary balance between the quality of the environment, economic considerations, and USACE's statutory missions.

### 5.2.2 CEQA Environmentally Superior Alternative

CEQA does not provide specific direction regarding the methodology of comparing alternatives and the proposed project. Each project must be evaluated for the issues and impacts that are most important; this will vary depending on the project type and the environmental setting.

The CEQA Guidelines (Section 15126.6[e][2]) state that "If the environmentally superior alternative is the "No Project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives."

As described in Section 5.1, the type and degree of environmental impacts among all the alternatives is similar; differences in impacts are directly correlated to the degree of hopper dredge use versus mechanical dredge use under each alternative. Adverse impacts of the No Action/No Project Alternative would be similar to those of the Proposed Action/Project, because both alternatives involve the same dredge equipment type use. However, adverse impacts to longfin smelt and delta smelt would be greater under the No Action/No Project Alternative, because there would be fewer measures implemented to minimize entrainment impacts to these species. Although both reduced hopper dredge use alternatives would have slightly greater impacts on water quality, air quality, navigation, and underwater noise than the No Action/No Project Alternative and Proposed Action/Project, none of those increased impacts would exceed their respective significance thresholds or criteria. The reduction in the potential for entrainment of delta smelt and longfin smelt afforded under the reduced hopper dredge use alternatives substantially reduces or eliminates the impacts to these species. Therefore, Reduced Hopper Dredge Use Alternative 2, which would minimize hopper dredge use and the potential for entrainment and adverse effects on special-status fish species, is considered to be the environmentally superior alternative under CEQA.

## 5.3 SIGNIFICANT IMPACTS

Section 15126(b) of the CEQA Guidelines requires that an EIR "describe any significant impact, including those which can be mitigated, but not reduced to a level of insignificance. Where there are

impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons why the project is being proposed, notwithstanding their effect, should be described.”

Under CEQA, the Proposed Action/Project would have significant project-level and cumulative impacts to delta smelt and longfin smelt from entrainment. Although the Proposed Action/Project includes additional measures to minimize impacts to delta smelt and longfin smelt, as well as compensatory mitigation for potential impacts to listed fish species, the proposed extent of hopper dredge use under the Proposed Action/Project would substantially reduce the number of delta and longfin smelt. In consideration of the present status of these species’ populations, there would be significant project and cumulative impacts under the Proposed Action/Project under CEQA.

#### **5.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

Under 40 C.F.R. § 1502.16, NEPA requires description of the irreversible and irretrievable resource commitments related to the use of nonrenewable resources that could result from the implementation of the proposed project. Irreversible effects would primarily result from the use or destruction of a specific resource, such as energy and minerals that could not be replaced within a reasonable time frame. Irretrievable resource commitments would involve the loss in value of an affected resource that could not be restored as a result of the action; an example of this is the extinction of a threatened or endangered species, or the disturbance of a cultural resource.

Dredging and placement activities would require the use of fossil fuels for the operation of vessels and equipment. The commitment of these resources would apply irrespective of the alternative. Under all alternatives, the fossil fuel consumption would be similar to that under USACE’s historic and current maintenance dredging operations in San Francisco Bay.

An irreversible loss of special-status species could occur, should the project result in incidental take of federally listed fish species. However, measures have been identified that would minimize impacts to these species; therefore, USACE determined that an irretrievable loss of these species’ populations is not expected.

#### **5.5 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY**

Under 40 C.F.R. § 1502.16, NEPA requires consideration of the relationship between local short-term uses of the environment, and the maintenance and enhancement of long-term productivity.

Maintenance dredging and the placement of dredged material would result in short-term impacts on sediments, water quality, biological resources, air quality, and navigation. Short-term adverse impacts include increases in turbidity, disturbance of benthic communities, effects on fish and wildlife behavior, emissions of criteria pollutants, and delayed navigation of vessels; these impacts would be minor, localized, and temporary during dredging and placement activities. Entrainment of special-status fish species would result in permanent effects.

However, USACE determined that these potential adverse effects would be minimized by implementing the standard practices identified in Chapter 2 and the mitigation measures discussed in Chapter 3. Moreover, these short-term impacts are expected to be outweighed by long-term beneficial effects of maintaining the federal navigation channels to accommodate commercial, recreational, and emergency vessels. In addition, the beneficial reuse of dredged materials would contribute to the long-term productivity of the environment.

Therefore, the project would not be expected to adversely impact the long-term productivity of the environment.

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# **ATTACHMENT 9**

FINAL INTEGRATED GENERAL REEVALUATION REPORT  
AND ENVIRONMENTAL IMPACT STATEMENT

SAN FRANCISCO BAY TO STOCKTON, CALIFORNIA  
NAVIGATION STUDY



JANUARY 2020

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**FINAL INTEGRATED GENERAL REEVALUATION REPORT  
AND ENVIRONMENTAL IMPACT STATEMENT**

**SAN FRANCISCO BAY TO STOCKTON, CALIFORNIA, NAVIGATION IMPROVEMENT PROJECT**

**LEAD NEPA AGENCY:** Department of Army, U.S. Army Corps of Engineers, Jacksonville District

**NON-FEDERAL SPONSOR:** Port of Stockton

**ABSTRACT:** The San Francisco Bay to Stockton Navigation Improvement Project was originally authorized by Congress in the Rivers and Harbors (R&H) Act of 1965. The originally authorized study was scoped for a 78-mile long navigation project to include the John F. Baldwin and Stockton channels, however, it was re-scoped in 2016 to include navigation improvements up to Avon. The study area for this draft integrated General Reevaluation Report and Environmental Impact Statement (GRR/EIS) is a 13.2 mile length of navigation channel which spans from Central San Francisco Bay to Avon (just east of the Benicia-Martinez Bridge) and includes the Pinole Shoal Channel and the Bulls Head Reach portion of the Suisun Bay Channel. The channels in the study area primarily serve crude oil imports and refined product exports to and from several oil refineries and two non-petroleum industries. Although the navigation channels in the study area are authorized to a depth of up to -45 feet mean lower low water (MLLW), the channels are currently maintained to only -35 feet MLLW. The Recommended Plan/Proposed Project includes deepening the existing navigation channel to -38 feet MLLW (plus 2 feet of allowable overdepth), dredging a 2,600 foot sediment trap in Bulls Head Reach to -42 feet MLLW (plus 2 feet of allowable overdepth), leveling a rocky obstruction within the Pinole Shoal channel for navigability, and using the dredged material at beneficial reuse sites to contribute to restoration of tidal wetlands within the Delta.

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### Using this Document

 **Report Reference Materials:** To ease navigation through the report, prompts are provided, alerting the reader to reference additional sections or graphics, or to explain the purpose of an ensuing discussion. In this report, these prompts can be identified by this blue box format.

Additionally, informational foldouts **Graphics Executive Summary 1 and 2** are provided in the Executive Summary to be used while reading the document as reference maps with key points and landmarks. In addition, an overall table of contents is provided, along with detailed tables of contents and an index at the end of the report.

Organization of this report follows Exhibit G-7 (Feasibility Report Content) provided in Appendix G of US Army Corps of Engineers Engineering Regulation (ER) 1105-2-100 (30 June 2004), documenting the iterative U.S. Army Corps of Engineers (USACE) Plan Formulation Process. The planning process consists of six major steps:

- (1) Specification of problems and opportunities
- (2) Inventory, forecast, and analysis of existing conditions within the study area
- (3) Formulation of alternative plans
- (4) Evaluation of the effects of the alternative plans
- (5) Comparison of the alternative plans
- (6) Selection of the Recommended Plan based upon the comparison of the alternative plans.

Steps may be repeated as problems become better understood and new information becomes available.

Steps 1 and 2 are discussed in Chapters 1-2, and provide the foundation for developing alternative plans and selection of a Recommended Plan outlined in Chapter 3.

Each chapter and summary graphic, as well as the Executive Summary, describe plan development as it progresses through the four integrated environments that shape a navigation project: **the built environment** (Federal project, port facilities, placement areas, transportation network, advance maintenance areas, etc.); **the natural environment** (physical and biological resources including species of concern); **the navigation environment** (navigation restrictions, etc.), and **the economic environment** (commodity movement, vessel fleet characteristics, and transportation costs). Concerns relative to plan formulation and National Environmental Policy Act (NEPA) review are summarized and encapsulated in the discussions of these four main environments. California Environmental Quality Act (CEQA) compliance is not addressed in this document.

The recommended format of an Environmental Impact Statement (EIS) is provided in 40 CFR 1502.10 and has been integrated into the General Reevaluation Report. The basic table of contents for the report outlines how the EIS format has been integrated into the planning process to develop a Recommended Plan that meets the requirements of both USACE Plan Formulation Policy and NEPA.

Note that sections pertinent to the NEPA analysis are denoted with an asterisk.

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## EXECUTIVE SUMMARY

# FINAL INTEGRATED GENERAL REEVALUATION REPORT AND ENVIRONMENTAL IMPACT STATEMENT SAN FRANCISCO BAY TO STOCKTON, CALIFORNIA, NAVIGATION IMPROVEMENT PROJECT



Please refer to Graphic Executive Summary pages 1 and 2

## EXECUTIVE SUMMARY



### INTRODUCTION

The San Francisco Bay to Stockton Navigation Improvement Project was originally authorized by Congress in the Rivers and Harbors (R&H) Act of 1965. The authorization allowed for -45 foot channel depths, but the channels were only constructed to -35 feet mean lower low water (MLLW). This report is an interim response to the study authority.

The study was originally scoped for a 78-mile long navigation project to include the John F. Baldwin and Stockton channels, but was re-scoped in 2016 to only include improvements to Avon. The study area is a 13.2 mile length of navigation channel which spans from Central San Francisco Bay to Avon (just east of the Benicia-Martinez Bridge) and includes the Pinole Shoal Channel and the Bulls Head Reach portion of the Suisun Bay Channel. The channels in the study area primarily serve crude oil imports and refined product exports to and from several oil refineries and two non-petroleum industries. Although the navigation channels in the study area are authorized to a depth of up to -45 feet (MLLW), the channels are currently maintained to only -35 feet MLLW.

The U.S. Army Corps of Engineers (USACE) is responsible for preparing this integrated General Reevaluation Report (GRR)/Environmental Impact Statement (EIS) and is the lead Federal agency for National Environmental Policy Act (NEPA) compliance (42 U.S.C. §§ 4321 *et seq.*; 40 C.F.R. §1500.1). The Port of Stockton is the official non-Federal partner for the GRR/EIS.

Although this GRR was originally intended to be integrated with both NEPA and California Environmental Quality Act (CEQA) compliance requirements, this document may or may not be used as CEQA documentation; CEQA compliance will be determined by the non-Federal sponsor.

Although the non-federal sponsor (partner) for this project is the Port of Stockton, the navigation channel users benefitting from the proposed improvements are located within Contra Costa County. The County has been working to come to internal agreement to issue an updated Notice of Preparation (NOP) as CEQA lead for the project. However, at this time, Contra Costa County has determined they are unable to

## EXECUTIVE SUMMARY

complete this process. On March 11, 2019, the Port of Stockton informed the Corps they were considering acting as CEQA lead for the proposed project improvements included in this report through the issuance of a future NOP addressing project-level compliance for the Recommended Plan, and programmatic compliance for future deepening of the Stockton Deepwater Ship Channel (SDWSC). This intent has since been confirmed through a series of follow-on communications between the Port and Corps of Engineers' leadership in April 2019.

As stated in the current NOI issued on December 4, 2017 for this EIS and subsequent informal stakeholder discussions, the Corps of Engineers de-scoped the eastern portion of the original study area, which included the SDWSC, from consideration in this study. This GRR/EIS only addresses the study area from the Golden Gate Bridge to Avon and the Army Corps is not preparing a feasibility study or NEPA document from Avon to the Port of Stockton. The sponsor has not yet provided a formal letter of their intention for a future study from Avon to the Port of Stockton, but in the spirit of full transparency and long history regarding this project, recent communications by the Port of Stockton regarding their future interests are documented in this report. As such, with the knowledge of Port's intention to potentially deepen the navigation channel from Avon to Stockton, that potential action is addressed in the Cumulative Effects section in Chapter 4, **Table 4-22**.

### STUDY AREA, PURPOSE AND NEED

The navigation channels within the study area are regionally significant, providing navigation access to ports, harbors, refineries, and military terminals from San Francisco Bay through San Pablo and Suisun Bays and up the Sacramento-San Joaquin Delta and the San Joaquin River to the Port of Stockton.

The bays and delta through which the navigation channels cross are naturally shallow. Over time, channel deepening of the natural waterways and regular maintenance dredging has facilitated modern vessels to traverse the channels. The modern vessels crossing the channels can require up to 55 feet of draft when fully loaded. Given that these channels are maintained at -35 feet MLLW, most vessels must be “light-loaded”, or less than fully loaded with cargo, to navigate the channels with sufficient under-keel clearance. Light-loading increases the cost of transportation and, in turn, the cost of the shipped products because more trips must be made to carry the same volume of cargo. Within the study area, tankers carrying crude oil to California oil refineries and exporting petroleum are most impacted by light-loading practices.

According to the California Energy Commission, Californians consume nearly 44 million gallons of gasoline and 10 million gallons of diesel every day. California refineries produce these fuels and other products from crude oil and blending components. Transportation fuel production in California depends on the availability and quality of the crude oils used by refineries in the state. The supply of crude oil to California refineries has changed substantially in the last 10 years. Most notably, receipts of foreign crude oil have increased as production sources from California and Alaska have continued to decline. Each day approximately two million barrels (a barrel is equal to 42 U.S. gallons) of petroleum are processed into a variety of products, with gasoline representing about half of the total product volume. To comply with Federal and state regulations, California refiners invested approximately \$5.8 billion to upgrade their facilities to produce cleaner fuels, including reformulated gasoline and low-sulfur diesel fuel.

According to data from the Waterborne Commerce Statistics Center, 20 million to 27 million tons of commodities moved through the Carquinez Straight annually between 2005 and 2013. In terms of both

## EXECUTIVE SUMMARY

tonnage and value, the most important commodity that moves through the study is crude oil. Most of the crude oil moving through the channel is imported from foreign countries, although a small percentage of crude comes from domestic sources. This analysis focuses on the main oil refineries that import crude oil and export petroleum products. According to the Annual Energy Outlook (2015), the growth rate for crude oil imports is an annual rate of 0.3%, and petroleum and other liquid exports has an annual rate of 2.4%.

In order to maintain safety, the San Francisco Bar Pilots employ under-keel clearance of 3 feet for tankers and use of high tide when appropriate for vessels for fully loaded. It is a 5 hour transit from the entrance channel to refineries.

Given the constraints posed by existing channel depths, inefficient strategies that are currently employed to manage these constraints include:

- Vessels must light-load cargo
- Vessels must wait for favorable (high) tides which increases transportation costs
- High shoaling rates in Bulls Head Reach require dredging annually, incurring large mobilization and demobilization costs, and causing delays to vessels when dredging is postponed.

The Federal objective defining Federal interest in channel improvements is to reasonably maximize net benefits to the nation. Project specific objectives include:

1. Objective 1: Reduce transportation costs and increase deep draft navigation efficiency for the shipment of commodities to and from all facilities within the study area beginning in 2020
2. Objective 2: Maximize beneficial reuse of dredged material while minimizing placement costs
3. Objective 3: Reduce frequency of operation and maintenance dredging in high shoaling areas
4. Objective 4: Increase navigability to maintain safety

## ALTERNATIVE PLANS AND THE RECOMMENDED PLAN

### MEASURES

In order to address the problems and meet objectives, a total of 16 measures were initially considered: 8 non-structural and 8 structural. Non-structural measures considered were: congestion fees, intermodal transportation systems, lightering, light-loading, use of favorable tides and daylight transit only, traffic management, pipeline, and relocation of port facilities. Structural measures considered were: channel deepening to depths of -37 and -38 feet MLLW, sediment traps, rocky obstruction removal, and the beneficial reuse of material for dredged material placement.

The management measures were screened based on an assessment of how well they met the project objectives, the four planning and guidance accounts, and their ability to be complete, acceptable, efficient, and effective. The screening was performed to identify those measures appropriate for inclusion in developing alternative plans.

Non-structural and structural measures were compared and evaluated against a set of 13 different screening criteria to assess positive benefits and attributes which could be attained, worth a total of 2

## EXECUTIVE SUMMARY

points each, for a total maximum score of 26 points. Points were assigned as follows: Does Not Meet = 0; Partially Meets = 1; Fully Meets = 2. Negative scores up to -2 points were assigned for areas where negative effects could occur. The total score of each measure was then determined and only measures which scored greater than 13 (over half of the total available points) were carried forward to be combined into alternatives.

Measures which were screened out include all non-structural alternatives. Measures carried forward include the no-action plan, deepening alternatives at the -37 foot and -38 foot MLLW depth, a sediment trap at the -42 foot depth plus 2 feet of overdepth (based on the shoaling analysis conducted in 2015 titled "Bulls Head Deposition HydroSurvey Tech Memo"), removal of the rocky obstruction, and beneficial reuse of material.

### ALTERNATIVE DEVELOPMENT

Remaining measures were then combined into alternatives. These alternatives include the no-action alternative and two deepening alternatives; to depths of -37 feet and -38 feet MLLW, with the dredged material being beneficially used at one or more of the existing permitted beneficial reuse sites, namely, Cullinan Ranch Restoration Project (Cullinan Ranch), Montezuma Wetlands Project (Montezuma Wetlands), as well as other sites including San Francisco Deep Ocean Disposal Site (SF-DODS). A sediment trap measure is also included at Bulls Head Reach in both of the action alternatives as a separable element, as well as a measure removing a rocky obstruction for increased navigability.

### ALTERNATIVE COMPARISON

Per USACE guidance ER 1105-2-100, the final array of alternatives must be compared and evaluated against P&G criteria<sup>1</sup>, and additionally, an economic evaluation must be completed to identify which plan in the final array maximizes NED benefits. An environmental analysis must also be conducted under the National Environmental Policy Act (NEPA) to compare and evaluate the final array for a set of environmental factors, prior to determination of the Recommended Plan.

#### ***Plan Formulation Comparison and Evaluation of the Final Array.***

The initial array of alternatives were compared and evaluated against screening criteria, using an additional level of refinement in known information.

Comparison and evaluation of the initial array of alternatives ( **Table 3-3**) resulted in identification of those alternatives to be carried forward into the final array. The final array consists of the no action alternative, a -37 foot deepening alternative, and a -38 foot deepening alternative, both including a sediment trap, rock removal, and beneficial reuse placement. An analysis of placement sites for each alternative determined that split placement at Montezuma Wetlands and Cullinan Ranch was the least cost option. In-bay sites were screened out from consideration because they do not contain adequate site specific capacity/and initial deepening material does not have appropriate sediment composition for in-bay use; additionally, although material placement within the bay at these sites would keep material in the local system, it would not constitute beneficial reuse. Placement of material at SF-DODS is not ideal since it takes material out of the natural system, while both Cullinan Ranch and Montezuma Wetlands

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<sup>1</sup> The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, established by the U.S. Water Resources Council on March 10, 1983, have been developed to guide the formulation and evaluation studies of the major Federal water resources development agencies. These principles and guidelines are commonly referred to as the "P&G," and will be cited throughout the plan formulation sections of this report.

## EXECUTIVE SUMMARY

both can beneficially use the material and are the least cost plan. While SF-DODS is not carried forward as a placement site, it is worth mentioning that it is an available placement site if needed, if there are no other beneficial reuse sites with available capacity prior to construction. More information on placement site screening and assumptions during plan formulation is found in Chapter 3.

### ***Economic Comparison and Evaluation of the Final Array.***

Preliminary screening level cost estimates were developed for the two proposed deepening alternatives and applied in the economic analysis. Costs shown in **Table 3-5** include Operation, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) activities and Interest during Construction (IDC). Transportation costs and benefits were estimated using the USACE certified economic model *HarborSym* and estimated for a 50-year period of analysis for the years 2020 through 2069. The costs and benefits for each alternative were annualized at the FY16 price level and FY16 discount rate of 3.125% over 50 years.

The -38 foot deepening alternative provides higher net benefits than the -37 foot deepening alternative, and additionally meets planning criteria goals of being efficient, effective, acceptable, and implementable. The -38 foot deepening alternative also has a benefit to cost ratio greater than 1.

### ***Environmental Comparison and Evaluation of the Effects of the Final Array.***

The No Action Alternative is the NEPA benchmark or baseline for assessing environmental effects, including the cumulative impacts, of an action (e.g., project) alternative. The action alternatives are the -37 foot and -38 foot deepening alternatives. An alternative is considered to have a significant impact if it would cause a substantial adverse change in a resource compared to the NEPA baseline.

The effects of the alternatives on each resource category are described in Chapter 4. Effects of each of the action alternatives were found to be less than significant based upon the analyses. Impacts associated with hydrodynamic changes including salinity intrusion and water quality were addressed through extensive hydraulic modeling simulations (**Appendix B, Water Resources - Attachment 1, Salinity Model Report**). Modeling runs compared the hydrodynamic effects from the -37 foot, -38 foot, and the -38 foot with sediment trap and rocky obstruction alternatives. The effects of the proposed project deepening on X2, the distance up the axis of the estuary to the daily-averaged 2 practical salinity units (psu) near-bed salinity, and on water quality at municipal and industrial water intake and export locations in the Sacramento-San Joaquin Delta were evaluated (further description of X2 discussed in **Section 2.2.3.3 Salinity and water supply**). The sediment trap and rocky obstruction inclusion in modeling analyses were completed after the selection of the Recommended Plan, and were therefore only modeled in addition to the -38 foot depth. The change in X2 predicted in the model is insignificant with the -37 foot, -38 foot, and -38 foot plus sediment trap and rocky obstruction alternatives, further explained in Chapter 4.

Effects on the endangered delta smelt are described fully in the Biological Assessment (**Appendix G, Environmental - Attachment 4**). The project is not expected to result in the loss of the shallow water habitat needed for smelt reproduction and the slight shift in X2 would not be expected to significantly alter habitat for smelt or other fish species. The dredged material will be placed on beneficial reuse sites that will benefit upland, wetland, and tidal wetland species, offsetting the less than significant project effects to threatened and endangered species in the study area.

## EXECUTIVE SUMMARY

### THE RECOMMENDED PLAN

The discussion above shows that the **-38 foot deepening alternative** met P&G criteria, as well as all other screening criteria, and was identified as the NED plan which maximizes net benefits, and was fully evaluated under NEPA for effects. No locally preferred plan (LPP) has been identified. Therefore, the Recommended Plan is the -38 foot deepening alternative. The Recommended Plan is to deepen the existing maintained channel depth of the Pinole Shoal Channel and the Bulls Head Reach portion of the Suisun Bay Channel from -35 feet MLLW to -38 feet MLLW, with approximately 13.2 miles of new regulatory depths. Approximately 10.3 miles of the Pinole Shoal Channel (stations 0+00 to 548+00) and 2.9 miles of Bulls Head Reach to Avon (stations 0+00 62+00 and 88+00 to 160+00) would be dredged. A 2,600 foot-long sediment trap (width = 300 feet) is justified on its own as a separable element to reduce the frequency of operation and maintenance dredge events. It would be constructed at Bulls Head Reach (located between stations 62+00 and 88+00 of the Bulls Head Reach), with a depth of -42 feet MLLW, plus 2 feet of overdepth.

In summary, the Recommended Plan is the following:

- Deepen the existing maintained channel depth of the Pinole Shoal Channel and Bulls Head Reach (Suisun Bay) from -35 feet to -38 feet MLLW, with approximately 13.2 miles of new regulatory depths
- Dredge a 2,600 foot sediment trap at Bulls Head Reach with a depth of -42-feet MLLW, plus 2 feet of overdepth
- Level the rocky obstruction located to the west of Pinole Shoal from -39.7-feet MLLW to -43-feet MLLW
- Use dredged material at permitted beneficial reuse sites

The Recommended Plan would result in approximately 1.6 million cubic yards of dredged material from an approximate 390-acre footprint. The breakout of volumes for each feature is shown as follows:

- Pinole Shoal deepening = 1,443,900 cy
- Bulls Head Reach deepening = 38,700 cy
- Bulls Sediment Trap = 120,600 cy
- Rocky Obstruction (Suisun Bay Channel) = 40 cy of rock (950 sq. ft.)

All construction is expected to occur during the existing environmental work windows developed by the San Francisco Bay Long Term Management Strategy for the Placement of Dredged Material unless other windows are developed during consultation with the resource agencies. The environmental work window for the Pinole Shoal Channel is from June 1 through November 20 and the work window for the Bulls Head Reach portion of the Suisun Bay Channel is from August 1 through November 30.

It is assumed that the timing of the channel deepening will occur concurrently or immediately after completion of the O&M dredge cycle within each reach. Although feasible, dredging contract acquisition approach and timing is tight for accomplishment of both O&M dredging and channel deepening in one environmental work window therefore, this avoidance measure does carry some risk. Should dredging extend past the environmental work window, additional coordination would immediately be initiated with the appropriate agencies.

## EXECUTIVE SUMMARY

### ***Beneficial Reuse***

The Recommended Plan includes placing new construction material from the Pinole Shoal channel at a suitable and permitted site, currently assumed to be Cullinan Ranch Tidal Restoration, and the new construction material from Bulls Head Reach at a suitable and permitted site, currently assumed to be Montezuma Wetlands. Preliminary coordination with project stakeholders concluded their support and preference for the beneficial reuse placement at Cullinan Ranch and Montezuma Wetlands, or other available beneficial reuse sites. Placement of material in Cullinan Ranch Tidal Restoration and Montezuma Wetlands is the least cost placement alternative; additionally placement in these areas is considered to be beneficial reuse, and contributes to habitat needed for several species throughout the Delta, including the endangered delta smelt. Cullinan Ranch Tidal Restoration and Montezuma Wetlands contain their own monitoring programs (USACE and SCDM 1998; USFWS and CDFW 2008 – these documents are available upon request).

### **BENEFITS OF THE RECOMMENDED PLAN**

The Recommended Plan has estimated average annual net benefits of \$10.5 Million (FY2020 price levels, FY2020 2.75% discount rate), with a benefit to cost ratio of 4.4 to 1.0.<sup>2</sup>

In addition to maximizing net benefits and identifying the plan with the best benefit to cost ratio, the four P&G accounts below: National Economic Development (NED), Regional Economic Development (RED), Environmental Quality (EQ), and Other Social Effects (OSE) are always used as criteria in formulation and plan selection. These accounts are briefly summarized below.

#### ***National Economic Development (NED).***

This project reasonably maximizes net benefits in the amount of \$10.5 million average annual net benefits (FY2020, 2.75%), with a benefit to cost ratio of 4.4 to 1. The project allows tankers to utilize more of their existing capacity to transport all projected commodity volumes under existing and future conditions, reducing the amount of vessel transits in the future with-project compared to the future without-project scenario. By doing so, it provides transportation cost savings to the oil refineries, which are then passed on to the regional and national consumers who use the end product of the crude oil for gasoline, etc.

The sediment trap feature of the Recommended Plan provides direct benefit to channel users and vessel operations and is included as a separable element and incrementally justified feature of the Recommended Plan. It is sited in a portion of the channel that has traditionally required annual dredging at an estimated cost of \$1 million each year; based on the historical use of clamshell dredges which are mobilized and demobilized each year, in addition to numerous interim emergency dredging events. The sediment trap would reduce maintenance dredging requirements from an annual cycle to 2 dredge events every 3 years, thus creating a savings based on a reduction in the frequency of mobilization and demobilization 1 out of every 3 years. This creates a total present value savings of \$18 million for the O&M program, or an average annual equivalent savings of \$680,000 per year over a 50 period of analysis at a discount rate of 2.75%.

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<sup>2</sup> This study occurred over the span of several years. Therefore, price levels and discount rates were used as appropriate depending on what year the economic analysis occurred for varying levels of plan formulation. As such, this report cites FY price levels and discount rates used for each economic analysis throughout the study.

## EXECUTIVE SUMMARY

### ***Environmental Quality (EQ).***

This project reduces the amount of vessel transits in the future with-project scenario. Reducing the number of vessels would also reduce potential disruptions to the environment as vessels transit, as well as the risk of oil spills. Beneficial reuse of material would create additional habitat for many species, including the federally endangered delta smelt.

### ***Regional Economic Development (RED).***

This project would likely temporarily stimulate the regional economy during construction.

### ***Other Social Effects (OSE).***

Through beneficially placing material at permitted wetland sites, this project would also help provide resiliency and storm surge protection to infrastructure located around the perimeter of the channel and bay margins. One viable beneficial reuse placement option for the dredged material from this project is use as fill material to restore the wetlands due to subsidence and combat the further loss of wetlands by raising surrounding wetland and tidal marsh elevations to accelerate their development. Additionally, removing the rocky obstruction in Pinole Shoal channel will greatly enhance the navigability of the channels for harbor pilots.

## **ENVIRONMENTAL CONSIDERATIONS**

Over the past few decades, significant coordination has taken place between USACE, the Port of Stockton, and Federal, state, and local agencies, water managers, businesses, organizations, and the general public. The coordination has identified the following key areas of concern and are addressed in Chapter 4:

- Salinity intrusion in the delta, particularly related to impacts on drinking water and the designated critical habitat of the Federal and state listed endangered delta smelt.
- Impacts to threatened and endangered species including longfin smelt, green sturgeon, and salmonids.
- The potential to beneficially use dredged material in existing habitat restoration projects within the study area.

The full environmental analysis determines that there are less than significant effects as a result of the Recommended Plan. As such, mitigation is not expected.

## **COST ESTIMATE AND IMPLEMENTATION**

The cost estimate below reflects all project features as described earlier, including removal of the rocky obstruction and sediment trap. There are no local facility costs associated with the project cost. Environmental windows factored heavily into construction windows and sequencing. The total project cost, including a risk-based contingency.

EXECUTIVE SUMMARY

Table ES-1. Project Cost and Cost Sharing, -38 foot deepening project (RECOMMENDED PLAN).

(October 1, 2019 Price Levels, Program Year 2020) <sup>1</sup>						
WBS Number	General Navigation Features	Project Cost	Contingency	Total Project Cost	Federal Share	Non-federal Share
					75%	25%
12	Mob, Demob, Dredging	\$45,548,000	\$9,115,000	\$54,663,000	\$40,997,000	\$13,666,000
30	Pre-Construction, Engineering, and Design	\$1,591,000	\$318,000	\$1,909,000	\$1,432,000	\$477,000
31	Construction Management (S&I)	\$501,000	\$100,000	\$601,000	\$451,000	\$150,000
	<b>Subtotal Construction of GNF<sup>2</sup></b>	<b>\$47,640,000</b>	<b>\$9,533,000</b>	<b>\$57,173,000</b>	<b>\$42,880,000</b>	<b>\$14,293,000</b>
1	Lands, Easements, Right-of-Ways, Relocations (LERR) <sup>3</sup> - Federal	\$23,000	\$2,000	\$25,000	\$18,750	\$6,250
1	Lands, Easements, Right-of-Ways, Relocations (LERR) <sup>3</sup> - Non-Federal	\$23,000	\$2,000	\$25,000	\$0	\$25,000
	<b>Total Project First Costs</b>	<b>\$47,663,000</b>	<b>\$9,535,000</b>	<b>\$57,200,000</b>	<b>\$42,880,000</b>	<b>\$14,320,000</b>
12	Aids to Navigation <sup>4</sup>	\$16,000	\$3,000	\$19,000	\$19,000	\$0
	Credit for Non-Federal LERR <sup>5</sup>	\$0			\$0	-\$31,250
	10% GNF Non-Federal <sup>6</sup>	\$0			(\$5,717,300)	\$5,717,300
	<b>Total Cost Apportionment</b>	<b>\$47,680,000</b>	<b>\$9,540,000</b>	<b>\$57,220,000</b>	<b>\$37,180,000</b>	<b>\$20,010,000</b>

1. Cost is based on Project First Cost (constant dollar basis) on Total Project Cost Summary Spreadsheet, at an effective price level 1 Oct 2019 (Cost Appendix). Aids to Navigation broken out and shown as a separate cost.

2. 75% Federal/25% non-federal including the cost of the sediment trap.

3. RE admin costs. There are no actual lands and damages but per USACE regulations, RE admin costs will be placed in the 01 account. Additional RE costs will be cost shared according to the GNF. Escalation from the TPCS accounts for some numerical differences.

4. Navigation Aids - 100% Federal (U.S. Coast Guard cost, not USACE cost). Includes 8 relocations at \$2,000 each.

5. Credit is given for the incidental costs borne by the non-Federal sponsor for lands, easements, rights of way and relocations (LERR) per Section 101 of WRDA 86, not to exceed 10% of the GNF.

6. The Non-Federal Sponsor shall pay an additional 10% of the costs of GNF of the NED plan, pursuant to Section 101 of WRDA 86. The value of LERR shall be credited toward the additional 10% payment except in the case of LERR for GNF.

**COORDINATION WITH AGENCIES AND THE PUBLIC**

A Notice of Intent (NOI) to Prepare an Environmental Impact Statement/Environmental Impact Report was published in the Federal Register on 4 December 2017. The current NOI announced the reduction in scope of this project (to include only the Pinole Shoal and the Bulls Head Reach portion of the Suisun Bay) from the NOI that was published on 4 March 2016. Scoping comments received in 2016 and 2018 are

## EXECUTIVE SUMMARY

located in **Appendix I, Pertinent Correspondence Part 1**, along with a Comment Response Matrix to address the comments.

USACE participated in and gained valuable feedback at many meetings involving state and Federal agencies through various stages of this project. Most recently, informal working group meetings were held in December 2018, with attendees from the Environmental Protection Agency, National Marine Fisheries Service, United States Fish and Wildlife Service, Regional Water Quality Board, USACE, Contra Costa County, the Port of Stockton, Anchor QEA, California Department of Fish and Wildlife, Bay Area Air Quality Management District, Bay Area Conservation and Development District, Department of Water Resources, Delta Stewardship Council, Bureau of Reclamation, and State Water Contractors, among others. Discussions and feedback from these working group meetings provided valuable feedback that was considered in this report.

A Notice of Availability was published for the draft GRR/EIS in the Federal Register on May 10, 2019, a press release to announce the location and comment period of the document, and it was also published on the California State Clearinghouse website. A letter was sent to the general public to notice release of the draft GRR/EIS (mailing list available upon request) and to also notice the public meeting time and location that occurred on June 11, 2019 from 6pm-8pm at the Contra Costa County Conservation and Development office in Martinez, at 30 Muir Road, Martinez, CA 94553. Hard copies of the draft GRR/EIS were made available at the following libraries:

Cesar Chavez Central Library, 605 N El Dorado St, Stockton, CA 95202  
Contra Costa County Library, Martinez Branch 740 Court St, Martinez, CA 94553

Comments on the draft GRR/EIS were received from May 10, 2019 through June 24, 2019 for a 45 day public review period. Comments received after June 24 through August 31, 2019 are included in the comment response matrix, located in **Appendix I, Pertinent Correspondence Part 2**. These comments and responses also include comments from the Dredge Material Management Plan (DMMP) meeting that occurred in San Francisco in July 2019.

The proposed project minimizes risk to environmental resources, and threatened and endangered species by:

- Working with the approved USFWS environmental work window for delta smelt, listed salmonids and green sturgeon
- Using a clamshell dredge to avoid entrainment of species
- Placing all dredged material from deepening onto beneficial reuse sites to create/enhance wetland habitats and conditions for species within the delta, including delta and longfin smelt
- Commitments in the Programmatic Agreement for Cultural Resources

Other environmental commitments related to threatened and endangered species are discussed in the Biological Opinion (BO) from the USFWS, received October 3, 2019 which is included in **Appendix G**. The BO contains one non-discretionary term and condition which is to implement the conservation measures listed on pages 2 and 3 of the BO. These conservation measures are already incorporated into the project description and will be followed.

A Letter of Concurrence with determination that the project is not likely to adversely affect ESA-listed salmonids or green sturgeon was received from NMFS on December 6, 2019 (**Appendix G**). NMFS also

## EXECUTIVE SUMMARY

provided EFH conservation recommendations, which USACE responded to as required on January 6, 2020 (**Appendix G**).

### ENVIRONMENTAL COMPLIANCE STATUS ON REMAINING ITEMS

Communication and coordination between agencies has been ongoing throughout the study process, and certain items of compliance are being deferred to the preconstruction, engineering and design phase of work. All regulatory agencies have been actively engaged, and feedback from agency coordination has been incorporated into the project planning process. As a result of those discussions to date, obtaining compliance is considered to be low risk to the project, and are discussed below in more detail.

**Coastal Zone Management Act (CZMA) Consistency Concurrence** – USACE has had several coordination meetings with the San Francisco Bay Conservation and Development Commission (BCDC). The typical process for BCDC would be to issue a final Consistency Concurrence during the USACE Pre-construction, Engineering and Design (PED) phase when detailed project design information is available. In the interim, BCDC has verbally indicated that a letter from the Chair of the Commission will be sent to USACE for inclusion in this report, which will summarize USACE coordination with BCDC to date and confirm their intent to consider CZMA Consistency when CEQA compliance has been completed and more detailed design information is available. BCDC feedback on the Recommended Plan is consistent with comments received during public review, for which substantive responses have been provided in this report. Responses to these comments have been considered in the decision put forth for action by the Director.

**Programmatic Agreement (PA) under Section 106** - The California State Historic Preservation Officer (SHPO) received a copy of the draft PA and provided their comments to USACE for revisions on January 8, 2020. Those comments were addressed and incorporated into the draft PA before being sent out for a second round of review on January 28, 2020. The SHPO's cultural resources staff found the draft PA to be in good standing and requested USACE debrief the SPN District Engineer and route a signed PA to their office for implementation. A signature from the SPN District Engineer occurred on February 7, 2020. The SHPO signed the PA on February 14, 2020 for execution. This executed PA ensures that USACE is in compliance with Section 106 for the study and will continue our obligations for deferred identification of historic properties, consultation with the SHPO and concurring parties, and determining the study's effects during Preconstruction Engineering and Design (PED).

**Water Quality Certification** - Staff from the Regional Water Quality Control Board participated in an early meeting with local agencies to help determine the scope of the water quality impact assessment. More recently in Spring and Fall of 2019, USACE received correspondence from the Regional Board indicating they typically would not issue a water quality certification without completion of CEQA documentation and design-level detail for the project being available. CEQA compliance is a non-Federal responsibility and the Port of Stockton is pursuing this compliance on a separate timeline. In January 2020, USACE met via teleconference call with representatives of the Regional Board regarding the path forward for obtaining 401 water quality certification of the recommended plan, and the timing of completion for the final report. During this meeting, the Regional Board representatives indicated that submittal of the WQC application would need to be deferred until the design phase of work and committed to transmittal of a letter to USACE in February 2020 confirming inter-agency coordination and the path forward for 401 water quality certification upon completion of CEQA compliance and design detail. Feedback received from Regional Board staff and other agencies at the USACE December 2016 agency workshop was wrapped into technical analyses and modeling as contained within this report, and considered in the development

## EXECUTIVE SUMMARY

of report recommendations. Upon receipt this letter will be included in the final report package prior to the Director's signing.

### **RESIDUAL RISK**

#### SEA LEVEL RISE

Sea level rise is expected to be the same in both the future with-project and future without-project conditions. Numerical modeling has found that sea level rise is not anticipated to cause any significant changes to flow rates within San Francisco Bay and the Sacramento-San Joaquin Delta for both future without-project conditions and the Recommended Plan. The modeling has found that sea level rise may cause an increase in salinity intrusion into the delta in both future without-project conditions and without-project if current reservoir operations are maintained. Therefore, there is no anticipated sea level rise change or impact as a result of the Recommended Plan.

#### STORM SURGE

Numerical modeling found that water elevations would be similar for future without-project conditions and the Recommended Plan. Therefore, there is no anticipated significant change in storm surge for future without-project conditions and the Recommended Plan.

#### SEDIMENT QUALITY

Sediment testing in 1998 to a depth of 49 feet showed chromium levels that would be higher than anticipated for wetland placement at the beneficial reuse sites. Recent sediment testing occurred in 2009 in Pinole Shoal from depths of -37 feet to -39 feet, similar to proposed Recommended Plan depth. The Pinole Shoal material to 39 feet was tested with no significant concerns. The sediment in Bulls Head Reach was not tested for chromium recently, but is assumed for the Recommended Plan depth to -38 feet plus 2 feet of overdepth that the sediment quality will likely be similar to that of Pinole Shoal's depth to 39 feet. However, the acreage of sediment from the sediment trap of -42 feet plus 2 feet of overdepth may only be compatible for foundation placement. Discussion on sediment is further described and evaluated in Sections 2.2.2 and 4.1.2. Overall, the sediment quality is assumed to be compatible with requirements for placement at the beneficial reuse sites, either as cover material or foundation placement. To confirm the suitability for marsh placement, sediment sampling of both Pinole Shoal and Suisun Bay will be redone during Preconstruction, Engineering, and Design (PED), based upon the project dredge template.

SAN FRANCISCO BAY TO STOCKTON NAVIGATION IMPROVEMENT

INTEGRATED GENERAL REEVALUATION REPORT AND ENVIRONMENTAL IMPACT STATEMENT

INTRODUCTION

BACKGROUND

The San Francisco Bay to Stockton, California, Navigation Improvement Project was originally authorized by Congress in the Rivers and Harbors Act of 1965. The authorization allowed for -45 foot depths, but the channels were only constructed to -35 feet. The study was originally scoped for a 78-mile long navigation project to include the John F. Baldwin and Stockton channels, but has since been re-scoped to a total of 13.2 miles in the Pinole Shoal Channel and Suisun Bay Channel, to Avon. According to data from the Waterborne Commerce Statistics Center, 20 million to 27 million tons of commodities moved through the Carquinez Straight annually between 2005 and 2016. In terms of both tonnage and value, the most important commodity that moves through the study is crude oil. Most of the crude oil moving through the channel is imported from foreign countries, although a small percentage of crude comes from domestic sources. This analysis focuses on the main oil refineries that import crude oil and export petroleum products. In order to maintain safety, the San Francisco Bar Pilots employ under-keel clearance of 3 feet for tankers and use of high tide when appropriate for vessels for fully loaded. It is a 5 hour transit from the entrance channel to refineries. The recommended plan (shown on the back) is to deepen from -35 feet to -38 feet in the Pinole Shoal Channel and Bulls Head reach portion of the Suisun Bay Channel. Additionally, the plan recommends a sediment trap at Bull's Head reach at cost savings of \$680,000 per year, dredging of a navigational hazard (rock outcropping), and beneficial use of material, which provides average annual savings of \$13.6M, and annual net savings of approximately \$10.5M.

PROBLEMS - ECONOMIC INEFFICIENCIES

Existing channel depths (-35 feet MLLW) require vessels to transit the harbor light loaded (less than fully loaded), which decreases economic efficiency and increases transportation costs which are passed on to the American consumer. Inefficient strategies that are currently employed include:

- Vessels must light-load cargo
- Vessels must wait for favorable (high) tides which increases transportation costs
- High shoaling rates in Bulls Head Reach often require emergency dredging outside of the regular scheduled dredging efforts, causing delays to vessels

PURPOSE OF THE STUDY

This is a single purpose navigation study to increase efficiency of existing tanker vessels. Due to the prior authorization, this study is a general reevaluation report to verify that the authorized project is still economically justified and in the Federal interest to cost share for construction. In concert with Federal law, this report also integrates an environmental impact statement (under the National Environmental Policy Act, or NEPA).

PLAN FORMULATION

PROJECT OBJECTIVES

- 1) Reduce transportation costs and increase deep draft navigation efficiency for the shipment of commodities to and from all facilities within the study area
- 2) Maximize beneficial reuse of dredged material while minimizing placement costs
- 3) Reduce frequent of O&M dredging in high shoaling areas
- 4) Increase navigability to maintain safety

PROJECT CONSTRAINTS

- 1) Avoid adverse impacts on species of special concern
- 2) Avoid impacts to water quality and water quantity

NON-STRUCTURAL MEASURES

- Congestion Fees
- Intermodal transportation systems
- Light loading
- Use of tides
- Traffic Management
- Pipeline

Relocate Port Facilities

Both non-structural and structural measures, as well as the no-action plan, were considered during plan formulation; however, the non-structural measures were all screened from further analysis since they are either already being done, do not meet project objectives, or are not supported by the non-federal sponsor. Analysis of alternatives were considered at depths of 37 and 38 feet MLLW as the increments of depth that would be most likely to efficiently address problems and objectives.. Depths deeper than -38 feet MLLW were not analyzed in detail due to potential concerns regarding salinity impacts, study timeframe, and funding limitations. The final array included the 37 foot and 38-foot deepening alternatives, with sediment traps and beneficial use placement. The 38-foot deepening alternative, with associated features, had the highest net benefits and tentatively selected as the National Economic Development (NED) Plan – the plan with reasonably maximizes the environment.

STRUCTURAL MEASURES

- Incremental depths of 37 and 38 feet MLLW
- Beneficial use of dredge material
- Sediment trap at Bulls Head Reach

ECONOMICS

TRANSPORTATION COST SAVINGS

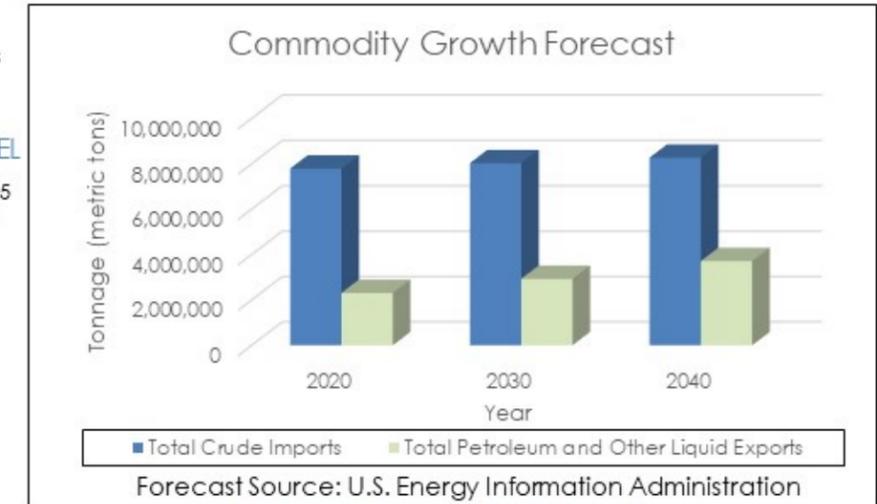
- Increased cargo vessel efficiency
  - Existing fleet of Panamax vessels will be able load more fully

BENEFITING VESSELS/DESIGN VESSEL

- DESIGN VESSEL - Panamax Tankers – 45 ft draft – represents more than 50% of vessels – benefits from project
- Aframax and Suezmax – 57 ft draft – visit other ports before visiting lightloaded – would not benefit



Benefiting vessels – 45 foot draft Panamax Tankers



Main Commodity – Crude Oil

California residents ultimately use crude oil for motor oil, fuel for thermal power, and liquefied petroleum gas. Crude oil is projected to grow at the same current rate of .30% and petroleum exports are projected to grow at the same current rate of 2.40% with or without the proposed project.

LIGHT-LOADING: Vessels can not use all available design cargo space, leading to more frequent trips, which translates to higher transportation costs.

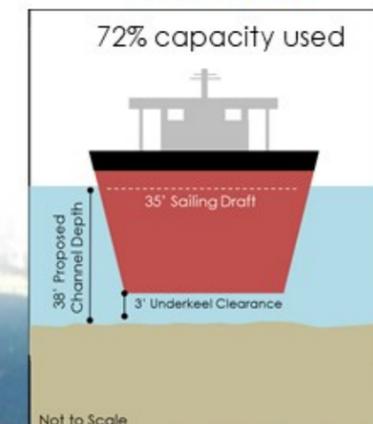
RECOMMENDED PLAN BENEFITS

- More efficient use of vessels = net savings of \$10.5M annually
- Sediment trap to avoid frequent dredging of high shoaling area = stand alone savings of \$680K annually
- This project will reduce the number of vessel transits by allowing current vessels to more fully load to capacity per trip.
- Vessel fleet won't be changing as a result of this project - Same size vessels bringing in goods at less cost.
- Benefit to Cost ratio = 4.4 to 1

EXISTING/FUTURE WITHOUT-PROJECT CONDITIONS



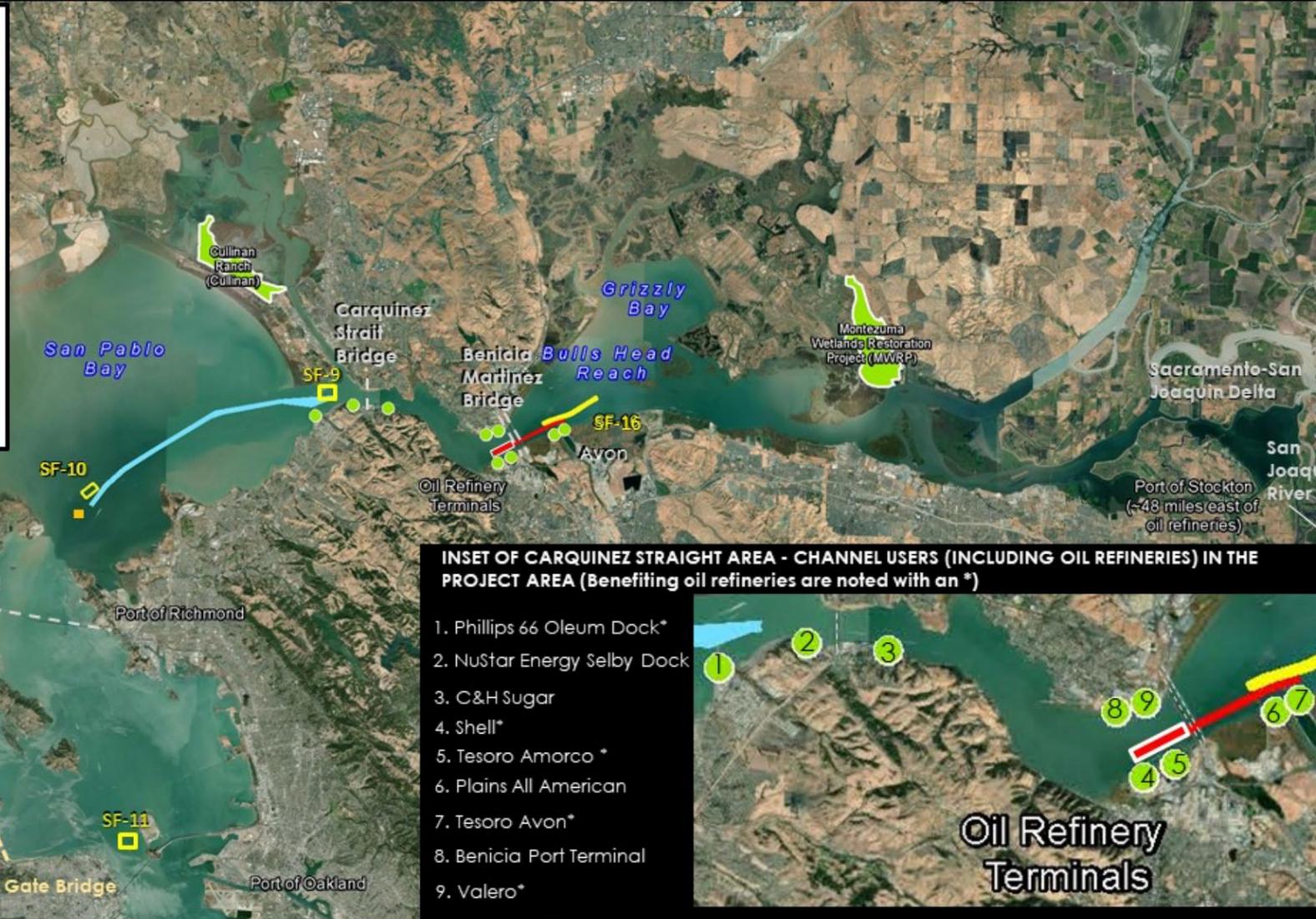
FUTURE WITH-PROJECT CONDITIONS



# RECOMMENDED PLAN- SAN FRANCISCO BAY TO STOCKTON NAVIGATION IMPROVEMENT

## LEGEND

- Deepen PSC from -35 ft to -38 ft MLLW + 2 ft overdepth
- Deepen BHR from -35 ft to -38 ft MLLW + 2 ft overdepth
- Oil Refineries (Channel Users)
- Beneficial Use Placement Sites
- BHR Sediment Trap to -42 ft MLLW + 2 ft overdepth
- Existing O&M Sites – SF-10, SF-16, SF-11, SF-9
- Existing rocky obstruction in existing Federal channel



### INSET OF CARQUINEZ STRAIT AREA - CHANNEL USERS (INCLUDING OIL REFINERIES) IN THE PROJECT AREA (Benefiting oil refineries are noted with an \*)

1. Phillips 66 Oleum Dock\*
2. NuStar Energy Selby Dock
3. C&H Sugar
4. Shell\*
5. Tesoro Amorco \*
6. Plains All American
7. Tesoro Avon\*
8. Benicia Port Terminal
9. Valero\*



## RECOMMENDED PLAN SUMMARY- 38-foot depth with sediment trap & rocky obstruction removal

### CHANNEL DEEPENING

- Deepen from -35 feet to -38 feet MLLW + 2 ft overdepth in two channels with clamshell:
  - TOTAL PROJECT LENGTH = 13.2 miles
  - (PSC): 10.3 miles; STA 0+00 to 547+00, Width=600 feet
  - (BHR): 2.9 miles, STA 0+00 to 62+00 and 88+00 to 160+00

### BULLS HEAD SEDIMENT TRAP

- Dredge trap to -42 feet MLLW + 2 ft overdepth
- Length = 2,600 feet; STA 62+00 to 88+00
- Width = 300 feet

### ROCKY OBSTRUCTION REMOVAL

- Dredge to -43 ft MLLW (via pneumatic jackhammer) to maintain navigation safety

### VOLUMES AND CONSTRUCTION DURATION

- TOTAL APPROX. PROJECT VOLUME = 1,603,200 cy
- Pinole Shoal = 1,443,900 cy
- Bulls Head Reach Channel = 38,700 cy
- Bulls Head Sediment Trap & Overdepth 2 ft = 120,600 cy
- Rocky Obstruction = 40 cy rock(950 sq. ft)
- Approximately 5 month construction duration

### PLACEMENT SITES & ASSUMPTIONS

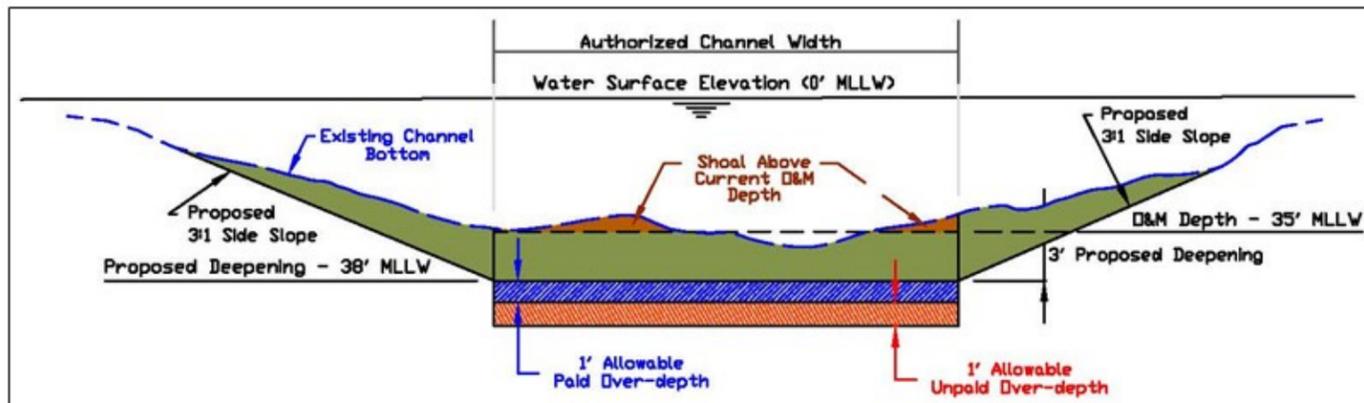
- Pinole Shoal Channel – Cullinan Ranch
- Bulls Head Reach– Montezuma Wetland
- O&M – SF-10 and SF-16 (Federal standard)
- SF-DODS – not assumed for placement but a backup site if needed

### COST & BENEFITS

- Project First Cost = \$57.2 M (includes contingency)
- Cost sharing 75% (Fed)/25% (Non-Fed)
- Average Annual Net Benefits = \$10.5M
- Benefit to Cost Ratio = 4.4 to 1

Pinole Shoal Channel (PSC); Bulls Head Reach (BHR); Bulls Head Sediment Trap (BHST)

### Typical Section



### OPERATIONS & MAINTENANCE

#### EXISTING (historical)

- Pinole Shoal Channel = 255,000 cy/2 years (hopper)
- Bulls Head Reach Channel = 25,000 cy/year (clamshell)
- Bulls Head Reach Advance Maintenance Area= Annual dredging to 37 feet MLLW + 2 feet overdepth

#### FUTURE WITH PROJECT

- Pinole Shoal = 351,800 cy/2 years (hopper)
- Bulls Head Reach Channel= 47,500 cy/year (clamshell)
- Bulls Head Reach Sediment Trap = 8,900 cy/year (average) and would be dredged twice every three years

The sediment trap would save \$1M for mob/demob costs once every 3 years, providing an average equivalent savings of \$680,000 to the Federal O&M program per year over 50 years. The net present value of savings is \$18 million. The initial investment will pay for itself 2 years after construction is complete.

### T&E Species - Delta Smelt Critical Habitat



### BENEFICIAL USE OF MATERIAL

- Beneficial Use of material in permitted sites Montezuma Wetlands and Cullinan Ranch Tidal Wetlands will create approximately 160 acres for wetland habitat

### ENVIRONMENTAL WORK WINDOWS:

- PSC- June 1 to November 30.
- BHR - August 1 to November 30.





1

# Introduction

# 1 INTRODUCTION\*



Please refer to Graphic Executive Summary Pages 1 and 2.

## 1.1 FEDERAL PROJECT PURPOSE\*

The Federal interest in navigation is established by the Commerce Clause of the U.S. Constitution. The project purpose is to provide safe, reliable, efficient, and environmentally sustainable waterborne transportation systems to contribute to national economic development (NED), for movement of commerce, national security, and recreation.

## 1.2 STUDY BACKGROUND AND LOCATION\*

The San Francisco Bay to Stockton Navigation Improvement Project was originally authorized by Congress in the Rivers and Harbors (R&H) Act of 1965. The authorization allowed for 45 foot channel depths, but the channels were only constructed and maintained to -35 feet MLLW. This report is an interim response to the study authority.

The study was originally scoped for a 78-mile long navigation project to include the John F. Baldwin and Stockton channels, but was re-scoped in 2016 to only include improvements to Avon. The re-scoped study area is a 13.2 mile length which spans from Central San Francisco Bay to Avon; just east of the Benicia-Martinez Bridge, and includes the Pinole Shoal Channel and the Bulls Head Reach portion of the Suisun Bay Channel. The channels in the study area primarily serve crude oil imports and refined product exports to and from several oil refineries and two non-petroleum industries.

## 1.3 STUDY SPONSOR

USACE is responsible for preparing the General Reevaluation Report (GRR) and is the lead Federal agency for NEPA compliance. The Port of Stockton is the official non-Federal partner for the GRR.

## 1.4 STUDY PURPOSE, NEED AND SIGNIFICANCE

The navigation channels within the study area are regionally significant, providing navigation access to ports, harbors, refineries, and military terminals from San Francisco Bay through San Pablo and Suisun bays and up the Sacramento-San Joaquin Delta and the San Joaquin River to the Port of Stockton.

The bays and delta through which the navigation channels cross are naturally shallow. Over time, channel deepening of the natural waterways and regular maintenance dredging has facilitated modern vessels to traverse the channels. The modern vessels crossing the channels can require up to 55 feet of draft when fully loaded. Given that these channels are maintained at -35 feet MLLW, most vessels must be “light-loaded”, or less than fully loaded with cargo, to navigate the channels with sufficient under-keel clearance. Light-loading increases the cost of transportation and, in turn, the cost of the shipped products because more trips must be made to carry the same volume of cargo. Within the study area, tankers carrying

crude oil to California oil refineries and those exporting petroleum are most impacted by light-loading practices.

According to the California Energy Commission, Californians consume nearly 44 million gallons of gasoline and 10 million gallons of diesel every day. California refineries produce these fuels and other products from crude oil and blending components. Transportation fuel production in California depends on the availability and quality of the crude oils used by refineries in the state. The supply of crude oil to California refineries has changed substantially in the last 10 years. Most notably, receipts of foreign crude oil have increased as production sources from California and Alaska have continued to decline. Each day approximately two million barrels (a barrel is equal to 42 U.S. gallons) of petroleum are processed into a variety of products, with gasoline representing about half of the total product volume. To comply with Federal and state regulations, California refiners invested approximately \$5.8 billion to upgrade their facilities to produce cleaner fuels, including reformulated gasoline and low-sulfur diesel fuel.

According to data from the Waterborne Commerce Statistics Center, 20 million to 27 million tons of commodities moved through the Carquinez Strait annually between 2005 and 2013. In terms of both tonnage and value, the most important commodity moved through the strait is crude oil. Most of the crude oil moving through the channel is imported from foreign countries, although a small percentage of crude comes from domestic sources. This analysis focuses on the main oil refineries that import crude oil and export petroleum products. According to the Annual Energy Outlook (2015), the growth rate for crude oil imports is an annual rate of 0.3% and petroleum and other liquid exports have an annual rate of 2.4%.

In order to maintain safety, the San Francisco Bar Pilots employ under-keel clearance of 3 feet for tankers and use of high tide, when appropriate, for vessels fully loaded. It is a 5 hour transit from the entrance channel to refineries.

Given the constraints posed by existing channel depths, inefficient strategies that are currently employed to manage these constraints include:

- Vessels must light-load cargo
- Vessels must wait for favorable (high) tides which increases transportation costs
- High shoaling rates in Bulls Head Reach require dredging annually, incurring large mobilization and demobilization costs and causing delays to vessels when dredging is postponed.

The Federal objective defining Federal interest in channel improvements is to reasonably maximize net benefits to the nation. Project specific objectives include:

- Objective 1: Reduce transportation costs and increase deep draft navigation efficiency for the shipment of commodities to and from all facilities within the study area beginning in 2020
- Objective 2: Maximize the beneficial reuse of dredged material while minimizing placement costs
- Objective 3: Reduce the frequency of operation and maintenance dredging in high shoaling areas
- Objective 4: Increase navigability to maintain safety

## 1.5 STUDY AUTHORITIES

- **1960 Rivers and Harbors Act, Pub.L. No. 86-845, Section 107, 84 Stat. 1818.** Authorizes the development and construction of small river and harbor improvement projects which will result in substantial benefits to navigation. This authorization facilitated the development and construction of a twenty-five (25) feet deep channel from Martinez to Avon.
- **1965 Rivers and Harbors Act, House Document 208, House Report 89-973 cited in Rivers and Harbors Act of 1965, Pub.L. No. 89-298, Section 301, 79 Stat. 1073.** Authorizes works of improvement of rivers and harbors and other waterways for navigation. This authority permits repair and restoration of works for wavewash protection within the limits of the modified San Joaquin River navigation project. This led to the modification of five existing projects:
  - San Francisco Harbor, Bar Channel – deepen to 55' [*completed 1974*]
  - Richmond Harbor, Richmond Channel, and maneuvering area – construct new 45' deep, 600' wide channel; deepen maneuvering area (Richmond Long Wharf) to 45' [*completed 1986*]
  - San Pablo Bay, Mare Island Strait – deepen to 45' Pinole Shoal Channel and maneuvering area at Oleum
  - Suisun Bay – deepen to 45' up to Chipps Island, and to 35' beyond, widen to 600' upstream to Middle Point and to 400' beyond
  - San Joaquin River – deepen to 35' and realign the channel; place rock revetment on levees bordering Stockton Deep Water Channel; provide public recreation along improved channel [*deepening completed 1988*]
  - Vicinity of Antioch – provide a 35' channel access and turning basin to accommodate a potential harbor
- **Energy and Water Development Appropriations Act, 1998.** The Act appropriated funds to the Department of the Army, under the supervision of the Chief of Engineers, for authorized civil functions of the U.S. Army Corps of Engineers. Included in this authorization was the expenditure of funds necessary for the study and restudy of authorized projects and the “preservation, operation, maintenance and care of existing river and harbor, flood control, and related works,” As such, USACE expended \$100,000 to initiate a reconnaissance study on deepening the Stockton DWSC to -40-feet MLLW. USACE also expended \$250,000 to complete the environmental review and continue preconstruction engineering and design for deepening the John F. Baldwin Ship Channel.
- **July 30, 2014, Resolution of the U.S. Senate Committee on Environment and Public Works.** The 2014 resolution provided authorization to study the San Francisco Bay to the Port of Stockton channels “in the interest of navigation, ecosystem restoration, flood risk reduction, recreation, and other water related resources purposes.”

## 1.6 RELATED DOCUMENTS\*

Numerous reports have been prepared in response to the Rivers and Harbors Act (RHA) of 1965 authorization:

- ***Final Environmental Impact Statement (EIS), Bank Protection, Filed with the Council on Environmental Quality on 11 October 1971.*** This document addressed impacts of the Venice Island to Stockton bank protection.
- ***San Francisco Bay to Stockton, California (Levee Setback), Interim GDM (No. 3), U.S. Army Corps of Engineers, Sacramento District, June 1969 (approved 6 January 1970).*** This document discussed the design and cost for construction of levees on a setback alignment at four locations between Venice Island and Stockton where channel excavation was within 50 feet of the toe of the existing levees.
- ***San Francisco Bay to Stockton, California (San Francisco Bar), Interim GDM (No. 4) and Final EIS, U.S. Army Corps of Engineers, San Francisco District, March 1971 (approved 17 August 1971).*** This document discussed the design, costs, construction methods, and environmental impacts of deepening the channel across the bar to -55 feet MLLW. Construction was completed in February 1974.
- ***San Francisco Bay to Stockton, California, (John F. Baldwin Ship Channel and Stockton DWSC) Avon to Stockton. Interim GDM and EIS (No. 1), U.S. Army Corps of Engineers, Sacramento District, September 1980.*** This project deepened the deep draft channels from Avon to the Port of Stockton to -35 feet MLLW. The project was completed in 1988.
- ***San Francisco Bay to Stockton, California, Project, FINAL Interim GDM (No. 5) and EIS (John F. Baldwin Ship Channel Phase II, Richmond Harbor Approach), U.S. Army Corps of Engineers, San Francisco District, May 1984.*** Construction of the West Richmond Channel and the maneuvering area near Richmond Long Wharf was addressed in the 1984 Interim Design Report and EIS. Deepening of the Richmond Long Wharf was completed in 1986. The West Richmond Channel has not been constructed to its authorized depth of -45 feet MLLW.
- ***SF Bay to Stockton Phase III (John F. Baldwin Ship Channel) Navigation Improvement Project Final EIR/EIS, U.S. Army Corps of Engineers, San Francisco District, September 1998.*** This document only analyzed improvement of the Western Reach channels and was prepared in tandem with the 1998 General Reevaluation Report (discussed below).
- ***SF Bay to Stockton, John F. Baldwin Ship Channel Phase III Contra Costa County, California Navigation Improvement Project General Reevaluation Report, U.S. Army Corps of Engineers, San Francisco District, 1998.*** The West Richmond Channel, Pinole Shoal Channel, Carquinez Strait, and the Bulls Head Reach portion of the Suisun Bay Channel were reevaluated in the 1990s. The resulting 1998 GRR recommended implementation of a crude oil pipeline alternative as a local plan in lieu of deepening because, at the time, the

deepening plan was "...essentially non-implementable... because of the severe and unresolved issues associated with salinity intrusion into the Sacramento-San Joaquin River Delta area." This proposed oil pipeline project was never implemented since it was not supported by local non-Federal interests.

## 1.7 FEDERAL PROJECTS & STUDIES NEAR THE STUDY AREA

- ***Final Composite Environmental Statement for Maintenance Dredging of Existing Navigation Projects, San Francisco Bay Region, California (December 1975)*** – The Statement of Findings recommended that maintenance dredging for federal navigation projects in San Francisco Bay be continued as authorized. Dredged material from 15 sites was recommended for open water disposal, although material from 5 additional sites was allowed to be considered for land placement pending further environmental review. Environmental impacts such as increased turbidity and disturbance of benthic organisms were determined to be adverse but limited, based on available data. Economic impacts were determined to be beneficial.
- ***Final Environmental Impact Statement for Designation of a Deep Water Ocean Dredged Material Disposal Site off San Francisco, California (August, 1993)*** - The EPA Final Rule initially designating the SF-DODS for dredged material disposal was published on August 11, 1994 (59 FR 41243). This initial rule established an "interim" allowable disposal volume of 6 million cubic yards per year. The maximum allowable disposal volume was reduced to 4.8 million cubic yards per year starting in January, 1997 (EPA Final Rule of December 30, 1996, 61 FR 68964). The reduction in allowable disposal volume was based on a revised prediction of long-term dredging needs conducted by the interagency Long Term Management Strategy (LTMS) for San Francisco Bay (LTMS 1996, 1998). The limit of 4.8 million cubic yards per year was subsequently made permanent in the EPA Final Rule published on July 23, 1999 (64 FR 39927). Through the 2007 disposal year, almost 16 million cubic yards of dredged material have been diverted to the SF-DODS from traditional in-Bay sites, reducing risks of disposal-related impacts within those sensitive waters, and, as described in this report, that reduction of risk has been accomplished without causing any significant impacts to the ocean.
- ***Final Environmental Impact Statement/Environmental Impact Report for Montezuma Wetlands Restoration Project (July 1998)*** – The purpose of the project is to combine the commercial placement of dredged materials within the restoration of a tidal wetland ecosystem. Approved cover and non-cover dredged materials taken from the San Francisco Bay Area would be used to raise the subsided land to elevations suitable for the restoration of tidal marsh and other habitats, including some seasonal wetland features.
- ***Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (2001)*** – The project area is the San Francisco Bay in California. Policy objectives of the Long Term Management Strategy (LTMS) are to identify an acceptable array of dredge material placement sites, develop management, economic, and environmental plans for these sites, implement a decision making framework for site usage, streamline permit procedures, and establish long term site monitoring.

- ***Final Environmental Impact Statement/Environmental Impact Report for Cullinan Ranch Restoration Project, Solano and Napa Counties, CA. (April 2005)*** - The U.S. Fish and Wildlife Service (Service) and the California Department of Fish and Game are proposing a restoration plan for 1,500 acres of former hayfield farm land in the San Pablo Bay. This restoration project would combine tidal salt marsh habitat for endangered species, waterfowl, water birds, and fish, as well as public access features to increase accessibility to wildlife resource values in the San Pablo Bay, while minimizing project-induced flood impacts to Highway 37. The Cullinan Ranch is managed by the Service as part of the San Pablo Bay National Wildlife Refuge.
- ***Final Environmental Impact Statement/Environmental Impact Report for South San Francisco Bay Shoreline Project (Chief's Report December 2015)*** - This project will safeguard homes and businesses along the South Bay by restoring four miles of levees, as well as some 2,800 acres of tidal marsh, along with creating access for recreation. The region's flood risk has been compounded by threats of sea level rise which has become an increasingly urgent environmental issue for the Bay Area, including in San Francisco to the north.
- ***Final Environmental Assessment/Environmental Impact Report for Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay, 2015-2024 (2015)*** – Sediment accumulation in these channels can impede navigability. Maintenance dredging removes this sediment and returns the channels to regulatory depths to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for the movement of commerce, national security needs, and recreation. Therefore, USACE's purpose in this project is to continue maintenance dredging of the Federal navigation channels in San Francisco Bay consistent with the goals and adopted plans of the LTMS, while adequately protecting the environment, including listed species.
- ***Delta Islands and Levees Feasibility Study Chief's Report (December 18, 2018)*** - recommends restoration of 340 acres of intertidal marsh at Big Break, located in Contra Costa County. The Recommended Plan would use approximately one million cubic yards of clean dredged material for annual maintenance of the Stockton Deep Water Ship Channel over an approximately 10 year period. The California Department of Water Resources is the non-Federal sponsor. The proposed restoration area is owned by the East Bay Regional Park District.

## 1.8 OTHER CURRENT NON-FEDERAL STUDIES AND PROJECTS ADJACENT TO OR NEAR THE STUDY AREA

Other non-Federal studies considered throughout this report, and cumulative effects, are located in **Table 4-27. Past, Present, and Reasonably Foreseeable Future Projects.**

- ***San Francisco Bay Living Shorelines Project*** – This project is managed by the State Coastal Conservancy and *is a multiple objective habitat restoration pilot project. Per the project website, "This experimental restoration project allows us to learn more about the best locations and techniques for native oyster and eelgrass restoration, to gather information about fish, invertebrate, and bird use of the reefs, and to assess whether the reefs can provide physical benefits such as reducing wave action and protecting adjacent shorelines. Oyster and eelgrass*

*reefs were constructed at two sites in San Francisco Bay in July and August 2012 (larger and small experiment at the San Rafael Shoreline, and small experiment at Hayward near the Eden Landing Ecological Reserve)."*

- **SF Bay Water Quality Improvement Fund (SFBWQIF) projects** – Over 30 projects are part of an EPA grant program to improve San Francisco Bay water quality. These are focused on restoring impaired waters and enhancing aquatic resources.



2

Existing and Future Without  
Project Conditions

## 2 EXISTING AND FUTURE WITHOUT-PROJECT CONDITIONS

Keeping in mind the initial problem statement in Chapter 1, this chapter describes the existing economic and environmental conditions, and the project alternative conditions are evaluated for the natural environment., where the project alternative conditions are evaluated for the natural environment.

### 2.1 GENERAL SETTING\*

Under the existing/no action/future condition, deepening the channel would not occur and all construction-related activities would be avoided. Ships would continue to employ inefficient strategies in managing channel depth constraints when transporting commodities to existing refineries. As no sediments would be dredged from channel deepening, there would be no placement of the proposed project sediments in the wetland creation sites in the San Francisco Bay area. However, maintenance dredging would continue and emergency or advanced maintenance dredging costs would be incurred on an as needed basis, with the Federal standard placement sites continuing to be used.

### 2.2 NATURAL ENVIRONMENT EXISTING CONDITIONS\*

The affected environment for all natural environment resources includes the Bay Area and Sacramento-San Joaquin Delta encompassing the New York Slough, Pinole Shoal, and the Bulls Head Reach portion of Suisan Bay. These areas are located within the counties of Marin, Contra Costa, and Solano. The natural environment resources described in the following sections (Section 2.2.1 through 2.2.16) are not expected to change under the future without-project condition, therefore the resource descriptions below apply to both existing and future without-project conditions (the No Action Alternative discussed in Chapter 4), with the exception of sea level rise. The timing and ability to know what changes would occur from existing conditions to the 50 year project condition with sea level rise are difficult to predict, and therefore are described together in this section.

#### 2.2.1 GEOLOGY AND SEISMICITY

**Seismicity.** Several Quaternary-active faults traverse the path of the navigation channels in the San Francisco Bay/Sacramento-San Joaquin Delta, including the Hayward fault zone, and the Franklin, Southampton, Green Valley, and Vaca faults. Quaternary-active faults are those that have slipped in Quaternary time (the last 1.8 million years). These are the most likely sources of future great earthquakes. The Hayward fault zone intersects the San Pablo Bay and the Pinole Shoal Channel; the Franklin and Southampton faults intersect the Carquinez Strait; the Green Valley fault zone and Concord fault intersect Suisun Bay at the Bulls Head Reach. The Vaca fault zone extends northwest to southeast immediately northwest of Sherman Island. There are no other Quaternary faults in the study area east of Sherman Island (USGS 2015).

The U.S. Geological Survey's (USGS 2010) 2009 Probable Seismic Hazard Analysis Program indicates that there is a 90 to 100 percent probability of a greater than 5.0 magnitude earthquake occurring within 50 years and 50 kilometers of the study area from the San Francisco Bay to McDonald Island. That probability

drops to 80 to 90 percent east of McDonald Island. There is a 40 to 50 percent probability of a 7.0 or greater earthquake occurring within 50 years and 50 kilometers of San Francisco Bay. The probability steadily decreases eastward from the Carquinez Strait, dropping to 0 to 10 percent for the Stockton area (USGS 2010).

The Federal Emergency Management Agency's (FEMA) Seismic Design Category ratings define the potential effects of shaking in the study area as follows:

- **D<sub>1</sub>, D<sub>2</sub>:** Very strong shaking—Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures, and
- **E:** Strongest shaking—Damage considerable in specially designed structures; frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations. Shaking intense enough to completely destroy buildings.

For the study area, shaking intensity generally declines moving eastward from San Francisco Bay, with the highest shaking potential centered on the Hayward and Green Valley fault zones and the Concorde fault (FEMA 2015).

Alquist-Priolo fault zones are present within the study area counties including Contra Costa, Marin and Solano Counties and within the cities of Richmond and Benicia. Alquist-Priolo fault zones generally occur within approximately 200 to 500 feet of major fault lines or zones. In the study area, this includes areas adjacent to the Hayward and Green Hill fault zones and the Concord fault (California Department of Conservation 1982a, 1982b, 1993)[CDC]. Alquist-Priolo fault zones are limited to land areas; delta and bay waters are not considered within these zones.

**Seismically Induced Liquefaction.** Liquefaction is a process in which saturated, loosely packed, coarse-grained soils transform from a solid to a near-liquid state as a result of seismic ground shaking. Effects of liquefaction may include slope instability, lateral spreading, loss of foundation bearing capacity, and ground settlement. It is important to distinguish between susceptibility and hazard for liquefaction. Susceptibility involves the presence of saturated sandy-to-silty Quaternary material. Hazard involves both the presence of such soils and the likelihood that they would be displaced during a particular seismic event, which may trigger liquefaction.

The Association of Bay Area Governments (ABAG) maintains comprehensive liquefaction hazard maps for the San Francisco Bay Area, including the study area from the San Francisco Bay east to Webb Tract. Liquefaction susceptibility varies within the study area, with several shoreline and nearshore areas identified as being moderately to highly susceptible to liquefaction. Areas of very high susceptibility occur scattered along the shorelines of coastal cities within the study area including Richmond, San Pablo, Pinole, Hercules, and Vallejo. Hazard maps identify delta islands as having high liquefaction potential (ABAG 2015a). East of Webb Tract, delta islands and shorelines are also identified as susceptible to liquefaction (Sacramento County 2011; San Joaquin County 2005).

**Slope Failure and Landslides.** Shoreline areas containing wetlands, marsh fill areas, and steep or unstable slopes—including certain levees—may be susceptible to landslides, slumping, soil slips, or rockslides. Inland dredged material placement sites containing steep slopes may also be susceptible to landslides. Although ABAG maintains landslide hazard maps for the San Francisco Bay Area, the shoreline and most inland areas adjacent to the study area have not been evaluated (ABAG 2015b). Slope or landslide hazard

areas occur along the coast of the study area, as identified in General Plans for Tiburon (2005), Richmond (2012), Pinole (2010), Solano (2008), and Contra Costa counties (2005). Underwater slope failures are also possible within the study area, although susceptible areas have not been documented.

**Other Upland Geologic Hazards.** In addition to liquefaction and landslides, upland areas potentially used for placement of dredge material may be susceptible to lateral spreading, subsidence, settlement, and erosion which may be caused or exacerbated by seismic activity. Unlike for liquefaction and landslides, comprehensive maps for these hazards have not been developed for the study area. Site susceptibility to these hazards is dependent upon their specific location, which has not been determined at this time.

**Shoreline Erosion.** Waves breaking on shore can suspend sediment and erode the shoreline. Larger waves contain more energy and have greater capacity to mobilize sediment. Deep draft vessels also produce waves as a result of the bow wave and displace water as they move. Larger, more fully loaded vessels have the potential to create larger waves when compared to smaller, lighter vessels. Shoreline erosion from vessel-induced waves is not expected to be a problem from vessels traveling in the open waters of the bays.

**Delta Levees.** Approximately 1,100 miles of levees and berms protect 700,000 acres of reclaimed marshland and uplands within the delta (LTMS 1998). In addition, many dredged material placement sites along the San Joaquin River contain berms or use the existing flood control levees to contain the dredged material. Levees and berms are critical infrastructure that protect agricultural lands, water supplies, upland development, and roads and railways from flooding. Delta levees also play a critical role in preventing intrusion of salty water from San Francisco Bay into the delta channels. These channels serve an integral role in the state's water transfer system, which provides water to approximately two-thirds of California's population. Adjacent landowners built and maintain the vast majority of the 1,100 miles of levees (LTMS 1998). Due to great variations in levee construction and soil types, geology, and other factors, levee conditions and maintenance requirements differ throughout the delta region.

**Bay Levees.** Levee failure is identified as a seismic hazard for Martinez (2015), Contra Costa (2005), and Solano Counties (2008). While failure-prone levees are not explicitly identified, landslide hazard areas identified in the general plans for the study area appear to include potentially unstable levee areas.

**Tsunamis and Seiches.** Seismic activity can potentially result in tsunamis or seiches, which would present a hydrological hazard. Tsunamis (seismic sea waves) are long-period waves typically caused by underwater seismic disturbances, volcanic eruptions, or submerged landslides. Tsunamis can travel across oceanic basins and cause damage several thousand miles from their sources. Low-lying coastal areas, such as tidal flats, marshlands, and former bay margins that have been artificially filled, but are still at or near sea level, are generally the most susceptible to tsunami inundation.

A seiche is caused by oscillation of the surface of an enclosed water body, such as San Francisco Bay, resulting from an earthquake or large wind event. Seiches can result in long-period waves that cause run-up; i.e. uprush on the shoreline or structures above the still water level or overtopping of adjacent landmasses, similar to tsunami run-up. The primary tsunami threat along the central California coast is from distant earthquakes along subduction zones elsewhere in the Pacific basin, including Alaska (City and County of San Francisco 2011).

The shoreline and some nearshore areas adjacent to the study area in Marin and Contra Costa Counties are within tsunami inundation areas as delineated on the State’s tsunami inundation maps (California Emergency Management Agency 2009a, 2009b). Based on a tsunami wave run-up of 20 feet entering the Golden Gate, the 2009 Contra Costa Countywide Comprehensive Transportation Plan indicates that tsunami attenuation in the San Francisco Bay would diminish the height of the wave to approximately 10 feet along the Richmond shoreline. East of Point Pinole, the wave height would diminish to approximately 2 feet (Contra Costa Transportation Agency 2009). Areas east of the Benicia Bridge are not included on State tsunami inundation maps. Tsunami effects are attenuated from their source, and tsunami effects extending east of the Benicia Bridge would be further attenuated by Suisun Bay and other upstream water bodies. The most recent local and significant tsunami event occurred in March 2011, when a tsunami originating in Japan caused a swell of two feet in the Bay (NOAA 2011). The NOAA operates the tsunami warning system serving the Pacific Northwest.

## 2.2.2 SEDIMENT AND SEDIMENTATION

### 2.2.2.1 SEDIMENTATION

The temporal fluctuation of maintenance dredging volumes depends primarily on the hydrologic conditions and the sediment supply from the Sacramento-San Joaquin Delta. Recent analyses of historical dredged material volumes and modeling results have indicated that sediment supply from tributaries to the Delta can vary by a factor of four or more between wet and dry years, and this can influence shoaling rates by a factor of two at some Federal navigation channels in Central Bay (Delta Modeling Associates 2015). However, the sediment supply to the Bay has decreased significantly in recent years (Schoellhamer 2011). Many factors contribute to the decreasing sediment yield; these factors may include depletion of erodible sediment from hydraulic mining, sediment impoundment by reservoirs, and riverbank protection.

### 2.2.2.2 SEDIMENT CHARACTERISTICS

The sediments within San Francisco Bay originate from erosion of surrounding hills or from later marine and riverine deposits. Generally, the upper several feet of the sediment profile in San Francisco Bay consists of more recently deposited marine and riverine sediments. The thickness of various underlying historic sediment formations varies throughout the San Francisco Bay/Delta Estuary and it can be several hundred feet thick. Large areas of San Francisco Bay, particularly in shallow areas, contain the marine clay-silt deposit termed “Bay Mud” several feet beneath softer, more recently deposited muds (USACE 2015b). In some areas of San Pablo Bay, Suisun Bay, and the Delta, natural peat deposits underlay more recent San Francisco Bay sediments. Estuary channels typically contain sandy bottoms, although regions where currents are strong, including the deep channels of San Francisco Bay and the central channels of the major rivers in the Delta, generally have coarser sediments (i.e., fine sand, sand or gravel) (LTMS 1998). San Francisco Bay surficial sediments have been deposited since industrialization began in California and, therefore, may have been exposed to anthropogenic sources of pollutants. Recent sand deposits, including riverine sand or sand bars in the San Francisco Bay, may also be exposed to anthropogenic sources of pollutants but typically do not accumulate significant pollutant concentrations. Data from monitoring sediment contaminants in the Bay indicate that overall, the peripheral industrialized areas have higher mean contaminant concentrations than Bay waters away from the shoreline (LTMS 1998). Over the years, sediment proposed for maintenance or new work dredging in the study area has undergone a significant amount of sediment sampling and analysis, including physical, chemical, and biological testing. In addition, sediment proposed for maintenance dredging from each channel has

undergone sediment testing according to the Master Sediment Sampling and Analysis Plan (Master SAP), for Pinole Shoal are located: [http://www.dmмосfbay.org/site/alias\\_8959/171100/default.aspx](http://www.dmмосfbay.org/site/alias_8959/171100/default.aspx) and for Bulls Head Reach: [http://www.dmмосfbay.org/site/alias\\_\\_8958/171080/default.aspx](http://www.dmмосfbay.org/site/alias__8958/171080/default.aspx). Sediment in the study area generally has low levels of contamination and does not contribute to significant environmental risks when dredged or disposed (LTMS 1998).

Sediment testing has been conducted to determine the suitability of dredged material for placement (e.g., either in ocean or in-Bay) or for beneficial reuse for the operations and maintenance dredging, and to evaluate potential contaminant releases during dredging. The data summaries presented in this section compare historic sediment quality results from the study area to regulatory criteria established by: the San Francisco Deep Ocean Disposal Site (SF-DODS) Ambient Concentrations of Toxic Chemicals Screening Levels (SFRWQCB 1998); Dredged Material Testing Thresholds for San Francisco Bay Area Sediments (SFEI 2014); Beneficial Reuse of Dredge Materials: Sediment Screening and Testing Guidelines (SFRWQCB 2000); and ambient or reference areas. This includes regulatory criteria for in-Bay placement, ocean, wetland cover material reuse, and wetland foundation material reuse.

Sediment from the Pinole Shoal Channel and Bulls Head Reach have been characterized and dredged. Overall, sediments in the Pinole Shoal Channel and Bulls Head Reach show little contamination and pose a low level of environmental risk (Lee 2000; Word and Kohn 1991). The following subsections discuss the sediment characterization studies and results in greater detail.

### 2.2.2.3 DEEPENING PROJECT CHARACTERIZATION OF THE JOHN F. BALDWIN SHIP CHANNEL

From 1989 to 1994, USACE conducted extensive testing under the guidelines in Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual (USEPA/USACE 1991) of the John F. Baldwin Ship Channel sediments for a potential deepening project to -45 feet MLLW plus 2 feet of overdepth (Kohn et al. 1991; Kohn et al. 1993; Kohn et al. 1994; Word and Kohn 1990). USACE conducted Tier III testing requirements for ocean placement, which are considered to be the most stringent and protective of the environment. Tier III testing requires conducting chemical, toxicity, and bioaccumulation testing to evaluate the risks associated with dredging and ocean placement of sediment. The results of these investigations are summarized in the following paragraphs.

Sediment core samples were collected to a depth of -47 feet MLLW (-45 feet MLLW plus 2 feet overdepth) from three reaches of the John F. Baldwin Ship Channel (West Richmond Reach, Pinole Shoal, and Carquinez Strait) in 1990. In the absence of a designated placement site at the time of the study, reference sediments representing two potential placement sites (one ocean site and one in-Bay site) were tested concurrently. While the study was in progress, the USEPA was in the process of designating SF-DODS, which was referred to as the Deep Off-Shelf reference site at that time. Therefore, the John F. Baldwin Ship Channel sediment data was compared to that reference data. Comparisons included biological responses of aquatic organisms to sediment exposure such as survival and contaminant bioaccumulation, as well as the sediment's physical, geological, and chemical characteristics.

All sediment samples were analyzed for conventional sediment measurements (grain size, total organic carbon, total volatile solids, percent solids, oil and grease, and total petroleum hydrocarbons), polycyclic aromatic hydrocarbons (PAHs), metals, and butyltins. Sediment composites and reference sediments for biological testing were also analyzed for chlorinated pesticides and polychlorinated biphenyls (PCBs). The bioaccumulation tissue samples were analyzed for PAHs, metals, and butyltins.

Water column tests showed there was no acute toxicity. The solid-phase tests of John F. Baldwin Ship Channel sediments showed no acute toxicity to *M. nasuta*, *N. caecoides*, or *R. abronius* relative to the Deep Off-Shelf reference site. However, sediment from Pinole Shoal Channel resulted in significant decrease in normal development of echinoderm larvae. The bioaccumulation testing results revealed that nine measured compounds for which action limits are established in tissues did not exceed Food and Drug Administration (FDA) action limits. However, significant bioaccumulation of the pesticide 4,4'-DDD was measured in organisms exposed to Pinole Shoal Channel sediment relative to the reference site. Four PAH compounds and tributyltin also significantly bioaccumulated in organisms exposed to Pinole Shoal Channel sediment relative to the reference site.

Based on the results of this study, proposed dredged material from John F. Baldwin Ship Channel met the deposited sediment toxicity (benthic bioassay) criteria for ocean placement, but some water column and bioaccumulation effects were observed.

Additional testing was conducted in 2000 on sediment to a depth of -47 feet MLLW from the West Richmond Channel and Pinole Shoal Channel to evaluate the suitability of dredged material for wetland beneficial reuse (Lee 2000). The test resulted in high levels of Chromium, however, the test results indicated that wetland creation using the tested sediment would create wetlands comparable to existing wetlands in the San Francisco Bay Area. Wetland plants and animals would contain contaminant levels similar to those of existing wetlands. Restrictions on the use of the tested sediment for wetland creation was not required at the time.

More recent material was tested from dredging the Pinole Shoal and Bulls Head Reach channels in 2009. The 2009 sampling at Suisun (Suisun Bay Channel New Your Slough SAR 2009 Jul.pdf) included some overdepth sampling at Bulls Head Shoal (-37 to -39 feet). The samples were not analyzed for total solids content of metals, instead they were tested for elutriate concentrations which are reported in ug/L instead of mg/Kg (dissolved metals in solution) for comparison with drinking water standards, leaching standards and RWQCB standards to determine suitability for in water placement and upland placement instead of wetland placement.

Based on the 2009 sampling results, it appears the material would be acceptable for in water placement and upland placement. There were no other non-maintenance event sampling reports available in USACE records. The 1990 samples in Suisun Bay showed chromium concentrations that exceed 250 mg/Kg, however, based other nearby sediment samples, dredge material from -38 to -40 feet may be suitable for wetland cover, while depths below that may exceed criteria for wetland cover but could possibly meet the criteria for use as foundation material in the wetland placement sites. The Bulls Head Reach sediment trap will be dredged deeper and this material may have higher concentrations of chromium. The sediment trap portion of new work material amounts to approximately 100,000 cubic yards. Testing of new work material will be done during the PED phase to determine its suitability for marsh placement (foundation or cover material) or alternative non-marsh placement.

The 2009 sediment testing data for Pinole Shoal from initial dredging for sample testing of -37 to -39 feet resulted in Chromium concentrations range from 51 to 61 mg/kg. The threshold criteria for wetland placement at surface is 112 mg/kg. Therefore, the material would be suitable for cover or wetland placement at the beneficial reuse sites. Confirmatory testing will be completed prior to placement at the reuse sites.

### 2.2.3 WATER QUALITY AND HYDROLOGY

The study area encompasses the waters of Central San Francisco Bay, San Pablo Bay, and Suisun Bay, and the lower Sacramento/San Joaquin Delta. **Figure 2-1** shows a map of the lower Sacramento and San Joaquin River basins which contribute freshwater flows that pass through Suisun Bay into San Francisco Bay.



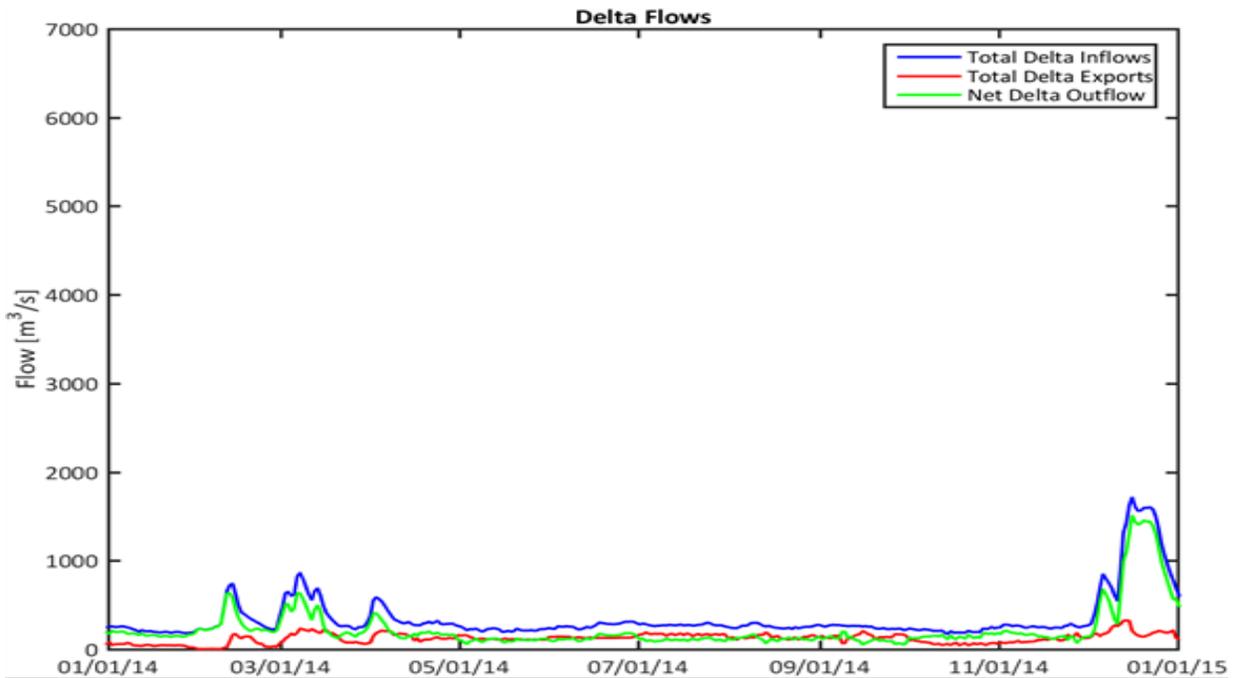
**Figure 2-1. Map of Sacramento and San Joaquin River Basins upstream of Suisun Bay (USGS, 2015). <https://ca.water.usgs.gov/projects/2015-17.html>**

Most of the precipitation in the study area falls as rain during winter and spring, which enters the Sacramento/San Joaquin Delta through surface water runoff and riverine flow. Precipitation varies significantly from year to year. Water years (WYs) are used to designate the differences in precipitation between years. Water years in California span the 12-month period between October 1 and September 30 (e.g., WY2014 spans from October 1, 2013 to September 30, 2014). This designation allows for all precipitation over the “wet season” (typically December through March) to be included in a single year. Water years are classified into five categories (e.g., critical (driest), dry, below normal, above normal, and wet (wettest)) based on inflows to the Delta. These are used to calculate Sacramento and San Joaquin

Valley Water Year Hydrologic Classification Indices. The frequency of each WY type based on the Sacramento Valley Water Year Hydrologic Classification for the 109-year period of record between WY1906 and WY2014 is as follows:

- Critical (Driest) WY 13.8 percent occurrence over 109-year record
- Dry WY 21.1 percent occurrence over 109-year record
- Below Normal WY 18.3 percent occurrence over 109-year record
- Above Normal WY 13.8 percent occurrence over 109-year record
- Wet (Wettest) WY 33.0 percent occurrence over 109-year record

Delta inflows, exports and outflows can vary significantly between critical and wet water years. WY2014 was designated as a critical water year (California Department of Water Resources 2016) [CDWR], the driest classification category. Baseline conditions during and following a critical year were established for the 1-year period spanning January 1, 2014, through December 31, 2014. This period spans winter and spring period during a critical WY, followed by the fall period between October 1 and December 31 of the subsequent WY. **Figure 2-3** shows the total delta exports (blue) and inflows (red), and the net delta outflow (green) during 2014. During this entire period, both Delta inflow and Delta outflow was extremely low.



**Figure 2-2. Total Delta Inflow, Exports, and Outflow for Year 0 Simulation Period Based on 2014 (Critical Year) Historic Conditions.**

WY2012 was designated as a below normal year (CDWR 2016). The conditions during and following the below normal WY for the 1-year period spanning from January 1, 2012, through December 31, 2012, show that during this period monthly flows were below average for most of the water year. **Figure 2-3** shows the total delta exports (blue) and inflows (red), and the net delta outflow (green) during 2012.

In contrast, WY2011 was designated as a wet WY (CDWR 2016), the wettest classification category. The conditions during and following a wet WY for the 1-year period spanning from January 1, 2011, through December 31, 2011, show that during this entire period, both Delta inflow and Delta outflow were significantly higher throughout the wet WY (Figure 2-4) than during the below normal WY (Figure 2-3) and critical WY (Figure 2-2).

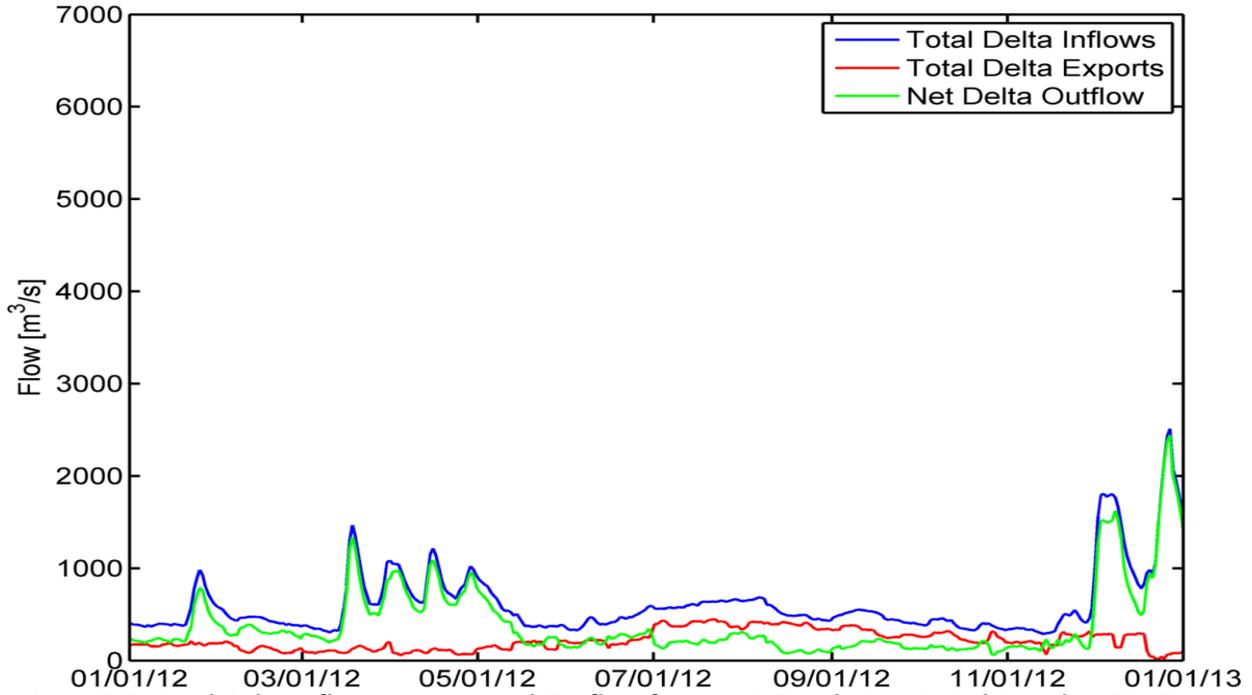
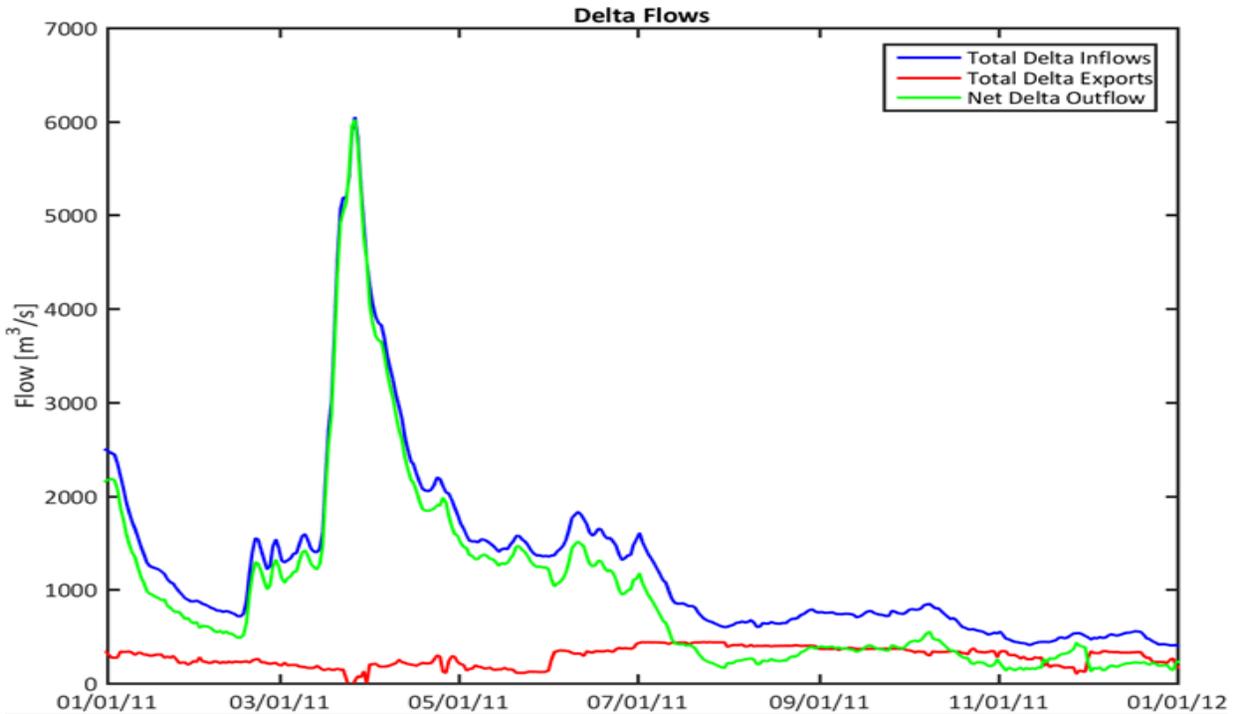


Figure 2-3. Total Delta Inflow, Exports, and Outflow for Year 0 Simulation Period Based on 2012 (Below Normal Year) Historic Conditions.



**Figure 2-4. Total Delta Inflow, Exports, and Outflow for Year 0 Simulation Period Based on 2011 Historic Conditions Classified as a Wet (Wettest) Water Year.**

Table 2-1, Table 2-2, and Table 2-3 provide the total monthly Delta inflow, exports and outflow for 2014, 2012, and 2011 periods evaluated in this analysis (CDWR 2019). For the critical year (2014) simulation period the total inflow, exports and outflow was 9,086 kac-ft/yr, 2,062 kac-ft/yr, 6,045 kac-ft, respectively. For the below normal year (2012) simulation period, the total inflow, exports and outflow was 15,673 kac-ft/yr, 4,652 kac-ft/yr, 10,131 kac-ft/yr, respectively. For the wet year (2011) simulation period, the total inflow, exports and outflow was 32,379 kac-ft/yr, 6,546 kac-ft/yr, 24,774 kac-ft/yr, respectively.

**Table 2-1. Monthly Total Delta Inflows, Exports, and Outflow during 2014.**

Month	Monthly Total Inflow [Acre-Feet]	Monthly Total Exports [Acre-Feet]	Monthly Total Outflow [Acre-Feet]
January 2014	463,639	99,192	293,939
February 2014	679,002	147,251	614,295
March 2014	999,902	269,545	782,311
April 2014	724,473	236,038	470,840
May 2014	504,046	102,306	256,676
June 2014	608,628	68,823	321,684
July 2014	637,363	122,694	251,179

August 2014	586,756	146,366	210,198
September 2014	542,881	214,520	190,478
October 2014	478,854	79,340	290,261
November 2014	551,195	177,373	323,326
December 2014	2,309,881	399,210	2,060,265

**Table 2-2. Monthly Total Delta Inflows, Exports, and Outflow during 2012.**

Month	Monthly Total Inflow [Acre-Feet]	Monthly Total Exports [Acre-Feet]	Monthly Total Outflow [Acre-Feet]
January 2012	1,071,380	376,613	702,029
February 2012	880,169	225,677	621,040
March 2012	1,382,866	217,868	1,236,786
April 2012	1,774,417	137,630	1,653,142
May 2012	1,123,511	208,941	768,153
June 2012	955,142	244,304	494,228
July 2012	1,363,309	636,586	463,290
August 2012	1,198,838	684,450	285,391
September 2012	1,006,751	563,406	290,786
October 2012	844,314	484,688	275,271
November 2012	808,469	425,689	374,385
December 2012	3,264,815	447,033	2,966,828

**Table 2-3. Monthly Total Delta Inflows, Exports, and Outflow during 2011.**

Month	Monthly Total Inflow [Acre-Feet]	Monthly Total Exports [Acre-Feet]	Monthly Total Outflow [Acre-Feet]
January 2011	3,096,843	662,137	2,413,439
February 2011	1,969,767	500,278	1,556,388
March 2011	6,666,916	395,629	6,393,593
April 2011	5,537,405	370,781	5,056,724
May 2011	3,224,559	219,472	2,903,560
June 2011	3,277,720	595,053	2,523,958
July 2011	2,056,865	717,355	1,087,506
August 2011	1,494,113	719,286	545,377
September 2011	1,574,259	691,197	729,274
October 2011	1,473,792	664,813	742,604
November 2011	974,192	429,760	492,061
December 2011	1,033,133	581,205	330,359

### 2.2.3.1 REGIONAL HYDRODYNAMICS

The San Francisco Estuary is bathymetrically and hydrodynamically complex. Freshwater, sediment, nutrients, and pollutants are carried to the estuary by river flow. The largest sources of freshwater to the estuary are the Sacramento and the San Joaquin Rivers. Historically, the Delta was characterized by tidal wetlands and interweaving water channels. However, this original wetland landscape was diked, drained, and converted into islands surrounded by levees.

The mixing of this freshwater with the salt water from the Pacific Ocean results in an estuary-wide horizontal salinity gradient, with salinity varying from full marine conditions (more than 30 practical salinity units [psu]) near the Golden Gate Bridge to freshwater conditions (less than 0.1 psu) in the Sacramento River (The Bay Institute 1998; CALFED 2000a). However, there is a net westward water flow from the Delta through the San Francisco Bay resulting from the net freshwater outflow from the Delta. Inflows into the Delta are controlled by upstream dams and reservoirs, which restrain peak flows in the winter and spring for flood control and storage, and release water in the summer and fall to meet agricultural and municipal demands—both for exports to interaction of the semidiurnal tides with a complicated bathymetry (Cheng and Gartner 1984). During flood tides, the water flows into the San Francisco Bay and the Delta, and the water level increases and higher salinity travels upstream. During ebb tides, the river water flows out of the Delta and freshwater pushes saline water into the Bay.

As the precipitation-induced channel inflows increase in the winter months, flows in some Delta channels can become one-directional (i.e., downstream). During this period, the tidal influence is minimal and overshadowed by precipitation-induced channel inflows. During the summer months, the flow patterns more closely correspond with the flood/ebb tidal cycles because net inflows to the Delta and San Francisco Bay tend to be lower during the summer months.

Delta water users including the U.S. Bureau of Reclamation’s Central Valley Project, the CDWRs’ State Water Project, as well as other agricultural and municipal water users have adapted their water supply systems to the daily, seasonal, and inter-annual variations that occur in delta water availability. Designated beneficial reuses of water for this area are presented in **Table 2-4**.

**Table 2-4. Study Area Beneficial Reuses Designation.**

Water body	Designated Beneficial Reuse														
	AGR	MUN	IND	PROC	COMM	SHELL	FRESH	EST	MIGR	RARE	SPWN	WILD	REC-1	REC-2	NAV
Bulls Head Reach			E		E	E		E	E	E	E	E	E	E	E
West Richmond Channel			E	E	E	E		E	E	E	E	E	E	E	E
Pinole Shoal Channel			E	E	E			E	E	E	E	E	E	E	E

- Notes: AGR - Agricultural Supply
- COMM - Commercial and Sport Fishing
- E - Existing Beneficial Reuse
- EST - Estuarine Habitat
- FRESH - Freshwater Habitat
- IND - Industrial Service Supply
- MIGR - Fish Migration
- MUN - Municipal and Domestic Supply
- NAV - Navigation
- PROC - Industrial Process Supply
- RARE - Preservation of Rare and Endangered Species
- REC1 - Water Contact Recreation
- REC2 - Noncontact Water Recreation
- SHELL - Shellfish Harvesting
- SPWN - Fish Spawning
- WILD - Wildlife Habitat

**2.2.3.2 TIDAL HYDRAULICS**

Astronomical tides in the study area are characterized as having a mixed semidiurnal tidal cycle, which means that the area experiences two high tides and two low tides of unequal height each lunar day. **Table 2-5** presents the mean and diurnal ranges at NOAA tidal gauge locations within the study area. The San Francisco, Richmond, and Martinez-Amorco Pier NOAA stations are located within the study area, while the Port Chicago station is outside of the study area (east). Tidal range increases from the San Francisco NOAA station into Central and South San Francisco Bays, and decreases moving west through San Pablo and Suisun Bays.

**Table 2-5. Tidal Ranges at NOAA Stations within the Study Area.**

NOAA Station Location	NOAA Station Identification No.	Mean Tidal Range (feet)	Diurnal Range (feet)
San Francisco	9414290	4.09	5.84
Richmond	9414863	4.32	6.06
Martinez-Amorco Pier	9415012	3.93	5.31

Source: NOAA 2015.

### 2.2.3.3 SALINITY AND WATER SUPPLY

Salinity is a long-standing management concern in the Delta, since increased salt concentrations can adversely affect municipal, agricultural, and industrial water supplies, as well as aquatic habitat conditions. Salinity levels are influenced by tidal cycles, freshwater inflow, water intakes and exports, and agricultural diversions and return flows in the Delta. “Exports” divert water for use outside the legal boundary of the Delta. The two primary Delta exporters are the State Water Project and the Central Valley Project, which are located in the south Delta (see **Figure 2-5**). Delta water “intakes” divert water for use within the legal boundary of the Delta. Intakes in the study area include in-Delta diversions for agricultural use and Contra Costa Water District (CCWD) intakes at Rock Slough, Old River, and Middle River at Victoria Canal (see **Figure 2-5**). Consideration of salinity levels is critical for supporting municipal, agricultural, and industrial uses, as well as maintaining habitable conditions for fish and wildlife.

The abundance or survival of several estuarine biological populations in the San Francisco Estuary have historically been positively correlated with freshwater flow, as indexed by the position of the **daily-averaged 2 psu isohaline near the bed**, (i.e., bottom) or **X2** (Jassby et al. 1995; Kimmerer et al. 2009; Kimmerer et al. 2013) as measured in kilometers from the Golden Gate Bridge as shown in **Figure 2-6**. In 1995, the State Water Resources Control Board (SWRCB) adopted X2 as a water quality standard to help restore the relationship between springtime precipitation and the geographic location and extent of estuarine habitat.

Water Rights Decision 1641 D-1641 (SWRCB 2000) requires that freshwater inflows to the Bay be sufficient to maintain X2 at specific locations for specific numbers of days each month during the spring (February through June). The objective of this “Spring X2” requirement is to help restore the relationship between springtime precipitation and the geographic location and extent of estuarine habitat. The Spring X2 requirement at Port Chicago (SWRCB 2000) applies only in months when the average electrical conductivity (EC) at Port Chicago (X2 = 64 km) during the 14 days just before the first day of the month is less than or equal to an EC measurement of 2.64 millimhos per centimeter (mmhos/cm). However, when X2 is less than 64, there are no current regulatory requirements that regulate the position of X2.

The Biological Opinion for delta smelt (*Hypomesus transpacificus*) calls for efforts to increase outflow to enlarge the area of habitat with suitable salinity (i.e., the low salinity zone) for this fish and has established X2 requirements during fall months following wet or above normal water years (USFWS 2008).

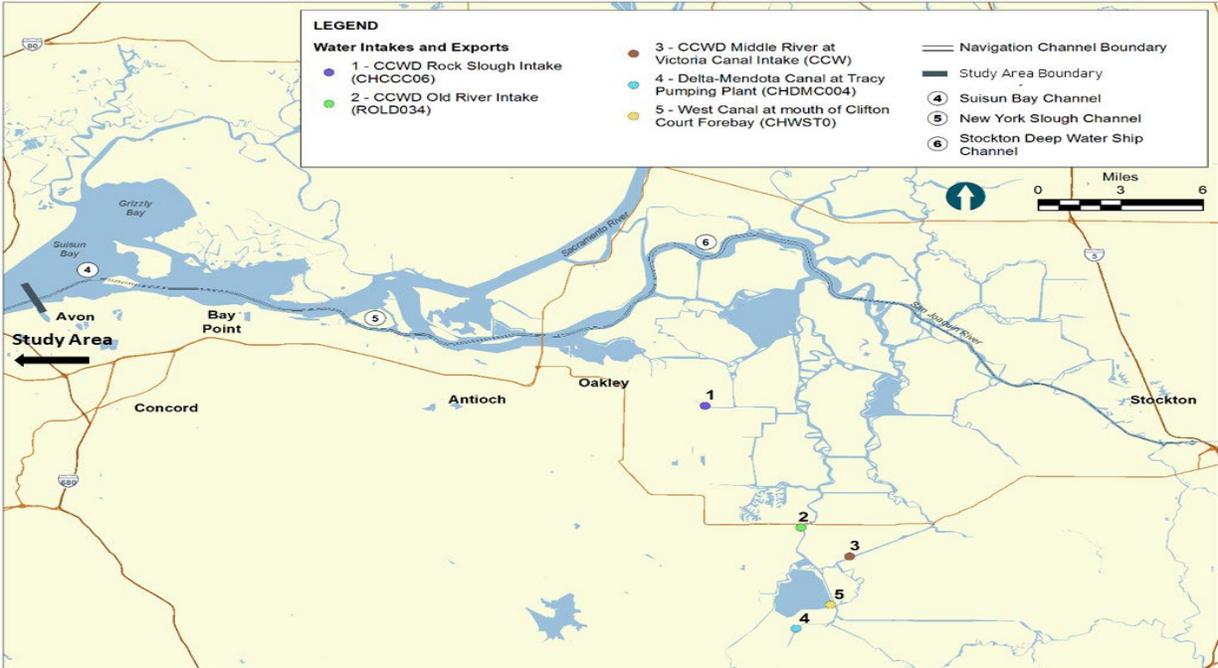


Figure 2-5. Locations of Water Intakes and Water Exports in the Delta.

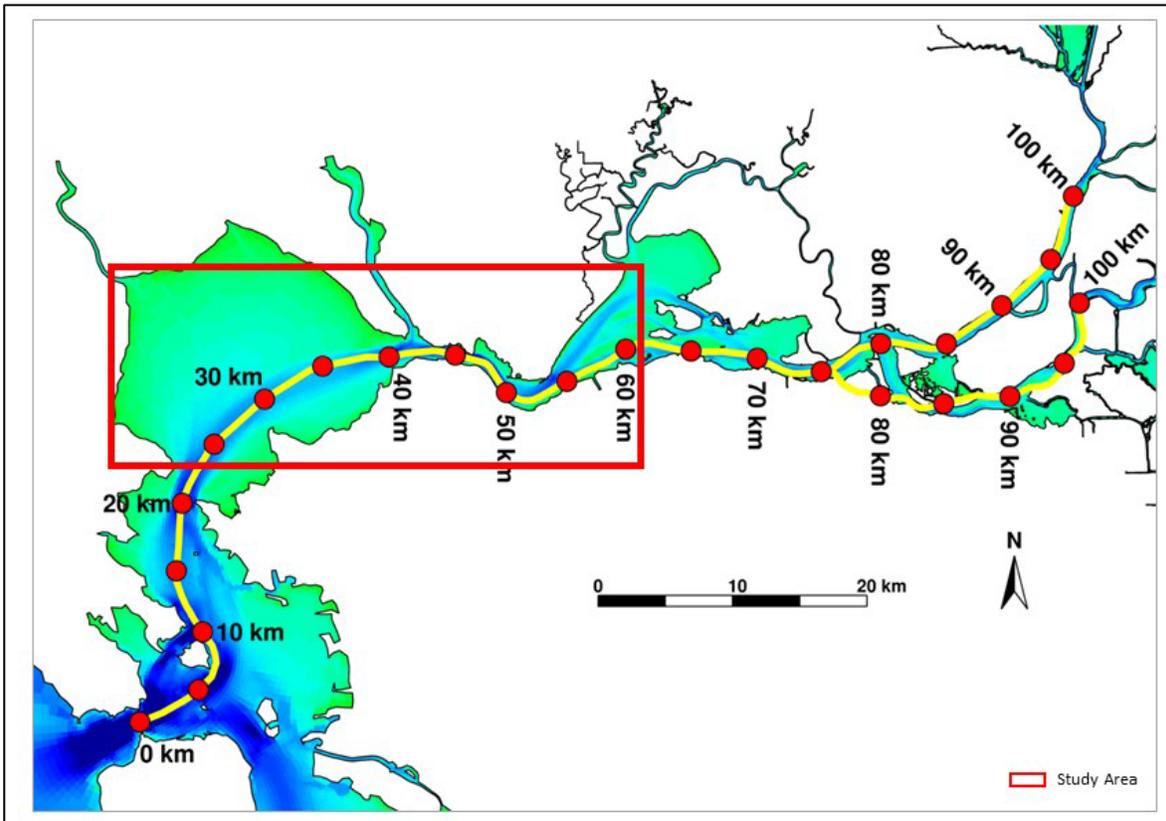


Figure 2-6. Transects Along Axis of Northern San Francisco Bay Used to Measure X2.

To meet the spring and fall X2 requirements, real-time operational changes are made to either increase the upper basin reservoir discharges or decrease Delta exports at the CVP and SWP pump stations or change both to increase the net delta outflow and push the 2 PSU isohaline downstream. While changing pumping rates and reservoir releases can be made with relative precision, the same cannot be said for the measurement of X2 or net Delta outflow. Delta outflow and X2 are utilized when assessing export pumping operations. The estimate for Delta outflow is prepared using a mass balance approach to sum all of the estimated inflows and outflows to compute a Net Delta Outflow Index (NDOI). Several of these flows such as net precipitation and agricultural consumptive use are inherently difficult to measure. The measurement errors from each of the components of the NDOI are additive and under low Delta outflow conditions can be substantial. Measurement of net Delta outflow using Doppler instrumentation is also imprecise, since filtering out tidal exchange volumes (which can be an order of magnitude greater than net outflow) requires accuracy that is beyond the ability of the current technology (particularly when net Delta outflow is below 10,000 cfs).

The measurement of X2 is similarly imprecise. For instance, while X2 is defined as the 2 PSU bottom salinity isohaline location, it is estimated using near surface salinity/electro conductivity measurements collected at four stations spaced approximately 10 kilometers apart. Since bottom salinity differs from surface salinity, an adjustment is applied to transform the interpolated average surface salinity 2 PSU location to the bottom 2 PSU isohaline location. Though the standard X2 estimate uses a single value for the surface to bottom salinity gradient adjustment, there have been several adjustment factors developed since X2 was originally conceived (Hericks et al, 2017). Mathematical estimation of the daily X2 location can also be done using autoregressive equations that consider the prior X2 location and current Delta outflow. The error in X2 location as estimated using autoregressive equations varies between 3.1 and 9.2 kilometer (Hericks et al 2017, MacWilliams et al, 2015).

The inability to accurately estimate X2 and net Delta outflow (NDOI) likely results in operational changes that at times results in either the targeted environmental conditions not being achieved because X2 is under estimated or the targeted environmental conditions are exceeded at the expense of thousands of acre-feet of project water released perhaps unnecessarily due to X2 being over-predicted (Hericks et al, 2017). Given the imprecision in measuring X2 and net Delta inflow, small changes to X2 positioning are generally not considered to be significant.

Impacts to X2 directly affect fish and wildlife through changes to the salinity distribution, and therefore, available low salinity zone habitat. Impacts also potentially affect water supply reliability during periods of the year when the position of X2 is managed by regulating (i.e., increasing) Delta outflow to push the X2 farther west. Within the study area/channel deepening, salinity varies significantly both geographically and seasonally. At the western end of the project area near the West Richmond Channel, salinity is typically around 30 psu, except during periods of very high Delta outflow. At the eastern end of the project area near Avon, salinity levels can be less than 1 psu during very high Delta outflows, but are generally more than 10 psu during periods of lower Delta outflow. Salinity gradients are also pushed seasonally westward into San Pablo Bay during typical periods of high Delta outflow in the winter and spring. In turn, salinity levels in Suisun Bay and the western Delta gradually increase in the summer and fall during periods of generally low Delta outflow. During critical WYs (**Figure 2-3**), Delta outflows can remain low throughout the year, leading to higher salinity in Suisun Bay and the western Delta than during wet WYs (**Figure 2-4**), when higher outflows through the winter and spring months push salinity gradients westward.

The D-1641 water quality objectives for municipal and industrial beneficial reuse stipulates a maximum allowable concentration of 250 milligrams per liter (mg/L) chloride at the municipal water intakes. It also stipulates a 150 mg/L chloride standard at either the intake to the Contra Costa Canal at Pumping Plant No. 1 or the City of Antioch's intake on the San Joaquin River. The 150 mg/L standard must be met for 155 to 240 days per year, depending on the type of WY. High bromide concentrations in raw water diverted from the Delta can also cause high concentrations of disinfection byproducts when water is treated for drinking water purposes. The disinfection byproducts are suspected carcinogens and are regulated by the USEPA. CCWD water plants include several treatment processes to minimize bromide/bromate and disinfection byproducts including coagulation, filtration, granulated activated carbon, chloramination, and ozone. The CCWD has a source water quality goal of 0.050 mg/L bromide concentrations. For the 1992 to 2004 period, the monthly average bromide concentration at the CCWD Rock Slough intake ranges between 0.10 mg/L in April to 0.44 mg/L in December (2010 USBR). In practice, the bromide goal is not typically met since 0.050 mg/L bromide equates to a concentration of 20 mg/L chloride which is well below the average chloride inflow concentration at any of the CCWD intake pump stations.

#### 2.2.3.4 MERCURY AND METHYLMERCURY

Mercury and methylmercury contamination is another long-standing management concern in San Francisco Bay and the Delta. Methylmercury is an organometallic bioaccumulative environmental toxicant produced naturally by bacterial action on inorganic mercury (i.e., methylation). Once formed, methylmercury can also be converted back to inorganic mercury through demethylation.

The microbial mediated processes of methylation and demethylation are complex and often occur simultaneously (LTMS 2010). While the processes are not completely understood, methylmercury production appears to occur primarily in the absence or near-absence of oxygen. Therefore, methylation rates and the total abundance of methylmercury tend to be highest in shallow natural aquatic systems with fine, organic-rich sediments (such as wetlands). Methylmercury can be toxic to humans, fish, and wildlife and is of particular concern because it bioaccumulates and biomagnifies (i.e., becomes present in successively increasing quantities higher up in the food chain) and can cause sub-lethal effects.

The Central Valley RWQCB issued an amendment to the Central Valley Basin Plan that established a total maximum daily load (TMDL) for methylmercury, effective October 2011 (CVRWQCB 2011). The TMDL also requires that dredging activities and dredged material reuse projects in the Delta minimize increases in methylmercury and total mercury discharges to Delta waterways. The potential for methylmercury formation within wetland or upland dredged material placement sites has generated recent attention. Methylmercury can accumulate in wildlife directly from contact with water in the placement sites, or indirectly, after water from the dredged slurry is released back into the receiving water.

The San Francisco Bay RWQCB established a mercury TMDL in 2008 to protect both people who consume Bay fish and aquatic organisms and wildlife. The TMDL calls for Waste Discharge Requirements for dredging and placement operations and requires conducting studies to better understand how their operations affect mercury fate, transport, and biological uptake (USEPA 2015a).

Various studies conducted in the San Francisco Bay and Delta area have examined not only the relationship between mercury, methylmercury, and bioaccumulation, but also potential management practices for minimizing methylmercury generation in the placement sites. These studies suggest methylmercury production, transport, and bioaccumulation can vary widely across a range of spatial and

temporal scales but it appears to be related to the availability (speciation) of inorganic mercury, organic matter, microbial activity (particularly sulfate-reducing and iron-reducing bacteria), and oxidation-reduction (redox) conditions in water and sediment, light level, and hydroperiod. A 2010 symposium on dredging operations and methylmercury convened by the San Francisco Bay LTMS summarized previous and ongoing pertinent research (LTMS 2010). The interim conclusion from the symposium was that although understanding of the relationship between specific environmental factors and mercury methylation is increasing, the current state of the science was not sufficiently advanced to promulgate best management practices (BMPs) for minimizing methylation.

USACE has undertaken studies in the Delta aimed at: (1) understanding the potential for placement sites to act as sources of methylmercury; and (2) identifying BMPs for mitigating methylmercury discharges. The results of these studies indicate that water column concentrations of methylmercury at dredged material placement sites generally increased and appeared to correlate with increases in water column total organic carbon. However, baseline data on both potential receiving water and natural occurrences (e.g., rainfall events) were not collected during this initial effort (Applied Marine Sciences 2010).

As part of its commitment to minimize dredging effects, the Corps has undertaken studies of methylmercury mobilization associated with its dredge material disposal practices. In 2011 and 2014, the Corps conducted sampling of inflow and outflow water at its Roberts Dredge Management Placement Site (USACE 2015) on the Sacramento River Deep Water Ship Channel (DWSC). The results indicated that total mercury concentrations were below the General Order permit standard but that the methylmercury concentration in the effluent was above the 0.06 ng/L Delta TMDL criteria.

McCord and Heim (2015) investigated management practices that would minimize methylmercury production in agricultural fields and wetlands. Their study identified several hydrologic management practices for managed wetlands that would reduce methylmercury concentrations within these systems but did not identify any management practices for unmanaged tidal marshes. The USGS (Valoppi, L, 2018) completed Phase I mercury studies at the South Bay Salt Pond Restoration project in 2015. They investigated the impact of hydrologic manipulation on methylmercury release from a coastal marsh. They found that methylmercury concentrations spiked in marsh discharges that occurred subsequent to opening tidal gates that had been shut for several months. One potential solution that the USGS researchers discussed was potentially limiting periods of no tidal interaction to minimize the potential for increased methylmercury concentrations within tidal marshes. A phase II study was proposed for the South Bay Salt Ponds to further evaluate further methylmercury management measures in tidally influenced wetlands.

#### 2.2.3.5 CHEMICAL POLLUTANTS

The overarching chemical water pollutant issues in the study area result from depleted freshwater flows, municipal and industrial wastewater discharges, agricultural drainage, and runoff. The chemical water pollutant issues for the study area are a result of municipal and industrial wastewater discharges and stormwater runoff. In urban areas, stormwater drainage systems may contain heavy metals and chemicals generated from vehicles and yard chemicals from residential and commercial areas. Because of pollutant loading, the Central Valley and San Francisco Bay Regional Water Quality Control Boards (RWQCBs) have developed and continue to develop programs in an effort to control pollutants from their sources, which include municipal, domestic, industrial, and agricultural wastewater and stormwater.

In San Francisco Bay, the San Francisco Estuary Institute (SFEI) administers a Regional Monitoring Program (RMP) for the San Francisco Bay RWQCB and major dischargers. SFEI conducts monitoring to assess spatial patterns and long-term trends in contamination throughout San Francisco Bay. To assess water quality, metals and organic (e.g., pesticides and polychlorinated biphenyls [PCBs]) contaminants are measured in water samples collected during the dry season. In 2011, results of the RMP showed significant improvements in basic water quality conditions due to investments in wastewater treatment (SFEI 2011). In 2018, results of the RMP report noted among other items that recent monitoring results were used to reclassify Polybromated diphenyl esters (PBDEs) from “moderate concern” to “low concern”. The recent RMP report also indicated that dioxin continues to be a source of use impairment and that storm event sampling showed that the Guadalupe River was a significant source of mercury load to the bay especially from larger storm events (SFEI 2018).

#### 2.2.3.6 NUTRIENTS

When discussing water quality, the term “nutrients” typically refers to nitrogen and phosphorus. Farmers apply fertilizer nutrients in the form of nitrogen, phosphorus, and potassium to prevent these elements from becoming limiting in the soil, and these nutrients eventually enter Delta waters as runoff. In addition, these elements become concentrated in wastewater discharges and can promote aquatic plant and algal growth to an excessive extent. Nitrogen in water can be used by aquatic plants in its inorganic form, either as nitrates or nitrites (combination of nitrogen and oxygen) or as ammonia (a combination of nitrogen and hydrogen). High levels of ammonia are believed to stimulate the growth of phytoplankton and be a threat to aquatic species. The sources of high ammonia contributions are likely wastewater treatment plants and, to a lesser extent, agricultural runoff from the use of nitrogenous fertilizers (CALFED 2009).

Excessive aquatic plant nutrients in the form of nitrogen and phosphorus compounds are causing and/or contributing to water quality issues in the Delta. These issues include:

- Excessive growth of algae causes severe taste and odor problems for domestic water utilities that use Delta water as a raw water source. This requires additional expenditures for water treatment. Harmful algal blooms may be caused by a combination of high nutrient concentrations and warm temperatures. Harmful algae compete with and may exclude diatoms and dinoflagellates, thus reducing primary production. Harmful algal blooms can produce powerful toxins that kill fish, shellfish, mammals, and birds, and may directly or indirectly cause illness in people. *Microcystis aeruginosa* (a common species of cyanobacteria) is an invasive alga that is common in the Delta during warmer months and may contribute to a reduction in copepod productivity (Lehman and Waller 2003).
- Excessive growths of water hyacinth (*Eichhornia crassipes*) and Brazilian elodea (*Egeria densa*), two highly invasive aquatic species, cause ecological impacts, impair recreational use of the Delta, and require herbicides to control, thus adding to water quality concerns. Further, after dying by herbicides, the decomposition of the dead plant materials can cause local declines in dissolved oxygen (DO) levels.
- Nutrient-rich waters may lead to increases in algal growth, which can also reduce DO levels through respiration and subsequent decomposition of the algal mats.
- San Francisco Bay has long been recognized as a nutrient-enriched estuary. However, DO concentrations in San Francisco Bay are much higher and phytoplankton biomass and productivity are substantially lower than would be expected from high nutrient enrichment. Studies suggests that phytoplankton growth and accumulation are largely controlled by a combination of factors,

such as strong tidal mixing, light limitation due to high turbidity, and grazing pressure by clams (Cloern and Jassaby 2012).

#### 2.2.3.7 CLEAN WATER ACT (CWA) 303(D) LISTED IMPAIRED WATERS

Section 303(d) of the CWA requires the identification of water bodies that do not meet, or are not expected to meet, water quality standards (i.e., impaired water bodies). The affected water body, and associated pollutant or stressor, is then prioritized in the 303(d) List. The CWA further requires the development of a TMDL for each listing.

The study area channels are located within portions of San Francisco Bay that are listed as impaired for pesticides (e.g., chlordane, dichloro-diphenyl-trichloroethane (DDT), dieldrin, dioxin and furan compounds), mercury, invasive species, PCBs, selenium, and trash. In greater San Francisco Bay, Suisun Bay and San Pablo Bay are listed for these same parameters, except for trash (SFBRWQCB 2010). In the Delta, the California Department of Water Resources (CDWR) and the Interagency Ecological Program operate several water quality monitoring sites. Based on data collected at these monitoring sites, SWRCB and CVRWQCB have found Delta waters to contain sufficient concentrations of various pollutants that are in violation of water quality standards. As such, the standard of water quality for beneficial reuses identified within the Delta is not being met. The Delta is listed as impaired for insecticides (i.e., diazinon, chlorpyrifos), pesticides, mercury, invasive species, PCBs, and selenium.

Dredging and dredged material placement can release sediment-associated metals and other pollutants by dispersion within the resulting sediment plume (Eggleton and Thomas 2004; Levine Fricke 2004) [LFR]. A number of studies have examined the release of contaminants into the water column (Bloom and Lasora 1999; Pieters et al. 2002; Vale et al. 1998), but general conclusions are difficult to draw because of the complex and specific nature of the physiochemical processes in each case. While the processes and mechanisms are well known, the exact results are dependent on numerous conditions that regulate them. Research to date has investigated the effect of dredging-induced sediment resuspension on many potentially toxic metals. However, despite the many comprehensive studies, there is very little consensus on the release of metals and their effects. Organic contaminants such as pesticides, PCBs, and PAHs (polycyclic aromatic hydrocarbons) are generally not very soluble in water and direct toxicity by exposure to dissolved concentrations in the water column is not very likely. Thus, the resulting short-term water quality impacts due to metal and organic contaminant releases from dredging activities do not appear to be a major issue.

Upstream of the study area, low DO is a concern in the interior Delta particularly upstream of Jersey Island. The causes of low DO include discharge of treated effluent loading from the City of Stockton, agricultural runoff, and reduced flushing of dead-end channels.

#### 2.2.3.8 GROUNDWATER

Most groundwater wells used for potable water in the study area are hundreds of feet deep, due to the thickness of the overburden above the deep aquifer (Wu 2010).

#### 2.2.4 AIR QUALITY

Air quality is affected by the rate, amount, and location of pollutant emissions and the meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions, including wind speed, wind direction, and air temperature, in combination with local surface topography (i.e., geographic

features such as mountains, valleys, and large water bodies), determine the effect of air pollutant emissions on local air quality.

**2.2.4.1 CRITERIA AIR POLLUTANTS**

As required by the Federal Clean Air Act (CAA) passed in 1970, the U.S. Environmental Protection Agency (USEPA) has identified six criteria air pollutants that are pervasive in urban areas and for which state and national health-based ambient air quality standards have been established. The USEPA calls these pollutants “criteria air pollutants” because they are regulated by developing specific public health- and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter (PM), and lead are the six criteria air pollutants regulated by the USEPA. PM is measured in two size ranges: PM10 for particles less than 10 microns in diameter, and PM2.5 for particles less than 2.5 microns in diameter.

**Table 2-6** lists the criteria pollutants and their major health effects.

**2.2.4.2 TOXIC AIR CONTAMINANTS**

Toxic air contaminants (TACs) are air pollutants that may lead to serious illness or increased mortality, even when present in relatively low concentrations. Potential human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity. Individual TACs vary greatly in the health risk they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another.

**Table 2-6. Criteria Pollutants and Health Effects.**

Pollutant	Description	Health Effect
Ozone	Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG, also sometimes referred to as volatile organic compounds or VOC by some regulating agencies) and nitrogen oxides (NO <sub>x</sub> ). The main sources of ROG and NO <sub>x</sub> , often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints and fuels. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process.	Ozone causes eye irritation, airway constriction, and shortness of breath, and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.
Carbon Monoxide	CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. CO concentrations have declined dramatically in California due to existing controls and	Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue, impair central nervous system function, and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal.

Pollutant	Description	Health Effect
	programs and most areas of the state, including the study area, have no problem meeting the state and Federal CO standards.	
Particulate Matter (PM10 and PM2.5)	PM10 and PM2.5 are also termed respirable particulate matter and fine particulate matter, respectively, and are a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from manmade and natural sources.	These particulates are small enough to be inhaled into the deepest parts of the human lung and can cause adverse health effects. Among the criteria pollutants that are regulated, particulates represent a serious ongoing health hazard.
Nitrogen Dioxide (NO <sub>2</sub> )	NO <sub>2</sub> is a reddish brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO <sub>2</sub> . NO <sub>2</sub> may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels.	Aside from its contribution to ozone formation, NO <sub>2</sub> can increase the risk of acute and chronic respiratory disease and reduce visibility.
Sulfur Dioxide (SO <sub>2</sub> )	SO <sub>2</sub> is a colorless acidic gas with a strong odor. It is produced by the combustion of sulfur-containing fuels such as oil, coal and diesel.	SO <sub>2</sub> has the potential to damage materials and can cause health effects at high concentrations. It can irritate lung tissue and increase the risk of acute and chronic respiratory disease (BAAQMD 2012).
Lead	Leaded gasoline (phased out in the U.S. beginning in 1973), lead based paint (on older houses and cars), smelters (metal refineries), and manufacturing of lead storage batteries have been the primary sources of lead released into the atmosphere.	Lead has a range of adverse neurotoxic health effects, of which children are at special risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California.

**2.2.4.3 ODORS**

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person’s reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another. An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Known as odor fatigue, a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity. The occurrence and severity of odor impacts depends on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors. Odor impacts should be considered for any proposed new odor sources located near existing receptors, as well

as any new sensitive receptors located near existing odor sources. Generally, increasing the distance between the receptor and the odor source will mitigate odor impacts.

#### 2.2.4.4 SENSITIVE RECEPTORS

Air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, those with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease, and those with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases.

Land uses such as schools, children's day care centers, hospitals, and nursing and convalescent homes are considered to be more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Parks and playgrounds are considered moderately sensitive to poor air quality because persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality. However, exposure times are generally far shorter in parks and playgrounds than in residential locations and schools. Residential areas are considered more sensitive to air quality conditions compared to commercial and industrial areas because people generally spend longer periods of time at their residences, with associated greater exposure to ambient air quality conditions.<sup>11</sup>

Sensitive receptors include children, adults, and seniors occupying or residing in residential dwellings, schools, colleges and universities, daycares, hospitals, and senior-care facilities. Workers are not considered sensitive receptors because all employers must follow regulations set forth by the Occupation Safety and Health Administration to ensure the health and well-being of their employees.

#### 2.2.4.5 REGIONAL SETTING

The geographic scope of the study area includes the waters within the North San Francisco Bay, San Pablo and Suisun Bays, covering the counties of Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, and San Francisco. The majority of the project area is located within the boundaries of the San Francisco Bay Area Air Basin (SFBAAB), though portions extend into the Sacramento Valley Air Basin (SVAB).

#### 2.2.4.6 SAN FRANCISCO BAY AREA AIR BASIN

The SFBAAB encompasses a nine-county region, which includes all of Alameda, Contra Costa, Santa Clara, San Francisco, San Mateo, Marin and Napa counties, and the southern portions of Solano and Sonoma counties. The Bay Area Air Quality Management District (BAAQMD) has jurisdiction over air quality within the SFBAAB. The climate of the SFBAAB is determined largely by a high-pressure system that is almost always present over the eastern Pacific Ocean off the west coast of North America. During winter, the Pacific high-pressure system shifts southward, allowing more storms to pass through the region. During summer and early fall, when few storms pass through the region, emissions generated within the Bay Area can combine with abundant sunshine under the restraining influences of topography and subsidence inversions to create conditions that are conducive to the formation of photochemical pollutants such as ozone and secondary particulates such as nitrates and sulfates.

#### 2.2.4.7 SACRAMENTO VALLEY AIR BASIN

The SVAB encompasses an eleven-county region, which includes all of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba counties, and portions of Placer and Solano counties. The Yolo-

Solano Air Quality Management District (YSAQMD) is responsible for Yolo County and the eastern portion of Solano County. Other counties within the SVAB are outside of the study area. The climate in the SVAB is Mediterranean. Prevailing winds originate offshore of San Francisco Bay and flow through the Carquinez Strait, then north through the Sacramento Valley. Elevations of the broad valley floor range from 60 to 500 feet above mean sea level. The valley is bordered to the north by the Sierra Cascade Mountains, to the east by the Sierra Nevada, and to the west by the Coast Ranges. The topography and climate of the air basin create a high potential for air inversions. Inversions occur frequently during all seasons. The most stable of these inversions occurs in the late summer and early fall, when cool coastal air is trapped beneath a warm air mass. Photochemical smog (i.e., ozone) trapped in these inversions is often exacerbated when preceded by sunny days with relatively high temperatures. During late fall and winter, air inversions occurring at ground level often result in low-lying fog when valley air becomes trapped and does not mix with coastal air. It is during these periods that the air basin experiences the highest concentrations of CO, NO<sub>x</sub>, and PM.

**2.2.4.8 EXISTING AIR QUALITY**

The BAAQMD, YSAQMD, and the ARB all monitor regional air quality through a network of monitoring stations, which record ambient concentrations of non-attainment criteria air pollutants. Probable future levels of air quality in the study area can generally be inferred from ambient air quality measurements conducted at the nearest monitoring stations by examining trends over time. The data gathered at these monitoring stations present the nearest available benchmark reference point as to what the pollutants of greatest concern are in the region and the degree to which the area is out of attainment with specific air quality standards.

The two closest monitoring stations to the study area in the SFBAAB are in Vallejo and San Pablo. **Table 2-7** shows a 3-year (2015 through 2017) summary of monitoring data for ozone, PM10, and PM2.5 recorded at these stations. These stations recorded no violations of ozone or PM10 standards but identified violations of state and Federal 24-hour PM2.5 standards.

Table 2-8 shows a 3-year (2015 through 2017) summary of monitoring data for ozone, PM10, and PM2.5 recorded at the Vacaville and Davis air monitoring stations, which are the stations closest to the study area within the SVAB. These stations recorded violations of the ozone Federal standards, but no violations of the state or Federal PM2.5 standards. Neither station monitors PM10 concentrations.

The YSAQMD currently meets the USEPA's health standards for five pollutants. The YSAQMD is part of the SVAB regional non-attainment area for ground-level ozone and fine particulate pollution.

**Table 2-7. Summary of Air Quality Monitoring Data within the SFBAAB (2015-2017).**

Pollutant	Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured <sup>a</sup>		
		2015	2016	2017
<b>Ozone</b>				
<i>Vallejo – 304 Tuolumne Street</i>				
Days 1hour State Std. Exceeded	>0.09 ppm <sup>b</sup>	0	1	1
Max. 1hour Conc. (ppm)	-	0.086	0.097	0.105

Pollutant	Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured <sup>a</sup>		
		2015	2016	2017
Days 8hour National Std. Exceeded	>0.070 ppm <sup>c</sup>	0	<b>1</b>	<b>2</b>
Days 8hour State Std. Exceeded	>0.07 ppm <sup>b</sup>	<b>1</b>	<b>1</b>	<b>1</b>
Max. 8hour Conc. (ppm)	-	<b>0.071</b>	<b>0.072</b>	<b>0.088</b>
<b>San Pablo – Rumrill Blvd.</b>				
Days 1hour State Std. Exceeded	>0.09 ppm <sup>b</sup>	0	0	<b>3</b>
Max. 1hour Conc. (ppm)	-	0.084	0.094	<b>0.104</b>
Days 8hour National Std. Exceeded	>0.070 ppm <sup>c</sup>	0	0	<b>2</b>
Days 8hour State Std. Exceeded	>0.07 ppm <sup>b</sup>	0	0	<b>2</b>
Max. 8hour Conc. (ppm)	-	0.062	0.061	<b>0.080</b>
<b>Suspended Particulates (PM10)</b>				
<b>San Pablo – Rumrill Blvd.</b>				
Days Over 24hour National Std.	>150 µg/m <sup>3c</sup>	0	0	0
Days Over 24hour State Std.	>50 µg/m <sup>3b</sup>	0	0	25.8
Max. 24hour Conc. (µg/m <sup>3</sup> )	-	43	33	95.3
Annual Average (µg/m <sup>3</sup> )	>20 µg/m <sup>3b</sup>	18.1	14.9	19.8
<b>Suspended Particulates (PM2.5)</b>				
<b>Vallejo – 304 Tuolumne Street</b>				
Days Over 24hour National Std.	>35 µg/m <sup>3c</sup>	<b>3</b>	0	<b>9</b>
Max. 24hour Conc. (µg/m <sup>3</sup> )	-	<b>41.4</b>	23	<b>101.9</b>
Annual Average (µg/m <sup>3</sup> )	>12 µg/m <sup>3b</sup>	9.6	7.3	11.5
<b>San Pablo – Rumrill Blvd.</b>				
Days Over 24hour National Std.	>35 µg/m <sup>3c</sup>	0	0	<b>9.3</b>
Max. 24hour Conc. (µg/m <sup>3</sup> )	-	33.2	19.5	<b>71.2</b>
Annual Average (µg/m <sup>3</sup> )	>12 µg/m <sup>3b</sup>	8.9	8.0	10.7
<b>NOTES</b>				
<i><b>Bold values are in excess of applicable standard</b></i>				
<i>conc. = concentration</i>				
<i>ppm = parts per million</i>				
<i>ppb = parts per billion</i>				
<i>µg/m<sup>3</sup> = micrograms per cubic meter</i>				
<i>N/A = not applicable</i>				
<sup>a</sup> Number of days exceeded is for all days in a given year, except for particulate matter. PM10 and PM2.5 are monitored every six days.				
<sup>b</sup> state standard, not to be exceeded.				
<sup>c</sup> Federal standard, not to be exceeded.				

Source: CARB 2016

**Table 2-8. Summary of Air Quality Monitoring Data within the SVAB (2015-2017).**

Pollutant	Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured <sup>a</sup>		
		2015	2016	2017
<b>Ozone</b>				
<b>Vacaville – Ulatis Drive</b>				
Days 1hour State Std. Exceeded	>0.09 ppm <sup>b</sup>	0	0	0
Max. 1hour Conc. (ppm)	-	0.085	0.092	0.089
Days 8hour National Std. Exceeded	>0.070 ppm <sup>c</sup>	0	<b>1</b>	<b>2</b>
Days 8hour State Std. Exceeded	>0.07 ppm <sup>b</sup>	<b>1</b>	<b>1</b>	<b>2</b>
Max. 8hour Conc. (ppm)	-	0.070	<b>0.072</b>	<b>0.079</b>
<b>Davis – UCD Campus</b>				
Days 1hour State Std. Exceeded	>0.09 ppm <sup>b</sup>	0	0	0
Max. 1hour Conc. (ppm)	-	0.081	0.083	0.078
Days 8hour National Std. Exceeded	>0.070 ppm <sup>c</sup>	<b>1</b>	<b>1</b>	<b>1</b>
Days 8hour State Std. Exceeded	>0.070 ppm <sup>b</sup>	<b>1</b>	<b>1</b>	<b>1</b>
Max. 8hour Conc. (ppm)	-	<b>0.071</b>	<b>0.072</b>	<b>0.071</b>
<b>Suspended Particulates (PM<sub>2.5</sub>)</b>				
<b>Davis – UCD Campus</b>				
Days Over 24hour National Std.	>150 µg/m <sup>3</sup> <sup>c</sup>	NA	NA	NA
Days Over 24hour State Std.	>50 µg/m <sup>3</sup> <sup>b</sup>	NA	N/A	N/A
Max. 24hour Conc. (µg/m <sup>3</sup> )	-	36.3	30.5	<b>59.2</b>
Annual Average (µg/m <sup>3</sup> )	>20 µg/m <sup>3</sup> <sup>b</sup>	10.1	NA	NA
<b>NOTES</b>				
<b>Bold values are in excess of applicable standard</b>				
<i>conc. = concentration</i>				
<i>ppm = parts per million</i>				
<i>ppb = parts per billion</i>				
<i>µg/m<sup>3</sup> = micrograms per cubic meter</i>				
<i>NA = not applicable</i>				
<sup>a</sup> Number of days exceeded is for all days in a given year, except for particulate matter. PM10 and PM2.5 are monitored every six days.				
<sup>b</sup> state standard, not to be exceeded.				
<sup>c</sup> Federal standard, not to be exceeded.				

Source: CARB 2016

### 2.2.5 CLIMATE CHANGE

Global warming is the increase in average global temperatures of the earth’s surface and atmosphere. The natural balance of GHGs in the atmosphere regulates the earth’s temperature. Without this natural

greenhouse effect, the earth's surface would be approximately 60° F cooler (U.S. Global Change Research Program 2014) [USGCRP]. Various gases in the earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth's surface temperature through the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), ozone (O<sub>3</sub>), water vapor, nitrous oxide (N<sub>2</sub>O), and chlorofluorocarbons (CFCs). Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for enhancing the greenhouse effect, or climate change, which contributes to global warming.

Existing sources of GHGs in the study area are extensive and include vehicles, marine vessels, industry, and farms. However, the effect of GHGs differ from other pollutants in that they do not directly impact local or even regional settings and are not often the effect of individual large sources. Rather, excess GHG emissions from many different sources combine to increase mean global temperatures, which in turn have numerous direct and indirect effects on the environment and humans on regional and local scales.

In California, an assessment of climate change impacts predicts that temperatures will increase from 4.1° F to 8.6° F by 2100, based on low and high global GHG emission scenarios (CCCC 2012). In 2013, the California Office of Environmental Health Hazard Assessment report identified changes to California's climate because of GHG emissions (OEHHA 2013). Changes identified in the report include the following:

- Exacerbation of air quality problems,
- Reduction in municipal water supply from the Sierra snowpack,
- SLR that could displace coastal businesses and residences,
- Increase in wildfires,
- Damage to marine and terrestrial ecosystems, and
- Increase in the incidence of infectious diseases, asthma, and other human health problems (CCCC 2012).

Observed environmental changes in California due to global warming include rising temperatures, rising sea levels, a lengthened growing season, and shifts in plant and animal ranges. At a local level, the navigation channel and surrounding area may be at greater risk of changing weather patterns, such as the current drought affecting water resources, the increasing intensity of rainfalls that can cause localized flooding, and the local effects from SLR. As discussed above, because the effects of climate change are regional in nature, the environmental setting in regards to climate change is the same throughout the study area.

## 2.2.6 BIOLOGICAL RESOURCES

The affected environment for biological resources was identified from existing information available for the San Francisco Bay Area and Sacramento San Joaquin Delta.

### 2.2.6.1 HABITAT TYPES

The study area provides habitat for a wide variety of aquatic species, including species associated with the benthos, such as annelids, mollusks, and crustaceans; phytoplankton and zooplankton; common fish species; special status fish species; invasive aquatic plants, fish, and invertebrates; and marine mammals. Aquatic habitats include tidal marsh and tidal mudflats; intertidal, shallow sub-tidal, and deep sub-tidal habitats; managed wetlands; rocky intertidal and subtidal; and open bay waters. Land adjacent to the San Joaquin River as it passes through the Delta is primarily used for agricultural purposes with pockets of

residential, commercial, and industrial development. Much of the land adjacent to the Carquinez Strait, San Pablo Bay, and the San Francisco Bay is developed. Suisun Bay is adjacent to Suisun Marsh and other wetland areas, as well as some developed shorelines. Land adjacent to Suisun Bay, the Carquinez Strait, San Pablo Bay, and the San Francisco Bay is largely developed. The habitat types around the Bay and Delta often blend with one another and with nearby upland habitats in transition zones called ecotones. Species found in these areas often occur in more than one habitat type (USACE 2014a).

**Tidal Marsh.** Tidal marsh habitat is comprised of tidally inundated vegetated wetland that may be salt or brackish, depending on the extent of freshwater influence. The plant communities found in this marsh-type habitat are influenced by salinity, substrate, wave energy, marsh age, erosion, and accretion. Marshes provide important rearing and refuge habitat for juvenile salmon, steelhead, and longfin smelt, and a wide variety of birds use tidal marshes for nesting, foraging, and refuge.

Tidal marshes occur at scattered locations along the waterways of the Delta and Bay, at the margins of San Pablo Bay, and in Suisun Marsh. The Suisun Marsh is located north of San Pablo Bay and Grizzly Bay. Suisun Marsh includes 52,000 acres of managed wetlands; 27,700 acres of upland grasses; 6,300 acres of tidal wetlands; and 30,000 acres of bays and sloughs. The Marsh serves as the resting and feeding ground for thousands of waterfowl migrating on the Pacific Flyway. Suisun Marsh is designated EFH for Pacific salmonids and Pacific groundfish, as well as critical habitat for Chinook salmon, steelhead, delta smelt, and green sturgeon. Suisun Marsh supports the state's commercial salmon fishery by providing important tidal rearing areas for juvenile fish, which allows them to grow twice as fast as those reared in the upper watershed, which greatly enhances their survival (Interagency Ecological Program n.d.) [IEP].

**Tidal Mudflats.** Tidal mudflats occur from below mean lower low water (MLLW) to mean tide level. These flats are characterized by a fine-grained silt and clay substrate and usually include minimal vascular vegetation. They are generally associated with tidal freshwater or brackish emergent wetlands at their upper edge and the tidal perennial aquatic community at their lower edge. Tidal mudflats support ecologically important benthic communities that include aquatic worms (*Oligochaeta*), crustaceans, and mollusks and provide fertile feeding grounds for various shorebird species. When the tidal mudflat community is flooded at high tide, it serves as shallow open water habitat for pelagic fish species (including Sacramento splittail and salmonids) and benthic fish species (including sturgeon) (CDWR 2013).

**Rocky Intertidal and Subtidal Habitat.** Rocky intertidal and subtidal habitat occurs around the margins of the Central Bay and San Pablo Bay. A diversity of wildlife occurs in these areas, which provide encrusting habitat for invertebrates that in turn attract foraging fishes. Pacific herring spawn on rocky habitat and the algae attached to rocky substrates (State Coastal Commission 2010) [SCC]. Shorebirds also utilize these habitats, and harbor seals often come ashore (haul out) on rocky shores (USACE 2014a).

**Open Bay.** The open bay includes both deep waters (deeper than -18 feet MLLW) and shallow bay waters (shallower than -18 feet MLLW) which comprise a majority of the open bays. Deep bay areas are inhabited by free swimming invertebrates and fish and provide roosting habitat for waterbirds. A variety of fish species inhabit the shallow bay which provides Pacific herring spawning habitat and functions as nursery habitat for juvenile halibut and sanddabs (*Citharichthys stigmaeus*), shiner perch (*Cymatogaster aggregata*), herring, and other fishes. Eelgrass, the Bay's only rooted seagrass, is present in some shallow bay areas. Several species of fish frequent both the deep and shallow bay, as do marine mammals. Anadromous fish use both the deep and shallow bays as migratory pathways (USACE 2014a).

**Managed Wetlands.** Managed wetlands are intentionally flooded and managed to enhance habitat values for specific wildlife species. Managed wetlands are present in Suisun Marsh (CDWR 2013).

**Terrestrial Habitats.** The proposed dredged material placement sites are the only areas that include terrestrial habitat and are described within relevant environmental documents prepared for each site (USACE and SCDEM 1998; USFWS and CDFW 2008).

#### 2.2.6.2 AQUATIC SPECIAL STATUS SPECIES

The discussion presented in this section is limited to protected aquatic resources, including Federal and/or state endangered or threatened species and their habitats; candidate Endangered Species Act (ESA) and California Endangered Species Act (CESA) species and their habitats; species of special concern and their habitats; and designated critical habitat for federally listed species. **Appendix G - Attachment 4** includes a list of aquatic special status species with recorded occurrences in the study area and identifies habitat types suitable for these species.

**Special Status Fish Species and Critical Habitat.** **Table 2-9** provides a summary of the habitat requirements; occurrence, life stage, and timing information; and designated critical habitat for special status fish species expected to occur in the study area.

Several species listed in **Table 2-9** have been identified as occurring in the study area by the California Department of Fish and Wildlife's (CDFW's) Fall Midwater Trawl (FMWT) program (CDFW 2015a). Additionally, USACE has conducted entrainment monitoring aboard the hopper dredge *Essayons* periodically since 2010 in Suisun Bay and San Pablo Bay (DR Reed et al. 2018). A discussion of these studies and results are provided below. In general, the dredging work windows that will be used (i.e., August 1 to November 30 at Bulls Head Reach and June 1 to November 30 at Pinole Shoal) will avoid most impacts to salmonids and limit impacts to other species due to the reduced time of exposure especially during spawning. The use of clamshell dredging for this project is thought to greatly reduce the likelihood of dredge entrainment.

The CDFW's FMWT began in 1967 and has sampled every year except 1974 and 1979 (CDFW 2014; Feyrer et al. 2007; Stevens and Miller 1983). The FMWT samples at more than 100 stations from San Pablo Bay landward into the Sacramento-San Joaquin Delta. Each station is typically sampled once each month from September through December. The FMWT was designed to index the year-to-year relative abundance of juvenile (age-0) striped bass (*Morone saxatilis*) (Stevens and Miller 1983). However, all captured species are identified and measured and the FMWT has become a long-term indicator of population trajectories for several small, pelagic fish, including delta smelt (Moyle et al. 1992; Sommer et al. 2007). The FMWT sampling methods are less likely to encounter mature individuals of larger species such as green sturgeon, salmonids, and striped bass.

**Table 2-9. Special Status Fish Species with Potential to Occur in the Study Area.**

DPS/ESU	Legal Status	Habitat Association	Occurrence	Critical Habitat in Study Area
Southern DPS green sturgeon ( <i>Acipenser medirostris</i> )	Federal threatened/ state species of special concern	Spawns in fast-moving, cool freshwater habitat in Sacramento, Klamath, and Trinity Rivers; juveniles rear in estuarine waters	Throughout Sacramento San Joaquin Delta and San Francisco Bay; spawn primarily in upper main stem of Sacramento River	Critical habitat present within the Sacramento-San Joaquin Delta and Suisun, San Pablo, and San Francisco bays
Delta smelt ( <i>Hypomesus transpacificus</i> )	Federal threatened/ state endangered	Inhabits open surface water; spawns primarily in sloughs and shallow edge-waters of channels in the upper Delta and Sacramento River	Known to occur in Sacramento-San Joaquin Delta and seasonally in Suisun Bay, Carquinez Strait, and San Pablo Bay	Critical habitat includes the Delta west to Carquinez Bridge
Sacramento River winter-run ESU Chinook salmon ( <i>Oncorhynchus tshawytscha</i> )	Federal endangered /state endangered	Migrates through the northern and central portions of San Francisco Bay; spawns in the spring and summer, primarily in the Sacramento River	Commonly found migrating through the northern portion of San Francisco Bay; spawn primarily in the Sacramento River	Critical habitat present in all waters from Sacramento River at Chipp’s Island to San Francisco Bay (north of the San Francisco/Oakland Bay Bridge)
Central Valley spring-run ESU Chinook salmon ( <i>Oncorhynchus tshawytscha</i> )	Federal threatened/ state threatened	Spawns in freshwater; juveniles rear in fresh and estuarine water before migrating to ocean	Commonly found migrating through the northern portion of San Francisco Bay; spawn in the Sacramento River Basin	Critical habitat present within the San Francisco-San Pablo-Suisun Bay complex
Central Valley DPS steelhead ( <i>Oncorhynchus mykiss irideus</i> )	Federal threatened	Spawns in freshwater; juveniles rear in fresh and estuarine water before migrating to ocean	Populations in the San Joaquin River and its tributaries	Critical habitat includes portions of the San Francisco-San Pablo-Suisun Bay estuarine complex
Central Coast DPS steelhead	Federal threatened/ state species of special concern	Spawns in freshwater; juveniles rear in fresh and estuarine water before migrating to ocean	Spawn in tributaries of San Francisco Bay, including in the San Joaquin watershed	Critical habitat includes portions of the San Francisco-San Pablo-Suisun Bay estuarine complex

DPS/ESU	Legal Status	Habitat Association	Occurrence	Critical Habitat in Study Area
Longfin smelt ( <i>Spirinchus thaleichthys</i> )	state threatened, state species of special concern/ Federal candidate	Euryhaline, nektonic, and anadromous; found in open waters of estuaries, mostly in middle or bottom of water column	Spawn from Suisun Bay into upper area of estuary near Rio Vista; larval longfin smelt concentrated in Suisun and San Pablo bays	No critical habitat
Central Valley fall-run/late-fall-run ESU Chinook salmon ( <i>Oncorhynchus tshawytscha</i> )	state species of special concern	Spawns in freshwater; juveniles rear in fresh and estuarine water before migrating to ocean	Commonly found migrating through the northern portion of San Francisco Bay; spawn in the Sacramento and San Joaquin River basins	No critical habitat
River lamprey and Pacific lamprey ( <i>Entosphenus tridentatus</i> ; <i>Lampetra ayresii</i> )	state species of special concern	Spawns in freshwater habitats in riffles; ammocoetes rear in freshwater benthos for 3 to 5 years before emerging and migrating to Ocean	Found in the San Francisco Bay, San Joaquin Delta, San Pablo Bay, and Suisun Bay watersheds	No critical habitat
Sacramento splittail ( <i>Pogonichthys macrolepidotus</i> )	state species of special concern/ Federal candidate	Slow moving river sections, dead end sloughs; requires flooded vegetation for spawning and foraging for young	Range includes the lower part of the Delta and sloughs adjoining Suisun and San Pablo bays	No critical habitat
Sacramento perch ( <i>Archoplites interruptus</i> )	state species of special concern	Historically found in the sloughs, slow-moving rivers, and lakes of the Central Valley	May be extirpated from native Delta (Crain et al. 2007)	No critical habitat

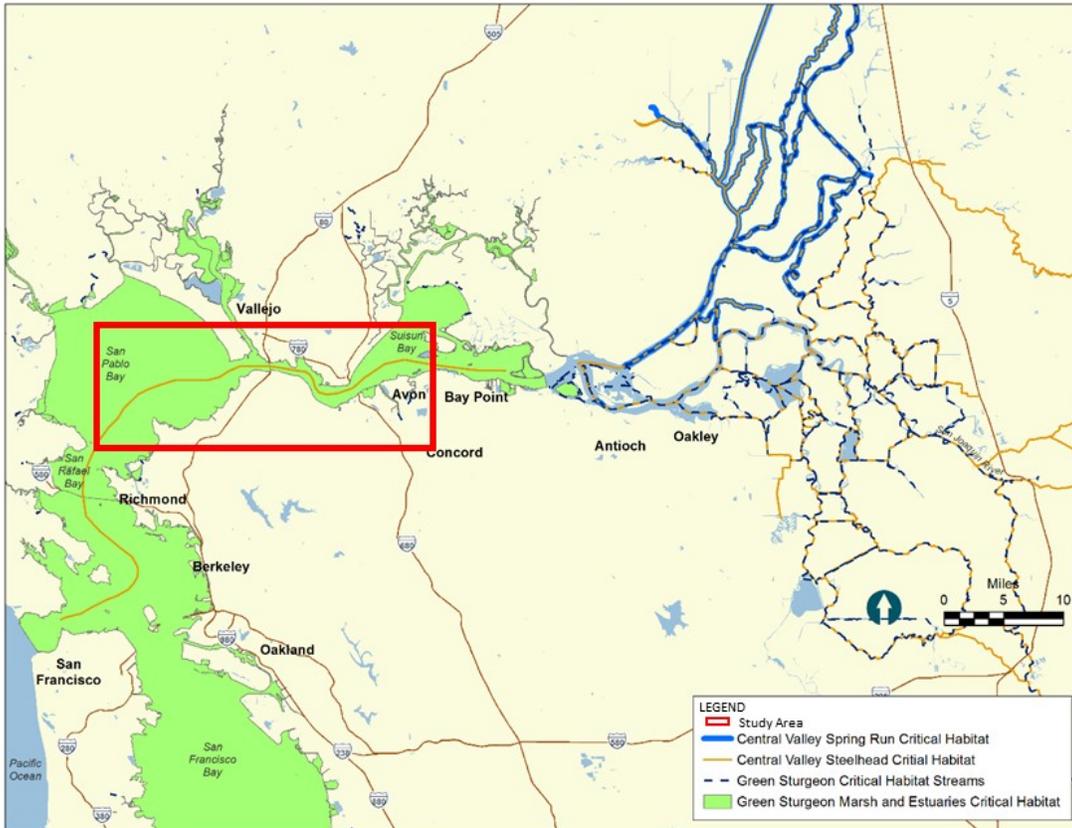
DPS = Distinct Population Segment      ESU = Evolutionarily Significant Unit      NA = Not applicable

Southern Distinct Population Segment Green Sturgeon (*Acipenser medirostris*) (Federal Threatened; State Species of Special Concern). The Southern Distinct Population Segment (DPS) of green sturgeon includes fish that inhabit the San Francisco Bay and Delta and spawn in the Sacramento River basin. Sub-adults and adults of this species inhabit nearshore oceanic waters, bays, and estuaries while also migrating to and from freshwater habitats. Freshwater occurrence of this species transpires during the early life-history stage (less than 4 years old), and later when adults return to freshwater to spawn (spawn age range of 10 to 15 years old). Spawning occurs in the spring and summer, as recorded in the upper Sacramento River and tributaries such as the Feather, Yuba, and American rivers. During the juvenile stage, green sturgeon can be found throughout the freshwater portions of their habitat the entire year. Juveniles of two apparent size groups (fork length range of 20 to 58 cm) have been collected in the Sacramento and San Joaquin rivers and Suisun Bay. However, there are substantial gaps regarding knowledge of this species’ biology, ecology, and habitat within the study area (USACE 2015e).

Green sturgeon individuals were not collected during the 2014 USACE maintenance dredging surveys, although individuals have been collected in the Stockton DWSC during previous years (USACE 2015f). This includes a total of four green sturgeon individuals from 2005 through 2014, all of which were collected during community monitoring, with none having been entrained by dredging equipment.

A primary factor for the decline of the green sturgeon is the restriction of spawning habitat to a limited area below Keswick Dam. Also contributing to the decline are flows of sufficient velocity to initiate the upstream spawning migration (Kohlhorst et al. 1991 as cited in CDFG 2002; NOAA 2008). Reduced flows have been identified as a factor in weakened year class recruitment in the white sturgeon population and are believed to have the same effect on green sturgeon recruitment. In addition to the adverse effects of impassable barriers, numerous agricultural water diversions exist in the Delta along the migratory route of larval and juvenile sturgeon. Entrainment and impingement in water pumps and screens are serious threats to sturgeon during their downstream migration. Sturgeon are also susceptible to uptake of contaminants from contaminated sediments through both dermal contact and incidental ingestion of sediments while feeding. Bioaccumulation is also a concern due to their long life. All of the above threats were identified by the NMFS Biological Review Team as potentially affecting the continued existence of the southern DPS of green sturgeon (70 FR 17386).

Critical habitat for the green sturgeon was designated on October 9, 2009 (50 FR 226). In California, critical habitat for green sturgeon in the Delta includes all waterways up to the elevation of mean higher high water (MHHW) within the area defined in California Water Code 12220, although some waterways are specifically excluded. As shown in **Figure 2-7**, the entire San Francisco Bay below MHHW is also designated as critical habitat, which includes the portion of San Francisco Bay that overlaps with the study area (NOAA 2009).



**Figure 2-7. Designated Critical Habitat for Green Sturgeon and Central Valley Steelhead in the Northern San Francisco Bay System and Watershed.**

Central Valley Distinct Population Segment Steelhead (*Oncorhynchus mykiss*) (Federal Threatened, State Threatened). The Central Valley DPS of steelhead includes all populations in the Sacramento and San Joaquin rivers and their tributaries. The current distribution ranges from Keswick Dam in the Upper Sacramento River to the Merced River in the San Joaquin River Basin, with distribution primarily limited by impassable dams.

Anadromous adults of the Central Valley steelhead Evolutionarily Significant Unit (ESU) make their upstream spawning migrations beginning in July (peaking in September and October) after residing in the ocean for 2 to 3 years. Spawning occurs from December through April. The study area is primarily used as a migration corridor. Spawning, incubation, and the majority of rearing occurs farther upstream than the study area. Juveniles reside in freshwater from 1 to 3 years, primarily occurring near the surface and in the water column above the benthos when over deeper waters. Juveniles feed on a diverse array of aquatic and terrestrial insects and other small invertebrates. Most juvenile Central Valley steelhead are found migrating through the study area during the spring, although outmigration occurs from December through August (USACE 2015e). No steelhead specimens have been encountered during USACE entrainment and community monitoring conducted during annual dredging from 2005 through 2014 (USACE 2015f). USACE maintenance dredging of the Stockton DWSC was accomplished in 2006 and 2007

during the June 1 through December 31 dredging windows, and from 2008 to the present during August 1 through November 30 dredging window.

Factors that limit productivity of steelhead populations include periodic reversed flows due to high water exports (drawing juveniles into large diversion pumps); loss of fish into unscreened agricultural diversions; predation by introduced species; and reduction in the quality and quantity of rearing habitat due to channelization, pollution, riprapping, and other factors (CACST 1988; Dettman et al. 1987; Kondolf et al. 1996a, 1996b as cited in NOAA 2006).

*Central Valley Spring-Run Evolutionarily Significant Unit Chinook Salmon (*Oncorhynchus tshawytscha*) (Federal Threatened, State Threatened)*. The Central Valley spring-run ESU of Chinook salmon is one of four distinct runs of salmon that spawn in the Sacramento-San Joaquin River system. The Chinook was historically the most abundant salmon species in the Central Valley. Populations remain in some tributaries of the Sacramento River, including Butte, Mill, Deer, Antelope, and Beegum creeks and the Yolo Bypass.

In general, spring-run Chinook salmon are found in the Suisun Marsh/North San Francisco Bay, Delta, Sacramento River, Feather River/Sutter Basin, Butte Basin, and North Sacramento Valley Ecological Zones (CDFG 1998). Spring-run Chinook adults typically migrate upstream to spawn from April to October, and spawn from August through October. Chinook alevins have been collected from Suisun Bay in January and February. Larger parr juveniles have been found from April to June. Juvenile life stages are commonly found inshore, in shallow water and throughout estuarine habitat. Some Chinook salmon delay their downstream migration until the early smolt stage. Juvenile outmigration peaks from May to June (USACE 2015e).

Similar to Central Valley steelhead, factors that limit productivity of salmonid populations include periodic reversed flows due to high water exports (drawing juveniles into large diversion pumps); loss of fish into unscreened agricultural diversions; predation by introduced species; and reduction in the quality and quantity of rearing habitat due to channelization, pollution, riprapping, and other factors (CACST 1988; Dettman et al. 1987; Kondolf et al. 1996a, 1996b as cited in NOAA 2006).

*Central Valley Fall-run/Late-fall-run Evolutionarily Significant Unit Chinook Salmon (*Oncorhynchus tshawytscha*) (State Species of Special Concern)*. The Central Valley fall-run and late-fall-run ESU of Chinook salmon are two of the four distinct runs of salmon that spawn in the Sacramento-San Joaquin River system. Late-fall-run Chinook are often larger than fish from other runs. They are most similar genetically to fall-run Chinook and are often combined into a single ESU, despite having distinctive life histories. The NMFS designated the Central Valley fall-run/late-fall-run Chinook salmon ESU as a candidate for listing on September 16, 1999, although the listing was later deemed unwarranted (50 CFR 223; NMFS 2009). The Central Valley fall-run/late-fall-run Chinook salmon ESU is a state species of special concern. The ESU includes all naturally spawned populations of fall-run Chinook salmon in the Sacramento and San Joaquin River Basins and their tributaries, east of Carquinez Strait. Fall-run Chinook are the most abundant run in the Central Valley (Moyle 2002).

Fall-run Chinook spawn in upstream reaches of the Sacramento River from October through December, peaking in late October and November. Fall-run Chinook emerge between approximately December and March and out-migrate to the ocean between December and June. Late-fall-run adults enter the Sacramento River from October through April and spawn from January to April, peaking in February and

March. Late-fall-run Chinook fry typically emerge from April to June and rear year-round. Fall-run Chinook tend to mature in the ocean before returning to spawn, while late-fall-run Chinook may return to freshwater as immature adults (BCAG 2011).

*Sacramento River Winter-run Evolutionarily Significant Unit Chinook Salmon (*Oncorhynchus tshawytscha*) (Federal Endangered, State Endangered)*. The Sacramento River winter-run ESU of Chinook salmon differs from other Chinook ESUs in that they have characteristics of both stream- and ocean-type races (Healey 1991). Study area waters are primarily used by winter-run Chinook for adult spawning migrations and juvenile out-migrations, with some usage overlap for juvenile rearing. Winter-run Chinook spawning occurs in accessible upper reaches of the Sacramento River basin from April through July, with adults migrating upstream from December to July. Chinook alevins have been collected from Suisun Bay in January and February. Larger parr juveniles have been found from April to June. Juvenile life stages are commonly found inshore, in shallow water and throughout estuarine habitat. Some Chinook salmon delay their downstream migration until the early smolt stage. Juvenile outmigration peaks from May to June (USACE 2015f).

Activities identified by the NMFS (NOAA 1994) that affect winter-run Chinook habitat include water management operations by the Central Valley Project (CVP) and the State Water Project (SWP), small and large water diversions by other private entities, bank restoration, dredging, and other construction-related activities in the Sacramento River and Delta.

*Longfin Smelt (State Threatened, Federal Candidate)*. Longfin smelt is state-listed as threatened and is a Federal candidate species. Longfin smelt, a small sized euryhaline and anadromous fish, was historically among the most abundant fish in the San Francisco estuary and the Delta. Significant declines in longfin smelt abundance have occurred throughout its range during the past quarter century. Longfin smelt are distinguished by their long pectoral fins, which reach or nearly reach the base of their pelvic fins. They reach a maximum size of about 150 mm (total length), and reach maturity near the end of their second year. As they mature in the fall, adults found throughout San Francisco Bay migrate to brackish or freshwater in Suisun Bay, Montezuma Slough, and the lower reaches of the Sacramento and San Joaquin rivers. Spawning adults congregate at the upper end of Suisun Bay and in the lower and middle Delta, especially in the Sacramento River channel and adjacent sloughs (USACE 2015f). Spawning occurs primarily from January through March, after which most adults die (CDFG 2009a). In April and May, juveniles are believed to migrate downstream to San Pablo Bay. Juvenile longfin smelt are collected throughout the Bay during the late spring, summer, and fall and occasionally venture offshore as far as the Gulf of the Farallones. Juveniles typically inhabit the middle and lower portions of the water column (USACE 2015f).

Since 1967, CDFW has conducted monthly trawl surveys for longfin smelt during September through December at sampling sites throughout the Sacramento and Stockton DWSCs. The FMWT samples 122 stations each month from September to December and a subset of these data is used to calculate an annual abundance index. These 122 stations range from San Pablo Bay upstream to Stockton on the San Joaquin River, Hood on the Sacramento River, and the Sacramento Deep Water Ship Channel. Survey results from 8-year period 2010 through 2018 are presented in **Table 2-10**. Longfin smelt populations have seen a significant decline since CDFW surveys began in 1967, when a total of 81,737 individuals were collected (CDFW 2015b).

**Table 2-10. CDFW Fall Midwater Trawl Indices for Longfin Smelt.**

Year	September	October	November	December	Total
2010	2	7	4	178	191
2011	68	16	92	301	477
2012	6	2	17	36	61
2013	8	28	21	107	164
2014	6	3	5	2	16
2015	0	0	0	4	4
2016	3	0	2	2	7
2017	6	23	25	87	141
2018	13	5	8	26	52

Source: CDFW 2015b, updated in 2019.

The annual abundance of longfin smelt is significantly and positively correlated with the amount of freshwater flow during spawning and larval periods (Baxter 1999; Hieb and Baxter 1993; Jassby et al. 1995; Stevens and Miller 1983). Three factors were identified as potentially responsible for this significant correlation: (1) a reduction in predation during high flows; (2) increased habitat availability that may improve survival by reducing intraspecies competition; and (3) an increase in nutrients stimulating the base of the food chain (Stevens and Miller 1983). However, the relationship changed to substantially lower longfin smelt abundance after the introduction of the invasive Amur River clam in the late 1980s. This corresponded with a decline in phytoplankton and zooplankton abundance due to grazing by the Amur River clam (Bennett et al. 2002). Other introduced species such as striped bass and inland silversides have had an impact on longfin smelt populations due to predation (CDFG 2009b).

In 2004, numbers of longfin smelt (along with other pelagic species including Delta smelt, striped bass, and threadfin shad) exhibited a sharp decline in abundance that has continued to the present time. The Pelagic Organism Decline (POD) phenomenon is currently under investigation to better understand how stock-recruitment effects, declines in habitat quality, increased mortality rates, and reduced food availability due to invasive species may be working separately or together to contribute to declining abundance of longfin smelt and other pelagic species.

*Delta Smelt (Hypomesus transpacificus) (Federal Threatened, State Endangered).* The delta smelt is a euryhaline fish with a habitat range extending from the lower reaches of the Sacramento and San Joaquin rivers, through the Delta, and into Suisun Bay. This Delta endemic species is currently found in very low abundance within the Sacramento and Stockton DWSCs.

Delta smelt was listed as a threatened species under the ESA on March 5, 1993 (58 FR 12854). The state status of delta smelt under CESA was elevated from threatened to endangered (March 4, 2009). On March 24, 2009, the USFWS initiated a 5 year status review of delta smelt. As of April 7, 2010, and again reconfirmed on December 5, 2014 (79 FR 72450), reclassification status of delta smelt to endangered was found warranted but precluded by other higher priority ESA listing actions (75 FR 17667).

Presence and abundance of delta smelt is closely associated with salinities between 0 and 7 practical salinity units (psu). The upper salinity tolerance for this species is 19 psu, with a strong preference for habitat near or upstream of the 2 psu isohaline. Delta smelt are not present in waters over 25°C and are

rarely found in water temperatures above 22°C. Spawning habitat is present in dead-end sloughs, near inshore areas of the Delta, and shallow fresh water channels of the Delta and Suisun Bay. During the fall prior to spawning, delta smelt congregate in upper Suisun Bay and the lower reaches of the Delta. The spawning period is estimated to be from February to June. Delta smelt may prefer spawning over vegetation, if present, but often deposit their eggs over submerged tree branches and stems or in open water over sandy and rocky substrate, and they may even use the shallower areas of Delta levees. Eggs are demersal and adhesive. Newly hatched larvae float near the surface of the water, with movements following tides and discharge. Sommer and Meija (2013) state that delta smelt are more commonly associated with lower salinities and higher turbidities, moderate temperatures, and some tidal influence (USACE 2015f).

Larger juveniles and adults are most abundant during the spring and summer in Suisun Bay and the Delta, as evidenced from trawl and trap net catch data. Seasonal migrations occur within a short section of the upper estuary. Juvenile smelt move downstream to San Pablo Bay and Carquinez Strait before turning back to Suisun Bay or upstream sloughs for spawning. During average and high outflow years, delta smelt congregate from upper Suisun Bay to the Sacramento River near Decker Island. During low outflow and drought years, their pre-spawning congregations are centered in the channel of the Sacramento River and are rarely found further downstream in Suisun Bay (USACE 2015f).

Since 1967, CDFW has conducted monthly trawl surveys for delta smelt during September through December at sampling sites throughout the Sacramento and Stockton DWSCs. Survey results from the 8-year period 2010 through 2018 are presented in **Table 2-11** (CDFW 2015b). Entrainment monitoring conducted aboard the hopper dredge *Essayons* demonstrates that both delta smelt and longfin smelt may be present in the project area during the specified work windows (**Table 2-12**; DR Reed et al. 2018), although the entrainment numbers shown are not comparable among years due to variable sampling effort that cannot be measured accurately. Again, the proposed action would minimize the likelihood of entrainment by utilizing clamshell dredging rather than hopper dredging.

Delta smelt are threatened by loss of estuarine habitat; entrainment during water diversion operations for the CVP, SWP, and the myriad of agricultural diversions; pulses of pesticides; food shortages; and predation by and competition from invasive species (Bennett 2005; CDFG 2009c; SWCA 2009). In 2004, scientific monitoring of aquatic organisms and water quality in the San Francisco estuary revealed a synchronous decline of several pelagic fish species (delta smelt, longfin smelt, striped bass, and threadfin shad) (Baxter et al. 2008). This POD is being investigated to better understand how stock-recruitment effects, declines in habitat quality, increased mortality rates, and reduced food availability due to invasive species, may be working separately or cumulatively to cause POD. Further information on the delta smelt is provided in the Biological Assessment (**Appendix G, Environmental - Attachment 4**).

**Table 2-11. CDFW Fall Midwater Trawl Indices for Delta Smelt.**

Year	September	October	November	December	Total
2010	6	12	0	11	29
2011	50	54	23	216	343
2012	0	23	12	7	42
2013	4	3	2	9	18
2014	4	4	0	1	9
2015	5	0	0	2	7
2016	0	0	8	0	8
2017	0	2	0	0	2
2018	0	0	0	0	0

Source: CDFW 2015b, updated in 2019.

**Table 2-12. Numbers of delta smelt and longfin smelt collected during entrainment monitoring aboard the hopper dredge Essayons. Numbers are not comparable among years due to variable effort that cannot be accurately measured. Delta smelt are not expected to occur in the Richmond area of San Pablo Bay.**

Year	Month	Location	Delta Smelt	Longfin Smelt
2010	June	San Pablo Bay (Pinole Shoal)	0	0
2011	July	San Pablo Bay (Pinole Shoal) and Central Bay (Richmond Long Wharf and Southampton Shoal)	0	15
	August	Suisun Bay and Delta (New York Slough and Preston Reach)	4	3
2016	June	San Pablo Bay (Pinole Shoal) and Central Bay (Richmond Long Wharf)	0	12
	September/October	San Pablo Bay (Pinole Shoal) and Central Bay (Richmond Long Wharf)	0	0
2017	June	San Pablo Bay (Pinole Shoal)	0	56
2018	June	(San Pablo Bay) Richmond Outer Harbor	0	30
	October	(San Pablo Bay) Richmond Outer Harbor	0	0

*Sacramento Splittail (Pogonichthys macrolepidotus) (State Species of Special Concern).* The Sacramento splittail was federally-listed as threatened from 1999 to 2003 (68 FR 183) and is found exclusively in the Sacramento-San Joaquin Delta, Central Valley streams, and the Napa and Petaluma rivers. In 2003, the

USFWS removed the splittail from the threatened species list, after litigation by water agencies challenged the listing. The listing was reconsidered following a 2009 suit by the Center for Biological Diversity, but it was determined the listing was not warranted. The species remains a state species of special concern.

The splittail is relatively long-lived (up to 9 years) and can grow up to 400 mm long. Historic populations occurred as far north as Redding in the Sacramento River, and as far south as Friant Dam near Fresno in the San Joaquin River. The splittail has adapted to living in estuarine systems and is tolerant of salinities from 10 to 18 parts per thousand. Young-of-year and yearling splittail abundance is highest in shallow water. Adults move slowly upstream during winter and spring to forage and spawn in flooded areas. The splittail’s small, subterminal mouth with barbels and pharyngeal teeth, along with the large upper tail lobe, reflect their preference for feeding on bottom invertebrates in low to moderate current strength. Splittail reach adulthood in their second year at approximately 170 mm (USACE 2015f).

Since 1967, the CDFW has conducted monthly trawl surveys for Sacramento splittail during September through December at sampling sites throughout the Sacramento and Stockton DWSCs. Survey results from the 5-year period 2010 through 2014 are presented in **Table 2-13** (CDFW 2015b).

Populations of splittail have declined due to dams and other impassable barriers and modifications to flood basins that have reduced spawning habitat (Moyle 2002; UCCE 2010).

**Table 2-13. CDFW Fall Midwater Trawl Indices for Sacramento Splittail.**

Year	September	October	November	December	Total
2010	0	0	0	0	0
2011	15	0	0	0	15
2012	0	0	0	1	1
2013	0	0	0	1	1
2014	0	0	0	1	1
2015	0	0	0	0	0
2016	0	0	0	0	0
2017	0	0	0	1	1
2018	0	0	0	0	0

Source: CDFW 2015b, updated 2019

*River Lamprey (Lampetra ayresii) (State Species of Special Concern) and Pacific Lamprey (L. [Entosphenus] tridentate) (State Species of Special Concern).* Anadromous Pacific and river lamprey both occur in the project area. River lamprey in California have primarily been recorded within the Feather River and the lower Sacramento-San Joaquin River system, including both DWSCs. Less is known about the southern distribution of the river lamprey. Both species of lamprey have adult upstream migrations during the early spring and spawn from late spring to early summer in gravel substrates upstream of the Delta and lower Sacramento-San Joaquin river system (USACE 2015f).

During their upstream spawning migration, adult Pacific lamprey generally hibernate in freshwater for up to 1 year. They hibernate in substrates near their spawning area and do not feed prior to spawning the following year. River lamprey begin their transformation from ammocoete to adult form at about 120 mm total length, and Pacific lamprey at approximately 140 to 160 mm. River lamprey metamorphosis

lasts from 9 to 10 months. During this time, both lamprey species congregate close to the saltwater-freshwater interface in estuaries. The lamprey's transformational stage between filter-feeding ammocoete and parasitic adult is known as macrophthalmia. Adult teeth develop and grow during this period (USACE 2015f).

Migration of fully developed macrophthalmia to the ocean likely occurs between late fall and spring, when outflows are high. However, some river lamprey may spend their entire life history in freshwater. River lamprey appear to be more parasitic in freshwater than Pacific lamprey. Adult river lampreys spend less time in the ocean or estuary migrating back to freshwater in the fall and winter. In general, adult Pacific lamprey migrate from stream to spawning areas in winter and spring (USACE 2015f).

During the 2014 USACE entrainment monitoring for Stockton and Sacramento DWSCs maintenance dredging, a total of 131 river lamprey were collected. During entrainment monitoring for maintenance dredging from 2005 through 2014, a total of 461 lampreys (211 river lamprey and 250 undetermined lamprey specimens) were collected (USACE 2015f).

*Sacramento Perch (Archoplites interruptus) (State Species of Special Concern)*. The Sacramento perch is a benthopelagic freshwater fish found in the Sacramento, San Joaquin, Pajaro, and Salinas River drainages (UCCE 2010). They prefer vegetated sloughs, pools in sluggish rivers, and lakes. Sacramento perch are most common in ponds and impoundments where they have been introduced throughout the state such as in Clear Lake and Alameda Creek (Crain et al. 2007). However, they may be mostly extirpated from their native Delta (FISHBIO 2010; Moyle 2002). These fish may be impacted by potential saltwater intrusion into freshwater habitat, though they are capable of surviving high temperatures, salinities of up to 17 parts per thousand, high turbidity, and low water clarity (UCCE 2010).

Sacramento perch are found along the bottom of inshore regions, feeding opportunistically throughout the day on small crustaceans within the sediment. Adult fish may feed on other fish, including juvenile perch. Sacramento perch reach sexual maturity in year 2 or 3 and generally spawn from March through early August when water temperatures range from -17.4 to -17.2°C. Prior to spawning, perch gather in shallow areas abundant with filamentous algae and macrophytes. Male perch create shallow nests, which are visited by a female. Upon release of eggs and milt, the female abandons the nest and the male remains to guard the nest and embryos for several days. Emergent larvae are planktonic for approximately 2 weeks.

Sacramento perch have not been collected during USACE community monitoring for Stockton and Sacramento DWSCs maintenance dredging (USACE 2015f).

*Striped Bass (Morone saxatilis) (Federally Protected Game Fish)*. Striped bass is a federally protected game fish (72 FR 205) introduced into the Delta in 1879 with the goal of introducing a commercial fishery. Within ten years of their introduction, the fishery had been established. Striped bass currently support one of California's largest commercial fisheries (CDWR 2013).

Striped bass move readily between saltwater and freshwater, spending most of their life cycle in estuaries. They are sensitive to temperatures above 25°C, but adults can also withstand the rapid changes in temperature that can be associated with changes in salinity. Striped bass need three very specific habitat features: (1) a large cool river for spawning, with enough flows sufficient to keep larvae suspended as they drift downstream to the estuary; (2) a large waterbody with plenty of fish to eat; and (3) a protective

estuary for juveniles to grow by feeding on invertebrates. In California, the only area that satisfies these criteria is the San Francisco Bay estuary and its surrounding water bodies (UCCE 2010). Striped bass populations spend the majority of their time in bays but will move out into the ocean during El Niño years and winter in the Delta until the end of the spawning season.

Since 1967, the CDFW has conducted monthly trawl surveys for striped bass (age-0) during September through December at sampling sites throughout the Sacramento and Stockton DWSCs. Survey results from the last 5 years (2010 through 2014) are presented in **Table 2-14** (CDFW 2015b).

**Table 2-14. CDFW Fall Midwater Trawl Indices for Striped Bass (age-0).**

Year	September	October	November	December	Total
2010	16	5	11	11	43
2011	112	62	30	68	272
2012	20	16	14	75	125
2013	18	5	13	34	70
2014	8	2	4	45	59
2015	4	8	11	29	52
2016	43	4	5	72	124
2017	43	118	146	163	470
2018	4	16	9	13	42

Source: CDFW 2015b, updated 2019.

**Marine Mammals.** The most common marine mammals to inhabit the San Francisco Bay estuary are Pacific harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*). Other marine mammal species that occasionally inhabit the Bay and that could be considered transient visitors in the study area include the gray whale (*Eschrichtius robustus*), harbor porpoise (*Phocoena phocoena*), northern elephant seal (*Mirounga angustirostris*), Steller sea lion (*Eumetopias jubatus*), northern fur seal (*Callorhinus ursinus*), and, less frequently, the southern sea otter (*Enhydra lutris*) (URS 2003). On rare occasions, individual humpback whales (*Megaptera novaeangliae*) have entered the Bay. Marine mammals generally do not occur in Delta rivers, although in 2014 a wayward sea lion was found in the San Joaquin River (USFWS 2014).

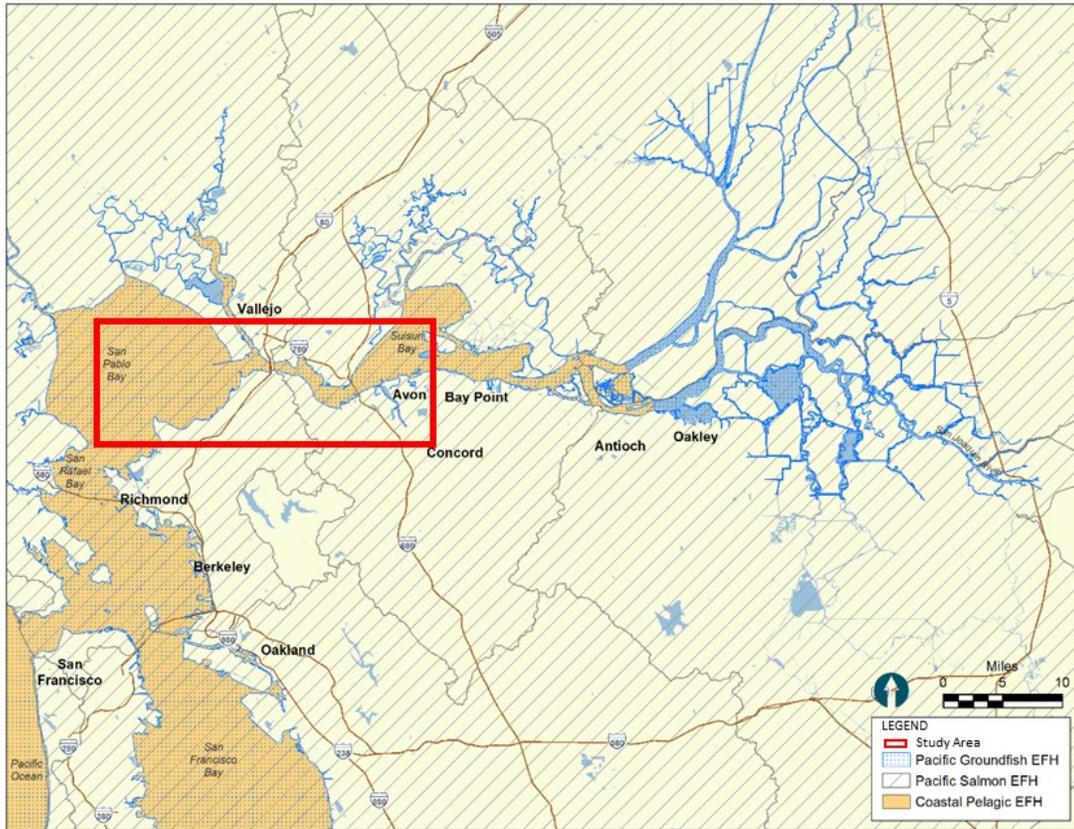
Pacific harbor seals are non-migratory, have limited seasonal movements associated with foraging and breeding activities, and use the Bay year-round (Kopec and Harvey 1995). Harbor seals forage in shallow waters on a variety of fish and crustaceans and, therefore, can occasionally be found foraging in the study area. Harbor seals haul out in groups ranging in size from a few individuals to several hundred. Habitats used as haul out sites include tidal rocks, bayflats, sandbars, and sandy beaches (Zeiner et al. 1990). California sea lions breed in Southern California and along the Channel Islands. After the breeding season, males migrate up the Pacific Coast and enter into the Bay. During anchovy and herring runs, approximately 400 to 500 sea lions (mostly immature males) feed almost exclusively in the North and Central Bay (USFWS 1992) and could occasionally forage in the study area. There are no haul-out sites for either the harbor seal or the California sea lion within the Federal navigation channels.

**Essential Fish Habitat.** The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) was enacted to maintain healthy populations of commercially important fish species. Under

the Magnuson-Stevens Act, eight regional Fishery Management Councils are responsible for developing Fishery Management Plans (FMP) to manage the specified commercial species. The Sustainable Fisheries Act of 1996 amended the Magnuson-Stevens Act, requiring the protection of the habitats of species for which there is a fishery management plan. These habitats are designated as Essential Fish Habitat (EFH), being defined as “...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” EFH can consist of both the water column and the underlying surface (e.g., seafloor) of a particular area, and it includes those habitats that support the different life stages of each managed species. A single species may use many different habitats throughout its life to support breeding, spawning, nursery, feeding, and protection functions. As shown in **Figure 2-8**, the study area is within the EFH for Pacific salmon, Pacific groundfish (fish that live on, in, or near the bottom of the water body they inhabit), and coastal pelagic species (fish that inhabit the water column, neither near the bottom nor shore of the water body they inhabit).

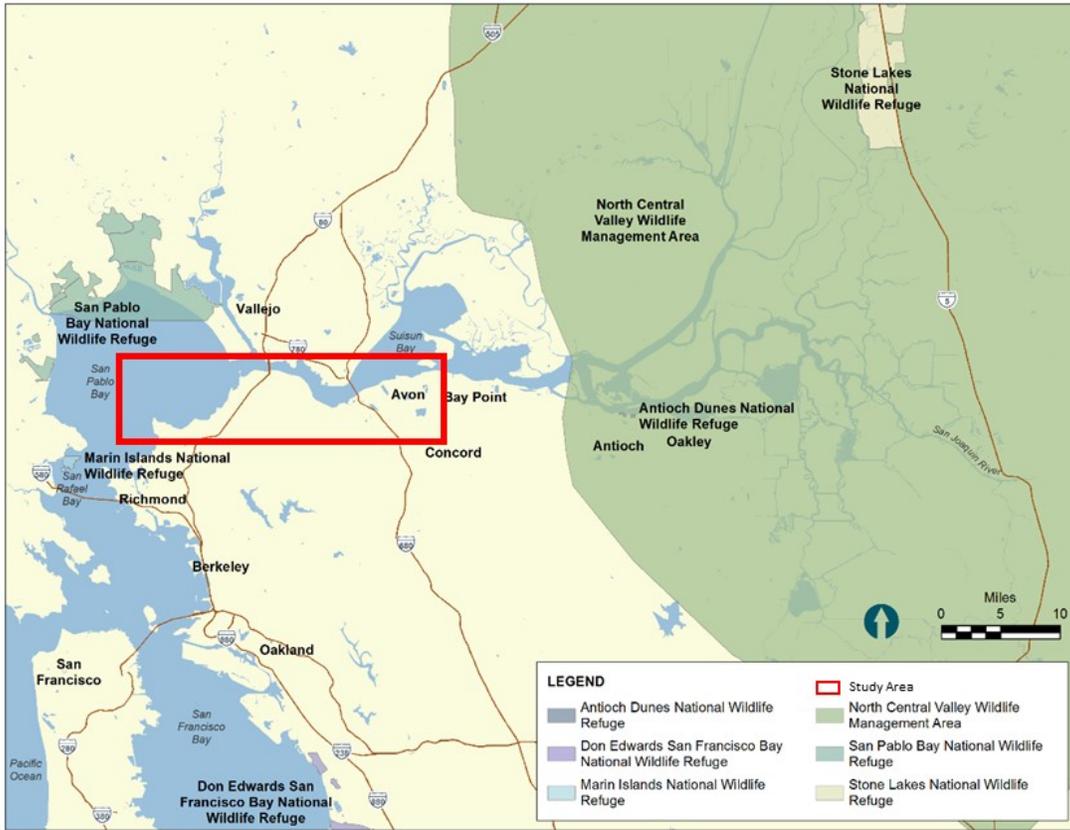
The Pacific salmon FMP includes Chinook and coho salmon (*Oncorhynchus kisutch*), and on occasion includes pink salmon (*Oncorhynchus gorbuscha*), sockeye (*Oncorhynchus nerka*), and chum (*Oncorhynchus keta*). The Pacific Groundfish FMP is designed to protect habitat for more than 90 species of fish, including rockfish, flatfish, some sharks and skates, and other species that associate with the underwater substrate, including both rocky and soft substrates. The coastal pelagic species EFH is defined as all marine and coastal waters from the shoreline offshore to the limits of the exclusive economic zone. The coastal pelagic FMP includes market squid (*Loligo opalescens*), Pacific sardine (*Sardinops sagax*), Pacific mackerel (*Scomber japonicus*), jack mackerel (*Trachurus symmetricus*), and northern anchovy (*Engraulis mordax*).

**Eelgrass Beds.** Eelgrass requires specific environmental conditions to flourish, primarily salinity, light transmittance, and water depth. The proposed dredging areas within the study area include waters which are generally too deep, turbid, and fresh for eelgrass to survive. Thus, eelgrass is not expected to be present in the channel areas where dredging operations would take place.



**Figure 2-8. Essential Fish Habitat for Pacific Groundfish, Pacific Salmon, and Coastal Pelagic Fish in the Northern San Francisco Bay System.**

**Wildlife Management Areas.** Figure 2-9 shows the wildlife management areas and national wildlife refuges in the study area that are managed by the CDFW, the USFWS, or similar entities. In these areas, lands are either enhanced for wildlife or permanently protected from development (USFWS 2010). The Federal Antioch Dunes National Wildlife Refuge (NWR) is located along the southern shore of the San Joaquin River south of West Island (USFWS 2010). It was the first NWR in the United States established to protect endangered plants and insects (USFWS 2010b). Established in 1980, the refuge provides protection for three endangered species: Lange’s metalmark butterfly (*Apodemia mormo langei*), Antioch Dunes evening primrose (*Oenothera deltoides ssp. howellii*), and Contra Costa wallflower (*Erysimum capitatum*) (USFWS 2010b). The state-run Lower Sherman Island Wildlife Area is located at the confluence of the Sacramento and San Joaquin rivers (CDFG 2010). It includes approximately 3,100 acres of primarily marsh and open water habitat in the western Delta (CDFG 2010). The project area of San Pablo Bay and the Bulls Head Reach portion of Suisun Bay do not include any wildlife management areas.



**Figure 2-9. National Wildlife Refuges and Wildlife Management Areas in the Study Area.**

### 2.2.7 LAND USE AND PLANNING

**Marin County.** The jurisdictions included within Marin County include the cities of Tiburon, San Rafael and Novato. There is moderate to low development in the Richardson Bay planning area, which contains watersheds that drain to Richardson Bay. The San Rafael Basin planning area is primarily within a city-centered corridor and is more highly developed. The Novato planning area is part of the city-centered/Baylands corridor, which generally contains watersheds that also drain to San Pablo Bay, and includes the unincorporated community of Bel Marin Keys and the Hamilton Wetlands Preserve (Marin County 2007).

**Contra Costa County.** As a whole, Contra Costa County is relatively undeveloped. Growth in the County is broken into the subareas of West County, Central County and East County. In the West and Central County areas, the suburban cities and towns are primarily residential, commercial, and industrial. In the East Central County and East County areas, land use is designated primarily for agriculture and general open space. The West County area consists of five cities, four of which (Richmond, Pinole, Rodeo and Hercules) are located in the study area. The city areas are developed with a wide variety of uses, but mostly contain a proportional mix of principal urban land uses. The Central County area includes the City of Martinez; the East County area includes Pittsburg, Oakley and Antioch. The affected uses within the Central and East County areas are predominantly residential, agricultural, recreational and open space.

In these areas, development is concentrated in collections of small urban communities and mid-sized cities (Contra Costa County 2005).

The Contra Costa County Northern Waterfront is also located within the study area. The Northern Waterfront is approximately one-mile-wide and 55 miles long and contains 63.86 square miles. It includes six cities, several unincorporated communities, and a variety of unincorporated pockets of land (developed and undeveloped) located in the county. Within the Northern Waterfront there is a wide range of land uses from industrial, commercial, residential, marinas, public, and recreational uses, to natural habitat, open space, and wildlife refuges (Craft Consulting Group and Cambridge Systematics 2013) [CCG&CS]. The Northern Waterfront is located between the Port of Richmond on the west and the Ports of West Sacramento and Stockton on the east. Along this stretch of the John F. Baldwin Channel from the Carquinez Strait to Suisun Bay and the Delta there are a number of marine terminals and wharfs. These facilities are privately owned and primarily serve the adjacent manufacturing operations which include: C&H sugar refinery in Crockett; Tesoro and Shell at Martinez and Phillips 66 in Rodeo; the Mirant power plant, Dow chemical plant, and the USS-POSCO's steel-coil processing plant in Pittsburg (CCG&CS 2013).

**Solano County.** Solano County is divided into two topographic sections. The study area extends into the foothills of the coastal range and is characterized by steep slopes, which become more gently rolling in the east. The remainder of the County is part of the Sacramento Valley, which is characterized by level topography, with some isolated areas of low rolling hills. Approximately 14 percent of the total land area of the County is in cities. The remainder of the County (over 329,000 acres) is in agricultural use, 70 percent of which is unincorporated. The southern extent of the County (including the cities of Vallejo and Benicia), consists of waterfront area adjacent to San Pablo Bay and the John F. Baldwin Channel. Development in Vallejo and Benicia is a mixture of open space, residential, commercial, and waterfront. Agricultural land is concentrated in the eastern portion of the County and includes the watershed lands contiguous with the water bodies. A significant feature of the County is the Suisun Marsh, which has an area of more than 30 square miles (Solano County 2008).

### 2.2.8 MINERAL RESOURCES

Mineral resource deposits are described based on broad geologic classifications or resource zones. For purposes of addressing mineral resources, the affected environment discussion focuses on mineral resources within the counties adjacent to the navigation channels in the study area. Information was obtained directly from maps, interpretation of aerial photographs, and from plans and other documents associated with the various jurisdictions within which the study area coincides.

The mineral resources within the study area are shown in **Figure 2-10** and described in detail below.

#### **Marin County**

Of the eight mineral resource sites designated in Marin County, four are located in proximity to the study area and include:

- Ring Mountain (Tiburon Peninsula): A 190-acre site that is considered to be a Scientific Resource Zone rather than a production site due to the rare geologic formations found there. The site contains rare, colorful and enigmatic metamorphic rock as well as many species of rare plants. This preserve is the type location for the mineral Lawsonite.

- Section D-1 Novato Conglomerate (Black Point): Located adjacent to Bel Marin Key, this site is located within the city of Novato and is an alluvial resource, which contains a thick accumulation of well-rounded pebbles, cobbles and boulders in a well-cemented sandy matrix. This material has been found to be suitable for use in Portland Concrete Cement.
- Sector D-2 Novato Conglomerate (Black Point): Located adjacent to Bel Marin Key, this site is located at the Renaissance Faire/Living History Centre and was once quarried for the conglomerate it contains. The material in this sector is a similar alluvial deposit as in Sector D-1 above.
- Sector I Franciscan Complex Sandstone (San Pedro Hill): This site is located at the tip of the San Pedro Peninsula just outside San Rafael City limits and has been mined since the beginning of the 20th century. The site has yielded crushed stone suitable for Portland Cement Concrete aggregate and rip rap. Shale deposits are also present and these materials have been developed by several quarries throughout the years to supply bricks, tile and lightweight aggregate (Marin County 2005b).



Figure 2-10. Mineral Resources.

**Contra Costa County**

The only mineral resource located near the study area in Contra Costa County is the shale deposit located on land near Port Costa. The Carquinez Strait Regional Shoreline Park surrounds the site. The mineral deposit is designated for protection in the County Conservation Plan (Contra Costa County 2005).

**Solano County**

The only regionally significant mineral resource near the study area in Solano County is the Sulphur Springs Mountain Deposit, which is a deposit of igneous rock from which aggregate is produced. The aggregate is used in the manufacture of asphaltic concrete, Portland Cement Concrete, rip-rap, drain rock and road base. An active quarry within the deposit exists along Lake Herman Road west of Lake Herman in the boundary hills between Benicia and Vallejo. Quarrying there has resulted in a cut face, which is visible from the Lake Herman area. Several abandoned mercury mines exist in the Sulphur Springs Mountain

area. These mines have not been in production since the mid-1940s. This deposit is located on land and not in the navigation channel (Solano County 2008).

### 2.2.9 AGRICULTURE

There are no agricultural resources within the zone of impact (one-mile buffer) of the channel or the proposed beneficial reuse locations. Agricultural resources within the surrounding counties are too distant to potentially experience direct impacts by the alternatives considered, and no possible indirect effects can be identified.

### 2.2.10 AESTHETICS

The navigation channels within the portion of San Francisco Bay, San Pablo Bay and the small part of the Carquinez Strait included within the study area can be seen from parks, industrial areas, bridges, some roads, recreational boating, and residential areas. The area includes scenic views of water, hills, bridges, ships in the shipping channel, and recreational boats.

Sensitive visual receptors are locations or populations particularly exposed to visual impacts, or zones where visual impacts would be more apparent than elsewhere. They include residential areas and park users, such as those within the Point Pinole Regional Shoreline and Knox/Miller Regional Shoreline Parks in Richmond; China Camp State Park in Marin County; and the Martinez Regional Shoreline Park. Topography varies from beach areas adjacent to the waterways to higher elevations on natural hillsides. Lighting from urban uses exists in developed areas and on transportation infrastructure such as roads and bridges.

Most of the deep draft navigation channels in the study area are visible from open space; parks; agricultural, industrial, commercial, and residential land uses; bridges and some roads and recreational boating areas. The topography ranges from flat areas to hillsides. Existing users of the waterways are comprised of large ships, such as car carriers; other cargo ships; oil tankers; tug boats; barges; maintenance dredging equipment; and recreational users, such as small motor boats, sailboats and non-motorized craft, such as kayaks and paddle boards.

### 2.2.11 CULTURAL RESOURCES

This section summarizes existing cultural and historic resources that are located within the study area. For the purposes of this discussion the Area of Potential Effects (APE) is approximately ¼ mile around the project features where cultural resources could be impacted. The boundary of the APE will be further refined during PED. Cultural resources include prehistoric and historic archaeological sites; architectural properties such as buildings, bridges, and infrastructure; and resources of importance to Native Americans (traditional cultural properties and sacred sites). “Artifacts” include any objects manufactured or altered by humans. The following are common terms used to discuss the regulatory requirements and treatment of cultural resources:

- **Cultural resources** describe several different types of properties: prehistoric and historical archaeological sites; architectural properties such as buildings, bridges, and infrastructure; and resources of importance to Native Americans or other groups of people.
- **Historic properties** are defined by the National Historic Preservation Act (NHPA) as any prehistoric or historic district, site, building, structure, shipwreck, or object included on, or

eligible for inclusion on, the National Register of Historic Places (NRHP), including artifacts, records, and material remains related to such a property.

- **Historical resources** include buildings, sites, structures, objects, or districts, each of which may have historical, prehistoric, architectural, archaeological, cultural, or scientific importance, and is eligible for listing or is listed in the California Register of Historical Resources (CRHR) or a local register of historical resources. The CRHR also includes resources listed in or formally determined to be eligible for listing in the NRHP, as well as some California State Landmarks and Points of Historical Interest.

This section summarizes the cultural and historic settings of the general region within which the affected environment is located, and discusses in more detail the prehistoric and historic resources relevant to the study area.

**Prehistoric Period.** During the last major ice age, what is now San Francisco Bay was well above sea level, with today's underwater areas being an exposed valley of dry land. Within that valley, converging rivers drained through the Golden Gate and across the continental shelf toward the then Pacific coastline. Glacial melt began approximately 15,000 years ago, and meltwaters began filling San Francisco Bay around 10,000 to 11,000 years before present (B.P.). Around 8,000 B.P., marine waters rose to levels sufficient to enter San Francisco Bay. Sea levels rose rapidly until approximately 6,000 B.P., and have continued to rise more slowly since then (Moratto 1984).

San Francisco Bay, San Pablo Bay, the Carquinez Strait, Suisun Bay, the San Joaquin River and surrounding waterways, marshlands and uplands were used extensively by humans during prehistoric and historic times. Before circa A.D. 1770, around the time of the first major European contact, the San Francisco Bay and Delta regions were occupied by Miwok, Patwin, and Costanoan/Ohlone Native American people. The Costanoan/Ohlone population in 1770 has been estimated at 7,000. Archaeological remains related to the prehistoric occupation of the area are evidenced by hundreds of shellmounds and occupation sites that lined the shores of San Francisco, San Pablo, and Suisun Bays. Native people were also known to produce and use the naturally-occurring salt deposits that exist along San Francisco Bay. The locations of these shellmounds approximately follow the current shoreline, but also occur along major tributaries draining into the Bay (Moratto 1984).

Shellmounds are mounds or deposits containing shells, animal bones, and potentially human remains and other evidence of prehistoric settlement of an area. Many of the shellmounds known to be located around San Francisco Bay have been found in close relationship with marshy areas. A number of known shellmounds stand partially below current sea level, indicating that their accumulations began during lower water level occurrences in the past. Given the long duration for the bay water rise and human occupation of the shore zone, it is likely that earlier use and occupation sites, such as shellmounds, are present below current sea levels (Moratto 1984).

The configuration of the San Francisco Bay shoreline has also changed in the roughly last one hundred and fifty years due to deposition of gold mining sediments flowing downstream from hydraulic mining locations, agriculture, the narrowing of river channels through levee construction, construction of salt ponds, development of "man-made land," and more modern construction and fill near the shore. For example, it is estimated that 875 million cubic meters of sediment were deposited in the Bay between 1850 and 1914 as a result of mining in the Sierra Nevada foothills (Moratto 1984).

**Spanish Time Period.** Spanish explorers are said to have first visited the entrance to San Francisco Bay in 1769. Spanish explorers came into increasing contact with Native Americans in the first half of the 1770s as expeditions were led through the region. Travel from the sea into the Bay first occurred in 1775. Spanish exploration in the late 1700s and 1800s led to the establishment of permanent settlements along the coast of California, mostly in the form of missions (USACE and RWQCB 2015; USFW and CDFG 2008).

**Mexican Time Period.** In 1821 Mexico gained independence from Spain and California changed from Spanish to Mexican control. With this change in control came the relaxation of trade restrictions. Merchant ships, occasional whalers, and warships from the U.S. and Europe began freely entering the Bay. The change to Mexican independence brought new laws, administrators and a shift of power from missionaries to secular governors and ranching families. The decline of the missions allowed for the rise of extensive ranching along the California coast as well as in the Sacramento Valley area. What was then Native American land was divided into more than 500 land grants (i.e., Ranchos) distributed to prominent California families. Then followed a period of skirmishes and battles between the Mexican army and Native Americans. This and parceling of the land into Ranchos, along with epidemics of smallpox and malaria that spread through Native populations resulted in the further decimation of the Native population and culture (Paddison 2015; Sturtevant 1978; USACE and RWQCB 2015).

**American Time Period.** California became a part of the U.S. as a result of the Mexican-American War that ended in 1848. The Gold Rush (lasting from 1849 to approximately 1855) generated a large population increase of immigrants and gold seekers to California. The Gold Rush also resulted in a large increase in ships traveling into the Bay, with San Francisco becoming a major city and port. Various other cities also grew along the waterways within the Bay Area. Commercial whaling and salmon fishing began in the 1850s. Fishing and shrimping grew into major industries. Ferries became popular ways to travel throughout the Bay Area until the construction of train and car bridges, which caused people to switch modes of local travel (USACE and RWQCB 2015).

### KEY RESOURCES OF THE STUDY AREA

**Shipwrecks in San Francisco Bay.** Since its exploration by Spanish navigators began in 1769, San Francisco Bay and its associated waterways have been the site of numerous shipwrecks. The California State Lands Commission (CSLC) has created a database of more than 1,500 shipwrecks off the coast of California and within its bays and waterways (CSLC 2015). The database includes the approximate latitude and longitude and other available information for each shipwreck. The data describes potential resource locations, since exact locations for many of the shipwrecks may not be known. In addition, NOAA's Automated Wreck and Obstruction Information Center includes over 13,000 listed shipwrecks and obstructions (NOAA 2013). Lastly, the U.S. National Parks Service (2015) maintains a list of shipwrecks that are on the National Register of Historic Places.

All three databases were searched for any known shipwrecks located in the areas that could be affected by the alternatives. No shipwreck locations listed on the NRHP were reportedly located in the area of potential effects (APE) of the alternatives considered. The CSLC database identifies 172 shipwrecks within the counties bounded by the study area which sank between 1595 and about 1979, and 24 within the project vicinity. Two of these shipwreck locations are reported within 0.25-miles of the proposed APE. Even though some shipwrecks have been salvaged through time, the CSLC database does not indicate if such salvaging has taken place for any of the shipwrecks contained on its list of wrecks.

In addition, to the reported shipwrecks, USACE contracted a submerged cultural resource survey of portions of the proposed APE which is documented in a report titled *Report on a Nautical Archaeological Survey of Four Areas in the John F. Baldwin Ship Channel* (Sullivan and Allan 1996). The survey identified eight acoustic targets in the vicinity of the Pinole Shoal Channel that are believed associated with the schooner *Sagamore*, which sank in 1864. The potential wreck was designated as the Baldwin Channel Wreck but was not assigned a trinomial archaeological site number. Instead, the site was designated by the state with two primary numbers (07-002760 and 07-0598) due to its location along the boundary of two counties.

It is possible that many of the shipwrecks identified within the CSLC and NOAA databases were salvaged or intentionally demolished to reduce risks to ship traffic. Dredging has taken place in the Federal shipping channels for a number of years. Dredging may have removed or disturbed evidence of shipwrecks that potentially present within the study area; however, portions of the channel are not in active shoaling areas and may still contain intact cultural resources. A submerged cultural resource target cluster consisting of eight acoustic targets were identified as part of the Baldwin Channel Wreck site within the Pinole Shoal Channel. The wreck was located in the vicinity of the rocky obstruction just west of Pinole Shoal that is proposed for removal (07-002760 and 07-0598). These targets and the two other reported shipwreck locations may potentially be located on and/or within the bottoms affected by the alternatives are shown in **Table 2-15**.

**Table 2-15. A list of 24 historic shipwrecks reported within approximately 5-miles of the APE.**

Project Features	Ship Name	Type	Year Sunk	Cause of Loss	County	Source
Pinole Shoals	<i>Ringleader</i>	Schooner	1869	Capsized	Contra Costa	CSLC 2011
San Pablo Bay	<i>Necanium</i>	Steam Schooner	1936	Foundered	Contra Costa	CSLC 2011
San Pablo Bay	<i>Fidelity</i>	Gas screw	1932	Burned	Contra Costa	CSLC 2011
Pinole Shoals*	<i>Sagamore</i>	Schooner	1864	Foundered	Contra Costa	CSLC 2011
Pinole Shoals	<i>Victor H. Kelly</i>	Tanker	1952	Burned	Contra Costa	CSLC 2011
Pinole Shoals*	<i>Harry</i>		1904	Storm	Contra Costa	CSLC 2011
Pinole Shoals	<i>Monarch</i>	Tug	1915	Collision	Contra Costa	CSLC 2011
Pinole Shoals	<i>Gold Hunter</i>	Steamship	1815	Collision	Contra Costa	CSLC 2011
Pinole Shoals	<i>Uncle Abe</i>	Schooner	1877	Stranded	Contra Costa	CSLC 2011
Pinole Shoals	<i>Stamboul</i>	Whaling Bark	1843		Contra Costa	CSLC 2011
Pinole Shoals	<i>Amelia</i>		1889	Burned	Contra Costa	CSLC 2011
Suisan Bay	<i>Sacramento</i>	Schooner	1866		Contra Costa	CSLC 2011
Suisan Bay	<i>J. Bragdon</i>		1853		Solono	CSLC 2011
Suisan Bay	<i>Fredrick Williams</i>	Schooner	1870	Stranded	Solono	CSLC 2011
Suisan Bay	<i>Tennessee</i>	Steamship	1851	Collision	Solono	CSLC 2011
Suisan Bay	<i>Montezuma</i>	Gas screw	1925	Burned	Solono	CSLC 2011
Suisan Bay	<i>Amelia</i>	Steamship	1874	Stranded	Solono	CSLC 2011
Suisan Bay	<i>Emma Adelia</i>	Schooner	1870	Burned	Solono	CSLC 2011
Suisan Bay	<i>Alden Anderson</i>	Steam Screw	1924	Burned	Contra Costa	CSLC 2011

Project Features	Ship Name	Type	Year Sunk	Cause of Loss	County	Source
Suisun Bay	<i>Comanche</i>	Steamboat	1853	Collision	Contra Costa	CSLC 2011
Cullinan Ranch WL	<i>Villa</i>	Sloop	1869	Capsized	Solano	CSLC 2011
Montezuma WL*	<i>Covina</i>	Gas screw	1926	Burned	Solano	CSLC 2011
Suisun Bay	<i>Forrester</i>	Schooner	1935	Stranded	Contra Costa	CSLC 2015
Suisun Bay	<i>Charles B. Kennedy</i>	Barge	1926	Wrecked	Contra Costa	CSLC 2015

\*\* Denotes shipwrecks reported sunk within 0.25 miles of the APE.

### 2.2.12 ENVIRONMENTAL JUSTICE

The specific affected areas for Environmental Justice (EJ) impact analysis were determined in accordance with the Council of Environmental Quality’s (CEQ) guidance for identifying the “affected community.” This requires consideration of the nature of the likely project impacts and identification of an associated Area of Potential Effects (APE) within a corresponding unit of geographic analysis.

For the purpose of EJ analysis, the APE corresponds to the areas of effect associated with the specific environmental issues analyzed in this document. The APE includes communities (U.S. Census-designated places such as towns, cities, and neighborhoods) adjacent to the navigation channels: Tiburon, Corte Madera, Larkspur, San Rafael, Santa Venetia, Novato, Black Point – Green Point, Richmond, Bayview – Montalvin, Pinole, Hercules, Rodeo, Crockett, Vallejo, Benicia, Martinez, Bay Point, Pittsburg, Antioch, Oakley, Bethel Island, Country Club, and Stockton. The unincorporated community of Avon is heavily industrialized and does not have residents, so it is not a Census-designated community.

Census data describing residents of the communities in the APE are shown in **Table 2-16**.

In the study area, the communities of Richmond, Hercules, Vallejo, and Rodeo have a greater percentage of minority residents than the APE as a whole. Richmond also has a higher percentage Hispanic or Latino residents than the APE as a whole. Therefore, impacts that disproportionately affect residents of these communities more than other communities in the APE could constitute an EJ impact.

**Table 2-16. Characteristics of the Residents of the APE.<sup>1</sup>**

<sup>1</sup> APE = Area of Potential Effect (Consists of the communities of Tiburon, Corte Madera, Larkspur, San Rafael, Santa Venetia, Novato, Black Point – Green Point, Richmond, Bayview – Montalvin, Pinole, Hercules, Rodeo, Crockett,

Towns and Cities Comprising the APE	Percent Minority (Non-White) <sup>2</sup>	Percent Hispanic or Latino	Percent in Poverty <sup>3</sup>	Percent Under Age 18
Tiburon	12	5	5	25
Corte Madera	16	8	4	27
Larkspur	14	8	4	19
San Rafael	29	30	12	22
Santa Venetia	22	19	7	20
Novato	24	21	7	25
Black Point-Green Point	9	9	1	17
Richmond	69	39	19	28
Bayview-Montalvin	50	30	8	26
Pinole	54	22	9	23
Hercules	78	15	6	26
Rodeo	56	25	9	27
Crockett	20	16	11	15
Vallejo	67	23	18	23

Vallejo, Benicia, Martinez, Bay Point, Pittsburg, Antioch, Oakley, Bethel Island, Country Club, and Stockton)

<sup>2</sup> Any person identifying as other than “one race, White”

<sup>3</sup> Source: U.S. Census Bureau 2013.

**Table 2-17** compares data describing residents of the APE to data describing residents of the surrounding 7-county region within which the APE is located and to the State of California as a whole. Based on the data, the APE does not have a greater proportion of residents who are children (e.g., under the age of 18) or living in poverty (e.g., family of 4 with a household income of \$23,550.00) compared to the surrounding 7-county region as a whole. The APE also does not contain a greater proportion of residents who are Hispanic or Latino, children, or living in poverty compared to California as a whole.

However, **Table 2-17** does show the APE has a greater proportion of residents who are Hispanic or Latino than the totality of the surrounding 7 counties. In addition, the APE has a greater percentage of residents who are minority compared to both the entire 7-county region and California as a whole. In summary, the APE is located in a part of the surrounding region that has a higher degree of minority and Hispanic or Latino residents.

**Table 2-17. Comparison of Residents of the APE to Residents of the Region and State.<sup>1</sup>**

Location	Percent Minority (Non-White) <sup>2</sup>	Percent Hispanic or Latino	Percent In Poverty	Percent Under Age 18
APE <sup>3</sup>	53	32	18	27
Surrounding Region <sup>4</sup>	44	26	16	26
California	42	38	17	25

<sup>1</sup> Source: U.S. Census Bureau 2013.

<sup>2</sup> Any person identifying as other than “one race, White”

<sup>3</sup> APE = Area of Potential Effects

<sup>4</sup> Surrounding Region = Marin, Sonoma, Napa, Contra Costa, Solano, Sacramento, and San Joaquin Counties

### 2.2.13 NOISE

The study area deep draft channels are flanked by shorelines characterized by parks and open space, residential areas, industrial zones, bridges and some roads. The distance from the channel to the shoreline ranges from as little as 0.2 mile (at station 72+00 of the Bulls Head Reach alignment) to as many as 7.76 miles (at station 113+00 of the Pinole Shoal Channel alignment).

Existing noise producers in the channels and waterways include large ships, such as car carriers, other cargo ships, oil tankers, tug boats, barges, maintenance dredging equipment and recreational users, such as motor boats. Along the Contra Costa shoreline, railroad noise contributes to the ambient noise, until the train tracks reach the railroad bridge across the Carquinez Strait between the Cities of Martinez and Benicia. Noise-sensitive receptors along the study area route include residential areas and park users, such as those within the Point Pinole Regional Shoreline and Knox/Miller Regional Shoreline parks in Richmond, China Camp State Park in Marin County, and the Martinez Regional Shoreline Park. Recreational boaters may also be noise receptors in the study area.

Ambient noise levels along shoreline areas of Contra Costa County adjacent to the study area range from 60 to 65 dB (L<sub>dn</sub>) near roadways and trains, and 70 and 75 dB (L<sub>dn</sub>) adjacent to the two bridges (Contra Costa County 2005).

### 2.2.14 PUBLIC HEALTH AND ENVIRONMENTAL HAZARDS

**Hazardous Materials Sites.** Sites potentially containing hazardous materials were identified through database record searches for sites with known or potential hazardous waste and/or materials within the study area. This included a search of the California Department of Toxic Substances Control (CDTSC) EnviroStor database (CDTSC 2015), the State Water Resources Control Board (SWRCB 2015) GeoTracker database and the National Oceanic and Atmospheric Administration (NOAA) Office of Response and Restoration’s “Where we Work” database (NOAA 2015). These databases list 83 sites with an active, open or unidentified status within 1,000 feet of the proposed deepening channel shoreline.

**Hazardous Materials Transportation.** Various products, including hazardous materials, are transported on shipping routes that cross the San Francisco Bay and the Sacramento-San Joaquin Delta. Transportation of hazardous materials involves some risk of spillage and subsequent contamination of soil, water or sediments. Hazardous materials shippers and transporters must comply with specific requirements of 49 CFR 171, including proper classification, labeling, packaging and handling.

Detailed information on commodities shipped and routes taken is not readily available due to security and proprietary reasons. However, entities that transport certain types and quantities of hazardous materials are required by the Hazardous Materials (HM)-232 final rule (49 CFR 172) to develop and implement security plans, as administered by the U.S. Department of Transportation's (DOT's) Research and Special Programs Administration. Security plans are considered "security sensitive information," available only on a "need to know" basis to those with relevant responsibilities or appropriate security clearance (Batelle and Total Security. US n.d.; 49 CFR 172, Section 172.802[c]). While non-disclosure of information concerning materials and routes is not a specific requirement of HM- 232, it is a common feature of security plans (Coleman personal communication as cited in ICF International 2013).

Information on specific types and quantities of hazardous materials transported through shipping channels in the study area is limited to publicly available information. Typical cargos at the Port of West Sacramento include cement, bulk and bagged fertilizer, pelletized Kaolin clay and anhydrous ammonia (ICF International 2013). Commodities brought through the Port of Stockton include bulk materials, such as aggregate, coal, petroleum coke, ores, clay, sulfur and anhydrous ammonia (Port of Stockton 2010).

**Oil Production, Transport and Spills.** Oil has been imported along the John F. Baldwin Ship Channel since at least the late nineteenth century. There are currently five refineries in Northern California, four of which are located in the study area. Shell, Tesoro, ConocoPhillips and Valero own four refineries. The fifth, Chevron, is located nearby at the Port of Richmond. There are also nine terminals that receive oil within the study area. Crude oil is the commodity imported to the terminals, while petroleum products are exported from the terminals.

A single oil spill has been recorded in study area waters. On February 10, 2015, the Shell refinery in Martinez reported a spill of crude oil from a line undergoing hydrostatic testing. The release occurred near the seaward end of the Shell pier, where a fixed containment boom is maintained. Response contractors were on the scene before sunset and applied additional containment boom and deployed skimmers (NOAA 2015). In addition to that occurrence, there is a single recorded instance of an oil spill attributable to a 2007 vessel collision in the San Francisco Bay (well out of the study area), when the *Cosco Busan* container ship struck a San Francisco-Oakland Bay Bridge tower, spilling 53,000 gallons of fuel oil (NOAA 2015).

### 2.2.15 RECREATION RESOURCES

The San Francisco Bay area and Delta combine to form a unique geographic region that provides exceptional recreational opportunities including boating, fishing, hunting, hiking, biking, camping and wildlife viewing. Across the Bay and Delta, opportunities for water and shoreline recreation are provided by wetlands, wildlife refuges, state parks, shoreline parks and waterfront areas, and landing/launching facilities (BCDC 2008). There are no national parks located in the study area.

Population is the most important driver of the demand for recreational opportunities in the San Francisco Bay region, including the demand for waterfront-oriented recreation. It is estimated that there is a pool of nearly 9.0 million persons considered to be potential recreationalists within a reasonable travel distance of the Delta and San Francisco Bay area (Delta Protection Commission 2005). Recreational users originate from both within and outside of these areas. The majority of the recreational activities within the Delta are focused on the navigable waterways which are publicly accessible. Boating use totals more

than 6.4 million visitor days annually, and is composed of 2.13 million annual boat trips in the larger Delta-Suisun area (California Department of Water Resources 2007) [CDWR].

The existing supply of waterfront parks, beaches, 75 public fishing piers, regional trails, launching lanes and marinas in the San Francisco Bay area comprises a substantial part of the large, complex web of the region's recreational opportunities. The current waterfront park acreage in the region totals approximately 25,000 acres. The entire bay is relatively shallow, with narrow, deep channels near the Golden Gate Bridge and Carquinez Strait which tend to be maintained by tidal currents. Therefore, boating (including canoeing and sail boating), fishing, and windsurfing are common activities. There are 174 launching lanes (some ramps have multiple lanes) within the San Francisco Bay area, providing 18 percent of the State's boating facilities (BCDC 2006).

Most of the recreational facilities within the Delta are provided through private marinas and several thousand boat berths. Private facilities also provide launching facilities, recreational vehicle and tent camping, picnicking, restaurants, and bait and tackle shops.

Five fishing access/launching facilities owned by the California Department of Fish and Game and managed by Sacramento and Yolo Counties are located within the Delta. San Joaquin County provides land and water access at Westgate Park. Brannan Island State Recreation Area provides boat launching, camping, swimming, nature interpretation, and wind surfing. Hunting occurs mainly on private lands, although some hunting is allowed on state and federally owned lands and waterways (Delta Protection Commission 2015).

**Marin County.** Water-based recreational areas within Marin County include the San Pablo Bay National Wildlife Refuge, Marin Island National Wildlife Refuge, Hamilton Wetlands Preserve, and Corte Madera Marsh State Marine Park. Other recreational opportunities include camping, picnic areas, fishing access, trail access, and various preserves and state parks (e.g., Hamilton Wetlands Preserve, Tiburon Uplands Nature Preserve, China Camp State Park and Angel Island State Park). There are 17 public and private marinas within the study area channels that provide access to the Bay (CA Division of Boating and Waterways 2015).

**Contra Costa County.** Recreation areas within Contra Costa County include Browns Island (within the City of Pittsburg), Winter Island, Jersey Island, Bradford Island, Webb Tract, Holland Tract, Palm Tract, Orwood Tract, Knightsen area, and Coney Island, Bethel Island, Hotchkiss Tract and Veale Tract. Water areas include Big Break, partially owned by East Bay Regional Park District, Franks Tract and Clifton Court Forebay (Delta Protection Commission 2005). Access to these areas is provided by approximately 40 public and private marinas and launch facilities.

Other recreational opportunities include camping, picnic areas, fishing access (at a few marinas and at several sites created specifically for fishing), trail access, and three public parks (Antioch/Oakley Regional Shoreline, Barbara Price Marina Park and Riverview Park). In addition, Franks Tract State Recreation Area and Big Break allow public hunting access during waterfowl hunting season. The California Department of Fish and Game's Rhode Island Wildlife Area also allows fishing and hunting from boats only. In addition to these public opportunities, there are private hunting clubs operating on Winter Island and Veale Tract (Delta Protection Commission 2005).

**Solano County.** Solano County's recreational areas include Hastings Tract, Prospect Island, and Ryer Island. Waterways in the County include Barker Slough, Cache Slough, Hastings Cut, Hoss Slough, Lindsey Slough, the Sacramento River, and the Sacramento Deep Water Ship Channel. Solano County has four marinas (Arrowhead Harbor, Snug Harbor Resort, Hidden Harbor Marina and Delta Marina Yacht Harbor) and five launching facilities providing access to the Delta and nearby areas. All marinas and launching facilities are located along or near a confluence of the Sacramento River. Other recreational opportunities in Solano County include camping, fishing access, picnic areas, trail access, and one public park (Delta Protection Commission 2005).

## 2.2.16 SOCIO-ECONOMICS

The socio-economics of the surrounding community area are summarized in this section. The factors used to describe the demographic and socioeconomic environment include recent trends in population, as well as employment and income. More detailed information can be found in **Appendix D - Economic Analysis**.

### 2.2.16.1 POPULATION

California is ranked as the largest state in terms of resident population as of 2016, with 37.3 million residents. Between the years 1990 and 2010, California's population increased by 25.2%, from 29.8 million to 37.3 million people, which is higher than the national growth over the same historical period. All counties within the immediate economic regions of San Francisco Bay have seen a growth in population according to 2010 census data.

Census data from 2010 show increases in population across the bay area. Specifically, Contra Costa County (10.6 percent), Solano County (4.8 percent), and Marin County (2.1 percent). San Francisco is the largest city in the bay area, with a population of more than 800,000, followed by Stockton (291,707), Concord (122,067), and Vallejo (115,942).

Population projections (California Department of Transportation) forecast an increase of 8.12% from 2020 to 2030 and 6.52% from 2030 to 2040.

### 2.2.16.2 EMPLOYMENT AND INCOME

California private sector annual employment in 2014 totaled 13.5 million, with average annual wage of \$69,880. Of the major industry sectors within the State, the Health Care and Social Assistance sector employs the most persons, with 2,000,372 employees. Retail Trade and Accommodation and Food Services follow closely behind in total employed persons, with 1,623,371 and 504,176 employees, respectively. County industry sectors yield employment distributions similar to the State level, with few exceptions.

Of the private sector industries, Mining, Quarrying, and Oil and Gas Extraction sector employees are paid the highest in average annual earnings, slightly over \$138,000, followed by Information sector employees, earning on average \$136,214. The average annual earnings of Mining, Quarrying, and Oil and Gas Extraction sector employees nearly doubles the average annual wage earnings across all industry sectors. In December of 2014, the unemployment rate in California was 7 percent, higher than all but two other locations in the U.S. (Mississippi and Washington, D.C.). In October of 2015, California experienced the

largest job growth in the country, adding nearly 41,200 new jobs and bumping its unemployment rate down to 5.8 percent.

### 2.2.16.3 SPECIFIC SOCIO-ECONOMICS IN THE STUDY AREA

According to the 2010 U.S. Census, the Bay Area and the State of California have higher percentages of minority populations relative to the total United States population. Within the Bay Area, approximately 55 percent of the population identified as White, 8.3% of the population identified as Black or African American, 18.5 percent of the population identified as Asian, and 11.1 percent of the population identified as Other. San Francisco County contained the highest percentage of minority populations relative to other area counties.

As a whole, the Bay Area in 2010 had a higher median age than the State of California and equaled the median age for the United States. Marin County and Contra Costa County all had median ages higher than or equal to the State and National median age. Solano County's median age was higher than the State level, but lower than the National level.

All counties had higher median household (2010 Census) incomes than the State of California.

Marin County had the highest median household income and per capita income. Marin County, Contra Costa County, and Solano County all had lower percentages of people living below poverty level compared to the State of California.

Marin County and Contra Costa County had higher percentages of people over the age of 25 that earned a Bachelor's Degree or higher when compared to the State of California and the United States. Solano County had lower percentages of people over the age of 25 that earned a Bachelor's Degree or higher, at 24.3 percent and 18.1 percent, respectively.

### 2.2.16.4 ECONOMIC SPENDING

Maritime infrastructure and recreation are the economic spending components included in this analysis due to their potential to be impacted.

**Maritime Infrastructure.** The major ports in San Francisco Bay include the ports of San Francisco, Oakland, Redwood City and Richmond. Contra Costa's Northern Waterfront includes ports and marine terminals on San Pablo Bay, Carquinez Strait, Suisun Bay and the Sacramento-San Joaquin River. The river ports include the Port of West Sacramento (79 nautical miles from the Golden Gate Bridge through the San Francisco Bay and the 30 foot deep Sacramento Ship Channel). The river ports are broadening their base away from their heavy dependence on construction materials by developing new export and import operations (Craft Consulting Group and Cambridge Systematics 2013) [CCG&CS].

The Bay Area ranks as the fourth largest exporting region in the U.S. in terms of tonnage. While the Port of Oakland handles 82 percent of the region's maritime trade, the Bay Area's ports at Richmond, Benicia, San Francisco and Redwood City, plus the inland port at Stockton, also handle significant maritime trade. The Port of Stockton is the primary Northern California port for bulk cargo, with the remainder handled at San Francisco and Redwood City. Richmond and Benicia handle mostly automobiles and trucks. Although it is a substantial maritime center, Northern California handles only 10.7 percent of West Coast

tonnage, which primarily passes through the Port of Los Angeles (31.9 percent) and the Port of Long Beach (25.6 percent) (CCG&CS 2013).

**Recreation.** Recreational opportunities provide a large economic benefit to the region and to the State as a whole. Annual gross receipts in the Delta are over \$247 million by boaters and over \$186 million by anglers, as reported in the 1998 Delta Recreational User Survey report prepared by the U.S. Department of Agricultural and Resource Economics for the Delta Protection Commission and the Department of Boating and Waterways. These two recreation groups also impact spending on other industries (e.g., groceries, restaurants, gas stations and drugstores) in connection with their boating and fishing activities. When a multiplier was incorporated into the model to account for actual expenditures plus value-added dollars in the Delta, the annual estimated figures rose to over \$444 million for boaters and over \$336 million for anglers.

### 2.2.17 NATIVE AMERICANS

USACE has initiated consultations with Native American tribes with interests in the project area including Amah Mutsun Tribal Band of Mission San Juan Baptista, Cloverdale Rancheria of Pomo Indians, Coastanoan Rumsel Carmel Tribe, Cortina Rancheria Kletsel Dehe Band of Wintun Indians, Dry Creek Rancheria Band of Pomo Indians, Federated Indians of Graton Rancheria, Indian Canyon Mutsun Band of Costanoan, Kashia Band of Pomo Indians of the Stewarts Point Rancheria, Lytton Rancheria, Middletown Rancheria, Mishewal Wappo Tribe of Alexander Valley, Muwekma Ohlone Indian Tribe of the SF Bay Area, North Valley Yokuts Tribe, Ohlone Indian Tribe, United Auburn Indian Community of the Auburn Rancheria, Wilton Rancheria, and Yocha Dehe Wintun Nation. These tribes have a long history of living in the vicinity of the project area and maintain a strong connection to the region through continued use. In addition to the federally-recognized tribes, additional tribes who are not federally recognized have expressed a general interest in projects in the general vicinity of the study. The following tribes have provided responses to letters sent asking for input on the project on January 31, 2019 (see **Appendix H, Cultural Resources Correspondence**): the United Auburn Indian Community of the Auburn Rancheria, Wilton Rancheria, the Indian Canyon Band of the Costanoan, Lytton Rancheria, Northern Valley Yokut, Wilton Rancheria, and the Yocha Dehe Wintun Nation.

## 2.3 NAVIGATION ENVIRONMENT

### 2.3.1 VESSEL USE AND OPERATION

#### EXISTING CONDITIONS

Vessel traffic movement in the study area is managed by the San Francisco Bar Pilots, in coordination with the U.S. Coast Guard's Vessel Traffic Services (VTS). A bar pilot will board all deep draft vessels calling on ports and harbors, beginning at the offshore sea buoy, before vessels enter the San Francisco Bay through the -55 foot MLLW Main Ship Channel.

Once aboard, the pilot updates VTS with location and destination information, as well as any safety concerns, as necessary. In turn, VTS keeps pilots alert of other vessels, including other deep draft vessels, ferries, recreational vessels, tugs, and dredges navigating in the Bay. This close coordination between the bar pilots and VTS helps maintain safe navigation in the Bay Area. Early coordination between shipping companies and the bar pilots ensures that deep draft vessels arrive at the pilot station with an appropriate

draft meeting under-keel regulations and at specific times such that vessels having deeper drafts can take advantage of prevailing tidal conditions to "ride the tide" if necessary.

Astronomical tides in the San Francisco Bay area are mixed, semi-diurnal, with two highs and two lows of unequal height occurring each lunar day. The largest changes in water level typically occur as the tide falls from higher high to lower low water, an event generally requiring 7 to 8 hours. Tidal influence causes water in the San Joaquin River to flow out to sea during ebb tide, while reversing flow upstream towards Stockton during flood tide.

In the bay area, a 2 foot under-keel<sup>3</sup> clearance is required for non-hazardous material, and a 3 foot under-keel clearance is required for hazardous material (i.e., petroleum). This safety measure helps reduce the risk for a vessel to run aground while transiting the channel. Considering prevailing tidal conditions, the shallowest portion of the channel which the vessel must navigate determines the operating draft of each vessel.

Daylight restrictions, fog conditions, excessive shoaling, and other factors further restrict the maximum allowable draft of vessels over the course of the year. Maximum vessel drafts using the channels over the past 5 years have averaged about -33.5 feet for bulk and general carriers, and -29.5 feet for liquid tankers. These maximums take into account the required under-keel clearances for the different vessel types.

Often deep draft vessels will take advantage of tides higher than MLLW to allow for deeper drafts of ships transiting the channels. For example, an oil tanker with a required 3 foot under-keel travelling to an oil terminal in the vicinity of Carquinez Strait may arrive at the offshore pilot station with a draft of -37 feet MLLW, to navigate safely through the Pinole Shoal Channel, the tanker may traverse the channel on a high tide of at least 5 feet above the -35 foot MLLW channel depth (or limiting shoal) – this is referred to as "riding the tide". If a vessel has to wait for a high tide to safely navigate a channel with the appropriate under-keel clearance, this is referred to as a "tidal delay."

In general, the longest tidal delay for most vessels calling at the refineries near Carquinez Strait is approximately 12 hours, although there are reports of some vessels having to wait nearly 24 hours for the higher of the two daily high tides before moving through the channels. Typically, shippers try to reduce tidal delays by coordinating early and often with the bar pilots to ensure that they know what the anticipated operating depth is when they plan to arrive. The bar pilots will not only provide the anticipated operating depth of the day the vessel will arrive, but also the timeframe the respective vessel must be at the offshore pilot station to successfully use the tide to accommodate the vessel's draft. Typically, the timeframe is only an hour. Outgoing vessels also take advantage of tides to move fully loaded vessels.

Lightering<sup>4</sup> of petroleum products is no longer allowed in San Francisco Bay. Light-loading refers to vessels carrying less cargo than their design allows in order to reduce their draft so that they can safely access a channel.

The operational strategies described above (riding the tide and light loading) are used by the deep draft vessels that call at the oil refineries located throughout the study area. They are all economically

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<sup>3</sup> Under-keel clearance is the vertical difference between the lowest protruding section of the hull and the minimum actual channel depth.

<sup>4</sup> Lightering is the process of transferring cargo between vessels of different sizes to reduce a vessel's draft in order to enter port facilities.

inefficient, causing loss of time and money. More detailed information about navigation economics can be found in Section 2.5.

### FUTURE WITHOUT-PROJECT CONDITIONS (NO-ACTION ALTERNATIVE)

These procedures for vessel operations, and inefficiencies, will continue to occur in the future without-project condition.

#### 2.3.2 SEA LEVEL CHANGE

To incorporate the direct and indirect physical effects of projected future sea level change on design, construction, operation, and maintenance of projects, the U.S. Army Corps of Engineers (USACE) has provided guidance in the form of Engineering Regulation, ER 1100-2-8162 and Engineering Technical Letter (ETL) 1100-2-1. Three scenarios are required by Engineering Regulation (ER) 1100-2-8162: a Baseline (or “Low”) scenario, which is based on historic sea level rise and represents the minimum expected sea level change; an Intermediate scenario; and a High scenario representing the maximum expected sea level change.

### EXISTING CONDITIONS

According to the Oceanic and Atmospheric Administration tide gauge (9414290) at San Francisco, California, the historic sea level rise rate was determined to be 0.00659 feet per year.

### FUTURE WITHOUT-PROJECT CONDITIONS (NO-ACTION ALTERNATIVE)

Following procedures outlined in ER 1110-2-8162 and ET 1100-2-1, low, intermediate, and high sea level rise values were estimated over the life of the project using the official USACE sea level change calculator tool. Projections for sea level rise are based on a start date of 1992, which corresponds to the midpoint of the current National Tidal Datum Epoch of 1983-2001. In the future without-project conditions, sea level rise could be expected to increase by 0.5 feet (low), 1 foot (intermediate), and 2.7 feet (high) by year 2070 with respect to the above mentioned present local mean sea level tide datum. The potential impacts of rising sea level include increased salinity intrusion into the Sacramento-San Joaquin Delta, overtopping of waterside structures, increased shoreline erosion, and flooding of low lying areas.

#### 2.3.3 STORM SURGE

### EXISTING CONDITIONS

An excerpt from the USACE Deep Water Shipping Scenario Report (2011) predicted water stage at San Francisco Fort Point NOAA station (9414290) for the baseline scenario under 2007-2008 historic conditions. A tidally-averaged stageplot noted potential for existing storm surge within the study area of almost 1.64 feet (0.5 m), which was used under the baseline scenario.

### FUTURE WITHOUT-PROJECT CONDITIONS (NO-ACTION ALTERNATIVE)

Storm surge would be expected to remain approximately the same in the future without-project, but could increase with increased sea level rise.

## 2.4 BUILT ENVIRONMENT

### 2.4.1 EXISTING FEDERAL PROJECT

#### EXISTING CONDITIONS

The existing Federal navigation project within the study area is described in this section, and portions of the project proposed for deepening are detailed in **Table 2-18**. Other areas of the existing channel not presented below have naturally deep water at 39 feet MLLW or more. Pinole Shoal Channel is a length 10.3 miles, and the Bulls Head Reach portion of Suisun Bay is 2.9 miles long. The high shoaling area (referred to in this report as the advance maintenance area, and the area where the proposed sediment trap would be) in Bulls Head Reach is currently deepened to -37 feet MLLW + 2 feet of overdepth annually. Maintenance dredging events for these areas are described in the next section.

**Table 2-18. Existing Federal Project Dimensions Within the Study Area.**

Channel	Length (feet)	Existing	
		Depth (feet MLLW)	Width (feet)
Pinole Shoal Channel	54,800	-35	600
Bulls Head Reach (in Suisun Bay)	15,900	-35	300
Bulls Head Reach Advance Maintenance Area	2,600	-37	300

#### FUTURE WITHOUT-PROJECT CONDITIONS (NO-ACTION ALTERNATIVE)

In the future, these channels will continue to have the projects depths as stated above.

### 2.4.2 OPERATIONS AND MAINTENANCE (INCLUDING HIGH SHOALING AREAS)

#### EXISTING CONDITIONS

USACE maintains the navigability of Federal navigation channels to either the authorized depth or a lesser regulatory depth. The regulatory depth is the depth to which environmental compliance has been completed. Accumulated sediments settling in the channels can impede navigability in the study area channels. Maintenance dredging removes this sediment and returns the channels to regulatory depths to provide safe, reliable, and efficient waterborne transportation systems. For the foreseeable future, hopper dredging will continue to be used to maintain Pinole Shoal, whereas clamshell dredging will be used to maintain Bulls Head Reach as has been required by USFWS since 2017.

**Table 2-19 Maintenance Dredging within the Study Area.**

Channel	Dredge Type	Typical Dredging Frequency (years) <sup>5</sup>	Median Volume Dredged Annually (CY) <sup>6</sup>	Federal Placement Site
Pinole Shoal Channel	Hopper	2	255,000	SF-10 (San Pablo Bay)
Bulls Head Reach	Clamshell	1	25,000	SF-16 (Suisun Bay)
Bulls Head Reach Advance Maintenance Area	Clamshell	1		SF-16 (Suisun Bay)

*HIGH SHOALING AREA IN BULLS HEAD REACH*

The Bulls Head Reach advance maintenance area portion of the Suisun Bay Channel begins approximately 1 mile south of the Interstate 680 Benicia-Martinez Bridge and extends east approximately 3 miles to the Avon Wharf.

USACE typically elects to perform advance maintenance every year in this area because it shoals faster than the annual dredging cycle, and it is essential for USACE to maintain the utility of the channel as long as possible before needing to address any shoaling issues outside of the work windows established by the Long Term Management Strategy (LTMS) Plan within which USACE may conduct maintenance dredging activities so as to minimize impacts to listed species and species of concern. Within the study area, maintenance dredging is constrained for environmental reasons to the period between June and November in the West Richmond and Pinole Shoal channels, and to the period between August and November in the Bulls Head Reach.

Since 2000, emergency dredging actions have been performed in Bulls Head Reach outside of the regular maintenance window with an average frequency of approximately 3 years. Beginning in 2012, the high shoaling area within Bulls Head reach was deepened for advance maintenance to -37 ft MLLW plus 2 ft of overdepth and since then, emergency dredging outside of the scheduled O&M dredging has not been required – however, annual dredging of this advance maintenance area still occurs, and is performed as described below.

For the immediate future, hopper dredges will no longer be permitted to dredge in the Suisun Bay Channel, including Bulls Head Reach, because of the presence of delta smelt, which is a listed endangered species. Therefore, annual advance maintenance dredging actions will be performed using clamshell dredge plants. Currently, each annual advance maintenance effort must be consulted and coordinated with the environmental resource agencies and the Major Subordinate Command (South Pacific Division) for authorization and approval. This effort can take two to three months to complete at an annual cost of approximately \$75,000 in labor for all involved, and at a cost of \$1,000,000 for mobilization and demobilization (not including the cost of the removal of the material itself).

<sup>5</sup> Note that this dredging frequency is meant to capture existing conditions. Pinole channel is currently dredged every two years; however, prior to 2017, it was dredged annually.

<sup>6</sup> Median Annual Maintenance Volumes from Fiscal Year 2005 to 2014.

### FUTURE WITHOUT-PROJECT CONDITIONS (NO-ACTION ALTERNATIVE)

Maintenance dredging of the channels would continue to occur at the same frequency and would generate the same volumes of dredged material as under the existing conditions, with additional time and cost spent for each event as described above. Maintenance dredging will continue to occur annually at Bulls Head Reach and every two years at Pinole Shoal to maintain the current depth of -35 feet MLLW + 2 feet of overdepth. Maintenance dredging should continue to produce annual volumes of dredged sediments similar to those shown in **Table 2-19**, with the dredged sediments continuing to be disposed in a similar fashion as is presently done.

For the high shoaling area in Bulls Head Reach, advance maintenance dredging actions will be performed annually using clamshell dredge plants (to -37 feet MLLW + 2 feet of overdepth), with emergency maintenance events outside of planned maintenance dredging if needed.

### 2.4.3 DREDGED MATERIAL PLACEMENT/BENEFICIAL REUSE

#### EXISTING CONDITIONS

USACE is a partner in the Dredged Material Management Office (DMMO) along with the San Francisco Bay Regional Water Quality Control Board (Water Board), San Francisco Bay Conservation and Development Commission (BCDC), State Lands Commission, and the U.S. Environmental Protection Agency (USEPA). The DMMO was created as a recommendation of the 2001 LTMS to coordinate dredging and dredged sediment placement and placement within San Francisco Bay. The LTMS was approved in 2001 and set goals for beneficial reuse and in-Bay open water placement of dredged material.

In April 2015, USACE and the Water Board completed an Environmental Assessment and Environmental Impact Report for Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay, Fiscal Years 2015-2024 (Maintenance Dredging EA/EIR). That document is intended to fulfill NEPA and CEQA requirements for maintenance dredging of the Federal navigation channels in San Francisco Bay for the Federal fiscal years 2015 through 2024.

#### **POTENTIAL BENEFICIAL REUSE SITES**

In addition to using dredged sediment to restore ecosystems in the Delta, a combination of existing and newly permitted beneficial reuse sites as well as existing and new upland dredged material placement sites used by USACE and the Port of Stockton for annual maintenance dredging events can be considered.

**CULLINAN RANCH TIDAL RESTORATION SITE.** Cullinan Ranch is a beneficial reuse site owned by the USFWS. Once restored, the site will become part of the larger San Pablo Bay Wildlife Refuge. The site is fully permitted and has been accepting dredged material from Federal and non-Federal maintenance dredging projects since 2013. The site consists of diked baylands and was used for agriculture until the late 1980s. Following diking and draining the site, much of the land lost up to 6 feet of elevation as a result of sediment deposition, soil compaction, and loss of organic matter. Dredged material is being used to raise site elevations for wetland restoration. Cullinan Ranch currently has capacity of approximately 2.8 million cubic yards of dredged material, but, it is in the process of amending the permit to increase the capacity to 9 million cubic yards. The Cullinan Ranch Tidal Restoration Site is located immediately adjacent to State

Highway 37. The southern off-loader location is within 200 feet of the Highway 37 Mare Island Bridge over the Napa River, with the northern off-loader location being approximately 750 feet north of the Mare Island Bridge.

Details on the purpose and need, design, construction requirements, and environmental impacts are provided in the Cullinan Ranch Wetland Restoration Site's EIS/EIR (USFWS and CDFW 2008; CSLC 2012). This GRR/EIS incorporates the beneficial reuse site NEPA documents by reference and therefore does not provide further details regarding the construction activities associated with restoration construction or off-loading dredged material.

**MONTEZUMA WETLANDS RESTORATION PROJECT.** Montezuma Wetlands restoration site is an approximate 2,400-acre privately-owned upland beneficial reuse site that has been receiving dredged material from Federal and non-Federal dredging Projects since 2001. It is located on the eastern edge of Suisun Marsh, west of Collinsville, in Solano County. The purpose of the site is to restore approximately 1,800 acres of tidal wetlands, seasonal wetlands, intertidal ponds, vernal pools, and upland buffer zones. Montezuma is a fully permitted ecosystem restoration and beneficial reuse site. Ground elevations have subsided by up to 10 feet and dredged material is used to raise site elevation such that restoration can occur. The site has a current capacity for approximately 12 million cubic yards of dredged material and can accept both cover and non-cover material.

Dredged material scows having a capacity of 4,000 to 5,000 cubic yards would be transported anywhere from 16 to 32 miles from the area of deepening to the off-loader anchored at the mouth of Montezuma Slough adjacent to the site. Implementation of the project could deliver sediment to the Montezuma off-loader. The off-loader is located approximately 100 feet offshore of the southeastern levee of the Montezuma site, approximately 0.5 mile east of the mouth of Montezuma Slough and 0.2 mile north of Chain Island. The hamlet of Collinsville, which contains several residences, is located approximately 1,900 feet east of the off-loader location. Recreational boaters are likely to pass by this site, and the Department of Water Resources Collinsville Day-Use area is about 2 miles northwest of the off-loader location. In the area of the Montezuma Wetlands, ambient noise, consisting of nearby roadway noise, is estimated to be less than 60 dB. (Solano County 2015). The off-loader would pump the slurry from the scows into the designated cells within the Montezuma site. The water used to make up the slurry would be pumped from Montezuma Slough. The Montezuma site is permitted to draw water from Montezuma Slough and discharge any water used during the process of off-loading dredged material back into the bay water via Montezuma Slough, provided it meets the site's waste discharge requirements. Once dredged material is off-loaded to the site, it would be placed in cells where it would be available for onsite ecosystem restoration.

The Montezuma Wetlands Restoration Site is responsible for all environmental impacts associated with off-loading, placing, and managing the dredged sediment. Details on the purpose and need, design, construction requirements, and environmental impacts are provided in the Montezuma Wetland Restoration Site's EIS/EIR (USACE and SCDEM, 1998). This GRR/EIS incorporates the NEPA analysis of the beneficial reuse sites by reference and therefore does not provide further details regarding the construction activities associated with restoration construction or off-loading of dredged material; the reader is referred to the Montezuma EIS/EIR for that information.

**DELTA ISLANDS RESTORATION SITE.** USACE and the California Department of Water Resources (DWR) propose to restore approximately 340 acres of intertidal marsh habitat in the Sacramento-San Joaquin River Delta (Delta). The restoration work would involve placing dredged material into the shallow open water of a

flooded Delta island and planting aquatic vegetation over an estimated 10-year period to create 340 acres of intertidal marsh in an area now lost to land subsidence. The Delta Islands converted into farmland until a levee break in 1928 inundated the island. Since then, Big Break has remained unvegetated open water.

The Final EIS can be found here:

[https://www.spk.usace.army.mil/Portals/12/documents/civil\\_works/Delta/DeltaStudy/FinalEIS/Delta\\_Islands\\_Final\\_Feasibility\\_Report-EIS\\_Sep2018.pdf?ver=2018-09-14-162532-197](https://www.spk.usace.army.mil/Portals/12/documents/civil_works/Delta/DeltaStudy/FinalEIS/Delta_Islands_Final_Feasibility_Report-EIS_Sep2018.pdf?ver=2018-09-14-162532-197). The Recommended Plan in the Delta Islands study include three sources of material for subsidence reversal: direct placement from O&M dredging operations, previously dredged stockpiled material, and a gross assumption of trucking/barging similar material from a 30 mile radius. All material sourced from direct placement from O&M dredging operations is included in the Recommended Plan.

### FUTURE WITHOUT-PROJECT CONDITIONS (NO-ACTION ALTERNATIVE)

The future without-project would not contribute sediment to the beneficial reuse sites. The sites would continue to accept material from other dredging projects throughout the area.

#### 2.4.4 CHANNEL USERS

### EXISTING CONDITIONS

The channels in the study area serve crude oil imports and refined product exports to and from facilities located on the shoreline of Carquinez Strait. Channel users include seven petroleum related facilities (oil refineries and tank farms), one marine terminal, and a sugar factory. The nine channel users are described below:

- **Phillips 66, Oleum Dock, Rodeo:** Phillips 66 Oleum operates three docks located in the waters off Rodeo, California, at the eastern end of the Pinole Shoal Channel. Crude oil is received by pipelines from California oil fields and also from tankers. The facility has a total capacity of 1 million barrels of crude oil and 2.9 million barrels of petroleum products. The dock has three berthing areas totaling about 2,500 feet. The berths can accommodate vessels up to 1,000 feet long with depths up to -38 feet MLLW. Crude oil pipelines extend from the dock areas to 45 steel storage tanks.
- **NuStar Energy, Selby Dock, Rodeo:** NuStar Energy is a privately owned trans-shipper of petroleum products located in Crockett, California. NuStar Energy does not own products shipped through the facility. Rather, it warehouses products for its customers. The facility has 24 storage tanks with a capacity of 3.04 million barrels per day. Crude oil is delivered to refineries through the Kinder Morgan pipeline system and by sea. It operates one dock for off-loading petroleum products to storage tanks. The dock has one berth with a draft of -45 feet MLLW and can accommodate vessels up to 831 feet long and 100,000 dead weight tons. NuStar Energy is also serviced by trucks and rail.
- **C&H Sugar, Port of Crockett:** C&H Sugar is located east of the Carquinez Bridge on the southern shore of Carquinez Strait, in Crockett, California. The port contains five berths that can accommodate vessels up to 750 feet long with depths up to -36 feet MLLW. It receives unrefined sugar and ships packaged refined sugar. The current capacity is approximately 112 thousand tons of sugar. The facility is also serviced by the Union Pacific Railroad.

- Shell Oil Refinery, Martinez:** Shell Oil Refinery is located on approximately 1,100 acres along the southern shore of Carquinez Strait in Martinez, California. The refinery has a tanker and barge petroleum loading and unloading facility that imports and refines crude and exports refined petroleum products. It converts approximately 165,000 barrels of crude oil per day into gasoline, jet fuel, diesel, petroleum coke, industrial fuel oil, liquefied petroleum gas, asphalt, and sulfur. The docking facilities provide four berthing areas. Berths 1 and 2 are on the channel side and are currently in operation. The berths can accommodate vessels up to 1,000 feet long that draw up to -39 feet MLLW. Berths 3 and 4 are on the south side of the dock (inland side) and not currently maintained.
- Tesoro Amorcó Marine Oil Terminal, Martinez:** Amorcó Marine Oil Terminal is owned and operated by Tesoro Refining and Marketing Company. The terminal is a tanker and barge petroleum unloading facility (i.e., import only) used by Golden Eagle Refinery, located in Martinez, Contra Costa County, California. The terminal imports crude oil to Tesoro's Amorcó Tank Farm immediately upland where it later is transferred to Tesoro's Golden Eagle Refinery for refining. The single berth dock is approximately 1,130 feet long by 150 feet wide with a depth of up to -40 feet MLLW. The terminal can accommodate up to 190,000 dead-weight ton (DWT) vessels with displacements up to 200,000 DWT. Annual ship and barge traffic averages about 69 vessels per year. The current throughput of the terminal is 16.9 million barrels.
- Plains All American Terminal, Martinez:** The Plains All American Oil Terminal is a 225-acre site located on the south shore of Carquinez Strait, in Martinez, California. The oil terminal owns and operates the Shore Terminal docks in Martinez. The dock is a single-vessel berth with associated pumps and pipelines to transport crude to upland storage tanks and refinery. The dock is approximately 100 feet long, 40 feet wide, with a -38 foot MLLW berthing area that operates as a barge and tanker loading and unloading facility. The dock can currently handle vessels up to 950 feet long and 150,000 deadweight tonnage (DWT) displacements.
- Tesoro Avon Marine Terminal:** Tesoro Avon Marine Terminal is owned and operated by Tesoro Refining and Marketing Company (Tesoro). The terminal is a tanker and barge petroleum export facility associated with the Golden Eagle Refinery, located in Contra Costa County, California. The facility exports refined petroleum products, including premium fuel oil, gas oil, diesel, and cutter stock, from the refinery to tanker vessels for export. Although the Avon terminal is a multi-berth terminal facility consisting of two berths (Berth 1 and Berth 2), the terminal currently supports only Berth 1. The docking facility is approximately 1,520 feet long and ranges from 20 to 80 feet wide, with a depth of -40 feet MLLW. The terminal can accommodate vessels up to 113,635 DWT with displacements of up to 102,600 long tons. Annual ship and barge traffic averages 124 vessels per year (between 2004 and 2013) and the throughput ranges from about 5.1 to 12.8 million barrels per year.
- Benicia Port Terminal Company AmPorts:** The Port of Benicia is located in the Benicia Industrial Park, immediately west of the Martinez Bridge. It is a small port (640 acres) owned and operated by AMPORTS, one of North America's largest auto processors, processing more than 1 million vehicles each year. The port also provides break bulk service. The port is located near rail service. It can handle up to three -38 foot deep MLLW draft vessels along its 2,400 foot long wharf.

- **Valero Benicia Refinery:** Valero Refinery is located on the northeastern shore of Carquinez Strait, in Benicia, Solano County, California. The facility currently processes crude oil received by pipeline and marine tanker and barge vessels. It also has significant asphalt production capabilities, producing 25 percent of the asphalt supply in northern California. Currently, Valero refines domestic crude from the San Joaquin Valley (delivered by pipeline) and Alaska North Slope (delivered by tanker or barge), as well as foreign sour crude. The refinery has a throughput capacity of 170,000 barrels per day. The dock has a berthing length of 1,100 feet and a depth of -32 feet MLLW

#### FUTURE WITHOUT-PROJECT CONDITIONS (NO-ACTION ALTERNATIVE)

These channel users will continue to use the channels in the future without-project conditions.

### 2.4.5 MARITIME INFRASTRUCTURE WITHIN THE STUDY AREA

#### EXISTING CONDITIONS

Major ports located within the study area include the Ports of Richmond and Benicia and the Contra Costa County Northern Waterfront. The Port of Stockton is also a major port whose customers utilize these navigation channels, although port facilities are located at the terminus of the Stockton Deep Water Ship Channel, outside the area of proposed improvements.

**Port of Richmond.** The Port of Richmond is located approximately nine miles northeast of the Golden Gate Bridge on the eastern shore of San Francisco Bay. The Port encompasses five city-owned terminals and ten privately owned terminals for handling bulk liquids, dry bulk materials, metals, vehicles and break bulk cargoes. In 2008, the Port handled 19 million short tons of cargo, primarily in the form of liquid petroleum. In recent years, the Port has expanded its dry bulk, break bulk and containerized cargo handling capabilities and has increased its automobile processing facilities. It ranks number one for ports in San Francisco Bay in vehicles and liquid bulk. In addition to these general commodities, the Port can also handle dry-bulk, break bulk and containers. The Port is connected to a sophisticated rail network served by four major rail companies (CCG&CS 2013).

**Port of Benicia.** The Port of Benicia is a privately owned and operated port located in Solano County. The Port specializes in handling bulk goods such as agricultural products and motor vehicles. There is direct port access to I-680 and I-780 interstate freeways; UP Rail service; a dockside water depth of -38 feet and a 2,400 foot long deep water pier. The Port also has an oil terminal for the Valero oil refinery at Benicia (CCG&CS 2013).

**Contra Costa County Northern Waterfront.** The Northern Waterfront is located between the Port of Richmond on the west and the ports of West Sacramento and Stockton on the east. Along this stretch of the channel from the Carquinez Strait to Suisun Bay and the Delta there are a number of marine terminals and wharfs. These facilities are privately owned and primarily serve the adjacent manufacturing operations including: C&H sugar refinery in Crockett; Tesoro and Shell at Martinez and Phillips 66 in Rodeo; and Mirant power plant, Dow chemical plant, and the USS-POSCO's steel-coil processing plant in Pittsburg (CCG&CS 2013).

FUTURE WITHOUT-PROJECT CONDITIONS (NO-ACTION ALTERNATIVE)

These ports will continue to use the channels in the future without-project conditions.

2.4.6 BRIDGES

EXISTING CONDITIONS

Vehicle traffic in the study area is limited to five bridges that cross the Central San Francisco Bay, the Carquinez Strait and the San Joaquin River (**Table 2-20**). The vehicle bridges are all of fixed height, ranging between 135 to 148 feet vertical clearance as measured from the water surface at high tide. Therefore, the movement of vehicle traffic on Interstate 80, Interstate 580, Interstate 680, and State Route 160 is not affected by vessel traffic.

**Table 2-20. Bridges in the Study Area.**

Official Name	Common Name	Number of Spans	Vertical Clearance <sup>1</sup>	Vertical Clearance with Projected High RSLC <sup>1</sup>	Waterbody	Purpose
Golden Gate Bridge	Golden Gate Bridge	2	220 feet	217.3 feet	Central San Francisco	Vehicle Traffic on the National Highway System
N/A	Richmond-San Rafael Bridge	2	185 feet	182.3 feet	Central San Francisco/San Pablo Bays	Vehicle traffic on Interstate 580
Alfred Zampa Memorial Bridge	Carquinez Bridge	Two	148 feet	145.3 feet	Carquinez Strait	Vehicle traffic on Interstate 80
George Miller, Jr. Bridge	Benicia-Martinez Bridge	Two	138 feet	135.3 feet	Carquinez Strait	Vehicle traffic on Interstate 680
Union Pacific Rail Bridge	Part of the Benicia-Martinez Bridge	One lift-span	Closed 70 feet Open 135 feet	Closed 76.3 feet/Open 67.3 feet	Carquinez Strait	Union Pacific, Burlington Northern Santa Fe, and Amtrak trains

<sup>1</sup> Vertical clearance at high tide

## FUTURE WITHOUT-PROJECT CONDITIONS (NO-ACTION ALTERNATIVE)

The bridges will continue to be built and function as described above. Projected regional sea level change (RSLC) under the USACE high curve scenario was factored in to calculate how vertical clearance could be affected. All numbers are referenced to high tide. In this event, current vessels would not be impacted, or vessels could choose to sail at a lower tide.

### 2.4.7 UTILITIES AND PUBLIC SERVICE

The Utility Investigation Report for the San Francisco to Stockton Deep Water Ship Channel (USACE 2011) was the primary source of information considered for known utility channel crossings. The most recent NOAA Nautical Charts covering the study area were also consulted to identify locations where the deep draft shipping channels intersect with overhead transmission lines or buried cables and pipelines.

Known utilities in the study area include the buried Trans Bay Cable<sup>7</sup> and other transmission lines, buried pipelines, and overhead transmission lines as discussed in the following sections. The region is served by an extensive network of natural gas pipelines and a number of these pipelines cross the study area navigation channels. In addition, there are a number of petroleum refineries in the region and some petroleum product pipelines originating at the refineries cross the study area navigation channels. Other underwater cables crossing the shipping channels within the study area include both telephone and fiber optic lines.

#### 2.4.7.1 BURIED/UNDERWATER CABLES (UWC)

The 53-mile long Trans Bay Cable runs between the converter stations in Pittsburg, Contra Costa County, and the City of San Francisco (**see Figure 2-11**). This power transmission cable, carrying 400 megawatts (high voltage) of direct current, generally runs east-west along the same route as the shipping channels, close to the West Richmond Channel, the Pinole Shoal Channel, through the Carquinez Strait and close to the Bulls Head Reach. Plan and profile drawings of the cable were included in the Utility Investigation Report (USACE 2011). Design documents indicate that the cable was to be buried at a depth of 3 to 6 feet below the bottom sediments. Based on available information, the Trans Bay Cable crosses the dredged channels at two locations (UWC-3 and UWC-4). Although the crossing designated UWC-1 is included for completeness, it is located in the West Richmond Channel which, currently, is not dredged.

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<sup>7</sup> Utilities in the overall study area are assessed in this section. However, subsequent sections of the report in Section 4.1.18 and Section 5.1 evaluate utilities within the project footprint and determine that there will be no impacts to any utilities or any relocations needed.



**Figure 2-11. Buried/Underwater Cables.**

Other buried cables found in the study area cross the ship channel at the Richmond-San Rafael Bridge, in the Carquinez Strait, and at the Benicia-Martinez Bridge. The Level 3 Communications fiber optic cable at the Benicia-Martinez Bridge, designated as UWC-9, is the only other cable that crosses a dredged portion of the navigation channel.

**Table 2-21. Known Buried/Underwater Cable Crossings.**

Designator on Figure 4-20	Near or in Channel	Location Description	Depth Below Channel Bottom	Description of Crossing
UWC-1	West Richmond Channel	Southern extremity of the West Richmond Channel	6 feet	Trans Bay Cable
UWC-2	West Richmond Channel	Richmond - San Rafael Bridge	Unknown	Two Pacific Telephone and Telegraph lines

Designator on Figure 4-20	Near or in Channel	Location Description	Depth Below Channel Bottom	Description of Crossing
UWC-3	Pinole Shoal Channel	Western extremity of Pinole Shoal Channel	6 feet	Trans Bay Cable
UWC-4	Pinole Shoal Channel	Eastern extremity of the Pinole Shoal Channel	6 feet	Trans Bay Cable runs in parallel and within with the shipping channel
UWC-5	Carquinez Strait	Western extremity of Carquinez Strait, west of Carquinez Bridge, Vallejo	Unknown	A 12-inch fiber optics conduit owned by Level 3 Communications
UWC-6	Carquinez Strait	Within Carquinez Strait, east of Carquinez Bridge	Unknown	Two Pacific Telephone and Telegraph lines
UWC-7	Carquinez Strait	Within Carquinez Strait, east of Carquinez Bridge	Unknown	Unknown
UWC-8	Carquinez Strait	Within Carquinez Strait, west of Benicia-Martinez Bridge	20 feet	A 3-inch steel pipe with fiber optic cable owned by AT&T
UWC-9	Bulls Head Reach	At the Benicia-Martinez Bridge	Unknown	A fiber optics line owned by Level 3 Communications

Sources: eCoastal 2015; NOAA 2015; USACE 2011.

#### 2.4.7.2 BURIED/UNDERWATER PIPELINES (PLC)

Available information indicates that there are at least seven buried pipelines crossing the navigation channel. There is a natural gas pipeline crossing at the Carquinez Bridge (PLC-1) and there are six pipelines that cross at the Benicia-Martinez Bridge (PLC-2) (see **Figure 2-12**)

The existing 35 foot channel is not currently dredged at the Carquinez Bridge and as a result of prevailing natural depths it is not proposed for deepening. The existing 35 foot depth of the Bulls Head Reach at the Benicia-Martinez Bridge is maintained by annual dredging, or on an as needed basis. The locations of the pipeline crossings are shown in **Figure 2-12** with details provided in **Table 2-22**.<sup>8</sup>

<sup>8</sup> Sources: California Natural Gas Pipelines (California Energy Commission 2015) [CEC]; Final Environmental Impact Report for the Proposed Trans Bay Cable Project (URS 2006); Utility Investigation Report San Francisco to Stockton Deep Water Ship Channel (USACE 2011); and NOAA Nautical Charts (NOAA 2015).

**Table 2-22. Buried/Underwater Pipeline Crossings**

Designator on Figure 4-21	Near or in Channel	Location	Depth Below Channel Bottom	Description
PLC-1	Carquinez Strait	At the Carquinez Bridge, Vallejo	Unknown	A Pacific Gas and Electric (PG&E) natural gas pipeline
PLC-2	Bulls Head Reach	At the Benicia-Martinez Bridge	Unknown	Six pipelines cross below the surveyed channel bottom. Three are owned and operated by Valero Benicia Refinery and three are owned and operated by Kinder Morgan.

Sources: CEC 2015; NOAA 2015; URS 2016; USACE 2011.



**Figure 2-12. Buried/Underwater Pipelines.**

### 2.4.7.3 OVERHEAD POWER TRANSMISSION LINES (OHC)

There are two overhead transmission line crossings in the Carquinez Strait (OHC-1 and OHC-2), as shown in **Figure 2-13**. The height of power lines crossing over the channels does not limit the safe clearance and passage of vessels traveling in the channels because some bridges in the study area are lower.



**Figure 2-13. Overhead Cables.**

## 2.5 ECONOMIC ENVIRONMENT

The section differs from the previous socio-economics section in that it discusses the economics of the navigation environment. The base year for this economic analysis is 2020.<sup>9</sup>

<sup>9</sup> Environmental analyses in the following sections use 2023 as the base year. The 3 year difference is negligible for the overall assumptions in the analyses.

2.5.1 COMMODITIES

EXISTING CONDITIONS

Commodity forecasts for deep-draft navigation studies typically use three to five years of empirical data to determine a baseline average on which to project commerce. Baseline averages over a longer period of time can lead to an underestimation of port growth. To minimize the impact of potential anomalies in trade volume on a long-term forecast, three years of empirical data (2011-2013) were used to establish the baseline for the commodity forecast.

Crude oil represented the majority of the total tonnage of import commodities that moved through the study area to port facilities in the study area. Most of the crude oil moving through the channel is imported from foreign countries, although a small percentage of crude comes from domestic sources such as Alaska.

All of the crude oil shipments arrive at the various oil industry ports in the vicinity of Avon. Crude oil is imported, while petroleum products are exported. Historical imports and export moving through the oil terminals from 2011 to 2013 are provided in **Table 2-23**.

**Table 2-23. Historical Imports and Exports.**

Petroleum Product Movements	2011	2012	2013	3-year Average
Total Crude Imports	7,864,034	7,729,726	7,292,532	<b>7,628,764</b>
Total Petroleum Exports	1,813,297	1,949,962	2,109,409	<b>1,957,556</b>

FUTURE WITHOUT-PROJECT CONDITIONS (NO-ACTION ALTERNATIVE)

Estimates of growth for the oil refineries that import crude oil and export petroleum products are described in the **Appendix D, Economic Analysis**. Crude oil imports are projected to grow at an annual rate of 0.3%. Petroleum and other liquid exports are projected to grow at an annual rate of 2.4%. **Table 2-24** shows the commodity forecast for years 2020, 2030, and 2040. Even though port and terminal capacity would not be reached, for the purposes of this report’s analysis, it is assumed that tonnage would be held constant after year 2040<sup>10</sup>.

**Table 2-24. Commodity Forecast 2020-2040 (metric tons).**

Commodity	2020	2030	2040
Total Crude Imports	7,790,000	8,027,000	8,271,000
Total Petroleum and Other Liquid Exports	2,311,000	2,930,000	3,714,000

<sup>10</sup> Per ER 1105-2-100, "specific commodity studies are of limited value for projections beyond approximately 20 years". This is a general guideline for deep draft navigation studies due to uncertainty in forecasts.

2.5.2 FLEET

EXISTING CONDITIONS

Vessels in the study area are primarily tankers with maximum design drafts ranging from -40 to -55 feet MLLW as shown in **Table 2-25**. Crude oil vessels can generally be classified into two groups:

- **Group 1:** Aframax and Suezmax tankers with DWTs typically between 80,000 and 150,000 dead weight tons (DWT). These vessels have design drafts of as much as -55 feet, and arrive in Northern California only after having lightered elsewhere, typically Southern California. These vessels arrive less than half full and will often, but not always need to use the tides to deliver their remaining load.
- **Group 2:** Panamax tankers. Because of the draft restrictions in the channels, the tankers will arrive between 70 percent and 80 percent loaded and will use the available tide to arrive drafting between -35 feet and -37 feet.

Tankers from both groups typically deliver approximately 50,000 metric tons of commodities. **Table 2-25** shows vessel fleet data for foreign deep draft vessels calling the refineries. **Table 2-26** shows the 2000 distribution of oil tankers calling at ports in the study area by weight. More than 50 percent of the vessels are 50,000 or 70,000 DWT. **Table 2-27** shows the annual transits in 2015 in both directions (i.e., inbound and outbound) and sailing drafts in the study reach channels.

**Table 2-25. Vessel Types and Attributes.**

Vessel Type	Capacity (DWT)	Maximum Design Draft	Maximum Beam	Maximum Length Overall	Tons Per Inch (TPI)
Panamax Medium	16,000-40,000	40	101	700	100
Panamax	35,000-77,000	45	106	760	154
Aframax	77,001-120,000	50	160	920	238
Suezmax	120,001-195,000	55	165	960	299

**Table 2-26. Tankers by Class - Year 2000.**

DWT	20k	25k	35k	50k	60k	70k	80k	90k	110k	150k	165k
Vessel Calls	28	79	102	44	34	15	7	15	14	14	35
Percentage of Calls	7%	20%	26%	11%	9%	4%	2%	4%	4%	4%	9%

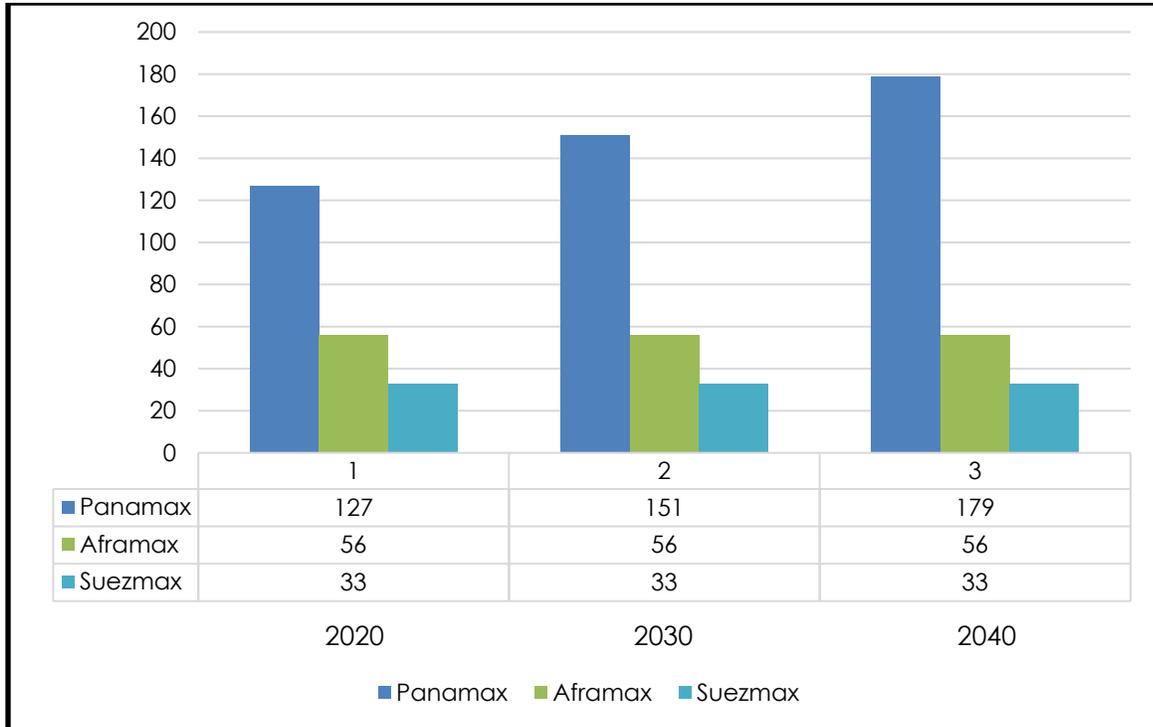
**Table 2-27. Tankers by Class - Year 2015.**

DWT	20k	25k	35k	50k	60k	70k	80k	90k	110k	150k	165k
Vessel Calls	1	1	59	27	34	72	0	34	75	34	0
Percentage of Calls	0%	0%	18%	8%	10%	21%	0%	10%	22%	10%	0%

Vessels in the existing condition may wait on high tide (which can be up to 6 feet) in order to maximize their loading capacity. For the current channel depth of 35 feet, a vessel using low tide can transit the channel at 32 feet (allowing 3 feet of underkeel clearance).

FUTURE WITHOUT-PROJECT CONDITIONS (NO-ACTION ALTERNATIVE)

Figure 2-14 shows the forecast of vessels calling on the terminals within the study area if there is no action taken, where vessel transits could increase from 127 in 2020 to 179 in 2040. Panamax vessels will continue to transit the most frequently and experience the most inefficiencies.



**Figure 2-14. Forecast of Vessels calling at terminals within the study area.**

In the future with-out project condition, vessels with sailing drafts greater than 32 feet will encounter tidal delays.



3

## Plan Formulation

## 3 PLAN FORMULATION

### 3.1 PLAN FORMULATION RATIONALE

The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, established by the U.S. Water Resources Council on March 10, 1983, have been developed to guide the formulation and evaluation studies of the major Federal water resources development agencies. These principles and guidelines are commonly referred to as the “P&G,” and will be cited throughout the plan formulation sections of this report.

Plan formulation is the process of developing alternative plans to address a given problem and established objectives. The first step in plan formulation involves identifying all potential management measures for the given problems. A management measure is a structural or nonstructural action that can be implemented at a specific geographic site to address one or more planning objectives.

An alternative plan includes one or more management measures to address the problem. Alternative plans can differ by types of measures, or how measures are combined or defined, including dimensions, quantities, materials, locations or implementation time frames.

Four accounts (P&G 1983) facilitate the evaluation of management measures and display the effects of alternative plans.

- **National Economic Development (NED) account:** Includes consideration of a measure’s potential to meet the planning objective to reduce storm damages, as well as decrease costs of emergency services, lower flood insurance premiums, and consider project costs. Costs and benefits used to fully evaluate the NED objective are not calculated at this stage; however, estimates can be made to gage the overall cost-effectiveness of a measure for this initial screening. Effects of sea-level change and a measure’s adaptability to such change were considered under the National Economic Development (NED) account.
- **Environmental Quality (EQ) account:** Considers ecosystem restoration, water circulation, noise level changes, public facilities and services, aesthetic values, natural resources, air and water quality, cultural and historic preservation, and other factors covered by the National Environmental Policy Act (NEPA).
- **Other Social Effects (OSE) account:** Includes considerations for the preservation of life, health, and public safety; community cohesion and growth; tax and property values; and, the displacement of businesses and public facilities. For evaluation purposes, the OSE account is inclusive of the planning objectives to maintain recreation and maintain a safe evacuation route, and the planning constraint to avoid conflict with legal requirements.
- **Regional Economic Development (RED) account:** Considers the potential impacts on the local economy. .

The P&G require the NED plan to be selected as the Recommended Plan, unless an exception is granted. The NED plan must also be evaluated in consideration of the P&G criteria of completeness, effectiveness, efficiency, and acceptability. Each alternative plan is formulated in consideration of these four criteria.

Preliminary plans were formulated by combining management measures. Each plan was formulated in consideration of the following four criteria described in the Principles and Guidelines (P&G):

1. **Completeness:** Extent to which the plan provides and accounts for all necessary investments or actions to ensure realization of the planning objectives
2. **Effectiveness:** Extent to which the plan contributes to achieving the planning objectives
3. **Efficiency:** Extent to which the plan is the most cost-effective means of addressing the specified problems and realizing the specified opportunities, consistent with protecting the nation's environment
4. **Acceptability:** Workability and viability of the alternative plan with respect to acceptance by Federal and non-federal entities and the public, and compatibility with existing laws, regulations, and public policies

## 3.2 SCOPING\*

### DETERMINATION OF STUDY AREA AND SCOPE

A Ship Simulation Study (*Vessel Simulation Navigation Study of the Proposed John F. Baldwin Ship Channel – Phase III Proposed Channel Improvements*, DTMA 91-88-C-80024, Final Report) was completed in August 1992 for USACE by Marine Safety International. The study used a USACE-approved numerical model that met the acceptance criteria identified in EM 1110-2-1613, and was conducted with input from the San Francisco Bay Harbor Pilots. The design vessel for the study was the Exxon Benicia<sup>11</sup>. In addition to proposed deepening alternatives (which were being explored at that time), the preliminary design included some minor channel realignments but did not include any widening. The Pilots made recommendations for relocation of navigation aids and channel realignment details that would increase navigation safety and satisfy their concerns. The final study report confirmed that if the recommendations were incorporated into the proposed channel design, there would be no need for any widening. Since the ship simulation was performed, all of the pilot's recommendations have been incorporated into the existing channel configurations, with the exception of the actual deepening. The pilots also requested that USACE consider another measure, such as a sediment trap to control excessive shoaling that occurs in the Suisun Bay Channel in the Bulls Head reach north of the Martinez Bridge.

The study area was originally scoped in 2008 to include the entire 78-mile long navigation project to include the John F. Baldwin and Stockton channels, however, it was re-scoped in 2016 to include

<sup>11</sup> Dimensions of the Exxon Benicia were as follows: LOA = 906 feet; Beam = 173 feet; Draft = 43 feet. Current dimensions of the Panamax tanker design vessel is: LOA = 750 feet; Beam = 105 feet; Draft = 45 feet.

navigation improvements up to Avon. The re-scoped study area described in this report is more appropriate for the immediate problems facing existing vessels and the study fits into the three year timeframe required for USACE feasibility studies. The study area now encompasses the area which spans from Central San Francisco Bay to Avon (just east of the Benicia-Martinez Bridge). All other existing channels within this area are already naturally deep, and therefore Pinole Shoal Channel, and the Bulls Head Reach portion of the Suisun Bay Channel are the focused areas carried forward for the study area.

### PUBLIC AND AGENCY INPUT

On March 12, 2008, USACE and the Port of Stockton published the original Notice of Intent/Notice of Preparation (NOI/NOP) for an EIS/EIR. Two public scoping meetings were held on March 26 and April 2, 2008. Comments and questions were solicited for consideration in evaluating potential impacts, environmental issues, and alternatives for the proposed channel deepening between San Francisco Bay and the Port of Stockton.

Because of the amount of time that has passed since the original NOI/NOP were published, USACE and the Port of Stockton published a supplemental NOI and supplemental NOP on March 4, 2016, to notify the public of the preparation of this EIS/EIR, provide an update on the study description, and re-open the public scoping process. Because the 2016 NOI/NOP was a supplement to the original, no additional public meetings were held during the scoping period. The public scoping period ended on April 4, 2016.

An additional NOI was published in the Federal Register on December 4, 2017. The current NOI announced the reduction in scope of this project (to include only Pinole Shoal and the Bulls Head Reach portion of the Suisun Bay) from the NOI that was published on March 4, 2016. Scoping comments received in 2016 and 2017/2018 are located in **Appendix I, Pertinent Correspondence Part 1**, along with a comment response matrix to address the comments.

Agency meetings were held in December 2018 to discuss the scope of the project, as well as the updated salinity information that is contained within the draft and final GRR/EIS.

A Notice of Availability was published for the draft GRR/EIS in the Federal Register on May 10, 2019, a press release to announce the location and comment period of the document, and it was also published on the California State Clearinghouse website. A letter was sent to the general public to notice release of the draft GRR/EIS (mailing list available upon request) and to also notice the public meeting time and location that occurred on June 11, 2019 from 6pm-8pm at the Contra Costa County Conservation and Development office in Martinez, at 30 Muir Road, Martinez, CA 94553. Hard copies of the draft GRR/EIS were made available at the following libraries:

Cesar Chavez Central Library, 605 N El Dorado St, Stockton, CA 95202

Contra Costa County Library, Martinez Branch 740 Court St, Martinez, CA 94553

Comments on the draft GRR/EIS were received from May 10, 2019 through June 24, 2019 for a 45 day public review period. Comments received after June 24 through August 31, 2019 are included in the comment response matrix, located in **Appendix I, Pertinent Correspondence Part 2**. These comments and

responses also include comments from the Dredge Material Management Plan (DMMP) meeting that occurred in San Francisco in July 2019.

## 3.3 PROBLEMS AND OPPORTUNITIES\*

### 3.3.1 PROBLEMS

The study area as described earlier is the existing navigation channel from the Golden Gate Bridge to Avon (approximately 44 miles), with a specific focus on the Pinole Shoal and Bulls Head Reach portion of the Suisun Bay Channel.

Pinole Shoal Channel and Bulls Head reach are maintained at -35 feet MLLW. However, even the smallest class of vessels, the panamax class, has the capacity to draft at -45 feet MLLW. Therefore, vessels must be “light-loaded”, or less than fully loaded with cargo, to navigate the channels with sufficient under-keel clearance (for liquid tankers, under-keel clearance is 3 feet). Light-loading increases the cost of transportation and, in turn, the cost of the shipped products because more trips must be made to carry the same volume of cargo.

Channel depths in ship channel are inadequate for fully loaded modern deep-draft vessels, which increases transportation costs and decrease economic efficiency. Inefficient strategies that are currently employed include:

- Insufficient Depth, leading to inefficient use of capacity and inefficient transit schedules:
  - All vessels must light-load cargo to safely transit the -35 foot channel depth.
  - Panamax tankers are the smallest class and most easily affected, lightloading to -32 feet and unable to use their full draft capacity of -45 feet
  - Vessels will often wait for favorable (high) tides of up to 6 feet in a two hour window (up to 12 hours of delay) to in order to gain additional draft efficiencies.
- Additional time and cost to project:
  - High shoaling rates in Bulls Head Reach often require additional dredging outside of the regular scheduled dredging efforts. The U.S. Coast Guard considers any shoaling above the currently maintained depth of -35 feet MLLW in Bulls Head Reach to be a hazard to navigation.

### 3.3.2 OPPORTUNITIES

- **Increase efficiency of vessels (both in capacity used and in transit schedules)**
- **Reduce transportation costs**
- **Reduce frequency of operation and maintenance dredging intervals in high shoaling areas**
- **Opportunity to beneficially use dredged material.** Several opportunities to beneficially use dredged material for habitat restoration exist at a number of wetland restoration sites within the San Francisco Bay Area. These opportunities would be enhanced by deepening the ship channel

since new work material is superior to maintenance material to accomplish the habitat restoration objectives at these sites. For implementation and permitting, an important consideration in any navigation improvement project is ensuring maximum beneficial reuse of dredged material, also echoed in the San Francisco Bay Long Term Management Strategy (LTMS) for dredged material.

## 3.4 CONSTRAINTS

### 3.4.1 PLANNING CONSTRAINTS

A constraint is a restriction that limits the extent of the planning process; it is a statement of effects that alternative plans should avoid. Constraints are designed to avoid undesirable changes between without and with-project future conditions. The planning constraint for this study area is to avoid conflict with Federal regulations, as stated in Federal law, USACE regulations, and executive orders, and specifically to:

1. Avoid adverse impacts on species of special concern:

Avoid Salt Water Intrusion: Deepening beyond certain depths in the channel could potentially allow saltwater to flow upstream into freshwater habitat, which has the potential to adversely impact several state and federally-listed threatened and endangered species, such as salmonids, green sturgeon, and delta and longfin smelt, as well as aquatic habitats in the Delta.

Dredge Within Environmental Windows: To minimize effects to special status species from in-water work, several environmental work windows have been established in San Francisco Bay and the Delta. Environmental work windows limit the timeframe when in-water work can occur, which would affect any construction schedule developed to implement a project. In addition, some of the listed species are present all year long, thereby further complicating construction activities. The work windows to protect special status species vary from 4 months to 6 months during the year, with actual months in which dredging is prohibited depending on the specific channel location. Permission to dredge outside of the established work windows would require extensive coordination with the resource agencies.

Type of Dredge: To minimize effects to listed species due to entrainment, a mechanical clamshell dredge will be used for all work associated with this channel deepening project, including at Pinole Shoal.

The existing Biological Opinions for the maintenance dredging require construction to occur within special status work windows. Since 2017, mechanical clamshell dredges have been required by USFWS in the Bulls Head Reach area.

2. Avoid significant impacts to water quality and water supply: A measure considered to improve navigation efficiency in the project study area must not significantly impact California water supply and quality without acceptable mitigation. Water quality and water supply in the Sacramento-San Joaquin Delta is a very contentious issue in California, particularly considering drought years. Water that flows through the Delta provides drinking water to more than 25 million Californians, irrigation waters to approximately 1 million acres of farmland, and water to

more than 3 million acres of wildlife refuges. Affected water supply stakeholders include, but are not limited to:

- Contra Costa Water District
- Metropolitan Water District of Southern California (a consortium of 26 cities and water districts that provides drinking water to nearly 19 million people in parts of Los Angeles Orange, San Diego, Riverside, San Bernardino and Ventura counties)
- California Department of Water Resources
- U.S. Bureau of Reclamation
- Westlands Water District

### 3.4.2 LOCAL CONSTRAINTS

Local and state laws, such as California State statutes, do not constrain NED formulation. However, they may be considered in the selection of a Locally Preferred Plan (LPP).

## 3.5 OBJECTIVES

### 3.5.1 FEDERAL AND PROJECT SPECIFIC OBJECTIVES

The Federal objective, as stated in the P&G, is to contribute to national economic development (NED) consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to NED are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net economic benefits that accrue in the study area and the rest of the nation. development (NED) consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to NED are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net economic benefits that accrue in the study area and the rest of the nation. development (NED) consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to NED are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net economic benefits that accrue in the study area and the rest of the nation.

The Federal objective is to reasonably maximize net benefits to the nation, and as such, it does not seek to identify specific targets within objectives.

1. Objective 1: Reduce transportation costs and increase deep draft navigation efficiency for the shipment of commodities to and from all facilities within the study area beginning in 2020
2. Objective 2: Maximize beneficial reuse of dredged material while minimizing placement costs
3. Objective 3: Reduce frequency of operation and maintenance dredging in high shoaling areas
4. Objective 4: Increase navigability to maintain safety

### 3.5.1.1 FEDERAL ENVIRONMENTAL OBJECTIVES

USACE strives to balance the environmental and development needs of the nation in full compliance with the National Environmental Policy Act environmental concerns relative to the study. Therefore, significant environmental resources to the fullest extent. Significant adverse impacts that cannot be avoided are mitigated to on significant resources. Significant adverse impacts that cannot be avoided are mitigated to on significant resources. Significant adverse impacts that cannot be avoided are mitigated as required by Section 906(d) of WRDA 1986.

This report is an integrated General Reevaluation study and Environmental Impact Statement, which discusses and documents the environmental effects of the Recommended Plan and summarizes compliance with Federal statutes and regulations.

### 3.5.1.2 ENVIRONMENTAL OPERATING PRINCIPLES

Consistent with the NEPA, USACE has formalized its commitment to the environment by creating a set of “Environmental Operating Principles” applicable to all its decision making and programs. These principles foster unity of purpose regarding environmental issues and ensure that environmental conservation and preservation, and restoration are considered in all USACE activities. Section 6.6.27 includes a discussion of USACE Environmental Operating Principles and how the study addresses them.

### 3.5.1.3 CAMPAIGN PLAN OF THE U.S. ARMY CORPS OF ENGINEERS (USACE)

USACE Campaign Plan goals and objectives are derived, in part, from the Commander’s intent, the Army Campaign Plan, and the Office of Management and Budget. The four campaign plan goals and their associated objectives also build on prior strategic planning efforts. Each campaign plan goal and objective is led by a USACE senior leader who manages and oversees actions to reach the goal and objectives.

The successful achievement of the campaign plan goals and objectives are dependent on actions implemented by the entire USACE team. The implementing actions supporting each goal and objective are contained in the headquarters staff and Major Subordinate Command (MSC) implementation guidance for the Campaign Plan. The four goals of the Campaign Plan are:

**Goal 1:** Deliver innovative, resilient, and sustainable solutions to the Department of Defense (DoD) and the nation.

**Goal 2:** Deliver enduring and essential water resource solutions, utilizing effective transformation strategies.

**Goal 3:** Deliver support that responds to, recovers from, and mitigates disaster impacts to the nation.

**Goal 4:** Build resilient People, Teams, Systems and Processes to sustain a diverse culture of collaboration, innovation and participation to shape and deliver strategic solutions.

These Campaign Plan goals and associated objectives will be addressed through the course of this feasibility study.

### 3.5.2 STATE AND LOCAL OBJECTIVES

State and local objectives in this case are consistent with the Federal and project objectives.

## 3.6 SUMMARY OF MANAGEMENT MEASURES

Assessment and avoidance of measures that would result in significant changes in salinity was a large factor in the consideration, comparison and evaluation of measures during this study. As noted in the existing conditions chapter of this report, salinity variations within the channel are a high priority concern for the communities and ecological resources (delta smelt being the most sensitive species to salinity changes in the area) in the immediate study area. As such, this was a heavily weighted factor under the environmental quality P&G account, which resulted in the screening of several deeper channel depths of -40 feet, -43 feet and -45 feet from further consideration.

### 3.6.1 IDENTIFICATION OF MANAGEMENT MEASURES

The following non-structural and structural management measures were considered and screened for possible inclusion in alternative plans. A short description of each measure is listed below.

#### NON-STRUCTURAL (AN ACTIVITY) MEASURES

1. **Congestion fees.** Congestion fees are charged when high traffic results in delays unloading cargo. This measure was screened out because congestion in the channels is not a problem and not projected to be a problem in the future. Therefore, fees would be ineffective at meeting the planning objectives.
2. **Intermodal Transportation Systems.** Since commercial enterprises and industries utilizing shipping channels are profit-maximizing entities, a reasonable assumption is that movement of goods and commodities already employ the most effective and efficient intermodal means of transportation, given current channel depth constraints in conjunction with other operational considerations. If modification or improvements utilizing one of the other modes to reduce transportation costs were more effective and efficient, the commercial enterprises and industries would likely pursue that that approach in lieu of channel deepening. Diverting shipped cargo to overland transportation networks may also incur adverse impacts associated with increased traffic congestion and air pollution in the region. Because navigation is the most efficient way of transporting goods to the port facilities in the study area with the least emissions, this measure was considered ineffective at meeting planning objectives and was screened out.
3. **Lightering.** This measure was screened out because Petroleum lightering is prohibited in San Francisco Bay and it is assumed that this will still be prohibited in the future without-project condition.
4. **Light Loading.** This measure refers to vessels not loading to their full capacity, in order to safely transit existing channel depths. This measure is already being employed, and it is assumed to be a part of the future without-project condition; therefore it was screened from further analysis.

5. **Use of Favorable Tides and Daylight Transit Only.** Use of favorable tides refers to vessels entering a channel at high tide so that they can come in at a deeper draft than they would be able to at low tide. This measure (i.e., “riding the tide”) was screened out because it is already being implemented to the maximum extent possible and is also considered a component of the future without-project condition.
6. **Traffic Management.** Traffic management of commercial vessels is not a problem in the study area. Therefore, the traffic management measure were screened out because it would be ineffective in meeting the planning objectives.
7. **Pipeline.** The pipeline measure was selected in the 1998 GRR as the locally preferred plan. The pipeline was conceptually designed to utilize an existing pipeline owned by PG&E and to construct portions of a new pipeline between Avon and Richmond. This alternative also proposed to construct a -45 foot MLLW deep-draft berth near Richmond where oil tankers could unload petroleum products. After the 1998 GRR was finalized, it was determined that USACE does not have the authority to construct an oil pipeline. Subsequently, the oil industry determined that it was not in their interest to proceed with the pipeline because it was not cost effective. Today, the non-Federal sponsor does not support this management measure as an alternative, and it is no longer within the re-scoped study area.
8. **Relocate Port Facilities.** Relocating port facilities to deeper water and/or docking boats in the bay was screened out due to the extensive landside development investment associated with the existing refinery sites and due to safety concerns.

### STRUCTURAL (CONSTRUCTION/ASSEMBLY ON-SITE) MEASURES

**Channel Deepening.** Various intermediate depths beyond the existing -35 foot MLLW maintained depth were considered/Depths of -37 foot MLLW and -38 foot MLLW were analyzed in detail, as described as follows for Pinole Shoal and Bulls Head reach portion of Suisun Bay to Avon. These depths were considered to be the increments that would be most likely to efficiently address the problems and objectives. Depths deeper than -38 foot MLLW were not analyzed in detail due to potential concerns regarding salinity impacts and study time and funding limitations.

1. **Deepen to -37 Feet MLLW.** Deepening to -37 feet MLLW would result in approximately 0.8 million cubic yards of material being dredged from the ship channel. This measure meets the overall goal of reducing the transportation costs and increasing the efficiencies of transporting commodities to and from facilities, and improves travel schedules for vessels arriving at and departing from San Francisco Bay. Based on draft salinity intrusion significance thresholds used for the EIS analyses (as defined in CCWD 2010), salinity modeling results indicate that potential impacts from deepening to -37 feet MLLW would likely not result in salinity intrusion that would require mitigation.
2. **Deepen to -38 Feet MLLW.** Deepening to -38 feet MLLW would result in approximately 1.4 million cubic yards of material being dredged from the ship channel. This measure meets the overall goal of reducing the costs and increasing the efficiencies of transporting commodities to and from facilities,

and improves travel schedules for vessels arriving at and departing from San Francisco Bay. Based on draft salinity intrusion significance thresholds developed for the EIS analyses (as defined in CCWD 2010), salinity modeling results indicate that potential impacts from deepening to -38 feet MLLW would also likely not result in salinity intrusion that would require mitigation.

3. **Sediment Trap.** A sediment trap was considered to address the consistent high rate of shoaling in the advanced maintenance area within this reach, as requested by the San Francisco Bar Pilots. Existing conditions require advance maintenance during regular maintenance dredging episodes or emergency dredging to retain the dredged depth throughout the year (see Section 2.4.2). To reduce the likelihood and frequency of dredging for the Bulls Head Reach, a shoal analysis was performed which showed a sediment trap of an additional 4 foot depth could be dredged to ensure that the Bulls Head Reach is maintained reliably and is consistent with the prevailing maintained depth of the connecting Federal channels. The estimated increase in dredging volume associated with deepening the sediment trap is considered negligible when compared to the total volume of material that would be dredged with any of the alternative channel depths considered in this study; therefore, volume estimates for a sediment trap have been included with the total estimated volume of material that would be dredged for each channel depth discussed above.
4. **Rocky obstruction removal.** This measure refers to a small area of natural buried rock of approximately 950 square feet just south of Pinole Shoal Channel, within the Federal navigation channel, which is a navigation hazard to vessels and could become more so if Pinole Shoal is deepened, as reported by the San Francisco Bar Pilots. Bar pilots need at least a 3 feet underkeel below design depth plus 2 feet allowable overdepth. This measure would propose to level the rock using a pneumatic jackhammer from -39.7 feet MLLW to approximately -43 feet MLLW (depending on design depth), which is estimated to be 40 cubic yards, to maintain safety for vessels entering or departing the Pinole Shoal Channel.

**Dredged Material Placement Sites.** This is a required measure associated with channel dredging measures, regarding the identification and use of a site(s) to place the material removed from the channel. Several placement site options were considered, including existing in-bay sites (SF-10, SF-16, SF-9, SF-11), the San Francisco Bay Deep Ocean Disposal Site (SF-DODS), using existing beneficial reuse sites, constructing new beneficial-use sites, and partnering with other projects and programs in the region that could benefit from the availability of project-generated material. It was determined that owing to unknowns related to the completion of design and receipt of construction funding for this project relative to other regional efforts, those opportunities would be reevaluated during the design phase of work. The existing sediment chemistry, physical characteristics, and bioassay data for the material proposed for dredging were evaluated and that data was compared to the requirements of each available placement site. In addition, the available capacity of each placement site was compared against the volume of material estimated to be dredged, as well as if the site would be available to accept dredged material when the channels in the study area would be deepened. The analysis also included other proposed deepening projects within San Francisco Bay (e.g., Redwood City Harbor) and maintenance dredging projects that could also use the placement sites.

In-bay sites SF-10 (San Pablo Bay) has a site specific capacity limit of 500,000 cy per year and SF-11 (Suisun Bay) has a site specific capacity limit of 200,00 cy per year. Placement in these sites would be exceeded

by placement of the large volume of deepening material. SF-11 (Alcatraz) is located farther from the other in-bay sites has a site specific capacity of 400,000 cy from October to April and 300,000 cubic yards per month from May to September. This site is not only a much farther distance from the project area but also would have capacity exceeded by the large volume of deepening material. While initially thought to be a feasible disposal site, SF-9 was eliminated upon more detailed consideration. A recent review of the site has shown that a significant mound has been building on the site since 1999. Currently, portions of the site sit as high as 8ft and total disposal capacity is estimated to be only 1.31M. As such, the Dredged Material Management Office (DMMO) agencies have agreed to more actively manage the site to prevent further mounding. The composition of the initial deepening material is unknown; however, previously un-dredged material is more consolidated and less dispersive than operation and maintenance dredge material and concerns have been raised that Pinole Shoal material may not be as dispersive as required for the SF-9 site. Considering those factors, use of SF-9 has been screened from consideration for this deepening project<sup>12</sup>. Additionally, USACE is a signatory on the San Francisco Bay Long Term Management Strategy (LTMS) agreement, along with Environmental Protection Agency (EPA) and state signatories, where the goal among signatories is to reduce in-bay disposal over time and to apply beneficial reuse when possible. Due to limited site specific capacity, incompatible sediment composition of initial deepening material with the in-bay sites, and in keeping with the LTMS, in-bay disposal was screened out early on in the plan formulation of placement sites. The analysis and rationale as described above resulted in three sites chosen to be carried forward for consideration as the most likely sites given current assumptions, and are briefly discussed below:

1. **Cullinan Ranch.** Cullinan Ranch, a 1,575-acre parcel in the San Pablo Bay National Wildlife Refuge, was originally purchased by the USFWS for the purpose of increasing habitat for salt marsh harvest mouse (*Reithrodontomys raviventris*) and California clapper rail (*Rallus longirostris obsoletus*). Located in Solano County, the southern property boundary of the parcel is a naturally formed levee that is the base for State Highway 37. The western property boundary of the parcel comprises Dutchman Slough and South Slough, both of which flow into the nearby Napa River. Cullinan Ranch is a tidal restoration project with the goal of restoring diked baylands to historic tidal marsh conditions by using dredged material to raise site elevations by approximately 6 feet. Cullinan Ranch is permitted to receive up to 9 million cubic yards of dredged material and currently has the capacity to accept up to 2.4 million cubic yards of dredged material. The Redwood City Harbor deepening project and other maintenance dredging projects are also considering using this site. Placing material at Cullinan meets the planning objective of maximizing beneficial reuse of dredged material.
2. **Montezuma Wetlands.** The approximately 1,800-acre Montezuma Wetlands Restoration Project is a privately owned and operated wetland restoration project located adjacent to Montezuma Slough in northern Honker Bay. In the early 1900s, the site was diked, drained, and used for agriculture. Since the site was diked, the land has subsided up to 10 feet and dredged material is being used to raise site elevations for wetland restoration. The site can take dredged material with elevated concentrations of constituents of concern, as long as this

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<sup>12</sup> While the in-bay was not considered to be a viable option for initial construction placement due to site specific capacity limitations of all sites/and or incompatible sediment composition, in-bay could be used for operation and maintenance (O&M) material.

sediment is buried under 3 feet of clean cover material. The Montezuma site currently has the capacity to accept up to 12 million cubic yards of dredged material. However, the Redwood City Harbor deepening project is also considering using this site for dredged material. Placing material at Montezuma Wetlands meets the planning objective of maximizing beneficial reuse of dredged material.

3. ***San Francisco Bay – Deep Ocean Disposal Site (SF-DODS)***. The SF-DODS is located in the Pacific Ocean, approximately 55 nautical miles west of the Golden Gate Bridge. The site is the deepest and farthest-offshore ocean placement site in the nation. The regulatory site capacity of SF-DODS is 4.8 million cubic yards per year. Sediment placed at SF-DODS can have higher concentrations of constituents of concern compared to many beneficial-use sites.

### 3.6.2 PRELIMINARY SCREENING OF MEASURES

The management measures presented above were screened based on an assessment to meet project objectives, avoid constraints, ability to meet the four P&G accounts, and ability to meet the 4 P&G criteria. The screening was performed to identify those measures that are appropriate for inclusion for development of alternative plans. **Table 3-1 and Table 3-2** provides an overview of the screening results for the measures identified for the project study area.

Non-structural and structural measures were compared and evaluated against a set of 13 different screening criteria to assess positive benefits and attributes which could be attained, worth a total of 2 points each, for a total maximum score of 26 points. Points were assigned as follows: Does Not Meet = 0; Partially Meets = 1; Fully Meets = 2. Negative scores up to -2 points were assigned for areas where negative effects could occur. The total score of each measure was then determined, and only measures which scored greater than 13 (over half of the total available points) were carried forward to be combined into alternatives.

**Table 3-1.Preliminary Structural Measures Screening.**

1. Measures				
2. Impact Assessment (4 P&G Accounts)	Deepen to -37 feet MLLW	Deepen to -38 feet MLLW	Sediment Trap	Rocky Obstruction Removal
A. National Economic Development (NED)	F -Acheives NED benefits. 2	F -Acheives NED benefits. 2	P - Likely to achieve NED benefits. 1	P - Likely to contribute to NED benefits when combined. 1
B. Environmental Quality (EQ)	P - May have some environmental affects but not likely to have salinity intrusion which would require mitigation. 1	P - May have some environmental affects but not likely to have salinity intrusion which would require mitigation. 1	P - May have some environmental affects but not likely to have salinity intrusion which would require mitigation. 1	P - Unlikely to have environmental affects. 1
C. Regional Economic Development (RED)	P - Could have some RED during construction. 1	P - Could have some RED during construction. 1	P - Could have some RED during construction. 1	P - Contributes toward RED when combined 1
D. Other Social Effects (OSE)	P - Community may be affected in the short term during construction but overall would benefit. 1	P - Community may be affected in the short term during construction but overall would benefit. 1	P - Community may be affected in the short term during construction but overall would benefit. 1	F - Improves navigability for vessels. 2
<b>3. Plan Evaluation</b>				
<b>A. Contribution to Planning Objectives</b>				
Objective 1: Reduce transportation costs and increase deep draft navigation efficiency for the shipment of commodities to and from all facilities within the study area beginning in 2020	F - Would likely reduce transportation costs and increase efficiency. 2	F - Would likely reduce transportation costs and increase efficiency. 2	F - Would likely reduce transportation costs and increase efficiency. 2	P - Will contribute to this objective when combined. 1
Objective 2: Maximize beneficial reuse of dredged material while minimizing placement costs	F - Would likely be able to have an opportunity to place material at beneficial use site. 2	F - Would likely be able to have an opportunity to place material at beneficial use site. 2	F - Would likely be able to have an opportunity to place material at beneficial use site. 2	P - Possibility of beneficial reuse 1
Objective 3: Reduce frequency of operation and maintenance dredging in high shoaling areas	F - Would likely be able to reduce operation and maintenance in shoaled areas. 2	F - Would likely be able to reduce operation and maintenance in shoaled areas. 2	F - Would likely be able to reduce operation and maintenance in shoaled areas. 2	O - Does not contribute. 0
Objective 4: Increase navigability to maintain safety	O - Removal of hazard would not occur. 0	O - Removal of hazard would not occur. 0	O - Removal of hazard would not occur. 0	F - Rock outcropping hazard would be removed to increase navigability and maintain safety 2
<b>B. Response to Planning Constraints</b>				
(1) Avoid conflict with state and Federal regulations, as stated in Federal law, USACE regulations and Executive Orders.	F - Fully meets 2	F - Fully meets 2	F - Fully meets 2	F - Fully meets 2
<b>C. Response to Evaluation Criteria</b>				
(1) Completeness	F - Complete 2	F - Complete 2	F - Complete 2	P -Must be combined with deepening to be complete. 1
(2) Effectiveness	F - Meets all objectives. 2	F - Meets all objectives. 2	F - Meets all objectives. 2	P - Meets some obejctoves when combined. 1
(3) Efficiency	F - Is cost-effective 2	F - Is cost-effective 2	F - Is cost-effective 2	F - Is cost-effective when combined. 2
(4) Acceptability	P - Would be generally acceptable. 1	P - Would be generally acceptable. 1	P - Would be generally acceptable. 1	P - Would be generally acceptable. 1
<b>SCORE</b>	<b>20</b>	<b>20</b>	<b>19</b>	<b>16</b>
<b>CARRIED FORWARD</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

O = Does not meet; P - Partially meets; F = Fully meets

Table 3-2. Preliminary Non-Structural Measures Screening.

1. Measures								
2. Impact Assessment (4 P&G Accounts)	No-Action	Congestion Fees	Intermodal transportation systems	Lightering/Light Loading	Tides and Daylight Transit Only	Traffic Management	Relocate Port Facilities	Pipeline
A. National Economic Development (NED)	O - Does not improve NED. 0	O - Congestion is not an issue; Would not create benefits and would likely have no benefits to offset the costs. 0	O - Would not be more cost effective than vessel transportation. 0	P - Possibly could be cost efficient and have reasonable benefits. 1	O - This measure is already being done and is not providing needed benefits in the existing conditions. 0	O - Traffic Management is not an issue; Would not create benefits and would likely have no benefits to offset the costs. 0	O - This measure could have NED benefits but the large landside cost investment could outweigh the benefits. 0	P - This measure could have NED benefits but the large cost investment could outweigh the benefits. 1
B. Environmental Quality (EQ)	P - Environmental effects will continue with current trends. 1	O - Would not affect the environment in positive or negative ways. 0	O - Would not be more advantageous than vessel transportation. 0	O - There are potential negative environmental impacts associated with lightering 0	O - Would not affect the environment in positive or negative ways. 0	O - Would not affect the environment in positive or negative ways. 0	O - This measure could have impacts with moving the existing oil refinery to a new location. 0	P - There are potential negative environmental impacts associated construction of a pipeline. 1
C. Regional Economic Development (RED)	O - Does not improve RED. 0	P - Could provide slight increase in regional economy through fees. 1	P - Could provide some regional economic development through other transportation modes. 1	P - Could provide some regional economic benefit development associated with private companies performing lightering operations 1	O - This measure is already being done and would not provide additional regional economic development benefits. 0	O - Would not provide regional economic benefits. 0	P - Could provide some regional economic development during relocation and new construction. 1	P - Could provide some regional economic development during pipeline construction. 1
D. Other Social Effects (OSE)	P - Community would not be affected beyond future without project trends. 1	O - Would not affect public in positive or negative ways. 0	P - Could create positive or negative effects (ie negative: More trucks on the road = more congestion for community) 1	O - There are potential negative environmental impacts associated with lightering, which affect the community's environmental and well-being 0	P - This measure is likely not affecting the community in a negative way. 1	O - Would not affect public in positive or negative ways. 0	O - Relocation may not be acceptable to the community in terms of noise, construction activity, potential environmental impacts and safety concerns. 0	P - Pipeline may not be acceptable to the community in terms of noise, construction activity, and potential environmental impacts. 1
<b>3. Plan Evaluation</b>								
<b>A. Contribution to Planning Objectives</b>								
Objective 1: Reduce transportation costs and increase deep draft navigation efficiency for the shipment of commodities to and from all facilities within the study area beginning in 2020	O - Would not reduce transportation costs 0	O - Congestion in the channels is not a problem; therefore this measure would meet the objective. 0	O - Would not reduce transportation costs as shipping is generally the least cost of all modes. 0	P - Could potentially reduce transportation cost. 1	O - This measure is already being done and is not providing needed benefits in the existing conditions. 0	O - Congestion in the channels is not a problem; therefore this measure would meet the objective. 0	P - Relocation to deeper water could meet this objective. 1	P - Could potentially reduce transportation cost. 1
Objective 2: Maximize beneficial reuse of dredged material while minimizing placement costs	P - Beneficial use could occur independent of a project. 1	O - This objective would not be met. 0	O - Would not apply to this objective. 0	O - Would not apply to this objective. 0	O - Would not apply to this objective. 0	O - This objective would not be met. 0	P - This could potentially be met. 1	P - This could potentially be met. 1
Objective 3: Reduce frequency of operation and maintenance dredging in high shoaling areas	O - Reduction of operation and maintenance would not occur. 0	O - This objective would not be met. 0	O - This objective would not be met. 0	O - This objective would not be met. 0	O - This objective would not be met. 0	O - This objective would not be met. 0	P - Depending on the new location, shoaling could potentially decrease or increase. 1	O - This objective would not be met. 0
Objective 4: Increase navigability to maintain safety	O - Removal of hazard would not occur. 0	O - This objective would not be met. 0	O - This objective would not be met. 0	O - This objective would not be met. 0	O - This objective would not be met. 0	O - This objective would not be met. 0	O - This objective would not be met. 0	O - This objective would not be met. 0
<b>B. Response to Planning Constraints</b>								
(1) Avoid conflict with state and Federal regulations, as stated in Federal law, USACE regulations and Executive Orders.	F - Fully meets 2	F - Fully meets 2	F - Fully meets 2	O - Petroleum lightering in not allowed in San Francisco Bay. 0	F - Fully meets 2	F - Fully meets 2	P - Fully meets; uncertain if this could feasibly be done within regulations. 1	P - Decision by vertical team post 1998 GRR that Corps is not authorized to construct this measure. Non-Federal sponsor could construct but does not support, nor do the oil refineries. 1
<b>C. Response to Evaluation Criteria</b>								
(1) Completeness	F - Complete. 2	P - Could potentially be combined for completeness. 1	P - Could potentially be combined for completeness. 1	P - Could potentially be combined for completeness. 1	O - This measure is not complete. 0	O - This measure is not complete. 0	P - This measure would likely be complete. 1	O - This measure is not complete. 0
(2) Effectiveness	O - Not effective in meeting objectives. 0	O - Not effective in meeting objectives. 0	O - Not effective in meeting objectives. 0	O - Not effective in meeting objectives. 0	O - Not effective in meeting objectives. 0	O - Not effective in meeting objectives. 0	P - Would meet objectives. 1	O - Not effective in meeting objectives. 0
(3) Efficiency	O - Would not provide needed benefits - therefore not cost effective. 0	O - Would not provide needed benefits - therefore not cost effective. 0	O - Would not provide needed benefits - therefore not cost effective. 0	P - Could possibly achieve some benefits. 1	O - Would not provide needed benefits - therefore not cost effective. 0	O - Would not provide needed benefits - therefore not cost effective. 0	O - Benefits would likely not outweigh costs 0	O - Would not provide needed benefits - therefore not cost effective. 0
(4) Acceptability	P - Would be generally acceptable but not to Port. 1	P - Would be generally acceptable. 1	P - May or may not be acceptable to the public and agencies. 1	O - Would not be acceptable. 0	P - Would be generally acceptable. 1	P - Would be generally acceptable. 1	O - Would likely be unacceptable to Port due to high cost and coordination, and community. 0	O - This is not acceptable to Port or Oil Refineries. 0
<b>SCORE</b>	8	5	6	5	4	3	7	7
<b>CARRIED FORWARD</b>	Yes- carried for comparison.	No	No	No	No	No	No	No
O = Does not meet; P = Partially meets; F = Fully meets								

## 3.7 ALTERNATIVE FORMULATION STRATEGY

**Table 3-1 and Table 3-2** show evaluation and screening criteria, along with additional pertinent information.

As mentioned earlier, comparison and evaluation of effects of measures to potential salinity changes, and its subsequent effects towards communities and species (in particular, delta smelt) as a result of deepening was a major factor in the screening process.

Another key consideration during this process was to set an objective to integrate the dredged material beneficially into the environment for each alternative. The contribution of dredged material to the beneficial reuse sites would contribute to additional wetland and benthic habitat, and benefit several sensitive species, including delta smelt habitat beyond what is currently in the area.

Measures which were screened out include all non-structural alternatives, as they are already being implemented or did not compete well relative to other measures.

Measures carried forward as feasible ways to alleviate problems, meet objectives, show benefits under the P&G accounts, meet P&G screening criteria, and have low risk in terms of adverse environmental effects include the no-action plan, deepening alternatives at the -37 foot and -38 foot MLLW depth, sediment trap at the -42 foot depth plus 2 feet of overdepth (based on the shoaling analysis titled Bulls Head Deposition HydroSurvey Tech Memo- 2015), and removal of the rocky obstruction in Pinole Shoal channel.

These remaining measures were then combined into alternatives. These alternatives include the no-action alternative and two deepening alternatives (to depths of -37 feet and -38 feet MLLW), with the dredged material being beneficially used at one or more of the existing permitted beneficial reuse sites, namely, Cullinan Ranch, Montezuma Wetlands, or other sites such as SF-DODS, and in-bay placement. A sediment trap measure is also included at Bulls Head Reach in both of the action alternatives, as well as the measure addressing removal of the rocky obstruction for increased navigability.

## 3.8 ALTERNATIVE COMPARISON AND EVALUATION OF THE FINAL ARRAY

**Table 3-3** displays the initial array of alternatives, which were then compared and evaluated against screening criteria, using an additional level of refinement with known information. A description of each alternative is below.

**No-Action:** The no-action alternative is defined as the continuation of present-day policies and actions to maintain the existing Federal project channel dimensions within the study area, assuming no new Federal actions re: channel improvements over the next 50 years. The purpose of the no-action alternative and subsequent alternative analyses is to provide a comparison of the magnitude of environmental effects of the action alternatives against a benchmark of no-action. This comparison also demonstrates the degree to which the need for channel improvement is real and that it was thoroughly considered and appropriately and adequately answered.

The shipping channel in the study area would continue to remain in place and function at the existing constructed depths. Maintenance dredging of the channel would continue to occur at the same frequency and would generate the same volumes under current conditions, and would occur annually at both the Pinole Shoal Channel and at Bulls Head Reach to maintain the current depth of -35 feet MLLW. Maintenance dredging would continue to be managed and environmental review of maintenance dredging would continue to be performed by USACE.

**-37 foot MLLW Alternative:** The -37 foot MLLW alternative would deepen Pinole Shoal channel and the Bulls Head Reach portion of Suisun Bay channel within the shipping channels to a depth of -37 feet MLLW. The existing advance maintenance area within Bulls Head Reach Channel would be further deepened from -37 feet MLLW (plus 2 feet of overdepth) to -42 feet MLLW (plus 2 feet of overdepth) to function as a sediment trap. In the future with project condition, the design vessel (Panamax) with a sailing draft greater than 34 feet (37 foot channel minus 3 feet underkeel clearance) will encounter tidal delays, rather than at 32 feet (35 foot channel minus 3 feet underkeel clearance) in the future without project condition. Therefore, the increased loading capacity in the future-with project condition would reduce vessel calls and partially reduce tidal delays.

The total dredging volume for the -37 foot MLLW Alternative would be approximately 860,000 million cubic yards from over approximately 200 acres of channel bottom. An estimated 438,500 cubic yards of sediment would be dredged to reach -37 feet MLLW and an additional 422,800 cubic yards of sediment would be dredged if the allowable overdepth (2 feet) was fully dredged.

To reduce the risk of entrainment of special status fish, dredging would be conducted during approved seasonal environmental work windows and by using a mechanical clamshell dredge. Dredged material would be placed in scows and, once full, transported by tugs to one of the sites where it would be off-loaded to the respective beneficial reuse site. Deepening under this alternative would take approximately 3 months and would be completed in 1 year during the existing environmental work windows for Pinole Shoal and Bulls Head Reach. The environmental work windows for these channels are June 1 through November 30 and August 1 through November 30, respectively.

Environmental resources that have the potential to be affected include special status fish, native and commercially important fish, benthic resources, water quality, and air quality. Dredging within the existing work windows with a clamshell dredge would ensure that impacts to special status fish are avoided or minimized. Impacts to water quality could result from increases in suspended sediment concentrations and minor salinity intrusion. Impacts resulting from increased suspended sediment and turbidity would be temporary and localized around the vicinity of dredging. Impacts to air quality would result from emissions during dredging and dredged material transport to the beneficial-use sites. As this alternative would use existing sites with all environmental permits to accept dredged material, analysis of the impacts of off-loading the dredged material and any habitat construction activities once the material is off-loaded is not required in this report.

**-38 foot MLLW Alternative:** The -38 foot MLLW Alternative would deepen Pinole Shoal channel and the Bulls Head Reach portion of Suisun Bay channel to a depth of -38 feet MLLW of the advance maintenance area within Bulls Head Reach Channel would be further deepened from -38 feet MLLW (plus 2 feet of overdepth) to -42 feet MLLW (plus 2 feet of overdepth) to function as a sediment trap. In the future

with project condition, the design vessel (Panamax) with a sailing draft greater than 35 feet (38 foot channel minus 3 feet underkeel clearance) will encounter tidal delays, rather than at 32 feet (35 foot channel minus 3 feet underkeel clearance) in the future without project condition. Therefore, the increased loading capacity in the future-with project condition would reduce the number of vessel calls and partially reduce tidal delays.

The total dredging volume for the -38 foot MLLW Alternative would be approximately 1.5 million cubic yards from over approximately 390 acres of channel bottom. An estimated 861,300 cubic yards of sediment would be dredged to reach -38 feet MLLW and an additional 646,200 cubic yards of sediment would be dredged if the allowable overdepth (2 feet) was fully dredged.

To reduce the risk of entrainment of special status fish, dredging would be conducted during approved seasonal environmental work windows and by using a mechanical clamshell dredge at Pinole Shoal (i.e., which typically is maintained by using a hopper dredge) as well as at Bulls Head Reach. Similar to the -37 foot MLLW Alternative, dredged material would be transported by tugs to one of the sites where it would be off-loaded. Deepening under this alternative would take approximately 4.5 months and would be completed in 1 year during the existing environmental work windows for Pinole Shoal and Bulls Head Reach.

Environmental resources that have the potential to be affected are similar to those discussed in for the -37 foot MLLW Alternative.

#### **Removal of Rocky Obstruction**

This measure refers to a small natural buried rock of approximately 950 square feet just south of Pinole Shoal Channel, within the Federal navigation channel, which is a navigation hazard to vessels and could become more so if Pinole Shoal is deepened, as reported by the San Francisco Bar Pilots. Bar pilots need at least a 3 feet underkeel below design depth plus 2 feet allowable overdepth. This measure would propose to level the rock using a pneumatic jackhammer from -39.7 feet MLLW to approximately -43 feet MLLW (depending on design depth), which is estimated to be 40 cubic yards, to maintain safety for vessels entering or departing the Pinole Shoal Channel.

**Table 3-3. Initial Array of Alternatives Criteria and Screening.**

Alternatives	No Action (Future Without-Project)	Placement Site: SF-DODS		Placement Site: Cullinan Ranch		Placement Site: Montezuma Wetlands		Placement Site: Split between Cullinan Ranch & Montezuma Wetlands	
		37 feet	38 feet						
<b>1. Impact Assessment (4 P&amp;G Accounts)</b>									
A. National Economic Development (NED)	O - Vessels (Tankers) will continue to load inefficiently, passing additional costs on to the customer; would not produce any additional benefits to the nation	O - Some NED savings will be achieved, but not as much as compared other plans	P - Moderate NED savings will be achieved	O - Some NED savings will be achieved, but not as much as compared other plans	P - Moderate NED savings will be achieved	O - Some NED savings will be achieved, but not as much as compared other plans	P - Moderate NED savings will be achieved	P - Moderate NED savings will be achieved, least cost	F - Highest NED savings will be achieved, least cost
	0	0	1	0	1	0	1	1	2
B. Environmental Quality (EQ)	F - Environmental quality will remain as it currently is.	P - material placed in this site would be taken out of the natural system.	P - material placed in this site would be taken out of the natural system.	F - placement here can offset mitigation anticipated for loss of benthic foraging habitat and residual impacts to special status species	F - placement here can offset mitigation anticipated for loss of benthic foraging habitat and residual impacts to special status species	F - placement here can offset mitigation anticipated for loss of benthic foraging habitat and residual impacts to special status species	F - placement here can offset mitigation anticipated for loss of benthic foraging habitat and residual impacts to special status species	F - placement here can offset mitigation anticipated for loss of benthic foraging habitat and residual impacts to special status species	F - placement here can offset mitigation anticipated for loss of benthic foraging habitat and residual impacts to special status species
	2	1	1	2	2	2	2	2	2
C. Regional Economic Development (RED)	P - Regional development will continue on a similar trend as it has in the past	P - Some regional economic development could be achieved	P - Some regional economic development could be achieved	P - Some regional economic development could be achieved	P - Some regional economic development could be achieved	P - Some regional economic development could be achieved	P - Some regional economic development could be achieved	P - Some regional economic development could be achieved	P - Some regional economic development could be achieved
	1	1	1	1	1	1	1	1	1
D. Other Social Effects (OSE)	P - Other social effects will remain as they currently are	P - Other social effects will remain as they currently are	P - Other social effects will remain as they currently are	P - Other social effects will remain as they currently are	P - Other social effects will remain as they currently are	P - Other social effects will remain as they currently are	P - Other social effects will remain as they currently are	P - Other social effects will remain as they currently are	P - Other social effects will remain as they currently are
	1	1	1	1	1	1	1	1	1
<b>2. Plan Evaluation - Contribution to Planning Objectives</b>									
Objective 1: Reduce transportation costs and increase deep draft navigation efficiency for the shipment of commodities to and from all facilities within the study area beginning in 2020	O - This objective will not be met.	O - Smaller Annual Net Benefits when compared to other plans (Transportation Cost Savings)	P - Moderate with Annual Net Benefits (Transportation Cost Savings)	O - Smaller Annual Net Benefits when compared to other plans (Transportation Cost Savings)	P - Moderate with Annual Net Benefits (Transportation Cost Savings)	O - Smaller Annual Net Benefits when compared to other plans (Transportation Cost Savings)	P - Moderate with Annual Net Benefits (Transportation Cost Savings)	O - Smaller Annual Net Benefits when compared to other plans (Transportation Cost Savings)	F - Most fully meets with Annual Net Benefits, least cost
	0	0	1	0	1	0	1	0	2
Objective 2: Maximize beneficial reuse of dredged material while minimizing placement costs	O - This objective will not be met.	O - material placed in this site would be taken out of the natural system.	O - material placed in this site would be taken out of the natural system.	F - Material would be beneficially used in this site.	F - Material would be beneficially used in this site.	F - Material would be beneficially used in this site.	F - Material would be beneficially used in this site.	F - Material would be beneficially used in this site. Most fully meets objective	F - Material would be beneficially used in this site. Most fully meets objective
	0	0	0	2	2	2	2	2	2
Objective 3: Reduce frequency of operation and maintenance dredging in high shoaling areas	O - This objective will not be met.	F - A sediment trap is proposed with all alternatives and would reduce frequency of emergency O&M events and will provide a cost savings of to the nation over 50 years.	F - A sediment trap is proposed with all alternatives and would reduce frequency of emergency O&M events and will provide a cost savings of to the nation over 50 years.	F - A sediment trap is proposed with all alternatives and would reduce frequency of emergency O&M events and will provide a cost savings of to the nation over 50 years.	F - A sediment trap is proposed with all alternatives and would reduce frequency of emergency O&M events and will provide a cost savings of to the nation over 50 years.	F - A sediment trap is proposed with all alternatives and would reduce frequency of emergency O&M events and will provide a cost savings of to the nation over 50 years.	F - A sediment trap is proposed with all alternatives and would reduce frequency of emergency O&M events and will provide a cost savings of to the nation over 50 years.	F - A sediment trap is proposed with all alternatives and would reduce frequency of emergency O&M events and will provide a cost savings of to the nation over 50 years.	F - A sediment trap is proposed with all alternatives and would reduce frequency of emergency O&M events and will provide a cost savings of to the nation over 50 years.
	0	2	2	2	2	2	2	2	2
Objective 4: Increase navigability to maintain safety	O - Removal of hazard would not occur.	F - rocky obstruction hazard would be removed to increase navigability and maintain safety	F - rocky obstruction hazard would be removed to increase navigability and maintain safety	F - rocky obstruction hazard would be removed to increase navigability and maintain safety	F - rocky obstruction hazard would be removed to increase navigability and maintain safety	F - rocky obstruction hazard would be removed to increase navigability and maintain safety	F - rocky obstruction hazard would be removed to increase navigability and maintain safety	F - rocky obstruction hazard would be removed to increase navigability and maintain safety	F - rocky obstruction hazard would be removed to increase navigability and maintain safety
	0	2	2	2	2	2	2	2	2
<b>C. Response to Planning Constraints</b>									
(1) Avoid conflict with state and Federal regulations, as stated in Federal law, USACE regulations and Executive Orders.	F - Will remain in compliance with all regulations, etc.	F - Will remain in compliance with all regulations, etc.	F - Will remain in compliance with all regulations, etc.	F - Will remain in compliance with all regulations, etc.	F - Will remain in compliance with all regulations, etc.	F - Will remain in compliance with all regulations, etc.	F - Will remain in compliance with all regulations, etc.	F - Will remain in compliance with all regulations, etc.	F - Will remain in compliance with all regulations, etc.
	2	2	2	2	2	2	2	2	2
<b>D. Response to Evaluation Criteria</b>									
(1) Completeness	O - Not considered to be complete because it does not provide investments or actions to ensure realization to meet the planning objectives.	F - Complete							
	0	2	2	2	2	2	2	2	2
(2) Effectiveness	O - Not effective in meeting the planning objectives	P - Partially effective	F - More fully effective	P - Partially effective	F - More fully effective	P - Partially effective	F - More fully effective	P - Partially effective	F - More fully effective
	0	1	2	1	2	1	2	1	2
(3) Efficiency	P - Cost effectiveness - does not incur a cost but also does not obtain benefits	P - Partially efficient	F - More fully efficient	P - Partially efficient	F - More fully efficient	P - Partially efficient	F - More fully efficient	P - Partially efficient	F - More fully efficient
	1	1	2	1	2	1	2	1	2
(4) Acceptability	compatible with existing laws, regulations, and public policies; however, it does not achieve full acceptability since there are problems which can be improved.	P - This plan would likely be sufficiently acceptable to public communities and agencies.	P - This plan would likely be sufficiently acceptable to public communities and agencies.	P - This plan would likely be sufficiently acceptable to public communities and agencies.	P - This plan would likely be sufficiently acceptable to public communities and agencies.	P - This plan would likely be sufficiently acceptable to public communities and agencies.	P - This plan would likely be sufficiently acceptable to public communities and agencies.	P - This plan would likely be sufficiently acceptable to public communities and agencies.	P - This plan would likely be sufficiently acceptable to public communities and agencies.
	1	1	1	1	1	1	1	1	1
O = Does not meet; P = Partially meets; F = Fully meets	8	12	16	15	19	15	19	16	21

**Table 3-4. Final Array of Alternatives.**

Alternative	Description of Alternative	Screening Outcome
No Action	No action would be taken to reduce the cost of transportation and increase economic efficiencies.	<b>Retained</b>
<u>Deepen</u> : -37 feet MLLW <u>Placement Site</u> : Existing permitted beneficial reuse sites	<ul style="list-style-type: none"> <li>• Deepen to -37 feet MLLW with 2 feet of overdepth.</li> <li>• Includes sediment trap at Bulls Head Reach.</li> <li>• Beneficially use approximately 860,000 cubic yards of dredged sediment at Montezuma Wetlands or Cullinan Ranch.</li> <li>• Rocky obstruction removal.</li> </ul>	<b>Retained</b>
<u>Deepen</u> : -38 feet MLLW <u>Placement Site</u> : Existing permitted beneficial reuse sites	<ul style="list-style-type: none"> <li>• Deepen to -38 feet MLLW with 2 feet of overdepth.</li> <li>• Includes sediment trap at Bulls Head Reach.</li> <li>• Beneficially use approximately 1.6 million cubic yards of dredged sediment at Montezuma Wetlands or Cullinan Ranch.</li> <li>• Rocky obstruction removal.</li> </ul>	<b>Retained</b>

Comparison and evaluation of the initial array of alternatives shown in **Table 3-3** resulted in a reduced array of alternatives moving forward to the final array of alternatives, shown in **Table 3-5**. A cost analysis for potential placement sites was conducted for the following options: 1) All material placed at Cullinan Ranch, 2) All material placed at Montezuma Wetlands, 3) Split material between Cullinan Ranch and Montezuma Wetlands, and 4) All material at SF-DODS. The analysis determined that split placement between Montezuma Wetlands and Cullinan Ranch was the least cost option. Additionally, this maximizes the planning objective to beneficially use material. Placement of material at SF-DODS would be economically justified and material is anticipated to be suitable for this site, but is not the least cost placement site, and additionally is not ideal since it takes material out of the natural system. Should material be unsuitable for upland placement or if upland placement is otherwise not available, material may be disposed of at SF-DODS. Appropriate coordination with EPA would be done prior to disposal. While SF-DODS is not carried forward as a placement site, it is worth mentioning that it is an available placement site if needed, if there are no other beneficial reuse sites with available capacity prior to construction.

### 3.9 ECONOMIC EVALUATION OF THE FINAL ARRAY

Preliminary screening level cost estimates were used for the two proposed deepening alternatives for use in the economic analysis. Costs shown in **Table 3-5** include Operation, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) activities and Interest during Construction (IDC). Transportation costs and benefits were estimated using the USACE certified economic model, HarborSym, and estimated for a 50-year period of analysis for the years 2020 through 2069. For this comparison, the costs and benefits were annualized at the FY16 discount rate of 3.125% over 50 years.

The -38 foot alternative provides higher net benefits than the -37 foot alternative, and additionally meets planning criteria goals of being complete, efficient, effective, and acceptable. The -38 foot alternative also shows a positive benefit to cost ratio of 3.1 to 1.

**Table 3-5. Final Array – Economic Evaluation & Comparison.**

	ALTERNATIVES		
	No-Action (35')	37'	38'
<b>AAEQ Transportation Cost</b>	\$209,846,000	\$202,221,000	\$198,534,000
<b>AAEQ Transportation Cost Reduction (Benefit)</b>	0	\$7,625,000	\$11,312,000
<b>Project Cost</b>	0	\$33,400,000	\$54,600,000
<b>Construction Duration (months)</b>	0	5	10
<b>Interest During Construction (IDC)</b>	0	\$172,000	\$635,000
<b>Sub-total Cost Including IDC</b>	0	\$ 33,572,000	\$ 55,235,000
<b>Annualized Construction Cost &amp; IDC</b>	0	\$ 1,917,000	\$ 2,198,000
<b>OMRR&amp;R</b>	0	\$581,300	\$1,397,700
<b>TOTAL Average Annual Costs</b>	0	\$ 2,498,300	\$ 3,595,000
<b>Average Annual Benefits</b>	0	\$7,625,000	\$11,312,000
<b>Net Benefits</b>	0	\$ 5,126,700	\$ 7,717,000
<b>BCR</b>	0	3.1	3.2

### 3.10 ADDITIONAL ANALYSIS FOR THE FINAL ARRAY

The final array of alternatives must be compared and evaluated against P&G criteria, as displayed throughout this chapter. Additionally, an economic evaluation must be made to identify which plan in the final array maximizes NED benefits, discussed above. An environmental analysis must also be conducted under NEPA to compare and evaluate the final array for a set of environmental factors (Chapter 4), prior to determination of the Recommended Plan. At the time of environmental analyses, the Recommended Plan was not yet identified; however, for the purposes of readability in this report, the 38 foot MLLW deepening alternative plus sediment trap and rocky obstruction removal is referred to as the Recommended Plan in the following chapter.



4

# Comparison of Environmental Effects of Alternative Plans

## 4 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALTERNATIVE PLANS

This section describes the potential environmental effects (direct, indirect, and cumulative) anticipated to result from the alternatives as compared to the NEPA baselines, and the methods used to conduct the evaluation. The environmental effects are evaluated against “significance impact thresholds” identified for each resource. Significance thresholds specify the level of impact beyond which an alternative is considered to have a significant impact.

This EIS classifies effects as follows:

- A **beneficial effect** would generally be regarded as an improvement or substantial positive change in the resource
- A **negligible effect /no impact** would cause a slight adverse, beneficial or negative change in the resource, but one that generally would not be either noticeable or unacceptable
- A **less-than-significant impact/adverse but not significant effect** would cause an adverse change in the resource that would likely be noticeable, but would not cross the specified significance threshold
- A **significant effect** would cause adverse effects greater than the specified significance threshold; the alternative would cause a substantial adverse change in the resource that would significantly affect its condition; the severity of the impact could be reduced by pursuing specific mitigation measures
- A **significant and unavoidable adverse effect** would result in adverse effects that exceed the specified significance impact threshold, and the use of mitigation measures would not reduce this impact to less than significant levels
- An **adverse effect** is found when an undertaking alters, directly or indirectly, any of the characteristics of a historic property that qualify the property for listing in the NRHP in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.
- If there is insufficient information to evaluate the effect of an alternative, a result of **no determination** may be made.

The environmental consequences analyses also distinguish between the effects that would be associated with the construction and subsequent operational phases.

As previously described, construction of the alternatives will include the dredging and associated activities required to deepen the channels for each depth considered in the final array of alternatives. The analyses consider all activities and consequences resulting from construction up to and including transport of dredged material to the off-loaders at the beneficial reuse sites proposed for material placement. However, the analysis does not address the subsequent activities undertaken at the placement sites using the dredged material because those activities have already been covered in relevant environmental documents prepared for each site (USACE and Solano County Department of Environmental Management [SCDEM] 1998; USFWS and CDFW 2008).

The operations phase includes the long-term activities, including periodically performing maintenance dredging, disposing of the resulting dredged material, and maritime activities in the study area over the

50-year evaluation period. A 50-year period was selected to analyze environmental effects because USACE policy specifies that the economic life of deep draft navigation projects is 50 years (see **Appendix D, Economic Analysis**). For the -37 foot and -38 foot MLLW Alternatives, the 50-year period covers the years 2020 to 2069.

When a significant effect to a resource is anticipated for an alternative, mitigation measures are identified to avoid, minimize, reduce, rectify, or compensate for the anticipated impact. Where possible, the effect analyses also predict the residual impacts that would still exist after all available mitigation measures are implemented.

## 4.1 NATURAL ENVIRONMENT

A summary of the environmental effects impact rating is presented first in this chapter. Each section will describe the effects of the alternatives in further detail. As described in Chapter 3, the alternatives include No Action, deepening the navigation channel to -37 foot MLLW or -38 foot MLLW. Preliminary modeling of the final array of alternatives (-37 foot MLLW and -38 foot MLLW) did not include the sediment trap or rocky obstruction. The analysis in each resource section describes the effects of the -37 and -38 foot alternatives without a sediment trap and rocky obstruction. If effects on each resource are similar for -37 foot MLLW, -38 foot MLLW, and 38 foot MLLW plus the sediment trap and rocky obstruction, the effects are described within the same paragraph. The Recommended Plan (-38 foot MLLW plus sediment trap and rocky obstruction removal) was further modeled to show any incremental effects of adding the sediment trap to the 38 foot depth. The 38 foot MLLW plus sediment trap at Bulls Head Reach plus the rocky obstruction result in different effects from the -37 and -38 foot deepening only alternatives for the water quality, biological resources, and cultural resources. The results of the effects analysis for these resources are described with a subheading of -38 foot + Sediment Trap and Rocky Obstruction.

**Table 4-1** provides a summary of the environmental effects and benefits that would occur for each of the alternatives. The level of adverse impact for a given resource is defined as: (0) negligible/no impact; (-1) adverse but not significant impact/less than significant; (-2) significant but mitigatable adverse impact; (-3) significant and unavoidable adverse impact that cannot be mitigated. Beneficial impacts are indicated in the table by “B”.

**Table 4-1. Summary of Environmental Effects with Impact Ratings.**

Significance Impact Threshold ID	Significance Impact Threshold Description (An alternative is considered to have a significant impact if it would)	Impact Rating <sup>1</sup> (Primary/Cumulative)			Mitigation Measures <sup>1</sup>		
		No Action	-37 Foot	-38 Foot	Measure Number	Mitigation Measure Description	Residual Impact
<b><i>Geology and Seismicity</i></b>							
GSS-01	Increase potential risks related to rupture of a known earthquake fault; seismic shaking; tsunami or seiche; or seismic related ground failure, including liquefaction or landslides.	0/0	0/0	0/0	NM	NM	NA
GSS-02	Cause geologic units or soils to become unstable and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction, collapse, or erosion.	0/0	-1/-1	-1/-1	NM	NM	NA
<b><i>Sediment and Sedimentation</i></b>							
SS-01	Substantially degrade sediment quality due to dredging and placement of dredged materials.	0/0	-1/0	-1/0	NM	NM	NA
SS-02	Cause substantial modification of sedimentation or sediment transport processes that results in significant effects on downstream areas.	0/0	-1/0	-1/0	NM	NM	NA
<b><i>Water Quality and Hydrology</i></b>							
WQ-01	Substantially degrade water quality through alteration of temperature, salinity, pH, and dissolved oxygen; increased turbidity, or nutrient loading.	0/0	-1/0	-1/0	NM	NM	NA
WQ-02	Violate quality standards because of mobilization of contaminated sediments or release of hazardous materials.	0/0	-1/0	-1/0	NM	NM	NA
WQ-03	Negatively impact groundwater or surface water quality from leaching of contaminants or surface water runoff from placement sites.	0/0	-1/0	-1/0	NM	NM	NA

CHAPTER 4.0 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALTERNATIVE PLANS

Significance Impact Threshold ID	Significance Impact Threshold Description (An alternative is considered to have a significant impact if it would)	Impact Rating <sup>1</sup> (Primary/Cumulative)			Mitigation Measures <sup>1</sup>		
		No Action	-37 Foot	-38 Foot	Measure Number	Mitigation Measure Description	Residual Impact
WQ-04	Cause substantial modification of tidal hydraulics, tidal currents, and circulation that would result in significant effects on water levels or tidal flows within either San Francisco Bay or the Sacramento-San Joaquin Delta.	0/0	-1/0	-1/0	NM	NM	NA
WQ-05	Substantially impair water quality for municipal and industrial beneficial reuses.	0/0	-1/-1	-1/-1	NM	NM	NA
WQ-06	Substantially affect water exports and operations due to shifts in X2.	0/0	-1/-1	-1/-1	NM	NM	NA
<b>Air Quality</b>							
AQ-01	Violate any air quality standard, or contribute substantially to an existing or projected air quality violation.	0/0	-1/0	-1/0	NM	NM	0
AQ-02	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable Federal or state ambient air quality standard, including releasing emissions that exceed quantitative thresholds for ozone precursors.	0/0	-1/0	-1/0	NM	NM	0
AQ-03	Expose sensitive receptors to substantial pollutant concentrations.	0/0	0/0	0/0	NM	NM	0
AQ-04	Create objectionable odors affecting a substantial number of people.	0/0	0/0	0/0	NM	NM	0
AQ-05	Conflict with, or obstruct implementation of the applicable air quality plan.	0/0	0/0	0/0	NM	NM	0
<b>Climate Change</b>							
CC-01	Directly or indirectly exceed applicable Federal or state GHG standards.	0/0	0/0	0/0	NM	NM	0

CHAPTER 4.0 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALTERNATIVE PLANS

Significance Impact Threshold ID	Significance Impact Threshold Description (An alternative is considered to have a significant impact if it would)	Impact Rating <sup>1</sup> (Primary/Cumulative)			Mitigation Measures <sup>1</sup>		
		No Action	-37 Foot	-38 Foot	Measure Number	Mitigation Measure Description	Residual Impact
CC-02	Conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions and climate change impacts.	-1/0	-1/-1	-1/-1	NM	NM	--1
<b>Biological Resources</b>							
BR-01	Cause increased turbidity that adversely affects special-status species and critical habitat.	0/0	-1/-1	-1/-1	NM	NM	NA
BR-02	Cause benthic habitat disturbance that adversely affects special-status species, critical habitat, or habitat for commercially valuable marine species.	0/0	-1/-1	-1/-1	NM	NM	NA
BR-03	Cause underwater noise that adversely affects special-status fish and marine mammals.	0/0	-1/-1	-1/-1	NM	NM	NA
BR-04	Adversely affect special-status or commercially or recreationally important marine species through entrainment.	0/0	-1/-1	-1/-1	NM	NM	NA
BR-05	Result in the disturbance of EFH and "Special Aquatic Sites," including eelgrass beds and mudflats.	0/0	-1/-1	-1/-1	NM	NM	NA
BR-06	Interfere with the movement of resident or migratory fish or wildlife species.	0/0	-1/-1	-1/-1	NM	NM	NA
BR-07	Adversely affect special-status fish species, including their critical habitat, as a result of X2 shifts.	0/0	-1/-1	-1/-1	NM	NM	NA
<b>Land Use and Planning</b>							
LU-01	Introduce land uses or activities incompatible with existing or adjacent land uses.	0/0	-1/0	-1/0	NM	NM	NA
<b>Mineral Resources</b>							

CHAPTER 4.0 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALTERNATIVE PLANS

Significance Impact Threshold ID	Significance Impact Threshold Description (An alternative is considered to have a significant impact if it would)	Impact Rating <sup>1</sup> (Primary/Cumulative)			Mitigation Measures <sup>1</sup>		
		No Action	-37 Foot	-38 Foot	Measure Number	Mitigation Measure Description	Residual Impact
MIN-01	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State or a locally important mineral resource recovery site delineated in a county General Plan, specific plan, or other land use plan.	0/0	0/0	0/0	NM	NM	NA
<b>Agricultural Resources</b>							
AG-01	Degrade the quality, or agricultural productivity, of Important Farmland or farm resources (including irrigation water systems, levees, drainage systems), or directly or indirectly cause lands presently in agricultural production (including Important Farmland) to convert to non-agricultural uses.	0/0	0/0	0/0	NM	NM	NA
<b>Aesthetics</b>							
AE-01	Have a substantial adverse effect on a scenic vista or substantially degrade the existing visual character or quality of the site and its surroundings.	0/0	0/0	0/0	NM	NM	NA
AE-02	Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.	0/0	0/0	0/0	NM	NM	NA
<b>Cultural Resources and Native American Trust Assets</b>							
CR-01	Cause an adverse effect to a historic property (including shipwrecks and shellmounds).	0/0	0/0	0/0	NM	NM	NA
					NM	Archaeologist oversight	
CR-02	Disturb any human remains, including those interred outside of formal cemeteries.	0/0	0/0	0/0	NM	NM	NA
<b>Environmental Justice and Community Effects</b>							
EJ-01	Disproportionately affect environment of communities within the APE when compared to surrounding areas.	0/0	0/0	0/0	NM	NM	NA

CHAPTER 4.0 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALTERNATIVE PLANS

Significance Impact Threshold ID	Significance Impact Threshold Description (An alternative is considered to have a significant impact if it would)	Impact Rating <sup>1</sup> (Primary/Cumulative)			Mitigation Measures <sup>1</sup>		
		No Action	-37 Foot	-38 Foot	Measure Number	Mitigation Measure Description	Residual Impact
<b>Navigation, Transportation and Circulation</b>							
NT-01	Change vessel traffic patterns, resulting in unplanned or regularly occurring delays, adverse change in freedom of movement, increase safety risks, or introduction of safety hazards.	0/0	-1/0	-1/0	NM	NM	NA
<b>Noise</b>							
NOI-01	Result in a 90 dBA equivalent continuous sound level over a 1-hour period in a residential or public park area, or a 100 dBA equivalent continuous sound level over a 1-hour period in an industrial area.	-1/-1	-1/-1	-1/-1	NM	NM	NA
<b>Public Health and Environmental Hazards</b>							
PH-01	Operations occur on a site that is included on a list of hazardous material sites and, as a result, create a significant hazard to the public or the environment.	0/0	0/0	0/0	NM	NM	NA
PH-02	Create a significant hazard to the public or the environment by disrupting the routine transport, use, or placement or storage of hazardous materials or wastes.	0/0	0/0	0/0	NM	NM	NA
PH-03	Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan.	0/0	0/0	0/0	NM	NM	NA
<b>Recreation</b>							
RE-01	Substantially reduce or restrict the availability or quality of existing recreation opportunities in the Project area.	-1/0	-1/0	-1/0	NM	NM	NA
					NM	NM	
<b>Socioeconomics, Population and Housing</b>							
SOC-01	Result in a rapid or sizeable shift in population trends or would notably affect regional employment, spending and earning patterns, or community resources in a manner that could not be easily absorbed or accommodated by the economy as a whole.	0/-1	0/-1	0/-1	NM	NM	NA

CHAPTER 4.0 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALTERNATIVE PLANS

Significance Impact Threshold ID	Significance Impact Threshold Description (An alternative is considered to have a significant impact if it would)	Impact Rating <sup>1</sup> (Primary/Cumulative)			Mitigation Measures <sup>1</sup>		
		No Action	-37 Foot	-38 Foot	Measure Number	Mitigation Measure Description	Residual Impact
<b>Utilities and Public Services</b>							
UTIL-01	Interfere with operations of, cause damage to, or otherwise disrupt the use of any buried underwater cable, buried underwater pipeline, or overhead power transmission lines.	0/0	0/0	0/0	NM	NM	NA
<p><sup>1</sup>Impact Rating - First number denotes primary impact. Second number (after the slash) denotes cumulative impact, following these rating definitions:</p> <ul style="list-style-type: none"> <li>-3 = significant and unavoidable adverse impact</li> <li>-2 = significant but mitigable adverse impact</li> <li>-1 = adverse but not significant impact/less than significant impact</li> <li>0 = negligible or no impact</li> <li>B = beneficial</li> </ul> <p>MM = Mitigation measure (see text for description of measure)            NM = No mitigation required            NA = No residual impacts            ND = No impact determination can be made at this time</p>							

#### 4.1.1 GEOLOGY AND SEISMICITY

Impacts on or associated with geology were qualitatively evaluated based on the potential to temporarily or permanently alter geologic or seismic conditions of the study area. In addition, because geological hazards such as earthquakes happen independently of the project, the potential for increased risk of injury due to geologic and seismic hazards were qualitatively evaluated.

Under NEPA, an alternative would be considered to have a significant impact on or associated with geology and seismicity if it would:

Impact GSS-01: Increase potential risks related to rupture of a known earthquake fault; seismic shaking; tsunami or seiche; or seismic-related ground failure, including liquefaction or landslides; or

Impact GSS-02: Cause geologic units or soils to become unstable and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, collapse, or erosion.

#### NO ACTION ALTERNATIVE

It is anticipated that the current hazard resulting from fault rupture or seismic-induced hazards will persist over the 50-year analysis addressed in this report. This would continue to present a risk of very strong to strongest ground shaking throughout the study area. The risk of seismically induced liquefaction or slope failure in areas prone to instability would remain, including coastal areas with wetlands, marsh fill, steep or unstable slopes, and within certain levees in Contra Costa and Solano counties. It is also anticipated that the current hazard resulting from tsunami and seismically induced seiche on the San Francisco Bay and Delta would continue. The hazard of a substantial tsunami affecting the Delta and the Suisun Marsh appears to be minor because of their distance from the Pacific Ocean and the attenuating effect of San Francisco and Suisun Bay waters. Therefore, the No Action Alternative, which involves continued maintenance dredging and use of the existing deep draft navigation channels, would have no impact related to the rupture of a known earthquake fault; seismic shaking; tsunami or seiche; or seismic-related ground failure, including liquefaction; or landslides. The No Action Alternative would also have no impact related to geologic units or soils becoming unstable.

#### FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVE

##### **Evaluation of Impact GSS-01: Increase potential risks related to rupture of a known earthquake fault; seismic shaking; tsunami or seiche; or seismic-related ground failure, including liquefaction or landslides:**

The -37 foot and -38 foot MLLW Alternative would be constructed and maintained within the same footprint as the existing -35 foot MLLW channel and context of the same potential geologic hazards described above for the No Action Alternative. Thus, it is anticipated that the current hazards resulting from fault rupture or seismic-induced hazards would persist. Channel deepening would not result in an increased risk of fault rupture or ground shaking and would not result in construction of any structures that would be susceptible to seismic hazards. While dredging would occur in waters adjacent to potentially unstable coastlines, the dredge prism would be designed to avoid underwater sloughing that could potentially undermine levee or shoreline stability. All construction would occur in compliance with Title 23, Division 1, Article 8, Sections 111137 of the CCR and other applicable regulations. Tsunami and seiche hazards in the study area would be unaffected by this alternative and would remain minimal. This alternative would not interfere with any tsunami warning systems or response plans. Neither Alternative

would, therefore, have no impact related to rupture of a known earthquake fault; seismic shaking; tsunami or seiche; or seismic-related ground failure, including liquefaction; or landslides.

**Evaluation of Impact GSS-02: Cause geologic units or soils to become unstable and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, collapse, or erosion:**

Geologic hazards potentially resulting from upland placement of dredge material were addressed during the evaluation and construction of existing placement sites, and would be analyzed separately for any new placement sites that are separately permitted and used for both alternatives. Dredging and deepening would not create unstable geologic units within the navigation channel, as existing side slopes ratios would be maintained. Although this alternative may result in minimal erosion of the channel sides from sloughing after dredging due to the disturbance of sediments, historic patterns of erosion and sediment accumulation would not be expected to change.

Certain shoreline areas adjacent to the Alternatives dredging footprint may be susceptible to geologic hazards, however, the dredge prism would be designed to avoid underwater sloughing that could potentially undermine levee or shoreline stability. All construction would occur in compliance with Title 23, Division 1, Article 8, and Sections 111137 of the CCR, the USACE Coastal Engineering Manual, and other applicable regulations.

The deeper channel would be able to accommodate more fully loaded vessels, potentially creating larger waves and increased shoreline erosion. However, the number of shipping vessels under both alternatives is projected to decrease slightly compared to the No Action Alternative. Any potential increase in shoreline erosion from more fully loaded vessels would, therefore, be nominal when considered in the context of potential reduction in shipping vessels and broader vessel activity in the Bay and Delta. Therefore, the both alternatives would have less than significant impacts related to geologic units or soils becoming unstable.

#### 4.1.2 SEDIMENT AND SEDIMENTATION

Impacts on or associated with sediment and sedimentation were qualitatively evaluated based on the potential for the alternatives to temporarily or permanently alter sediment quality or transport conditions in the project area. Under NEPA, an alternative could have an impact from sediment if it would cause the following:

Impact SS-01: Substantially degrade sediment quality due to dredging and placement of dredged materials; or

Impact SS-02: Cause substantial modification of sedimentation or sediment transport processes that results in significant effects on downstream areas.

For each of the thresholds established previously, the effect of the project was evaluated using available information and data.

#### NO ACTION ALTERNATIVE

Under the No Action Alternative, maintenance dredging would continue to occur where and when needed. Historic sediment testing data show low levels of contamination throughout the study area. Sediments from the area are typically suitable for placement in the ocean, in-bay, and for beneficial reuse. USACE would continue to conduct sediment testing for maintenance dredging activities in accordance with appropriate Federal and regional guidelines and continue to obtain all necessary permits and approvals as

described above. Therefore, the No Action Alternative would continue to not degrade sediment quality as a result of regular dredging and placement of dredged materials in the study area.

Under the No Action Alternative, existing sedimentation patterns would continue to occur and periodic maintenance dredging would also continue to be performed in the present manner such that the channels in the study area are maintained at the existing -35 foot regulated depths. Thus, there would be no change in sedimentation or sediment transport processes.

#### FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES

**Evaluation of Impact SS-01: Substantially degrade sediment quality due to dredging and placement of dredged materials:** Based on historic sediment testing data, sediment from the dredge prism for the -37 foot and -38 foot MLLW Alternatives show low levels of contamination and it was determined suitable for placement in-bay or for wetland or upland beneficial reuse. USACE will conduct all necessary testing and coordination required with the DMMO and obtain all necessary approvals for dredging and placement of dredged material prior to construction. Conformance with guidelines and agency review would ensure that dredging and dredged material placement activities would not substantially degrade sediment quality either in the channels, or at placement sites or placement sites. For these reasons, the -37 foot and -38 foot MLLW Alternative would result in less than significant impacts on sediment quality.

**Evaluation of Impact SS-02: Cause substantial modification of sedimentation or sediment transport processes that results in significant effects on downstream areas:** The effects of deepening the navigation channels were evaluated by estimating the increase in channel sedimentation resulting from the deepening. USACE estimated an increase in channel sedimentation (for combined Pinole Shoal Channel, Bulls Head Reach and the sediment trap) of 185,200 cubic yards as a result of deepening to -37 feet MLLW (**Appendix A - Civil Site**) and 230,500 cubic yards as a result of deepening to -38 feet MLLW. The increase in dredging volumes required to maintain the depth of -37 feet MLLW is estimated to be only 0.5 percent of the average annual sediment flux to San Francisco Bay, and 1.2 percent for -38 feet, based on sediment flux estimates by McKee et al. (2013). As breakouts of the total volumes described above, the estimated increase in channel sedimentation for deepening the sediment trap under the -37 foot alternative is 5,700 cy and under the -39 foot alternative is 8,900 cubic yards (**Appendix A - Civil Site**). The increase in dredging volumes required to maintain the navigation channel to a depth of -38 feet MLLW plus the sediment trap is estimated to be only 1.2 percent of the average annual sediment flux to San Francisco Bay, based on sediment flux estimates by McKee et al. (2013).

As a result, the effect of both alternatives is expected to result in a less than significant impact on sedimentation and sediment transport processes in areas downstream of the study area.

#### 4.1.3 WATER QUALITY AND HYDROLOGY

Water quality variables that are potentially affected by dredging operations include turbidity, dissolved oxygen, nutrients, salinity, temperature, pH, and concentrations of trace metals and organic contaminants if they are present in the sediments.

The analysis considered whether the alternatives would:

- Substantially degrade water quality through alteration of temperature, salinity, pH, and dissolved oxygen; increased turbidity; or nutrient loading

- Violate any water quality standards (**Table 4-2**), or substantially degrade water quality because of mobilization of contaminated sediments or release of hazardous materials during dredging and placement activities.

The analysis also describes Best Management Practices (BMPs) and other measures to avoid, minimize, or mitigate potential adverse impacts on water quality, including measures mandated under existing regulations and programs, as applicable.

Under NEPA, an alternative would be considered to have a significant impact on water quality, water supply, and/or hydrology and hydraulics if it would:

Impact WQ-01: Substantially degrade water quality through alteration of temperature, salinity, pH, and dissolved oxygen; increased turbidity, or nutrient loading; or

Impact WQ-02: Violate quality standards because of mobilization of contaminated sediments or release of hazardous materials; or

Impact WQ-03: Negatively impact groundwater or surface water quality from leaching of contaminants or surface water runoff from placement sites; or

Impact WQ-04: Cause substantial modification of tidal hydraulics, tidal currents, and circulation that would result in significant effects on water levels or tidal flows within either San Francisco Bay or the Sacramento-San Joaquin Delta; or

Impact WQ-05: Substantially impair water quality for municipal and industrial beneficial reuses; or

Impact WQ-06: Substantially affect water exports and operations due to shifts in X2.

In an effort to easily compare the effect analysis of each alternative, this water quality and hydrology section is arranged per impact rather than by alternatives in the previous sections.

**Table 4-2. Water Quality Objectives (Standards).**

Chemical	Pinole Shoal and Bulls Head Reach (Marine) <sup>a</sup>			East of Bulls Head Reach (Freshwater)		
	WQO 1-Hour Average	WQO 24-Hour Average (µg/L)	WQO 4 day Average (µg/L)	WQO Maximum (µg/L) <sup>b</sup>	WQO 1-Hour Average (µg/L) <sup>a</sup>	WQO 4 day Average (µg/L) <sup>a</sup>
<b>Metals (µg/L)</b>						
Arsenic	69	--	36	10	340	150
Boron	--	--	--	200 <sup>e</sup>	--	--
Barium	--	--	--	100	--	--
Cadmium	42	--	9.3	50 <sup>e</sup>	3.9 <sup>f</sup>	1.1 <sup>f</sup>
Chromium	1,100	--	50	5 <sup>e</sup>	16 <sup>f</sup>	11 <sup>f</sup>
Copper	9.4 <sup>c</sup>	--	6.0 <sup>c</sup>	10	13 <sup>f</sup>	9 <sup>f</sup>
Lead	210	--	8.1	15 <sup>e</sup>	65 <sup>f</sup>	2.5 <sup>f</sup>
Mercury	2.1	--	--	2 <sup>e</sup>	2.4	0.025
Nickel	74	--	8.2	200 <sup>e</sup>	470 <sup>f</sup>	52 <sup>f</sup>
Selenium	20	--	5	5 <sup>e</sup>	20	5
Silver	1.9	--	--	10	3.4 <sup>f</sup>	--
Zinc	90	--	81	100	120 <sup>f</sup>	120 <sup>f</sup>
PAHs (µg/L)	--	15	--	--	--	--
<b>Pesticides (µg/L)</b>						
Chlorpyrifos	--	--	--	--	0.025	0.015
Diazinon	--	--	--	--	0.16	0.1
Dissolved Oxygen (mg/L)	5/7 <sup>d</sup>	--	--	6	--	--
Cyanide (µg/L)	9.4	--	2.9	--	22	5.2

**Notes:**

WQOs for metals are based on the dissolved fraction unless noted otherwise.

- As defined in the SF Bay Basin Plan
- As defined in the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins
- Applicable to the portion of the delta located in the San Francisco Bay Region, Suisun Bay, Carquinez Strait, San Pablo Bay, Central San Francisco Bay, and the portion of Lower San Francisco Bay north of the line representing the Hayward Shoals
- Downstream of Carquinez Bridge = 5.0 mg/L minimum; Upstream of Carquinez Bridge = 7.0 mg/L minimum
- Based on the total fraction
- Based on hardness; value shown assume hardness of 100 mg/L

-- = No guidance value

µg/L = micrograms per liter

mg/L = milligrams per liter

PAH = polycyclic aromatic hydrocarbon

WQO = Water Quality Objectives

***EVALUATION OF IMPACT OF WQ-01: SUBSTANTIALLY DEGRADE WATER QUALITY THROUGH ALTERATION OF TEMPERATURE, SALINITY, PH, AND DISSOLVED OXYGEN; INCREASED TURBIDITY, OR NUTRIENT LOADING*****NO-ACTION ALTERNATIVE**

The No Action Alternative would continue ongoing maintenance dredging, placement of dredged material in approved open water placement sites, and use of the channel. There would be no long-term changes in water quality from baseline conditions. Sediment sampling and analysis would be required for ongoing maintenance dredging efforts to avoid potential sediment and water quality impacts. Therefore, temperature, salinity, pH, and dissolved oxygen, increased turbidity, or nutrient loading would remain unchanged from baseline conditions.

**FUTURE WITH -37 FOOT ALTERNATIVE**

Background concentrations of suspended particulates and resulting turbidity measurements, as well as other water quality parameters, already vary as a result of numerous natural and anthropogenic factors including ship traffic, erosion, storms, and seasonal high freshwater inflows into the Delta during the winter and spring. Dredging for the -37 foot MLLW Alternative would temporarily re-suspend sediments in the water column, thereby increasing turbidity, and affecting other water quality parameters.

Mechanical dredging is proposed for the -37 foot MLLW Alternative. Operating from a crane or derrick on a barge, the clamshell bucket is lowered, filled with sediment, raised through the water column, and positioned above the dump barge for temporary containment prior to placement. Clamshell dredging generates turbidity from the impact of the bucket with the channel bottom and from spillage and leakage of material from hoisting the bucket through the water column and swinging it over the barge. Key factors that influence turbidity in the water column are the cycle time of the dredging, the bucket type, the amount of bottom sweeping/smoothing, and the number of passes at a specific location (Collins 1995). Clamshell dredging activities typically result in localized water column concentrations of re-suspended sediment of several hundred mg/L near the dredging operation. The extent of sediment resuspension is a byproduct of several factors, including physical properties of the sediment, site conditions, nature and extent of debris and obstructions, and operational considerations of the dredge equipment and operator. Levels of suspended sediment are expected to be highest closest to the dredging operations. Concentrations typically become reduced to near background levels within several hundred feet of the dredge (Palermo et al. 1990; Bridges et al. 2008). Suspended sediment plumes generated in the immediate vicinity of the dredge are transported by currents to nearby areas until they settle out of the water column (Anchor 2003).

Increased suspended sediments can affect aquatic organisms both directly and indirectly. The level of impact to individual organisms depends on the amount of time an individual organism is exposed to suspended sediments, the concentration of suspended sediment in the water column, and the composition of the sediments (fine-grained versus coarse-grained and chemical associations). An extensive literature review on the subject of dredging-induced turbidity and potential effects on aquatic organisms concluded that it is very unlikely that total suspended solids (TSS) levels would reach harmful concentrations as a result of dredging (Anchor 2003). The length of time it takes the suspended material to settle, combined with the current direction and velocity, would determine the size and duration of the turbidity plume. It is expected that the mixing zone would rapidly return to background or preconstruction conditions upon

completion of the construction activities. Furthermore, settling rates are largely determined by the grain size of the suspended material.

Potential impacts from dredging also include short-term decreases in DO and increases in nutrients, or changes in temperature or pH, due to resuspension of sediment and sediment-bound organic material. These impacts would be temporary, generally being confined to the dredging area, and would return relatively quickly to background levels following construction (Jones and Lee 1978; LaSalle 1990; Lee et al. 1978; Simenstad 1988). USACE research has shown that there are techniques (e.g., slowing the dredge cycle, use of silt curtains, dredge bucket design) that can be employed to dredge sediment and cause a limited amount of sediment to be re-suspended (USACE 1986).

Under the -37 foot MLLW Alternative, impacts from changes in temperature, salinity, pH, and DO; increased turbidity; or nutrient loading would be short-term. Measurements of these water quality parameters would rapidly return to baseline conditions once construction in a given area concludes. Because the changes in salinity and tidal flows are minor in comparison to the baseline conditions, the project's impact on HABs/blooms is likely to be limited to a relatively small geographical displacement of algal blooms with minimal impact on duration or intensity. In all, project related effects on algal blooms is expected to be insignificant in comparison to other algal bloom driving factors such as relative sea level rise and general warming trends for ocean water and river flows. Additionally, the alternative does not propose to dredge farther than Port Chicago, which is at least 25 miles downstream of Jersey Island and the area where DO is currently low. Thus, impacts to water quality from construction are expected to be less than significant as a result of the -37 foot MLLW Alternative as compared to the baseline.

#### FUTURE WITH 38 FOOT ALTERNATIVE

Potential water quality impacts of the -38 foot MLLW Alternative due to construction would be the same as those of the -37 foot MLLW Alternative, although they would occur on proportionally larger scales due to the larger volume of dredged material. However, the impacts to water quality due to construction are expected to be less than significant as a result of the -38 foot MLLW Alternative as compared to the baseline.

#### FUTURE WITH 38 FOOT ALTERNATIVE + SEDIMENT TRAP AND ROCKY OBSTRUCTION (RECOMMENDED PLAN)

Potential water quality impacts of the Recommended Plan Alternative due to construction would be the similar to those of the -38 foot MLLW Alternative, although they would occur on proportionally larger scales due to the larger volume of dredged material from the sediment trap and rock removal. The impacts to water quality due to construction of this alternative are expected to be less than significant as a result of the Recommended Plan Alternative as compared to the baseline.

#### ***EVALUATION OF IMPACT OF WQ-02: VIOLATIONS OF WATER QUALITY STANDARDS BECAUSE OF MOBILIZATION OF CONTAMINATED SEDIMENTS OR RELEASE OF HAZARDOUS MATERIALS***

Dredging of sediments has the potential to release contaminants into the water column if they are present in the material at high concentrations. The suspension of sediment can mobilize sediment-bound contaminants into the water column, where they have the potential to dissolve into the water. However, most contaminants are tightly bound to finer sediment, such as silt, clay, and organic matter and are not readily water soluble or easily released during short-term resuspension of sediments, as would be the case

during dredging operations and from the passage of ships (LTMS 1998). Release of hazardous materials can also occur as a result of mishaps associated with shipping traffic.

#### NO ACTION ALTERNATIVE

The No Action Alternative would continue ongoing maintenance dredging, placement of dredged material in approved open water placement and upland placement sites, and use of the channel. As a result, there would be no changes from the present strategy for evaluating the potential of mobilizing contaminated sediments or release of hazardous materials above baseline conditions. As discussed in **Section 2-4**, there have been no contaminated sediment issues with ongoing maintenance dredging efforts. Therefore, there would be no new impact related to violations of water quality standards, and water quality would be unchanged from baseline conditions. One potential issue for future maintenance and deepening events is the potential for changes to water quality criteria which may affect acceptability of future sediment assessment results. For instance, the USEPA has proposed new selenium criteria for aquatic life for the San Francisco Bay and Delta (USEPA, 2016). This proposed criteria includes maximum tissue selenium concentrations and water column selenium concentrations. The proposed water column concentrations of 0.2 ug/L and 1.0 ug/L, dissolved and particulate fractions, respectively are significantly lower than the existing chronic criteria of 5.0 ug/L for total recoverable selenium. At present, it is unknown whether this new selenium rule if enacted will compel changes to the existing channel maintenance program. No change is expected in the likelihood of an accidental spill or release from shipping traffic.

#### FUTURE WITH -37 FOOT ALTERNATIVE

Prior to dredging the -37 foot MLLW Alternative, sediment chemistry testing would be done to ensure that the new work material does not contain contaminants at concentrations that might result in elevated levels in the water column during dredging. Prior testing has been done in some reaches of the channel to this depth and the results indicated that mobilization into the water column is not likely to result in water quality violations. Future sediment quality assessments would take into account revised water quality criteria such as the USEPA's proposed revision to aquatic selenium criteria for the Bay and Delta.

Sediment within the study area is expected to be suitable for beneficial reuse or unconfined placement as is noted in **Section 2-4** (Sediment and Sedimentation). Past characterizations have not determined the presence of any contaminated materials. Prior to dredging, sediment within the dredge footprint for the -37 foot MLLW Alternative would be sampled and analyzed as described in **Section 2.2.2 and 4.1.2**. This process would also identify contaminated sediments (e.g., sediments unsuitable for beneficial reuse or placement at approved sites) or any hazardous waste. If any such sediments were identified, appropriate dredging and placement methods would be implemented as a condition of the project approvals.

Additionally, USACE would implement BMPs and comply with water quality protection measures included as conditions to the WDRs and WQCs issued by RWQCB and the letter of concurrence issued by the BCDC for USACE's consistency determination. Adherence to these measures and BMPs would minimize the potential for water quality degradation.

Vessels would be operated in compliance with all applicable regulations related to the prevention of water pollution by fuel, harmful substances, and garbage, as well as from accidental discharges. During transport, the dredged material would be secured, with precautions in place to minimize any risk of spills. As such, the potential for the release of hazardous substances from vessel operations during dredging, transport, and placement activities would be minimal.

Therefore, dredging and placement activities are not expected to increase contaminant concentrations in the water column above background conditions, or result in violation of a water quality standard. Impacts of dredging to water quality standards under the -37 foot MLLW Alternative would be less than significant as compared to the baseline.

Deepening the channel will allow petroleum tankers to carry more cargo on each transit of the channel which will result in fewer transits relative to the base condition. Fewer transits of loaded tanker ships should reduce the probability of a spill or accidental release relative to baseline conditions.

#### FUTURE WITH 38 FOOT ALTERNATIVE

Potential water quality impacts of the -38 foot MLLW Alternative are likely to be the same as those of the -37 foot MLLW Alternative, although they would occur on proportionally larger scales due to the larger volume of dredged material. Dredging and placement activities are not expected to increase contaminant concentrations in the water column above background conditions, or result in violations of water quality standards. Thus, short-term, less than significant impacts to water quality are expected under the -38 foot MLLW Alternative as compared to the baseline. Relative to the 37 ft alternative, a 38 ft channel should have a slightly smaller probability of a spill or accidental release of hazardous material. Future sediment quality assessments would take into account revised water quality criteria such as the USEPA's proposed revision to aquatic selenium criteria for the Bay and Delta.

#### FUTURE WITH 38 FOOT ALTERNATIVE + SEDIMENT TRAP AND ROCKY OBSTRUCTION

Potential water quality impacts of the Recommended Plan are likely to be the same as those of the -38 foot MLLW Alternative, although they would occur on proportionally larger scales due to the larger volume of dredged material. Dredging and placement activities are not expected to increase contaminant concentrations in the water column above background conditions, or result in violations of water quality standards. Thus, short-term, less than significant impacts to water quality are expected under this Alternative as compared to the baseline. Relative to the 37 ft alternative, a 38 ft channel should have a slightly smaller probability of a spill or accidental release of hazardous material because of a slight reduction in ship calling frequency due to greater loading capacity associated with increased draft. Future sediment quality assessments would take into account revised water quality criteria such as the USEPA's proposed revision to aquatic selenium criteria for the Bay and Delta.

#### ***EVALUATION OF IMPACT OF WQ-03: NEGATIVE IMPACT TO GROUNDWATER OR SURFACE WATER QUALITY FROM LEACHING OF CONTAMINANTS OR SURFACE WATER RUNOFF FROM PLACEMENT SITES***

#### NO ACTION ALTERNATIVE

The No Action Alternative would continue ongoing maintenance dredging of the existing 35 foot channels and placement of dredged material in designated open water placement areas. This alternative would not result in new sources of contaminant leaching compared to baseline conditions. Therefore, there would be no negative impact to groundwater or surface water quality at the placement sites compared to baseline conditions.

#### FUTURE WITH -37 FOOT ALTERNATIVE

Based on historic sediment testing conducted for the study area (see **Section 2.2.2**), dredged material is expected to meet both upland and wetland beneficial reuse placement criteria. However, if dredged

material were placed at an upland or beneficial reuse site, additional tests to estimate leachate concentrations from sediments would need to be conducted. Wetland or upland placement of dredge material must comply with Subchapter 15 of the Porter-Cologne Water Quality Control Act, which regulates the upland placement of spoil material and subsequent diffuse discharge of water that may affect groundwater quality. The RWQCB is responsible for regulating discharges of waste that could affect the quality of waters of the State. These regulations consider the groundwater-surface water interface within the basin, and are designed to reduce potential groundwater quality impacts from dredged material placement to a less than significant level. The -37 foot MLLW Alternative does not involve excavation to depths that would affect aquifer systems or groundwater movement, and would not involve the construction of substantial new impervious surfaces that would impede groundwater recharge. Thus, less than significant impacts to groundwater or surface water quality are expected under the -37 foot MLLW Alternative as compared to the NEPA baseline.

#### FUTURE WITH 38 FOOT ALTERNATIVE

Potential water quality impacts of the -38 foot MLLW Alternative would be the same as those of the -37 foot MLLW Alternative, although they would occur on proportionally larger scales due to the larger volume of dredged material. Thus, less than significant impacts to groundwater or surface water quality are also expected under the -38 foot MLLW Alternative as compared to the NEPA baseline.

#### FUTURE WITH 38 FOOT ALTERNATIVE + SEDIMENT TRAP AND ROCKY OBSTRUCTION

Potential water quality impacts of this Alternative would be the same as those of the -38 foot MLLW Alternative, although they would occur on proportionally larger scales due to the larger volume of dredged material. Thus, less than significant impacts to groundwater or surface water quality are also expected under this Alternative as compared to the NEPA baseline.

#### ***EVALUATION OF IMPACT OF WQ-04: CAUSE SUBSTANTIAL MODIFICATION OF TIDAL HYDRAULICS, TIDAL CURRENTS, AND CIRCULATION THAT WOULD RESULT IN SIGNIFICANT EFFECTS ON WATER LEVELS OR TIDAL FLOWS WITHIN EITHER SAN FRANCISCO BAY OR THE SACRAMENTO-SAN JOAQUIN DELTA***

#### NO ACTION ALTERNATIVE

Under the No Action Alternative, sedimentation and periodic maintenance dredging would continue to occur as the study area channels have traditionally been maintained at their existing -35 foot MLLW depths. As a result, there would be no changes to the existing geometry of the study area and, therefore, there would be no impact on existing water levels or tidal flows.

#### FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION (RECOMMENDED PLAN) ALTERNATIVES

A detailed analysis of the effect of deepening the navigation channels to the maximum depths under evaluation on water levels, tidal velocities, and tidal flows throughout San Francisco Bay and the Delta is presented in **Appendix B, Water Resources**. Impacts were shown to be less than significant.

#### ***EVALUATION OF IMPACT OF WQ-05: SUBSTANTIALLY IMPAIR WATER QUALITY FOR MUNICIPAL AND INDUSTRIAL BENEFICIAL REUSES***

The D-1641 salinity requirements pertaining to the study area, as well as high bromide concentration concerns for drinking water, are discussed in **Section 2.2.3**. The significance threshold for the project is defined as a violation of D-1641 water quality criteria, or a detectable, measurable adverse impact to drinking water quality due to changes in chloride or bromide concentration. Evaluation of project impacts

against published water quality compliance criteria is normally straightforward. However, there is no single widely accepted criterion for what constitutes a detectable, measurable adverse impact to drinking water quality when criteria are met. Previous studies in the Delta have applied thresholds based on monthly-average salinity differences between conditions with and without a project corresponding to a chloride concentration increase of more than 5 percent or 5 mg/L whichever is greater (e.g., CCWD 2010). Other studies have evaluated water quality impacts based on how or whether the timing of exports would be shifted to maintain water quality conditions equivalent to those under the No Action Alternative (USBR 2015).

The change in X2 position and change in water quality (chloride) were assessed at CCWD, SWP, and CWP pump stations for the -37 ft and -38 ft alternative under Critical Year (2014) and Wet Year (2011) Conditions. For the Recommended Plan alternative (-38 ft alternative with outcrop removal and sediment trap), additional evaluation was done including simulation of a Below Normal Year (2012), a period of record evaluation of X2 changes, additional chloride compliance evaluation at Antioch, and evaluation of changes at the Emmaton, and Jersey Point electroconductivity compliance locations. The results of the modeling predictions are presented in detail in the Salinity Modeling Report that is included as **Appendix B, Water Resources- Attachment 1**. For measurable changes to water quality, the significance level for chloride is no increase levels that exceed 5 mg/L and 5 percent of the baseline concentration. For bromide, the significance level is 5 percent increase in estimated concentration. The significance of changes to bromide levels is evaluated using the percent change in chloride concentration. This is done using the relationship between bromide and chloride concentrations at Delta intakes developed by Denton (2005).

Since the exact weather, hydrology, and operations conditions for the base year cannot be accurately predicted, this analysis considered the effects on salinity during a wet WY, below normal WY, and a critical WY representative of the range of possible Year 0 conditions. The evaluation of effects on salinity during both the wettest, below normal, and driest conditions provides an assessment of the full range of effects on salinity that are likely to result from the alternatives.

### NO ACTION ALTERNATIVE

The No Action Alternative would continue ongoing use of the channel and maintenance dredging at the -35 foot MLLW depth and placement of dredged material in approved open water placement areas. Continuation of existing conditions in the study area would not result in impairment of municipal or industrial beneficial reuses. Therefore, there would be no negative impact to municipal or industrial uses.

### FUTURE WITH -37 FOOT ALTERNATIVE

A three-dimensional hydrodynamic model was used to evaluate the -37 foot MLLW Alternative's impacts on water quality at municipal and industrial water intake and export locations in the Delta (see **Figure 2-5** and **Appendix B, Water Resources**). The -37 foot MLLW Alternative was predicted to result in a maximum monthly-average change in chloride concentration of between 0.3 mg/L at the CCWD Middle River at Victoria Canal Intake to 0.7 mg/L at the CCWD Rock Slough Intake during a critical WY (**Table 4-2, Appendix B - Attachment 1**). During the wet WY evaluated, the predicted maximum monthly-average change in chloride concentration ranged from 0.0 mg/L at the CCWD Middle River at Victoria Canal Intake and the West Canal at the mouth of Clifton Court Forebay to 0.2 mg/L at the CCWD Rock Slough (**Table 4-6, Appendix B - Attachment 1**).

The D-1641 water quality objectives for municipal and industrial beneficial reuse stipulate a maximum allowable concentration of 250 mg/L Cl at the municipal water intakes. The critical year and wet year simulations show that at the CCWD, SWP, and CWP intakes there were no occurrences of chloride above 250 mg/L (**Figures 4.1-2 through Figure 4.1-6 and Figures 4.2-2 through Figure 4.2-6, Appendix B - Attachment 1**). The maximum monthly-average change in chloride concentration predicted to result from the -37 foot MLLW Alternative during the critical and wet years evaluated was less than 0.3 percent of the allowable chloride concentration. This 0.3 percent maximum monthly-average change in chloride concentration occurred during the critical WY, which has historically occurred in 13.8 percent of the years between 1906 and 2014. During the wet WY, which has historically occurred in 33 percent of the years between 1906 and 2014 (see **Section 2.2.3 and Appendix B, Water Resources – Attachment 1**), the maximum monthly-average change in chloride concentration was less than 0.1 percent of the allowable chloride concentration (250 mg/L).

Since these predicted maximum monthly average changes in chloride concentration (occurring during both wet and critical WY) are significantly less than either 5 percent or 5 mg/L, the long-term impact to water quality at the Delta intake and export locations would be less than significant as a result of the 37 foot MLLW Alternative as compared to the NEPA baseline.

The D-1641 criteria includes an evaluation of the number of days chloride must be below 150 mg/L which varies from 155 day/year for a critical year to 240 days for a wet year. A review of the chloride histograms for the FWO and -37 ft alternatives shows no difference in the number of days with chloride below 150 mg/L (**Figures 4.1-2 through Figure 4.1-6 and Figures 4.2-1 through Figure 4.2-6, Appendix B - Attachment 1**). Given no change in the number of days < 150 mg/L for the wet and critical year simulations, the impact of the -37 ft alternative on meeting this D1641 criteria is less than significant.

#### FUTURE WITH 38 FOOT ALTERNATIVE

The three-dimensional hydrodynamic model was also used to evaluate the 38 foot MLLW Alternative's impacts on water quality at municipal and industrial water intake and export locations in the Delta (see **Appendix B, Water Resources – Attachment 1**). For the 38 foot MLLW Alternative, the predicted maximum monthly-average change in chloride concentration ranged from 1.2 mg/L at the CCWD Middle River at Victoria Canal Intake and the Delta-Mendota Canal at Tracy Pumping Plant to 2.4 mg/L at the CCWD Rock Slough Intake during a critical WY (2014) (**Table 4-3, Appendix B - Attachment 1**). During the wet WY (2011) evaluated, the predicted maximum monthly-average change in chloride concentration ranged from 0.1 mg/L at the CCWD Middle River at Victoria Canal Intake to 0.8 mg/L at the CCWD Rock Slough Intake Slough (**Table 4-7, Appendix B - Attachment 1**).

The D-1641 water quality objectives for municipal and industrial beneficial reuse stipulate a maximum allowable concentration of 250 mg/L Cl at the municipal water intakes. The critical year and wet year simulations show that at the CCWD, SWP, and CWP intakes there were no occurrences of chloride above 250 mg/L (Figures 4.1-8 through Figure 4.1-12 and Figures 4.2-8 through Figure 4.2-12, Attachment 1, Appendix B). The maximum monthly-average change in chloride concentration predicted to result from the 38 foot MLLW Alternative during the 2 years evaluated was less than 1.0 percent of the allowable chloride concentration. This 1 percent maximum monthly-average change in chloride concentration occurred during a critical WY (2014), which has historically occurred in 13.8 percent of the years between 1906 and 2014. During a wet WY (2011), which has historically occurred in 33 percent of the years between 1906 and 2014, the maximum monthly-average change in chloride concentration was 0.3 percent of the

allowable chloride concentration (see **Section 2.2.3** and **Appendix B, Water Resources – Attachment 1**). Since these predicted maximum monthly average changes in chloride concentration (occurring during both wet and critical WYs) are significantly less than either 5 percent or 5 mg/L, the long-term impact to water quality at the Delta intake and export locations would be less than significant as a result of the 38 foot MLLW Alternative as compared to the NEPA baseline.

The D-1641 criteria includes an evaluation of the number of days chloride must be below 150 mg/L which varies from 155 day/year for a critical year to 240 days for a wet year. A review of the chloride histograms for the FWO and 38 ft alternatives shows no difference in the number of days with chloride below 150 mg/L (**Figures 4.1-8 through Figure 4.1-12 and Figures 4.2-8 through Figure 4.2-12, Appendix B - Attachment 1**). Given no change in the number of days < 150 mg/L for the wet and critical year simulations, the impact of the 38 ft alternative on meeting this D1641 criteria is less than significant.

### FUTURE WITH 38 FOOT ALTERNATIVE + SEDIMENT TRAP AND ROCKY OBSTRUCTION

The three-dimensional hydrodynamic model was also used to evaluate the Recommended Plan Alternative's impacts on water quality at municipal and industrial water intake and export locations in the Delta (see **Appendix B, Water Resources – Attachment 1**). For the Recommended Plan Alternative, the predicted maximum monthly-average change in chloride concentration ranged from 1.8 mg/L at the CCWD Middle River at Victoria Canal Intake and the Delta-Mendota Canal at Tracy Pumping Plant to 3.6 mg/L at the CCWD Rock Slough Intake during a critical WY (**Table 5-2, Appendix B - Attachment 1**). During the below normal WY evaluated, the predicted maximum monthly-average change in chloride concentration ranged from 1.1 mg/L at the CCWD Middle River at Victoria Canal Intake to 3.1 mg/L at the CCWD Rock Slough Intake (**Table 5-5, Appendix B - Attachment 1**). During the wet WY evaluated, the predicted maximum monthly-average change in chloride concentration ranged from 0.1 mg/L at the CCWD Middle River at Victoria Canal Intake to 1.1 mg/L at the CCWD Rock Slough Intake (**Table 5-8, Appendix B, Water Resources – Attachment 1**).

The D-1641 water quality objectives for municipal and industrial beneficial reuse stipulate a maximum allowable concentration of 250 mg/L Cl at the municipal water intakes. The critical year (2014), below normal year (2012) and wet year (2011) simulations show that at the CCWD, SWP, and CWP intakes there were no occurrences of chloride above 250 mg/L (**Figures 5.2-2 through 5.2-6, 5.3-2 through 5.3-6, and 5.4-2 through 5.4-6, Appendix B – Attachment 1**). The maximum monthly-average change in chloride concentration predicted to result from the Recommended Plan Alternative during the three years evaluated was 3.6 mg/L which is less than 1.5 percent of the allowable chloride concentration (**Table 5-1, Appendix B – Attachment 1**). This 1.5 percent maximum monthly-average change in chloride concentration occurred during a critical WY (2014), which has historically occurred in 13.8 percent of the years between 1906 and 2014. For the 2012WY, which is classified as a below normal year (historically occurred about 20 percent of the years between 1906 and 2014), the maximum monthly change in chloride concentration was 3.1 mg/L which is 1.2 percent of the allowable chloride concentration (Table 5-6, Attachment 1, Appendix B). During the wet WY (2011), which has historically occurred in 33 percent of the years between 1906 and 2014, the maximum monthly-average change in chloride concentration was less than 0.5 percent of the allowable chloride concentration (**Table 5-7, Appendix B - Attachment 1**).

Compliance with the D-1641 criteria regarding minimum number of days of chloride less than 150 mg/L was assessed at the CCWD Rock Slough pump stations (CHCCC06) and the Antioch intake (RSAN007) in

**Figures 5.2-7, 5.3-7, and 5.4-7 of Appendix B – Attachment 1.** To meet the Critical, Below Normal, and Wet water year water quality objectives, the number of days with daily concentration of Cl<sup>-</sup> is less than 150 mg/l should exceed 155 days, 175 days, and 240 days respectively at either CHCCC06 or RSAN007. For the critical year, the number of days below 150 mg/L meets the 155 day minimum at CHCCC06 for both the Recommended Plan and No Action Alternative though the Recommended Plan has 8 fewer days below 150 mg/L. The critical year results at RSAN007 do not meet the criteria for either the Recommended Plan or No Action Alternatives though there is no change in the number of days below 150 mg/L. Because this standard stipulates that daily mean chloride concentration must be less than 150 mg/l for at least 155 days during a critical water year at either at Contra Costa Canal at Pumping Plant #1 or at the Antioch Water Works intake, this standard is met for the Year 0 Recommended Plan scenario. For the below normal year, the number of days below 150 mg/L meets the 175 day minimum at CHCCC06 for both the Recommended Plan and No Action Alternative with no change in number of days meeting criteria. The below normal year results at RSAN007 do not meet the criteria for either the Recommended Plan or No Action Alternatives and the Recommended Plan has 4 fewer days with Cl below 150 mg/L. Because one of the two stations is in compliance, this standard is met for the below normal Year 0 Recommended Plan scenario. For the wet year, the number of days below 150 mg/L meets the 240 day minimum at both CHCCC06 and RSAN007 for both the Recommended Plan and No Action Alternative with no change in number of days meeting criteria. Because both of the stations are in compliance, this standard is met for the wet Year 0 Recommended Plan scenario.

Compliance with the D-1641 conductivity criteria at Emmaton were assessed in **Figures 5.2-8, 5.3-8, 5.4-8, of Appendix B - Attachment 1.** The Emmaton conductivity water quality objectives for agricultural beneficial reuse apply from April 1 through August 15. **Figure 5.2-8** shows the predicted 14-day running average electrical conductivity on the Sacramento River at Emmaton for the Critical Year No Action Alternative and the Critical Year Recommended Plan scenario. The bar chart shows both the Recommended Plan and No Action Alternative result in exceedance of the conductivity criteria. The Recommended Plan results in two additional days of potential exceedance relative to the No Action Alternative during the critical year (2014) which extends the predicted period of non-compliance from 64 to 66 days. It should be noted that in 2014 the State Water Resources Control Board (SWRCB) issued an Order that Approved a Temporary Urgency Change in License and Permit Terms that allowed exceedance of this criteria without violation. **Figure 5.3-8** shows the predicted 14-day running average electrical conductivity on the Sacramento River at Emmaton for the Below Normal Year No Action Alternative and the Below Normal Year Recommended Plan scenario. There is no assurance that the SWRCB would approve a Temporary Urgency Change for conductivity at Emmaton in the future. However, the impact of the Recommended Plan on Emmaton water quality compliance is still considered to be not significant given that the extended period of potential non-compliance only occurs during critical years which are infrequent (about 20 percent of time) and that the period of non-compliance only increases in duration by approximately three percent relative to existing conditions (2 days added to 64 days). **Figure 5.4-8** shows the predicted 14-day running average electrical conductivity on the Sacramento River at Emmaton for the Wet Year No Action Alternative and the Wet Year Recommended Plan scenario. There were no conductivity exceedances for the Recommended Plan or the No Action Alternative for the Wet year.

Compliance with the D-1641 conductivity criteria at Jersey Point were assessed in **Figures 5.2-9, 5.3-9, 5.4-9, of Appendix B - Attachment 1.** These figures show that there were no conductivity exceedances for the Recommended Plan or the No Action Alternative under any of the tested water supply scenarios (Critical, Below Normal, Wet).

The change in bromide concentration was evaluated using the predicted Chloride concentrations for the Recommended Plan (Tables 5-2, 5-5, and 5-8, Appendix B - Attachment 1) and a regression equation to predict bromide concentration using chloride (Denton, 2015). For the critical year, the expected percent change in bromide concentration is similar to that predicted for chloride. For the Rock Slough intake, a maximum monthly increase of 0.013 mg/L and average annual increase of 0.008 mg/L. At the Old River intake, the bromide increase for the critical year would be a maximum monthly increase of 0.006 mg/L and average annual increase of 0.003 mg/L. For the below normal year, the expected change in bromide concentration is similar for the Rock Slough intake is a maximum monthly increase of 0.011 mg/L and average annual increase of 0.004 mg/L. At the Old River intake, the bromide increase for the below normal year would be a maximum monthly increase of 0.009 mg/L and average annual increase of 0.003 mg/L. For The wet year, bromide at Rock Slough Intake increased by a maximum of 0.004 mg/L and 0.002 mg/L at Old River intakes though the average annual increased bromide at these stations was 0.0 at both stations. For the three simulation years, all of the projected monthly bromide increases at all five stations (Clifton Court, Tracy, Rock Slough, Old River, and Middle River) were lower than the 5 percent change significance threshold and are similar in magnitude to the Minimum Detection Limit for bromide using the standard EPA 300.1 laboratory method.

Since these predicted maximum monthly average changes in chloride concentration (occurring during wet, below normal, and critical WYs) are significantly less than either 5 percent or 5 mg/L, and less than 5 percent for bromide, and there is no significant change in D-1641 compliance conditions at any of the relevant stations (CCWD, SWP, and CWP), the long-term impact to water quality at the Delta intake and export locations would be less than significant as a result of the Recommended Plan Alternative as compared to the NEPA baseline.

***EVALUATION OF IMPACT OF WQ-06: SUBSTANTIALLY IMPAIR WATER EXPORTS AND OPERATIONS DUE TO SHIFTS IN X2***

The following discussion focuses on the effects of the alternatives on a shift in the position of X2 (see discussion above) as it relates to an impact on water quality that would require a significant change in water exports or operations. The effect of a shift of X2 on biological resources and sensitive species is evaluated separately in the Biological Resources section.

Changes to channel dimensions can affect salinity intrusion, which can result in impacts to water quality. Gravitational circulation is a primary mechanism that results in saltwater intrusion into the Delta. Freshwater is less dense than seawater and as a result, freshwater flows on top of salty water resulting in salinity stratification. This stratification and the resulting exchange of flows causes a mixing action that enhances salt intrusion. Because the strength of gravitational circulation, which is one of the primary mechanisms responsible for salinity intrusion, generally increases with water depth, incremental deepening of the channels from the existing -35 feet MLLW to -37 or -38 feet MLLW could potentially lead to increased salinity intrusion, resulting in an increase in X2 (i.e., a retreat farther upstream in the estuary of the location at which the daily-averaged 2 psu isohaline occurs near the bed (see **Section 2.2.3 and Appendix B, Water Resources - Attachment 1**).

Since water management operations are regulated during specific conditions in the spring and fall of some WYs, an increase in X2 may impact water operations if the changes in X2 were sufficient to affect exports or require changes to water operations to meet the X2 requirements mandated by either D-1641 or the

Biological Opinion (BO) for delta smelt. The 2010/2017 Los Vaqueros Expansion EIS/EIR used a significance threshold for X2 location of a change of more than 1.0 km (CCWD 2010, 2017). The 2015 Long-Term Water Transfers EIS/EIR used a 10 percent change in the location of X2 as its significance threshold; however, this project was projected to improve X2 positioning so its adverse impacts to Delta Smelt habitat would likely be minimal. For this project, the significance threshold for a change in X2 is identical to the one used by the CCWD and USBR for the Los Vaqueros Expansion project. A significance threshold for change in X2 of greater than 1 km, is reasonable in light of the accuracy of measuring X2 using surface salinity data and the inherent uncertainty in the estimate of net Delta Outflow which is a component of the operations decision tree used for the export pump stations and the upstream control structures.

Since the exact weather, hydrology, and operation conditions for the base year when the proposed project is constructed cannot be accurately predicted, the effects on X2 during both a wet WY, a below normal WY, and a critical WY are representative of the range of possible Year 0 conditions. To understand how the project will impact future conditions, Year 50 conditions are assessed for the Recommended Plan. The evaluation of effects on X2 during a recent 10 year period (2008-2017) as well as for the period of record (1906-2017) have also been evaluated for the Recommended Plan using a X2 regression equation that was validated using results from the UnTrim Bay Delta model. The evaluation of the changes in acreage of the Low Salinity Zone (LSZ) was prepared primarily for the biological impact assessment; however, it can be applied to the WQ-6 analysis to reinforce the low significance of changes in X2 (i.e., the location at which the daily-averaged 2 psu isohaline occurs near the bed) that result from the project. Each of these analyses are detailed in **Chapters 6, 7, and 8 of the Hydrodynamic and Salinity Intrusion Modeling Report (Appendix B - Attachment 1)**.

#### NO ACTION ALTERNATIVE

The No Action Alternative would continue ongoing use of the channel and maintenance dredging and placement of dredged material in approved open water placement areas, including continued use of the deep draft channels. The No Action Alternative would have no influence on any impairments of water exports and operations that may occur in the study area since this is the baseline condition for comparison. Such impairments, if they occur, would continue to be caused by larger exterior forces such as prolonged natural drought events similar to those that have occurred during critical WYs (see **Appendix B, Water Resources - Attachment 1**). Therefore, there would be no negative impact to water exports or operations due to a shift in X2 resulting from the No Action Alternative.

A discussion of the maintenance dredging effects on the position of X2 is warranted here because of differences between modeling assumptions and actual conditions. Maintenance of the existing 35 foot channel has limited influence on the position of X2. Maintenance of the navigation channel, particularly in the Bulls head reach of Suisun Bay is done on an annual basis in the fall to restore the authorized depth plus some advanced maintenance incremental depth. The position of X2 is influenced by the changing status of the channel bathymetry. While the actual bathymetry of the channel is constantly changing in portions that are subject to high rates of shoaling and annual fall dredging events, the hydrodynamic model uses a single bathymetric dataset that represents the maximum allowable depth for each alternative since it includes the authorized channel depth and two full feet of overdepth. Just after a maintenance dredging event, the authorized channel depth with overdepth provides the least resistance to upstream transport of saline bay water. Just before a maintenance event, resistance to upstream transport of saline water is at its greatest, since shoaling has reduced the overall depth of the channel. The position of X2 is influenced by the changing status of the channel bathymetry. For this alternative, the No Action Alternative model bathymetry assumed an authorized depth of -35 ft channel plus 2 ft of over-depth for all of the channel. Since 2009, USACE has been dredging a 2,600 ft section of Bulls head reach to a depth of approximately

-38 ft MLLW. In general, if the channel is shoaling over the winter, spring, and summer, the X2 position estimates provided by the model output for the No Action Alternative are likely somewhat higher than would be experienced in reality given a slightly shallower depth during the critical summer and early fall X2 periods. Additionally, since the actual dredging practice is to dredge Bulls Head Reach to -38 ft MLLW instead of the model assumption of -37 ft MLLW including overdepth, comparisons of change relative to the No Action Alternative are somewhat conservative since the depths in the Bulls Head Reach in the No Action Alternative are greater than -37 ft following advanced maintenance dredging.

#### FUTURE WITH -37 FOOT ALTERNATIVE

The three-dimensional hydrodynamic model was also used to conduct a detailed evaluation of the effect of the -37 Foot MLLW Alternative on X2 under both wet and critically dry conditions. Based on this analysis, the average annual predicted shift in X2 for the -37 Foot MLLW Alternative was 0.03 km downstream during a critical WY and 0.08 km downstream during a wet WY (See Tables 4-1 and 4-5, Figures 4.1-1 and 4.2-1). When only the portions of the year when X2 was greater than 64 km were considered (since there are no regulatory requirements that govern the position of X2 when X2 is west of Port Chicago and less than 64 km), the average predicted shift in X2 for the -37 Foot MLLW Alternative was 0.03 km during a critical WY and 0.05 km during a wet WY.

Since these predicted shifts in X2 are much smaller than the accuracy to which X2 can be measured operationally, it is not expected that deepening the existing channel an additional 2 feet (plus overdepth) would result in a significant shift in the timing or magnitude of water exports in order to maintain water quality conditions equivalent to those under baseline conditions. Based on this evaluation of the change in X2, the impact of the -37 foot MLLW Alternative on water exports or operations would be less than significant as compared to the NEPA baseline.

#### FUTURE WITH -38 FOOT ALTERNATIVE

The three-dimensional hydrodynamic model was also used to conduct a detailed evaluation of the effect of the -38 foot MLLW Alternative under both wet and critically dry conditions (See Tables 4-1 and 4-5, and Figures 4.1-7 and 4.2-7 in Appendix B – Attachment 1). Based on this analysis, the average annual predicted shift in X2 for the -38 foot MLLW Alternative was 0.11 km during a critical WY and 0.20 km during a wet WY. When only the portions of the year when X2 was greater than 64 km were considered (since there are no regulatory requirements that govern the position of X2 when X2 is west of Port Chicago and less than 64 km), the average predicted shift in X2 for the -38 foot MLLW Alternative was 0.11 km during a critical WY and 0.15 km during a wet WY.

Since these predicted shifts in X2 are on the same order of magnitude as the accuracy to which X2 can be measured operationally, it is not expected that deepening the existing channel three additional feet (plus overdepth) would result in a significant shift in the timing or magnitude of exports in order to maintain water quality conditions equivalent to those under the No Action Alternative. Based on this evaluation of the change in X2, the impact of the 38 foot MLLW Alternative on water exports or operations would be less than significant as compared to the NEPA baseline.

#### FUTURE WITH -38 FOOT ALTERNATIVE + SEDIMENT TRAP AND ROCKY OBSTRUCTION

The three-dimensional hydrodynamic model was also used to conduct a detailed evaluation of the effect of the 38 Foot MLLW Alternative plus the sediment trap and rocky obstruction under critically dry, below

normal, and wet conditions for Year 0 and the critically dry condition for Year 50. Based on this analysis, the average annual predicted shift in X2 for the Recommended Plan Alternative was 0.17 km during a critical WY, 0.21 km during a below normal WY, and 0.27 km during a wet WY (Year 0 conditions). When only the portions of the year when X2 was greater than 64 km were considered (since there are no regulatory requirements that govern the position of X2 when X2 is west of Port Chicago and less than 64 km), the average predicted shift in X2 for the Recommended Plan Alternative was 0.17 km during a critical WY, 0.21 km during a below normal WY, and 0.23 km during a wet WY (Year 0 conditions). For Year 50 conditions, the average predicted shift in X2 for the Recommended Plan Alternative was 0.17 km for all the year and for that portion of the year with X2 > 64 km; the difference between the Year 0 and Year 50 dry year model runs show the relative position of X2 moves down 4 km in the upstream area if there are no changes made to upstream releases and downstream pumping to account for climate and sea level change.

As discussed in the X2 assessment for the No Action Alternative, the predictions of change for the Recommended Plan are expected to be somewhat conservative because the No Action Alternative model bathymetry assumption of -37 ft MLLW depth (-35 feet + 2 foot of overdepth) for the 2,600 ft. Bullshead segment was used rather than the actual -38 ft MLLW depth the channel has been deepened to as part of the advanced maintenance dredging episodes in this segment since 2009 (similarly the X2 change predictions for the -37 ft and -38 ft alternatives are also likely somewhat conservative.)

In addition to the three simulated years, X2 was predicted for the 10 year period from 2008 to 2017 using a calibrated and validated X2 empirical function as detailed in Chapter 8 of the Hydrodynamic and Salinity Intrusion Model (**Appendix B - Attachment 1**). The results shown in Table 8-1 of the Salinity Model Report show that the annual average change in X2 for the Recommended Plan for these 10 years ranges from 0.18 to 0.22 km. This is an indication that the Recommended Plan change to X2 varies little (roughly 0.2 km) regardless of hydrologic loading. That the empirical equation predictions compare very favorably to the three years of UnTRIM simulation results provides the authors additional confidence in the overall analysis.

**Chapter 7 of the Hydrodynamic and Salinity Intrusion Modeling Report** includes an assessment of the change in the Low Salinity Zone (LSZ) of Suisun Bay. This analysis shows that the predicted change in X2 location due to the Recommended Plan for all three simulated years' results in average monthly changes that range from an additional 446 acres to a loss of 597 acres. The average monthly change in acreage across all 36 simulated months was a reduction of 45 acres out of a monthly average of 20,375 acres. If only months with losses are averaged, the loss in acreage due to the Recommended Plan is less than 1.1 percent of the average monthly acreage. These insignificant changes in LSZ acreage due to the Recommended Plan are another indication that the change in X2 position from the Recommended Plan is not significant.

Since these predicted shifts in X2 are on the same order of magnitude as the accuracy to which X2 can be measured operationally and the change in LSZ acreage is not significant as discussed in **Chapter 7 of the Hydrodynamic and Salinity Intrusion Modeling Report (Appendix B - Attachment 1)**, it is not expected that deepening the existing channel by three feet will result in a significant shift in the timing or magnitude of exports in order to maintain water quality conditions equivalent to those under the No Action Alternative. Based on this evaluation of the change in X2, the impact of the Recommended Plan Alternative on water exports or operations would be less than significant as compared to the NEPA baseline.

#### 4.1.4 AIR QUALITY

Using the assumptions and models discussed in **Sections 2.2.4**, air pollutant emissions from the proposed construction and operational activities were calculated using the most current emission factors and methods, then compared to the criteria identified in **Section 2.2.4** to determine their significance. For impacts that exceeded a significance criterion, measures were evaluated for their ability to mitigate the impacts to insignificance. No sensitive land uses are located in the study area—it primarily contains the existing ship channel and placement sites. No sensitive land uses are located within 1,000 feet of the proposed dredging footprints or within 1,000 feet of the docking locations for ships.

An alternative would be considered to have a significant impact on air quality if it would cause the following:

Impact AQ-01: Violate any air quality standard, or contribute substantially to an existing or projected air quality violation

Impact AQ-02: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable Federal or state ambient air quality standard, including releasing emissions that exceed quantitative thresholds for ozone precursors

Impact AQ-03: Expose sensitive receptors to substantial pollutant concentrations

Impact AQ-04: Create objectionable odors affecting a substantial number of people

Impact AQ-05: Conflict with, or obstruct implementation of the applicable air quality plan

##### 4.1.4.1 THRESHOLDS

The purpose of the general conformity program is to ensure that actions taken by the Federal government do not undermine state or local efforts to achieve and maintain NAAQS. Before a Federal action is taken, it must be evaluated for conformity with the State Implementation Plan (SIP). All reasonably foreseeable emissions, both direct and indirect, predicted to result from the action are taken into consideration and must be identified with respect to location and quantity. Direct emissions occur at the same time and place as the action. Indirect emissions are reasonably foreseeable emissions that may occur later in time and/or farther removed from the action. The emissions are subject to conformity if the Federal agency can practicably control them and maintain control through a continuing program responsibility. If it is found that the action would create emissions above de minimis threshold levels specified in USEPA regulations, the action cannot proceed unless mitigation measures are specified that would bring the project into conformance.

General conformity applies in both Federal non-attainment and maintenance areas. In these areas, it applies to any Federal action not specifically exempted by the CAA or USEPA regulations. General conformity does not apply to projects or actions that are covered by the transportation conformity rule. If a Federal action falls under the general conformity rule, the Federal agency responsible for the action is responsible for making the conformity determination. In some instances, a state will make the conformity determination under delegation from a Federal agency.

The significance criteria used to evaluate NEPA air quality effects are based on the Federal general conformity thresholds. Currently, the SFAAB is classified as moderate nonattainment for the Federal 8-hour ozone standard, nonattainment for the 24-hour PM<sub>2.5</sub> standard, and maintenance for the Federal CO standards. Because sulfur dioxide is considered a precursor to PM<sub>2.5</sub>, the conformity threshold for SO<sub>2</sub> also applies. The portion of the SVAB under jurisdiction of YSAQMD is currently classified as severe non-attainment for the Federal 8-hour ozone standard, non-attainment for the 24-hour PM<sub>2.5</sub> standard, and maintenance for the Federal CO standards. **Table 4-3** shows the applicable general conformity thresholds that apply to the Recommended Plan in both air basins.

**Table 4-3. General Conformity de minimis Thresholds for Projects in the SFBAAB and SVAB.**

Pollutant	SFBAAB Threshold (tpy)	SVAB Threshold (tpy)
CO	100	100
NO <sub>x</sub>	100	25
ROG	50	25
PM <sub>2.5</sub>	100	100
PM <sub>10</sub>	--	100
SO <sub>2</sub>	100	100

Source: USEPA 2016

### NO ACTION ALTERNATIVE

**AQ-01: Would the alternative conflict with or Obstruct Implementation of the Applicable Air Quality Plan?** The No Action Alternative would continue maintenance dredging of the 35 foot deep navigation channel and existing shipping patterns. This alternative does not include construction, does not increase ship calls as compared to the 50-year NEPA baseline, and would not incrementally increase emissions within the study area. Therefore, the No Action Alternative would not violate any air quality standard or contribute to any violations.

**Impact AQ-02: Would the alterantive result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard?** The No Action Alternative would continue maintenance dredging of the 35 foot deep navigation channel and existing shipping patterns. This alternative does not include construction, does not increase ship calls as compared to the 50-year NEPA baseline, and would not incrementally increase emissions within the study area. Therefore, the No Action Alternative would not result in a net increase of any criteria pollutant for which the project region is in a nonattainment status or release emissions that exceed ozone precursor emissions.

**Impact AQ-03: Would the alternative expose sensitive receptors to substantial pollutant concentrations?** The No Action Alternative does not include construction and does not increase ship calls as compared to the NEPA baseline. There would be no incremental emissions because of the No Action Alternative. Therefore, the No Action Alternative would not expose sensitive receptors to substantial pollutant concentrations under NEPA.

**Impact AQ-04: Would the alternative result in other emissions (such as those leading odors) adversely affecting a substantial number of people?** The No Action Alternative would continue maintenance dredging of the 35 foot deep navigation channel and existing shipping patterns. This alternative does not include construction, does not increase ship calls as compared to the 50-year NEPA baseline, and would not incrementally increase emissions within the study area. Therefore, the No Action Alternative would create no objectionable odors affecting a substantial number of people under NEPA.

**Impact AQ-05: Would the Alternative Conflict With, Or Obstruct Implementation of The Applicable Air Quality Plan?** The No Action Alternative would continue maintenance dredging of the 35 foot deep navigation channel and existing shipping patterns. This alternative does not include construction, does not increase ship calls as compared to the 50-year NEPA baseline, and would not incrementally increase emissions within the study area. Therefore, the No Action Alternative would not conflict with any applicable

plans, policies, or regulations adopted to reduce emissions and there would be no impact as compared to the NEPA baseline.

### FUTURE WITH -37 FOOT ALTERNATIVE

**AQ-01: Would the alternative conflict with or Obstruct Implementation of the Applicable Air Quality Plan** Table 4-4 shows the annual construction emissions for the -37 Foot MLLW Alternative. The data show that construction emissions would not exceed the applicable general conformity thresholds for any of the applicable criteria pollutants in either the SFBAAB or SVAB, where construction activities would take place for the -37 foot MLLW Alternative.

**Table 4-4. Annual Construction Emissions for the -37 Foot MLLW Alternative as Compared to the De Minimis Thresholds.**

Operational Activities	Air Pollutant					
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>
<b>Within SFBAAB</b>						
Dredging (tpy)	1.6	24.7	10.3	24.7	24.7	0.1
Worker Transport (tpy)	0	0.2	0.4	0	0	0
Sediment Transport (tpy)	2.4	19.6	32.6	0.5	0.5	0
Total Emissions (tpy)	<b>3.9</b>	<b>44.4</b>	<b>43.2</b>	<b>25.2</b>	<b>25.2</b>	<b>0.1</b>
SFBAAB de minimis Threshold (tpy)	50	100	100	--	100	100
Exceed?	No	No	No	No	No	No
<b>Within SVAB</b>						
Sediment Transport (tpy)	0.2	1.5	2.5	0.04	0.04	0.001
SVAB de minimis Threshold (tpy)	25	25	100	100	100	100
Exceed?	No	No	No	No	No	No

**Table 4-5** shows the annual operational emissions for the -37 Foot MLLW Alternative as compared to the No Action Alternative (NEPA baseline). As shown, for the years 2023, 2030, or 2040, as compared to the NEPA baseline, emissions would decrease under the -37 Foot MLLW Alternative. Therefore, emissions would not exceed the applicable general conformity thresholds for any of the applicable criteria pollutants in the SFBAAB. This comparison uses SFBAAB thresholds because: 1) most of the impacts would occur in this air basin; and 2) the SFBAAB has more stringent thresholds than the SVAB.

Because emissions would not exceed applicable NEPA thresholds, the -37 Foot MLLW Alternative would result in less-than-significant impacts.

**Table 4-5. Annual Operational Emissions under the -37 Foot MLLW Alternative Compared to the No Action Alternative (NEPA).**

Operational Activities	Air Pollutant			
	ROG	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>2023</b>				
Vessels (tpy)	-0.33	-7.92	-0.19	-0.18
Tugs (tpy)	-0.18	-0.89	-0.03	-0.03
Total Emissions (tpy)	-0.51	-8.81	-0.23	-0.21
BAAQMD Thresholds (tpy)	50	100	100	100
Exceed?	No	No	No	No
<b>2030</b>				
Vessels (tpy)	-0.3	-7.2	-0.18	-0.16
Tugs (tpy)	-0.13	-0.81	-0.03	-0.03
Total Emissions (tpy)	-0.43	-8.01	-0.21	-0.19
BAAQMD Thresholds (tpy)	50	100	100	100
Exceed?	No	No	No	No
<b>2040</b>				
Vessels (tpy)	-0.3	-7.2	-0.18	-0.16
Tugs (tpy)	-0.13	-1.14	-0.03	-0.03
Total Emissions (tpy)	-0.43	-8.34	-0.21	-0.19
BAAQMD Thresholds (tpy)	50	100	100	100
Exceed?	No	No	No	No

**Impact AQ-02: Would the alternative result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard?** As shown in **Table 4-4** and **Table 4-5**, construction and operations under the -37 Foot MLLW Alternative would not result in substantial emission increases. Consequently, the -37 Foot MLLW Alternative would not cause or contribute significant increases in air quality criteria pollutants as compared to the NEPA baseline.

**Impact AQ-03: Would the alternative expose sensitive receptors to substantial pollutant concentrations?** Construction activities would produce Diesel Particulate Matter (DPM) and PM<sub>2.5</sub> emissions from a variety of equipment, including dredging, boat operation, and pumps. These emissions could result in elevated concentrations of DPM and PM<sub>2.5</sub> at sensitive receptors. A health risk assessment was not conducted because the distance between the emission sources and sensitive receptors exceeds the 1,000 feet screening threshold established by the BAAQMD (BAAQMD 2012).

Construction activities would produce DPM and PM<sub>2.5</sub> emissions due to diesel combustion equipment such as dredging equipment, marine vessels, and sediment unloading equipment. These emissions could result in elevated concentrations of DPM and PM<sub>2.5</sub>.

BAAQMD uses the 1,000-foot screening threshold to determine whether a project's emissions of TACs during construction and operation merit a health risk assessment. YSAQMD does not require a health risk

assessment for projects that consist primarily of mobile source emissions. Construction emissions generated by the -37 foot MLLW Alternative would occur in water-based locations located substantially farther than 1,000 feet from sensitive receptors. Consequently, a quantitative health risk assessment was not performed for this alternative. The -37 foot MLLW Alternative would not expose sensitive receptors to substantial quantities of TACs or PM<sub>2.5</sub>, and impacts would be less than significant as compared to the NEPA baselines.

**Impact AQ-04: Would the alternative result in other emissions (such as those leading odors) adversely affecting a substantial number of people?** The -37 foot MLLW Alternative would include construction and a decrease in ship calls as compared to the No Action Alternative (NEPA baseline). Both activities would generate odors from diesel fuel combustion. However, construction dredging would occur in the ship channel, which is located at substantial distances from sensitive receptors. The placement sites are also located at considerable distances from sensitive receptors. Operationally, fewer ships would travel in the ship channel than under the No Action Alternative, and these ships would dock at industrial locations, distant from sensitive receptors. Therefore, there would be no incremental odor impacts as a result of the -37 foot MLLW Alternative.

**Impact AQ-05: Would the Alternative Conflict With, Or Obstruct Implementation of The Applicable Air Quality Plan?** The -37 foot MLLW Alternative includes construction and changes in operational emissions associated with ship calls. USEPA has established general conformity requirements that establish de minimis emission thresholds. Projects that exceed de minimis thresholds are required to prepare an in-depth conformity analysis that demonstrates that the project would not worsen existing violations or contribute to new violations of the NAAQS. As shown in **Table 4-4** and **Table 4-5**. The -37 foot MLLW Alternative does not exceed any de-minimis thresholds.

SIPs are the primary planning tool for areas that are nonattainment for one or more of the NAAQS. SIPs are also required for areas that were previously nonattainment but that have been reclassified as attainment-maintenance. The -37 foot MLLW Alternative would not conflict with BAAQMD's existing SIPs because marine transportation is typically not covered by SIPs and the alternative would not result in emissions that exceed the Federal conformity thresholds. Consequently, there would be no impact to existing federally required air quality plans.

#### [FUTURE WITH 38 FOOT AND 38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES](#)

**AQ-01: Would the alternative conflict with or Obstruct Implementation of the Applicable Air Quality Plan** The applicable Federal air quality plan is the general conformity program, which is to ensure that actions taken by the Federal government do not undermine state or local efforts to achieve and maintain NAAQS. Before a Federal action is taken, it must be evaluated for conformity with the SIP. Table 4-6 shows the annual construction emissions for the Recommended Plan. As shown, construction emissions would not exceed the applicable general conformity thresholds for any of the applicable criteria pollutants in the SFBAAB or SVAB under the Recommended Plan.

**Table 4-6. Annual Construction Emissions for the Recommended Plan as Compared to Conformity Thresholds.**

Construction Activities	Air Pollutant					
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>
<b>Year 2023 Within BAAQMD</b>						
Dredging (tpy)	0.89	6.29	14.37	0.35	0.34	0.04
Worker Transport (tpy)	0.06	0.35	0.29	0.01	0.01	0.00
Sediment Transport (tpy)	1.46	29.43	9.64	0.21	0.2	0.05
Total Emissions (tpy)	<b>2.41</b>	<b>36.07</b>	<b>24.3</b>	<b>0.57</b>	<b>0.54</b>	<b>0.09</b>
SFBAAB de minimis Threshold (tpy)	50	100	100	--	100	100
Exceed?	No	No	No	No	No	No
<b>Year 2023 Within YSAQMD</b>						
Dredging (tpy)	0.0	0.0	0.0	0.0	0.0	0.0
Worker Transport (tpy)	0.0	0.0	0.0	0.0	0.0	0.0
Sediment Transport (tpy)	0.0	0.3	0.1	0.0	0.0	0.0
Total Emissions (tpy)	<b>0.0</b>	<b>0.3</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
SVAB de minimis Threshold (tpy)	25	25	100	--	100	100
Exceed?	No	No	No	No	No	No

**Table 4-7** shows the No Action Alternative (NEPA Baseline) and Recommended Plan emissions and **Table 4-8** shows the annual operational emissions for the Recommended Plan as compared to the No Action Alternative (NEPA baseline). As shown, for the years 2023, 2030, or 2040, emissions would not exceed the applicable thresholds for any of the applicable criteria pollutants in the SFBAAB. This comparison uses BAAQMD thresholds because: 1) most of the impacts would occur in the SFBAAB; and 2) BAAQMD has more stringent thresholds than YSAQMD.

**Table 4-7. Annual Operational Emissions for the No Action Alternative (NEPA Baseline) and RECOMMENDED PLAN.**

Operational Activities	Air Pollutant			
	ROG	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>No Action Alternative</b>				
<b>2023</b>				
Vessels (tpy)	3.85	91.42	2.24	2.07
Tugs (tpy)	1.63	7.99	0.39	0.27
Total Emissions (tpy)	5.48	99.41	2.63	2.34
<b>2030</b>				
Vessels (tpy)	4.58	108.69	2.67	2.46
Tugs (tpy)	1.94	11.46	0.47	0.4
Total Emissions (tpy)	6.52	120.15	3.14	2.86
<b>2040</b>				
Vessels (tpy)	5.43	128.85	3.16	2.91
Tugs (tpy)	2.3	14.55	0.55	0.5
Total Emissions (tpy)	7.73	143.4	3.71	3.41
<b>Recommended Plan</b>				
<b>2023</b>				
Vessels (tpy)	3.43	81.34	0.88	0.82
Tugs (tpy)	1.45	6.85	0.35	0.23
Total Emissions (tpy)	4.87	88.19	1.23	1.05
<b>2030</b>				
Vessels (tpy)	4.12	49.53	2.4	2.22
Tugs (tpy)	1.75	10.24	0.42	0.35
Total Emissions (tpy)	5.87	59.77	2.83	2.57
<b>2040</b>				
Vessels (tpy)	5.01	118.77	2.91	2.68
Tugs (tpy)	2.12	13.41	0.51	0.46
Total Emissions (tpy)	7.12	132.18	3.42	3.14

**Table 4-8. Annual Operational Emissions for the Recommended Plan Compared to the No Action Alternative (NEPA Baseline).**

Operational Activities	Air Pollutant			
	ROG	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>2023</b>				
Vessels (tpy)	-0.42	-10.08	-1.36	-1.25
Tugs (tpy)	-0.18	-1.14	-0.04	-0.04
Total Emissions (tpy)	<b>-0.61</b>	<b>-11.22</b>	<b>-1.4</b>	<b>-1.29</b>
BAAQMD Thresholds (tpy)	50	100	100	100
Exceed?	No	No	No	No
<b>2030</b>				
Vessels (tpy)	-0.46	-59.16	-0.27	-0.24
Tugs (tpy)	-0.19	-1.22	-0.05	-0.05
Total Emissions (tpy)	<b>-0.65</b>	<b>-60.38</b>	<b>-0.31</b>	<b>-0.29</b>
BAAQMD Thresholds (tpy)	50	100	100	100
Exceed?	No	No	No	No
<b>2040</b>				
Vessels (tpy)	-0.42	-10.08	-0.25	-0.23
Tugs (tpy)	-0.18	-1.14	-0.04	-0.04
Total Emissions (tpy)	<b>-0.61</b>	<b>-11.22</b>	<b>-0.29</b>	<b>-0.27</b>
BAAQMD Thresholds (tpy)	50	100	100	100
Exceed?	No	No	No	No

Because emissions would not exceed applicable thresholds, the Recommended Plan would result in less-than-significant impacts.

**Impact AQ-02: Would the alternative result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable Federal or state ambient air quality standard?** Construction and operations under the Recommended Plan would not result in substantial emission increases. Consequently, the Recommended Plan would not cause or contribute to significant increases in air quality criteria pollutants as compared to the NEPA baseline.

**Impact AQ-03: Would the alternative expose sensitive receptors to substantial pollutant concentrations?** The Recommended Plan would include construction and a decrease in ship calls as compared to the No Action Alternative (NEPA baseline). However, emissions associated with construction are not expected to expose sensitive receptors to substantial pollutant concentrations because emissions would occur in the existing ship channel, more than 1,000 feet from sensitive receptors. This impact is considered less than significant.

**Impact AQ-04: Would the alternative result in other emissions (such as those leading odors) adversely affecting a substantial number of people?** The Recommended Plan would include construction and a decrease in ship calls as compared to the No Action Alternative (NEPA baseline). Both activities would generate odors from diesel fuel combustion. However, construction dredging would occur in the ship channel, which is located at substantial distances from sensitive receptors. Similarly, the placement sites

are also located at considerable distances from sensitive receptors. Operationally, fewer ships would travel in the ship channel than under the No Action Alternative, and these ships would dock at industrial locations, distant from sensitive receptors. Therefore, there would be no incremental odor impacts as a result of the Recommended Plan.

**Impact AQ-05: Would the Alternative Conflict With, Or Obstruct Implementation of The Applicable Air Quality Plan? The Recommended Plan includes construction and changes in operational emissions associated with ship calls. USEPA has established general conformity requirements that establish de minimis emission thresholds. Projects that exceed de minimis thresholds are required to prepare an in-depth conformity analysis that demonstrates that the project would not worsen existing violations or contribute to new violations of the NAAQS. As shown in Table 4-7 and Table 4-8, the Recommended Plan does not exceed any de minimis thresholds.**

State Implementation Plans (SIPs) are the primary planning tool for areas that are nonattainment for one or more of the NAAQS. SIPs are also required for areas that were previously nonattainment but that have been reclassified as attainment-maintenance. The Recommended Plan would not conflict with BAAQMD’s existing SIPs because marine transportation is typically not covered by SIPs and the alternative would not result in emissions that exceed the Federal conformity thresholds. Consequently, there would be no impact to existing federally required air quality plans.

**4.1.5 CLIMATE CHANGE INDUCED BY PROJECT**

The project specific analysis examines the environmental effects from construction associated with deepening the study area channels to either -37 or -38 feet MLLW + the sediment trap and rocky obstruction. The analysis also evaluates changes in shipping operations directly attributable to the alternatives. GHG emissions from the proposed construction and operational activities were calculated using the most current emission factors and methods, and then compared to the applicable criteria to determine their significance. For GHG emission impacts that exceeded a significance criterion, measures were evaluated for their ability to mitigate these impacts to insignificance.

**4.1.5.1 OPERATIONAL ASSUMPTIONS**

**Appendix D, Economic Analysis** projects that the volume of petroleum products (which are the dominant cargo in the project area) will grow at the same rate. The vessel mix, however, is projected to change if deepening is implemented. The predicted increase in petroleum product volumes is expected to be shipped primarily in vessels of the Panamax class. The deeper channel depth would allow those vessels to avoid some of the costly operational strategies currently in use, making them a more efficient option than the larger vessels. Therefore, the climate change analysis focuses on the change of Panamax vessels over time among alternatives as shown in **Table 4-9**, with the year 2023 as the construction start year, similar to the economic analysis.

**Table 4-9. Projected Annual Number of Panamax Ship Calls Over Time.**

Year	Total Panamax Ship Calls/Year		
	NEPA Baseline/No Action Alternative (35-Foot)	-37 foot MLLW Alternative	-38 foot MLLW Alternative
2023	127	116	113
2030	151	141	136
2040	179	169	165

The following assumptions were used to assess GHG emissions from operations:

- Annual ship calls are based on 2014 data, which represented the available full year of ship data in the USACE Waterborne Commerce Statistics Center (USACE 2016) at the time the analysis was conducted.
- The maximum tugboat engine size is assumed to be 3,600 hp for main engines and 235 hp for auxiliary engines, based on the maximum values in CARB's OFFROAD2014 model. A load factor of 50 percent for main engines and 31 percent for tugboats is assumed based on OFFROAD2014.
- Two tugboats would accompany each Panamax vessel (Port of Los Angeles 2008b).
- Marine vessel emissions are based on the CARB's Emission Estimation Methodology for Ocean-Going Vessels (2011). CARB's estimation procedure uses separate calculations for main and auxiliary engines.
- Average vessel characteristics for tankers assumes main engine power of 13,034 kilowatts and auxiliary power of 2,339 kilowatts (CARB 2011). Estimates assume a load factor of 83 percent for main engines and 26 percent for auxiliary engines (CARB 2011). Emission factors for main engines and auxiliary engines are based on medium marine distillate (0.1 percent sulphur) (CARB 2011). Main engines are assumed to operate for 2 hours per ship call and auxiliary engines for 34 hours per ship call.
- Annual ship calls are based on 2014 data, which represents the most recently available full year of ship data in the USACE Waterborne Commerce Statistics Center (USACE 2016).

Maintenance dredging of the channels to their maintained depths would continue to occur annually during the dredging window.

An alternative could have an impact on climate change if it would cause the following:

Impact CC-1: Directly or indirectly exceed applicable Federal or state GHG standards:

- NEPA: GHG emissions are compared to the CEQ reference point of 25,000 metric tons per year of CO<sub>2</sub> equivalent.

Impact CC-2: Conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions and climate change impacts

NO ACTION ALTERNATIVE**Table 4-10. Operational GHG Emissions for the No Action Alternative (Metric Tons per Year).**

Activities/yr.	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub>	CO <sub>2</sub> equivalent
<b>2023</b>				
Vessels	0.07	-	538	540
Tugs	0.002	0.005	187	189
O&M <sup>1</sup>	0.0	0.0	0.0	0.0
Total GHG Emissions	0.07	0.00	726	<b>729</b>
GHG Emissions Threshold				10,000
Exceed Threshold?				<b>No</b>
<b>2030</b>				
Vessels	0.15	-	1,184	1,188
Tugs	0.004	0.01	412	415
O&M <sup>1</sup>	0.0	0.0	0.0	0.0
Total GHG Emissions	0.15	0.01	1,596	<b>1,603</b>
GHG Emissions Threshold				10,000
Exceed Threshold?				<b>No</b>
<b>2040</b>				
Vessels	0.24	-	1,938	1,943
Tugs	0.01	0.02	674	680
O&M <sup>1</sup>	0.0	0.0	0.0	0.0
Total GHG Emissions	0.25	0.02	2,612	<b>2,623</b>
GHG Emissions Threshold				10,000
Exceed Threshold?				<b>No</b>

**Impact CC-1: Directly or indirectly exceed applicable Federal or state GHG standards:** Because the No Action Alternative does not include construction and does not increase ship calls as compared to the NEPA baseline, it would not result in additional GHG emissions. Therefore, the No Action Alternative would not conflict with any applicable plans, policies, or regulations adopted to reduce GHG emissions and there would be no impact as compared to the NEPA baseline.

**Impact CC-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions and climate change impact:** Under the No Action Alternative, there would be no construction-related GHG emissions and ship calls would be the same as compared to the NEPA baseline. This impact is considered less than significant because the level of increased ship activity would not conflict with applicable plans, policies, or regulations designed to reduce GHG emissions and climate change impacts.

FUTURE WITH -37 FOOT ALTERNATIVE

**Impact CC-1: Directly or indirectly exceed applicable Federal or state GHG standards:** The -37 foot MLLW Alternative would generate GHG emissions during construction and operation. Construction emissions would occur in 2021 and would include dredging emissions, worker transport on land and by boat to the dredging operation, and boat transport of dredged sediment to placement sites (**Table 4-11**). CO<sub>2</sub>

equivalent emissions of 11,778 metric tons per year are less than the CEQ reference point of 25,000 metric tons per year.

As compared to the No Action Alternative, the -37 foot MLLW Alternative would have fewer ship calls in 2023, 2030, and 2040 (Table CC-1), reducing GHG emissions from vessels and tugs (**Table 4-12**). Even though operation and maintenance emissions would increase to maintain the deeper ship channel, total GHG emissions would be substantially below the Federal threshold of 25,000 metric tons of CO<sub>2</sub> equivalent per year for all three future years considered in this analysis.

USACE has not adopted a significance threshold and has established the position that there are no science-based GHG significance thresholds. In the absence of an adopted or science-based GHG standard, in compliance with the CEQ and USACE NEPA implementing regulations, a significance determination regarding the -37 foot MLLW Alternative's GHG emissions is not made under NEPA.

**Table 4-11. Construction GHG Emissions for the -37 foot MLLW Alternative (Metric Tons per Year).**

Activities	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub>	CO <sub>2</sub> equivalent
Dredging	0.75	0.24	9,472	9,565
Worker Transport	0.004	0.01	130	133
Sediment Transport	0.12	0.05	2,061	2,080
Total GHG Emissions	0.87	0.3	11,663	<b>11,778</b>
CEQ GHG Reference Point				25,000
Exceed Threshold?				<b>No</b>

**Table 4-12. Operational GHG Emissions for the -37 foot MLLW Alternative Minus the No Action Alternative (Metric Tons per Year).**

Activities/yr.	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub>	CO <sub>2</sub> equivalent
<b>2023</b>				
Vessels	-0.04	-	-296	-297
Tugs	-0.001	-0.003	-103	-104
O&M <sup>1</sup>	0.149	0.054	2,087	2,107
Total GHG Emissions	0.16	0.04	1,696	<b>1,713</b>
GHG Emissions Threshold				25,000
Exceed Threshold?				<b>No</b>
<b>2030</b>				
Vessels	-0.034	-	-269	-270
Tugs	-0.001	-0.002	-94	-94
O&M <sup>1</sup>	0.159	0.058	2,226	2,248
Total GHG Emissions	0.149	0.054	2,087	<b>1,883</b>
GHG Emissions Threshold				25,000
Exceed Threshold?				<b>No</b>
<b>2040</b>				
Vessels	-0.034	-	-269	-270
Tugs	-0.001	-0.002	-94	-94
O&M <sup>1</sup>	0.149	0.054	2,087	2,107
Total GHG Emissions	0.11	0.05	1,724	<b>1,743</b>
GHG Emissions Threshold				25,000
Exceed Threshold?				<b>No</b>

**Table 4-13. Operational GHG Emissions for the -37 foot MLLW Alternative Minus Existing Conditions (Metric Tons per Year).**

Activities/yr.	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub>	CO <sub>2</sub> equivalent
<b>2014 Baseline</b>				
Vessels	0.36	0.00	2,880	2,887
Tugs	0.011	0.026	1,002	1,010
O&M <sup>1</sup>	NA	NA	NA	NA
Total GHG Emissions	0.37	0.03	3,882	<b>3,898</b>
Exceed Threshold?				<b>No</b>
<b>2023</b>				
Vessels	0.03	-	242	243
Tugs	0.001	0.002	84	85
O&M <sup>1</sup>	0.15	0.05	2,087	2,107
Total GHG Emissions	0.18	0.06	2,414	<b>2,435</b>
BAAQMD Emissions Threshold				10,000
Exceed Threshold?				<b>No</b>
<b>2030</b>				
Vessels	0.11	-	915	918
Tugs	0.003	0.008	318	321
O&M <sup>1</sup>	0.15	0.05	2,087	2,107
Total GHG Emissions	0.27	0.06	3,321	<b>3,346</b>
BAAQMD Emissions Threshold				10,000
Exceed Threshold?				<b>No</b>
<b>2040</b>				
Vessels	0.21		1,669	1,673
Tugs	0.01	0.01	581	585
O&M <sup>1</sup>	0.149	0.054	2,087	2,107
Total GHG Emissions	0.36	0.07	4,336	<b>4,366</b>
BAAQMD Emissions Threshold				10,000
Exceed Threshold?				<b>No</b>

**Impact CC-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions and climate change impact:** GHG emissions generated by construction and operation of the -37 foot MLLW Alternative would not exceed the Federal GHG emission level of 25,000 metric tonnes of CO<sub>2</sub> equivalent per year. As a result, the -37 foot MLLW Alternative would not conflict with adopted plans aimed at reducing GHG emissions, and impacts would be considered less than significant.

## FUTURE WITH 38 FOOT AND 38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES

**Impact CC-1: Directly or indirectly exceed applicable Federal or state GHG standards:** The 38 foot MLLW Alternative would generate GHG emissions during construction and operation. The construction emissions would occur in 2021 and 2023 and include dredging emissions, worker transport on land and by boat to the dredging operation, and boat transport of dredged sediment to various placement sites (**Table 4-14. Construction GHG Emissions for the -38 foot MLLW Alternative (Metric Tons per Year)**). Although the 38 foot MLLW Alternative's emissions of 17,841 metric tons of CO<sub>2</sub> equivalent per year would be higher than that associated with construction of the -37 foot MLLW Alternative (see **Table 4-11. Construction GHG Emissions for the -37 foot MLLW Alternative (Metric Tons per Year)**), it would still be less than the Federal threshold of 25,000 metric tons per year.

**Table 4-14. Construction GHG Emissions for the -38 foot MLLW Alternative (Metric Tons per Year).**

Activities	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub>	CO <sub>2</sub> equivalent
Dredging	1.22	0.4	15,365.07	15,517.34
Worker Transport	0.01	0.01	239.01	243.65
Sediment Transport	0.12	0.05	2,061.23	2,080.17
Total GHG Emissions	1.34	0.46	17,665.31	<b>17,841.16</b>
GHG Emissions Threshold				25,000
Exceed Threshold?				<b>No</b>

As compared to the No Action Alternative, the -38 foot MLLW Alternative would have fewer ship calls in 2023, 2030, and 2040, thereby reducing GHG emissions from vessels and tugs (**Table 4-13 and Table 4-14**). Even though operation and maintenance emissions would increase to maintain the deeper ship channel, total GHG emissions would be substantially below the Federal threshold of 25,000 metric tons of CO<sub>2</sub> equivalent per year.

USACE has not adopted a significance threshold and has established the position that there are no science-based GHG significance thresholds. In the absence of an adopted or science-based GHG standard, in compliance with the CEQ and USACE NEPA implementing regulations, a significance determination regarding the -38 foot MLLW Alternative's GHG emissions is not made under NEPA.

**Table 4-15. Operational GHG Emissions for the 38 foot MLLW Alternative Minus Existing Conditions (Metric Tons per Year).**

Activities/yr.	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub>	CO <sub>2</sub> equivalent
<b>2023</b>				
Vessels	0.02	-	161	162
Tugs	0.001	0.001	56	57
O&M <sup>1</sup>	0.159	0.058	2,226	2,248
Total GHG Emissions	0.18	0.06	2,444	<b>2,466</b>
BAAQMD Emissions Threshold				10,000
Exceed Threshold?				<b>No</b>
<b>2030</b>				
Vessels	0.1	-	780	783
Tugs	0.003	0.007	272	274
O&M <sup>1</sup>	0.159	0.058	2,226	2,248
Total GHG Emissions	0.26	0.07	3,278	<b>3,304</b>
BAAQMD Emissions Threshold				10,000
Exceed Threshold?				<b>No</b>
<b>2040</b>				
Vessels	0.2	-	1,561	1,565
Tugs	0.006	0.01	543	548
O&M <sup>1</sup>	0.159	0.058	2,226	2,248
Total GHG Emissions	0.36	0.07	4,330	<b>4,361</b>
BAAQMD Emissions Threshold				10,000
Exceed Threshold?				<b>No</b>

**Impact CC-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions and climate change impact:** GHG emissions generated by construction and operation of this alternative would not exceed the Federal GHG emission level of 25,000 metric tons of CO<sub>2</sub> equivalent per year. As a result, the 38 foot MLLW Alternative would not conflict with adopted plans aimed at reducing GHG emissions.

#### 4.1.6 BIOLOGICAL RESOURCES

Impacts on biological resources, including special status species, critical habitat, EFH, and other sensitive resources, were qualitatively evaluated based on the habitat preferences for various species known or suspected to occur in the study area, as well as the quantity and quality of existing habitat. Potential impacts were analyzed using recent CDFW, California Native Plant Society, NMFS, and USFWS data for special status species and habitats, fish surveys, literature reviews, and professional expertise and judgment in evaluating how the alternatives could interact with and impact aquatic biological resources. The decision in the alternatives to limit dredging within the programmatically established Long-Term Management Strategy (LTMS) environmental work windows constitutes a minimization and possibly avoidance measure with respect to Special Status Species and Essential Fish Habitat.

Under NEPA, an alternative would be considered to have a significant impact on biological resources if it would:

- Impact BR-01: Cause increased turbidity that adversely affects special status species and critical habitat; or
- Impact BR-02: Cause benthic habitat disturbance that adversely affects special status species, critical habitat, or habitat for commercially valuable marine species; or
- Impact BR-03: Cause underwater noise that adversely affects special status fish and marine mammals; or
- Impact BR-04: Adversely affect special status or commercially or recreationally important marine species through entrainment; or
- Impact BR-05: Result in the disturbance of EFH and “Special Aquatic Sites,” including eelgrass beds and mudflats; or
- Impact BR-06: Interfere with the movement of resident or migratory fish or wildlife species; or
- Impact BR-07: Adversely affect special status fish species, including their critical habitat, as a result of X2 shifts.

### NO ACTION ALTERNATIVE

**Impact BR-01: Cause increased turbidity that adversely affects special status species or critical habitat:**

The No Action Alternative would continue ongoing maintenance dredging and use of the channel, and would not result in turbidity changes above baseline conditions. Therefore, special status species or critical habitat would not be affected by turbidity above baseline conditions.

**Impact BR-02: Cause benthic habitat disturbance that adversely affects special status species, critical habitat, or commercially valuable marine species:**

The No Action Alternative would continue ongoing maintenance dredging and use of the channel, and would not result in changes to benthic habitat above baseline conditions. USACE would continue to implement applicable avoidance, minimization, and mitigation measures such as those described in section 1.3.4 of NMFS’s 2015 programmatic biological opinion on LTMS dredging activities. These include using species- and location-specific work windows; limiting hopper dredge return-water overflow to 15 minutes per dredging episode and allowing no overflow from barges receiving material from clamshell dredges to reduce turbidity; implementing turbidity control and/or monitoring measures when dredging within 250 m of eelgrass; ensuring that hopper dredge dragheads maintain contact with the benthic sediment when dredging, etc. Overall, the potential effects of benthic habitat disturbance would be short term and localized. Therefore, there would be no additional impacts to special status species, critical habitat, or commercially valuable marine species above baseline conditions.

**Impact BR-03: Cause underwater noise that adversely affects special status fish or marine mammals:**

The No Action Alternative would continue ongoing maintenance dredging and use of the channel. The existing baseline underwater noise levels associated with periodic dredging of the channels and regular ship traffic movements within the channels would not change. Therefore, there would be no additional noise related impacts to special status fish or marine mammals above baseline conditions. It is likely that most animals occurring within and near the channels have become adapted to the existing underwater navigation related noises that regularly occur throughout the year.

**Impact BR-04: Adversely affect special status or commercially or recreationally important marine species through entrainment:**

The No Action Alternative would continue ongoing maintenance dredging and use of the channel, and would not result in additional entrainment impacts. Therefore, there would be no

impacts to special status or commercially or recreationally important marine species above baseline conditions.

**Impact BR-05: Result in the disturbance of EFH and “Special Aquatic Sites,” including eelgrass beds and mudflats:** The No Action Alternative would continue ongoing maintenance dredging operations and shipping use of the channel, and would not result in additional disturbance of EFH or Special Aquatic Sites. Therefore, there would be no new impacts to EFH and Special Aquatic Sites above baseline conditions.

**Impact BR-06: Interfere with the movement of resident or migratory fish or wildlife species:** The No Action Alternative would continue ongoing maintenance dredging operations and shipping use of the channel, and would not result in additional changes that would interfere with the movement of resident migratory fish or wildlife species. Therefore, there would be no impacts to the movement of resident migratory fish or wildlife species.

**Impact BR-07: Adversely affect special status fish species, including their habitat, as a result of X2 shifts:** The No Action Alternative would continue ongoing maintenance dredging operations and shipping use of the channel. Continuation of those activities would not result in a shift in the X2. Therefore, compared to the NEPA baseline, there would be no additional impacts to special status fish species due to a shift in X2 under the No Action Alternative.

#### FUTURE WITH -37 FOOT ALTERNATIVE

**Impact BR-01: Cause increased turbidity that adversely affects special status species or critical habitat:** Background turbidity in the estuary is naturally high, with total suspended solids (TSS) levels varying from 10 mg/L to more than 100 mg/L (Robinson and Greenfield 2011). Turbidity plumes from dredging that could limit plankton productivity would be of short duration, as well as being localized and small in the area affected compared to surrounding areas of similar habitat. In San Francisco Bay, turbidity plumes would be quickly diluted to near or within background particulate concentrations. Any increases in turbidity associated with construction of the -37 foot MLLW Alternative would represent a negligible change from turbidity effects that now result from maintenance dredging under the No Action Alternative. Increased turbidity from dredging is therefore expected to have a negligible effect on plankton productivity.

The turbidity resulting from dredging to deepen the channels may affect some marine and estuarine organisms and aquatic wildlife during various life stages by affecting respiration (clogging gills), reducing visibility and the ability to forage or avoid predators, and altering movement patterns (due to avoidance of turbid waters). Suspended sediments have been shown to affect fish behavior, including avoidance responses, territoriality, feeding, and homing behavior.

Wilber and Clarke (2001) found that suspended sediments result in cough reflexes, changes in swimming activity, and gill flaring. Suspended sediments can have other impacts, including abrasion to the body and gill clogging. Generally, bottom-dwelling fish species are the most tolerant of suspended solids, and filter feeders are the most sensitive. The effect of dredging on fish can vary with life stage; early life stages tend to be more sensitive than adults. For example, pelagic eggs and larvae of fishes and shellfishes depend on local hydrodynamic conditions for transport into and out of dredging activity areas and have limited avoidance capabilities. Demersal eggs (eggs sinking to the bottom) and sessile, or non-motile life history stages, are perceived to be particularly susceptible because of their longer exposure to elevated suspended sediments or due to smothering by increased sedimentation. Motile organisms can generally avoid unsuitable conditions.

The USACE Waterways Experiment Station Technical Report DS785 Effects of Dredging on Aquatic Organisms (Hirsch et al. 1978), states that:

“...most organisms tested are very resistant to the effects of sediment suspensions in the water, and aside from natural systems requiring clear water such as coral reefs and some aquatic plant beds, dredging induced turbidity is not a major ecological concern.”

Pacific herring, a commercially important species, spawn in San Francisco Bay from November through March and so could be affected if spawning occurred in the area just before the end of the work window for maintenance dredging activities (i.e., November). Exposure of Pacific herring eggs to suspended San Francisco Bay dredged sediments at ecologically relevant concentrations of 250 or 500 milligrams per liter (mg/L) within their first 2 hours of contact with water has been documented to result in higher percentages of abnormal larvae, as well as an increase in larval mortality (Griffin et al. 2009). However, the suspended sediment from dredging in the shipping channel would need to travel into the shallow spawning areas for adverse effects to occur.

It should be noted that the eggs or larval life stages of steelhead, Chinook salmon, or green sturgeon are not expected to be present in any of the Federal navigation channels since those areas are not used as spawning habitat. In addition, large adult and juvenile fish (including steelhead, Chinook salmon, and green sturgeon) as well as marine mammals are motile enough to avoid areas of high turbidity plumes caused by dredging.

Increased turbidity and activity during dredging may disturb marine mammal foraging activities by temporarily decreasing visibility or causing the relocation of mobile prey from the area affected by the sediment plume. Marine mammals would not be substantially affected by dredging operations because they forage over large areas of San Francisco Bay and the ocean and can avoid areas of temporarily increased turbidity and dredging disturbance.

The deepening of the channel would involve only clamshell dredging during appropriate work windows and upland placement of dredged material for beneficial reuse. To minimize increases in turbidity, barges or scows receiving material for transport from clamshell dredging would not be allowed to overflow. Beneficial reuse would allow all turbidity associated with in-bay disposal to be avoided. Future maintenance dredging would continue to occur as part of the LTMS program. Therefore, compared to the NEPA baseline, impacts on special status species and critical habitat from localized and temporary increases in turbidity would be less than significant, and similar to the impacts resulting from maintenance dredging and ongoing use of the channel under the No Action Alternative.

**Impact BR-02: Cause benthic habitat disturbance that adversely affects special status species, critical habitat, or commercially valuable marine species:** Construction dredging would directly impact benthic communities through physical disruption and direct removal of benthic organisms, resulting in the potential loss of most, if not all, organisms in the dredged area. Benthic habitat within the existing Federal channels is highly disturbed because of regular maintenance dredging and the propeller wash of ship traffic. Organisms immediately adjacent to the dredged channels may also be lost during deepening because of smothering or burial from sediments re-suspended in the water column as a result of the dredging.

Critical habitat for steelhead, Chinook salmon, delta smelt, and green sturgeon overlaps with some or all of the estuarine/marine portions of the project area. Benthic habitat can be an important part of critical habitat for some species by providing foraging areas, especially for green sturgeon. The loss of benthic invertebrates

during dredging activities may decrease the forage value of critical habitat at the dredge location. No state-listed or federally-listed benthic epifauna and infauna are likely to occur in the study area. Because delta smelt feed in the water column, benthic habitat provides less of a function for that species than for species that forage in the benthos.

The -37 foot MLLW Alternative may impact two primary constituent elements<sup>1</sup> of delta smelt critical habitat: rearing habitat and adult migration. Rearing habitat includes shallow water river and tributary habitat extending eastward from Carquinez Strait, including Suisun Bay. Additional rearing habitat outside of the dredge footprint is present at Grizzly Bay, Honker Bay, Montezuma Slough and its tributary sloughs, up the Sacramento River to its confluence with Three Mile Slough, and south along the San Joaquin River including Big Break. Protection of this habitat is most important from February through summer. The entire study area is within the rearing habitat primary constituent element. With the exception of August, the work window for Bulls Head Reach (August 1 through November 30), which is a part of the Suisun Bay Channel is mostly protective of the delta smelt rearing life stage. However, rearing delta smelt may still be affected by the -37 foot MLLW Alternative to a minor degree.

With respect to adult migration, adults must be provided unrestricted access to suitable spawning habitat from December through July. Spawning areas include areas of the Sacramento and San Joaquin rivers and tributaries, Cache Slough, Montezuma Slough, and tributaries. Although spawning habitat is not found in the project area, adult delta smelt begin migrating from the study area to spawning grounds in September and October. Dredging activities may affect adults migrating through the study area to spawning grounds during this timeframe, since dredging would occur during the existing work windows of June 1 through November 30 in the Richmond and Pinole Shoal channels and August 1 through November 30 in the Bulls Head Reach (part of the Suisun Bay Channel). However, the affected area would be limited to the immediate dredging or placement zone and would not substantially limit the available habitat or movement of fish. Effects would be similar to those of ongoing maintenance dredging. As evidenced by Bay Study and the FMWT data (see **Table 4-16 and Table 4-17**), little or no delta smelt are expected to occur within the dredge footprint within the Pinole Shoal Channel (e.g., less than 1 percent of delta smelt have been collected in almost 50 years of trawling). Therefore, there is no potential for impact on delta smelt or delta smelt critical habitat from benthic disturbance.

**Table 4-16. Percent of Delta Smelt Caught in Pinole Shoal Channel Dredge Area During Fall Midwater Trawl and Bay Study 2000-2013 (June 1 to November 3).**

Station Number	Total Delta Smelt Catch	Total Catch at All Stations*	Percent of Total Catch
<b>Fall Midwater Trawl Stations</b>			
306	0	799	0
309	0	799	0
310	0	799	0
321	0	799	0
325	0	799	0

<sup>1</sup>A physical or biological feature essential to the conservation of a species for which its designated or proposed critical habitat is based on, such as space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and habitats that are protected from disturbance or are representative of the species historic geographic and ecological distribution.

337	0	799	0
338	0	799	0
<b>Bay Study Stations</b>			
325	0	173	0
346	0	173	0

**Table 4-17. Percent of Delta Smelt Caught in Suisun Bay Dredge Area During Fall Midwater Trawl and Bay Study 2000-2013 (August 1 to November 30).**

Station Number	Total Delta Smelt Catch	Total Catch at All Stations*	Percent of Total Catch
<b>Fall Midwater Trawl Stations</b>			
407	2	911	0.22
408	1	911	0.11
409	0	911	0
410	0	911	0
<b>Bay Study Stations</b>			
432	2	125	1.6

Following sediment-disturbing activities such as dredging, disturbed areas are usually recolonized quickly by benthic organisms (Newell et al. 1998). The species that recolonize first are usually characterized by rapid growth and reproduction rates. Marine benthic invertebrates often colonize disturbed sedimentary habitats via pelagic larvae that settle from the water column. Crustaceans, such as amphipods that are abundant in San Francisco Bay, brood young to much more advanced stages than pelagic larvae, releasing what are essentially miniature adults into the sediment. These can rapidly colonize adjacent disturbed areas.

Since recovery may be slower in deep water channels, there is potential for some loss of habitat and forage to organisms that use the channels. This potential is minimal, because the Federal deep-draft navigation channels are in a constant state of disturbance by deep draft vessels that travel through the channels at a maximum of 15 knots under their own power. At a minimum, oil tankers can be as close as 3 feet to the channel bottom and other vessels as close as 2 feet. Annually, approximately 3,800 vessel trips occur in the Oakland Harbor Channel; 2,300 vessel trips occur in the Richmond Harbor Channel; 2,300 to 4,000 vessel trips occur in the Pinole Shoal Channel; 800 vessel trips occur in the Suisun Bay and New York Slough channels; and 250 vessel trips occur on Redwood City Harbor Channels (**Appendix D, Economic Analysis**). Under these conditions, the benthos of these highly used channels, which are also dredged annually, is in a constant state of disruption. The potential for habitat loss in channels that are dredged less frequently would be slightly greater, but still small due to disruption of benthos from frequent vessel traffic.

Studies have indicated that even relatively large areas disturbed by dredging activities are usually recolonized by benthic invertebrates within 1 month to 1 year, with original levels of biomass and abundance developing within a few months to between 1 and 3 years (Newell et al. 1998). Following dredging, disturbed areas are recolonized, beginning with mobile and opportunistic species (Lenihan and Oliver 1995; Oliver et al. 1977). These species, characterized by rapid growth and reproduction, may or may not be the same species that were present in the area prior to the disturbance.

San Francisco Bay harbors more nonindigenous benthic invertebrate species than any other aquatic ecosystem in North America (Cohen and Carlton 1995). The introduced species range from approximately

20 to 80 percent of all species present (Lee et al. 1999). Therefore, depending on the area of San Francisco Bay, recolonization would likely include nonindigenous species already present in the area.

Under the -37 foot MLLW Alternative, USACE would continue maintenance dredging the project area. The frequency of dredging and volumes dredged may increase slightly in the future to account for the incrementally deeper channel.

Appropriate work windows and clamshell dredging would be used for deepening the channel. For maintenance dredging, USACE would continue to implement applicable avoidance, minimization, and mitigation measures such as those described in section 1.3.4 of NMFS's 2015 programmatic biological opinion on LTMS dredging activities (see NO ACTION ALTERNATIVE, Impact BR-02 of this document for an example list of measures). As described previously, the potential effects of benthic habitat disturbance would be short term and localized. Therefore, compared to the NEPA baseline, impacts on special status species, critical habitat, or commercially valuable marine species from localized and temporary disturbances of benthic habitat from the -37 foot MLLW Alternative and future maintenance dredging would be less than significant.

**Impact BR-03: Cause underwater noise that adversely affects special status fish or marine mammals:**

Mechanical and hydraulic dredges produce a complex combination of repetitive sounds that may be intense enough to cause adverse effects on fish and marine mammals. In addition, the intensity, periodicity, and spectra of emitted sounds differ among dredge types and the substrate being dredged. Clamshell dredges have a repetitive sequence of sounds generated by winches, bucket impact with the substrate, closing and opening the bucket, and sounds associated with dumping the dredged material into the barge. The most intense sound impacts are produced during the bucket's impact with the substrate, with peak Sound Pressure Levels (SPLs) of 124 dB being measured 150 meters from the bucket strike location (Dickerson et al. 2001; Reine et al. 2002).

The scientific knowledge of the effects of dredge-generated noise and sound waves on fishes is limited and varies depending on the species. Effects may include behavioral changes, neurological stress, and temporary shifts in hearing thresholds. Studies on the effects of noise on anadromous Pacific coast fishes are primarily related to pile-driving activities. The interagency Fisheries Hydraulic Working Group has established interim criteria for noise impacts from pile driving on fishes. A peak SPL of 206 dB is considered injurious to fishes. Accumulated SPLs of 187 dB for fishes that are greater than 2 grams, and 183 dB for fishes below that weight, are considered to cause temporary shifts in hearing, resulting in temporarily decreased fitness (i.e., reduced foraging success and reduced ability to detect and avoid predators). The NMFS uses 150 dB as the threshold for adverse behavioral effects.

Injury to fish from peak noise (e.g., rupture of swim bladder) is not expected to occur, but behavioral effects (e.g., changes in feeding behavior, fleeing, and startle responses) could occur. All fish, listed or otherwise, would experience the same effects. For reference, commercial shipping vessels present under baseline conditions can produce continuous noise in the range of 180 to 189 dB which exceeds the NFMS thresholds for adverse behavioral effects to fish and marine mammals (Reine and Dickerson 2014).

For marine mammals, the NMFS criteria define exposure to underwater noises from impulse sounds at or above 160 dB Root Mean Square (RMS)<sup>1</sup> and continuous sounds at or above 120 dB as constituting harassment to marine mammals. The NMFS has also determined that noises with SPLs above 180 dB RMS can cause injury to cetaceans (whales, dolphins, and porpoises), and SPLs above 190 dB RMS can cause injury to pinnipeds (seals and sea lions). Marine mammals are highly motile and would likely avoid areas of noise and disturbance from dredging operations.

The construction noise related impacts of the -37 foot MLLW Alternative would generate noise levels and produce behavioral reactions and effects to fish and marine mammals that would be similar to the existing conditions under the No Action Alternative. The -37 foot MLLW Alternative would take place in the Federal navigation channels, which already receive regular boat traffic, and have annual maintenance dredging occurring with clamshell dredges, and therefore have high background levels of underwater noise. Therefore, based on the analysis presented above, compared to the NEPA baseline, temporary adverse effects to special status fish or marine mammals from underwater noise would be less than significant during -37 foot MLLW Alternative construction and future maintenance dredging of slightly incrementally deeper channels.

**Impact BR-04: Adversely affect special status or commercially or recreationally important marine species through entrainment:** All forms of dredging have the potential to incidentally remove organisms from the environment along with the dredged material, a process referred to as entrainment. Mechanical dredging, as would occur under the -37 foot MLLW Alternative, is generally accepted to entrain far fewer fish than hydraulic dredging because little water is removed along with the sediment and it does not involve any suction. However, even a clamshell dredge may remove demersal fish and crustaceans that live in or on the sediment. Entrained fish are likely to suffer mechanical injury or suffocation during dredging, resulting in mortality. Organisms that can survive entrainment, such as small crustaceans, would be transported and released with the dredged material. Such organisms would be lost if the dredged material is disposed of in an upland location or in habitat unsuitable for the species.

The existing work windows include seasonal avoidance of Dungeness crab, Pacific herring, delta smelt, steelhead, coho salmon, and Chinook salmon for dredging conducted in various portions of San Francisco Bay. The work windows have been established to avoid sensitive periods for these species (i.e., migration periods and spawning periods). In the past, dredging schedules have occasionally slipped for logistical or financial reasons, and dredging occurred outside of the existing work window for one or more species. In the event that this should occur in any year covered by this EIS, USACE would initiate an additional consultation process with the appropriate agencies to obtain written authorization to work outside these windows.

Clamshell dredging would be conducted during appropriate work windows to reduce the potential for entrainment. USACE would also implement appropriate measures to minimize impacts to EFH, as detailed in the Agreement on Programmatic EFH Conservation Measures for Maintenance Dredging Conducted Under the LTMS Program (2011).

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<sup>1</sup> Root-mean-square measures the average noise energy measured over a 35-millisecond period. Note that this is a different type of measurement than the peak sound or sound exposure level used to measure impacts to fish (NOAA 2012).

The following paragraphs address the potential for entrainment-related impacts to occur from the -37 foot MLLW Alternative on special status or commercially or recreationally important marine species potentially present as compared to the NEPA baseline:

**Dungeness crab (*Cancer magister*) and Pacific herring.** The commercially important Dungeness crab and Pacific herring may occur in the project area and could be entrained during dredging, if work was improperly managed. By using clamshell dredging and complying with the existing LTMS work windows intended to reduce the potential for entrainment, effects to Dungeness crab and Pacific herring would be less than significant.

**Steelhead and salmon.** Steelhead and salmon may occur in the project area. By using clamshell dredging and complying with the existing LTMS work windows intended to reduce the potential for entrainment, effects to steelhead and salmon would be less than significant.

**Sacramento splittail.** Sacramento splittail have been collected during the CDFW FMWT (1 encountered in 2017). By using clamshell dredging and complying with the existing LTMS work windows intended to reduce the potential for entrainment, effects to Sacramento splittail would be less than significant.

**Pacific and river lamprey.** Pacific and river lamprey are anadromous and may occur in the dredge footprint. There is currently no work window approved for Pacific and river lamprey. Although Pacific and river lamprey are likely to occur in the project area, due to their relative abundance and the limited potential for entrainment impacts to occur by using a mechanical dredge, there would be less than significant impacts on these species.

**Striped bass.** Striped bass individuals are regularly collected during the CDFW FMWT (560 age-0 bass encountered since 2010). Although striped bass are likely to occur in the project area, due to their relative abundance and the limited potential for entrainment impacts to occur by using a mechanical dredge, there would be less than significant impacts on striped bass.

**Sacramento perch.** Sacramento perch may be extirpated from its native Delta habitat. Since this species is not known to occur in the project area, individuals of this species should not be impacted.

**Demersal fish species.** Demersal fish species (e.g., Pacific staghorn sculpin and Pacific sanddab [*Citharichthys sordidus*]) which live and feed on and near the bottom, have a higher potential to be entrained with the sediment. Although some of these fish may be entrained, these are not special status species. The minimal mortality anticipated from these bottom species, if any, would have no significant effect on their population numbers or species survival. Therefore, there would be a less than significant impact of these species.

**Green sturgeon.** There is currently no work window approved for green sturgeon. This species is presumed to be present year round throughout the estuary. Green sturgeon spawn in the Sacramento River which is outside the project area. Although juvenile and adult green sturgeon are expected to be present in the estuary during dredging, it is generally believed they would be motile enough to avoid entrainment. The LTMS agencies are in the process of updating the LTMS Programmatic ESA consultation with the NMFS to include green sturgeon. The updated consultation would satisfy ESA compliance for green sturgeon for USACE's future maintenance dredging under the LTMS program. Therefore, there would be less than significant impacts on green sturgeon.

**Delta smelt.** Delta smelt have the potential to occur in the portions of the estuary that include the Napa River Channel, San Pablo Bay/Mare Island Straight, and Suisun Bay Channel dredge areas during certain seasons. Delta smelt occur in San Pablo Bay in lower numbers than in the Napa River or Suisun Bay. However, they may be present in San Pablo Bay in increased numbers during high water outflow years. Delta smelt are not expected to occur in the other Federal channels.

Due to their small size and fragile nature, any entrained individuals would likely be killed either through physical injury during entrainment or suffocation in the collected dredged material. Because delta smelt typically occur in the upper portion of the water column, entrainment is more likely when dredging in shallow waters (Sweetnam and Stevens 1993). To reduce delta smelt entrainment, the LTMS uses a depth of 10 feet to distinguish between “shallow” and deeper waters when implementing work windows for delta smelt. Furthermore, the agreed-upon LTMS work windows include seasonal avoidance of delta smelt for dredging conducted in various portions of San Francisco Bay. As evidenced by Bay Study and the FMWT data mentioned above, few or no delta smelt are expected to occur within the dredge footprint within the Pinole Shoal and Suisun Bay channels. As discussed, since less than 1 percent of delta smelt have been collected in the dredge footprint in almost 50 years of trawling, there is limited potential for entrainment to occur. Furthermore, the use of mechanical dredging will greatly reduce the likelihood of entrainment. Therefore, there is almost no potential for delta smelt to be entrained in this channel segment, and no impact is anticipated.

**Longfin smelt.** Longfin smelt have the potential to occur throughout much of the San Francisco Bay estuary, and populations are seasonally concentrated in certain portions of the estuary. The densities of longfin smelt in the estuary are lowest in the fall, when spawning adults have moved upstream and before larval smelt have moved down into the estuary. During the winter and spring months, larval longfin smelt are concentrated in Suisun and San Pablo bays, but are also present in the Central and South bays in lower densities. While juveniles and adults are present throughout the estuary at all times of year, the majority of the population is concentrated in the Suisun, San Pablo, and Central bays, as well as nearshore waters during the summer months.

As evidenced by Bay Study and FMWT data (see **Table 4-18 and Table 4-19**), longfin smelt are likely to occur within the proposed dredge footprints in the Pinole Shoal and Bulls Head Reach channels. Across all years of the Bay Study and FMWT data, as discussed above, over 11 percent of the total longfin smelt were collected in the dredge area. Although longfin smelt are likely to occur in the project area, because of their relative abundance and the limited potential for entrainment impacts by using a mechanical dredge, there would be less than significant impacts on longfin smelt.

**Table 4-18. Percent of Longfin Smelt Caught in the Proposed Dredge Footprint in Pinole Shoal During Fall Midwater Trawl and Bay Study 2000-2013 (June 1 to November 3).**

Station Number	Total Longfin Smelt Catch	Total Catch at All Stations*	Percent of Total Catch
<b>Fall Midwater Trawl Stations</b>			
306	132	2089	6.32
309	9	2089	0.43
310	181	2089	8.66
321	196	2089	9.38
325	21	2089	1.01
337	4	2089	0.19
338	23	2089	1.1
<b>Bay Study Stations</b>			
325	89	834	10.67
346	145	834	17.39

Source: CDFW 2015a, 2015b.

\*Includes all the stations in San Pablo and Suisun bays

**Table 4-19. Percent of Longfin Smelt Caught in the Proposed Dredge Footprint in the Suisun Bay Channel During Fall Midwater Trawl and Bay Study 2000-2013 (August 1 to November 30).**

Station Number	Total Longfin Smelt Catch	Total Catch at All Stations*	Percent of Total Catch
<b>Fall Midwater Trawl Stations</b>			
407	20	3205	0.62
408	19	3205	0.59
409	87	3205	2.71
410	33	3205	1.03
<b>Bay Study Stations</b>			
432	8	885	2.94

Source: CDFW 2015a, 2015b.

\*Includes all the stations in San Pablo and Suisun bays

**Impact BR-05: Result in the disturbance of EFH and “Special Aquatic Sites,” including eelgrass beds and mudflats:** All of the waterbodies in the project area are designated as EFH under one or more FMPs. The programmatic EFH agreement completed in 2011 includes a number of conservation measures that enhance the environmental protectiveness of the LTMS program.

Eelgrass beds and mudflats are considered special aquatic sites and are subject to jurisdiction under Section 404 of the CWA and San Francisco Bay Conservation and Development Commission jurisdiction under Section 66605 of the McAttee-Petris Act. Additionally, eelgrass beds and estuarine areas such as San Francisco Bay are considered special aquatic sites under EFH.

Eelgrass in San Francisco Bay provides spawning habitat for herring and serves as a nursery ground and shelter for juvenile fish, among other functions. Eelgrass has been identified as EFH for various life stages of fish species managed by FMPs. Although eelgrass does exist near the Richmond Inner Harbor Channel and Oakland Inner Harbor, there is no known eelgrass within any of the channel boundaries. Examination of surveys done over the last 15 years indicates that eelgrass has persisted in essentially the same locations and densities around Richmond Harbor (USACE 2012b). Pre- and post-surveys of eelgrass conducted at Oakland Harbor in 2010 and 2011 found an increase in eelgrass habitat area and in the density of existing beds, in comparison with several reference sites (Merkel & Associates 2011, 2012). These results indicate that there does not appear to be any adverse effect to, or decline in, eelgrass habitat resulting from annual maintenance dredging activities at Richmond Harbor and Oakland Harbor. Furthermore, mapping of eelgrass in San Pablo Bay indicates that it occurs almost entirely downbay of Point Pinole (i.e., at the far western end of the proposed project area) and at depths shallower than 6 feet (see Boyer and Wyllie-Echeverria 2010 for a discussion), and so would be unlikely to be affected by project activities.

Mudflats serve as important foraging areas for shorebirds species and provide shallow water habitat for juvenile fish. No loss of mudflat acreage would occur as a result of dredging activities under this alternative. Sensitive habitats (such as marshes and mud flats) that occur in the vicinity of some of the Federal navigation channels (e.g., the Napa River) would not be disturbed.

Dredging to -37 feet would result in a loss of benthic habitat considered EFH for Pacific Groundfish. This would occur due to the removal of sediment and benthic organisms with a clamshell dredge, which is unavoidable. Although essentially all of the effects of the proposed project may be considered temporary, the recolonization of disturbed areas by benthic invertebrates is thought to require several months at a minimum, and may take longer. Other effects such as the creation of noise or turbidity plumes would cease immediately or within minutes or hours of when active dredging stops, and may be avoided or minimized by fish (including prey fishes) exhibiting avoidance behavior.

The disturbance of the soft-bottom habitat and removal of sediment containing benthic invertebrates from dredging may be partially offset through the beneficial reuse of the dredged sediment, which is expected to be used to create 160 acres of wetland habitat and would increase food production in adjacent Bay waters.

Based on the analysis presented above, compared to the NEPA baseline, the -37 Foot MLLW Alternative would result in no impacts to mudflats or eelgrass, but may result in an impact to EFH.

**Impact BR-06: Interfere with the movement of resident or migratory fish or wildlife species:** Since the -37 Foot MLLW Alternative only involves deepening the existing channel by 2 feet, it would not permanently interfere with the movement of resident or migratory fish or other wildlife species. The extent to which dredging activities could impede migration because of entrainment is discussed in the analyses for **Impact Criteria BR-04 through BR-06**. The project will operate 24 hours per day, 7 days per week. However, active dredging will occur at most only approximately 3 out of every 4 hours due to the need to reposition the dredge and also to be move it out of the shipping channel to allow deep draft vessels to pass. Consequently, fish passage should be able to occur unimpeded 25% of the time in the shipping channel, however, the shipping channel is only a small portion of the bay's cross section. The noise and in-water disturbance associated with dredging could cause fish and wildlife species to temporarily avoid the immediate dredging or placement area while work is being conducted. However, these impacts would be short term and localized. Therefore, compared to the NEPA baseline, the -37 foot MLLW Alternative would have less than significant impacts related to movement of resident or migratory fish or wildlife species.

There would be no new impacts to non-aquatic species potentially associated with placement sites, as placement sites have been pre-authorized.

**Impact BR-07: Adversely affect special status fish species, including their habitat, as a result of X2 shifts:**

Previous analyses pertaining to effects of X2 shifts on special status fish species and their critical habitat (CCWD 2010) used a significance criterion based on the shift in X2 for the purposes of evaluating changes in habitat quantity and quality for estuarine species. In their analysis, an upstream change in X2 location within 1 km of baseline conditions was considered to be less than significant for estuarine species. The 1 km X2 criterion used in CCWD's analysis was derived from the criterion applied to the environmental analysis of the Environmental Water Account (U.S. Bureau of Reclamation et al. 2003). For purposes of this analysis, the established quantitative threshold as previously applied was considered, as well as other factors.

Because salinity intrusion generally increases with water depth, incrementally deepening the existing channel 2 additional feet below the -37 foot MLLW Alternative could potentially lead to increased salt intrusion which would result in an increase in X2. Since an increase in X2 may impact special status fish species, the distribution of which is influenced by salinity levels, a detailed evaluation of the effect of the -37 foot MLLW Alternative was conducted under both wet and critically dry conditions (see **Appendix B, Water Resources-Attachment 1, Salinity Model Report**). The average annual predicted shift in X2 was 0.03 km upstream during a critical dry water year and 0.08 km upstream during a wet water year. Estimating X2 from field observations has a measurement uncertainty of at least 0.05 km (see **Appendix B, Water Resources- Attachment 1, Salinity Model Report, page 38**). Since these predicted shifts in X2 are much smaller than the 1 km shift considered to be less than significant, as compared to the NEPA baseline, the shift in X2 resulting from the -37 foot MLLW Alternative would result in less than significant impact to special status fish species through X2 shifts.

#### FUTURE WITH 38 FOOT ALTERNATIVE

**Impact BR-01: Cause increased turbidity that adversely affects special status species or critical habitat:**

The incrementally greater deepening proposed under the 38 Foot MLLW Alternative would have no additional significant effect on turbidity or turbidity impacts compared to the -37 foot MLLW Alternative. Turbidity will be monitored, and work would be limited to the existing LTMS work windows. Therefore, compared to the baseline, impacts on special status species and critical habitat from localized and temporary increases in turbidity would be less than significant.

**Impact BR-02: Cause benthic habitat disturbance that adversely affects special status species, critical habitat, or commercially valuable marine species:**

The incrementally deeper -38 foot MLLW Alternative would have no significant additional disturbance on benthic habitat compared to the -37 foot MLLW Alternative. Although both the -38 foot MLLW Alternative and the -37 foot MLLW Alternative would remove and affect a greater amount of benthic organisms compared to the No Action Alternative, for maintenance dredging the impact minimization measures described in section 1.3.4 of NMFS's 2015 programmatic biological opinion on LTMS dredging activities (see NO ACTION ALTERNATIVE, Impact BR-02 of this document for an example list of measures) would be implemented and the potential effects of benthic habitat disturbance would remain short term and localized. Therefore, compared to the baseline, impacts on special status species, critical habitat, or commercially valuable marine species from localized and temporary disturbances of benthic habitat would be less than significant.

**Impact BR-03: Cause underwater noise that adversely affects special status fish or marine mammals:** The incrementally greater deepening proposed under the -38 foot MLLW Alternative may result in a commensurate increase in the duration of construction and associated underwater noise impacts. However, noise levels would be unchanged and behavioral effects of aquatic organisms, if any, would be similar to those effects associated with the -37 foot MLLW Alternative and would be less than significant.

**Impact BR-04: Adversely affect special status or commercially or recreationally important marine species through entrainment:** The incrementally deeper channel under the -38 foot MLLW Alternative would have no significant incremental entrainment effects compared to the -37 foot MLLW Alternative. Dredging would continue to occur during established construction windows designed to protect special status fish species, unless otherwise approved. Mechanical dredging would be the type of dredge machinery for this project. Similar to the -37 foot MLLW alternative, few or no delta smelt are expected to occur within the -38 foot MLLW Alternative dredge footprint during the proposed construction windows. Therefore, compared to the baseline, the -38 foot MLLW Alternative would result in less than significant impacts to special status and commercially important species resulting from entrainment, and no significant impacts to smelt and demersal species are expected.

**Impact BR-05: Result in the disturbance of EFH and “Special Aquatic Sites,” including eelgrass beds and mudflats:** The slightly greater deepening proposed under the -38 foot MLLW Alternative compared to the -37 foot MLLW Alternative would have no additional significant effects on mudflats or eelgrass compared to the No Action Alternative. Dredging would continue to occur in accordance with the provisions established through the formal programmatic Federal EFH consultations for the LTMS, and no new areas potentially containing mudflats or eelgrass would be dredged or used to contain dredged material. Therefore, the -38 foot MLLW Alternative would result in no impacts to mudflats or eelgrass.

The bottom ground that would be dredged to -38 feet would result in a loss of 318 acres of benthic habitat that would potentially affect EFH. Those are listed below and described in more detail in the Biological Assessment (**Appendix G – Attachment 4**).

***Pacific Groundfish EFH:*** Adverse effect under the Magnuson-Stevens Act “means any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH” (50 CFR § 600.810). The proposed action is *likely to adversely affect EFH for Pacific Groundfish*. This would occur due to the removal of sediment and benthic organisms with a clamshell dredge, which is unavoidable. Although essentially all of the effects of the proposed project may be considered temporary, the recolonization of disturbed areas by benthic invertebrates is thought to require several months at a minimum, and may take years. Other effects such as the creation of noise or turbidity plumes would cease immediately or within minutes or hours of when active dredging stops, and may be avoided or minimized by fish (including prey fishes) exhibiting avoidance behavior.

The disturbance of 318 acres soft-bottom habitat and removal of sediment containing benthic invertebrates from dredging may be partially offset through the beneficial reuse of the dredged sediment, which is expected to be used to create 160 acres of wetland habitat and would increase food production in adjacent Bay waters.

***Pacific Salmonid EFH:*** Potential effects to Pacific salmonid EFH are expected to be similar to those discussed under the ESA impacts to listed salmonid habitat and critical habitat (see NMFS EFH letter **Appendix G**). As

discussed in those sections, the proposed action would temporarily affect estuarine habitat and water quality during dredging. Additionally, salinity intrusion may slightly increase the salt content of water near the eastern portion of the salinity wedge; however, this is not likely to be perceptible to migrating and rearing salmonids transitioning between freshwater and saltwater. Therefore, the proposed action is *not likely to adversely affect Pacific Salmonid EFH*.

**Coastal Pelagic EFH:** Northern anchovy is one of the most abundant fishes in the San Francisco Bay and an important commercial fish and prey resource other commercial fisheries. During construction, the proposed action has the potential to temporarily increase noise and suspended sediment in the surrounding water column. However, these impacts would be localized and not permanently affect coastal pelagic EFH. Restoration of wetland habitat resulting from beneficial reuse of dredged material would ultimately benefit coastal pelagic EFH by improving the quality and quantity of food resources. Because of the localized and temporary impacts, it is expected that the proposed action is *not likely to adversely affect Coastal Pelagic EFH*.

**Impact BR-06: Interfere with the movement of resident or migratory fish or wildlife species:** The slightly greater deepening under the -38 foot MLLW Alternative would have no additional significant effects on fish or wildlife migration compared to the -37 foot MLLW Alternative. Entrainment impacts and, by extension migration impacts, would remain minimal as described in the preceding discussions. The work schedule would remain the same as proposed under the -37 foot MLLW alternative. Behavioral impacts from noise and in-water disturbance associated with dredging would remain short term and localized. No new structures that might impede fish or wildlife movement would be constructed. Therefore, the -38 foot MLLW Alternative would result in less than significant impacts related to movement of resident or migratory fish or wildlife species as compared to the baseline.

**Impact BR-07: Adversely affect special status fish species, including their habitat, as a result of X2 shifts:** The -38 foot MLLW Alternative represents a slight incremental increase over the previous -37 foot MLLW Alternative and a 3 foot incremental increase over the No Action Alternative of a -35 foot MLLW channel depth. The analysis contained in **Appendix B- Attachment 1** and discussed in Water Quality and Hydrology, also evaluated the effect of the -38 foot MLLW Alternative under both wet and critically dry conditions. Based on this analysis, the average annual predicted shift in X2 for the -38 foot MLLW Alternative was 0.11 km upstream during a critical water year and 0.2 km upstream during a wet water year. Since these predicted shifts in X2 are much smaller than the 1 km shift considered to be less than significant, the shift in X2 resulting from the -38 Foot MLLW Alternative would result in less than significant impacts to special status fish species with distributions determined by salinity levels.

#### [FUTURE WITH -38 FOOT ALTERNATIVE + SEDIMENT TRAP AND ROCKY OBSTRUCTION](#)

The addition of the sediment trap and removal of the rocky obstruction to the -38 foot MLLW alternative would have the potential to further impact X2 and increase noise impacts, respectively. Therefore, BR-03 and BR-07 are further discussed within this section. Impacts to BR-01, BR-02, BR-04, BR-05, and BR-06 result in similar effects to the -38 foot Alternative.

**Impact BR-03: Cause underwater noise that adversely affects special status fish or marine mammals:** Noise effects on fish from the removal of the rocky obstruction are discussed in detail in the BA, and are not likely to adversely affect special status species (**Appendix G- Attachment 4**). No effects to fish habitat are anticipated because the rocky obstruction currently does not protrude above the bottom substrate.

Noise effects from removal of the rocky obstruction on marine mammals may include complex changes in behavior or hearing loss which may easily be linked to reduced fitness. Specific impacts may include

changes in breeding, feeding, or predator-avoidance behaviors; changes in migration routes, dive times, or swimming speeds; changes in mating call frequency or duration; habitat avoidance; etc. (Erbe 2012; Johnson and Tyack 2003; NMFS 2018; Wursig et al. 1998). Impacts may be species specific (NMFS 2018).

Two pinniped marine mammal species may occur in the project area, California sea lion (*Zalophus californianus*) and harbor seal (*Phoca vitulina*). The SPL of 132 dB produced by removal of the rocky obstruction and discussed in the BA (**Appendix G- Attachment 4**) is well under NMFS's threshold of 190 dB rms for assessing auditory impacts to pinnipeds (NMFS 2018).

NMFS (2018) provides new guidance for assessing noise impacts to marine mammals. The associated new methodology focuses on identifying temporary threshold shifts (TTS) and permanent threshold shifts (PTS) that may be induced by anthropogenic noise. Also, marine mammals are categorized according to their hearing abilities to account for species-specific differences. The California sea lion and harbor seal fall into different categories based on their taxonomic families (i.e., *Otariidae* and *Phocidae*, respectively). Specifically, harbor seals are expected to have an extended range of hearing compared to California sea lions, and also are better adapted to underwater hearing and presumably more vulnerable to noise impacts.

The new TTS and PTS thresholds are based on measurements of peak sound pressure level (PK) and cumulative sound exposure level (SEL cum). Using NMFS's companion spreadsheet tool (<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance>), the noise impacts of the project (i.e., PTS SEL cum isopleth to threshold [meters]; NMFS 2018) were determined to be 0 and hence well under the more conservative threshold of 185 meters for phocid pinnipeds. The second measurement of noise impacts (i.e., PTS PK isopleth to threshold (meters); NMFS 2018) generated an "NA" result compared to the 218 meter PK threshold for phocid pinnipeds. Results were the same whether dB rms values were used for noise 50 feet or 400 feet from the source. In summary, noise impacts from the proposed removal of the rocky obstruction are not likely to adversely affect California sea lion or harbor seal.

The buried rocky obstruction is located just outside of the current deepening footprint but is still within the existing Federal navigation channel, and already experiences regular boat traffic producing high background levels of underwater noise. Therefore, compared to the baseline, temporary adverse effects to special status fish and marine mammals from underwater noise would be less than significant.

**Impact BR-07: Adversely affect special status fish species, including their habitat, as a result of X2 shifts:**

With the inclusion of the sediment trap, the average annual predicted shift in X2 was 0.17 km upstream during a critical dry water year and 0.27 km upstream during a wet water year (see **Appendix B, Water Resources- Attachment 1, Salinity Model Report**). Since these predicted shifts in X2 are much smaller than the 1 km shift considered to be less than significant, as compared to the baseline, the shift in X2 resulting from the -38 Foot MLLW Alternative + Sediment Trap and Rocky obstruction would result in a less than significant impact to special status fish species through X2 shifts.

It should be noted that channel deepening must occur immediately after completion of O&M dredging, or possibly concurrently. Although feasible, dredging contract acquisition approach and timing is tight for accomplishment of both O&M dredging and channel deepening in one environmental work window therefore, this avoidance measure does carry some risk. Should dredging extend past the environmental work window, additional coordination would immediately be initiated with the appropriate agencies.

#### 4.1.7 LAND USE AND PLANNING

Project components were evaluated with regard to consistency with Federal, state, and local plans, policies, and regulations pertaining to land use. Land use was also evaluated for compatibility of the alternatives with county General Plans and physical division of existing communities.

An alternative would be considered to have a significant impact if it would cause the following:

Impact LU-01: Introduce land uses or activities incompatible with existing or adjacent land uses.

#### NO ACTION ALTERNATIVE

**LU-01: Introduce land uses or activities incompatible with existing or adjacent land uses:** Under the No Action Alternative land uses would remain the same as they currently exist at both the dredging and placement sites. There would be no introduction of new land uses or activities incompatible with existing or adjacent land uses. Therefore, no land use impacts would occur under the No Action Alternative.

#### FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES

**LU-01: Introduce land uses or activities incompatible with existing or adjacent land uses:** Under this alternative there would be no introduction of new land uses. Expected dredging activities and use of placement sites would be consistent with designated land uses. Dredging equipment would be temporarily present in areas used for commercial navigation and recreational boating. This may result in an ongoing and/or temporary condition, but considered as an insignificant impact since there would be no new land uses or activities introduced. Consequently, impacts to land use would be less than significant.

#### 4.1.8 MINERAL RESOURCES

The analysis of potential impacts to mineral resources included review and evaluation of maps, reports and other relevant data for mineral resources in the study area. Known deposits of mineral resources that may be impacted were evaluated for their relative importance in a regional as well as national context. To ascertain the compatibility of the alternatives with county General Plans, the proposed alternatives were compared to the mineral conservation goals and policies identified in the General Plans.

An alternative would be considered to have a significant impact if it would cause the following:

Impact MIN-01: Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State, or a locally important mineral resource recovery site delineated in a county General Plan, specific plan, or other land use plan.

#### NO ACTION ALTERNATIVE

**Impact MIN-1: Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State or a locally important mineral resource recovery site delineated in a county General Plan, specific plan, or other land use plan:** Under the No Action Alternative, activities associated with the proposed channel deepening would not occur. There would be no change in the existing maintenance dredging and placement of dredged material practices and no change in use of the proposed placement sites. Therefore, no impacts to mineral resources would occur.

## FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES

**Impact MIN-1: Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State or a locally important mineral resource recovery site delineated in a county General Plan, specific plan, or other land use plan:** Under these alternatives, dredging activities would occur entirely within the existing alignment of the channel and dredged material placement during construction would occur at established beneficial reuse sites. Subsequent maintenance of the deepened channel would follow current practices used for the existing channel. The areas identified for channel dredging would not overlap with areas identified for in-water mining of sand in the bays or in the Delta. There would also be no change to land uses as a result of this alternative and there would be no change in availability or access to mineral resources in the area. As such, no impacts to mineral resources would occur under this alternative.

### 4.1.9 AGRICULTURE

The California Agricultural Land Evaluation and Site Assessment Model (CDC 1997) provides an accepted methodology to assess the effects of proposed projects on agricultural resources. The Model determines a proposed activity's projected impact on the adequacy of soils for agriculture. However, the Model does not readily apply in the case of navigation channels. If the Model were used, the maximum impact score would be far below the threshold score required for a determination of significant impact. Rather than use the Model, for this analysis, the impacts to agricultural resources are evaluated based on a qualitative assessment of potential effects of construction, operation and maintenance activities conducted for the alternatives considered. This evaluation considers possible effects to soils and irrigation systems, changes in vulnerability to drought, and induced land use changes.

Any alternative would be considered to have a significant impact on the agricultural resources in the affected area if the alternative would:

**Impact AG-01:** Degrade the quality, or agricultural productivity, of Important Farmland or farm resources (including irrigation water systems, levees, drainage systems), or directly or indirectly cause lands presently in agricultural production (including Important Farmland) to convert to non-agricultural uses.

### NO ACTION ALTERNATIVE

**Impact AG-01: Degrade the quality, or agricultural productivity, of Important Farmland or farm resources (including irrigation water systems, levees, drainage systems), or directly or indirectly cause lands presently in agricultural production (including Important Farmland) to convert to non-agricultural uses:** Under the No Action Alternative, activities associated with proposed deepening of the existing channel would not occur. There would be no change in the existing maintenance dredging and placement of dredged material practices, and no change in use of the proposed placement sites. Therefore, no impacts to agricultural resources would occur under the No Action Alternative.

However, even in the absence of Federal action to deepen the shipping channels, agricultural lands in the study area and region are impacted by a variety of factors, many of which threaten the viability of farmlands in the future. Among the threats is increasing urbanization and other developmental pressures over the next 50 years that could result in the conversion of some marginal farmlands to more intensive land uses. Aside from the potential of direct farmland conversion, other future threats to agriculture in the study area include drought, salinity intrusion, soil subsidence, and sea level rise, none of which are influenced by the continued maintenance of the existing -35 feet navigation channel.

Future extended droughts are likely to continue to periodically occur, affecting the study area and a large portion of California. Such droughts will reduce the availability of irrigation water. The more extreme drought events may also allow higher salinity waters from the San Francisco Bay system to extend farther upstream into the Delta, creating temporary problems for irrigation users in the most downstream reaches of the lower Delta. Salinity intrusion is already a water supply management issue affecting the use and management of Delta agricultural lands. A variety of existing factors interact to influence salinity levels in the Delta waterways and groundwater. Major factors include:

- Flows from the San Joaquin and Sacramento Rivers
- Tidal fluctuations and exchanges from San Francisco Bay
- Levees originally built to reclaim tidal wetlands for agricultural uses
- Sub-surface agricultural irrigation and drainage systems
- Subsidence due to oxidation of peat soils behind levees
- Operation by the Central Valley Project and the State Water Project of large water supply intakes in the south Delta
- Releases of freshwater from the Delta Cross Channel, New Melones Dam and other similar facilities, and
- Temporary salinity barriers

These factors, which are unrelated to maintenance of the existing -35 feet channel, are anticipated to continue contributing, in varying degrees, to the existing salinity intrusion problems in the Delta.

Projected sea level rise will likely contribute to the existing salinity intrusion problem in the future, which would adversely affect agricultural activities and production within the Delta. Sea level rise would make Delta waters too saline for irrigation use, groundwater could become too saline, or the water table could become elevated. The result would be that lands currently in agricultural production may become unusable for current crops and could be converted to other land uses.

Soil subsidence has the potential to undermine the structural integrity of the levees that protect farmlands in areas influenced by seasonal flooding, in addition to reducing the subsurface distance between the root zone and the ambient water table.

#### [FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES](#)

**Impact AG-01: Degrade the quality, or agricultural productivity, of Important Farmland or farm resources (including irrigation water systems, levees, drainage systems), or directly or indirectly cause lands presently in agricultural production (including Important Farmland) to convert to non-agricultural uses:**

The -37 foot and -38 foot MLLW Alternatives would have no significant adverse impacts on agricultural resources because they would not directly or indirectly contribute to the conversion of farmland to non-agricultural uses and would not contribute to increased salinity intrusion into the Delta (see **Section 4.1.3 Water Quality and Hydrology**).

The environmental effects, both in the short-term and the long-term, are very similar to the impacts projected for the No Action Alternative. The principal difference between these two alternatives is that new work dredged material removed during to provide the -37 and -38 feet MLLW channel would be placed

in established beneficial reuse sites, none of which contain farmland. All future maintenance dredged materials would continue to be placed in existing approved open-water sites. As a result, neither Alternative would have no significant adverse impact on agricultural resources.

#### 4.1.10 AESTHETICS

The visual character of a project site is typically evaluated with respect to its physical components and an analysis of its compatibility with the land uses of the immediate surrounding areas. Visual impacts are also analyzed through an examination of views and/or viewsheds. Viewshed impacts are typically characterized by the loss and/or obstruction of existing scenic vistas or other major views in the area available to the general public.

The analysis of impacts on aesthetics for the study area included a general comparison of existing conditions to conditions that would result from implementation of the alternatives. Aerial photography, other photographs, land use maps, and topographical data were reviewed to collect data to determine the impacts to the affected environment. Impacts to aesthetic resources were qualitatively evaluated based on the potential for the various alternatives to temporarily or permanently alter or result in the loss of aesthetic resources in the study area. In addition, general construction impacts were assessed within the immediate area of the navigation channels to be dredged. Light and glare impacts were also analyzed by considering the qualitative aesthetic characteristics of the existing nighttime lighting and daytime glare environments on the site and any modifications the proposed alternatives would make to those environments.

An alternative would be considered to have a significant impact if it would cause the following:

Impact AE-01: Have a substantial adverse effect on a scenic vista or substantially degrade the existing visual character or quality of the site and its surroundings; or

Impact AE-02: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

#### NO ACTION ALTERNATIVE

**Impact AE-01: Have a substantial adverse effect on a scenic vista or substantially degrade the existing visual character or quality of the site and its surroundings:** The No Action Alternative would result in no additional construction dredging equipment in the various waterways. Annual operations and maintenance dredging would continue to occur within the established work windows for the respective channels. No impacts to scenic vistas would result.

**Impact AE-02: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area:** The No Action Alternative results in no additional construction dredging equipment for this project throughout the various waterways. Therefore, no light or glare impacts would result.

#### FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES

**Impact AE-01: Have a substantial adverse effect on a scenic vista or substantially degrade the existing visual character or quality of the site and its surroundings:** Construction dredging equipment would be visible to various visual receptors along the project route during the construction phase. As described more fully in the project description, the dredging equipment that would be seen from varying distances would

likely include a 26-cubic yard clamshell dredge working in tandem with up to four 2,000 to 5,000 cubic yard capacity scows (depending on the beneficial reuse site used) and two or three tug boats. It is likely that there would be one scow at the dredge plant and at least one scow in transit to or from the off-loading facility, while one scow would be at the off-loading facility to be unloaded.

During construction, viewers would see a mechanical clamshell dredge and the above identified auxiliary vessels involved in construction activities. Construction would occur throughout the day and night. At night, lighting would be required for the work areas and for navigational aids. It is expected that low-intensity industrial lighting would be used in the work areas.

The views of construction equipment would be from a distance. They would vary depending on the location of the viewing point, and the construction-related aesthetic impacts would be temporary. Viewers of the shipping channel commonly see various shipping operations, including the transport of dredging, industrial and commercial equipment. With the exception of differences in the type of equipment used, construction activities viewed would be similar to those seen in historical and current routine maintenance dredging of the navigation channels within the study area.

The operational phase would result in a similar number of ships traveling along the waterway as occurs during existing conditions. There would likely be fewer oil tankers and other types of ships passing by viewers. This is because a deeper channel would result in fewer tankers filled to a higher capacity, reducing the number of trips required to transport the same tonnage of commodities. In addition, following construction, the type and duration of future channel maintenance dredging activities would continue essentially unchanged from existing operations. Therefore, no adverse impacts to vistas and scenic character are expected to occur during the construction or operation phase.

**Impact AE-02: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area:** Construction would occur both day and night, with night lighting being required to illuminate the work areas and be used as navigational aids. These are expected to consist of low-intensity, industrial lighting, which would focus upon the work areas. The views would be temporary and would not result in nighttime glare or permanent changes in the viewshed. No new lights are expected at any of the ports, as existing facilities would continue to serve the shipping needs. No significant impacts to day or nighttime views as a result of additional glare or light would occur.

#### 4.1.11 CULTURAL RESOURCES

The analysis of impacts of the -37 foot, -38 foot, and -38 foot with sediment trap and rocky obstruction removal (Recommended Plan) on cultural resources and historic properties for the study area was completed through a review of existing databases, reports, and other information sources to determine if any cultural resources exist in the area. A review of CEQA/NEPA documents that previously evaluated impacts of channel dredging and placement practices on cultural resources was also completed, including the EA/EIR addressing maintenance dredging of the Federal navigation channels in San Francisco Bay for the period 2015 through 2024 (USACE and RWQCB 2015). A separate analysis of the impacts on cultural resources for the beneficial reuse areas at Montezuma Wetlands Project and Cullinan Ranch included the EIR/EIS for Montezuma Wetlands and is ongoing (USACE 1998; USFWS and CDFW 2008).

Pursuant to Section 106 of the National Historic Preservation Act (NHPA) (36 CFR § 800.8), USACE is employing a phased process to identify and evaluate historic properties and assess effects. Ongoing consultation and consideration of effects will occur during PED as the area of potential effects (APE) may be subject to change based on final designs or modifications of project features. Cultural resources

assessments will be conducted in areas that have not been previously surveyed with a high potential for containing historic properties. During PED and prior to construction, these surveys and a final determination of effects for any historic properties within the APE will be coordinated with the California State Historic Preservation Officer (SHPO), Native American Tribes, and other consulting parties. Due to the timing of the San Francisco to Stockton Navigation Improvement project, USACE is currently unable to identify and evaluate cultural resources and determine effects of the alternatives on historic properties prior to completion of the EIS. Therefore; pursuant to 54 U.S.C. 306108 and § 800.4(b)(2), USACE is deferring the final identification and evaluation of historic properties until after project approval, additional funding becomes available, and prior to construction. These obligations are stipulated within the Programmatic Agreement with the California State Historic Preservation Officer, executed for the study on February 14, 2020.

USACE's Dredging Guidance Letter No. 89-01 (USACE 1989) directs USACE to make a reasonable and good faith effort to identify submerged cultural resources that may be affected by project implementation. The review of project documents, the California Historical Resources Information System (CHRIS) database, and historical records has determined that there is a high potential for submerged cultural resources to be present within the APE.

The project does not propose demolition of existing structures or the introduction of features that would be incompatible with the historic setting of the built environment. The placement of dredge material within the Montezuma Wetlands and Cullinan Ranch will assist in the restoration of the landscape to its historical elevations prior to the twentieth-century construction of levees. The effects on the landward side of levees is considered as part of USACE's compliance with Section 106 of the National Historic Preservation Act (NHPA); however, this NEPA analysis only considers the effects of the project on the submerged archaeological resources because previous NEPA studies have been completed on these placement areas. The three shipwreck databases were searched for any known shipwrecks located in the areas that might be affected by the alternatives. The significance of effects was determined based on the presence of a historical resource potentially affected and the type of anticipated impacts.

For the purposes of NEPA, to determine whether cultural resources could be adversely affected, the historical significance and integrity of the resource itself must first be evaluated.

### NO ACTION ALTERNATIVE

**Impact of CR-01: Cause a substantial adverse effect to a historic property.** Under the No Action Alternative, all activities associated with proposed deepening of the existing channel would not occur. There would be no change in the existing maintenance dredging and placement of dredged material practices and no change in use of the proposed placement sites. Therefore, no impacts to historic properties would occur under the No Action Alternative. Since no individual impacts would occur from the No Action Alternative; that alternative would not contribute to any cumulative impacts from other past, present, and reasonably foreseeable future activities that could have substantial adverse impacts on historic properties in the study area.

**Evaluation of Impact CR-02: Disturb any human remains, including those interred outside of formal cemeteries.** Under the No Action Alternative, activities associated with proposed deepening of the existing channel would not occur. There would be no change in the existing maintenance dredging and placement of dredged material practices and no change in use of the proposed placement sites. Since there would be

no additional construction dredging to deepen the existing navigation channel, no human remains, including those interred outside of formal cemeteries should be encountered or disturbed. Therefore, no impacts would occur to human remains. Because the No Action Alternative would not disturb any human remains, including those interred outside of formal cemeteries, continued maintenance and use of the navigation channels would not incrementally contribute to the cumulative effects of other unrelated past, present, and reasonably foreseeable actions within the study area having the potential to adversely affect human remains.

#### FUTURE WITH -37 FOOT ALTERNATIVE

**Impact of CR-01: Cause an adverse effect to a historic property.** Under the Future with -37 Foot Alternative, activities associated with proposed deepening of the existing channel have the potential to cause an adverse effect to historic properties, if present. Analysis of CHRIS data shows a previously recorded shipwreck, which is identified as the Baldwin Channel Wreck (P7-002760 and 21-000598), within 500 feet of the Pinole Shoal Channel APE; however, there is some question as to the location of the wreck. The wreck was identified during a USACE sponsored submerged cultural resource survey of portions of proposed Baldwin Channel Navigation improvements (Sullivan and Allan 1996). Sullivan and Allan (1996) tentatively identified the wreck and indicated that portions of the wreck were located within the existing Pinole Shoal Federal Navigation Channel. The wreck site was tentatively identified as the *Sagamore*, a schooner which foundered in 1864. Although this wreck was reported in the vicinity, it could also be one of several other ships that were reported sunk in the area (USACE and RWQCB 2013). The California State Lands Commission (CSLC) database identified 24 shipwrecks that sank near the channel dredging and placement areas, three of which are reported within the APE. The *Harry*, which sank in 1904, and the *Alden Anderson*, a steam screw which sank in 1924, were reportedly lost within what is now the navigation channel. The gas screw *Cavina*, which was reported lost in 1926, was located within 0.25 miles of MWRS (see **Table 2-11**).

Globally, sea levels began rising at the end of the Late Glacial Maximum (LGM). The present configuration of San Francisco Bay began forming between 15,000 to 18,000 BP, with the inundation of the Sacramento and San Joaquin river valleys (Masters and Aiello 2007). By the end of the Holocene (8000 BP) sea levels were approximately 20 meters below the present-day levels. Locally, these levels may have varied considerably due to tectonic instability in the San Francisco Bay region. In general, this rise resulted in the submergence of prehistoric sites throughout the Bay area. No prehistoric archaeological sites are recorded in the immediate vicinity of the existing navigation channel. However, an early twentieth century map showing the locations of shell mounds sites in the San Francisco Bay region show multiple shell mounds located along the north and south shores of the Carquinez Strait (Nelson 1909). While these sites are located outside the APE, they do indicate that the area was a nexus for prehistoric settlements in the late prehistoric period. Earlier sites can be expected to have been situated on former ridges and hills which were located adjacent to the Pleistocene and Holocene paleochannels. Preliminary analysis of bathymetry data within the APE indicates the possible presence of inundated ridges and islands directly adjacent to the Suisun Bay navigation channel. Some of these areas can be considered to have a moderate to high probability of containing inundated prehistoric sites.

At those locations along the channels where prevailing bottom depths are 35 feet or less MLLW, dredging the channel to -37 feet could disturb a narrow width of existing bottoms paralleling both sides of the existing navigation channel to accommodate a deepened dredging prism. In some instances over-depth dredging may disturb a larger footprint than anticipated. Additionally, sloughing of the channel side slopes may occur over time as the overall channel cross section adjust to the altered sediment conditions. This

unavoidable process has a potential to adversely impact any shipwreck or inundated prehistoric site that may be located near the edge of the existing navigation channels. Based on the proximity of 24 known wrecks in the project vicinity, the presence of the Baldwin Channel wreck within the APE, and the presence of several landforms which appear to have a moderate to high probability of containing prehistoric resources it is possible that dredging may cause an adverse change effect to historic properties, if present. Any submerged archaeological site or submerged historic resource that has remained in California State waters for more than 50 years will require evaluation for eligibility for listing on the National Register of Historic Places (NRHP).

Although no previously identified historic properties are located within the APE, the locations of historic shipwrecks that are listed in the CSLC database are imprecise and in some instances inaccurate. Therefore, it is possible that additional unknown shipwrecks and submerged archaeological sites occur within the project APE. Deepening the existing maintained -35 foot MLLW channel segments to -37 feet, has the potential to have adverse impacts to historic properties. Additional archaeological resource investigations will be required as a component of future detailed design studies of this alternative to either confirm the absence of shipwrecks or submerged prehistoric sites within the APE.

**Evaluation of Impact CR-02: Disturb any human remains, including those interred outside of formal cemeteries.** Under the Future with -37 Foot Alternative there is no evidence of the presence of human remains within the study area. However, activities associated with the proposed deepening of the existing channel have the potential inadvertently disturb human remains with implementation of this alternative. Therefore, the potential to disturb unidentified human remains would be a significant adverse impact. If human remains of Native American origin are discovered during dredging, it would be necessary to comply with state laws relating to the disposition of Native American burials, which fall under the jurisdiction of the Native American Heritage Commission (PRC Section 5097). In addition, pursuant to State law (CEQA Guidelines Section 15064.5, PRC 5097.87, and the Health and Safety Code Section 7050.5) mitigation measure, MM-CR-02 would be implemented if any human remains are discovered.

Globally, sea levels began rising at the end of the Late Glacial Maximum (LGM). The present configuration of San Francisco Bay began forming between 15,000 to 18,000 BP, with the inundation of the Sacramento and San Joaquin river valleys (Masters and Aiello 2007). By the end of the Holocene (8000 BP) sea levels were approximately 20 meters below the present-day levels. Locally, these levels may have varied considerably due to tectonic instability in the San Francisco Bay region. In general, this rise resulted in the submergence of prehistoric sites throughout the Bay area. No prehistoric archaeological sites are recorded in the immediate vicinity of the existing navigation channel. However, an early twentieth century map showing the locations of shell mounds sites in the San Francisco Bay region show multiple shell mounds located along the north and south shores of the Carquinez Strait (Nils 1906). Shell mounds can contain Native American burials. While the mounds identified on the Nils (1906) map are located outside the APE, they do indicate that the area was a nexus for prehistoric settlements in the late prehistoric period. Earlier sites can be expected to have been situated on former ridges and hills which were located adjacent to the Pleistocene and Holocene Paleochannels. Preliminary analysis of bathymetry data within the APE indicates the possible presence of inundated ridges and islands directly adjacent to the Suisun Bay navigation channel. Some of these areas can be considered to have a moderate to high probability of containing inundated prehistoric sites.

At those locations along the channels where prevailing bottom depths are -35 feet or less MLLW, dredging the channel to -37 feet could disturb a narrow width of existing bottoms paralleling both sides of the existing navigation channel to accommodate a deepened dredging prism. In some instances over-depth

dredging may disturb a larger footprint than anticipated. Additionally, sloughing of the channel side slopes may occur over time as the overall channel cross section adjust to the altered sediment conditions. This unavoidable process has a potential to adversely impact inundated prehistoric sites or burials that may be located near the edge of the existing navigation channels. Potential impacts to cultural resources from anchoring or spudding during dredging and off-loading operations are possible beyond the limits of the dredging. Any submerged archaeological site or submerged historic resource within the APE more than 50 years will require evaluation for eligibility for listing on the NRHP.

Although no human remains have been identified within the APE submerged terrestrial archaeological sites may occur within the project APE. Deepening the existing maintained -35 foot MLLW channel segments to -37 feet, has the potential to have impact human remains. Additional archaeological resource investigations will be required as a component of future detailed design studies of this alternative to either confirm the absence of submerged prehistoric sites within the APE.

Cultural resources assessments will be conducted in areas that have not been previously surveyed with a high potential for containing historic properties. During PED and prior to construction, these surveys and a final determination of effects for any historic properties within the APE will be coordinated with the California SHPO, Native American Tribes and other consulting parties. Discovery of historic properties may also lead to the development of avoidance, minimization, and/or mitigation plans in consultation with the SHPO. Due to the timing of the San Francisco Navigation Improvement project planning, USACE is currently unable to identify and evaluate cultural resources and determine effects of deepening the channel to -37 feet on historic properties prior to completion of the EIS.

#### FUTURE WITH -38 FOOT ALTERNATIVE

Under the Future with -38 Foot Alternative, activities associated with proposed deepening of the existing channel have the same potential as those of the -37 foot MLLW Alternative, although they would occur on proportionally larger scales due to the larger volume of dredged material.

#### FUTURE WITH -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION

Under the Future with -38 foot MLLW Alternative, sediment trap, and removal of rocky obstruction activities associated with proposed alternative have the same potential as those of the -37 foot MLLW Alternative, although they would occur on proportionally larger scales due to the larger volume of dredged material from the inclusion of the sediment trap and rocky obstruction removal. In addition, the analysis of CHRIS) data shows that a previously recorded shipwreck, which is identified as the Baldwin Channel Wreck (P7-002760 and 21-000598), is located within the rocky obstruction APE; however, there is some question as to the location of the wreck. A submerged cultural resource survey of this site will be required to provide an accurate location of this resource. If this site is identified within the APE a diver identification and evaluation survey will be required to assist USACE determine the eligibility of the site for listing on the NRHP.

If an archaeological resource cannot be avoided, the Project archaeologist shall consult with the appropriate agencies and tribes as described within the Programmatic Agreement to resolve adverse effects to a potential historic property. USACE shall evaluate the potential of the resource to meet the criterion for eligibility for listing on the NRHP and CRHR. USACE shall complete a determination of effects Report, which shall be submitted to USACE for review upon completion.

#### 4.1.12 ENVIRONMENTAL JUSTICE AND COMMUNITY EFFECTS

Executive Order 12898 mandates that each Federal agency make environmental justice (EJ) part of the agency mission and to address, as appropriate, disproportionately high and adverse human health or environmental effects of the programs and policies on minority and low-income populations. Significance thresholds that may be used to evaluate the effects of a proposed action related to EJ are not specifically outlined. However, Council on Environmental Quality (CEQ) guidance requires an evaluation of a proposed action's effect on the human environment and USACE must comply with Executive Order 12898.

The methodology for conducting the EJ impact analysis included review of the impact conclusions presented in Chapter 4 of this report for each of the environmental resource categories considered. An EJ analysis was accomplished to determine if minority populations or low-income populations could experience disproportionately high and adverse effects where the following effect scenarios were identified: (1) significant impacts would occur to a specific environmental resource; (2) could contribute to a cumulatively significant impact on a study area resource when considered in combination with other projects; and/or (3) impacts are judged to be high and adverse, even if not significant.

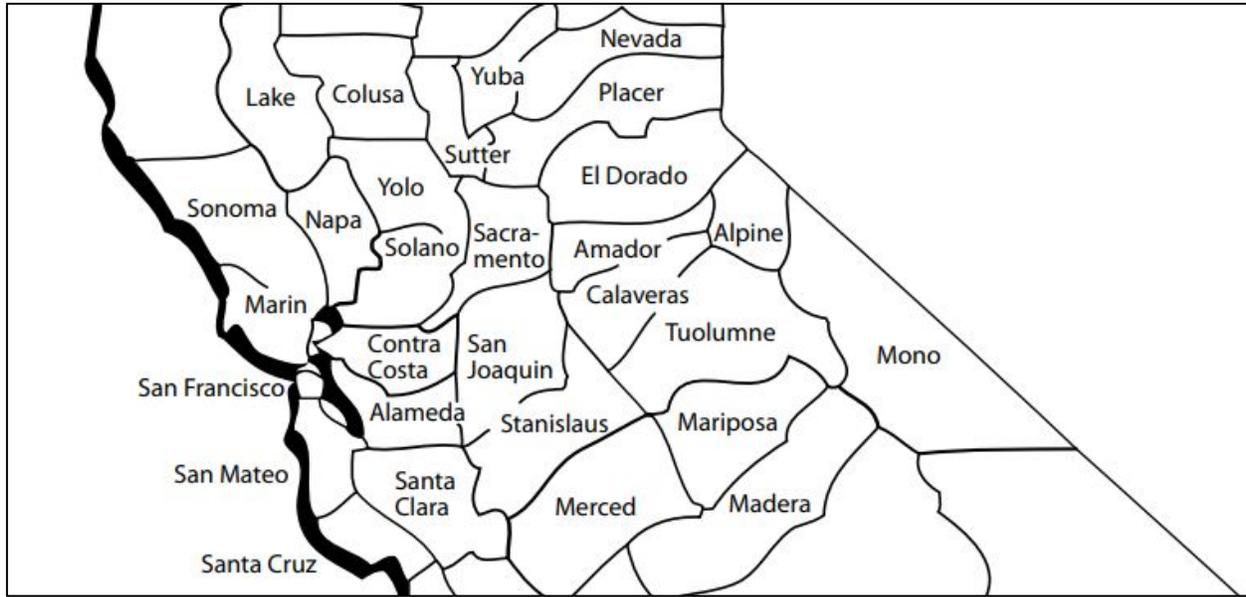
Potential EJ impacts were analyzed through the following ordered process:

1. Identify types of impacts that may occur,
2. Describe the portion of the study area in which impacts may occur,
3. Identify potentially affected populations, and
4. Determine whether environmental impacts are disproportionate to low-income or minority populations.
5. To determine whether impacts are disproportionate, the APE was compared to surrounding geographic entities to determine if it contains disproportionately low-income or minority populations. The results were compared to the impact analyses from other resource categories to determine the likelihood of disproportionate impacts to low-income or minority populations.

An alternative would be considered to have a significant EJ impact if it would cause the following:

Impact EJ-01: Disproportionate environmental effects to communities within the APE when compared to surrounding areas.

**Figure 4-1. Counties within the Bay Area.**



The population growth trends from 1980 through 2010 for the San Francisco Bay area (**Figure 4-1**) are shown in **Table 4-20** below. The region as a whole has experienced a rapid rate of growth since 1980. According to 2010 U.S. Census data, the Bay Area has a 49.8 percent growth between 1980 and 2010, with a net population increase of 1,064,877 residents.

**Table 4-20. Bay Area Population Growth, 1980-2010.**

Bay Area Population Growth, 1980-2010					
	Population				Percent Increase 1980-2010
Geography	1980	1990	2000	2010	
San Francisco County	678,974	723,959	776,733	805,235	18.6%
Marin County	222,592	230,096	247,289	252,409	13.4%
Contra Costa County	656,331	803,732	948,816	1,049,025	59.8%
Solano County	235,203	340,421	394,542	413,344	75.7%
San Joaquin County	347,342	480,628	563,598	685,306	97.3%
Bay Area	2,140,442	2,578,836	2,930,978	3,205,319	49.8%
California	23,667,902	29,760,021	33,871,648	37,253,956	57.4%
United States	226,542,199	248,709,873	281,421,906	308,745,538	36.3%

Population density varied extensively for the five counties from a low of 485 persons per square mile in Marin County to a high of 17,179 persons per square mile in San Francisco County.

As shown in **Table 4-21** below, the Bay Area and the State of California have mostly higher percentages of minority populations than the United States according to the 2010 U.S. Census. In the Bay Area, San

Francisco County has a higher percentage of minority populations than the other counties. In 2010, the Bay Area as a whole had more of a diverse racial composition compared to the U.S., where approximately 55 percent of the population identified as White, 8.3% of the population identified as Black or African American, 18.5 percent of the population identified as Asian, and 11.1 percent of the population identified as Other.

**Table 4-21. Racial Composition in the Bay Area, 2010.**

Racial Composition 2010		San Francisco County	Marin County	Contra Costa County	Solano County	San Joaquin County	Bay Area	California	U.S.
White	No.	390,387	201,963	614,512	210,751	349,287	1,766,900	21,453,934	223,553,265
	%	48.5%	80.0%	58.6%	51.0%	51.0%	55.1%	57.6%	72.4%
Black or African American	No.	48,870	6,987	97,161	60,750	51,744	265,512	2,299,072	38,929,319
	%	6.1%	2.8%	9.3%	14.7%	7.6%	8.3%	6.2%	12.6%
American Indian and Alaska Native	No.	4,024	1,523	6,122	3,212	7,196	22,077	362,801	2,932,248
	%	0.5%	0.6%	0.6%	0.8%	1.1%	0.7%	1.0%	0.9%
Asian	No.	267,915	13,761	151,469	60,473	98,472	592,090	4,861,007	14,674,252
	%	33.3%	5.5%	14.4%	14.6%	14.4%	18.5%	13.0%	4.8%
Native Hawaiian and Other Pacific Islander	No.	3,359	509	4,845	3,564	3,758	16,035	144,386	540,013
	%	0.4%	0.2%	0.5%	0.9%	0.5%	0.5%	0.4%	0.2%
Other	No.	53,021	16,973	112,691	43,236	131,054	356,975	6,317,372	19,107,368
	%	6.6%	6.7%	10.7%	10.5%	19.1%	11.1%	17.0%	6.2%
Two or More Races	No.	37,659	10,693	62,225	31,358	43,795	185,730	1,815,384	9,009,073
	%	4.7%	4.2%	5.9%	7.6%	6.4%	5.8%	4.9%	2.9%
Total Population	No.	805,235	252,409	1,049,025	413,344	685,306	3,205,319	37,253,956	308,745,538
	%	100%	100%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

The age characteristics of the Bay Area are shown in **Table 4-22** below. As a whole, the Bay Area in 2010 had a higher median age than the State of California and equaled the median age for the United States. San Francisco County, Marin County, and Contra Costa County all had median ages higher than or equal to the State and National median age. Solano County's median age was higher than the State level, but lower than the National level. San Joaquin County was the only area to have a median age lower than both State and National levels.

**Table 4-22. Age Distribution in the Bay County, 2010.**

Age Distribution 2010		San Francisco County	Marin County	Contra Costa County	Solano County	San Joaquin County	Bay Area	California	U.S.
Under 18	No.	124,570	56,452	287,513	113,222	223,585	805,342	10,452,042	74,181,467
	%	15.5%	22.4%	27.4%	27.4%	32.6%	25.1%	28.1%	24.0%
18-64	No.	570,823	153,765	631,074	253,275	390,540	1,999,477	22,555,400	194,296,087
	%	70.9%	60.9%	60.2%	61.3%	57.0%	62.4%	60.5%	62.9%
65 or Above	No.	109,842	42,192	130,438	46,847	71,181	400,500	4,246,514	40,267,984
	%	13.6%	16.7%	12.4%	11.3%	10.4%	12.5%	11.4%	13.0%
Total Population	No.	805,235	252,409	1,049,025	413,344	685,306	3,205,319	37,253,956	308,745,538
	%	100%	100%	100%	100%	100%	100%	100%	100%
Median Age		38.5	37.2	38.5	36.9	32.7	37.2	35.2	37.2

The 2010 U.S. Census income and poverty data for the Bay Area and the State of California are summarized in **Table 4-23** below. All counties had higher median household incomes than the State of California, with the exception of San Joaquin County at \$59,900.

**Table 4-23. 2010 U.S. Census Income & Poverty Data for the Bay Area.**

Regional Income and Poverty Data	San Francisco County	Marin County	Contra Costa County	Solano County	San Joaquin County	California	U.S.
Median Household Income	\$75,604	\$90,839	\$78,756	\$67,177	\$59,900	\$61,094	\$53,046
Per Capita Income	\$48,486	\$56,791	\$38,219	\$28,929	\$22,589	\$29,527	\$28,155
Percent of People Below Poverty Level	13.5%	7.7%	10.5%	13.0%	18.2%	15.9%	15.4%

Marin County had the highest median household income and per capita income, while San Joaquin County had the lowest median household income and per capita income. San Joaquin County had the highest percentage of people living below poverty level (18.2 percent) when compared to other counties in the region and to the State of California. San Francisco County, Marin County, Contra Costa County, and Solano County all had lower percentages of people living below poverty level compared to the State of California. As shown in **Table 4-24** below, all counties in the Bay Area had a higher percentage of people over the age of 25 that graduated high school or higher when compared to the State of California and the United States, except for San Joaquin County. San Francisco County, Marin County, and Contra Costa County had higher percentages of people over the age of 25 that earned a Bachelor's Degree or higher when compared to the State of California and the United States. Solano County and San Joaquin County had lower percentages of people over the age of 25 that earned a Bachelor's Degree or higher, at 24.3 percent and 18.1 percent, respectively.

**Table 4-24. Distribution of Education in the Bay Area.**

<b>Geography</b>	<b>High School Graduate or Higher - Persons 25 Years or Older</b>	<b>Bachelor's Degree or Higher - 25 Years and Older</b>
San Francisco County	86.3%	52.4%
Marin County	92.4%	54.6%
Contra Costa County	88.8%	39.0%
Solano County	87.2%	24.3%
San Joaquin County	77.3%	18.1%
California	81.2%	30.7%
U.S.	86.0%	28.8%

As defined in Executive Order 12898 and the CEQ guidance, a minority population occurs where one or both of the following conditions are met within a given geographic area:

- The American Indian, Alaskan Native, Asian, Pacific Islander, Black, or Hispanic population of the affected area exceeds 50 percent; or
- The minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

For this study, the geographic location used in determining demographics was the San Francisco Bay area. Based on 2010 census data, as shown in Table 25 in the Economic Analysis appendix, (Socioeconomic and Regional Analysis section), the aggregate minority population is 44.9 percent of the total population in the San Francisco Bay area. The aggregate minority population in the State of California is 42.4 percent. Therefore, the aggregate minority population percentage for the San Francisco Bay area does not exceed 50 percent and is not meaningfully greater than the aggregate minority population in the State of California, so the study area does not contain a high concentration of minority populations.

Executive Order 12898 does not provide criteria to determine if an affected area consists of a low-income population. For the purpose of this assessment, the CEQ criterion for defining a minority population has been adapted to identify whether or not the population in an affected area constitutes a low-income population. An affected geographic area is considered to consist of a low-income population (i.e. below the poverty level for purposes of this analysis) where the percentage of low income persons:

- Is at least 50 percent of the total population; or
- Is meaningfully greater than the low-income population percentage in the general population or other appropriate unit of geographic analysis.

Based on 2010 census data, as shown in Table 27 in the Economic Analysis appendix (Socioeconomic and Regional Analysis section), 13 percent of the individuals in the San Francisco Bay area are considered below the poverty level. Since the percentage of individuals below the poverty level in the San Francisco area does not exceed 50 percent and is less than both the State of California and all of the United States (15.9 percent and 15.4 percent, respectively), the San Francisco Bay area does not have a high concentration of

low-income individuals. In summary, the study area which comprises the San Francisco Bay area is not an EJ community.

#### NO ACTION ALTERNATIVE

**Impact EJ-01: Disproportionately disrupt economic vitality or community cohesion:** No significant impacts compared to the No Action Alternative would result from increased ship calls in the future. Any operational air quality impact would be equally borne by all populations. Therefore, there would be no disproportionate impacts to the communities within the APE compared to surrounding areas under the No Action Alternative.

#### FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES

**Impact EJ-01: Disproportionately disrupt economic vitality or community cohesion:** No significant impacts compared to the No Action Alternative would result from increased ship calls in the future. Any operational air quality impact would be equally borne by all populations. Therefore, there would be no disproportionate impacts to the communities within the APE compared to surrounding areas under the No Action Alternative.

#### 4.1.13 NAVIGATION, TRANSPORTATION, AND CIRCULATION

Impacts on navigation, transportation and circulation were assessed by determining the net increase in vessel traffic resulting from both phases of the study compared to vessel safety, as well as the potential to increase risks to vessel traffic during both construction and operation. This analysis also examined the potential changes in maintenance dredging requirements as a result of channel deepening. As discussed previously, deepening will primarily affect crude oil tankers.

An alternative would be considered to have a significant impact if it would cause the following:

Impact NT-01: Change vessel traffic patterns, resulting in unplanned or regularly occurring delays, adverse change in freedom of movement, increase safety risks, or introduction of safety hazards

Based on the environmental setting of the study area and the characteristics of the alternatives under evaluation, there would be no adverse impacts to the navigation, transportation, and circulation topics described below; therefore, they are not discussed further in this section:

- **Increase land-based traffic on roadways, railways, and recreational pathways.** The alternatives would not affect roadways, railways, and recreational pathways on land.
- **Increase roadway and rail traffic due to changes in bridge operations.** Roadway traffic in the study area is not affected by vessel traffic because existing roadway bridges are all of fixed height. Rail traffic is not expected to be affected because vessel traffic would be reduced under the alternatives.

#### NO ACTION ALTERNATIVE

**Impact NT-1: Change vessel traffic patterns, resulting in unplanned or regularly occurring delays, adverse change in freedom of movement, increase in safety risks, or introduction of a safety hazards:** The No Action Alternative represents the current and future conditions assuming channel deepening does not take

place. No construction would occur, so there would be no temporary impacts to vessel traffic patterns as a result of construction activities under the No Action Alternative.

Because the primary impacts to marine navigation are expected to be borne by tankers carrying petroleum products, projections about changes in petroleum shipping and the effect on the vessel fleet mix are used to determine the vessel traffic and commodity movements with the No Action Alternative. Both imports and exports of petroleum products are expected to increase modestly based on global economic conditions with or without channel deepening. **Table 4-25** shows projected changes in commodity imports and exports under the No Action Alternative (see **Appendix D, Economic Analysis**).

**Table 4-25. Commodity Forecast for No Action Alternative (Metric Tons).**

Commodity	Forecast		
	2020	2030	2040
Total Crude Imports	7,736,000	7,892,000	8,052,000
Total Petroleum Exports	2,311,074	2,930,000	3,714,000

The commodities identified in **Table 4-25** would move through the project area in a mix of vessels. Under the No Action Alternative, the number of larger Aframax and Suezmax vessels is forecasted to remain the same through 2040 (approximately 50 and 30, respectively). The number of Panamax vessels are projected to increase modestly from approximately 125 in 2020 to 175 in 2040.

Recreational vessel traffic would continue throughout the study area under the No Action Alternative. No forecasts are available for recreational traffic, but it would be expected to change proportionally with population in the Bay Area. According to the Plan Bay Area 2040, a joint planning document, the population of the nine-county San Francisco Bay area is projected to increase by 29 percent by 2040 (ABAG and MTC 2013). Therefore, a corresponding increase in recreational vessel traffic could be expected. However, recreational traffic is separated from commercial traffic under the governing international and inland rules of navigation, so changes affecting large commercial vessels would not be expected to affect recreational traffic.

Under the No Action Alternative, the existing maintenance dredging program would continue as it has historically occurred throughout the study area. The manner in which the existing 35 foot MLLW channel is maintained has been determined to have negligible effect on marine navigation (USACE 2014a). Based on the above analysis, the No Action Alternative would have no impact on the vessel traffic patterns, safety risks, safety hazards, freedom of movement or safety issues for either commercial or recreational vessels.

**FUTURE WITH -37 FOOT ALTERNATIVE**

**Impact NT-1: Change vessel traffic patterns, resulting in unplanned or regularly occurring delays, adverse change in freedom of movement, increase in safety risks, or introduction of a safety hazards:** **Appendix D, Economic Analysis** projects that the volume of petroleum products (which are the dominant cargo in the project area) will grow at the same rate whether the proposed project is implemented or not. However, the vessel mix is projected to change if deepening is implemented. Specifically, additional cargo volume would be accommodated by vessels between 35,000 DWT and 77,000 DWT (Panamax), the main class of vessels that would benefit from the deepening. The deeper channel depth would allow those vessels to avoid some of the costly operational strategies currently in use, making them a more efficient option than

the larger vessels. In the future with project condition, the design vessel (Panamax) with a sailing draft greater than 34 feet (37 foot channel minus 3 feet underkeel clearance) will encounter tidal delays, rather than at 32 feet (35 foot channel minus 3 feet underkeel clearance) in the future without project condition. Therefore, the increased loading capacity in the future-with project condition reduces the number of vessel calls and partially reduces tidal delays.

**Table 4-26** shows the predicted maximum traffic volumes of bulk tankers in the project area (see **Appendix D, Economic Analysis**). Compared to the No Action Alternative, the number of vessels transiting this area may actually decrease under the -37 foot MLLW alternative. Because no increases in traffic are expected and traffic will continue to be controlled by Vessel Traffic Services implementing Federal and state rules of navigation, no adverse impacts are likely to commercial shipping, freedom of movement, and/or safety associated with operations with the -37 foot MLLW Alternative compared to the baseline.

**Table 4-26. Bulk Vessel Fleet Volume Forecast.**

Vessel Type	No Action Alternative			-37 Foot MLLW Alternative			-38 Foot MLLW Alternative		
	2020	2030	2040	2020	2030	2040	2020	2030	2040
Panamax	125	150	175	116	141	169	113	136	165
Aframax	50	50	50	56	56	56	56	56	56
Suezmax	30	30	30	33	33	33	33	33	33
<b>Total</b>	<b>205</b>	<b>230</b>	<b>255</b>	<b>205</b>	<b>230</b>	<b>258</b>	<b>202</b>	<b>225</b>	<b>254</b>

Recreational traffic is separated from commercial traffic under governing international and inland rules of navigation, so changes affecting large commercial vessels are not expected to affect recreational traffic.

Dredged material from construction deepening would be placed at existing beneficial reuse sites which have all permits. Use of these sites would result in short-term increases in tug and barge movement. These effects would be limited to the year that it could take to deepen the channel if work is performed during only the established work window that spans June 1 to November 30 in San Pablo Bay and August 1 through November 30 in Bulls Head Reach. After construction is complete, regular maintenance dredging would continue to be conducted on an annual basis in the project area. Maintenance dredging would essentially resemble that now performed with the existing 35 foot channel and would continue to have a negligible impact on marine navigation. All dredging equipment would be required to comply with local safety requirements including publication of construction announcements in the USCG Local Notice to Mariners. Thus, impacts would be temporary and less than significant.

#### [FUTURE WITH 38 FOOT AND 38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES](#)

**Impact NT-1: Change vessel traffic patterns, resulting in unplanned or regularly occurring delays, adverse change in freedom of movement, increase in safety risks, or introduction of a safety hazards:** According to **Appendix D, Economic Analysis**, the -38 foot MLLW Alternative would result in a slight decrease in commercial vessel traffic compared to the -37 foot MLLW Alternative and the No Action Alternative. This reduction is forecast because vessels between 35,000 DWT and 77,000 DWT (Panamax) would be able to travel the channel more fully loaded, avoiding some currently used operational strategies such as lightering and tidal delay. Because of this projected reduction in the number of vessels, no adverse impacts are expected to commercial shipping or recreational vessel traffic. In the future with project condition, the design vessel (Panamax) with a sailing draft greater than 35 feet (38 foot channel minus 3 feet underkeel clearance) will encounter tidal delays, rather than at 32 feet (35 foot channel minus 3 feet underkeel

clearance) in the future without project condition. Therefore, the increased loading capacity in the future-with project condition reduces the number of vessel calls and partially reduces tidal delays.

Impacts under the -38 foot MLLW Alternative would be similar in nature to those that would occur under the -37 foot MLLW Alternative. The removal of the rocky obstruction would reduce the safety risk to vessels traversing the shipping channel. Therefore, impacts would be temporary and less than significant.

#### 4.1.14 NOISE

The analysis of noise includes a general comparison of existing noise conditions to potential noise levels during the construction. The U.S. Federal Transit Administration guidelines for assessment of noise impacts for construction activities provide commonly accepted thresholds for construction noise impacts to residential and industrial areas. These thresholds were adopted as significance thresholds for this analysis.

Impact NOI-01: Result in a 90 dBA equivalent continuous sound level over a 1-hour period in a residential or public park area or a 100 dBA equivalent continuous sound level over a 1-hour period in an industrial area.

#### NO ACTION ALTERNATIVE

**Impact NOI-01: Result in a 90 dBA equivalent continuous sound level over a 1-hour period in a residential or public park area or a 100 dBA equivalent continuous sound level over a 1-hour period in an industrial area:** The No Action Alternative would not result in any construction dredging activities to deepen the various channel segments and would not result in the off-loading of dredged soils. Annual operations and maintenance dredging would continue to occur within the established work windows for the respective channels. Noise impacts from annual maintenance dredging were analyzed for the period 2015-2024 in the San Francisco Bay Federal Channels Maintenance and Operations EA/EIR (USACE and RWQCB 2015) and found to be less than significant.

#### FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES

**Impact NOI-01: Result in a 90 dBA equivalent continuous sound level over a 1-hour period in a residential or public park area or a 100 dBA equivalent continuous sound level over a 1-hour period in an industrial area:** The effects of the -37 foot MLLW Alternative on noise would be similar to the No Action Alternative, although the timeframe within which higher noise levels would be generated would be extended because of the larger quantities of sediments that would be dredged during initial construction. However, subsequent noise generated during routine maintenance would be essentially the same as that associated with the No Action Alternative. Thus, noise impacts that would be produced by this alternative along the open water route of the navigation channels would be less than significant.

At the placement sites, sensitive receptors could include recreational users and non-motorized boaters. While the noise level in the immediate vicinity of the tug (within approximately 400 feet) may periodically exceed the applicable noise threshold, the presence of tugs at the off-loader would be episodic, and of limited duration. In addition, there is extensive availability of alternative recreation locations and recreational users and non-motorized boat users have ample opportunities for recreational activities in areas away from the off-loading location. Therefore, impacts to sensitive receptors at the placement sites would be less than significant. The potential impacts to wildlife from the proposed project due to noise is discussed in Biological Resources as well as **Appendix G- Attachment 4, Biological Assessment**.

#### 4.1.15 PUBLIC HEALTH AND ENVIRONMENTAL HAZARDS

Potential impacts to the study area from hazardous releases or storage of such materials were analyzed using a qualitative approach based on information compiled from known hazardous materials sites and current operations within the study area. This analysis considered changes or impacts to these conditions that may occur as a result of implementing navigation improvements. Potential impacts were analyzed using professional expertise and judgment in evaluating how construction and operational activities could impact known hazardous material sites and existing operations and potentially cause hazardous releases or exposure of individuals to hazards.

Alternatives are considered to have a significant impact if implementation or operations activities would:

- Impact PH-01: Occur on a site that is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment; or
- Impact PH-02: Create a significant hazard to the public or the environment by disrupting the routine transport, use, or placement or storage of hazardous materials or wastes; or
- Impact PH-03: Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan.

#### NO ACTION ALTERNATIVE

**Impact PH-01: Occur on a site that is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment:** Although two existing hazardous sites may overlap with the No Action Alternative maintenance dredging footprint, impacts to those hazardous sites would be avoided by coordinating ongoing maintenance dredging and placement operations with any active cleanup activities. This includes existing or future cleanup efforts at the U.S. Army MOTCO MRS 8 and MRS 10 sites or at hazardous materials sites in the shoreline or nearshore areas. There is no pathway for existing dredging or placement practices to impact other listed hazardous sites. Therefore, the No Action Alternative would have no impact related to hazardous material sites.

**PH-02: Create a significant hazard to the public or the environment by disrupting the routine transport, use, disposal, or storage of hazardous materials or wastes:** Operation and maintenance activities would remain unchanged under the No Action Alternative, and new hazardous material exposure pathways would not be introduced. Therefore, the No Action Alternative would have no impacts to the routine transport, use, disposal or storage of hazardous materials or wastes.

**Impact PH-03: Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan:** The No Action Alternative would not impair implementation or interfere with any emergency response or evacuation plans. In the event of an emergency, dredge equipment would be removed from the channel or positioned in such a manner as to not impede the navigation of emergency response or evacuation vessels. Maintenance of the existing 35 feet MLLW channel depth would have a long-term beneficial impact by removing shoaled sediment and maintaining the navigability of the Federal channels for use by vessels during emergency response operations. Therefore, the No Action Alternative would have no adverse impacts on emergency plans.

## FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES

**Impact PH-01: Occur on a site that is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment:** There are no existing hazardous sites, and existing cleanup or hazardous material enforcement actions at the shoreline or nearshore area would be unaffected by this alternative. The Alternatives would introduce no new uses that would increase exposure to hazardous material sites. Therefore, the Alternatives would have no impacts related to hazardous material sites.

**PH-02: Create a significant hazard to the public or the environment by disrupting the routine transport, use, disposal, or storage of hazardous materials or wastes:** Under all Alternatives, the channel would be able to accommodate vessels with deeper drafts, allowing vessels to carry heavier loads. This could potentially include increased volumes of hazardous material cargo compared to baseline conditions. This could result in increased hazardous material discharges in the event of a spill or vessel collision. Although the amount of hazardous material cargo may increase in individual vessels, the overall amount of hazardous cargo is not projected to increase (see **Appendix D, Economic Analysis**). Therefore, hazardous cargo shipping demands could potentially be accommodated with fewer vessels carrying greater cargo loads. The economic analyses completed for this alternative predict that the overall number of shipping vessels is projected to remain nearly the same or even decrease slightly compared to the No Action Alternative, and the risk for vessel accidents would not increase. Furthermore, vessel accidents in the project area are rare, as supported by NOAA records. Transport of hazardous materials would continue to occur in compliance with all Federal, state, and local regulations. Hazardous material use associated with vessel operation (e.g., fuels, oils and solvents) would be unchanged from existing conditions and would continue to occur according to established best management practices and in compliance with applicable regulations, as discussed in Water Quality and Hydrology.

In addition, all sediment to be dredged as part of the Alternatives would undergo extensive testing in advance of dredging to ensure that it meets the requirements for beneficial reuse. Based on the analysis presented above, the Alternatives would have no impacts to the routine transport, use or disposal of hazardous materials or wastes and/or hazardous sites.

**Impact PH-03: Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan:** Same as No Action Alternative.

### 4.1.16 RECREATION

Environmental effects on recreational resources were assessed by evaluating the potential for direct interference with recreational activities (e.g., blocking access to a marina entrance) and reduced access to recreational facilities and areas (e.g., through the presence of construction equipment in the waterways). Information was obtained for each county from the Delta Protection Commission's Inventory of Recreational Facilities, County General Plans, and other publically available information on local recreation.

An alternative would be considered to have a significant impact if it would cause the following:

- Impact RE-01: Substantially reduce or restrict the availability or quality of existing recreation opportunities; or
- Impact RE-02: Conflict with Federal, state, and/or local agency regulations and policies regarding recreational resources.

The following recreation topic will not be discussed because there would be no adverse impacts.

**RE-02: Conflict with Federal, state, and/or local agency regulations and policies regarding recreational resources.** Activities proposed would comply with current Federal, state, and local agency regulations and policies. While it is possible that the cities and counties in the study area could amend regulations specific to recreational resources in their General Plans, it is unlikely that the regulations pertaining to recreational resources would be modified to prohibit dredging or dredged material placement activities in the identified placement sites. Thus, as compared to the baseline conditions, proposed activities should conform with Federal, state, and local agency regulations and policies regarding recreational resources. In addition, the alternatives would not be anticipated to contribute incrementally to any cumulative adverse effects on such regulations and policies when considered in combination with other activities within the study area.

### NO ACTION ALTERNATIVE

**Impact RE-01: Substantially reduce or restrict the availability or quality of existing recreation opportunities:** Under the No Action Alternative recreation features would continue to function as they do currently. Any short-term impacts associated with the dredging activities would be inconsequential. Therefore, based on a worst case analysis, existing recreation resources and activities could experience occasional, less than significant, adverse impacts during dredging events. Over time, an increase in ship traffic could also have less than significant effects on recreational boat use. Overall, impacts of the No Action Alternative on recreation would be less than significant.

### FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES

**Impact RE-01: Substantially reduce or restrict the availability or quality of existing recreation opportunities:** The proposed dredging and placement activities under this alternative would not create a demand for new recreational facilities and would not result in increased use or deterioration of existing recreational facilities. Dredging would create a long-term beneficial impact for watercraft by ensuring safe navigation. However, these benefits would be less than significant.

Construction activities under this alternative may occasionally delay or temporarily impede recreational watercraft during dredging and placement activities. However, in most locations, there would be sufficient room for recreational vessels to maneuver around the dredge equipment, and therefore, impacts from dredging activities are expected to be negligible. Compared to the baseline conditions, there would be short-term impacts to the use, quality, and availability of recreational opportunities due to the presence of construction equipment. However, these types of activities are typical and impacts would be less than significant.

#### 4.1.17 SOCIO-ECONOMICS

NEPA does not provide specific thresholds of significance for socioeconomic impact assessment. Significance is understood to vary depending on the setting of the proposed action (40 CFR 1508.27[a]).

For the purposes of this analysis, the effects of the alternatives on socioeconomic factors are considered to be significant if an alternative would result in any of the following socioeconomic impacts:

- **Impact SOC-01:** Result in a rapid or sizeable shift in population trends or would notably affect regional employment, spending and earning patterns, or community resources in a manner that could not be easily absorbed or accommodated by the economy as a whole.

**Measurable and/or prolonged change in local job supply or change in revenue from leading industries.**

Navigation improvements would provide access to oil terminals and industry in Pittsburg and the Port of Stockton. Dredging of the navigation channels would provide a beneficial socioeconomic impact by maintaining navigability of the channels and access to local ports and harbors critical to maritime commerce and the regional economy.

Dredging and associated construction activities are expected to result in economic benefits related to a small, local increase in jobs. The majority of these jobs would likely be associated with the dredging activities, while a few temporary jobs would also be created at the sediment delivery location if a beneficial reuse site is used. Subsequent shipping operations and maintenance of the channels are not expected to result in a large increase in local employment placing added demands on housing and/or public services.

**NO ACTION ALTERNATIVE**

**Impact SOC-01: Result in a rapid or sizeable shift in population trends or would notably affect regional employment, spending and earning patterns, or community resources in a manner that could not be easily absorbed or accommodated by the economy as a whole:** There would be no new dredging activities or new use of the placement sites under the No Action Alternative. The existing deep draft channel dimensions would continue to be maintained, existing activities at facilities called on by commercial vessels would continue, and the number of vessels would increase slightly into the future. Existing beneficial effects of navigation transportation would continue to be enjoyed by local ports and the industries that transport commodities through the ports as well as by the port and industrial workers that depend upon the availability of the existing navigation channels. Thus, there would be no effect on population in the study area as a result of routine maintenance of the existing navigation channels.

**FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES**

**Impact SOC-01: Result in a rapid or sizeable shift in population trends or would notably affect regional employment, spending and earning patterns, or community resources in a manner that could not be easily absorbed or accommodated by the economy as a whole:** This alternative would create a small, local, temporary increase in jobs. However, it is expected that all jobs would largely be filled by local workers and there would be no impact on regional employment. Any spending and earning in the local area from the temporary increase in jobs would not have the ability to impact regional spending or earning patterns. Similarly, there would be no additional demand on community resources that could not be accommodated by the economy as a whole. Dredging of the navigation channel would provide a beneficial socioeconomic impact by maintaining navigability of the channels and access to local ports and harbors critical to maritime commerce and the regional economy. There is likely to be increased efficiency in use of the channels from the deepening of the channel for importing and exporting of materials. However, no noticeable change in maritime infrastructure or regional economy associated with this alternative is expected.

**4.1.18 UTILITIES AND PUBLIC SERVICE**

The significance threshold used in this analysis focuses on impacts that navigation channel deepening could have on buried utility cables, buried pipelines, and/or overhead power transmission lines. Implementation of an alternative would be considered to have a significant impact on the utilities considered if the alternative would:

- **UTIL-01:** Interfere with operations of, cause damage to, or otherwise disrupt the use of any buried/underwater cable or pipeline, or overhead power transmission line.

#### NO ACTION ALTERNATIVE

**Impact UTIL-01: Interfere with operations of, cause damage to, or otherwise disrupt the use of any buried/underwater cable or pipeline, or overhead power transmission line:** In the absence of Federal action to deepen the existing -35 feet MLLW navigation channels, continuation of regular maintenance dredging would have no adverse impacts to buried underwater cables and pipelines, water supply infrastructure, or overhead power transmission lines. Commercial ships would continue to navigate the marked ship channels using the same precautions as at present.

#### FUTURE WITH -37 FOOT, -38 FOOT, AND -38 FOOT + SEDIMENT TRAP AND ROCKY OBSTRUCTION ALTERNATIVES

**Impact UTIL-01: Interfere with operations of, cause damage to, or otherwise disrupt the use of any buried/underwater cable or pipeline, or overhead power transmission line:** For the alternatives, the utilities that have the potential to be impacted by channel deepening are: (1) the Trans Bay Cable and 2) the Rodeo Sanitary District sewer outfall. The height clearance of the two overhead power transmission lines that cross the channels exceeds the low clearance of some bridges in the study area. That means the transmission lines would not be affected by implementation of either channel deepening alternatives.

The Rodeo sanitary sewer outfall is located in the Carquinez Straight at the edge of the naturally deep channel in between where the Pinole Shoal ends and the Bulls Head Reach begins, and will not be investigated further. Therefore, the only utility that was analyzed to determine effects from the alternatives is the trans-bay cable utility owned by Trans Bay Cable.

The utility survey that was conducted in 2011 (*Utility Investigation Report – San Francisco to Stockton Deep Water Ship Channel*, dated May 2011) provided As-Built drawings from Trans Bay Cable for their 10 inch diameter direct current (DC) transmission line that was constructed in 2010. The As-Built drawings were reviewed and compared with the USACE hydrographic condition survey that was performed at approximately the same period that the trans-bay cable was installed. The drawings indicate that the trans-bay cable crosses the Pinole Shoal in two locations: STA 62+00 and from STA 468+00 to STA 547+11. In both locations, the channel is naturally deeper than the alternative depths. The As-Built drawings indicate the trans-bay cable was buried to a depth that is approximately -48 to 49 feet MLLW (which is 6 feet below existing natural channel bottom, where the existing natural channel bottom is between -42 and -43 MLLW) for both crossing locations. The cable utility does not intersect the other Federal channels in the remainder of the project footprint. Therefore, it has been determined that the trans-bay cable utility will not be impacted by the alternatives and no relocations would be needed.

During design of the channels, consultations will be initiated with all owners and operators of the known buried/underwater cables and pipelines under or near the navigation channels.

Implementation of these actions would not impact any utilities.

## 4.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The resource commitments needed for the -38 foot MLLW + sediment trap and rocky obstruction (Recommended Plan) are neither irreversible nor irretrievable, with most impacts being short-term and temporary. The only expected irretrievable resource commitment from is the consumptive use of non-renewable fossil fuels for the operation of dredge, tugs, and related support equipment during construction and future maintenance dredging. There is no other expected commitment of irretrievable resources.

## 4.3 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

The alternatives would not result in any significant and unavoidable adverse environmental impacts. The salinity would shift due to the proposed project, however, it is considered a less than significant effect supported by hydrodynamic modeling (see discussion in **Appendix B, Water Resources - Attachment 1 Salinity Modeling Report and Section 4.1.2 and 4.1.3 of the main report**).

## 4.4 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

As described in above, the Recommended Plan is compatible with Federal, state, and local objectives. The alternatives do not conflict with any stated plans or policies. By facilitating wetland creation through beneficial reuse of dredged sediment, both the -37 foot MLLW and -38 foot MLLW Alternatives are furthering Long-term Management Strategy objectives for managing dredging in the San Francisco Bay Area. Therefore, the alternatives would maintain consistency of future vessel operational emissions in the Bay Area with applicable plans and objectives.

## 4.5 CONFLICTS AND CONTROVERSY

Extensive coordination undertaken by USACE and the Port of Stockton with Federal, state, and local agencies, water managers, businesses, organizations, and the general public prior to preparation of this report identified the following key issues of known concern and expected controversy:

- Salinity intrusion in the Delta, particularly related to impacts on drinking water and designated critical habitat of the Federal and state listed endangered delta smelt.
- Impacts to threatened and endangered species including longfin smelt, green sturgeon, and salmonids.
- The potential to beneficially use dredged material in existing habitat restoration projects within the study area.
- Effects of sea level rise within the study area.

## 4.6 UNCERTAIN, UNIQUE, OR UNKNOWN RISKS

The Recommended Plan is not unique or unusual, and understanding of the resources in the area is thorough. The effects of dredging activities are well understood; USACE has extensive experience evaluating the environmental effects associated with dredging projects. The environmental analysis did not identify any highly uncertain, unique, or unknown risk effects on the human environment which would result from implementing the project.

## 4.7 CUMULATIVE EFFECTS

EPA requires the consideration of cumulative effects of the proposed action combined with those of other projects. NEPA defines a cumulative effect as an environmental effect that results from the incremental effect of an action when combined with other past, present and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7).

Cumulative effects can result from individually less than significant, but collectively significant, actions taking place over a period of time. Cumulative effects can result in unintended adverse environmental effects despite efforts to mitigate for an individual action's specific direct and indirect impacts. The purpose of a cumulative impacts analysis is to identify the potential for incremental increased environmental effects caused by a series of actions.

An inherent part of the cumulative effects analysis is the uncertainty surrounding actions that have not yet been fully developed. The CEQ (1997) regulations provide for the inclusion of uncertainties in the EIS analysis, and state that "(w)hen an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an EIS and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking" (40 CFR Part 1502.22). The CEQ regulations do not say that the analysis cannot be performed if the information is lacking. Consequently, the analysis contained in this section includes what could be reasonably anticipated to occur given the uncertainty created by the lack of detailed investigations to support all cause and effect linkages that may be associated with the Proposed Action/Recommended Plan.

The cumulative effect analyses include considerations of the past, present, and reasonably foreseeable future actions listed in **Table 4-27**. Potential cumulative effects were evaluated by comparing the effects of the alternatives with those of the actions identified in **Table 4-27**. The analyses do not specifically address each action listed unless the impacts of the alternative under evaluation, combined with those of a specifically identified action could result in a cumulative effect.

**Table 4-27** summarizes cumulative effects on the geographic scope by identifying the past, present, and reasonably foreseeable future projects. Resources listed in the table (**Table 4-28**) are only the resources that would be expected to potentially have effects in relation to cumulative effects. Resources discussed in Chapter 4, but not listed in the cumulative effects table includes Geology and Seismicity, Air Quality, Mineral Resources, and Agriculture.

**Table 4-27. Past, Present, and Reasonably Foreseeable Future Projects.**

<b>Project Name</b>	<b>Location</b>	<b>Lead Agency</b>	<b>Summary</b>
Bay-Delta Water Quality Control Plan Update	Sacramento-San Joaquin Delta	State Water Resources Control Board (SWRCB)	SWRCB is updating the plan to modify water quality objectives for the Lower San Joaquin, Stanislaus, Tuolumne, and Merced Rivers, evaluate and potentially amend existing water quality objectives that protect beneficial reuses and the program of implementation to achieve those objectives, require changes to water rights and other measures to implement changes from the first two phases, and evaluate and potentially establish water quality criteria and flow objectives that protect beneficial reuses on tributaries to the Sacramento River.
Cache Slough Area Restoration	Cache Slough	California Department of Water Resources (CDWR)	Evaluation of restoring areas within the Cache Slough Complex as part of the CDWR and California Department of Fish and Wildlife (CDFW) Fish Restoration Program. The 53,000-acre Cache Slough Complex is located in the northwest corner of the Delta at the downstream end of the Yolo Bypass.
CALFED Bay-Delta Program (CALFED) Levee Stability Program	Sacramento-San Joaquin Delta	USACE	Management of levees to protect agricultural and other resources. Implementation is ongoing.
CALFED Levee System Integrity Program	Sacramento-San Joaquin Delta	CDWR, CDFW, and USACE	Provides for long-term protection of natural resources through maintenance and improvement of the Delta levee system. Goals are to protect life, infrastructure, and properties, and to reduce the risk to land use and associated economic activities, water supply, infrastructure, and ecosystem from catastrophic breaching of Delta levees. Implementation is ongoing.
Calhoun Cut/Lindsey Slough Tidal Habitat Restoration	Cache Slough (Delta)	CDFW	Excavation and placement of fill over 927 acres at the historic Lindsey Slough in the Calhoun Cut Ecological Reserve to reestablish tidal connection to the historic marsh and channel system and enhance existing marsh habitat and associated vernal pools and grassland. Completed in November 2014.

CHAPTER 4.0 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALTERNATIVE PLANS

<b>Project Name</b>	<b>Location</b>	<b>Lead Agency</b>	<b>Summary</b>
California EcoRestore	Sacramento-San Joaquin Delta	California National Resources Agency (CNRA)	Initiative to help coordinate and advance at least 30,000 acres of critical habitat restoration in the Sacramento-San Joaquin Delta. Includes implementation of existing mandates for habitat restoration. Planned to occur through 2020.
California Water Action Plan	State-wide	CDWR	Presents the status and trends of California's water-dependent natural resources; water supplies; and agricultural, urban, and environmental water demands for a range of plausible future scenarios. Evaluates different combinations of regional and statewide resource management strategies to reduce water demand, increase water supply, reduce flood risk, improve water quality, and enhance environmental and resource stewardship. Existing plan was initiated in January 2014; plans are revised every 5 years.
California Water Fix	Sacramento / San Joaquin River Basins	CDWR, BOR, CNRA	Project diverts Sacramento River water at Cortland and Clarksburg into twin tunnels that discharge at Clinton Court Bay 40 miles south. Goal is to make more reliable water deliveries to the State Water Project and the Central Valley Project and better meet the environmental flow requirements in the lower San Joaquin Delta. Project EIS has been released for public review in 2017. Expect implementation to begin in 2025 and 10 years to construct.
Chippis Island Tidal Marsh Restoration	Suisun Marsh	Fishery Foundation of California	Returning 750 acres of island to tidal marsh habitat that can be used by estuarine fish for spawning and rearing.
Cullinan Ranch Restoration Project	Solano County	Ducks Unlimited and U.S. Fish and Wildlife Service (USFWS)	Restoration of diked baylands to tidal marsh. Would serve as a beneficial reuse placement site for millions of cubic yards of dredged material. Construction ongoing since 2011.
Decker Island Tidal Habitat Restoration	East Decker Island	CDWR	Acquisition and restoration of approximately 140 acres of tidal wetlands on Decker Island. Includes breaching the island's perimeter levee to restore tidal hydrology to the site. Construction anticipated for completion in 2020.

CHAPTER 4.0 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALTERNATIVE PLANS

<b>Project Name</b>	<b>Location</b>	<b>Lead Agency</b>	<b>Summary</b>
Delta Islands and Levees Feasibility Study	Sacramento-San Joaquin Delta	USACE	Restoration of approximately 89.5 acres of lost or degraded tidal marsh habitat in the west/central Delta. Involves transporting and placing dredged material (from annual dredging of the Stockton Deep Water Ship Channel [DWSC] and previously stockpiled dredged material from existing dredged material placement sites) into open water. Draft Feasibility Study and EIS released in April 2014.
Delta Long Term Management Strategy	Sacramento-San Joaquin Delta	USACE	Interagency program focused on the development of a comprehensive, long-term management plan for dredged material management in the Delta to maximize beneficial reuse of dredged sediment and streamline permitting.
Delta Wetlands Projects	Sacramento-San Joaquin Delta	Semitropic Water Storage District	Transformation of two low-lying islands to reservoirs to store 215,000 acre-feet of water, and two other islands into 9,000 acres of protected wetlands and wildlife habitat. Reservoir islands will store available water in winter months for beneficial reuse during summer months. Final EIR released in 2011.
Dutch Slough Tidal Marsh Restoration	West Delta	CDWR	Seasonal wetland and tidal marsh restoration of 1,166 acres in the western Delta. Final EIR was released in September 2014.
Franks Tract Project	Sacramento-San Joaquin Delta	CDFW and BOR	Evaluation of installing operable gates to reduce seawater intrusion and positively influence movement of fish species to areas that provide favorable habitat conditions in the Delta. Gates would be operated seasonally and during certain hours of the day, depending on fisheries and tidal conditions. Currently on hold.
Hamilton/Bel Marin Keys Wetlands Restoration - Phase III	Marin County	State Coastal Conservancy and USACE	Placement of dredged material to raise elevations, develop wetlands, and to construct additional levees to protect neighboring communities. Implementation of tidal connectivity via levee breaching. Wetlands restoration has already occurred at the Hamilton Airfield.
Hill Slough Tidal Habitat Restoration	Suisun Marsh	CDFW and private partners	Restoration of tidal marsh and enhancement of upland managed wildlife habitat over 1,750 acres. Design consists of breaching levees, lowering levee segments, and other improvements. Road improvements and

CHAPTER 4.0 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALTERNATIVE PLANS

Project Name	Location	Lead Agency	Summary
			interior site work will begin in 2018, with all inwater construction work taking place in 2019.
In-Delta Storage Project	Sacramento-San Joaquin Delta	CDWR and BOR	Would provide capacity to store approximately 217,000 acre-feet of water in the south Delta for water supply, water quality, and ecosystem benefits. Project includes two storage islands and two habitat islands. Design is similar to the Delta Wetlands proposal from a decade prior, but would also include new embankment design, consolidated inlet and outlet structures, new project operations, and revised Habitat Management Plans. Suspended since July 2006 due to funding issues.
Liberty Island Conservation Bank	Liberty Island	Wildlands, Inc.	Restoration of 186 acres to mitigate permitted impacts to tidal fisheries habitat throughout the Delta, with a permanent conservation easement and a non-wasting long-term endowment to manage the property in perpetuity. Bank is currently active.
Long Term Water Transfers	State-wide, San Luis and Sacramento-San Joaquin Delta	Mendota Water Authority and BOR	Would facilitate transfer of up to 600,000 acre-feet of water per year from willing sellers north of the Delta to buyers south of the Delta or in the Bay Area over a 10-year period. Transfer methods could include groundwater substitution, reservoir release, cropland idling, crop shifting, and conservation. Final EIS/EIR released in March 2015.
Los Vaqueros Reservoir Expansion Project	Los Vaqueros Reservoir	Contra Costa Water District and BOR	Increased the storage capacity of Los Vaqueros Reservoir and diverted additional water from the Delta intake near Rock Slough for additional storage volume. Originally constructed in 1998 and expanded in 2012 to 160,000 AF. CCWD and BOR currently in process of planned expansion to 275,000 AF (2017 Supplemental EIS, BOR).
Lower San Joaquin Feasibility Study	Sacramento-San Joaquin Delta	USACE	Evaluation of whether there is a Federal interest in providing flood risk management and ecosystem restoration improvements along the Lower San Joaquin River.
Lower Yolo Restoration Project	Cache Slough	Westlands Water District	Restoration of approximately 1,670 acres on a site that has historically been used for pasture/cattle grazing. Currently on hold pending ownership issues; expected completion by the end of 2017.

CHAPTER 4.0 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALTERNATIVE PLANS

<b>Project Name</b>	<b>Location</b>	<b>Lead Agency</b>	<b>Summary</b>
Meins Landing Tidal Habitat Restoration	Suisun Marsh	CDWR	Restoration of 666 acres of seasonally managed (non-tidal) marsh in Suisun Marsh, Solano County, to provide a diversity of habitats. Identified as part of the Delta Ecosystem Enhancement Program.
Navigation Improvement from Avon to Stockton	Avon to Stockton – Stockton Deep Water Ship Channel	Port of Stockton	The Port of Stockton may propose to deepen the Stockton Deep Water Ship Channel from Avon to the Port of Stockton in the reasonably foreseeable future. The Port would have to address alternatives and their environmental effects through a separate NEPA and CEQA analysis and obtain approvals and permits from the appropriate resource agencies. The project would be responsible for avoidance, minimization, and mitigation requirements determined to be necessary based on the outcome of the NEPA/CEQA analysis completed for the project. At this time, the project is undefined as to the proposal for navigational depth improvements, as well as timing of proposal.
North Bay Aqueduct Alternative Intake	Sacramento River	CDWR	Construction and operation of an alternate intake that will draw water from the Sacramento River and connect it to the existing North Bay Aqueduct system to provide reliable delivery of water to the Solano County Water Agency and the Napa County Flood Control and Water Conservation District. Would operate in conjunction with the existing North Bay Aqueduct intake at Barker Slough. Final EIR anticipated for release in summer 2016.
Ongoing Maintenance Dredging of Port of Stockton Docks	Stockton	Port of Stockton	Annual maintenance dredging is conducted at the Port of Stockton’s 19 docks. Authorized depths are -35 feet MLLW at 17 docks and -40 feet MLLW at Docks 12 and 13 to accommodate a sediment trap. Dredged material is typically placed at upland placement sites on Roberts and Rough and Ready islands.
Ongoing Operations and Maintenance Dredging of Federal Navigation Channels	Stockton, Sacramento, and John F. Baldwin DWSCs	USACE	Annual maintenance dredging is conducted throughout the Stockton, Sacramento, and John F. Baldwin DWSCs to maintain existing depths, which range from -30 to -35 feet MLLW. Depending on the channel, dredged material is either placed in-bay, at the San Francisco Deep Ocean

CHAPTER 4.0 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALTERNATIVE PLANS

Project Name	Location	Lead Agency	Summary
			Disposal Site, at separately permitted beneficial reuse sites, or at upland placement sites.
Prospect Island Tidal Habitat Restoration	Cache Slough	CDWR	Restoration of 1,316 acres to freshwater tidal wetland and open water (subtidal) habitats to benefit native fish and improve aquatic ecosystem functions. Includes interior grading, vegetation management, possible clean fill import for subsidence reversal, possible weir installation, and breaching of exterior levees. Draft EIR was released in August 2016.
Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes	Sacramento-San Joaquin Delta	USFWS	Addressing recovery needs for several fish species in the Delta. Recovery actions involve increasing freshwater flows; reducing entrainment losses to water diversions; reducing the effects of dredging, contaminants, and harvesting; developing additional shallow-water habitat, riparian vegetation zones, and tidal marsh; reducing effects of toxic substances from urban non-point sources; reducing the effects of introduced species; and conducting research and monitoring. Released in 1996.
Rush Ranch Tidal Habitat Restoration	Suisun Marsh	Solano Land Trust	Restoration, management, and monitoring of wetlands and other shoreline habitat, including the mouth of Spring Branch Creek. Installation and management of public trails over a 2,070-acre area. Initial Study/Mitigated Negative Declaration was released in 2015.
Sacramento River DWSC Deepening	Sacramento River	USACE and Port of Sacramento	Evaluation of deepening and widening the Sacramento River DWSC to improve transportation efficiencies. Draft EIS/EIR released in 2011. Currently on hold.
San Joaquin River Restoration Program: Salmon Conservation and Research Facility	San Joaquin River	CDFW	Program involves construction and operation of the salmon conservation and research facility, reintroducing and managing Chinook salmon in the restoration area, conducting fisheries research and monitoring in the restoration area, and managing and supporting recreation within the restoration area. Draft Environmental Assessment released in January 2016.

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<b>Project Name</b>	<b>Location</b>	<b>Lead Agency</b>	<b>Summary</b>
San Joaquin River Restoration Program	San Joaquin River	San Joaquin River Restoration Program	Comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River and restore a self-sustaining Chinook salmon fishery in the river while reducing or avoiding adverse water supply impacts. First water releases from Friant Dam began in 2009. Restoration flows began in 2014.
Suisun Marsh Habitat Management, Preservation, and Restoration Plan	Suisun Marsh	CDFW, USFWS, BOR, and Suisun Marsh Charter Group	Completed in 2014, plan balances goals of Bay-Delta Program, Suisun Marsh Preservation Agreement, and Federal and state endangered species programs within the Suisun Marsh. Would provide for simultaneous protection and enhancement of: (1) existing wildlife values in managed wetlands; (2) endangered species; (3) tidal marshes and other ecosystems; and (4) water quality (including maintenance and improvement of levees). Implementation occurring over 30 years.
Tule Red Restoration	Suisun Marsh	Westervelt Ecological Services, Inc.	Will restore over 400 acres of tidal wetlands in the Suisun Marsh. Construction was completed in the fall of 2018.
Upgrade of Facilities to Restore Delta Smelt and Other Native Aquatic Species	Rio Vista	USFWS, BOR, CDWR, and CDFW	Development of a permanent fish restoration facility in Rio Vista as part of the 2009 Interim Federal Action Plan for the Delta and upgrades to the existing facility to serve as an interim restoration propagation facility until the Rio Vista facility is operational.
Upper San Joaquin River Basin Storage Investigation	San Joaquin River	BOR	Investigation considered alternatives for storage of water from the upper San Joaquin River watershed. Goals are improving water supply reliability and operational flexibility in the Central Valley, San Joaquin Valley, and other regions of California, and enhancing water temperature and flow conditions in the San Joaquin River. Draft EIS released in August 2014.

**Table 4-28. Cumulative Effects.**

Resource	Past and Present (Existing Condition)	Proposed Action (Recommended Plan)	Cumulative Effects (with consideration of future projects)
Sediment and Sedimentation	Continued dredge maintenance and use of the navigation channels will continue but would not incrementally contribute to any cumulative effects on sediment quality within the study area.	Sediment testing has shown low levels of contamination and was determined suitable for in-bay, wetland, or upland beneficial reuse. All required testing and coordination will be completed prior to construction of the project.	Projects in <b>Table 4-27</b> may affect sediment quality within the study area. Any such projects would be required to undergo separate environmental review and to implement avoidance and minimization measures as needed to address such impacts. Therefore, it is therefore anticipated that any present or foreseeable projects would result in less than significant impacts to these water quality parameters.
Water quality and Hydrology	Present conditions would not degrade water quality through alteration of temperature, salinity, pH, and dissolved oxygen/ increased turbidity, or nutrient loading; continued maintenance and use of the navigation channels would not incrementally contribute to any cumulative adverse effects.	The Recommended Plan-related shift of X2 of between 0.17 and 0.27 km would not be individually significant and should not contribute to cumulatively significant impacts when considered in combination with other known past, present, or future activities within the study area. This small change in X2 position is likely to intermittently result in relatively small reductions in Delta Export pumping when other export constraints are not controlling. However, these reductions are expected to not be significant and may be partially or wholly mitigated by small increases in export pumping during periods when X2 and other constraints are not limiting.	The less than significant change in X2 position from the Recommended Plan is likely to be relatively unaffected in the future due SWP/CVP responses to climate change. The Year 50 analysis shows that due primarily to projected sea level rise, the X2 isohaline will move upstream by a distance of 4 km unless significant changes are made to water management operations. However, despite this large change in X2 due to sea level rise under future baseline conditions the predicted effect of the Recommended Plan under these conditions was predicted to be similar to the effect under existing conditions. This suggests that the Recommended Plan effects are likely to be relatively unaffected by cumulative changes resulting from other projects in the Delta. The change in X2 is more

			<p>than 10 times greater than the predicted change in X2 associated with implementation of this project. This is an indication that the current water management operations and facilities will have to undergo significant change under any scenario if environmental and water quality/supply targets are to be met in the future. The California Water Fix project currently planned for implementation by 2035, is an example of the kind of large-scale infrastructure project needed to ensure delivery of SWP/CVP water and protect the Delta ecosystem. If the Waterfix project or a similar project is implemented, a large fraction of SWP/CVP water will be diverted from Sacramento River water will bypass the Delta. In this case, the less than significant impact of this project on water supply operations could be diminished since Delta export pumping will be less influenced by the X2 position criteria.</p> <p>The depth, timing, and complete project description associated with a navigational deepening project from Avon to the Port of Stockton is currently unknown. In 2016, prior to the reduction in scope for the current Recommended Plan, a salinity analysis considering depths ranging from -37 feet to -38 feet was developed. The modeling scenarios to deepen the channel to -37 and -38 feet showed slightly greater impacts than</p>
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			<p>the recommended plan. Additional modeling would need to be completed by the project to assess and understand the Avon to Port of Stockton deepening project's impacts and how those impacts would contribute to cumulative effects on water quality and salinity intrusion in conjunction with projects throughout the area. Depending on the proposed project depth (and other project description variables), the potential Avon to Port of Stockton deepening project may result in significant cumulative effects to water quality. Further study is needed. The project would be responsible for environmental documentation and, if necessary, implementing avoidance, minimization, and/or mitigation measures to offset or reduce environmental impacts that would result from channel deepening.</p>
Climate change	<p>Because the existing conditions does not include construction and does not increase ship calls as compared to the NEPA baseline, it would not result in additional GHG emissions. Therefore, the No Action Alternative would not conflict with any applicable plans, policies, or regulations adopted to reduce GHG emissions and there would be no impact as compared to the NEPA baseline.</p>	<p>GHG emissions are inherently cumulative and any incremental amount of emissions contributes to global warming. No specific cumulative quantitative level of GHG emissions from related projects in the region or state-wide has been identified which no impacts would occur. Therefore, it is conservatively assumed that any additional emissions related to the proposed project would represent a short term cumulative impact.</p>	<p>Current and future projects would incorporate a variety of GHG reduction measures in response to a variety of rules and measures. However, because GHG emissions are inherently cumulative and any incremental amount of emissions contributes to global warming, no specific cumulative quantitative level of GHG emissions from related projects in the region or statewide has been identified to which no impacts would occur. Therefore, it is conservatively assumed that the any</p>

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			additional emissions represent a significant cumulative impact.
Biological Resources	Current maintenance dredging would continue to alter the bottom habitat without the proposed project. The maintenance dredging of the current navigation channel for Pinole Shoal is a two year cycle and for Bulls Head Reach a one year cycle.	The proposed project would deepen the existing channel by 3 feet, with maintenance dredging every 2 years. Effects would be similar to the current maintenance dredging operations. The additional 3 feet in Pinole Shoal and 4-5 feet of dredging in Bulls Head Reach would affect delta and longfin smelt habitat (see BA in the Environmental Appendix) by removing some existing habitat along the bottom of Suisan Bay and the side slopes in Pinole Shoal. These impacts are expected to be offset by the use of dredged material at Cullinan Ranch and Montezuma Wetlands, which have both been shown to benefit smelt and other listed species.	The proposed project may result in a cumulative effect in concert with reasonably foreseeable future projects, specifically channel deepening from Avon to the Port of Stockton. Based on the existing 2019 salinity modeling for the Recommended Plan and modeling conducted in 2016, effects of deepening from Avon to the Port of Stockton would be greater than the current Recommended Plan, depending on the channel depth proposed. Depending on the effect of the deepening the channel to the Port of Stockton on the change in X2, the EIS/EIR for the Avon to the Port of Stockton project would be responsible for addressing any environmental or biological effects. If the Port of Stockton pursues a deepening from Avon, additional analysis on the X2 position would likely be performed. The Port of Stockton would address any environmental impacts related to their proposed alternatives under a separate NEPA and CEQA analysis and consultation with the appropriate resource agencies.
Land Use and Planning	The No Action would be unchanged from present conditions and does not introduce land uses or activities that are incompatible with existing land uses within the study area,	Dredging to 38 feet and subsequent maintenance and use of the deepened channel would be very similar to the No Action Alternative. The potential for incompatible land use conflicts to occur	No significant cumulative effects are expected to land use due to implementation of the proposed action or future actions within the existing navigation channel.

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	continued maintenance of the navigation channels would not add incremental impacts to any cumulative land use conflicts that may occur when considered in combination with other actions within the study area.	would be less than significant. As a result, this alternative is not expected to contribute incrementally to land use conflicts that may occur within the study area when considered in combination with other unrelated activities.	
Aesthetics	The No Action Alternative would be unchanged from present conditions and does not impact existing scenic vistas, continued maintenance of the navigation channels would not add any incremental aesthetic issues.	The views of construction equipment would be from a distance, depending on the location of the viewing point, and these views would be temporary. Views of various maritime activities are typical along the route. The proposed project would not result in individual or cumulative impacts to existing scenic vistas and/or visual character when considered in combination with other unrelated activities within the study area.	The proposed project would not result in individual or cumulative impacts to existing scenic vistas and/or visual character when considered in combination with other activities within the study area.
Cultural Resources	Existing conditions would not change due to the maintenance dredging of the existing navigation channels.	The proposed project is not expected to result in significant cumulative impacts to cultural resources.	The proposed project is not expected to result in significant cumulative impacts to cultural resources when considered in combination of other past, present, and reasonably foreseeable impacts in the future.
Environmental Justice	The No Action Alternative would not disproportionately affect communities within the APE, continued maintenance and shipping use of the navigation channel would remain the same.	The proposed project would not disproportionately affect communities within the APE. The proposed project is within a current Federal navigation channel that is routinely dredged on a yearly basis.	The proposed project would not result in cumulatively considerable impacts when considered in combination with other past, present, and reasonably foreseeable future activities within the APE, the study area as a whole, and the surrounding 7-county region.

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<p>Navigation, Transportation, and Circulation</p>	<p>The No Action Alternative would be unchanged from present and anticipated future conditions, it would not contribute to any cumulative effects related to changes in vessel traffic patterns, unplanned or regularly occurring delays, freedom of movement, increased safety risks, or safety hazards.</p>	<p>Vessel traffic would not increase under the proposed project and traffic would continue to be controlled by Vessel Traffic Services implementing Federal and state rules of navigation.</p>	<p>Numerous types of vessel use occur in the Bay, and increases in these uses over time are expected. Construction or operation of other projects described in Table 4-27 could contribute to a short- or long-term increase in vessel traffic in the Bay.</p> <p>The Recommended Plan could contribute to changes in vessel traffic patterns if the SDWSC were deepened by others subsequent to construction. However, unplanned or regularly occurring delays or freedom of movement should not be affected. In addition, the Recommended Plan should decrease navigational safety risks/hazards when considered in combination with other past, present, and reasonably foreseeable future activities within the study area.</p>
<p>Noise</p>	<p>Continued maintenance dredging would continue to occur within the navigation channel.</p>	<p>Noise generated by construction activities would have a slightly longer duration in any given area along the path of the navigation channels compared to routine existing maintenance dredging operations. The rocky obstruction would be removed using a jackhammer, producing underwater noise that is discussed in the Biological Resources section and the Biological Assessment.</p>	<p>The proposed project would not result in significant individual or cumulative noise impacts within the study area when considered in combination with other noise generating activities.</p>
<p>Public Health and Environment</p>	<p>Continued maintenance and use of the navigation channels would not affect public health.</p>	<p>The proposed project is not expected to affect any hazardous material sites.</p>	<p>It is unlikely that the present or foreseeable future projects listed in <b>Table 4-27</b> would be located on hazardous material sites, or would</p>

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<p>ntal Hazards</p>			<p>affect management of any such sites. The proposed project should not incrementally contribute to any significant cumulative hazards to the public or the environment when considered in combination with other past, present, and/or reasonably foreseeable actions within the study area.</p>
<p>Recreation</p>	<p>Continued maintenance of the navigation channels would not contribute incrementally to any cumulative adverse effects on recreation when considered in combination with other activities within the study area.</p>	<p>The proposed project would comply with current Federal, state, and local agency regulations and policies regarding recreation and would not contribute incrementally to any cumulative adverse effects on recreation when considered in combination with other activities within the study area.</p>	<p>Activities associated with implementation of this alternative would comply with current Federal, state, and local agency regulations and policies regarding recreation and would not contribute incrementally to any cumulative adverse effects on recreation when considered in combination with other activities within the study area.</p>
<p>Socioeconomics</p>	<p>Continued maintenance of the navigation channels would have no influence on population trends, regional employment, spending patterns, or community resource needs.</p>	<p>The proposed project would not affect regional employment, spending and earning patterns, or community resources. Other projects in the area would have a greater cumulative influence on these socioeconomic variables.</p>	<p>Due to the size and stability of the regional economy, the cumulative effects of this alternative in combination with all other reasonably foreseeable activities would remain less than significant.</p>
<p>Utilities and Public Service</p>	<p>The existing conditions would not affect buried underwater cables and pipelines or overhead transmission lines Continued maintenance and use of the navigation channels would not incrementally contribute to any cumulative effects that other unrelated actions within the study</p>	<p>The proposed project is not expected to adversely affect the utilities that cross the navigation channels.</p>	<p>The channel deepening activities would not add to any cumulative impacts on utilities within the study area when considered in combination with the effects of other past, existing, and/or future projects and activities in the area regardless of their origin.</p>

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	area may have on these utility resources.		
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## 4.8 RECOMMENDED PLAN

Under the definition of the National Economic Development (NED), the -38 foot deepening alternative with the sediment trap and removal of the Pinole Shoal channel rocky obstruction reasonably maximizes net benefits, and is therefore identified to be the NED plan. Since there is not a locally preferred plan, this is also the Recommended Plan.

The environmental evaluation shows minimal changes between the -37 foot, -38 foot, and -38 foot with sediment trap and removal of rocky obstruction alternatives, with the exception of the shift in X2. The sediment trap produces a slightly greater shift in the X2 from the -38 foot alternative, however, the addition of the sediment trap removes the need for interim emergency dredging operations in the Bulls Head Reach area. The beneficial reuse of material in each alternative is the least cost placement alternative. Additionally beneficial reuse contributes to habitat needed for several species throughout the Delta, including the endangered delta smelt. Because effects from the Recommended Plan were found to be less than significant, mitigation is not expected to be required.



5

The Recommended Plan

## 5 THE RECOMMENDED PLAN

This chapter discusses the details of The Recommended Plan discussed in this chapter include material quantities and classifications, operations and maintenance, dredged material placement, cost, risk and uncertainty.

### 5.1 OVERVIEW OF THE RECOMMENDED PLAN



Refer to the Executive Summary foldout as a reference map and consolidated graphic.

No locally preferred plan (LPP) has been identified. Therefore, the Recommended Plan is the -rocky obstruction. The Recommended Plan proposes to deepen the existing maintained channel depth of the Pinole Shoal Channel and the Bulls Head Reach portion of the Suisun Bay Channel from -35 feet MLLW to -38 feet MLLW, with approximately 13.2 miles of new regulatory depths. Approximately 10.3 miles of the Pinole Shoal Channel (stations 0+00 to 548+00) and all 2.9 miles of the Bulls Head Reach to Avon (stations 0+00 62+00 and 88+00 to 160+00) would be dredged. A 2,600 foot-long sediment trap (width = 300 feet) would be constructed at Bulls Head Reach (located between stations 62+00 and 88+00 of the Bulls Head Reach in the area currently subject to annual advance maintenance dredging to a depth of -38 feet), with a depth of -42 feet MLLW, plus 2 feet of overdepth. The sediment trap would be maintained at -42 feet MLLW during future maintenance dredging to reduce rapid shoaling in the channel and emergency maintenance.

The Recommended Plan proposes the following:

- Deepen the existing maintained channel depth of the Pinole Shoal Channel and Bulls Head Reach (Suisun Bay) from -35 feet to -38 feet MLLW, with approximately 13.2 miles of new regulatory depths
- Dredge a 2,600 foot sediment trap at Bulls Head Reach with a depth of -42 feet MLLW, plus 2 feet of overdepth.
- Level the rocky obstruction located to the west of Pinole Shoal from -39.7 ft. MLLW to -43 feet MLLW
- Beneficially reuse the dredged material

If the entire overdepth prism were dredged, the Recommended Plan would result in approximately 1.6 million cubic yards of dredged material from an approximate 318-acre footprint. The breakout of volumes for each feature is shown as follows:

- Pinole Shoal Channel deepening = 1,443,900 cy
- Bulls Head Reach deepening = 38,700 cy
- Bulls Sediment Trap & Overdepth 2 feet = 120,600 cy
- Rocky obstruction (Pinole Shoal Channel) = 40 cy of rock (950 sq. ft.).

All construction is expected to occur during the existing environmental work windows developed by the San Francisco Bay Long Term Management Strategy for the Placement of Dredged Material unless other work windows are developed during consultation with the resource agencies. The environmental work window for the Pinole Shoal Channel is from June 1 through November 30 and the work window for the

Bulls Head Reach portion of the Suisun Bay Channel is from August 1 through November 30. All dredging for this channel deepening project will be conducted using a clamshell dredge including at Pinole Shoal, which typically is maintained using a hopper dredge.

It is assumed that the timing of the channel deepening will occur immediately after completion or concurrent with the O&M dredge cycle within each reach. Although feasible, dredging contract acquisition approach and timing is tight for accomplishment of both O&M dredging and channel deepening in one environmental work window therefore, this avoidance measure does carry some risk. Should dredging extend past the environmental work window, additional coordination would immediately be initiated with the appropriate agencies.

The environmental work window for O&M dredging is the same as the work window for the deepening project, which begins 1 June. O&M dredging in Pinole Shoal Channel can be completed within approximately 10 to 20 days with a hopper dredge, depending on the volume of material to be dredged. O&M material would be placed at in-bay sites SF-10 and SF-16, according to the Federal standard.

New construction dredging for the Recommended Plan could begin as early as the beginning of June, with an estimated construction duration of 3.5 months. New construction material from Pinole Shoal channel would be placed at Cullinan Ranch; new construction material from deepening Bulls Head Reach would be beneficially used at a suitable and permitted site, currently assumed to be Montezuma Wetlands. The beneficial reuse placement at Cullinan Ranch and Montezuma Wetlands is currently assumed to minimize effects to special status species and essential fish habitat, offsetting the minimal effects of the change in salinity. The Recommended Plan has estimated average annual net benefits of \$10.5 Million (fiscal year 2020 price levels, 2.75% discount rate).

The only utility within the vicinity of the project footprint is the Trans Bay Cable. As-built drawings indicate that the trans-bay cable crosses the Pinole Shoal in two locations; however, in both locations, the As-Built drawings indicate the trans-bay cable is buried to a depth that is approximately -48 to 49 feet MLLW for both crossing locations. The cable utility does not intersect the other Federal channels in the remainder of the project footprint. Therefore, it has been determined that the trans-bay cable utility will not be impacted by the Recommended Plan and no relocations would be needed.

## 5.2 MATERIAL QUANTITIES AND CLASSIFICATIONS

The Recommended Plan proposes dredging and placement of a total of approximately 1.6million cubic yards (cy) of material. Of that total amount, approximately 1,443,900 cy material would be placed in the Cullinan Ranch Site and roughly 159,300 cy of material would be used in Montezuma Wetlands Restoration Site, as shown in **Table 5-1**.

**Table 5-1. Project Features and Associated Dredging Volumes.**

<b>CHANNEL</b>	<b>QUANTITY (CY)</b>	<b>PROPOSED PLACEMENT</b>	<b>CLASSIFICATION</b>
Pinole Shoal Channel (STA 0+00 to STA 547+00)	1,443,900	Cullinan Ranch	Silty Sand/Clayey Sand
Suisun Bay Channel (STA 0+00 to STA 62+00 and STA 88+00 to 160+00)	38,700	Montezuma Wetland	Silty Sand/Clayey Sand
Bulls Head Reach Sediment Trap (STA 62+00 to 88+00)	120,600	Montezuma Wetland	Silty Sand/Clayey Sand
Rocky Obstruction Leveling	40 cy	Sidecast	Rock
<b>TOTAL ESTIMATED DREDGING QUANTITIES</b>	<b>1,603,200</b>		

## 5.3 MITIGATION

The Recommended Plan was determined to have less than significant effects on all resources, as described further in Chapter 4 of this integrated document. As such, mitigation is not expected to be required.

## 5.4 CONSTRUCTION ASSUMPTIONS

### INITIAL DEEPENING WORK/DREDGING

It is assumed that the timing of the channel deepening will occur immediately after completion or concurrent with the O&M dredge cycle within each reach. Although feasible, dredging contract acquisition approach and timing is tight for accomplishment of both O&M dredging and channel deepening in one environmental work window therefore, this avoidance measure does carry some risk. Should dredging extend past the environmental work window, additional coordination would immediately be initiated with the appropriate agencies.

The O&M dredging event in Pinole Shoal Channel will remove the material above -35-ft MLLW plus up to 2-ft overdepth, to be disposed at the “Federal standard” placement site in San Pablo Bay, SF-10. The environmental work window for O&M dredging is the same as the work window for the deepening project, which begins 1 June. O&M dredging in Pinole Shoal Channel can be completed within approximately 10 to 20 days with a hopper dredge, depending on the volume of material to be dredged. O&M material would be placed at in-bay sites SF-10 and SF-16, according to the Federal standard.

The following construction assumptions were used for cost estimating purposes for the channel deepening elements of the Recommended Plan:

- Two dredge plants will be used with 21-CY clamshell buckets in the Pinole Shoal Channel
- Four 2,000 CY scows and two 1,800 HP tug boats will be used for dredged material placement at Cullinan Ranch from Pinole Shoal Channel
- One 21-CY clamshell dredge plant will be used in the Bulls Head Reach Channel

- Two 4,000 CY scows and one 1,800 HP tug boat for placement at Montezuma Wetlands Restoration Project From the Bulls Head Reach Channel

The dredged material will be hauled by scow from the Pinole Shoal channel to the Cullinan Ranch beneficial reuse placement site, and dredged material from the Bulls Head Reach channel will be hauled to the Montezuma Wetlands Restoration Project site where off-loaders will be stationed to unload scows and pump the dredged material into both sites. The Napa River that leads to the Cullinan Ranch site is too shallow for fully loaded 4,000 CY scows, so it is assumed that the scows will be loaded to only 65 percent of their capacity, or less, in order to transit to the off-loader location. It is also possible that the contractor may use 2,000 CY scows that can be fully loaded.

Utilizing two dredge plants for dredging in Pinole Shoal Channel and placement of dredged material at the Cullinan Ranch site, and one dredge plant in Bulls Head Reach channel with dredged material placement at the Montezuma wetlands site, the total construction duration for the dredging component of the Recommended Plan is estimated at 4.6 months.

Although the method described above is assumed for cost estimating purposes, other methods could be used during construction and are described in the **Appendix A, Civil Site**.

All dredging is assumed to begin at the western end of the Pinole Shoal Channel, where the previously discussed rock formation is located, and progress easterly to the end of the project boundary at the Avon terminal in the Bulls Head Reach channel.

A brief bulking analysis has been conducted for initial placement of material in **Appendix A, Civil Site** and concludes that the effect of bulking of the material from this project is significantly low. A more detailed analysis will be performed during the pre-construction and engineering design (PED) phase to reevaluate the dredge material quantity from the new work and other factors that may impact project cost including bulking.

### ROCKY OBSTRUCTION

A buried rock formation posing a potential navigation hazard per San Francisco Bay Bar Pilots just outside of the Recommended Plan footprint but within the Federal Channel was recently surveyed and was found to be at approximately -39.7-ft MLLW. The rock formation will be lowered so that there is a minimum of 3-ft of additional clearance below the 2-ft of overdepth tolerance, to approximately -43-ft MLLW for the -38-ft depth. Although the rock formation has not been specifically sampled, it is assumed that because of its predicted hardness, the removal will likely require using a pneumatic jack-hammer attachment that would be mounted to an excavator mounted on a work barge. The jack-hammer would chisel the rock down to the desired elevation and the material would likely fall to the bay floor where it is naturally deep. The estimated quantity of rock to be removed is approximately 40 cubic yards (CY) to achieve a safe navigation depth of -43-ft MLLW for the -38-ft Recommended Plan depth, within an area of approximately 950 square feet.

### AIDS TO NAVIGATION

In addition to the utilities discussed above, eight of the existing navigation aids along the Pinole Shoal Channel and Bulls Head Reach were found to be within the channel slope. The aids can be moved out of

the way temporarily until the dredging of the proposed project side slopes is completed and repositioned to the appropriate location. The cost associated with the temporary removal and reinstallation for these navigation aids has been included in the project first cost estimate; however, Relocation, establishment, and disestablishment of aids to navigation are to be funded by the United States Coast Guard (USCG). Coordination between USACE and the USCG will be initiated during the feasibility phase and will continue during Pre-construction, Engineering, and Design (PED) phase.

## 5.5 DREDGED MATERIAL PLACEMENT SITES

During initial construction, the Recommended Plan must use placement sites that are cost effective and can also accept the dredged material from these channels. The following sections outline where material will be placed during initial construction and assumptions to date.

For the purposes of cost estimating, it is assumed that material will be beneficially used at Montezuma Wetlands and Cullinan Ranch, which was determined to be the least cost placement option. Confirmatory sediment testing of the dredged material will take place during PED, and based upon testing results, these sites could require reevaluation at that time. Other beneficial reuse sites (i.e. Delta Islands) may be more appropriate and will be re-assessed during PED.

### 5.5.1 MONTEZUMA WETLAND RESTORATION SITE (MWRP)

Placement at Montezuma Wetlands Restoration Project (MWRP) meets one of the project objectives to beneficially use material. The approximately 1,800-acre Montezuma Wetlands Restoration Project is a privately owned and operated wetland restoration project located adjacent to Montezuma Slough in northern Honker Bay. It is located on the eastern edge of Suisun Marsh, west of Collinsville, in Solano County. In the early 1900s, the site was diked, drained, and used for agriculture. Since the site was diked, the land has subsided up to 10 feet and dredged material is being used to raise site elevations for wetland restoration. The site can take both clean cover material and material with elevated concentrations of constituents of concern, as long as this sediment is buried under 3 feet of clean cover material. Montezuma Wetlands has approximately 12 million tasks associated with removing sediment from the scows, drawing water from Montezuma Slough to slurry material in the scows, managing the sediment on-site including decanting water and water quality monitoring are separately permitted under the Montezuma Wetland water quality certification. The average haul distance from the Suisun Bay Channel area to the MWRP off-loader is 13 miles. MWRP contains its own plan in phases to achieve restoration; therefore, once the material is offloaded onto the site, MWRP is responsible for any monitoring and restoration achievements. This project is contributing to the restoration benefits by providing dredged material.

### 5.5.2 CULLINAN RANCH TIDAL RESTORATION SITE

Placement at Cullinan Ranch Wetland Tidal Restoration Site meets one of the project objectives to beneficially use material. Cullinan Ranch Wetland Restoration Site is a 1,575 acre parcel in the San Pablo Bay National Wildlife Refuge. It was originally purchased by the USFWS for the purpose of increasing habitat for salt marsh harvest mouse and California clapper rail. Located in Solano County near the city of Vallejo, the southern property boundary of the parcel is a naturally formed levee that is the base for State Highway 37. The western property boundary of the parcel comprises Dutchman Slough and South Slough, both of which flow into nearby Napa River. Cullinan Ranch is a tidal restoration project with the goal of restoring diked baylands to historic tidal marsh conditions by using dredged material to raise site elevations by approximately 6 feet. There is currently capacity for up to 2.4 million cubic yards of dredged

material. The sediment from the project will be used to raise up to 290 acres of the site to marsh plain elevation. The site has two permitted locations for an off-loader to moor, both located in Napa River, north and south of the mouth of Dutchman Slough, respectively. The average haul distance from the Pinole Shoal Channel area to the Cullinan off-loader is 10 miles. Cullinan Ranch contains its own plan in phases to achieve restoration; therefore, once the material is offloaded onto the site, Cullinan Ranch is responsible for any monitoring and restoration achievements. This project is contributing to the restoration benefits by providing dredged material. Cullinan Ranch is a tidal restoration project with the goal of restoring diked baylands to historic tidal marsh conditions.

### 5.5.3 SAN FRANCISCO DEEP OCEAN DISPOSAL SITE (SF-DODS)

It is not anticipated that this site will be used – however, should the above sites not be available at the time of construction, and should other beneficial reuse sites not be available, this site does have adequate capacity and would be used as a last option. The SF-DODS is located in the Pacific Ocean, approximately 55 nautical miles west of the Golden Gate Bridge. The site is approximately 70 nautical miles from the beginning of the Pinole Shoal Channel and approximately 88 miles from the beginning of the Suisun Bay Channel. The site was established in 1994 by the Long Term Management Strategy agencies, and is managed by the EPA Region 9.

## 5.6 OPERATION AND MAINTENANCE

Existing O&M dredging requirements would increase by the amounts as shown in **Table 5-2**. O&M material from Pinole Shoal and Suisun Bay will continue to be placed in the in-bay placement sites SF-10 and SF-16, respectively. The water quality permit issued to USACE for programmatic O&M dredging in the region shows that USACE is currently permitted to use a 3.5 MCY capacity of in-bay disposal over a 5 year period. It is estimated that Pinole Shoal Channel O&M volumes will increase from 127,500 to 175,900 cy to be dredged every other year and Bulls Head Reach O&M volumes will increase from 25,000 to 54,600 cy to be dredged annually (inclusive of the sediment trap), as shown in **Table 5-2**.

The water quality permit for the regional O&M program is currently in the process of being re-negotiated for the next 5 year period. Coordination between the study team and San Francisco Bay Regional Dredge Technical Specialist will continue to ensure the revised permit includes O&M estimates for this project. See **Appendix J, Plan for Management of Dredged Materials**, for additional detail. This information will be incorporated into the next San Francisco Bay Dredged Material Management Plan (DMMP) update.

**Table 5-2. Estimated Future O&M Volumes.**

Channel	Dredge Type	Typical O&M Dredging Frequency (years)	Median O&M Volume Dredged Annually (CY)	Estimated O&M Annual Increase (cy)	Future Estimated Annual O&M Total (cy)	Federal Placement Site
Pinole Shoal Channel (STA 0+00 to STA 547+00)	Hopper	2 <sup>15</sup>	127,500	48,400	175,900	SF-10 (San Pablo Bay)
Bulls Head Reach (STA 0+00 to STA 62+00 and STA 88+00 to 160+00)	Clamshell	1	25,000	20,700	45,700	SF-16 (Suisun Bay)
Bulls Head Reach (Advance Maintenance Area) Sediment Trap*(STA 62+00 to 88+00)	Clamshell	1	0	8,900	8,900	SF-16 (Suisun Bay)
<b>TOTAL DREDGING QUANTITIES</b>			<b>152,500</b>	<b>78,000</b>	<b>230,500</b>	
<b>*Sediment trap currently does not exist, but material is removed annually from the advance maintenance area.</b>						

**5.6.1 SEDIMENT TRAP**

The shoal rate for the Bulls Head Reach was determined independently based on the shoal analysis in **Appendix B, Water Resources**. The analysis determined that if a sediment trap was excavated to a depth 4-ft deeper than the rest of the Bulls Head Reach channel, the sediment trap would provide sufficient capacity for the annual channel shoaling that has been typically encountered. This will allow the entire Suisun Bay Channel to be maintained with dredge events only 2 out of every three years (ie: annual dredging for two years sequentially and able to forego the consecutive dredging event each third year), and without the need for interim emergency dredging.

<sup>15</sup> The Corps proposes to return to annual dredging of Pinole Shoal beginning in 2020. However, coordination with State agencies is ongoing. Therefore, this document will assume that Pinole Shoal dredging is biannual.

## 5.7 BENEFITS OF THE RECOMMENDED PLAN

### 5.7.1 ECONOMIC COSTS AND BENEFITS

**Table 5-3** below, shows the economic Recommended Plan, The economic cost shown below varies slightly from the project first cost shown earlier in Chapter 3 for a few reasons. First, the sediment trap costs as well as the sediment trap savings benefits were included in the below final analysis (and were not included in the Chapter 3 final array analysis). Second, this summary includes Interest During Construction (IDC), described in the section below, as well as OMRR&R. Finally, this table shows a refinement in project first cost, to include a risk-based contingency which is periodically updated as new information becomes available. The benefit to cost ratio is justified (over 1.0) at 4.4 to 1. More details on this analysis can be found in the **Appendix D, Economics Analysis**.

**Table 5-3. Summary of Economic Costs - Recommended Plan Net Benefits and BCR.<sup>16</sup>**

Project (Depth)	38 foot deepening
Project First Cost	\$ 57,240,000
Interest During Construction (IDC)	\$ 470,000
Total Economic Costs with IDC	\$ 57,710,000
Annualized Economic Cost & IDC	\$ 2,053,000
OMRR&R Cost	\$ 1,030,000
TOTAL ECONOMIC AVERAGE ANNUAL COST	\$ 3,083,000
Annualized Transportation Cost Savings (Benefits)	\$ 12,885,000
Annualized Sediment Trap Cost Savings (Benefits)	\$ 682,000
TOTAL AVERAGE ANNUAL BENEFITS (Deepening + Sediment Trap)	\$ 13,567,000
AA Net NED Benefits	\$ 10,484,000
BCR (x:1)	4.4

### INTEREST DURING CONSTRUCTION

Interest during construction (IDC) accounts for the opportunity cost of expended funds before the benefits of the project are available and is included among the economic costs that comprise the recommended plan project costs. The amount of the pre-base year cost equivalent adjustments depends on the interest rate; the construction schedule, which determines the point in time at which costs occur; and the magnitude of the costs to be adjusted. Pre-construction, Engineering, and Design (PED) costs are included in the IDC as well as construction costs and durations. The IDC calculation includes 6 months for construction activities.

<sup>16</sup> The summary reflects the FY2020, 2.75% discount rate, annualized over 50 years.

## 5.7.2 BENEFITS WITH REGARD TO THE FOUR P&G ACCOUNTS

As mentioned earlier in the Plan Formulation Rationale, the four accounts NED, RED, EQ and OSE are always used as criteria in formulation and selection of a plan, in addition determining the plan with the highest net benefits and a justified benefit to cost ratio. These points are listed and briefly summarized below.

### NATIONAL ECONOMIC DEVELOPMENT (NED)

This project reasonably maximizes net benefits in the amount of \$10.5 million average annual net benefits. The project allows tankers to utilize more of their existing capacity, reducing the amount of vessel transits in the future with-project compared to the future without-project scenario. By doing so, it provides transportation cost savings to the oil refineries, which is then passed on to the regional and national consumers who use the end product of the crude oil for gasoline, etc.

### ENVIRONMENTAL QUALITY (EQ)

This project reduces the amount of vessel transits in the future with-project scenario, and by reducing the number of vessels could also reduce any disruptions to the environment as vessels transit, as well as further reducing the risk of oil spills. Beneficial reuse of material would not only offset any immediate effects but would contribute to the creation of additional habitat for delta smelt.

### REGIONAL ECONOMIC DEVELOPMENT (RED)

This project would likely temporarily stimulate the regional economy during construction.

### OTHER SOCIAL EFFECTS (OSE)

Through beneficially using material to wetland sites, this project would also help provide resiliency and storm surge protection of the established infrastructure in the developed areas that surround the general bay area. One viable beneficial reuse for the dredged material from this project is as fill material to raise grades in the wetlands and tidal marsh areas adjacent to the bays in order to accelerate their development. Additionally, benefits of removing the rocky obstruction will greatly add to the navigability of the channels for harbor pilots.

## 5.7.3 INCREMENTAL ANALYSIS OF THE SEDIMENT TRAP

A shoal analysis was performed on this area of the channel in 2015, entitled Bulls Head Deposition HydroSurvey Tech Memo, April 2015. The analysis recommends continuing advance maintenance (currently at -37 feet MLLW + 2 feet of overdepth in the advance maintenance area), or construct a permanent sediment trap between STA 62+00 and STA 88+00 to a depth of -42 feet MLLW for the -38 feet MLLW Recommended Plan depth. The proposed sediment trap in Bull Head Reach channel will be excavated to a depth that will be 4ft below the selected alternative depth and will also have 2 ft of allowable overdepth, and side slopes that are cut at a 3H: 1V horizontal to vertical ratio. The location of the proposed sediment trap is based on historical hydrographic survey data from the previous 17 years. The historical survey data indicates that this area of the Bulls Head Reach channel shoals in at a much higher rate than the rest of the Suisun Bay Channel.

The sediment trap is an added benefit for channel users and is included as a feature of the alternative plans as a separable element with stand-alone benefits and savings (**Table 5-1**). It is proposed in an area that typically needs to be dredged annually, at an estimated cost of \$1 million each year (based on historical use of a clamshell dredge). The sediment trap would reduce the maintenance requirements to 2 dredging cycles every 3 years, resulting in a cost savings associated with a reduction in the frequency of maintenance dredging. This creates a net present value savings of \$18 million, with an average annual equivalent savings of \$680,000 per year over a 50 period of analysis at a FY2020 discount rate of 2.75%.

A more detailed incremental analysis of the costs and benefits associated with the proposed sediment trap are included in **Appendix D, Economic Analysis**, while additional information on the historical and annual dredging activities can be found in **Appendix A, Civil Site**.

**Figure 5-1. Sediment Trap Cost Savings Analysis.**

O&M Alternatives	Total Present Value	Average Annual O&M Cost
Maintenance Costs without Project, with existing emergency maintenance	\$26,997,170	\$1,000,000
Maintenance Costs with-Project, without Sediment Trap	\$26,997,170	\$1,000,000
Maintenance Costs with-Project, with Sediment Trap	\$8,586,679	\$318,058
Savings (Benefits)	\$18,410,491	\$681,942
Sediment Trap Net Benefits	-	\$363,884
Sediment Trap BCR	-	1.9

## 5.8 FEDERAL IMPEMENTATION RESPONSIBILITIES

Under the Water Resources Development Act (WRDA) 1986, as amended by Section 201 of WRDA 1996, Federal participation in navigation projects is limited to sharing costs for design and construction of the general navigation features (GNF) consisting of breakwaters and jetties, entrance and primary access channels, widened channels, turning basins, anchorage areas, locks, and dredged material placement areas with retaining dikes.

## 5.9 NON-FEDERAL IMPLEMENTATION RESPONSIBILITIES

Non-Federal interests are responsible for and bear all costs for acquisition of necessary lands, easements, rights-of-way and relocations; terminal facilities; and dredging berthing areas and interior access channels to those berthing areas.

## 5.10 RECOMMENDED PLAN COST

The cost was estimated using MII<sup>17</sup>. **Table 5-4** addresses USACE cost sharing guidelines while **Table 5-5** displays the total project first cost. The estimate used for the cost sharing table shown is based on the “constant dollar basis” (second column) on the Total Project Cost Summary (TPCS spreadsheet (Appendix C, Cost Engineering and Risk Analysis) which reflects program year 2020 at effective price level 1 Oct 19. The project first cost is referenced in this report and represents the most refined level of cost detail, with added contingency, which was determined through the Cost and Schedule Risk Analysis (CSRA). More details on the cost estimate can be found in **Appendix C, Cost Engineering and Risk Analysis**, as can details of cost assumptions, and risks that factored into the contingency.

The cost estimate below reflects all Recommended Plan project features, including but not limited to removal of the rocky obstruction, construction of the sediment trap, cultural resource surveys during PED, and relocation of 8 aids to navigation (ATONS)<sup>18</sup>. There are no local facility costs associated with the project cost. Environmental windows factored heavily into construction windows and construction sequencing.

The project first cost, with added contingency, is estimated to be \$57,240,000.

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<sup>17</sup> MII is the second generation of the Micro-Computer Aided Cost Estimating System (MCACES). It is a detailed cost estimating software application that was developed in conjunction with Project Time & Cost, Inc. (PT&C). MII is one of several modules of an integrated suite of cost engineering tools called Tri-Service Automated Cost Engineering Systems (TRACES). It interfaces with other PC based support modules and databases used by the Tri-Service Cost Engineering community. MII provides an integrated cost estimating system (software and databases) that meets the U.S. Army Corps of Engineers (USACE) requirements for preparing cost estimates.

**Table 5-4. Cost Share Guidelines.**

Feature	Federal Cost % <sup>1</sup>	Non-Federal Cost % <sup>1</sup>
<b>General Nav. Features (GNF)</b>	· 90% from 0' to 20'	· 10% from 0' to 20'
	· 75% from 20' to 50'	· 25% from 20' to 50'
	· 50% from 51; and deeper <sup>18</sup>	· 50% from 51' and deeper
Mitigation (if needed)	· 75%	· 25%
GNF's costs for this project include: mobilization, all dredging costs, and all placement area construction costs.		
<b>Navigation Aids</b>	· 100%	· 0%
<b>Operation and Maintenance</b>		
GNF	· 100% except cost share 50% costs for maintenance > 50 feet	· 0% except cost share 50% for maintenance > 50 feet
(1) The Non-Federal Sponsor shall pay an additional 10% of the costs of GNF over a period of 30 years, at an interest rate determined pursuant to Section 106 of WRDA 86. The value of LERR shall be credited toward the additional 10% payment.		

<sup>18</sup>Per Section 2102(b) of WRRDA 2014 and Section 1111 of WRDA 2016

**Table 5-5. Project Cost and Cost Sharing, -38 foot deepening project (RECOMMENDED PLAN).**

(October 1, 2019 Price Levels, Program Year 2020) <sup>1</sup>						
WBS Number	General Navigation Features	Project Cost	Contingency	Total Project Cost	Federal Share	Non-federal Share
					75%	25%
12	Mob, Demob, Dredging	\$45,548,000	\$9,115,000	\$54,663,000	\$40,997,000	\$13,666,000
30	Pre-Construction, Engineering, and Design	\$1,591,000	\$318,000	\$1,909,000	\$1,432,000	\$477,000
31	Construction Management (S&I)	\$501,000	\$100,000	\$601,000	\$451,000	\$150,000
	<b>Subtotal Construction of GNF<sup>2</sup></b>	<b>\$47,640,000</b>	<b>\$9,533,000</b>	<b>\$57,173,000</b>	<b>\$42,880,000</b>	<b>\$14,293,000</b>
1	Lands, Easements, Right-of-Ways, Relocations (LERR)3 - Federal	\$23,000	\$2,000	\$25,000	\$18,750	\$6,250
1	Lands, Easements, Right-of-Ways, Relocations (LERR)3- Non-Federal	\$23,000	\$2,000	\$25,000	\$0	\$25,000
	<b>Total Project First Costs</b>	<b>\$47,663,000</b>	<b>\$9,535,000</b>	<b>\$57,200,000</b>	<b>\$42,880,000</b>	<b>\$14,320,000</b>
12	Aids to Navigation <sup>4</sup>	\$16,000	\$3,000	\$19,000	\$19,000	\$0
	Credit for Non-Federal LERR <sup>5</sup>	\$0			\$0	-\$31,250
	10% GNF Non-Federal <sup>6</sup>	\$0			(\$5,717,300)	\$5,717,300
	<b>Total Cost Apportionment</b>	<b>\$47,680,000</b>	<b>\$9,540,000</b>	<b>\$57,220,000</b>	<b>\$37,180,000</b>	<b>\$20,010,000</b>
<p>1. Cost is based on Project First Cost (constant dollar basis) on Total Project Cost Summary Spreadsheet, at an effective price level 1 Oct 2019 (Cost Appendix). Aids to Navigation broken out and shown as a separate cost.</p>						
<p>2. 75% Federal/25% non-federal including the cost of the sediment trap.</p>						
<p>3. RE admin costs. There are no actual lands and damages but per USACE regulations, RE admin costs will be placed in the 01 account. Additional RE costs will be cost shared according to the GNF. Escalation from the TPCS accounts for some numerical differences.</p>						
<p>4. Navigation Aids - 100% Federal (U.S. Coast Guard cost, not USACE cost). Includes 8 relocations at \$2,000 each.</p>						
<p>5. Credit is given for the incidental costs borne by the non-Federal sponsor for lands, easements, rights of way and relocations (LERR) per Section 101 of WRDA 86, not to exceed 10% of the GNF.</p>						
<p>6. The Non-Federal Sponsor shall pay an additional 10% of the costs of GNF of the NED plan, pursuant to Section 101 of WRDA 86. The value of LERR shall be credited toward the additional 10% payment except in the case of LERR for GNF.</p>						

## 5.11 LANDS, EASEMENTS, RIGHT-OF-WAY & RELOCATION (LERR) SUMMARY

This section serves as a summary of **Appendix F, Real Estate Plan**, which can be referenced for more detailed information. Navigation Servitude will be applied to this project as it meets the dominant right

of the Government under the Commerce Clause of the U.S. Constitution (U.S. CONST. art. I, §, cl.3) to use, control and regulate the navigable waters of the United States and the submerged lands thereunder for various commerce related purposes including navigation and flood control provided in paragraph 12-7 of ER 405-1-12. This project serves a purpose to improve navigation by deepening of the Pinole Shoal Channel and Bulls Head Reach Channel, which are located below the mean or ordinary high water mark of a navigable watercourse.

Policy Guidance Letter 44 Revisions, September 27, 2017 (PGL 44) provides guidance to set forth current U.S. Army Corps of Engineers policy regarding the relocation and removal of utilities located in or under navigable water of the U.S. that interfere with Federal navigation improvements implemented under Section 101 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 2211). Specifically, the memorandum modifies guidance on the interaction between Federal powers under the navigation servitude and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and the non-Federal sponsor's performance and payments responsibilities for utility relocation. Based current information, PGL 44 does not apply as the current project does not impact any utilities. The Trans Bay Cable is located in the West Richmond Channel which, currently is not dredged. Additional investigations will be conducted during PED to confirm the location and depth of the utility during PED and if impact is identified then the non-Federal sponsor is responsible for performing, or assuring the performance of all utility relocations necessary for the project and PGL 44 would then apply.

All material dredged from the project would be beneficially reused at one or more existing permitted dredged material beneficial reuse I sites – either at Cullinan Ranch Tidal Wetlands or Montezuma Wetlands Restoration Site.

Currently, additional real estate is not required for the project; however the non-Federal sponsor will be required to acquire the minimum interest in real estate that will support the construction and subsequent operation and maintenance of the proposed USACE project should additional real estate be required.

An estimated \$25K for Federal and \$25K non-Federal administrative fees is for real estate certification.

There are no Public Law 91-646 Relocations required in connection with the project.

## 5.12 FINANCIAL ANALYSIS OF NON-FEDERAL SPONSOR'S CAPABILITIES

A financial analysis is required for any plan being considered for USACE implementation that involves non-Federal cost sharing. The ultimate purpose of the financial analysis is to ensure that the non-Federal sponsor understands the financial commitment involved and has reasonable plans for meeting that commitment. By memorandum dated April 24, 2007, the Assistant Secretary of the Army (Civil Works), granted approval of the self-certification of non-Federal sponsors for their ability to pay the non-Federal share of projects. The self-certification is required prior to submission of the Project Partnership Agreement, typically during the PED phase of the project. Included with the self-certification, the financial analysis shall include the non-Federal sponsor's statement of financial capability, the non-Federal sponsor's financing plan, and an assessment of the sponsor's financial capability. The appropriate self-certification form has been provided to USACE by the Port of Stockton.

## 5.13 VIEWS OF THE NON-FEDERAL SPONSOR

The Port of Stockton, the non-Federal sponsor, greatly supports this project both financially through cost sharing and legislatively through project authorization. A letter of support is included in **Appendix I, Pertinent Correspondence Part 1**.

## 5.14 RISK AND UNCERTAINTY

Engineering Regulation 1105-2-100 directs planners to identify areas of risk.

Economics. For the economics portion of the study, a sensitivity analyses was done for each of the major commodity forecasts to show alternative scenarios for crude oil imports and petroleum exports, and confirm Federal Interest with a positive BCR in each scenario. All topics described above can be found in more detail in **the Appendix D, Economic Analysis**.

Engineering. A potential area of risk is sediment testing of the dredge material. One source (USFSW 1998) indicates material at a 49 foot depth may have elevated levels of Chromium. However, this sediment was sampled at a deeper depth than what the project depth will be. Additionally, risk to using information from this report alone is inherent due to different sampling methods than which are currently used. Another source (ERDC 2000) indicates suitability of dredged material from Pinole Shoal and Bulls Head Reach as follows "Overall, the wetland mesocosms tests indicated that creating wetlands with Pinole Shoal Channel sediments will produce plants or animals with tissue metal concentrations in the range of those found in existing San Francisco Bay area wetlands; PAH concentrations were negligible; PCBs and butyltins were not detected in mesocosms organisms. Use of Pinole Shoal sediments for wetland creation would produce wetlands comparable to existing wetlands in the Bay area." Therefore, this is considered to be a medium risk at this time. Sediment testing will take place during PED. If testing shows levels of chromium are not acceptable for cover material at one or both sites, other combinations of placement/disposal are available (ex: non-cover at Montezuma, all SF-DODS, or other beneficial reuse sites willing to take the material). This has been modeled in the Cost and Schedule Risk Assessment and would be covered by the project contingency if needed.

Environmental. Risks during construction to threatened and endangered species have been minimized within the proposed plan (using beneficial reuse to offset effects) and cost estimate by avoiding seasons of peak activity, using a clamshell dredge, and incorporating other management methods such as observers. Risks as a result of salinity changes were incorporated early in the plan formulation process and were avoided by considering depths which would not incur large scale salinity effects. Remaining salinity risks have been addressed through modeling to verify assumptions along with coordination with water user groups and resource agencies.

Cost. Each of the above factors, as well as a thorough analysis of each project element, were incorporated into the Cost and Schedule Risk Assessment (CSRA) process, where the purpose of the CSRA is to develop a more statistically based project contingency. Therefore, areas of specific risk detail on the CSRA can be found in **Appendix C, Cost Engineering and Risk Analysis**.

### 5.14.1 RESIDUAL RISK

Residual risks are risks that remain after all risk reduction actions have been completed. In this case, it applies to risks which would happen in the future without-project condition, but would also be the same with implementation of the Recommended Plan.

#### SEA LEVEL RISE

Following procedures outlined in ER 1110-2-8162 and ET 1100-2-1, low, intermediate, and high sea level rise values were estimated over the life of the project using the official USACE sea level change calculator tool. Projections for sea level rise are based on a start date of 1992, which corresponds to the midpoint of the current National Tidal Datum Epoch of 1983-2001. In the future without-project conditions, sea level rise could be expected to increase by 0.5 feet (low), 1 foot (intermediate), and 2.7 feet (high) by year 2070 with respect to the above mentioned present local mean sea level tide datum. The potential impacts of rising sea level include increased salinity intrusion into the Sacramento-San Joaquin Delta, overtopping of waterside structures, increased shoreline erosion, and flooding of low lying areas. A positive potential impact of sea level rise on the project is a reduction in required maintenance due to increased depth in the channel.

The highest sea level change scenario was chosen for evaluation in the model because it was anticipated to have the most impact to hydrodynamics and salinity for the Recommended Plan (See Appendix B for more information). As demonstrated in Appendix B, the modeling results found that there would be no changes to hydrodynamics for the Recommended Plan when compared to without-project conditions for the high scenario, and it is anticipated a similar result would occur for the low and medium scenarios if they were run over the 50 year period of analysis. The modeling results found that the changes to salinity for the Recommended Plan when compared to without-project conditions would not be significant for the high scenario, and it is anticipated a similar result would occur for the low and medium scenarios if they were run over the 50 year period of analysis. Regional sea level rise will not affect the function of the project alternatives or the overall safety of the design vessel and the structural aspects of the project will generally be unaffected. Therefore, sea level rise is expected to be the same in both the future with-project and future without-project conditions and additionally sea level rise is not anticipated to impact costs or benefits of the Recommended Plan.<sup>19</sup> (Reference Appendix B, Water Resources).

As a note, the project is not claiming habitat benefits for project justification. However, the description below explains how the material is expected to contribute to restoration sites and what could be expected in sea level rise scenarios. The beneficial reuse of the dredged material would contribute to restoring salt marsh and tidally influenced habitat used by upland, wetland, and tidal wetland species at sites which are both owned, managed, and monitored by other entities. This project does not claim habitat benefits from the beneficial reuse of material on these sites. In the future without-project conditions (which would be the same in the future with-project as well), sea level rise could range from 0.5 to 2.8 ft by year 2070 with respect to the present local mean sea level tide datum. The contribution of increased acreage of restored habitat would likely still serve the same species in any of the sea level rise scenarios or could be adapted

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<sup>19</sup> Vertical clearance of bridges were also assessed for projected regional sea level change (RSLC) under the USACE high curve scenario, found in Table 2-20 of Chapter 2. All numbers are referenced to high tide. In this event, Panamax vessels in the current fleet which are also the vessels which would benefit from the recommended plan would not be impacted, or vessels could choose to sail at a lower tide.

as needed by the private owner of the site. Additionally, established marshes could be expected to accrete with sea level rise over time through on-going accretion of sediment and organic matter.

### STORM SURGE

The USACE Deep Water Shipping Scenario Report (2011) predicted water stage at San Francisco Fort Point NOAA station (9414290) for the baseline scenario under 2007-2008 historic conditions. A tidally-averaged stageplot noted a storm surge of almost 1.64 feet (0.5 m), which was used under the baseline scenario for existing and future without-project conditions.

Relative to the baseline (existing) surge at Fort Point, no significant change in stage was predicted for deepening of -45 feet plus 2 feet of overdepth, which is what the above cited report assumed at the time. The Recommended Plan in this report proposes to deepen the channel to -38 feet MLLW + 2 feet of overdepth, which is less than what was modeled in the above mentioned report. Therefore, it can be assumed that no significant change would be expected with the implementation of the Recommended Plan. However, in the both the future without-project condition and Recommended Plan, storm surge could increase additionally with increased sea level rise.



6

Environmental  
Compliance

## 6 ENVIRONMENTAL COMPLIANCE

This chapter discusses the status of coordination and compliance of The Recommended Plan with environmental requirements. Additionally, it shows how the Recommended Plan meets USACE environmental operating principles.

### 6.1 SCOPING & PUBLIC INVOLVEMENT

Scoping included publication in the Federal Register of a Notice of Intent to prepare an Environmental Impact Statement/Environmental Impact Report on March 4, 2016. At that time, the project included deepening the navigation channel to Stockton. Based upon salinity modeling results and public controversy, the scope of the project was reduced to deepen the navigation channel only to Avon. Salinity modeling was revisited to include deepening only to Avon, while also including a sediment trap at Bulls Head Reach. The results of the salinity modeling are presented in **Appendix B, Water Resources-Attachment 1**, as well as in Chapter 4. An additional Notice of Intent to prepare an Environmental Impact Statement/Environmental Impact Report was published December 4, 2017 to announce the reduction in scope on this navigation project. All agency and public scoping comments from 2016 and 2017, with a comment response matrix, are included in **Appendix I, Pertinent Correspondence Part 1**. Because this study has been ongoing since prior to 2016, the baseline conditions were not updated to include the most recent data for economics, greenhouse gases, socio-economics, or air quality. In efforts to minimize expenditure of funds to repeat extensive analyses, a qualitative assessment was completed to compare the most up to date data with what was previously used in analysis and found to be similar enough not to change the results significantly.

Agency meetings were held in December 2018 to discuss the scope of the project, as well as the updated salinity information that is contained within the draft and final GRR/EIS.

A Notice of Availability was published for the draft GRR/EIS in the Federal Register on May 10, 2019, a press release to announce the location and comment period of the document, and it was also published on the California State Clearinghouse website. A letter was sent to the general public to notice release of the draft GRR/EIS (mailing list available upon request) and to also notice the public meeting time and location that occurred on June 11, 2019 from 6pm-8pm at the Contra Costa County Conservation and Development office in Martinez, at 30 Muir Road, Martinez, CA 94553. Hard copies of the draft GRR/EIS were made available at the following libraries:

Cesar Chavez Central Library, 605 N El Dorado St, Stockton, CA 95202

Contra Costa County Library, Martinez Branch 740 Court St, Martinez, CA 94553

Comments on the draft GRR/EIS were received from May 10, 2019 through June 24, 2019 for a 45 day public review period. Comments received after June 24 through August 31, 2019 are included in the comment response matrix, located in **Appendix I, Pertinent Correspondence Part 2**. These comments and responses also include comments from the Dredge Material Management Plan (DMMP) meeting that occurred in San Francisco in July 2019.

## 6.2 LIST OF RECIPIENTS

The draft EIS was made available to appropriate stakeholders and agencies by letter with the location of the document on the internet at:

(<https://www.saj.usace.army.mil/About/Divisions-Offices/Planning/Environmental-Branch/Environmental-Documents/>). From the link provided, go to “Other Locations”, then SF Bay to Stockton. Hard copies of the document were made available to the public at the following libraries. A list of stakeholders who received notification is available upon request.

### **Libraries where a hard copy is available to view:**

Cesar Chavez Central Library 605 N El Dorado St, Stockton, CA 95202

Contra Costa County Library – Martinez Branch 740 Court St, Martinez, CA 94553

## 6.3 COMMENTS RECEIVED AND RESPONSE

Comments received from the public scoping meeting or on draft EIS are located in the **Appendix I Pertinent Correspondence Part 1 and Part 2, respectively.**

## 6.4 ENVIRONMENTAL COMMITMENTS

The proposed project minimizes risk to environmental resources, and threatened and endangered species by:

- Working with the approved USFWS environmental work window for delta smelt, listed salmonids and green sturgeon
- Using a clamshell dredge to avoid entrainment of species
- Placing all dredged material from deepening onto beneficial reuse sites to create/enhance wetland habitats and conditions for species within the delta, including delta and longfin smelt
- Commitments in the Programmatic Agreement for Cultural Resources

Other environmental commitments related to threatened and endangered species are discussed in the Biological Opinion (BO) from the USFWS. The BO contains one non-discretionary term and condition which is to implement the conservation measures listed on pages 2 and 3 of the BO. These conservation measures are already incorporated into the project description and will be followed.

## 6.5 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

The status of the proposed action’s compliance with applicable Federal environmental requirements is summarized below. Prior to initiation of construction, the project will be in compliance with all applicable Federal laws and Executive Orders.

### 6.5.1 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) OF 1969

Environmental information on the project has been compiled and this EIS/EIR has been prepared. The draft EIS was circulated for review by NOA in the Federal Register in Spring 2019. All correspondence has been included as **Appendix I, Pertinent Correspondence Part 1**. The project is in compliance with the National Environmental Policy Act (NEPA).

### 6.5.2 ENDANGERED SPECIES ACT OF 1973

USACE obtained a list of the federally threatened and endangered species and critical habitat that have potential to occur within the project area on November 27, 2017 (**Appendix G - Attachment 4**). USACE submitted the Biological Assessments to the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) (**Appendix G-Attachment 4**) at the time of release of the draft report. A Biological Opinion was provided by USFWS on October 3, 2019 and a letter of concurrence was provided by NMFS on December 6, 2019. The proposed project is therefore in compliance with the Act.

### 6.5.3 FISH & WILDLIFE COORDINATION ACT OF 1958

Coordination with the USFWS under the FWCA is ongoing. The Final Coordination Act Report is located in **Appendix G-Attachment 4**. USACE will continue to coordinate future actions with the USFWS. The project is in compliance with the Act.

### 6.5.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (*INTER ALIA*)

The SHPO in each state is responsible for ensuring that Federal agencies comply with Section 106 of this Act, which requires that they consider the effects of a proposed undertaking on properties that have been determined to be eligible for, or included in, the NRHP. The Section 106 review process consists of four steps: (1) identification and evaluation of historic properties; (2) assessments of the effects of the undertaking on historic properties; (3) consultation with the SHPO, Native American Indian Tribes, and appropriate agencies to develop a plan to address the treatment of historic properties; and (4) concurrence from the SHPO regarding the agreement or results of consultation.

Pursuant to Section 106 of the NHPA (36 CFR § 800.8), USACE is employing a phased process to identify and evaluate historic properties and assess effects. Ongoing consultation and consideration of effects will occur during Preconstruction, Engineering and Design (PED) as the APE may be subject to change based on final designs or modifications of project features. Therefore; pursuant to 54 U.S.C. 306108 and § 800.4(b)(2), USACE is deferring final identification and evaluation of historic properties until after project approval, additional funding becomes available, and prior to construction through a Programmatic Agreement (PA) executed on February 14, 2020 with the California State Historic Preservation Office.

USACE shall avoid, minimize, and mitigate adverse effects to historic properties that could be affected by activities associated with the implementation of the project, including dredging and pipeline placement. During the PED phase of the project, the specific location of the proposed work (e.g., alignment, width, and depth) shall be developed in consultation with the California SHPO, and Native American Tribes. USACE shall make reasonable attempts to identify cultural resources through remote sensing surveys to determine whether the dredging activities would adversely affect archaeological resources or historic properties. If a potential site is identified near or within the channel or project feature, after consultation with the SHPO, additional investigations will be undertaken to evaluate the site for eligibility for listing on the NRHP. Should the site be determined to be historically significant, the project design would be modified to either avoid or mitigate the site. If necessary, additional NHPA documentation would be prepared at that time to disclose the adverse effects that would result from the undertaking. If the activities are proposed to take place in an area that would affect the site(s), USACE shall not complete that part of the proposed action until the site is evaluated for NRHP eligibility, the appropriate environmental review is completed, and a follow-on course of action is agreed upon through consultation with all appropriate entities and outlined in the PA.

The potential always exists that during construction, a previously unknown archaeological sites could be discovered even after cultural resource surveys have been completed. In such a situation, the following measures would be incorporated into the dredging contract(s) to mitigate any potential impacts during construction to shipwrecks, Native American, and/or historical archaeological resources

As discussed in **Section 4.2.12 Cultural Resources**, both archeological and historic sites were found in the vicinity of the project. USACE has reviewed site records for the Project areas, which includes all proposed work areas for this study. Consultation with interested Indian tribes was initiated via letters dated January 31, 2019. Two Tribal bands were identified to have ancestral affiliation to the landscape and cultural resources residing within the study area. USACE is still coordinating between the two identified Indian tribes and will continue to make a good faith effort in leaving tribal consultation open during PED. Based on archival and historic records research, correspondence with local Indian Tribes, and past field investigations conducted in the study area, the project will be in compliance with the National Historic Preservation Act of 1966 through an executed PA that defers final identification and evaluation of historic properties and assessing the study's effects to occur during PED. A programmatic agreement describing the phased approach of USACE's compliance with Section 106 following 36 CFR 800.14 [b][1] is currently being reviewed by the SHPO as of January 28, 2020. USACE has provided several Indian tribes the opportunity to comment on the draft PA and incorporated any necessary corrections made. USACE has also provided the public and local historic societies an opportunity to review the draft PA online on November 15, 2019. The Advisory Council on Historic Preservation responded to the USACE's request to be an Invited Signatory for the PA and believes their participation as an Invited Signatory to execute the agreement is not needed. An executed PA signed by the SPN District Engineer and SHPO occurred on February 14, 2020. This agreement document requires USACE to complete necessary surveys and evaluations during PED and prior to project construction, following 36 CFR 800.4 [b][2]<sup>20</sup>. Once surveys and evaluations have been completed consultations will be updated with the SHPO, concurring parties, and interested tribes. Correspondence to date and the executed PA can be found in **Appendix H, Cultural Resources Correspondence**.

### 6.5.5 CLEAN WATER ACT OF 1972

The Federal CWA (33 U.S.C. § 1257 et seq.) requires states to set standards to protect water quality. The objective of the Federal CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Specific sections of the CWA control discharge of pollutants and wastes into marine and aquatic environments, as further discussed in Section 3.4.1. USACE has initiated Section 401 Water Quality Certification with the Regional Water Board (see **Appendix I, Pertinent Correspondence Part 1** for email correspondence). Staff from the Regional Water Quality Control Board participated in an early meeting with local agencies to help determine the scope of the water quality impact assessment. More recently in Spring and Fall of 2019, USACE received correspondence from the Regional Board indicating they typically would not issue a water quality certification without completion of CEQA documentation and design-level detail for the project being available. CEQA compliance is a non-Federal responsibility and the Port of Stockton is pursuing this compliance on a separate timeline. In January 2020, USACE met via teleconference call with representatives of the Regional Board regarding the path forward for obtaining 401 water quality certification of the recommended plan, and the timing of completion for the final report. During this meeting, the Regional Board representatives indicated that submittal of the WQC application would need to be deferred until the design phase of work and committed to transmittal of a letter to USACE in February 2020 confirming inter-agency coordination and the path forward for 401 water

<sup>20</sup> Survey cost estimates during PED have been incorporated into the total project cost.

quality certification upon completion of CEQA compliance and design detail. Feedback received from Regional Board staff and other agencies at the USACE December 2016 agency workshop was wrapped into technical analyses and modeling as contained within this report, and considered in the development of report recommendations. Upon receipt this letter will be included in the final report package prior to the Director's signing. USACE is in compliance with this Act.

### 6.5.6 CLEAN AIR ACT OF 1972

The USEPA is the Federal agency responsible for managing the Nation's air quality. USEPA establishes national ambient air quality standards, and oversees the air quality plans developed and implemented by the states. BAAQMD is responsible for developing local district air quality management plans and enforcing regulations pertaining to air emissions in the study area. As discussed in Section 5.2.5, the proposed action would not exceed national air quality standards based on modeled estimates of emission rates during construction of the project.

On November 30, 1993, the USEPA promulgated final general conformity regulations at 40 CFR 93B for Federal activities. These regulations apply to a Federal action in a nonattainment or maintenance area if the total emissions of the criteria pollutants and precursor pollutants caused by the action equal or exceed certain de minimis amounts, thus requiring the Federal agency to make a determination of general conformity. As discussed in Section 4.2.5, at least part of the Delta is in non-attainment for ozone, PM10, and PM2.5. As discussed in Section 5.5, the proposed action would not exceed de minimis thresholds based on modeled estimates of emission rates during construction of the project, and would be in full compliance with the CAA.

### 6.5.7 COASTAL ZONE MANAGEMENT ACT OF 1972

The CZMA, established in 1972 and administered by the NOAA's Office of Ocean and Coastal Resource Management, provides for management of the nation's coastal resources through a state and Federal partnership. Under the Federal consistency provisions of the CZMA, Federal projects need to be consistent with the state's coastal zone management program and policies to the maximum extent practicable (16 U.S.C. § 1456); this determination is made by the lead Federal agency, and concurrence is requested from the state or local agency responsible for implementing the CZMA. For San Francisco Bay, the Bay Area Coastal Development Conservation District (BCDC) is the state's coastal zone management agency responsible for issuing concurrence with consistency determinations under the CZMA. The San Francisco Bay Plan is BCDC's policy document specifying goals, objectives, and policies for BCDC jurisdictional areas. For portions of the study area outside of San Francisco Bay, concurrence with consistency determinations is issued by the California Coastal Commission. USACE has prepared a CZMA Evaluation within this EIS, located in **Appendix G, Attachment 2**, and has requested a consistency determination concurrence from the BCDC or California Coastal Commission prior to commencing dredging activities. USACE has had several coordination meetings with the San Francisco Bay Conservation and Development Commission (BCDC). The typical process for BCDC would be to issue a final Consistency Concurrence during the USACE Pre-construction, Engineering and Design (PED) phase when detailed project design information is available. In the interim, BCDC has verbally indicated that a letter from the Chair of the Commission will be sent to USACE for inclusion in this report, which will summarize USACE coordination with BCDC to date and confirm their intent to consider CZMA Consistency when CEQA compliance has been completed and more detailed design information is available. BCDC feedback on the Recommended Plan is consistent with comments received during public review, for which substantive responses have been provided in this report. Responses to these comments have been considered in the decision put forth for action by the Director.

### 6.5.8 FARMLAND PROTECTION POLICY ACT OF 1981

The NRCS is the Federal agency responsible for administering this act, which requires Federal agencies to coordinate a Farmland Conversion Impact form with the NRCS whenever their projects or programs would affect land designated as prime or unique farmland. The proposed action would not remove or alter any land that is protected under this Act. As a result the proposed project is in full compliance with this Act.

### 6.5.9 WILD AND SCENIC RIVER ACT OF 1968

No wild or scenic river reaches would be affected by the proposed project related activities. This Act is not applicable.

### 6.5.10 MARINE MAMMAL PROTECTION ACT OF 1972

The Marine Mammal Protection Act (MMPA) prohibits takes of all marine mammals in the U.S. (including territorial seas) with a few exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 et seq.) directs the Secretary of Commerce (Secretary) to allow, upon request, the incidental, but not intentional taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and regulations are issue or, if the taking is limited to harassment, notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings may be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for certain subsistence uses, and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring, and reporting of such takings are set forth. NMFS has defined “negligible impact in 50 CFR 216.103 as: “an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.”

Under the MMPA, harassment is defined as any act of pursuit, torment, or annoyance which has the potential to: (i) injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment). An Incidental Harassment Authorization (IHA) may be issued, except for activities that have the potential to result in serious injury or mortality (i.e., it may only authorize Level A and B harassment), for a period of no more than one year, following a 30-day public review period. Alternatively, regulations may be granted for a period of five years and may include takes by serious injury and mortality. Upon rulemaking (i.e., defining regulations), Letters of Authorization (LOAs) will be issued to the authorization holder. The rulemaking and associated LOAs cannot be valid for a period of more than five consecutive years. For both an IHA and regulations, authorization shall be granted if the Secretary finds that the taking will have a negligible impact on a species or stock, and that the IHA or regulations are prescribed setting forth the permissible methods of taking, the means of effecting the least practicable adverse impact, and requirements pertaining to monitoring and reporting.

In order to minimize effects below threshold requiring an IHA, protective measures for marine mammals such as sea lions and dolphins would be implemented during construction activities. Additional information can be found in Chapter 4 and Section 6.4 of this report. Coordination with the USFWS and NMFS under the MMPA is ongoing.

#### 6.5.11 ESTUARY PROTECTION ACT OF 1968

The National Estuary Program was created by Congress in the 1987 amendments to the Clean Water Act. The Program consists of 28 local estuary programs, managed federally by the USEPA, with a focus of improving the waters, habitats, and living resources of estuaries of national significance. The National Estuary Program is a non-regulatory program. The San Francisco Estuary, consisting of the San Francisco and Suisun Bays, the Suisun Marsh, and the Sacramento and San Joaquin River Delta, is one such estuary. The San Francisco Estuary program is managed by the USEPA, State of California, and locally by the San Francisco Estuary Partnership. Management of the estuary is guided by the San Francisco Estuary Project Comprehensive Conservation and Management Plan (CCMP). Since the purpose of the Delta Study is to restore historically lost tidal wetlands and reverse the effects of subsidence, which is included as one of the restoration goals of the CCMP, the proposed project is in full compliance with the intent of this Program.

#### 6.5.12 FEDERAL WATER PROJECT RECREATION ACT

Recreation opportunities and potential impacts to current recreation were considered during the planning processes for this study. Although the study area provides recreational benefits, the principles of this Act (Public Law 89-72) as amended, are not applicable to this project.

#### 6.5.13 MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT OF 1976

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation mandates the identification, conservation, and enhancement of EFH, which is defined as “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity,” for all managed species.

Federal agencies consult with NMFS on proposed actions that may adversely affect EFH and NMFS typically provides EFH conservation recommendations. The main purpose of the EFH provisions of the act is to avoid loss of fisheries due to disturbance and degradation of the fisheries habitat. USACE EFH assessment is incorporated into Section 4.1.6 of this report and is included in the Biological Assessment (**Appendix G-Attachment 4**). Coordination with NMFS occurred concurrently with release of the draft report and USACE received the EFH response from NMFS with two conservation recommendations on December 6, 2019 (**Appendix G**). USACE responded to NMFS on January 6, 2020 describing the methods for implementing the conservation recommendations (**Appendix G**). The proposed project is in compliance with this Act.

#### 6.5.14 COASTAL BARRIER RESOURCES ACT AND COASTAL BARRIER IMPROVEMENT ACT OF 1990

There are no designated coastal barrier resources in the project area that will be affected by this project. These Acts are not applicable.

#### 6.5.15 RIVERS AND HARBORS ACT OF 1899

Rivers and Harbors Act refers to a conglomeration of many pieces of legislation and appropriations passed by Congress since the first such legislation in 1824. The Rivers and Harbors Act of 1899 was the first Federal water pollution act in the United States. It focuses on protecting navigation, protecting waters from pollution, and acted as a precursor to the CWA of 1972. Section 10 of the Rivers and Harbors Act of 1899 regulates alteration of and prohibits unauthorized obstruction of navigable waters of the United States.

#### 6.5.16 ANADROMOUS FISH CONSERVATION ACT

The project is not expected to have a significant impact and is discussed in Section 4.1.6. The project is in coordination with NMFS and is in compliance with the Act.

#### 6.5.17 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

No migratory birds will be affected by project activities. The USACE standard MBPP will be used to minimize potential impacts to migratory birds. The project is in compliance with these Acts.

#### 6.5.18 PROTECTION AND SANCTUARIES ACT MARINE PROTECTION AND SANCTUARIES ACT MARINE PROTECTION AND SANCTUARIES ACT MARINE PROTECTION AND SANCTUARIES ACT

The Marine Protection and Sanctuaries Act (MPRSA) is the United States' implementation of an international treaty, the Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter (also known as the "London Convention"). Section 102 of the MPRSA authorizes USEPA to establish criteria for evaluating all dredged material proposed for ocean dumping. These criteria are published separately in the Ocean Dumping Regulations at 40 C.F.R. pt. 220-228. Section 102 also authorizes the USEPA to designate permanent ocean-dredged material placement sites in accordance with specific site selection criteria designed to minimize the adverse effects of ocean placement of dredged material. Section 103 of the MPRSA authorizes USACE to issue permits, subject to USEPA concurrence or waiver, for dumping dredged materials into the ocean waters. It requires public notice, opportunity for public hearings, compliance with criteria developed by the USEPA (unless a waiver is granted), and the use of designated sites whenever feasible. Although USACE does not issue itself permits, USACE and USEPA apply these standards to USACE projects as well. This EIS does not evaluate the impacts of the ocean placement of dredged material from USACE-maintained Federal navigation channels in San Francisco Bay, because the project proposes to only place the dredged material on beneficial reuse sites.

#### 6.5.19 EXECUTIVE ORDER (EO) 11990, PROTECTION OF WETLANDS

No wetlands would be negatively affected by project activities. Cullinan Ranch and Montezuma Wetlands would benefit from this project, by placing the dredged material onto the restoration sites. The proposed project is in compliance with the goals of this Executive Order (E.O.).

#### 6.5.20 E.O 11988, FLOOD PLAIN MANAGEMENT

This EO directs Federal agencies to avoid, to the extent possible, long- and short-term adverse effects associated with the occupancy or modification of the base flood plain (1% annual event), as well as to avoid direct and indirect support of development in the base flood plain, wherever there is a practicable alternative. The proposed action would have no measurable effect on the (FEMA's 100-year) floodplain in the Bay Area. In addition, because of the nature of the proposed work, the proposed action would not directly or indirectly support development in the floodplain. The proposed project would be in full compliance with this order.

#### 6.5.21 E.O. 12898 ENVIRONMENTAL JUSTICE

The purpose of the proposed action is to provide increased safety, efficiency, and lower costs for navigation while protecting the environment. The proposed activity would not (a) exclude persons from participation in, (b) deny persons the benefits of, or (c) subject persons to discrimination because of their race, color or national origin, nor would the proposed action adversely impact "subsistence consumption of fish and wildlife." The proposed project would benefit shipping and the general economy including

minority and low income populations. Furthermore, construction activities and any additional trucking/commerce that would be associated with project improvements is not anticipated to disproportionately affect economically disadvantaged residential areas or persons belonging to minority groups. Construction traffic and logistic traffic use commercial traffic routes immediately adjacent to the Port, including U.S. Highways and Interstate highways. Construction activities and any additional trucking/commerce that would be due to the project are not expected to disproportionately affect economically disadvantaged residential areas of persons belonging to minority groups. More details on the evaluation can be found in Section 4.1.12. The proposed project is in compliance with the goals of this E.O.

#### 6.5.22 E.O. 13045, PROTECTION OF CHILDREN

This E.O. requires each Federal agency to “identify and assess environmental risks and safety risks [that] may disproportionately affect children” and ensure that its “policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.” This project has no environmental or safety risks that may disproportionately affect children and is in compliance.

#### 6.5.23 E.O. 13089 CORAL REEF PROTECTIONECTION

This project would not impact those species, habitats, and other natural resources associated with coral reefs as defined in the E.O. The deepening would occur within the already authorized and regularly maintained navigation channel. The proposed project is in compliance with the goals of this E.O.

#### 6.5.24 E.O. 13112, INVASIVE SPECIES

This project would not introduce or affect the status of any invasive species and is therefore in compliance with the goals of this E.O.

#### 6.5.25 ENVIRONMENTAL OPERATING PRINCIPLES

Consistent with NEPA, USACE has reaffirmed its commitment to the environment by formalizing a set of “Environmental Operating Principles” applicable to all its decision making and programs. These principles foster unity of purpose on environmental issues and ensure that environmental conservation, preservation, and restoration are considered in all USACE activities.

USACE Environmental Operating Principles are:

1. Foster sustainability as a way of life throughout the organization.  
*Throughout the planning process, the team strived for minimization of impacts to the surrounding environment, with a key focus on salinity effects.*
2. Proactively consider environmental consequences of all USACE activities and act accordingly.  
*Throughout the planning process, the interdependence of the built environment, navigation environment, economics environment, and living environment remained evident and each project measure was carefully considered for all elements.*
3. Create mutually supporting economic and environmentally sustainable solutions.

*Beneficial reuse of material will offset any effects during construction and could expand habitat for the delta smelt.*

4. Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.

*Each element of human health, welfare, and viability of natural systems was thoroughly assessed throughout this report in a responsible manner.*

5. Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.

*Cumulative impacts to the environment were thoroughly assessed in this report and any effects have been thoroughly evaluated.*

6. Leverage scientific, economic and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.

*USACE collected a great deal of information throughout the preparation of this study which has been thoughtfully prepared and organized in a manner so as to facilitate a greater knowledge base about the area, its challenges, and the opportunities which can be achieved.*

7. Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

*USACE worked with many agencies, individuals, and groups throughout this study, sharing scientific, economic and social information and exchanging ideas for the betterment of a design that will find solutions to the problem while maintaining the level of quality within the surrounding environment.*



7

Recommendations

## 7 RECOMMENDATIONS

I have given consideration to all significant aspects in the overall public interest including engineering feasibility, economic, social, cost and risk analysis, and environmental effects. The Recommended Plan described in this report provides the optimum solution for National Economic Development (NED) benefits within the study area that can be developed with the framework of the formulation concepts. Implementation of the Recommended Plan described in this the San Francisco Bay to Stockton Navigation Study is recommended at this time, with such modification as in the discretion of the Commander, Headquarters, U.S. Army Corps of Engineers (HQUSACE), may be advisable.

### 7.1 ITEMS OF LOCAL COOPERATION

The Recommended Plan conforms to the essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and complies with other Administration and legislative policies and guidelines on project development. If the project were to receive funds for Federal implementation, it would be implemented subject to the cost sharing, financing, and other applicable requirements of Federal law and policy for navigation projects including WRDA 1986, as amended; and would be implemented with such modifications, as the Chief of Engineers deems advisable within his discretionary authority. Federal implementation is contingent upon the non-Federal sponsor agreeing to comply with applicable Federal laws and policies. Prior to implementation, the non-Federal sponsor shall agree to:

- a. Provide, during the periods of design and construction, funds necessary to make its total contribution for commercial navigation equal to:
  - (1) 25 percent of the cost of design and construction of the general navigation features (GNFs).
- b. Provide all lands, easements, rights-of-way, relocations, and placement areas (LERRDs), including those necessary for the borrowing of material and the placement of dredged or excavated material, and perform or assure the performance of all relocations, including utility relocations, all as determined by the Federal government to be necessary for the construction or operation and maintenance of the GNFs.
- c. Pay with interest, over a period not to exceed 30 years following completion of the period of construction of the GNFs, an additional amount equal to 10 percent of the total cost of construction of the GNFs less the amount of credit afforded by the Government for the value of the LERRD is provided by the sponsor for the GNFs. If the amount of credit afforded by the Government for the value of LERRD, and relocations, including utility relocations, provided by the sponsor equals or exceeds 10 percent of the total cost of construction of the GNFs, the sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of LERRD and relocations, including utility relocations, in excess of 10 percent of the total cost of construction of the GNFs.

- d. Provide, operate, and maintain, at no cost to the Government, the local service facilities in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and state laws and regulations and any specific directions prescribed by the Federal government.
- e. Give the Federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the Sponsor owns or controls for access to the project for the purpose of completing, inspecting, operating and maintaining the GNFs.
- f. Hold and save the United States free from all damages arising from the construction or operation and maintenance of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors.
- g. Keep and maintain books, records, documents, or other evidence pertaining to costs and expenses for a minimum of three years after the final accounting and assure that such materials are reasonably available for examination, audit, or reproduction by the Government.
- h. Perform, or ensure performance of, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601–9675, that may exist in, on, or under LERRD that the Federal government determines to be necessary for the construction or operation and maintenance of the GNFs. However, for lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigations unless the Federal government provides the sponsor with prior specific written direction, in which case the sponsor shall perform such investigations in accordance with such written direction.
- i. Assume complete financial responsibility, as between the Federal government and the sponsor, for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under LERRD that the Federal government determines to be necessary for the construction or operation and maintenance of the project.
- j. Agree, as between the Federal Government and the non-Federal sponsor, that the non-Federal sponsor shall be considered the operator of the local service facilities for the purpose of CERCLA liability.
- k. To the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA.
- l. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, (42 U.S.C. 1962d-5b) and Section 101(e) of the WRDA 86, Public Law 99-662, as amended, (33 U.S.C. 2211(e)) which provide that the Secretary of the Army shall not commence the construction of any water

resources project or separable element thereof, until the sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element.

- m. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended, (42 U.S.C. 4601-4655) and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way necessary for construction, operation, and maintenance of the project including those necessary for relocations, the borrowing of material, or the placement of dredged or excavated material; and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.
- n. Comply with all applicable Federal and state laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled “Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army”; and all applicable Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a et seq.), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 et seq.), and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)).
- o. Not use funds from other Federal programs, including any non-Federal contribution required as a matching share therefore, to meet any of the sponsor’s obligations for the project unless the Federal agency providing the Federal portion of such funds verifies in writing that such funds are authorized to be used to carry out the project.

CHAPTER 7.0 Recommendations

The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch.

A handwritten signature in black ink, appearing to read 'R. Clark', is positioned above the printed name.

ROBERT J. CLARK  
Colonel, EN  
Commanding



8

List of Preparers

## 8 LIST OF PREPARERS

### 8.1 PREPARERS

This GRR/EIS was prepared by the following U.S. Army Corps of Engineers:

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This report was reviewed by the following personnel:

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# **ATTACHMENT 10**



# CITY OF OAKLAND

Bureau of Planning

250 Frank H. Ogawa Plaza, Suite 3315, Oakland, California, 94612-2032

## **NOTICE OF PREPARATION (NOP) OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE OAKLAND WATERFRONT BALLPARK DISTRICT PROJECT**

The City of Oakland's Bureau of Planning is preparing an Environmental Impact Report ("EIR") for the Oakland Waterfront Ballpark District Project ("Proposed Project") at Howard Terminal. The City is requesting comments on the scope and content of the EIR. A description of the Proposed Project and its location, together with a summary of the probable environmental effects that will be addressed in the EIR are included herein. Pursuant to California Environmental Quality Act Guidelines §15063(a), the City has **not** prepared an Initial Study.

The EIR for the Proposed Project is being prepared in compliance with the California Environmental Quality Act (CEQA) (California Public Resources Code §§21000 et. seq.) and the State CEQA Guidelines (Guidelines) (California Code of Regulations, Title 14, Division 6, Chapter 3, §§15000 et. seq.). The EIR for the Proposed Project is also being prepared under the new California Assembly Bill 734 judicial streamlining legislation (California Environmental Quality Act: Oakland Sports and Mixed-Use Project) that added new provisions to CEQA as Public Resources Code § 21168.6.7 for the Proposed Project. The City of Oakland is the public agency that would consider approval of an amendment to the Oakland General Plan required for the Proposed Project, and as such, it is the Lead Agency for the Proposed Project. Pursuant to Guidelines §15082(a), upon deciding to prepare an EIR, the City as lead agency must issue a Notice of Preparation (NOP) to inform the Governor's Office of Planning and Research, trustee and responsible agencies, and the public of that decision.

The purpose of the NOP is to provide information describing the project and its potential environmental effects to those who may wish to comment regarding the scope and content of the information to be included in the EIR. Guideline §15082(b) states: "... [E]ach responsible and trustee agency and the Office of Planning and Research shall provide the lead agency with specific detail about the scope and content of the environmental information related to the responsible or trustee agency's area of statutory responsibility that must be included in the draft EIR. The response at a minimum shall identify: (A) The significant environmental issues and reasonable alternatives and mitigation measures that the responsible or trustee agency, or the Office of Planning and Research, will need to have explored in the Draft EIR; and (B) Whether the agency will be a responsible agency or trustee agency for the project." This notice is being sent to responsible or trustee agencies and other interested parties. Responsible and trustee agencies are those public agencies, besides the City of Oakland, that have a role in considering approval and/or carrying out the project. The City encourages responsible and trustee agencies and the Office of Planning and Research to provide this information to the City, so that the City can ensure that the Draft EIR meets the needs of those agencies. Once the Draft EIR is published, it will be sent to all responsible or trustee agencies and to others who respond to this NOP or who otherwise indicate that they would like to receive a copy. The Draft EIR will also be available for review at the City of Oakland at the address identified immediately below.

**SUBMITTING COMMENTS IN RESPONSE TO THIS NOP: The City encourages comments to be submitted electronically via the following link: <http://comment-tracker.esassoc.com/tracker/oaklandsportseir/>.** Comments that address the scope of the Draft EIR may also be directed in writing to: Peterson Vollmann, Planner IV, City of Oakland Bureau of Planning, 250 Frank H. Ogawa Plaza, Suite 2214, Oakland, CA 94612, by hand

delivery or mail, by email to PVollmann@oaklandca.gov, or by fax to (510) 238-4730. Mr. Vollmann may be reached by phone at (510) 238-6167. Time limits mandated by State law require that the City must receive comments within 30 days after publication of this notice; however, the City will receive comments through January 7, 2019, 38 days after publication of this notice. Responses to the NOP must be received via the above web address, mailing or e-mail address or fax by 5:00 p.m. on **Monday, January 7, 2019**. Please reference Case File Number **ER18-016** in all correspondence. Comments and suggestions as to the appropriate scope of analysis in the EIR are invited from all interested parties and will be received at the EIR Scoping Meetings to be held before the City Planning Commission, as noticed below.

Commenters should focus comments on potential impacts of the Proposed Project on the physical environment. Commenters are encouraged to identify ways that potential adverse effects resulting from the Proposed Project might be minimized and to identify reasonable alternatives and mitigation measures to the Proposed Project.

**EIR SCOPING MEETINGS:**

The **City of Oakland Planning Commission** will conduct a public scoping meeting on the EIR for the Oakland Waterfront Ballpark District Project on **Wednesday December 19, 2018 at 6:00 p.m.** in the Council Chambers in **Oakland City Hall, 1 Frank H. Ogawa Plaza, Oakland, CA.**

The **City of Oakland Landmarks Preservation Advisory Board** will conduct a public scoping meeting on the historic and cultural resource aspects of the Proposed Project on **Monday December 17, 2018 at 6:00 p.m.** in the Council Chambers, **Oakland City Hall, 1 Frank H. Ogawa Plaza, Oakland, CA.**

**PROJECT TITLE:** Oakland Waterfront Ballpark District Project (Case File No. **ER18-016**)

**PROJECT LOCATION:** Approximately 55 acres that comprises the Charles P. Howard Terminal and adjacent parcels, located at the Port of Oakland along the Inner Harbor of the Oakland-Alameda Estuary (See Figure 1, Site Location). The site is bound generally by the Oakland Estuary Middle Harbor on the south; Jack London Square on the east; Union Pacific railroad tracks and the Embarcadero on the north; and the heavy metal recycling center, Schnitzer Steel, on the west (see Figure 2, Site Boundary and Context).

**PROJECT SPONSOR:** Oakland Athletics Investment Group, LLC d/b/a The Oakland Athletics

**PROJECT SITE OWNERS:** City of Oakland acting by and through the Port of Oakland, Dynegy Oakland, LLC, and PG&E

**EXISTING CONDITIONS:** Maritime support uses for short term tenants. Existing uses and activities include but are not limited to: truck parking, loaded and empty container storage and staging, and longshore training facilities. The Project Site was previously used as a maritime container terminal until 2014. Howard Terminal is designated as Berths 67 through 69 within the Port of Oakland. Berths 67 and 68 were constructed in the early 1980's, and Berth 69 was constructed in the mid 1990's. The site includes a marginal wharf structure approximately 75' wide. A below grade rock dike sits adjacent to the Oakland Inner Harbor as the site's shoreline. The remaining site is

understood to be on grade pavement. Four cranes are located on Howard Terminal that were used to load/unload ships when the area was an active shipping facility. Howard Terminal is currently used by short term tenants.

Existing regional access to the Project Site exists via both Interstate 880 and Interstate 980, with on-ramps to each within one mile of the Project Site. The Project Site is located about one mile, a 20- to 25-minute walk, from three BART stations including West Oakland, 12th Street Downtown, and Lake Merritt. Railroad tracks are adjacent to the north boundary of the Project Site and there are several at-grade crossings of the railroad tracks nearby, including two directly into the Project Site. There is an Amtrak / Capital Corridor train station about one-half mile from the Project Site, transit bus service is within one-quarter mile, and the Jack London Ferry Terminal is immediately adjacent to the east of the Project Site.

The City of Oakland, acting by and through the City Council, controls the General Plan designation of the Project Site, which currently has a land use designation of “General Industrial” and the “Industrial General (IG)” zoning designation. In addition, areas of Howard Terminal fronting the Oakland Estuary (to the south) are designated within the Bay Conservation and Development Commission (BCDC) jurisdiction and are State Public Trust lands.

The Project Site is included in the list of Hazardous Waste and Substances sites in the Department of Toxic Substances Control (DTSC) EnviroStor database, one of the lists meeting the “Cortese List” requirements (<http://www.calepa.ca.gov/sitecleanup/corteselist/>, accessed October 2018).

**PROJECT DESCRIPTION:** The Project Sponsor proposes to develop the Howard Terminal property with the following key initial plan elements:

- Demolish existing buildings on the Project Site, except the existing power plant and the existing container cranes, which may be retained;
- Address any hazardous materials that may be present on the Project Site;
- Construct:
  - A new privately funded, open-air, approximately 35,000 person capacity Major League Baseball park;
  - Up to 4,000 residential units of varying affordability and types
  - Approximately 2.27 million square feet of adjacent mixed use development, including retail, commercial, office, cultural, entertainment, flex light industrial/manufacturing, and recreational uses;
  - A performance venue with a capacity of up to 3,500 individuals;
  - A 300 to 400-room hotel;
  - New and expanded utility infrastructure; and
  - New signage and lighting;
- Construct/provide improved access from the surrounding neighborhood and regional transportation networks, which could include, but may not be limited to:
  - an expanded shuttle and/or bus service (“rubber-tire trams”); and

- a new network of public streets and sidewalks that provide connectivity to and through the Project Site, and pathways that lead directly to the waterfront and related amenities.
- Construct/provide new waterfront public access, enhanced water views, and on-site open space;
- Comply with AB 734 regarding implementation of sustainability measures, development of a LEED Gold ballpark, and no net increase of greenhouse gas (GHG) emissions; and
- Phase development of the Proposed Project, with a target completion date of Spring 2023 for construction of Phase 1, including the ballpark, associated infrastructure, and potentially some ancillary development.

The Proposed Project may also consider one or more variants or options, potentially including but not limited to:

- New elevated pedestrian connections over the railroad tracks and improvements to existing at-grade crossings;
- An aerial tram or gondola above Washington Street extending from downtown Oakland near 12<sup>th</sup> Street BART to Jack London Square;
- Development of a portion of an existing power plant and removal of adjacent tanks;
- Altered edge configuration of the existing wharf to enhance public views and provide additional boat access/active water uses; and/or
- Extension of Embarcadero West to Middle Harbor Road and a new ramp from the existing Adeline Street overpass for new direct access to the Project Site.

**ANTICIPATED ENTITLEMENTS AND APPROVALS:** Discretionary approvals required for development of the Proposed Project are anticipated to include, but may not be limited to, the following:

- City Council approval of amendments to the General Plan and Planning Code after recommendation by the Planning Commission;
- Board of Port Commissioners approval of project transactional documents (e.g. leases and conveyance agreements);
- All necessary development permits and entitlements from the City & the Port;
- Port and State Lands Commission approval of a Trust Settlement and Exchange Agreement addressing public trust issues affecting the Project Site; and
- Bay Conservation and Development Commission (BCDC) Major Permit and Amendment to the BCDC and Metropolitan Transportation Commission (MTC) Seaport Plan.

**PROBABLE ENVIRONMENTAL EFFECTS AND PROPOSED SCOPE OF THE EIR:** The EIR will analyze and disclose the direct and indirect potentially significant impacts that would result from construction and operation of the Proposed Project under Existing Plus Project and Cumulative conditions (Guidelines §§15126.2, 15130), in addition to other analysis scenarios that may be appropriate for the EIR. Where significant impacts are identified, the EIR will describe potentially feasible mitigation measures that could minimize significant adverse impacts (Guidelines §15126.4). It is anticipated that the Proposed Project may have environmental impacts on aesthetics, air quality, biological resources, cultural resources, hazards, land use, noise and vibration, population and housing, public services, public utilities, transportation and circulation, hydrology and water quality, and growth inducement. It is anticipated that the Proposed Project would have no impact or less-than-significant impacts on

agricultural and forestry resources. Nevertheless, the EIR will evaluate the full range of environmental issues contemplated for consideration under CEQA and the CEQA Guidelines, including but not limited to the following:

- Aesthetics, Shadow and Wind (including Light, and Glare)
- Agricultural and Forestry Resources
- Air Quality
- Biological Resources
- Cultural and Historic Resources (including Tribal Cultural Resources)
- Geology and Soils (including Geological and Seismic Hazards)
- Greenhouse Gas Emissions /Global Climate Change
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise and Vibration
- Population and Housing (including Growth Inducement)
- Public Services (including Police Services, Fire Protection Services, Parks and Schools);
- Recreation
- Transportation and Circulation
- Public Utilities and Service Systems (including Energy Demand and Conservation)

The Draft EIR will evaluate cumulative impacts of the Proposed Project, including the effects of other past, present, and reasonably foreseeable projects in the vicinity (Guidelines §15130).

The Draft EIR will also identify and examine a range of reasonable alternatives to the Proposed Project, including, but not limited to, a No Project Alternative (Guidelines §15126.6) and an alternative site (e.g. the Oakland Coliseum site).

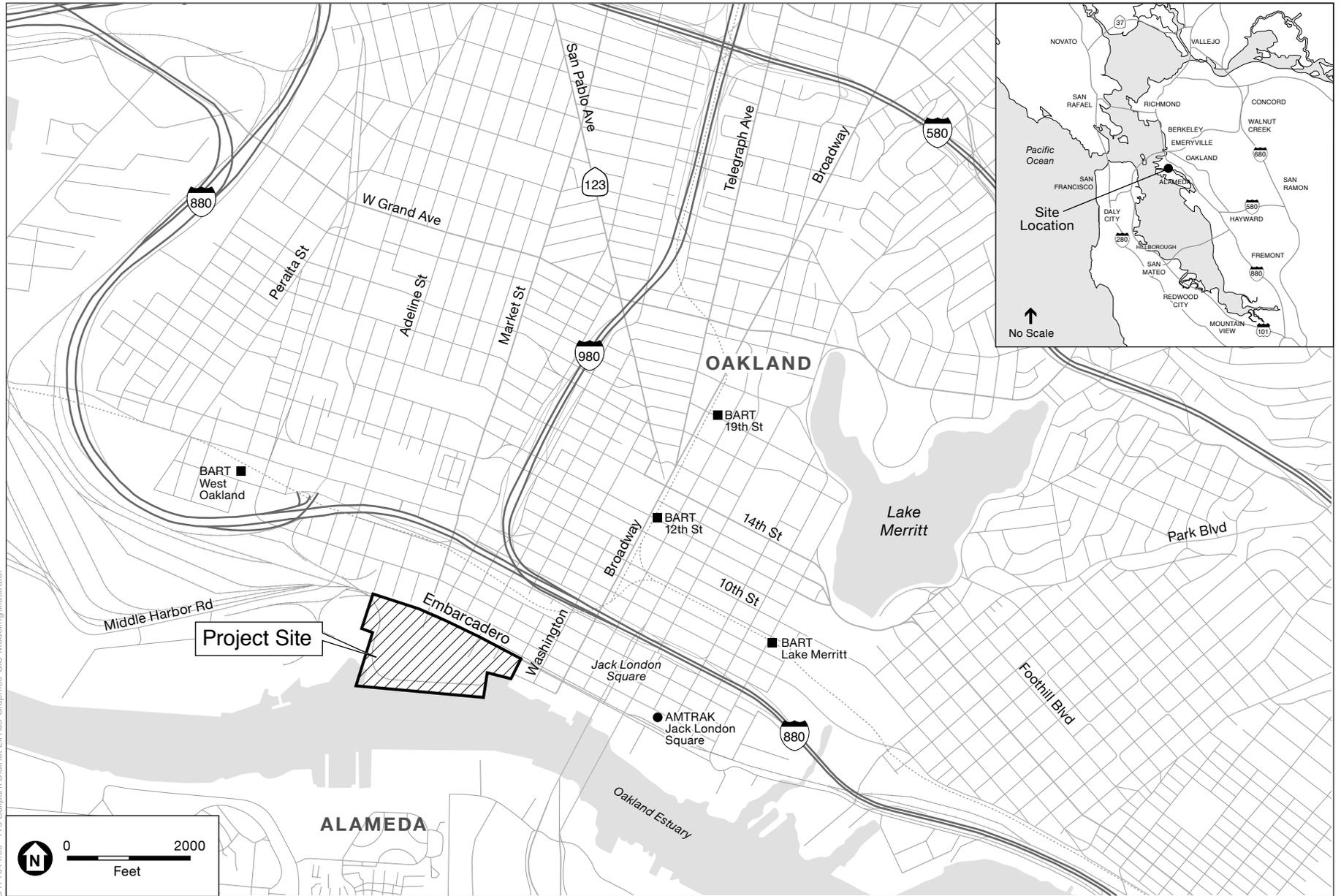
November 30, 2018  
Case File Number: **ER18-016**

  
\_\_\_\_\_  
Ed Manasse, Bureau of Planning  
Environmental Review Officer

Attachments:

- Figure 1, Project Location Map
- Figure 2, Site Boundary and Context

D:\71044.00 - A's Ballpark District EIR\05 Graphics-GIS-Modeling\Illustrator



SOURCE: ESA, 2018

Figure 1  
Project Location





SOURCE: City of Oakland, Bureau of Planning

**Figure 2**  
Site Boundary and Context

## Comment 44 for To Consider Proposed Control Measure for Ocean-Going Vessels At Berth (ogvatberth2019) - 15-1.

First Name: Frances and Dave  
Last Name: Low  
Email Address: fflow1221@gmail.com  
Affiliation: San Diego Embarcadero Coalition

Subject: Proposed Control Measure for Ocean-Going Vessels At Berth  
Comment:

Subject: Proposed Control Measure for Ocean-Going Vessels At Berth

I am a resident of downtown San Diego, along with 40,000 other people. The cruise ships dock extremely close to our high-density neighborhood and the pollution caused when the ships are not connected to shore power is toxic. The ships contaminate the whole downtown, but are especially dangerous for residents in the half-mile radius of the terminal, including the high-density populations of Columbia, Marina and Little Italy Districts, with high-rise condominiums, apartment complexes and hotels. Over 1400 hotel rooms are across the street from the ships and many residents are literally one block from the cruise ship terminal, a distance of about 800 ft.

I don't believe CARB is considering the proximity of the ships to the residential population in its rule making. A one size fits all scenario for rule-making does not work since the health and welfare of thousands of people is being put at risk. The San Diego cruise ship terminal is very different than LA's and should be treated differently.

1. I am pleased that ships in fleets will be required to connect to shore power Jan 1, 2021. I want ALL cruise ships to meet this requirement, no exceptions, at the San Diego cruise ship terminal. Cruise lines already had years to convert their ships. If they want to dock in San Diego they should not pollute the neighborhood and people's lungs and homes.
2. Maintain the current timeframe standards, or make them tougher, to connect to shore power. One hour after the ship docks to berth is acceptable. Changing this connection time to 2 hours after Ready to Work, in our situation, is unacceptable. Vessels and the Port need to make sure that the connections are maintained and labor is available to connect in one hour. Please do not lower standards and allow more than two hours to connect to shore power.
3. San Diego's Port Authority allows cruise ships to re-engage their engines 1/2 hour before leaving the berth. I want that to continue. A one hour timeframe to pollute, is not necessary. Every hour the cruise ships are allowed to pollute downtown, puts our health at increased risk.
4. In order for the Port of San Diego to meet the connection requirements already proposed, it needs money to build the

additional infrastructure to provide a second connection to shore power. Please provide the resources to make this happen before Jan 1, 2021.

Sincerely,

In case you aren't aware of the toxins in diesel pollution  
Wikipedia  
Chemical classes[edit]  
The following are classes of chemical compounds that have been found in diesel exhaust.[24]

Class of chemical contaminant Note  
antimony compounds[citation needed] Toxicity similar to arsenic poisoning[25]  
beryllium compounds IARC Group 1 carcinogens  
chromium compounds[26] IARC Group 3 possible carcinogens  
cobalt compounds  
cyanide compounds[26]  
dioxins[26] and dibenzofurans  
manganese compounds[26]  
mercury compounds[26] IARC Group 3 possible carcinogens  
nitrogen oxides[26] 5.6 ppm or 6500  $\mu\text{g}/\text{m}^3$ [1]  
polycyclic organic matter, including  
polycyclic aromatic hydrocarbons (PAHs)[1][26]  
selenium compounds  
sulfur compounds[26]

44-1

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2020-05-01 11:27:33

No Duplicates.

Comment 48 for To Consider Proposed Control Measure for Ocean-Going Vessels At Berth (ogvatberth2019) - 15-1.

First Name: Tracy  
Last Name: Fidell  
Email Address: tfidell@portoakland.com  
Affiliation: Port of Oakland

Subject: Port of Oakland comments on 15-day changes for Proposed At-Berth Amendment  
Comment:

Please see attached letter for comments from the Port of Oakland.

Attachment: [www.arb.ca.gov/lists/com-attach/117-ogvatberth2019-Wz1XOAdoVmRSOFcl.pdf](http://www.arb.ca.gov/lists/com-attach/117-ogvatberth2019-Wz1XOAdoVmRSOFcl.pdf)

Original File Name: Final Port of Oakland Comments on 15-day Changes to At-Berth Amendment.pdf

Date and Time Comment Was Submitted: 2020-05-01 12:26:08

No Duplicates.



May 1, 2020

Ms. Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on March 26, 2020 Notice of Availability of Modified Text for Proposed Control Measure for Ocean-Going Vessels at Berth (15-day changes)

Dear Ms. Csondes:

The Port of Oakland (Port) appreciates the opportunity to comment on the rulemaking materials posted March 26, 2020, for the Proposed Control Measure for Ocean-Going Vessels At Berth (Proposed Control Measure). The Port understands that the California Air Resources Board (CARB) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (current At-Berth Regulation), with the goal of having the new rule in place in 2021.

The Port of Oakland has a very successful shore power program, underscoring the effectiveness of the current At-Berth Regulation. In 2018, 83% of regulated vessel calls<sup>1</sup> at the Port of Oakland drew shore power, surpassing the regulatory requirement of 70% compliance. The plug-in rates at the Port of Oakland are increasing as more carriers retrofit their vessels for shore power. In 2019, the success rate for the regulated fleet was 84% and year to date for 2020, the rate is tracking at 83%. Once safety exemptions are taken into consideration, compliance is much higher, surpassing 90% at some berths.

Before listing comments on the regulation, the Port questions whether CARB's timeline for implementing the Proposed Control Measure is still appropriate and feasible. As CARB is aware, California and U.S. seaports and goods movement industry stakeholders are responding to an unprecedented global economic and public health crisis. The maritime industry, which

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<sup>1</sup> Steamships and infrequent callers (<25 calls/year) are exempt from the current regulation.

includes California and U.S. seaports, is included within the transportation critical infrastructure sector defined by the Department of Homeland Security. The maritime industry, operating under extraordinarily challenging public health, safety and financial conditions due to the COVID-19 pandemic, has swiftly reprioritized and reallocated scarce personnel and financial resources to ensure the continuity of essential supply chain services to the public, communities, businesses and local, state and federal government agencies around the United States. It seems problematic and inattentive to these challenges for CARB to require California seaports, terminal operators, and shipping companies to divert their limited resources and attention to this rulemaking process when lives and jobs are at risk, especially since many of the proposed measures are not due to take effect for several years. We respectfully request that CARB place the rulemaking process on “pause” to allow the maritime industry to focus its resources and attention on the performance of its critical supply chain functions and services in response to the COVID-19 pandemic.

**Specific Comments and Questions on the Proposed Control Measure**

1. One of the Port of Oakland’s main concerns about the Proposed Control Measure is its potential to create conflict and failure rather than collaboration among terminal operators, vessel operators and a local seaport. The Port of Oakland has expressed this concern in previous correspondence to CARB (see attachments to this letter, below). Specifically, the proposed complex regime of TIEs and VIEs has the potential to lead to disputes, rather than collaboration, among terminal operators, vessel operators, and a local seaport. Similarly, the proposed requirement for each port to prepare a “Port plan” and agree upon a “division of responsibilities” between terminal operators and the local seaport adds another potential arena of conflict for each port and its terminal tenants. It is doubtful whether CARB enforcement staff possess the necessary dispute resolution expertise to referee the foreseeable conflicts. The Port of Oakland recommends that CARB maintain the framework of the existing At-Berth Regulation in place for containerships. California’s container shipping industry has successfully coalesced around this existing regulation and has demonstrated consistent overcompliance with the rule.
2. According to the 15-day changes, the Innovative Concepts provision provides a pathway “for regulated vessel fleets to continue using fleet averaging methods to comply with the Proposed Regulation.” If the current regime is already acceptable as an Innovative Concept, why not let the current regime stay in place? Why force the carriers to re-apply every three years for a proven method that is already working? The Port suggests that CARB allow current fleet averaging methods to stay in place for all carriers who desire it without the need to constantly re-apply every three years. The shipping industry thrives on certainty.
3. According to CARB’s own analysis, the Port of Oakland has no feasible alternative compliance method at three out of four of its terminals (representing 83% of the Port’s call volume). This means that carriers relying on a barge-mounted bonnet system for compliance at the San Pedro Bay Ports (SPBP) will not be able to call Oakland, where the only feasible compliance method is shore power. This puts the Port of Oakland at a real disadvantage, especially as compared to its competitor ports in Tacoma, Seattle, Vancouver, and Prince Rupert. Diverting cargo to distant seaports only serves to increase emissions, undermining the purpose of the regulation.

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4. The inventory that serves as the foundation for this rule is flawed. It underestimates the efficacy of the current regulation and overstates the benefit of the Proposed Control Measure. The discrepancies listed below invalidate the conclusions of CARB's analysis.
  - a. CARB's 2016 baseline data do not seem reliable. Comparing summaries by vessel class size to the Port of Oakland's own data (used for billing and subject to audit), the values are off by up to 40% in critical areas.
  - b. The inventory calculation caps the benefit of the current regulation at 80%, which disregards current overcompliance primarily due to 1) the provision requiring every vessel capable of plugging in to do so, 2) the long call durations at the SPBP resulting in ~96% emission reductions, and 3) the fact that some infrequent callers are in fact plugging in even though they are not required to do so.
  - c. As recognized by CARB staff, the assumed growth rate for the Port Oakland is too high. The inventory assumes a 5% compounded annual growth rate (CAGR) for the Port of Oakland, which CARB staff have agreed should be lowered to 2.2%. Considering the current COVID-19 crisis and the related documented decline in cargo throughput at California seaports, it is evident that the 5% CAGR is speculative at best and should not serve as the analytical basis to estimate projected emissions reductions and cost-effectiveness of the Proposed Control Measure.

CARB inventory staff have acknowledged these issues in a variety of phone calls and emails to Port of Oakland staff. CARB staff members have said that they will address these issues in Summer 2020, which is obviously too late to make the required adjustments or revisions under the proposed rulemaking and adoption schedule.

The Port suggests that CARB take the time available now during the COVID-19 crisis to reassess its baseline data, compliance assumptions, and inventory calculations. The Port has kept meticulous shore power records and would be happy to share information and provide reliable data sets to CARB.

5. Lastly, the Port of Oakland notes that today's May 1, 2020, letter is the Port's fifth letter to CARB providing comments and expressing concerns regarding the Proposed Control Measure. (See attachments to this letter, below.) The Port has expended considerable time and personnel resources combing through the proposed regulation and raising substantive concerns and questions about many different details of the proposed regulation and the data upon which it is based. To date, CARB staff have not provided written responses to the questions and comments posed in the Port of Oakland's first four letters. The Port has attached the previous four letters to today's letter, and specifically requests detailed responses to each of the questions raised in all the Port's letters. The Port believes that CARB's intention to provide meaningful stakeholder engagement requires that CARB timely and diligently provide substantive written responses to questions raised and comments made by the Port of Oakland and other stakeholders.

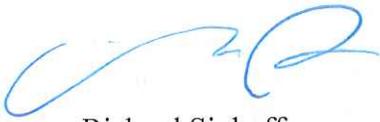
## **Closing**

The Port of Oakland appreciate the opportunity to review the 15-day changes to the Proposed Control Measure. As the Port of Oakland's maritime air quality policies and plans – Maritime

Air Quality Improvement Plan (2009) and Seaport Air Quality 2020 and Beyond Plan (2019) – emissions inventories, and shore power records and data show, among other policies and documents, the Port of Oakland is fully engaged and committed to reducing at-berth emissions and increasing shore-power usage. However, the Port believes that California seaports can achieve the desired outcomes of the existing shore power rule without getting mired in an unnecessarily complicated new regulation that is analytically flawed and presents the potential for conflict among seaports, terminal operators and vessel owners and operators.

The Port of Oakland looks forward to working with CARB on the emissions inventory and associated analyses. Please contact Tracy Fidell, P.E., Port Associate Environmental Planner/Scientist at [tfidell@portoakland.com](mailto:tfidell@portoakland.com) with any follow-up questions and responses.

Sincerely,



Richard Sinkoff  
Director of Environmental Programs and Planning

CC:

Kristi McKenney, Chief Operating Officer  
Michele Heffes, Port Attorney  
John Driscoll, Maritime Director  
Matthew Davis, Director of Governmental Affairs

Attachments (Prior letters to CARB):

- 1) June 10, 2019 Port letter to CARB re: Comments on May 10, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents
- 2) January 15, 2019 Port letter to CARB re: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor
- 3) February 15, 2019 Port letter to CARB re: Comments on *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor
- 4) December 2, 2019 Port letter to CARB re: Comments on October 15, 2019, Draft Proposed Control Measure for Ocean-Going Vessels at Berth and Supporting Documents



June 10, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on May 10, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the rulemaking materials posted May 10, 2019, for the Proposed Control Measure for Ocean-Going Vessels At Berth (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. On May 10, 2019, CARB posted the revised text of the Proposed Control Measure, and provided, as supporting documents, the presentation from the May 14 and May 16, 2019 public workshops, Cost Inputs and Assumptions in PDF format, and Cost Estimates in Excel format.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGVs”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting detailed information from marine terminal operators. The Port posts shore power usage statistics, reasons for equipped vessels not plugging in, and cost information on our shore power website: <https://www.oaklandseaport.com/development-programs/shore-power/>. In 2018, 75% of all calls to the Port drew shore power.

Public comments on the Proposed Control Measure are due to CARB June 10, 2019. Port staff understand CARB will then finalize the regulatory language and prepare an Initial Statement of

Reasons (“ISOR”) to release on October 18, 2019, with public comment on the ISOR closing on December 2, 2019. The CARB Governing Board is scheduled to hear the Proposed Control Measure on December 5, 2019. Do CARB staff intend to respond to public comment on the ISOR? Three days does not leave time for meaningful CARB response to public comment or public review of subsequent changes to the Proposed Control Measure. Port staff suggest a minimum of 14 days for CARB staff to review and respond to public comment, and for the public to review any changes, before the Proposed Control Measure can be heard.

The Proposed Control Measure includes the concept of an Incident Exemption, which is new since CARB published its draft Proposed Control Measure in August 2018. Vessel fleets would be granted Vessel Incident Exemptions (VIEs) and terminals would be granted Terminal Incident Exemptions (TIEs). Starting in 2021 for container ships and terminals, VIEs and TIEs would be granted at levels of 5% of the previous calendar year’s calls. CARB stated at the May 14, 2019, public workshop that the expected plug-in level for the container fleet is 90% in 2021.

Port staff submit the following comments and questions, divided into the topic areas of the draft regulatory text of the Proposed Control Measure, the presentation from the May 14, 2019 and May 16, 2019 public workshops, and the Cost Inputs and Assumptions in PDF format.

### **Comments and Questions on the Draft Regulatory Text of the Proposed Control Measure**

1. Port staff request clarification on the definition of “necessary infrastructure...that will enable a terminal to comply with this Control Measure” in Section 93130.10(b) of the Proposed Control Measure and what, in this context, “subject to verification by [CARB] enforcement staff” means. From Table XI Berth and Terminal Counts, Anticipated Infrastructure Needs, and Unique Vessels of the CARB Cost Inputs and Assumptions in PDF format, it appears that CARB believes that three new shore power vaults “would be installed in response to the Draft Regulation [Proposed Control Measure]...” at the Port. Accordingly Port staff request documentation supporting CARB staff’s berth-by-berth infrastructure analysis and determination that three new shore power vaults would be required at the Port in response to the Proposed Control Measure.
2. Regarding the Terminal and Port Plans required for Container terminals in Section 93130.11 of the Proposed Control Measure, the deadline of June 1, 2020 does not allow for sufficient time after the anticipated adoption of the Proposed Control Measure for ports and terminals to submit plans. Port staff object to the text in Section 93130.11(a) that “[a]s an alternative, Ports may submit plans for their terminal operators.” Ports should not be expected to submit plans for terminal operators. In addition, the statement in Section 93130.10(b) of the Proposed Control Measure that “Ports should use terminal plans as [the] basis for developing port plans” seems to indicate that the deadline for Port Plans should be adjusted to come after the deadline for Terminal Plans.
3. The definition of “Fleet” in Section 93130.2(b)(22) of the Proposed Control Measure does not explain how fleets will be established. What will CARB require at the beginning

of each compliance year to establish fleets? Will this be part of the online Freight Regulations Reporting System (“FRRS”) mentioned in the presentation from the May 14, 2019 and May 16, 2019 public workshops?

Port staff request an initial accommodation for new fleets entering the California market. New entrants should be given an opportunity to estimate the coming year’s ship calls and estimate the number of VIEs to be awarded for the coming year.

The definition of Fleet and the requirements for VIEs also need to be responsive to changes in the shipping industry, for example when businesses merge or alliances change. Likewise, CARB should clarify what provisions will accommodate changes in the terminal industry, such as new terminals or changes in ownership, in the allocation of TIEs.

4. Port staff have two comments regarding vessel commissioning. Port staff request that vessel commissioning events that do not successfully connect to shore power as discussed in Section 93130.7(f)(2) of the Proposed Control Measure be considered eligible for exceptions under the regulation. The commissioning attempt shows that the goal was to reduce emissions through shore power and as such an Exception should be available to operators in this situation. Port staff conduct each vessel commissioning (with the exception of those at the Matson Terminal) to ensure the safety of the vessel, terminal, and workforce. Vessel commissioning is an invaluable safety procedure and should not be penalized under the Proposed Control Measure.

Port staff request that the definition of “Vessel Commissioning” in Section 93130.2(b)(61) of the Proposed Control Measure be expanded to include the case in which the port authority is the commissioning agent, as is the case at the Port of Oakland. Likewise, in Section 93130.7(d)(1) (“If applicable, commission vessel as required by terminal operator”), Section 93130.8(a)(4) (“It is the terminal operator’s responsibility to commission vessels equipped with shore power”), and Section 93130.8(d)(1) (“If applicable, commission vessel for use of shore power”), the commissioning requirement should be determined by the port authority or the terminal operator.

5. The reduction in VIEs and TIEs for Container, Reefer, and Passenger vessels from 5% each to 3% each discussed in Sections 93130.7(g)(1)(A)(ii) and 93130.8(h)(1)(A)(ii) of the Proposed Control Measure serves to increase the usage of the Remediation Fund [Section 93130.12(a)] in and after 2023. Port staff request further information from CARB on when and where the Remediation Fund will be deployed, given that CARB anticipates zero-emissions regulation on trucks, transport refrigeration units, forklifts, and cargo-handling equipment in the time frame of enhanced usage of the Remediation Fund, making those categories ineligible for incentive-funded emissions reductions.

6. The allotted VIEs and TIEs for vessels other than Container, Reefer, and Passenger vessels in Sections 93130.7(g)(1)(A) and 93130.8(h)(1)(A) of the Proposed Control Measure reduce from 5% to 3% after only one year. Port staff note that at the advent of the ATCM, the requirement was 50% of all calls in the first year. An initial expectation of 90% usage does not accommodate the fact that the Proposed Control Measure is the first-of-its-kind requirement for Ro-Ro and Tanker vessels in the world, and the technologies and equipment required do not exist at this time and have not been tested.
7. Regarding the Remediation Fund described in Section 93130.12 of the Proposed Control Measure, what is the procedure and timeline for CARB to approve a public entity to manage the funds generated at the Port?
8. Port staff request clarification from CARB of what constitutes a failure to achieve “full emission reductions” as referenced in Section 93130.12(a)(3) of the Proposed Control Measure, regarding when the Remediation Fund may be used.
9. In response to the suggestion in Section 93130.8(a)(2) of the Proposed Control Measure that a terminal operator should be responsible to interrupt a vessel call to shift the vessel to a berth with shore power if no berth was previously available, Port staff request CARB prepare and share an analysis of harbor craft emissions associated with such a shift at each port. Second to OGV, harbor craft are the second-highest emitting sources of emissions in the Port’s 2017 Emissions Inventory. Given the short duration of the average vessel call to the Port, the suggestion to call additional harbor craft to reduce the remaining hours of an OGV call’s auxiliary emissions could lead to increased overall emissions.
10. Likewise, Port staff question if the suggestion in Section 93130.8(a)(3) of the Proposed Control Measure that a terminal operator should be responsible to provide an alternative CARB-approved emission control strategy if a commissioned shore power vessel is berthed such that it cannot connect to shore power is necessary. CARB’s own analysis in the Cost Inputs and Assumptions in PDF format, Table XI, declares that no barge-based capture and control system is anticipated for the Port.
11. Port staff note that the “power meter readings at the time of shore power connection and disconnection” requested in Section 93130.8(e)(2)(C) of the Proposed Control Measure are typically not available within 7 calendar days of a vessel’s departure, as anticipated by CARB. Power meter readings at the Port are typically available at the close of the calendar month and not sooner.
12. In Section 93130.1 of the Proposed Control Measure, the stated intent of the Proposed Control Measure is “to ensure that operators of ocean-going vessels reduce emissions using a California Air Resources Board (CARB) approved emission control strategy to reduce PM, NOx, and ROG emissions at berth without increasing overall GHG emissions from this Control Measure...” How will CARB monitor GHG emissions after

implementation of the Proposed Control Measure and what is the GHG emissions baseline?

### **Comments and Questions on the presentation from the May 14, 2019 and May 16, 2019 public workshops**

13. On Slide 4 of the presentation for the May 14, 2019 and May 16, 2019, public workshops, CARB staff show OGV at-berth emissions for the entire state. Port staff request to see these emissions totals further tabulated both by port or marine terminal and by vessel type. This is especially important as, per Section 93130.7(g)(2) of the Proposed Control Measure, VIEs are specific to the Fleet-Port pairing they are granted to.
14. On Slides 5 and 29 of the presentation for the May 14, 2019 and May 16, 2019 public workshops, CARB staff show a table of cost effectiveness for this rulemaking. The Port provides specific comments on the cost estimates below. Port staff request to see the total cost estimates and cost effectiveness estimates further tabulated both by port and by vessel type.

### **Comments and Questions on the Cost Inputs and Assumptions in PDF format**

15. In Table V. Auxiliary Engine Effective Power Values, CARB states that it is relying on “the same power values cited in Table 7 of the emission inventory methodology <https://ww3.arb.ca.gov/msei/ordiesel/draft2019ogvinv.pdf>. Values used in cost analysis for container/reefer and tanker vessels are calculated as one kW-average per vessel type, weighted by average vessel kW at each port/terminal and vessel visits to each port/terminal.”

As noted in the Port’s February 15, 2019 letter to CARB regarding the emissions inventory, the emissions inventory relies on the assumption that container vessel effective power is a function of vessel size bin. Will this assumption in the emissions inventory be modified to align with the cost estimate?

16. In Table VI. Duration of Emission Control at Berth, CARB shows that it is estimating statewide emissions reductions based on average duration of emission control at berth per vessel visit. The Port requests an emissions and cost analysis specific to each port or marine terminal and each vessel type. The stated average Container/Reefer duration of emission control at berth of 38.8 hours is about twice the average time for shore power connections at the Port. The difference between Port data and the average shows that the statewide average is not meaningful for the Port, and the conclusions of the averaging analysis may not apply to the Port.
17. Table VIII. Electricity and Fuel Cost Inputs and the associated Cost Estimates in Excel format show that CARB expects 100% of any Low Carbon Fuel Standard (“LCFS”) credits would be reinvested into shore power. It is not guaranteed that the credits would

all be reinvested into shore power. What assumptions did CARB staff make in projecting the LCFS credit value through 2032?

18. Related to the duration of emission control at berth in Table VI, Port staff would like to reiterate that shore power usage at the Port is billed based on hours of use, not kWh drawn. This affects the assumptions in Table VIII. Electricity and Fuel Cost Inputs, as well. While the cost of Pacific Gas & Electric electricity is relevant to the Matson Terminal and the overall discussion of electricity costs, the Port is the utility serving shore power at all but the Matson Terminal.
19. The growth assumptions in Table IX. Growth Factors overestimate actual TEU growth for the Port between 2016 and 2018 and continue to use a 3.9% compound annual TEU growth rate between 2018 and 2032. Port staff request that in addition to this high estimate of TEU growth, CARB prepare an estimate of emissions using a realistic growth estimate. For reference, the Port's CAGR between 2008 and 2018 was 0.4%. Port staff understand that the growth estimates CARB is using for emissions and costs for the Port will align with the vessel fleet projections (such as larger vessels each year) that are being used for the Ports of Long Beach and Los Angeles.
20. Port staff note that the cost of compliance with the existing At-Berth Regulation is high and requires frequent vessel retrofits. In 2018, the Port commissioned or re-commissioned nearly 100 vessels, or about 25% of the ever-commissioned vessel list. The ongoing costs of retrofitting vessels when the line rotation changes, maintaining vessel equipment, and commissioning vessels with the current At-Berth Regulation apply equally to comply with the Proposed Control Measure and should be included in the cost estimates as they are real and necessary costs of compliance with the Proposed Control Measure. The Proposed Control Measure is not additive and incremental to the At-Berth Regulation, but rather a replacement and as such the entire cost to comply with the Proposed Control Measure needs to be factored into the cost effectiveness.

## **Closing**

Port staff appreciate the opportunity to review the Proposed Control Measure and attend the public workshop on May 14, 2019. We look forward to working with CARB on refinements to improve the Proposed Control Measure, emissions inventory, and associated analyses.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,



Colleen Liang, Port Environmental Supervisor, for

**Richard Sinkoff**

Director of Environmental Programs and Planning

Enclosures: January 15, 2019 Port letter to ARB re: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

February 15, 2019 Port letter to ARB re: Comments on *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor



February 15, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* posted January 15, 2019, for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. CARB posted the text of the Proposed Control Measure on August 31, 2018. The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* was prepared in support of the Proposed Control Measure.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGVs”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting detailed information from marine terminal operators and posting that information on the Port’s website for public information purposes.<sup>1</sup>

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<sup>1</sup> <https://www.oaklandseaport.com/development-programs/shore-power/>

The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* document includes emissions from California ports and CARB-defined Marine Terminal Complexes (“MTCs”). The emissions for 2016 are tabulated in Appendix B, while emissions for other years are only represented graphically in figures in the document and in tables published by CARB on November 9, 2018.

Comments on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* are due to CARB February 15, 2019. CARB will then host a public workshop to discuss the emissions on February 26, 2019. After that, Port staff anticipate the need for a revised emissions inventory for the Proposed Control Measure that responds to public comments. The Port provides wharfinger information to CARB annually as required by grant funding obligations. In addition, Port staff request that CARB staff work with the Port to refine assumptions made in the emissions estimates.

Given the scheduling of the public workshop after the public comment period has closed, this letter includes comments and questions that may best be addressed in the workshop. Thus, the Port is providing a list of comments and questions on the draft emissions inventory and topics for discussion at the February 26 public workshop.

**Comments and Questions on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results***

1. Why was 2016 selected as the baseline calendar year for the emissions inventory? Does CARB plan to conduct in-depth emissions inventories for 2017 and 2018?
2. Table 4 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* shows vessel visit counts to California ports and MTCs in 2016 only. However, current trends are for fewer calls by larger vessels for a given amount of containerized cargo. The discussion on page 25 of the draft clarifies that “vessel practice changes” are not considered, even as the total number of calls is dropping in real time. Since 2013, total annual calls to the Port have been decreasing. Container cargo throughput is thus decoupled from vessel call activity. CARB should expand the vessel growth forecasting for the baseline scenario to include the effects of larger vessels and fewer calls for the same amount of containerized cargo.
3. Table 7 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* relies on the assumption that for all ports and MTCs, container vessel effective power will match that of the Ports of Los Angeles and Long Beach in 2016. The effective power does not appear to be a function of vessel size bin, so the level of detail with which the effective power is classified by CARB-defined size bin is not appropriate. In addition, given the variation between data from the Port of Los Angeles and the Port of Long Beach within the same CARB-defined size bin, the data may not be meaningful when averaged by CARB-defined size bin. CARB should use an average effective power for container vessels regardless of size.

4. The growth rates in the Freight Analysis Framework (“FAF”) for ports and MTCs outside of the San Pedro Bay are at odds with current trends. The FAF assumption for container cargo at the Port of Oakland is a 5% year-over-year growth rate between 2016 and 2020. Actual growth rates between 2016 and 2018 have not kept pace, with current Oakland planning documents estimating about half the FAF compound annual growth rate.<sup>2</sup> CARB should adjust the FAF growth forecasting for the baseline scenario to align with actual trends.
5. Page 27 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* discusses statistical significance in the context of the emission forecasting. If CARB staff have conducted an uncertainties analysis, it should be included in the methodology and results document.
6. Table 15 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* does not treat all ports and vessel types equally when assuming “Projected 2020 and Later Time on Shorepower,” without justifying the differences. For instance, CARB assumes container vessels at the Port of Hueneme spend 80% of their time on shore power after 2020, while CARB assumes at the Ports of Los Angeles and Long Beach container vessels spend only 65% of their time on shore power. Impossibly, CARB-defined size bins 7, 9, and 12 container vessels at the Port of Oakland are assumed to spend 100% of their time at berth on shore power.<sup>3</sup> Port staff request further justification for and synchronization of the assumptions for “Projected 2020 and Later Time on Shorepower.”
7. In the discussion of the “static age distribution model” versus a survival and turnover model, CARB staff do not consider the abnormally high number of OGV keels laid in 2015. How did CARB decide that the spike in keels laid in 2015 was not material to estimating NOx emissions through 2050?
8. CARB should revise its assumption that sulfur content in fuel is 0.1% based on the results of enforcement analyses of in-use fuel sulfur. The sulfur content of in-use fuel as sampled by the CARB enforcement team in calendar years 2017 and 2018 is lower than 0.1% by 30% and almost 50%, respectively, presenting information that actual emissions are lower than those estimated by CARB. (As stated on page 12, information from CARB’s enforcement team is already used to determine reduced emissions from reduced engine activity time.)

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<sup>2</sup> <https://www.portofoakland.com/community/environmental-stewardship/maritime-air-quality-improvement-plan/>

<sup>3</sup> Vessels arriving at berth need time to tie lines and lower gangways before they can connect shore power and likewise vessels need time to disconnect from shore power when leaving the berth. With these bookends on each vessel call, a vessel cannot be plugged into shore power for 100% of the time at berth.

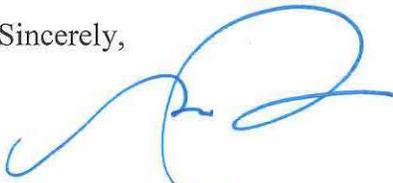
9. CARB should elaborate in the text on the Particulate Matter (“PM”) emission factor for Marine Gas Oil (“MGO”) at 0.1% sulfur. The 2007 Initial Statement of Reasons for At-Berth Regulation rulemaking used a value of 0.25 g/kW-hr for 0.1% S MGO. The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* uses a PM emission factor of 0.18 g/kW-hr for the same fuel. The root source for OGV auxiliary engine emission factors is stated in both cases as the 2002 Entec study, with no description of why two different values of PM emission factors are used for the same fuel.
10. Please add References to the Table of Contents and to the document (Sources of emission factor information are only included at the end of Appendix A).
11. On page 42, should the last sentence read “it excludes emissions from boilers,” not “it excludes emissions from auxiliary engines”?

### Closing

Port staff look forward to working with CARB to support the updated emissions inventories referred to in the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* after the workshop on February 26.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,



Richard Sinkoff  
Director of Environmental Programs and Planning



January 31, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the Preliminary Draft HRA posted November 5, 2018, for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. CARB posted the text of the Proposed Control Measure on August 31, 2018. The November 5, 2018, Preliminary Draft HRA and associated air dispersion modeling files that CARB released December 14, 2018, were prepared in support of the Proposed Control Measure.

The Preliminary Health Analyses document contains two types of assessment, 1) an HRA using air dispersion modeling and impacts estimation guidance from the California Environmental Protection Agency Office of Environmental Health Hazard Assessment (“OEHHA”) and 2) an Incidents per Ton (“IPT”) analysis.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGV”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting

detailed information from marine terminal operators and posting that information on the Port's web site for public information purposes.<sup>1</sup>

**The key input to the Preliminary Draft HRA is the estimated emissions from vessels at berth, which are not yet final. Emissions estimates need to be final and the Preliminary Draft HRA updated before the Preliminary Draft HRA results can be used.**

CARB conducted two HRAs addressing only the Ports of Long Beach and Los Angeles together and the Richmond Complex. CARB's use of AERMOD and the 2015 OEHHA Risk Assessment Guidelines for HRAs represents current best practices. However, the robustness of the findings is limited by the emissions estimates. Emissions estimates are typically completed before the HRA but in this case are open for public comment and discussion through the end of February 2019, at which point they may be refined.

The air dispersion model AERMOD, which CARB selected for the Preliminary Draft HRA is the preferred model from the US Environmental Protection Agency. Required inputs to AERMOD include meteorological data, emissions information for each pollutant considered, and exhaust parameters for release points. Of these inputs, the estimated emissions are key, since emissions have a direct linear relationship with the estimated ambient concentrations and health impacts from each source.

On November 5, 2018, CARB posted the Preliminary Draft HRA. CARB then posted a hard-coded spreadsheet of "Draft At Berth Emissions Estimates" used in the Preliminary Draft HRA on November 9, 2018, and air dispersion modeling files in mid-December with a public comment period for the Preliminary Draft HRA closing January 31, 2019.

CARB also posted the "Draft: 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results"—for the emissions that were entered into the Preliminary Draft HRA—on January 16, 2019, with a separate public comment period for the emissions methodology and results closing February 16, 2019.

Without greater understanding of the emissions used as data inputs to the air dispersion model and risk estimation calculations, the utility of the Preliminary Draft HRA is limited. Port staff are reviewing the emissions methodology released on January 16, 2019, and are comparing it with the spreadsheet posted November 9, 2018. Port staff look forward to discussing the emissions with CARB staff at the public workshop CARB scheduled for February 26, 2019. After that, Port staff anticipate the need for a revised HRA for the Proposed Control Measure that relies on emissions that have been reviewed and understood by all parties.

The AERMOD input and output files and risk estimation databases CARB provided on December 14, 2018, appear to carry out the methodology discussed in the Draft Preliminary HRA, but further review is not warranted until emissions are finalized. In addition to the

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<sup>1</sup> <https://www.oaklandseaport.com/development-programs/shore-power/>

wharfinger information provided by the Port to CARB annually as required by grant funding obligations, Port staff are happy to work with CARB staff to refine assumptions made in the emissions estimates.

**The role of the Preliminary Draft HRA posted November 5, 2018, in rulemaking for the Proposed Control Measure is not clear.**

The Proposed Control Measure is not an ATCM, in fact its stated purpose is to reduce NO<sub>x</sub>, PM, and GHG but not the toxic air contaminant DPM—which is the focus of the Preliminary Draft HRA. The inclusion of an HRA for any of the ports in California is therefore not a fundamental driver of the Proposed Control Measure (leaving the CARB Governing Board direction, Mobile Source Strategy, and Sustainable Freight Action Plan as drivers). Thus, any reductions in risk shown in the Preliminary Draft HRA are purely informational. Indeed, CARB’s elimination of the At-Berth Regulation ATCM by focusing on a Proposed Control Measure for NO<sub>x</sub> and PM but not DPM seems to imply that no further risk reductions are required.

The Preliminary Health Analyses report announces that the risk reductions of the Proposed Control Measure are “significant,” a term defined in the California Environmental Quality Act (“CEQA”) and used in CARB’s Certified Regulatory Program, but not defined in the CARB rulemaking process. While CARB staff present the percentage of reduction in risk of the Proposed Control Measure over the current At-Berth Regulation, the total residual risk should be compared to that of other source categories to prioritize the need for the Proposed Control Measure.

**Health impacts from Criteria Air Pollutants are managed through SIP Planning, which does not require a new Proposed Control Measure for the container fleet.**

PM<sub>2.5</sub> is a criteria air pollutant, not a toxic air contaminant, and the California Ambient Air Quality Standards (“CAAQS”) and National Ambient Air Quality Standards (“NAAQS”) are the appropriate health-protective standards for PM<sub>2.5</sub>. Regional ambient air concentrations of PM<sub>2.5</sub> are managed to levels below the CAAQS and NAAQS through SIP planning. Even so, CARB’s Mobile Source Strategy calls for an evaluation of emissions reductions from currently unregulated fleets, not the already regulated container fleet which calls Oakland. Thus, SIP planning for PM<sub>2.5</sub> attainment does not mandate an amended At-Berth Regulation to reduce statewide emissions through an “every vessel, every visit” control strategy like CARB staff have proposed.

**The Incidents Per Ton (“IPT”) methodology presented for PM<sub>2.5</sub>, a criteria air pollutant, is not a cost effectiveness metric.**

The IPT methodology provides information on health effects assuming ambient PM<sub>2.5</sub> concentration is the sole contributor to adverse health effects, with a direct linear relationship. The IPT methodology is not, however, part of a cost-effectiveness evaluation. CARB released a “Preliminary Cost Information” document in August 2018 as part of this rulemaking effort,

which relies on the same assumptions as the emissions inventory (which, as discussed above, may need refinement). The preliminary costs data evaluated total costs of the Proposed Control Measure, but not cost effectiveness of proposed measures calculated in terms of cost per ton of emissions removed. CARB has also not yet prepared a socio-economic impact analysis of the proposed rule.

**Closing**

Port staff are interested in working with CARB to improve the current ATCM focused on DPM to allow for 100% compliance. We look forward to seeing enhanced supporting documentation for the CARB emissions estimates and a revised HRA and cost effectiveness analysis once the emissions are updated.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,



Richard Sinkoff  
Director of Environmental Programs and Planning



December 2, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

**Subject: Comments on October 15, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents**

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the rulemaking materials posted October 15, 2019, for the Proposed Control Measure for Ocean-Going Vessels At Berth (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) plans to replace the current Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the current “At-Berth Regulation”) with the Proposed Control Measure, with the goal of taking the Proposed Control Measure to the CARB Governing Board on December 5, 2019 at a special meeting to be held in West Oakland. The Port understands that the CARB Governing Board will not vote on the Proposed Control Measure on December 5, 2019, and that comments are due December 9, 2019.

The Port fully supports CARB’s efforts to reduce emissions from ocean-going vessels at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff track shore power usage in real time, collecting detailed information from marine terminal operators. The Port regularly posts up-to-date shore power usage statistics, reasons for vessels not plugging in, and cost information on the Port’s shore power website: <https://www.oaklandseaport.com/development-programs/shore-power/>.

In 2018, 75% of all vessel calls at the Port of Oakland drew shore power (the number for all vessel calls includes steamships and “infrequent callers” which are both exempt from the current At-Berth Regulation), which surpassed the regulatory requirement of 70% compliance. The plug-in rates at the Port of Oakland continue to increase. For example, in October 2019, 100% of vessels

that were equipped with shore power plugged in and 83% of all vessel calls plugged in. This was the third time in 2019 and the second consecutive month where shore power plug-in rates were above 80%. For 2019, the year-to-date average, including October 2019, was 76%.

The Port has commented on previous drafts of the Proposed Control Measure and various supporting documents, and those previous comment letters are enclosed with this comment letter. The Port appreciates CARB's consideration of its past comments and sets forth its new and continuing comments and concerns below.

### **Comments on Emissions Inventory**

The Port has reviewed Appendix H: 2019 Update to Inventory for Ocean-Going Vessels at Berth: Methodology and Results. This inventory is extremely important, as it lays the foundation for the need for, and cost-effectiveness of, the Proposed Control Measure.

The Port appreciates all the hard work that went into the inventory, and the willingness of CARB staff to attempt to explain their methodology. At the same time, Port staff (along with other public seaport authorities and shipping partners that operate in the State) have struggled to understand the inventory results and implications for both Oakland and the State as a whole. Based on the collective feedback that has been received from stakeholders, CARB staff continues to revisit the baseline and forecasted emissions assumptions with updated calculations and results even as this Proposed Control Measure is being put before the CARB Governing Board. In other words, the methodology and analysis upon which the Proposed Control Measure is based, are still in flux.

To highlight just one particularly notable example, the 2020 estimated total hours at berth divided by typical call durations by vessel size indicate that there will be 2,580 calls for the Port of Oakland in 2020, which is a dramatic departure and increase (a deviation of over 40%) from observed operational realities and shipping trends. For context, the Port of Oakland had 1,175 calls in the first 10 months of 2019, 1,543 calls in 2018, and 1,598 calls in 2017. The same calculation applied to CARB values for the Ports of Los Angeles and Long Beach predicts 2,405 calls in 2020, which means Oakland would see 175 more calls than the Ports of Los Angeles and Long Beach combined. Such an order of magnitude difference has implications for evaluating the effectiveness and potential impact of the Proposed Control Measure and any marginal benefits that could be achieved by it.

Port staff compared the 2016 baseline values used by CARB in the inventory to 2016 actual values recorded at the Port. It appears that CARB's 2016 values for total time at berth are about 8% higher than actual, and that CARB's estimates for average power by ship size (which were derived from values at the ports of Los Angeles and Long Beach) are about 9% higher than actual for Oakland. Additionally, it seems that CARB has underestimated the total activity for the regulated fleet in 2016 by about 11%, which makes it appear that the Proposed Control Measure overestimates projected reductions. These over- and under-estimates do not balance out. In fact, they lead to further discrepancies which are compounded by CARB's assumed 21.5% growth rate which is applied equally across all vessel size bins. The Port understands that this growth rate was

developed from the Federal Highway Administration’s Freight Analysis Framework and requests that CARB explain how this growth rate applies to hours at berth, cargo volumes, emissions, ship calls, and cost.

The Port appreciates CARB staff’s recent acknowledgment that the cargo growth rate for Oakland needs to be adjusted. Port staff and CARB staff have had multiple discussions about the growth rate issue, and the Port understands that CARB will consider instead the Oakland-specific cargo forecast commissioned by the Bay Conservation and Development Commission (“BCDC”)<sup>1</sup>. This will lower the forecasted annual growth rate for Oakland from ~4.6% to a more realistic, but still high, forecast of 2.2%. For reference, the Port’s historical compounded annual growth rate from fiscal year 2008 to fiscal year 2018 was 0.4%.<sup>2</sup>

We look forward to evaluating the results and implications of these revised forecasts when the technical work is presented at a future date by CARB staff. The Port seeks assurance that no CARB vote will proceed until the emission reduction estimates reflect more realistic growth rates, for example as provided in the BCDC report.

The Port appreciates CARB staff’s willingness to apply an “efficiency factor” that acknowledges efficiency gains produced by moving more cargo on fewer, larger ships. One point of caution is that the layering of percentages makes it extremely difficult to follow the logic and relate CARB’s forecasted activity and emissions to any real-world metrics. Small errors and invalid assumptions with an initial set of data points can be magnified as these results are extrapolated into later forecast years, which lead to unrealistic and unreliable conclusions. The Port understands the complexity of the task, but a regulation as important and expensive as the one being proposed needs to be based on data that can be fact-checked, and must include forecasts that are grounded in factual operational data.

As an alternative, the Port of Oakland prefers and requests that CARB re-evaluate the inventory using 2016 baseline values provided by the Port and a Port-specific growth forecast. The Port further requests that the forecast activity levels be related to ship calls, which can be readily understood by all ports, regulatory agency staff as well as by the public. This would be consistent with how the Port tracks shore power usage and compliance. Lastly, and most importantly, the Port asks that these changes be made and the inventory fully peer-reviewed before the CARB Governing Board contemplates further action on the Proposed Control Measure.

### **Broad Concerns about the Proposed Control Measure**

The Port is extremely concerned that the Proposed Control Measure adds a substantial additional regulatory burden and cost to carriers and terminals that are already achieving high levels of plug-ins and emissions reductions. As the Port has discussed with CARB previously along with other California seaports, CARB could achieve more cost-effective emissions reductions from other source categories. In fact, during a conference call with CARB staff on Friday, November 22,

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<sup>1</sup> BCDC is currently amending its Seaport Plan for the San Francisco Bay Area.

<sup>2</sup> From Budget and Finance report at May 23, 2019 Port Board Meeting (File ID 098-19), slide 6.

2019, the Port joined its sister ports in proposing potentially preferred emissions reductions project alternatives based upon readily available specific equipment replacements, which will result in a significant reduction of emissions.

A second broad concern is that the Port of Oakland would be disadvantaged under the Proposed Control Measure because it does not have the option of a CARB approved emission control strategy (“CAECS”) other than shore power. As CARB itself found, the Port of Oakland cannot use a barge-based capture and control (“C+C”) method at three of its four terminals “due to concerns expressed from SF Bar Pilots about wave interaction from passing vessels and channel space and navigational constraints.” (See Appendix E: *Berth Analysis*.) The three terminals cited in CARB’s Appendix E (Everport, Matson, and OICT) account for over 83% of the Port’s call volume.

To elaborate, the potential negative impact to the Port and its carriers, tenants, and the community from the Proposed Control Measure is foreseeable. It is well established that almost every vessel calling Oakland also calls the ports of Los Angeles and Long Beach. Unlike Oakland, the ports of Los Angeles and Long Beach can use a barge-based C+C strategy. What will happen if carriers rely on a barge for compliance at the ports of Los Angeles and Long Beach, and then come to Oakland where a barge is not possible? The Port is very concerned that carriers may bypass Oakland if the Proposed Control Measure is enacted as currently written. Oakland has no feasible C+C alternative<sup>3</sup>, which could put the Port of Oakland at a serious competitive disadvantage.

To address the fact that a barge-based C+C will not work in Oakland, the Port requests that CARB grant Oakland exemptions corresponding to the number of calls that rely on barge-based C+C in Southern California.

As a third concern, the Port understands that the Proposed Control Measure anticipates other emission control strategies such as a land-based C+C system. However, the Port is concerned that landside emissions control approaches were never contemplated for use in the container fleets, have not been analyzed by CARB staff for use in the container shipping trades, and by CARB’s own analysis can result in an increase in greenhouse gas emissions<sup>4</sup>, which would seem to be an unacceptable outcome given the purpose and intent of this rulemaking.

The Port’s fourth concern is the introduction of shared responsibility which potentially creates conflict among vessels, terminals, and ports (see Table 5 of Proposed Control Measure) where none now exists. Upon the adoption of the initial At-Berth Regulation, CARB rightly acknowledged that in a global shipping environment it was not reasonable to expect that every vessel in every fleet would be equipped to receive shore power, hence the creation of fleet compliance averages and an exemption for infrequent callers. The Port has seen that its diligent involvement with carriers and terminals has resulted in a continuous positive trajectory in shore power usage.

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<sup>3</sup> Appendix E of the ISOR, page 12

<sup>4</sup> Appendix C-1 of the SRIA, page 15

The Proposed Control Measure continues the acknowledgement that there will be instances when ships cannot plug in, due to circumstances on the vessel or at the terminal, hence the inclusion of alternative compliance options and a complex regime of Terminal Incident Events (“TIEs”) and Vessel Incident Events (“VIEs”). The Port understands the goal of the TIE and VIE regime, but it creates more problems such as record-keeping and dispute resolution, than it solves. The Proposed Control Measure has no clear grievance or dispute resolution process when conflicts arise

### **Specific Comments on Proposed Control Measure**

1. Regarding the Terminal and Port Plans required for Container terminals in Section 93130.14, the deadline of July 1, 2021 is confusing because the Compliance Start Date listed in Section 93130.7(b) is shown as January 1, 2021. Shouldn’t the Plans and associated 90-day review window be completed prior to requiring compliance?

Port staff object to the text in Section 93130.14(a) that “[a]s an alternative, Ports may submit plans for their terminal operators.” Ports should not be expected to submit plans for terminal operators. In addition, the statement in Section 93130.14(b)(1) that “Ports should use terminal plans as [the] basis for developing port plans” seems to indicate that the deadline for Port Plans should be adjusted to come after the deadline for Terminal Plans.

2. The definition of “Fleet” in Section 93130.2(b)(29) does not explain how fleets will be established. What will CARB require at the beginning of each compliance year to establish fleets? How will this work?

The proposed regulation does not address how or whether VIEs will be granted for new fleets entering the California market, or for fleets that expand. New entrants should be allowed to estimate their annual ship calls and be granted the associated number of VIEs for the coming year. Otherwise, this is a barrier to entry for new fleets because they will be granted zero VIEs in their very first year of operation. This puts California ports at a competitive disadvantage compared to ports in Oregon, Washington, Canada, Mexico, and on the U.S. Gulf and East Coast.

The definition of Fleet and the requirements for VIEs also need to be responsive to changes in the shipping industry, for example when businesses merge or alliances change. It is not clear whether VIEs will be granted on a port-specific or State-wide basis. It is also not clear how disagreements will be resolved on whether a specific instance should use a TIE or a VIE. Will CARB adjudicate these?

3. The Port is glad to see that Vessel Commissioning is specifically exempt from the rule, as listed in visit exception Section 93130.8(c). However, the Port notes that it should not be limited to only the first visit, and should not matter whether the commissioning was successful. What happens if the commissioning was not successful? The Port of Oakland requires that vessels be re-commissioned if they have not been in Oakland for over a year. Further, the same vessel might need commissioning on both port side and starboard side. For these reasons, the same ship might require multiple commissioning trips.

Port staff request that vessel commissioning events that do not successfully connect to shore power as discussed in Section 93130.8(c) be eligible for exceptions under the regulation without the use of a VIE. The commissioning attempt shows that the goal was to reduce emissions through shore power and as such should be an exception in this situation. Port staff conduct each vessel commissioning (with the exception of those at Berths 61-6<sup>5</sup> to ensure the safety of the vessel, terminal, and workforce. Vessel commissioning is an invaluable safety procedure and should not be penalized under the Proposed Control Measure.

The Port requests that the definition of “Vessel Commissioning” in Section 93130.2(b)(76) of the Proposed Control Measure be expanded to include the port authority as the commissioning agent, as is the case at the Port of Oakland. The same language is found in Section 93130.7(e)(2) (“Ensure the vessel is commissioned as required by terminal operator”), Section 93130.8(c)(2) (“The terminal requires that the vessel be recommissioned”), and Section 93130.9(a)(2) “The terminal operator is responsible for commissioning vessels equipped with shore power.”). The commissioning requirement should be determined by the port authority or the terminal operator.

4. The Port requests that the definition of “Ready to Work” in Section 93130.2(b)(55) be expanded to include “Auxiliary Marine Power (AMP) container has been loaded on the ship and is in position, if applicable.” This is crucial for the requirement in Section 93130.9(d)(2)(D) that the vessel be plugged in “within 1 hour of vessel “Ready to Work”.” Many of the ships that call at the Port of Oakland rely on an AMP container to connect to shore power. The AMP container is often domiciled at the terminal and needs to be loaded onto the vessel by a ship-to-shore crane prior to plugging in. Some of the major carriers calling in Oakland rely on an AMP container to use shore power [MOL, NYK, K-Line (the ONE Alliance), Hyundai, and APL]. A vessel is not ready to plug in until the AMP container is in position.

Likewise, the Port requests that the disconnection requirement in Section 93130.9(d)(2)(E) be re-written to accommodate certain situations where the AMP container has been removed from the ship prior to the pilot boarding.

5. The Port appreciates the increase in TIEs to 15% for the first four years of the regulation as listed in Table 3 of Section 93130.11. The Port requests that the number of TIEs and VIEs be rounded *up* to the nearest whole number instead of rounding to the nearest whole number for instances where the number of TIEs or VIEs is calculated at a fraction of ship call as stated in Section 9310.11(a)(2). Any fractional call should be counted as a whole call. For example, if a carrier made 49 calls to a California port in 2019, the VIE calculation

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<sup>5</sup> The Port does not commission vessels at the Matson Terminal because these shore power vaults were installed by the former tenant, APL. The current terminal operator has assumed responsibility for these vaults.

would award 2.45 VIEs at the 5% level. This should be rounded up to three, not down to two.

6. Regarding the Remediation Fund described in Section 93130.15 of the Proposed Control Measure, what is the procedure and timeline for CARB to approve a public entity to manage the funds generated at the Port? What happens if no Remediation Fund administrator is established per Section 93130.15(a)? Does that mean the Remediation Fund would not be an option?
7. Port staff request further information from CARB on when and where the Remediation Fund will be deployed. Given that CARB anticipates zero-emissions regulation on trucks, transport refrigeration units, forklifts, and cargo-handling equipment in the time frame of enhanced usage of the Remediation Fund, would those categories be ineligible for incentive-funded emissions reductions?
8. Port staff note that the power meter readings required in Section 93130.9(d)(2)(C) and (F) and Section 93130.9(d)(3)(I) are not available until the close of each calendar month. This means that it will often not be possible to report the power usage within seven calendar days of a vessel's departure, as required in the Proposed Control Measure.
9. In Section 93130.1 of the Proposed Control Measure, the stated intent of the Proposed Control Measure is "to reduce oxides of nitrogen (NOx), reactive organic gases (ROG), particulate matter (PM), diesel particulate matter (DPM), and greenhouse gas (GHG) emissions from ocean-going vessels while docked at berth at California ports." How will CARB monitor GHG emissions after implementation of the Proposed Control Measure? What is the GHG emissions baseline?
10. The Port requests that maintenance events of landside shore power equipment be included in Section 93130.9(f) along with "construction or repair" so that maintenance events also have the option of using a TIE.
11. The Port requests that the Proposed Control Measure include an exemption for liquefied natural gas (LNG) powered vessels. This would have the desired effect of incentivizing cleaner ships, which would provide significant emission reductions throughout the ship's voyage, not just the small fraction of time while the ship is at berth in California.

## **Conclusion**

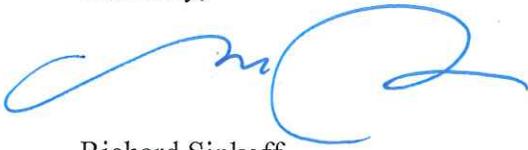
In conclusion, the Port of Oakland is fully committed to reducing emissions, and is proud of the results achieved with its industry and regulatory partners. In fact, the Port is unaware of any other port authority in the world that plugs in as many container vessels on an annual basis as the Port of Oakland. The partnership and collaboration with CARB, the Bay Area Air Quality Management District, and the Port's shipping and marine terminal customers have been a key to the success of

this program. The Port believes that these efforts can be used a model for other states and nations who might seek to reduce localized emission from ships at berth.

Port staff appreciate the opportunity to review and comment on the Proposed Control Measure and attend the public workshop on December 5, 2019. We look forward to continuing to work with CARB towards improving shore power effectiveness, emissions inventories, and associated analyses and to collaborate together to achieve cost-effective and feasible air quality improvements to protect public health.

Please contact Ms. Tracy Fidell, P.E., Port Associate Environmental Planner/Scientist at [tfidell@portoakland.com](mailto:tfidell@portoakland.com) with any follow-up questions.

Sincerely,



Richard Sinkoff  
Director of Environmental Programs and Planning

Enclosures:

- 1) June 10, 2019 Port letter to ARB re: Comments on May 10, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents
- 2) February 15, 2019 Port letter to ARB re: Comments on Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor
- 3) January 31, 2019 Port letter to ARB re: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

CC:

Danny Wan, Executive Director  
Michele Heffes, Acting Port Attorney  
Matt Davis, Director of Government Affairs  
Delphine Prevost, Manager Maritime Administration and Finance  
Diane Heinze, Environmental Assessment Supervisor

Comment 49 for To Consider Proposed Control Measure for Ocean-Going Vessels At Berth (ogvatberth2019) - 15-1.

First Name: Catherine  
Last Name: Reheis-Boyd  
Email Address: creheis@wspa.org  
Affiliation: Western States Petroleum Association

Subject: WSPA Comments on CARB 15-Day At Berth Regulation Changes  
Comment:

Attached is the WSPA Comment Letter regarding the CARB 15-Day At Berth Regulation Changes, dated May 1, 2020.

Attachment: [www.arb.ca.gov/lists/com-attach/118-ogvatberth2019-VjBUOwBvUGIEbglW.pdf](http://www.arb.ca.gov/lists/com-attach/118-ogvatberth2019-VjBUOwBvUGIEbglW.pdf)

Original File Name: Final WSPA At Berth CARB Comment Letter and Attachments  
May\_1\_2020.pdf

Date and Time Comment Was Submitted: 2020-05-01 12:52:06

No Duplicates.



Catherine H. Reheis-Boyd  
President

May 1, 2020

Clerk of the Board  
California Air Resources Board  
1001 I Street  
Sacramento, California 95814

sent via e-mail to: <http://www.arb.ca.gov/lispub/comm/bclist.php>

Re: WSPA Comments on "15-Day Changes" to CARB Proposed Control Measure for Ocean-Going Vessels at Berth

To the Clerk of the Board:

This letter supplements comments previously submitted by the Western States Petroleum Association (WSPA) on the California Air Resources Board's (CARB) Proposed Control Measure for Ocean-Going Vessels at Berth (Proposed Regulation), originally released October 15, 2019, and on the "15-Day Changes" to this original text, which were released March 26, 2020. WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states.

WSPA is providing these comments as part of a continuing effort to provide feedback on the At Berth Regulations. We incorporate our previous comments submitted on February 15, March 29, May 30, June 14, August 15, December 3, 2019 and March 6, 2020 by reference herein.

### **March 6, 2020 WSPA Comment Letter**

Please note that the comments that we submitted on March 6, 2020, in order to allow additional time for CARB staff to review and consider them, are submitted again as an attachment hereto for inclusion in the administrative record (see Tab 1). These comments outlined in specific detail a proposal to allow an alternative compliance option that would meet the same emission reduction goals in lieu of the control requirements in the Proposed Regulation, as well as proposed language to allow a feasibility study to be conducted. We are providing those comments again in response to the statement by CARB Chair Mary Nichols at the December 5, 2019 hearing on the Proposed Regulation that written comments submitted after December 19, 2019 but before the notice of 15-Day Changes will not be considered as part of the "official record." CARB December 5, 2019 Hearing Transcript ("Transcript"), Tab 2, at 150:12-14.

#### **I. Summary of Concerns**

- The 15-Day Changes completely ignore the COVID-19 pandemic and fail to account for any impacts to CARB staff's original baseline emissions or economic assumptions.
- CARB staff provide no basis for accelerating the already-unrealistic deadlines for tanker compliance by two years in the 15-Day Changes, which would create serious safety risks for tanker terminals. The 15-Day Changes also fail to address the need for a feasibility study as articulated in WSPA's March 6, 2020 letter.

49-1

- The proposed “Innovative Concepts” provisions in the 15-Day Changes are **not** the compliance alternative WSPA requested. WSPA was clear in its March 6, 2020 letter to CARB and in discussions with CARB staff that stakeholders need a viable compliance alternative **in lieu of** a requirement to install and operate at berth capture and control equipment, not a temporary **additional** obligation to the still-infeasible capture and control requirement. The “Innovative Concepts” provisions contain several significant limiting conditions, which strongly disincentivize funding by stranding investment and creating significant compliance risks. By structuring the “Innovative Concepts” provisions in this way, CARB essentially conveys that the only acceptable compliance option is control of at berth emissions.
- The 15-Day Changes do not address the comprehensive regulatory language revisions recommended by WSPA in its March 6, 2020 letter.

## II. Overview

For the past year and a half, WSPA has repeatedly communicated and submitted in writing to CARB staff critical safety and feasibility concerns with the Proposed Regulation. For a technology to be considered proven, all engineering and process safety considerations need to be evaluated and determined feasible. The technologies identified in this rulemaking to support the expected reductions must be evaluated and deemed feasible prior to setting or accelerating any compliance date. Comments from WSPA and others have shown that the types of emissions capture and control equipment that would be required by the current Proposed Regulation have not been proven safe and feasible in real-world operations with tankers at marine terminals. These comments also have explained in detail that no proven and currently available technology exists to allow terminals to meet the proposed emissions standards by the 2027 or 2029 deadlines contained in the original Proposed Regulation.

49-2

In response to these comments, CARB staff are proposing to **accelerate** each of these deadlines, requiring compliance two years sooner than the deadlines CARB staff themselves had proposed and argued in favor of just four months ago. The sole reason given for advancing the deadlines is that the CARB Governing Board directed CARB staff to do so. CARB staff have pointed to no evidence in the administrative record to justify the acceleration, nor have CARB staff explained how they believe the regulated community could possibly meet the new deadlines. CARB staff also have offered no response to the undisputed information in the record showing that the lack of proven safe and feasible capture and control systems for tanker terminal visits would make implementation impossible by the **original** 2027/2029 compliance dates, let alone the **accelerated** 2025/2027 deadlines.

49-3

For that reason, the 15-Day Changes now would place tanker vessel operators and marine terminal operators in an even more dangerous position by effectively requiring them to put untested equipment and processes into operation before crucial feasibility and safety studies can be completed. Indeed, the 15-Day Changes systematically ignore all of the identified risks associated with applying unproven technologies to oil tankers by requiring Terminal and Port plans to be submitted prior to CARB’s Interim Assessment. Accordingly, WSPA is compelled to respond by reiterating and supplementing our concerns arising from the infeasibility of timely compliance with the Proposed Regulation, now rendered even more infeasible by the 15-Day Changes which advance the deadlines and reduce time already insufficient for adequate feasibility and safety studies. As such, these comments (including our March 6, 2020 comments attached hereto for the record) cannot be dismissed as unrelated to the 15-Day Changes.

49-4

Pointing out the intractable feasibility concerns with the original Proposed Regulation, WSPA and other stakeholders urged CARB staff to at least allow for a viable alternative compliance path to the Regulation's capture and control requirements, permitting regulated parties to secure emissions reductions from other sources rather than through attempting to adopt unproven and potentially unsafe capture and control measures for tankers at berth. The 15-Day Changes do not provide the alternative compliance path we requested. Instead, the 15-Day Changes would adopt a limited "Innovative Concepts" provision that fails to provide a true "in lieu of" alternative to mandated implementation of (yet-unproven) at berth capture and control measures. The proposed "Innovative Concepts" would offer only a temporary substitute for at berth capture and control requirements, would set narrow locational constraints on potentially valid projects, would be subject to revocation and/or refusal to renew at CARB's unreviewable discretion, and would result in imposing unreasonable additional burdens on the regulated community. Indeed, because the 15-Day Changes would provide no relief **at all** from the parallel deadlines to install at berth capture and control as a CARB-approved emission control strategy (CAECS), CARB's refusal to renew an "Innovative Concept" would create a compliance trap for tanker terminals, leaving them with even fewer years to meet the already-infeasible 2029/2027 deadlines.

### **III. The 15-Day Changes Completely Ignore Impacts From the COVID-19 Pandemic**

As an initial matter, the 15-Day Changes make no mention at all of the COVID-19 pandemic that has impacted California and the nation. Aside from providing 20 additional days for public review and comment, CARB staff propose no alteration of the At Berth Regulation or this rulemaking to account for the unprecedented social and economic disruptions caused by the pandemic.

Numerous stakeholders have joined WSPA in urging CARB to postpone this and other non-essential rulemakings in light of the worldwide disruptions caused by COVID-19. See Tab 3 (Letter dated March 20, 2020 from California Association of Port Authorities, Cruise Lines International Association, Pacific Merchant Shipping Association, WSPA and World Shipping Council); Tab 4 (Letter dated March 24, 2020 from International Longshoreman and Warehouse Union and California Association of Port Authorities); Tab 5 (Letter dated April 15, 2020 from California Chamber of Commerce, local chambers of commerce and other organizations to Governor Newsom); Tab 6 (Letter dated April 10, 2020 from the California Manufacturers Association and other organizations, including WSPA, to Governor Newsom); Tab 7 (Letter dated April 21, 2020 from state legislators to CARB Chair Nichols).

COVID-19 has caused a worldwide collapse of economic activity not seen since the Great Depression. The Centers for Disease Control and most leading national health organizations now estimate that social distancing restrictions will need to continue throughout the summer of 2020, even in a best-case scenario. The Federal Reserve expects year-over-year gross domestic product to plummet by 30% in the second quarter 2020. Unemployment throughout the United States is forecasted to spike by the middle of 2020, with over 26 million new unemployment claims in the last five weeks ending on April 23. Over the three weeks prior to April 23, California processed about 3.4 million unemployment claims. These claims represent about 17% of the U.S. and California workforce, respectively. See Letter from Brad Williams (Capitol Matrix Consulting), April 27, 2020 ("CMC Analysis") (attached at Tab 8), pp. 3-4.

As one of the global hotspots for the pandemic, California continues to undergo mass quarantines, travel bans, a statewide stay-at-home order, and the virtual halting of the fifth largest economy in the world. Governor Gavin Newsom declared a State of Emergency in California on March 4, 2020 and has since issued nearly two dozen Executive Orders waiving or altering statutory and

regulatory requirements to account for statewide response to the COVID-19 pandemic. Stakeholders affected by the Proposed Regulation are and must be focused on business continuity and the health and well-being of thousands of California citizens in their employ.

Port and terminal activities have been significantly disrupted by the pandemic, with numerous vessel visits rescheduled or cancelled, personnel availability severely restricted, capital infrastructure construction activities delayed or scrapped, and company resources redirected to emergency response and support of efforts designed to slow the spread of the coronavirus (See Tab 4).

In short, “every key economic assumption in the CARB estimate of the proposed regulation has been dramatically affected by the COVID-19 pandemic.” CMC Analysis (Tab 8), p. 3.

Aside from providing a few weeks of additional public comment on the 15-Day Changes, CARB staff have made **no alterations whatsoever** to this rulemaking schedule or the Proposed Regulation itself in light of the devastating impacts of the COVID-19 crisis. Instead, CARB staff propose to tighten the compliance deadlines by two years. Even attempting to meet the new deadlines (which we believe are ultimately infeasible) would require immediate investment of resources and personnel that, as a practical matter, are unavailable in the middle of the pandemic. This is unacceptable at a time of unprecedented upheaval in California.

49-5

Attached to this comment letter is an independent analysis by Capitol Matrix Consulting (CMC) describing the unprecedented global economic impacts of COVID-19, and illustrating why CARB staff’s emission projections, the Standardized Regulatory Impact Assessment (“SRIA”) and the updated analysis of cost impacts in the 15-Day Changes are now outdated. The analysis concludes that “[t]he COVID-19 virus has fundamentally altered the economic landscape. The Department of Finance May 2019 economic forecast and the EIA fuel price projections, and other inputs used by CARB to develop the benefits, costs, and economic impacts of the proposed regulation are no longer credible.” CMC Analysis (Tab 8), p. 6. As of April 10, the Department of Finance (DOF) has indicated a dramatic shift in its forecast, and now anticipates the California unemployment rate could peak at a rate higher than the Great Recession of 2008, and that economic softness could persist into 2020-21 and beyond depending on the pace of recovery to local, state, and national economies. *Id.*, p. 4. In an April 10 letter addressed to the state Legislature, DOF referenced a multi-year recession alternative included in its January budget and indicated that actual increases in unemployment would be much larger. *Id.* Thus, because of the pandemic, “[f]uel prices, economic output, jobs, international trade and waterborne port activity will all be sharply lower than anticipated in any economic forecast made prior to March of this year. Given the emerging expectation that recovery from the historic COVID-19-related downturn will be slow. . . we expect the economic measures will remain below the levels assumed in the CARB projections for several years to come.” *Id.*, p. 3. This new post-COVID-19 reality will have significant impacts on baseline emissions, estimated emissions reductions, predicted health cost savings, specific economic impacts to California ports and terminals, and the more general impacts to California’s economy and the citizens who rely on it. *Id.* CARB staff should have assessed all of these post-COVID assumptions before releasing the 15-Changes. Its failure to do so is a violation of California law.

49-6

CARB staff’s forecasted tanker vessel activity in the 15-Day Changes continues to be based on two sources: the 2016 Mercator report developed for the Ports of Los Angeles and Long Beach (“Ports”) to assess economic outlook considering global and domestic economic factors along with competition from other port regions; and the Federal Highway Administration’s Freight

49-7

Analysis Framework for Northern California ports. Both reports assume static increases in potential GDP starting in the year 2020, and do not assume any shocks to the economy. This assumed GDP growth is then used to estimate future vessel visits and vessel emissions growth. CARB staff have relied on these two reports to generate forecasts for vessel emissions through 2040 to determine the Proposed Regulation's value, currently estimated by CARB staff to be about \$2.4 billion by 2040. Without revisiting expected economic and vessel activity in these regions in the wake of the COVID-19 crisis, these numbers will bear little relation to reality. California's economic activity has been affected dramatically by COVID-19 in 2020, and likely will feel effects into the next few years. For that reason, the outdated estimates being used by CARB staff now significantly overstate the At Berth Regulation's value and its potential emissions savings, while understating or completely ignoring negative impacts on the very communities the Regulation seeks to protect.

49-7  
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CARB staff's failure to take into account the impacts of COVID-19 in proposing the 15-Day Changes violates several requirements of California law. First, CARB staff have not discussed or even acknowledged the potential effects of the pandemic and the resulting economic freefall on stakeholders' ability to comply with the Proposed Regulation by its now-accelerated deadlines. Shipping commerce and vessel traffic have been substantially impacted by the virtual collapse of economic activity in California, and likely will feel effects from the pandemic well into 2021. The entire economic baselines of the shipping and petroleum industries are now radically different than the scenarios assumed by the SRIA released by CARB staff in August 2019 and the updated analysis of impacts on costs in Attachment B to the 15-Day Changes. California law and regulations mandate that CARB staff reassess the impacts of the Proposed Regulation in a revised SRIA, in light of these new economic realities facing the regulated industries and the California families who rely on them.

Second, CARB staff are obligated by law to reassess the impacts the pandemic may have on regulated parties to allocate sufficient resources to timely plan, construct and commission the substantial infrastructure that would be required by the Proposed Regulation. The 15-Day Changes' acceleration of compliance deadlines, discussed further below, reduces the already insufficient time for marine terminal owners and operators to safely complete all of the steps necessary to design and build control and capture facilities – even though no such real-world systems to date have been designed or demonstrated to safely work with tankers. For most California marine terminals, the ability to mobilize personnel and resources to launch major capital projects will be constrained for a considerable time. As of this date, most employees of regulated companies are still subject to stay-at-home orders, and they and their companies will be addressing the fallout of the COVID-19 crisis for months to come. CARB staff have addressed none of these concerns in the 15-Day Changes, as they are required to do under California statutes.

49-8

#### **IV. The Accelerated Deadlines for Tankers Proposed in the 15-Day Changes are Not Feasible and Ignore the Evidence in the Record**

One of the most significant provisions of the proposed 15-Day Changes involves the acceleration of implementation dates for ro-ro and tanker vessels. The 15-Day Changes propose to advance the compliance start dates for tanker vessel controls from 2027 to 2025 for vessels visiting the Ports, and from 2029 to 2027 for all remaining tanker vessels visiting California terminals. Also, updates to terminal plans for tankers now would be required in 2026 instead of 2028, and CARB's interim evaluation of tanker technology would be accelerated from June 2023 to December 2022. CARB staff cites to no evidence to support any of these accelerated deadlines in the 15-Day

49-9

Changes. The deadlines in the original Proposed Regulation were already infeasibly short, and the 15-Day Changes severely exacerbate the problem. Contrary to CARB staff's assertions, the accelerated deadlines will not result in "more emissions reductions in earlier years" and will not result in the health benefits claimed by CARB staff (see Notice, Attachment D), since these reductions cannot be achieved by tanker terminals by the original deadlines, let alone ones that are two years earlier.

49-9  
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A. The 15-Changes Fail to Address the Need for a Feasibility Study, and Would Result in Serious Safety Risks at California Marine Terminals

As noted above, WSPA and other stakeholders have provided numerous comments to CARB staff (most recently in a comment letter submitted on March 6, 2020) documenting that the types of capture and control systems intended for compliance with the Proposed Regulation have not been shown to be safe or feasible for use on tankers calling on marine terminals. For this reason, WSPA and others have explained to CARB staff that there is no evidence today that such control systems could be safely implemented for tanker terminals by the original 2029/2027 deadlines contained in the Proposed Regulation, and have repeatedly called for completion of a feasibility study before any capture and control requirements are imposed on marine terminals serving tankers.<sup>1</sup> These points have been substantiated time and again in the administrative record.

49-10

Ignoring the record evidence, CARB staff now propose not only to retain the requirements for marine terminals to adopt yet-unproven control systems for tanker visits, but to **accelerate** the deadline for implementation by two years for such visits. CARB staff have cited no evidence in the record to support this acceleration.

In fact, the record evidence strongly supports the conclusion that the original 2029/2027 implementation deadlines were unrealistic, and that now-**accelerated** 2027/2025 deadlines would be dangerous. As the diagram in Tab 9 illustrates, oil tankers differ from container ships in several important ways, including in the fact that safety considerations are critical on a tanker given its flammable and potentially explosive cargo. See Tab 9 ("Stack Capture is not ready for pilot testing on tankers"). Attempting to design and construct marine terminal capture and control for oil tankers without first conducting a feasibility study would put human lives at serious risk. As WSPA and others have commented, no feasible oil tanker capture and control technology exists today. Because they carry flammable and potentially explosive cargo, tankers are subject to extremely rigorous international and industry safety guidelines, such as the International Safety Guide for Oil Tankers and Terminals ("ISGOTT"). These guidelines ensure that oil tankers all over the world can dock at terminals safely and efficiently, following uniform and expert-reviewed procedures that help to minimize the risk of sparks or other ignition sources, such as static electricity. Barges and other vessels are not permitted to approach alongside a tanker. Measures must be taken during loading and unloading to ensure that the hull does not generate a static charge due to lack of grounding. Also, California law requires oil tankers during all times of loading and unloading to maintain the ability to break away from the dock quickly (i.e., within 30 minutes) in an emergency.

49-11

In addition, during loading and unloading of oil, vessel operators must take special precautions to ensure the remaining empty cargo space does not develop an explosive atmosphere. Vessel operators must continuously fill this space with inert gas – typically, a mixture of carbon monoxide

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<sup>1</sup> Further, WSPA has commented that if any technology is deemed to be too risky or unsafe for a port or terminal or vessel operator, that technology should be eliminated as a compliance option, and CARB should provide a sufficient amount of time for a port or terminal or vessel operator to develop a new plan without any form of penalty.

and carbon dioxide taken from the tanker boilers' exhaust gas – to ensure oxygen content remains between 3.5 to 4% and an explosive atmosphere is avoided. As loading or unloading continues, the operation of the boiler must be finely tuned to inject the precise amount of water, run the pumps at the precise rate, and fire the boiler as fast as needed to maintain the safe inert gas mix in the cargo spaces.

Failure to follow stringent safety measures in handling empty cargo space at berth can lead to catastrophic results:

- On the night of December 17, 1976, the oil tanker SS Sansinena docked in Los Angeles Harbor and unloaded some 20 million gallons of crude oil from its vessel tanks. The vessel vented its cargo tanks to the atmosphere, as was allowed at that time. The breeze was insufficient to disperse the crude oil vapors, and an ignition source on the vessel ignited them. This caused a massive explosion, killing nine people, breaking the SS Sansinena in two, and flinging pieces of the ship's deck 200 feet onshore. See Tom Guldner, *A crude oil tanker exploded – Why is that unusual?* (Oct. 12, 2018), <https://iffmag.mdmpublishing.com/a-crude-oil-tanker-exploded-why-is-that-unusual/> (attached at Tab 10). This incident helped prompt significant changes in the rules for oil tankers at berth, including the development of strict requirements for the management of oil vapors on tankers during and following loading and unloading.
- On June 12, 2003, the tanker Chassiron suffered an explosion and fire shortly after an unloading and loading stop in Bayonne, France, killing the ship's pumpsman and ripping the deck of entire vessel open from bridgehouse to manifold. The explosion was attributed to the formation of an explosive atmosphere in the tanks, ignited by static electricity or some other mechanical form of ignition. See "Technical Report of the Inquiry Into the Explosion On Board the Oil Tanker Chassiron" (excerpts), pp. 4, 63-65 ([http://www.bea-mer.developpement-durable.gouv.fr/IMG/pdf/RET\\_CHASSIRON\\_En\\_Site.pdf](http://www.bea-mer.developpement-durable.gouv.fr/IMG/pdf/RET_CHASSIRON_En_Site.pdf)) (attached at Tab 11).
- On January 15, 2012, the oil tanker Doola 3 exploded shortly after offloading its cargo in South Korea, killing 11 members of the 16-member crew. The likely cause of the explosion was determined to be ignition of tank vapors by buildup of static electricity on the vessel. See "Industry supports calls for IGS on small tankers," Riviera Newsletters (Apr. 11, 2017) (<https://www.rivieramm.com/opinion/opinion/industry-supports-calls-for-igs-on-small-tankers-29052>) (attached at Tab 12).

49-12

***No international or industry group has done a feasibility study to assess whether a shore-based capture and control system could be designed and implemented for oil tankers in a manner that would not compromise integrated safety systems, ship designs and procedures necessary to avoid the types of serious consequences discussed above.*** The location of the scrubber equipment on or near the vessel would have to either be explosion-proof or located outside of any hazardous classified areas – too far of a distance for an articulating arm – all while keeping exhaust vapors in the vapor phase and at levels needed for the proper function of the scrubbing equipment. This will present challenges for the hundreds of different vessel layouts visiting California's terminals.

49-13

Even assuming that an appropriate shore-based capture and control system could be designed and constructed, no group has assessed whether and what changes might be required on the oil tankers themselves to safely accommodate such systems. Oil tankers can have four, five or more

separate stacks for their various boilers and generators. No feasible interface has yet been developed to connect to those stacks and capture of emissions would have impacts on the mix of inert gases necessary to prevent an explosive atmosphere in the tankers' cargo spaces. Therefore, on-vessel changes would need to be researched, developed and implemented internationally to ensure that tankers operating throughout the world could safely connect to and operate with any such shore-based systems. CARB has no evidence to date that such shore-based technologies are safe or feasible, no international standard exists to design them, no guidance exists on how they could be safely operated, and no assessment has been made of the on-vessel changes that likely would be required.

49-13

Even presuming for sake of argument that some standards for shore-based capture and control for oil tankers could **eventually** be developed, CARB staff have provided no evidence that they could be implemented by the deadlines proposed in the 15-Day Changes. Industry typically requires five or more years to research any new safety procedure and rewrite the ISGOTT guidelines to implement it. Newly-required systems often are then phased in over a period of years to ensure smooth implementation. Oil tanker operators would then need to design the proposed on-vessel changes, and marine terminal operators would have to design the proposed shore-based system. The California Environmental Quality Act ("CEQA") and other state and local permitting reviews would need to be completed for the terminal, which can take several years. Once a terminal project is permitted, construction could take another 5-10 years, based on industry experience with other major infrastructure changes at California marine terminals. Thus, even assuming that a shore-based oil tanker capture and control system were feasible today (which it is not), that system would have no chance of being ready and permitted for operation before 2032, or potentially years later. Under the proposed 15-Day Changes, terminals could reach their implementation deadlines before the projects are even finished with **permitting**.

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Given these realities, oil tankers likely would not be in a position to safely accommodate shore-based capture and control for more than a decade. Thus, the proposed 15-Day Changes would only result in oil tankers finding terminals outside California where they would not be subject to capture and control requirements. Staff have not analyzed the economic impacts of that diverted vessel traffic to California's economy using the original 2029/2027 deadlines, and they certainly have not addressed the additional impacts that would result from moving that deadline up two years. Oil tanker vessel operators and terminals should not be asked to jeopardize the industry's safety standards to meet unrealistic regulatory deadlines for a technology that does not yet exist.

49-15

B. CARB's Governing Board Directed Staff to Investigate the Feasibility of Accelerated Compliance Dates, Not Simply Impose Them

The only explanation CARB staff offer for the acceleration is to concede that "[t]his change is proposed in direct response to CARB Board's request at its December 5, 2019 Governing Board hearing to accelerate implementation dates in order to achieve earlier public health benefits from the regulation." See Notice of Public Availability of Modified Text and Availability of Additional Documents and Information on Proposed Regulation ("15-Day Notice"), p. 7.

CARB staff appear to mischaracterize what the Board said in the December 5, 2019 Governing Board hearing. In that hearing, no member of the Board actually requested that CARB staff "accelerate implementation dates" for marine terminals hosting tankers, nor did the Board's final Resolution 19-28 from the hearing instruct CARB staff to substitute accelerated deadlines in the Proposed Regulation (the Resolution says nothing regarding any changes to the proposed compliance dates). In testimony during the hearing, some Board members did call for

accelerating the time for the interim “technology review” to determine whether the proposed requirements could be feasibly met for tankers:

Thus, at most, the Board instructed CARB staff to (1) investigate how to prioritize the “technology review” needed to assess feasibility for tankers, (2) investigate and explain **whether** accelerating deadlines would be a possibility, and (3) to reassess whether the existing deadlines could be realistically achieved. At no point did the Board “request [CARB staff] . . . to accelerate implementation dates,” but to analyze whether such acceleration could be justified and would be feasible.

C. Information Recently Added to the Administrative Record Does Not Support Accelerated Compliance Dates

Some Board members’ belief that accelerated deadlines may be possible could be attributable, at least in part, to inaccurate statements made by CARB staff and others at the December 5, 2019 Governing Board hearing on the Proposed Regulation. At that hearing, CARB staff erroneously represented to the Board that no operational and safety considerations needed to be addressed with regard to a safe tanker/shore interface and standardized operational procedures for control equipment involving a tanker and an emission capture system. We highlight three examples of such statements below and include other examples in an attachment to this letter (see Tab 13).

- At the December 5, 2019 Governing Board hearing, CARB staff asserted that a feasibility study was completed for tankers, that this feasibility study is fulfilled by the 2018 Technical Assessment and staff report, and that any remaining feasibility study is site-specific. However, the two documents CARB staff refer to do not reference any example of stack capture being safely and successfully applied to tankers, nor any analysis of how stack capture can be re-designed to operate safely on tankers. In fact, in these documents CARB staff have conceded that more tests and safety studies need to be performed *before* attempting to use stack capture on tanker vessels, regardless of site or location. In CARB staff’s own words:
  - “Although these shore-based and barge-based emission control systems are effective at reducing PM and NOX emissions on container vessels, **more testing is needed on other vessel types, including tankers**, auto carriers, general cargo and bulk cargo.” CARB Draft Technology Assessment: Ocean-Going Vessels, May 2018, p. 72 (emphasis added);
  - “**Regardless of location, safety studies need to be performed to ensure all safety considerations are met**, given that the tanker vessels carry explosive cargos.” CARB Staff Report: Initial Statement of Reasons (Oct. 15, 2019), p. III-22 (emphasis added); see *also* ISOR, Appendix B (Cost Analysis) to Appendix C-1 (SRIA), p. 38 (identifying feasibility study costs for tanker terminal capture and control projects among the costs required for implementing land-based capture and control systems).
- Also, at the December 5, 2019 Governing Board hearing, CARB staff alleged that “technology manufacturers have assured CARB staff that there are engineering solutions for both ro-ro and tanker vessels.” Transcript, Tab 2, at 26:10-12. While technology providers may have assured CARB staff that capture and control has proven feasible on vessels other than tankers, or that engineering solutions to enable controls on tankers

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might be developed at some future date, they have not stated that these solutions **currently** exist. In fact, on April 16, 2019 during a CARB At Berth Regulation Working Session, a lead technology provider (Advanced Environmental Group (AEG)) stated in a presentation that the land-based system faces a number of design challenges when applied to any tanker vessel, including safety (a higher hazard level, need for safety standards and procedures, emergency protocols) and ability to design and operate a larger and more complex configuration.

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- In the December 5 hearing, CARB staff suggested that shore power is widely used and claimed at various points that shore power is feasible and “demonstrated to be effective for tankers.” Transcript, Tab 2, p. 37:8-9. This simply does not square with real-world practice or with the significant weight of evidence in the record. Use of shore power for tankers still faces substantial technological and investment hurdles, making meaningful reductions of at berth emissions by shore power infeasible for tankers by either the originally proposed or the accelerated compliance deadlines. Currently, there is no international engineering standard for shore power connections to tankers, nor is there any requirement for tanker vessels to be fitted with a shore power connection. Development of such a standard and retrofitting of vessels to meet that standard would take time and occur on a schedule beyond CARB’s authority to mandate.<sup>2</sup> Tankers not equipped with shore power would be unavailable for charter to California. At terminals like Chevron’s Richmond Long Wharf (“RLW”), for example, the infrastructure needs are substantial because existing electrical infrastructure cannot handle the additional load and existing terminal facilities cannot support the additional weight and footprint of shore power equipment. Implementation of shore power will be further complicated by “grid-neutral” requirements (discussed further below), given that the power to supply some terminals is a combination of grid and on-site cogeneration electricity.

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CARB staff also received an October 14, 2019 letter from AEG and an October 21, 2019 letter from EnviroCare International and heard a December 5, 2019 presentation from the Coalition for a Safe Environment, discussing the state of marine control and capture technology. None of these communications support the accelerated compliance dates proposed in the 15-Day Changes:

- EnviroCare’s letter discusses the feasibility to control SOx and PM from vessel exhaust gas but does not address the feasibility of capturing exhaust gases, which is a critical safety issue for oil tankers (as discussed above). Also, the EnviroCare system is not designed to remove nitrogen oxides (NOx), which is the target pollutant of the At Berth Regulation, and has conceded that “the technical challenge is to cost effectively transport the gases from the ship funnel to the emission control equipment.” In contrast, WSPA has provided robust comments on the safety and feasibility concerns in attempting to capture exhaust gases from tanker vessels, and the timeframes that would be necessary to conduct a feasibility study to analyze those concerns. EnviroCare’s letter does not add evidence to the record addressing these safety and feasibility concerns, and certainly

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<sup>2</sup> Not only is there no standardization in the electricity voltage or distribution frequency between foreign vessels and United States standards, but vessels themselves are each unique and would require extensive retrofitting to add a number of new points of potential sparking (e.g., routing cables throughout the ship, mounting a switchgear and cable reels to the deck, etc.) CARB staff have provided no feasible path for tanker vessels to install this equipment in accordance with current ISGOTT safety guidelines designed to prevent fire and explosion.

does not support an acceleration of the compliance deadlines as proposed in the 15-Day Changes.

- AEG’s letter speculates that any challenges for implementation of capture and control for tankers can be overcome, but does not offer any specific technical review, feasibility study or other empirical evidence to support that speculation. AEG’s letter supplies no information on necessary modifications to vessel equipment to accommodate capture and control, nor does it discuss the feasibility or safety of modifying a marine terminal structure to accommodate the Ship Emissions Control Technologies (SECT) system. In fact, AEG expressed concerns about the SECT system being able to handle changes in flow rates during tanker loading and unloading, and about its current inability to accommodate tanker spark arrestor designs with existing technology. AEG also stated that vessel-specific coupling devices would need to be created for each individual ship, spark arrestor and stack diameter, but has not proposed how this could be done by the now-accelerated deadlines in the 15-Day Changes (for reference, approximately 200 unique vessels call on RLW in a three-year period).
- The Coalition for a Safe Environment’s December 5, 2019 presentation focuses on the barge-based only Advanced Maritime Emissions Control System (AMECS) which has been utilized for container ship applications in POLA/POLB. The Coalition has not presented any evidence that AMECS has been designed and applied to tankers, which would require a system significantly larger than the current AMECS system. Further, during CARB staff’s At Berth Working Session on April 15, 2019, the AMECS representative indicated their significant concerns with the interface with tankers from design (scale-up), timing, operability, and safety standpoints. Additional inaccuracies in the Coalition presentation are detailed in Tab 14 to this letter.

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In any event, CARB staff have admitted that these accelerated deadlines will “result[] in higher costs for vessel and terminal operators” (Notice, App. B, p. B-1), but have not demonstrated that these new deadlines can be safely or feasibly achieved by tanker terminals by 2029/2027, let alone by two years sooner. These substantial changes also will require an updated SRIA and health risk assessment. Adopting the 15-Day Changes without a proper determination of feasibility, safe operation and cost-effectiveness before any requirements or deadlines are imposed on regulated parties would violate the California Health & Safety Code. Moreover, the accelerated deadlines proposed in the 15-Day Changes cannot legally be justified as “technology-forcing” regulations, since CARB staff have provided no evidence in the administrative record indicating that at berth capture and control for tankers is reasonably anticipated to exist, or likely to become feasible or cost-effective, by the compliance deadlines. CARB bears the burden of establishing that a proposed regulation can be feasibly and cost-effectively implemented in the timeframes required by the regulation. CARB has failed to meet its burden here, and the available evidence WSPA and others have provided indicates a lack of any evidence that capture, and control can be safely and feasibly implemented for tankers in the timeframes required. We again strongly urge CARB to conduct a feasibility study for tankers, as described in our March 6<sup>th</sup> letter, and publish its analysis and findings in a report before any terminal plan deadlines are enforced.

D. The Draft EA Must Be Revised and Recirculated to Analyze the Environmental Consequences of Accelerated Compliance Deadlines As Required By CEQA

49-21

Regarding CEQA compliance, the 15-Day Notice asserts that the proposed revisions to the regulatory text “do not change implementation of the regulation in any way that affects the

conclusions of the Draft Environmental Analysis ... so no additional environmental analysis or recirculation of the analysis is required”; and that accelerating the implementation deadlines for tanker vessels “would not change the nature or extent of physical changes to the environment; it would simply result in them occurring ... two years sooner.” Notice, pp. 33-34.

However, the cursory and conclusory “Environmental Analysis” included in the Notice, consisting of little more than two pages (*id.*, pp. 33-35), provides no support for these claims. Instead, CARB staff ignore potentially significant impacts on the physical environment associated with the accelerated compliance deadlines in the revised proposal. The Draft Environmental Analysis (“Draft EA”) must be revised and recirculated to disclose and allow additional public comment on the substantially more severe environmental impacts that may result from the regulatory revision. See *also* Chevron’s comments on the 15-Day Changes submitted on April 30, 2020, which address CEQA issues associated with the 15-Day Changes in greater detail. WSPA concurs with and incorporates Chevron’s comments by reference.<sup>3</sup>

49-21  
cont.

- First, as discussed above, the 15-Day Changes increase the risk of a hazardous incident such as a fire or explosion from early deployment of untested technology. The impacts on human health and safety resulting from such a hazardous incident are literally a matter of life and death. A hazardous incident also poses the threat of an oil spill, which could significantly impact the aquatic environment and the species who use or interact with that environment. As explained in WSPA’s December 3, 2019 comments on the Draft EA, the document failed to disclose, let alone analyze, the serious health and safety and environmental risks associated with requiring emissions capture systems on tanker vessels. While such systems have been tested on container ships, they have not been designed, tested and proven safe for use on tankers. The “Environmental Analysis” in the 15-Day Notice fails to consider or even mention the potential for accelerated compliance deadlines for tanker vessels to exacerbate the risk of significant hazard impacts.

49-22

As discussed at length in our prior comments, including those on the Draft EA, tanker vessels are different from container vessels and pose unique safety considerations due to larger boilers and the need to handle flammable cargoes. Numerous important safety systems are required for proper handling of these flammable cargoes to prevent a hazardous incident from occurring. One such system is the use of inert gas to reduce the oxygen content in the tanker vessel’s cargo hold in order to ensure that flammable vapors

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<sup>3</sup> The 15-Day Notice (p. 37) also references three additional documents newly added to the administrative record which “helped inform staff’s opinion that there are technology solutions already available for improving shore power connections and also on-board solutions to reducing emissions from vessels at berth.” The Draft EA finds that land-based capture and control systems constitute the reasonably foreseeable means of compliance for tanker vessels (Draft EA, pp. 9-10, 22). In these comments and in WSPA’s previous comments, we have relied on those statements in the Draft EA, and we assume that this remains the case. Accordingly, the three additional documents on shore power and “on-board solutions” appear to be irrelevant to the feasibility of compliance for tanker vessels. If CARB staff wish to change the reasonably foreseeable means of compliance for tanker vessels – which provide the basis for environmental analysis of the Proposed Regulation (see CEQA Guidelines Section 15187) – the Draft EA would need to be revised to consider a different set of potentially significant impacts (including those associated with increased electrical power demand at terminals, new safety concerns raised by potential sparking sources from new wiring infrastructure on vessels, and new environmental and safety impacts from requiring different types of construction in different locations), and recirculated for additional public comment before it can be finalized.

49-23

are not ignited. The Proposed Regulation would require modifications to inert gas safety systems and other vital safety systems used at tanker terminals. However, currently there is no technology that has been shown to be safe and feasible for the stack capture and control for tanker vessels that would be needed for compliance with the regulation. The accelerated 2027 deadline introduced in the 15-Day Changes renders this problem even more acute. By increasing the likelihood that the compliance date will arrive before technical solutions are available to ensure that the new regulatory requirements will not compromise vitally needed safety systems, the 15-Day Changes increase the risk of hazardous incidents with potentially more severe impacts to human health and safety, both at the facility and in the surrounding community. Moreover, the increased risk of hazardous incidents also has the potential to harm wetlands and other sensitive habitats in the vicinity of tanker terminals, resulting in more severe impacts to biological resources.

49-23  
cont.

- Second, CARB staff have not adequately evaluated impacts to biological resources, wetlands and other sensitive habitats resulting from the suite of construction projects along the shorelines that would be required to comply the Proposed Regulation, which would need to be accomplished within the accelerated deadlines of the proposed 15-Day Changes. In particular, CARB staff have not evaluated the impacts or feasibility of forcing regulated facilities to conduct construction activities rapidly to meet the advanced deadlines, while at the same time adhering to seasonal work windows designed to protect fish species. WSPA’s December 2019 comments explained the deficiencies in the biological analysis in the Draft EA, and the proposed 15-Day Changes would make these deficiencies worse, by intensifying the impacts on a variety of special-status aquatic and shoreline species that CARB staff have yet to evaluate.

49-24

- Third, CARB staff have not evaluated cumulative impacts, including impacts to biological resources and other CEQA impact categories, in light of its proposed 15-Day Changes. The Notice contains one paragraph that purports to assess cumulative impacts, but this inadequate discussion does not in fact address cumulative impacts as defined by CEQA; that is, environmental impacts of other past, present and reasonably foreseeable future projects together with those of the proposed project (CEQA Guidelines 15355). Rather, the Notice states: “CARB staff do not anticipate this change [acceleration of the compliance deadlines] to have a large potential to cause cumulative impacts from other marine-related construction associated with this regulation, as no other compliance dates for ocean-going vessels or their related terminals are scheduled to go into effect during the new implementation years” and because “no significant construction is anticipated for ro-ro terminals.” Notice, p. 34 (emphasis added). While this text at least claims to address the prospect of overlapping construction by multiple operators subject to the Proposed Regulation, it entirely disregards cumulative development that is not “associated with this regulation”—namely, past, present and reasonably foreseeable future residential, commercial, and industrial development along the shoreline and maritime projects occurring in bays and waterways. See also the discussion above of hazard impacts including risks to human life and past incidents.

49-25

The altered deadlines of the 15-Day Changes not only compress and potentially intensify the severity of impacts from construction activities at facilities subject to the Proposed Regulation, but would also affect the interaction with impacts of other past, present and reasonably foreseeable cumulative projects in the shortened compliance timeframe. See, e.g., Chevron’s April 30 comments for some examples of specific cumulative projects which should be considered in such analysis.) As such, CARB staff’s cursory statement

fails to provide the cumulative impacts analysis required by CEQA, instead improperly limiting its assessment to impacts that would occur only under CARB's own rule. | 49-25  
cont.

- Finally, the bullets above are only examples of project-level and cumulative impacts that can be expected to become substantially more severe as a result of the accelerated deadlines. Rather than a dismissive and unsupported blanket assertion that the compressed implementation schedule “would not change the nature or extent of physical changes to the environment; it would simply result in them occurring ... two years sooner” (Notice, pp. 33-34), CARB should re-examine each of the impacts determined to be potentially significant in the Draft EA in light of the 15-Day Changes. | 49-26

CARB staff must revise and recirculate the Draft EA to evaluate the heightened hazards and impacts to biological resources resulting from the Proposed Regulation and the 15-Day Changes accelerating the already-unrealistic compliance deadlines, and to conduct a proper project-specific and cumulative analysis of all categories of impacts caused by construction activities associated with the Proposed Regulation together with impacts on the same resources from construction of other, unrelated cumulative projects. These are serious omissions of crucial impact analyses required by CEQA, which must be disclosed in a recirculated Draft EA and on which stakeholders are entitled to comment, before CARB may adopt the Proposed Regulation. | 49-27

#### V. The “Innovative Concepts” Provisions in the 15-Day Changes Do Not Provide a Compliance Alternative to Regulated Parties

Another major change proposed in the 15-Day Changes would allow the use of certain “Innovative Concepts” to meet compliance obligations. CARB staff present the “Innovative Concepts” provisions as “an alternative compliance pathway,” and claim that the new provisions are proposed “in response to numerous comments received by industry members and ports.” Notice, pp. 4, 20. **WSPA did not request these “Innovative Concepts” provisions.** WSPA was very clear in its March 6, 2020 letter to CARB about the changes that would be needed to implement a compliance alternative in lieu of at berth capture and control. The proposed “Innovative Concepts” provisions bear no resemblance to WSPA’s proposed alternative compliance option.

As CARB staff have conceded, the provisions in question would not actually provide a functional “alternative” to compliance with at berth control and capture requirements. Rather, as envisioned by CARB staff, most or all regulated parties seeking to use the “Innovative Concepts” provisions will find themselves forced into compliance with the default at berth control requirements anyway, typically after only six years. See Notice of 15-Day Changes, Attachment B, Summary of Proposed 15-Day Changes and Impacts on Costs: Control Measure for Ocean-Going Vessels At Berth, p. B-3 (“staff assume a six-year period for use of an Innovative Concept in the cost analysis”). But even this CARB assessment of a six-year usage period is overly optimistic. The “Innovative Concepts” provisions contain several significant limiting conditions, which strongly disincentivize funding by stranding investment and creating significant compliance risks. By structuring the “Innovative Concepts” provisions in this way, CARB essentially conveys that the only acceptable compliance option is control of at berth emissions.

Regulated parties would need to repeatedly apply for and receive CARB approval to use an “Innovative Concept” for limited three-year terms, would need to prove that the proposed reductions will be in excess of future “business-as-usual” emissions, and would be subject to denial of renewal if CARB or an approved local AB 617 community emissions reduction plan later mandates the reduction. According to the Notice (p. 21), “[T]he three year time period is expected

to be long enough to allow the applicant a window of certainty for compliance with the rule but short enough to ensure that an innovative concept is still achieving early or excess emissions reductions.” On the contrary, the 15-Day Changes provide no such “window of certainty”, since approval of an Innovative Concept may be revoked with no more than a 30-day notice, or may even become ineffective without revocation and on no notice, at any time. See 15-Day Changes, Proposed Sections 93130.17(f) and (g).

The “Innovative Concepts” provisions in the 15-Day Changes would require participating marine terminals, by December 1, 2021, to submit an application for approval of a proposed emission reduction as an “Innovative Concept.” The proposed reduction must meet a host of requirements. The proposal would need to reduce annual oxides of nitrogen (NOx), fine particulate matter (PM2.5) and reactive organic gases (“ROG”) emissions by an amount at least equal to the level that would have been achieved by implementing the Proposed Regulation’s at berth capture and control requirements. These reductions may only occur at the marine terminal or “within adjacent communities,” or overwater within three nautical miles of the terminal. They must be in excess of any reductions already required by any legal requirement or emission reduction strategy identified in any AB 617 Community Emission Reduction Plan, and they must also “exceed any reductions that would otherwise occur in a conservative business-as-usual scenario” (defined as those conditions reasonably expected to occur in the future in the relevant area without the “Innovative Concept” emission reduction, accounting not only for current laws and regulations but also “current economic and technological trends.”). See Notice, Attachment A, at A-57 (proposed 17 C.C.R. 93130.17(a)). As to this last requirement, the 15-Day Changes are silent as to how “business-as-usual” conditions would be determined to set a realistic baseline emissions inventory.

Far from being a true “alternative” to main-line compliance, as CARB staff conceded at the December hearing, the “Innovative Concepts” provisions would only provide a temporary delay of the inevitable need to install capture and control at marine terminals. Any “Innovative Concept” would only be approvable for maximum three-year terms, and CARB could revoke or decline to renew approval (in its unreviewable discretion) if the emission reduction at issue were to become mandated by regulation or by any CARB-approved AB 617 Community Emission Reduction Plan, or if CARB were to decide that the “business-as-usual” trend eventually would have resulted in the reduction anyway.<sup>4</sup> See *id.* If an “Innovative Concept” were to be revoked or renewal denied, a regulated marine terminal could be in imminent or immediate noncompliance, with no identifiable feasible path to compliance for tanker vessels. This would result in a continuously moving compliance target that will inevitably end in noncompliance. Once an “Innovative Concept” approval is revoked or renewal is denied, the terminal will have to identify and develop new “Innovative Concept” projects to avoid being required to install infeasible capture and control equipment. Even if a new “Innovative Concept” were identified, the 15-Day Changes provide no defined period of time to design, permit and implement it. Eventually, the pool of reasonably available reductions that could qualify as an “Innovative Concept” will be exhausted, leaving the terminal unable to avoid noncompliance. Ironically, the proposed “Innovative Concept” provisions would actually **stifle** innovation, as few terminals would commit the engineering, permitting,

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<sup>4</sup> CARB staff’s “Summary of Proposed 15-Day Changes and Impacts on Costs” also assumes that the average approved “Innovative Concept” would only remain in place for six years, as CARB staff expect future regulations to require many of the types of reductions regulated facilities would seek to use as an “Innovative Concept.” See Notice, Att. B, p. B-3.

construction timelines, capital and manpower needed to develop an “Innovative Concept” if it eventually will become a stranded investment.

With any proposed “Innovative Concept” emissions reductions limited to maximum three-year terms, and subject to revocation or non-renewal at any time if and when CARB, any other government agency, or an AB 617 community decides to simply require them (as CARB expects is likely to happen), regulated marine terminals could not rely on an “Innovative Concept” as a true “alternative” to compliance with at berth capture and control requirements. While CARB staff assume that terminals would make use of the “Innovative Concept” provisions, as proposed, those provisions offer little incentive for companies to make significant investments in emissions reductions that would provide, at best, only temporary relief from the primary at berth capture and control requirements.

The “Innovative Concept” provisions also suffer from several other deficiencies that limit their usefulness to regulated parties and disincentivize their use:

- Regulated parties should not be immediately disqualified from using an “Innovative Concept” and required to provide new reductions if the “Innovative Concept” becomes regulated. This contradicts the principle under California law that emission reduction credits must be real, permanent, quantifiable, enforceable and surplus at the time they are initially generated, based on the laws and regulations then in effect. See Cal. Health & Safety Code 39607.5; 17 C.C.R. 91501(i). Emissions credits are not retroactively disqualified, or new reductions required, if some of those credited reductions become regulated at some point in the future. Indeed, the 15-Day Changes would not retroactively require new reductions from regulated sources if future federal regulations achieve the emissions savings of the At Berth Regulation. Moreover, any other at berth CARB Approved Emission Control Strategy (CAECS) would involve a one-time operator investment resulting in a certain and creditable emissions reduction at the terminal or port. We would urge CARB staff to remove this unnecessary disparity between the CAECS compliance option and the proposed “Innovative Concept” provisions, and at least harmonize the “Innovative Concept” provisions to allow a more certain and permanent alternative to compliance with capture and control. At the very least, CARB staff should ensure that “Innovative Concept” reductions that were not already legally required at the time of their approval do not lose their “Innovative Concept” status if they later become legally required.
- The proposed “Innovative Concepts” language in the 15-Day Changes also would create a fundamental unfairness to regulated parties funding early and ongoing emissions reductions (e.g., funding early replacement of tugboat engines) by ultimately crediting the future-regulated source with the benefit of those reductions, rather than the regulated party who originally paid for the reduction. It is beyond question that early funding of emissions reductions not currently required by law reduces the future emissions baseline, which then allows less burden to be placed on other sources in the inventory for reductions. This conflicts with the way CARB has addressed early reductions in other contexts such as AB 32, where early reductions were immediately credited to the party funding them regardless of whether those reductions eventually became required by law.
- The 15-Day Changes would require emissions reductions from an “Innovative Concept” to be annually reported and compared to reductions that would be achieved from controlling at berth emissions through capture and control. This essentially imposes an

ever-changing annual mass emission reduction requirement, based on terminal activity (and requires a difficult assessment of what “business-as-usual” activity would have been without the “Innovative Concept”). In contrast, a CAECS does not need to meet an annual mass reduction requirement, but simply requires the source to achieve a control requirement that is independent of source activity. An “Innovative Concept” should be held to the same CAECS standard and only require implementing a control requirement that is independent of source activity, rather than being held to a changing annual mass emissions target.

- Permanent reductions should not require a reapplication for qualification every three years, given that the annual verification process will already confirm that those reductions are real, permanent, quantifiable, enforceable and surplus.
- Limiting the location of “Innovative Concept” emissions reductions only to “adjacent” communities may have unintended consequences. Neither “adjacent” nor “community” are defined in the Proposed Regulation, so it is unclear how close an area would need to be in order to be deemed “adjacent,” and where the boundaries of that area would end. Reductions in an “adjacent” nearby community impacted by terminal-area emissions, but that is not immediately bordering the port or terminal, could be needlessly excluded (even if they benefit that area). Also, a nearby AB 617 community may not be sure how to account for emissions reductions from “Innovative Concept” projects, and whether such reductions would need to be required by its Community Emissions Reduction Plan. WSPA recommends changing this criterion to “within five miles of the terminal or port,” in order to eliminate the ambiguous term “adjacent community” and strike a reasonable balance between distance from the terminal/port and a large enough area from which emissions reductions could still benefit communities affected by terminal/port-area emissions.
- Limiting qualifying reductions from tankers to distances no greater than 3 nautical miles from a port or terminal is unnecessary and conflicts with the benefits accounted for within the much larger area defined by CARB’s Fuel Sulfur And Other Operational Requirements For Ocean Going Vessels Within California Waters And 24 Nautical Miles of the California Baseline (13 Cal. Code Regs. § 2299.2) (Fuel Sulfur Regulation). The air basins defined in the Fuel Sulfur Regulation are nearly identical to those designated in the Health Risk Assessment (HRA) for the Proposed Regulation.<sup>5</sup> CARB staff should allow PM, NO<sub>x</sub> and ROG reductions in the wider area defined by the Fuel Sulfur Regulation to also qualify for credit as an “Innovative Concept.”
- The inability to obtain approval for an alternative reduction funded partially with public incentives does not make practical sense. CARB directed staff to craft an Innovative Concept option that “meets or exceeds” reductions from compliance with the Proposed Regulation. Under that rationale, even if a regulated facility decides to apply public incentive funds to partially fund an Innovative Concept, those emissions reductions should be credited if they would not have happened but for the offer of coverage as an “Innovative Concept,” and exceed the reductions that would have been achieved through complying with the capture and control requirements of the Proposed Regulation.
- The 15-Day Changes would require that reductions from an “Innovative Concept” be calculated using the actual data evidencing that reduction (i.e., a “business-as usual”

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<sup>5</sup> <https://ww3.arb.ca.gov/regact/2008/fuelogv08/appe2fuel.pdf>

emission baseline minus the actual emissions under the “Innovative Concept”). But the proposed regulatory language would then compare those “Innovative Concept” reductions to at berth emissions derived from default emission factors. This is an unnecessary disparity in emissions estimation methods and using default emission factors to estimate at berth emissions does not account for voluntary upgrades to vessel emission sources. To remedy this disparity, the proposed section 93130.17(d)(1)(B) should allow the option to calculate at berth emission reductions using best available information rather than mandating use of emission factors.

- The proposed December 2021 deadline for any “Innovative Concept” to be included in Port/Terminal Plans is too soon for regulated parties to have any meaningful plan for such proposed reductions ready, given the uncertainties listed above. It is also inconsistent with language in the Notice specifying that “[a]pplications for innovative concepts are due on or before terminal plan and port plan due dates,” given that proposed Section 93130.14(a)(2) provides that final revised terminal plan submittals are not even due until 2024 for ports and 2026 for all other tanker terminals. The 2021 “Innovative Concept” deadline should be changed to match the deadlines for revised terminal plans in Section 93130.14(a)(2).
- The “Innovative Concept” provisions also should clearly provide that port and terminal operators with an approved terminal plan containing an “Innovative Concept” or other CAECS should be entitled to rely on that approved “Innovative Concept” or CAECS completely for compliance with the Proposed Regulation, and not **also** be required to rely on another compliance option (such as the remediation fund option) during the time that the “Innovative Concept” is being constructed and implemented. Failing to clarify these risks unfairly penalizing entities that receive approval for and commit in good faith to a valid CAECS or “Innovative Concept,” either of which could take upwards of a decade to complete
- WSPA recommends CARB staff further revise the “Innovative Concepts” in the 15-Day Changes to reflect the proposal in WSPA’s March 6, 2020 comment letter, specifically the key provisions addressing how reductions from an “Innovative Concept” are determined to be equivalent, where they can occur, and which regulations they need to be in excess of.
  - WSPA’s proposal for a one-time demonstration of equivalent reductions between an “Innovative Concept” and CAECS using a 2016 baseline year is superior to the proposed 15-Day Changes language because:
    - The proposal uses ARB’s 2016 baseline (or an alternative subject to ARB approval), which was the foundation for determining an acceptable amount of annual reductions from the Proposed Regulation.
    - By having a one-time equivalency comparison, the regulated community would be afforded compliance certainty to incentivize investment.
    - By having an ongoing annual demonstration that emission reduction measures are in place and properly operating, there would be assurance that emission reductions are occurring.

- Like CAECS, WSPA's proposed language imposes a compliance requirement on an "Innovative Concept" that is independent of source activity, ensuring that an "Innovative Concept" is not chasing a changing annual mass emissions target.
- WSPA's proposal to allow calculation of uncontrolled at berth emissions using best available information avoids the inaccuracy of the default emissions factors mandated by proposed Section 93130.5(d)(1)-(2) in cases where vessel operators have voluntarily upgraded ship engines to cleaner engines.
- WSPA's proposal to at least allow reductions from Innovative Concepts to occur within five miles of the port/terminal and within California waters, if not within 24 nautical miles as discussed above, is superior to the language proposed in the 15-Day Changes. A five-mile limit strikes a balance between distance from the terminal/port and a large enough area from which to achieve emissions reduction. A fixed distance also recognizes that air quality benefits can change with meteorology and are not bound by "community" or city boundaries.
- WSPA's proposal to require reductions from "Innovative Concepts" to be specifically in excess of United States law and regulations is superior to the language proposed in the 15-Day Changes. Operators in California are presumed to be familiar with United States federal and state laws and regulations, but are not always versed in the international regulations that may apply at various ports of all throughout the world (especially if the vessels do not normally call on those ports). In setting the emission reduction requirements for CAECS, CARB staff have not disallowed emissions reductions that might be required by international regulations; it is sufficient if such reductions are not already required under United States federal or state laws or regulations.

#### **VI. The Amended "Interim Evaluation" Provisions Still Do Not Provide Any Relief for Regulated Parties and Do Not Meet CARB's Obligation to Prove Feasibility Before Imposing Regulatory Requirements**

The 15-Day Changes also propose amendments to the requirement that CARB staff conduct an "interim evaluation" of new control technologies, accelerating the deadline for that evaluation by six months to December 1, 2022 and specifically requiring review of "the information provided by the port and terminal plans" and "other public information provided to CARB including terminal specific engineering evaluations, logistical considerations, public engagement, and independent studies that inform the implementation timeline." See Notice, Att. A, p. A-46 (proposed 17 C.C.R. 93130.14(d)).

Even as amended, however, the "interim evaluation" provision is no substitute for conducting a proper feasibility study before mandating a control strategy, not after. These amendments do nothing to relieve facility operators of the Proposed Regulation's infeasible emissions reduction requirements, and they still do not require CARB to conduct the feasibility study necessary to assess the safety and feasibility of installing the very capture and control systems required by the Proposed Regulation. In our March 6, 2020 comment letter to the Board, WSPA reinforced the need for a proper feasibility study for stack capture and control systems on tankers, and proposed redlines that described the minimum elements that should be required as a part of any proposed

“interim evaluation.” Still, with or without an “interim evaluation” **after** adoption of the Proposed Regulation, a feasibility study is still needed **before** any regulation is adopted, and likely would take approximately three years. With the now-accelerated deadline of December 2022 for an interim evaluation, there is no way that interim evaluation could possibly be informed by a full and complete feasibility study or could itself seriously evaluate potential technological feasibility concerns created by the Proposed Regulation.<sup>6</sup>

Indeed, some Board members have made clear that they do not view the “interim evaluation” provisions as **any** serious restriction on proceeding rapidly with the Proposed Regulation. In responding to a discussion by Board member Gioia about the importance of the interim evaluation to stakeholders, Chair Nichols replied that “by signaling that we’re going to do a review in 2023, are we incentivizing people to just not do anything until 2023? . . . That would be obviously the wrong direction to go in . . . So I hope we have some understanding of what exactly is going to start to happen the minute this gets underway.” These statements illustrate the Governing Board’s and CARB staff’s understanding of the interim evaluation as a separate opportunity for **additional** future regulation of at berth activity, not as a limit on the proposed standards already in the rule.

Moreover, the 15-Day Changes now also allow CARB staff to recommend the Board either defer or *advance* compliance deadlines “backward or forward in time” based on the findings of the interim evaluation. See 15-Day Changes, Proposed Section 93130.14(d). Though there is little risk that a full and fair evaluation would support advancing the deadlines still further, with an even shorter compliance period remaining, the inclusion of this language eliminates any “window of certainty.”

## VII. The 15-Day Changes to the Proposed Regulation’s CAECS Provisions Fail to Address the Counterproductive “Grid-Neutral” Requirement

Finally, the “grid-neutral” provisions in proposed Section 93130.5(c) and (d) in the 15-Day Changes would impose unnecessary new requirements on any CAECS requiring provision of power. Some terminal operators currently draw power from a combination of grid and on-site cogeneration power. To meet the proposed “grid-neutral” requirement, these operators would need to isolate the power supply for the CAECS to pull directly and **only** from the grid, which adds unnecessary project complexity and is not a cost-effective way to reduce GHG emissions.

WSPA believes the grid-neutral requirement in the proposed 15-Day Changes is unnecessary. A market-based incentive to reduce GHG emissions from a CAECS already exists through the Cap-and-Trade Program, and the value of auctioned allowances is used by the state to further mitigate GHG emissions that might be generated by a CAECS. Additionally, a grid-neutral requirement drives facilities away from on-site cogeneration, which puts facilities at greater risk from Public Safety Power Shutoff events (which tend to drive facilities towards on-site power generation). For these reasons, this requirement should be removed from the 15-Day Changes. If CARB staff are concerned about impacts from a temporary power source (e.g., diesel engines) needed to power a CAECS, the 15-Day Changes should simply specify that CAECS may not be powered by those temporary power sources of concern.

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<sup>6</sup> In addition, the new provisions requiring CARB staff to “consider” public information and studies they receive do not create any new duty for CARB staff, and do not commit CARB staff to do anything more than report their findings to the Board and make recommendations for possible future regulatory amendments.

Clerk of the Board  
May 1, 2020  
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We apologize for the length of this 15-Day Changes comment letter, but we feel we are given no alternative due to the extensive unresolved issues in this rulemaking. Our hope was that by 1) working together through numerous meetings, 2) conducting visits to various facilities to understand the complexities, unfeasibility, and safety concerns these regulations pose, 3) providing seven sets of comment letters dating back to February of 2019 summarizing these concerns, and 4) working hard on an alternative compliance option that achieves the same emission reductions, would have yielded a different and better outcome.

CARB has historically stood on a long-standing performance-based philosophy - setting the emission reduction targets and allowing industry and business to figure out the most cost-effective and safe way to meet those targets. This regulation unfortunately deviates from this historical approach as it does not address the need for a feasibility study, poses unacceptable safety risks, picks a particular technology which is unproven, unsafe, and extremely costly which will not be available within the specified timelines, proposed at a time with what appears to be little acknowledgement of the unprecedented social and economic disruptions caused by the pandemic, and without recognizing a viable alternative pathway that industry worked hard to develop to meet the emission reductions the regulation attempts to achieve. CARB did, most recently, put forth an Innovative Concept but unfortunately it does not provide a functional alternative to compliance with at berth control and capture requirements, thus disincentivizing its use.

WSPA had hoped for a win-win solution for meeting the health goals of the communities with a performance based emission reduction pathway. We are now hopeful perhaps we can resume discussions to meet that mutual goal. Please feel free to contact me if I can provide any clarifications or answers any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Catherine A. Boyd", is enclosed in a thin blue rectangular border.

#### Attachments

cc: CARB Governing Board Members  
Governor Gavin Newsom  
CalEPA Secretary Jared Blumenfeld

**Western States Petroleum Association  
Comments on 15-Day Changes  
to At Berth Regulation**

**List of Attachments**

<b><u>Tab</u></b>	<b><u>Document</u></b>
1	WSPA Comment Letter of March 6, 2020
2	CARB December 5, 2019 Hearing Transcript (excerpts)
3	Letter dated March 20, 2020 from California Association of Port Authorities, Cruise Lines International Association, Pacific Merchant Shipping Association, WSPA and World Shipping Council to Jared Blumenfeld (CalEPA) and Mary Nichols (CARB).
4	Letter dated March 24, 2020 from International Longshoreman and Warehouse Union and California Association of Port Authorities to Jared Blumenfeld (CalEPA) and Mary Nichols (CARB).
5	Letter dated April 15, 2020 from California Chamber of Commerce, local chambers of commerce and other organizations to Governor Newsom
6	Letter dated April 10, 2020 from the California Manufacturers Association and other organizations, including WSPA, to Governor Newsom
7	Letter dated April 21, 2020 from state legislators to Mary Nichols (CARB)
8	Letter dated April 27, 2020 from Brad Williams (Capitol Matrix Consulting) to Catherine Reheis-Boyd (WSPA)
9	WSPA document, “Stack Capture is not ready for pilot testing on tankers.”
10	Tom Guldner, <i>A crude oil tanker exploded – Why is that unusual?</i> Int’l Fire Fighter Magazine (Oct. 12, 2018), <a href="https://iffmag.mdmpublishing.com/a-crude-oil-tanker-exploded-why-is-that-unusual/">https://iffmag.mdmpublishing.com/a-crude-oil-tanker-exploded-why-is-that-unusual/</a>
11	France Secretariat D’Etat Aux Transports et a La Mer, Bureau enquête — accidents / mer (BEAmer), “Technical Report of the Inquiry Into the Explosion On Board the Oil Tanker Chassiron” (excerpts) ( <a href="http://www.bea-mer.developpement-durable.gouv.fr/IMG/pdf/RET_CHASSIRON_En_Site.pdf">http://www.bea-mer.developpement-durable.gouv.fr/IMG/pdf/RET_CHASSIRON_En_Site.pdf</a> )
12	“Industry supports calls for IGS on small tankers,” Riviera Newsletters (Apr. 11, 2017) ( <a href="https://www.rivieramm.com/opinion/opinion/industry-supports-calls-for-igs-on-small-tankers-29052">https://www.rivieramm.com/opinion/opinion/industry-supports-calls-for-igs-on-small-tankers-29052</a> )
13	WSPA document, “List of Inaccurate Staff and Public Statements, CARB Hearing on At Berth Rule – Dec. 5, 2019.”
14	WSPA document, “Response to Coalition for Safe Environment Presentation.”



Catherine H. Reheis-Boyd  
President

March 6, 2020

Mr. Richard Corey  
California Air Resources Board  
1001 I Street  
Sacramento, California 95814

sent via email to [Richard.Corey@arb.ca.gov](mailto:Richard.Corey@arb.ca.gov)

Re: WSPA Supplemental Comments on and Suggested Red Line of CARB Proposed Control Measure for Ocean-Going Vessels at Berth

Dear Richard:

This letter supplements comments previously submitted by the Western States Petroleum Association (WSPA) on the California Air Resources Board's (CARB) Proposed Control Measure for Ocean-Going Vessels at Berth (Proposed Regulation), released October 15, 2019, and its accompanying Draft Environmental Analysis (Draft EA), released October 1, 2019. WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states.

WSPA is providing these comments as part of a continuing effort to provide feedback on the At Berth Regulations. We incorporate our previous comments submitted on February 15, March 29, May 30, June 14, August 15, 2019, and December 3, 2019 by reference herein.

The safety and well-being of our members' employees and the communities in which they operate is of critical importance to our members and their facilities. As you know, WSPA strongly supports CARB's air emission reduction goals and improving the air quality in communities where our members operate. We continue to have concerns, however, that the Proposed Regulation still does not adequately address potential safety and feasibility issues associated with the emissions capture and control equipment that would be required for tanker terminals. Like CARB, WSPA members feel strongly that the Proposed Regulation should not create an unacceptable risk of a catastrophic explosion or other dangerous incident.

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Since workshops on the Proposed Regulation began, WSPA has documented the recognized safety and feasibility problems associated with proposed tanker emission controls, urging CARB to partner with industry to first conduct a feasibility study. WSPA has also called on CARB staff to add to the Proposed Regulation an alternative compliance option that would achieve equivalent emission reductions from other sources.

To help address these issues, WSPA is attaching to this letter a suggested redline of the Proposed Regulation that clarifies additional provisions regarding the need for a feasibility study prior to the imposition of deadlines, and an alternative compliance option that would enable a more feasible path to compliance while ensuring the health and safety of the communities in which we operate. We believe that the propose changes improve the Proposed Regulation and help ensure that any measures required for marine terminals and tankers achieve important emissions reductions in a feasible, safe and cost-effective way.

**1. Any emission control strategy for tanker vessels must first be demonstrated feasible and safe in the types of facilities and marine terminals where it is proposed.**

Tankers have unique characteristics and safety concerns that distinguish them from other marine vessels. Tankers have very large boilers necessary to drive transfers of flammable liquid cargo. Indeed, the Proposed Regulation singles out tanker boilers as the sole category of boilers to be regulated on any at-berth vessel. For these boilers, CARB staff have acknowledged in the Initial Statement of Reasons (ISOR) that “[s]hore power . . . cannot be used to power boilers, because boilers are configured to operate on electricity. As such, shore power does not reduce tanker boiler emissions.” ISOR, p. ES-23.

Additional challenges with equipping tanker vessels with shore power include adoption by the international fleet given a lack of international requirements and standards to allow for a vessel to connect, to a grid, at multiple locations. Further, the time required to “turn over” the fleet of tankers to be equipped with this capability would be extensive. Accordingly, CARB staff have concluded that the most suitable control strategy would be stack capture and control (“stack capture”).

However, attempting to control tanker boilers with stack capture introduces significant risk, including risk of explosion that precludes testing the equipment on actual tankers. CARB staff may not have considered a stack capture system on an actual tanker, but instead may have only looked at stack capture systems that are used on *container* vessels in POLA and POLB, and may have concluded that those systems would work safely and feasibly on tanker vessels because they worked on container vessels. We are concerned that this conclusion does not contemplate the unique operations and safety considerations that exist for tanker boilers, including the following:

- Tanker boilers are required by regulation to route their exhaust gas to the cargo hold, in varying amounts, to make the vapor space in the cargo hold safe from explosion. Extensive engineering studies are needed to determine if and how stack capture and control can be designed and operated without impairing this safeguard or violating existing safety regulations.
- Capturing tanker boiler exhaust gas without a properly engineered and tested control mechanism runs the risk of static electricity generation, electrostatic discharge, and creating a potential explosive condition on a vessel filled with flammable and explosive liquid.
- There are no international or domestic standards or safety guidelines specifying how a stack capture and control mechanism would be safely managed or maintained for oil tankers. The international tanker fleet consists of a large variety of ships, mostly operated by third parties, with a complex mix of boiler configurations. All types of connections and interfaces between tankers and terminals must be designed to engineering standards, rules and guidelines from regulators (USCG, Classification Societies) and industry (Oil Companies International Marine Forum (OCIMF), International Safety Guide for Oil Tankers and Terminals (ISGOTT), International Marine Organization (IMO)). The Proposed Regulation would require installation of capture and control systems on tankers with no currently available guidance on how that could be done safely or feasibly.

Thus, before any actual pilot testing can be conducted, a feasibility study needs to be conducted to fully take into account these and other operational and safety considerations, including the

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need for development of rules and standards in order to design a safe interface and operational procedures for any control equipment between an oil tanker and an emissions capture system. We appreciate that CARB staff, in its staff report, have already recognized that more tests and safety studies need to be performed before attempting to use stack capture on tanker vessels, regardless of site or location. Also, as CARB staff heard from a lead technology provider in the April 16, 2019 CARB At Berth Working Session, a land-based system faces a number of design challenges when applied to any tanker vessel, including safety (a higher hazard level, need for safety standards and procedures, emergency protocols) and ability to design and operate a larger and more complex configuration. Vessel operators, mostly third-party, will not allow the connection of equipment that is not regulated, classified, and/or certified to design and safety standards recognized by regulators and industry.

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cont.

We respectfully request CARB to conduct a feasibility study before any terminal plan deadlines prior to 2023 are enforced. This feasibility study would identify the key criteria to demonstrate the operability and safety of stack capture on tankers, and require the engineering analysis of stack capture designs against these criteria prior to conducting any pilot testing program. In the attached redlined version of the Proposed Regulation, we have proposed changes that would address the need for a feasibility study. WSPA respectfully requests CARB to incorporate these redlines into a *revision of the Proposed Regulation*.

## **2. The Proposed Regulation should include an alternative compliance option to achieve equivalent emission reductions.**

During the January 30, 2020 webinar on the Proposed Regulation, CARB staff indicated that they are working on including an “alternative” compliance option to allow regulated facilities to reduce emissions from sources other than vessels at-berth. We believe such an “alternative” option must provide sources a way to to achieve similar emissions reductions to those anticipated by the Proposed Regulation, but through alternative methods *in lieu of* those capture and control requirements specified in the Proposed Regulation.

If an alternative compliance option can reduce emissions in communities adjacent to ports in an amount equivalent to the Proposed Regulation and by the currently proposed timelines, then the intent of the Proposed Regulation should be fulfilled, and there should be no additional requirements or limitations imposed on the alternative emission reductions.

In the attached redlines to the Proposed Regulation, WSPA has suggested revisions that would incorporate a workable example of the alternative compliance option described above. If available, an alternative emission reduction option would allow operators the ability to achieve the same air quality objectives as those targeted by the standards in the Proposed Regulation, in the same timeframe or earlier. It is important that operators be given the ability to achieve the same air quality objectives through alternative means, given the differences between operators, berths, etc.

WSPA commends CARB’s important ongoing work to identify and achieve real-world health benefits from feasible and cost-effective emissions reduction measures in communities impacted by air pollution. Those health benefits simply will not be achieved if proposed regulations are not feasible, and further dangerous risks of harm from fire or explosion could be created if the regulation proceeds forward without properly assessing the safety of the proposed requirements. Because California law requires a formal feasibility determination before a regulation is adopted, WSPA again respectfully requests staff to reassess the Proposed Regulation, provide for a

Mr. Richard Corey  
March 6, 2020  
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feasibility evaluation study before imposing any enforceable requirements on stakeholders, and revise the regulatory implementation in accordance with the findings of the feasibility evaluation study.

WSPA appreciates this opportunity to comment on the Proposed Regulation and strongly supports CARB's air emission reduction goals and improving the air quality in communities where our members operate. We appreciate the ongoing dialogue with you and staff on safety and other key feasibility issues associated with the emissions capture and control system that would be required for tanker terminals.

If you have any questions, please contact me at this office.

Sincerely,

A handwritten signature in blue ink, reading "Catherine A. Boyd", is enclosed in a thin black rectangular border.

Attachment

CC: CARB Governing Board members

**Attachment**

**APPENDIX A [Official] PROPOSED**

**REGULATION ORDER**

Amend title 13, division 3, chapter 5.1, section 2299.3; and title 17, division 3, chapter 1, subchapter 7.5, section 93118.3; California Code of Regulations (CCR), and

Adopt new title 17, division 3, chapter 1, subchapter 7.5, sections 93130-93130.20, CCR, to read as follows:

(Note: The proposed amendments to title 13, section 2299.3 and title 17, section 93118.3 are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions from the existing regulatory text. The symbol “\*\*\*” means that intervening text not amended is not shown. The entire text of sections 93130 through 93130.20 set forth below is new language in “normal type” proposed to be added to title 17, CCR.)

**Section 2299.3. Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At-Berth in a California Port.**

\*\*\*

(c) On January 1, 2021, section 93118.3 of title 17 of the California Code of Regulations shall be superseded by sections 93130 through 93130.20 of title 17 of the California Code of Regulations, as specified in section 93130. However, if sections 93130 through 93130.20 collectively are repealed or deemed invalid in their entirety by a final court decision, the requirements of section 93118.3 of title 17 of the California Code of Regulations shall again become operative. This subsection shall not be construed as expanding or limiting either the application or requirements of sections 93130 through 93130.20, title 17, CCR, but is intended to alert affected persons of the requirements regarding the operation of auxiliary diesel engines on ocean-going vessels at-berth in a California port and other provisions in that section.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

**Section 93118.3. Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At-Berth in a California Port.**

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(b) Applicability and General Exemptions.

\*\*\*

(4) On January 1, 2021, this section 93118.3, and section 2299.3 of title 13 of the California Code of Regulations, shall be superseded by sections 93130 through 93130.20 of title 17 of the California Code of Regulations, as specified in section 93130. However, if sections 93130 through 93130.20 collectively are repealed or deemed invalid in their entirety by a final court decision, the requirements of section 93118.3 of title 17 and section 2299.3 of title 13 of the California Code of Regulations shall again become operative. This section shall not be construed as expanding or limiting either the application or requirements of sections 93130 through 93130.20, title 17, CCR, but is intended to alert affected persons of the state's requirements regarding ocean-going vessels, ports, terminals, berths, and emission control strategies for ocean-going vessels.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

### **Section 93130. Control Measure for Ocean-Going Vessels At Berth.**

The Control Measure for Ocean-Going Vessels At Berth is set forth in sections 93130 through 93130.20, title 17, California Code of Regulations, and is referenced as the "Control Measure" within those sections.

On January 1, 2021, the requirements of this Control Measure shall supersede the requirements of section 93118.3 of title 17 and section 2299.3 of title 13 of the California Code of Regulations. However, the reporting and recordkeeping requirements of section 93118.3 (g) of title 17 shall remain in effect for compliance years through 2020. The annual statements of compliance for 2020 in section 93118.3 (g)(1)(A)(2) and (g)(2)(A)(3) are still due to the Executive Officer on March 1, 2021. Annual wharfinger data from the ports under section 93118.3 (g)(3) is still due to the Executive Officer on April 1, 2021. Compliance records in section 93118.3 (g)(1)(B), (g)(2)(B), and (g)(3)(B) are still required to be maintained for 5 years, through December 31, 2025.

As specified in section 93130.20, the individual provisions in this Control Measure are severable. However, if sections 93130 through 93130.20 collectively are repealed or deemed invalid in their entirety by a final court decision, the requirements of section 93118.3 of title 17 and section 2299.3 of title 13 of the California Code of Regulations shall again become operative.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

### **Section 93130.1. Purpose and Intent.**

The purpose of this Control Measure is to reduce oxides of nitrogen (NOx), reactive organic gasses (ROG), particulate matter (PM), diesel particulate matter (DPM), and greenhouse gas (GHG) emissions from ocean-going vessels while docked at berth at California ports. This Control Measure also ensures that

ocean-going vessels do not create excess visible emissions. California’s ocean-going vessel operations are largely situated in and around at-risk communities that directly benefit from localized reductions of NOx and PM. This contributes to meeting community health goals set forth in Assembly Bill 617 (Garcia, Stats. 2017, ch. 136). Furthermore, NOx and PM emission reductions contribute to meeting California’s State Implementation Plan obligations for attainment, and further CARB’s obligations under sections 39660 et seq. and 43013 et seq. of the Health & Safety Code. Additionally, reductions from shore power have a benefit of reducing GHG emissions. This contributes to meeting California’s GHG emission reduction targets established in Assembly Bill 32 (Nunez, Stats. 2006, ch. 488) and Senate Bill 32 (Pavley, Stats. 2016, ch. 249).

The intent of this Control Measure is to ensure that emissions from ocean-going vessels are reduced using a California Air Resources Board (CARB) approved emission control strategy to control PM, NOx, and ROG emissions at berth without increasing overall GHG emissions from this Control Measure, and that every ocean-going vessel meets visible emission standards at berth and at anchor. All parties necessary to achieving emission reductions from ocean-going vessels at berth have responsibilities and requirements under this Control Measure including but not limited to vessel operators, terminal operators, ports, and operators of CARB approved emission control strategies.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

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(b) Definitions.

The definitions in Health and Safety Code sections 39010 through 39060 shall apply to this Control Measure, except as otherwise specified in this section.

- (1) “Alternative Control Technologies” means technologies, techniques, or measures that reduce the emissions of NOx, PM, ROG, or GHG from an auxiliary engine and/or tanker auxiliary boiler other than shutting it down and operating on shore power.
- (2) “Anchorage” means a vessel’s allotted place to moor in place or drop anchor in California waters.
- (3) “Applicant” means any person who requests an approval from CARB for an emission control strategy.
- (4) “Application” means a formal request from an applicant using the process outlined in section 93130.5 of this Control Measure.
- (5) “Articulated Tug Barge” means a tanker barge that is mechanically linked with a paired tug that functions as one vessel. For the purposes of this Control Measure, articulated tug barges are not considered ocean-going vessels.
- (6) “Auxiliary Boiler” means a steam generator on an ocean-going vessel designed primarily to provide steam for uses other than propulsion or pumping cargo.

- (7) “Auxiliary Engine” means an engine on an ocean-going vessel designed primarily to provide power for uses other than propulsion, except that all diesel-electric engines shall be considered “auxiliary engines”.
- (8) “Berth” means a vessel's allotted place at a wharf, pier, or dock. This does not include anchorages such as at the off-shore tanker terminal at El Segundo, or where passenger vessels tender at anchor such as at Santa Barbara, or Catalina.
- (9) “Bulk Vessel” means a self-propelled ocean-going vessel constructed or adapted primarily to carry unpackaged dry bulk cargo. A bulk vessel may use vessel-based or shore-based equipment for loading and discharging of cargo.
- (10) “Calendar Year” means the time period beginning on January 1 through December 31 of a single year.
- (11) “California Ports (Ports)” means any port or independent marine terminal in California that receives an ocean-going vessel including:
  - (A) Landlord ports where the port owns the wharves which it rents or leases to a terminal operator;
  - (B) Operational ports where the port functions as a terminal operator; and
  - (C) Independent marine terminals.
- (12) “California time aggregate method” means the California State Implementation Plan method of calculating opacity emissions. The California time aggregate method is virtually identical to United States Environmental Protection Agency method 9 in the procedures the observer follows, but most notably differs in that the data is analyzed by counting the readings that exceeded the limit, rather than averaging all readings in a set.
- (13) “CARB” means the California Air Resources Board.
- (14) “CARB Approved Emission Control Strategy (CAECS)” means a method of reducing emissions from an ocean-going vessel at berth to a satisfactory level for compliance with the Control Measure and is verified and approved by CARB.
- (15) “CARB Approved Emission Control Strategy Operator” means any party who operates a CARB approved emission control strategy to reduce emissions for compliance with this Control Measure.
- (16) “Charter” or “Charter Agreement” means an agreement or contract where one person rents, leases, hires, or uses ocean-going vessels from another person to convey or transport goods or passengers to one or more designated locations.

- (17) "Charter Company" means any person that is in the business of leasing, renting, or lending ocean-going vessel(s) to other companies or persons to convey or transport goods or passengers to one or more designated locations.
- (18) "Commissioned Shore Power Vessel" means a shore power equipped vessel that visits a compatible shore power berth at a terminal and has completed vessel commissioning at that terminal.
- (19) "Container Vessel" means a self-propelled ocean-going vessel constructed or adapted primarily to carry uniformly sized ocean freight containers.
- (20) "Diesel-Electric Engine" means a diesel engine connected to a generator that is used as a source of electricity for propulsion or other uses.
- (21) "Diesel Engine" means an internal combustion, compression-ignition engine with operating characteristics substantially similar to the theoretical diesel combustion cycle. Regulating power by controlling fuel supply in lieu of a throttle indicates a compression ignition engine.
- (22) "Diesel Particulate Matter (DPM)" means the particles found in the exhaust of diesel engines, which may agglomerate and adsorb other species to form structures of complex physical and chemical properties.
- (23) "Distributed Generation" means electrical generation technologies that produce electricity near the place of use.
- (24) "Docked at Berth (at berth)" means the state of being secured to a berth.
- (25) "Executive Officer" means the Executive Officer of CARB, or his or her designee.
- (26) "Excess Emissions" means air pollution emitted by a vessel at berth during a time period when the vessel operator is required to reduce emissions, but does not achieve the full required reductions.
- (27) "Exception" means a situation that results in a compliant visit with or without emission reductions.
- (28) "First Line" means the time when a vessel's line is first attached to a berth in the process berthing the vessel.
- (29) "Fleet" means a group of vessels of the same vessel type that have agreed to utilize their combined Vessel Incident Events (VIEs) at a port or marine terminal. Vessel operators designate their fleet in the vessel visit reporting.
- (30) "Foreign-flag Vessel" means any vessel of foreign registry including vessels owned by United States citizen(s) but registered in a nation other than the United States.

- (31) "General Cargo Vessel" means a self-propelled ocean-going vessel constructed or adapted primarily to carry cargo that must be loaded individually, and that may or may not be in uniform-sized ocean freight containers. May use vessel-based or shore-based equipment for loading and discharging of cargo.
- (32) "Government or Military Vessel" means vessels operated by any branch of local, state, federal government military service, or by a foreign government, when such vessels are operated on government or military non-commercial service. This definition includes Coast Guard vessels. A commercial vessel that also carries some military cargo is not a government or military vessel unless the military is the vessel operator.
- (33) "Greenhouse Gas" (GHG) means carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrogen trifluoride (NF<sub>3</sub>), nitrous oxide (N<sub>2</sub>O), sulfur hexafluoride (SF<sub>6</sub>), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and other fluorinated greenhouse gases.
- (34) "Grid-neutral" means emitting no more GHG emissions than if the strategy were powered by the California grid as represented in the most recent eGRID Summary Table for State Output Emission Rates as the California CO<sub>2</sub>e emissions rate.
- (35) "Independent Marine Terminal" means a terminal that operates independently from a port or port authority. An Independent Marine Terminal has all the responsibilities of a terminal and a port.
- (36) "Last line" means when the time when the vessel is untied from the berth and the last line from the berth to the vessel is released.
- (37) "Lease" means a contract where one person conveys property or services to another person for a specific duration.
- (38) "Low Activity Terminal" means a terminal that has not previously exceeded the terminal thresholds in section 93130.10(a) of this Control Measure.
- (39) "Marine Gas Oil (MGO)" means any fuel that meets all the specifications for DMX or DMA grades as defined in Table I of International Standard ISO 8217, as revised on November 1, 2005, which is incorporated herein by reference, or DMX, DMA, or DMZ grades as defined in Table I of International Standard ISO 8217, as revised on June 15, 2010, which is incorporated herein by reference.
- (40) "Master" means the person who operates an ocean-going vessel or is otherwise in charge of the vessel's operations.
- (41) "Malfunction" means any sudden and unavoidable failure to operate in a normal manner by air pollution control equipment that is not caused in any way by poor maintenance, negligent operation, or any other reasonably preventable upset condition or equipment breakdown.

- (42) “Ocean-Going Vessel” means a commercial, government, or military vessel, excluding articulated tug barges, meeting any of these criteria:
- (A) A vessel greater than or equal to 400 feet in length overall as defined in 50 CFR § 679.2, as adopted June 19, 1996;
  - (B) A vessel greater than or equal to 10,000 gross tons under the convention measurement (international system) as defined in 46 CFR § 69.51-.61, as adopted September 12, 1989; or
  - (C) A vessel propelled by a marine compression ignition engine with a per-cylinder displacement of greater than or equal to 30 liters.
- (43) “Own” means having the incidents of ownership, including the legal title whether or not that person lends, or pledges an item; having or being entitled to the possession of the item as the purchaser under a conditional sale contract; or being the mortgagor of an item.
- (44) “Oxides of Nitrogen (NO<sub>x</sub>)” means compounds of nitric oxide (NO), nitrogen dioxide (NO<sub>2</sub>), and other oxides of nitrogen, which are typically created during combustion processes and are major contributors to smog formation and acid deposition.
- (45) “Particulate Matter (PM)” means any airborne finely divided material, except uncombined water, which exists as a liquid or solid at standard conditions (e.g., dust, smoke, mist, fumes, or smog).
- (46) “Particulate Matter 2.5 (PM<sub>2.5</sub>)” means any particulate matter with a diameter of less than 2.5 micrometers.
- (47) “Passenger Vessel” means a self-propelled vessel constructed or adapted primarily to carry people.
- (48) “Person” has the same meaning as set California Code, Health and Safety Code section 39047.
- (49) “Physical Constraint” at a terminal means an unavoidable barrier to provide a service due to the layout of a terminal or waterway where a state or federal public agency with jurisdiction over the resources effected by this Control Measure has made a safety determination that prevents the use of a CARB approved control strategy.
- (50) “Pilot on Board” means the vessel’s pilot has boarded the vessel to assume navigational control to prepare for vessel departure.
- (51) “Port” see California Port.
- (52) “Previously Unregulated Vessels” means container, refrigerated cargo, or passenger vessels that were part of a fleet before January 1, 2021 where the fleet did not exceed the annual visit thresholds specified in California Code of Regulations, title 17, section 93118.(b)(3)(E) for any year between 2014 and 2020 or the vessel is a steamship.

- (53) “Privately Owned United States Flag Commercial Vessel” means a vessel:
- (A) registered and operated under the laws of the United States,
  - (B) used in commercial trade of the United States,
  - (C) owned and operated by United States citizens, including a vessel under voyage or time charter to the Government, and
  - (D) a Government-owned vessel under bareboat charter to, and operated by, United States citizens.
- (54) “Reactive Organic Gases (ROG)” has the same meaning as set forth in subsection (a)(23) of section 2752 of title 13 of the California Code of Regulations.
- (55) “Ready to Work” means that the vessel is tied to the berth, the gangway has been lowered with netting down, and the United States Coast Guard, United States Customs and Border Protection, and other government authorities have cleared the vessel.
- (56) “Refrigerated Cargo Vessel” (commonly known as “reefer”) means a self-propelled vessel constructed or adapted primarily to carry refrigerated cargo. Refrigerated cargo vessels include vessels where the cargo may be stored in large refrigerated rooms within the vessel or vessels that primarily carry refrigerated cargo containers.
- (57) “Regulated California Waters” means any and all of the following:
- (A) All California internal waters;
  - (B) All California estuarine waters;
  - (C) All California ports, roadsteads, and terminal facilities (collectively “ports”);
  - (D) All waters within 3 nautical miles of the California baseline, starting at the California-Oregon border and ending at the California-Mexico border at the Pacific Ocean, inclusive;
  - (E) All waters within 12 nautical miles of the California baseline, starting at the California-Oregon border and ending at the California-Mexico border at the Pacific Ocean, inclusive;
  - (F) All waters within 24 nautical miles of the California baseline, starting at the California-Oregon border to 34.43 degrees North, 121.12 degrees West; inclusive; and
  - (G) All waters within the area, not including any islands, between the California baseline and a line starting at 34.43 degrees North, 121.12 degrees West; thence to 33.50 degrees North, 118.58 degrees West; thence to 32.65 degrees North, 117.81 degrees West; and ending at the California-Mexico border at the Pacific Ocean, inclusive.

- (58) "Remediation Fund" means an account established by a CARB-approved fund administrator under the terms of a Memorandum of Understanding with CARB to provide incentive monies to activities that achieve emission reductions, not otherwise required by law or regulation, in communities impacted by excess emissions from vessels at berth.
- (59) "Responsible Official" means any person(s) with the authority to determine the existence of emergency and safety events, and to substantiate that a vessel, terminal, port, or control equipment complies with requirements of this Control Measure.
- (60) "Responsible Party" means any person with an obligation under this Control Measure.
- (61) "Roll-On/Roll-Off Vessel" (commonly known as "ro-ro", "auto", or "vehicle carrier") means a self-propelled vessel constructed or adapted primarily to carry wheeled cargo that can be rolled on and off. Ro-ro vessels may carry exclusively automobiles (commonly known as a "pure car carrier") and/or a mixture of bulk equipment on wheels.
- (62) "Safety and Emergency Events" means an event where a responsible official reasonably determines that compliance with this Control Measure would endanger the safety of the vessel, crew, cargo, passengers, terminal, or terminal staff because of severe weather conditions, a utility event, or other extraordinary reasons beyond the control of the terminal operator or vessel operator.
- (63) "Selective Catalytic Reduction (SCR)" means an emission control system that reduces NOx emissions through the catalytic reduction of NOx in diesel exhaust by injecting nitrogen-containing compounds into the exhaust stream, such as ammonia or urea.
- (64) "Shore Power" refers to electrical power being provided by either the local utility or by distributed generation to a vessel at berth.
- (65) "Tanker Auxiliary Boiler" means a steam generator on a tanker vessel used to offload liquid product.
- (66) "Tanker Vessel" means a self-propelled vessel constructed or adapted primarily to carry liquid bulk cargo. Tanker vessels may carry petroleum crude, petroleum products, or non-petroleum based products, and are classified as either non-edible and dangerous or edible and non-dangerous.
- (67) "Terminal" means a terminal operator's facility consisting of adjacent wharves, piers, docks, other berthing locations and storage, which are used primarily for loading and unloading of passengers, cargo or material from vessels or for the temporary storage of this cargo or material on-site. Operational ports that rent a berth to vessel operators rather than lease to terminal operators shall treat that berth as a terminal.

- (68) “Terminal Incident Event (TIE)” is an exception provided to terminal operators to allow for a limited number of incidents where a vessel does not reduce emissions as required during a visit.
- (69) “Terminal Operator” means a person who leases terminal property from a port to load and unload passengers, cargo or material from vessels or for the temporary storage of this cargo or material on-site. Operational ports that use a single berth to service an individual customer are the terminal operator and the customer’s berth is a terminal.
- (70) “This Control Measure” means the Control Measure for Ocean-Going Vessels At Berth, California Code of Regulations, title 17, sections 93130-93130.20.
- (71) “Utility” shall have the same meaning and be used interchangeably with the term “Electric Utility” and means any person engage in or, or authorized to engage in, generating, transmitting, or distributing electric power by any facilities, including, but not limited to, any such person who is subject to the regulation of the Public Utilities Commission. Pub. Resource Code, section 25108 as it read on January 7, 1975.
- (72) “Utility Event” means the period of time during which any of the following events occurs; the utility event begins when such an event begins and ends when the event is over:
- (A) The utility serving the port or terminal cannot provide electrical power to the port because of a failure of equipment owned and maintained by the utility, a transmission emergency, distribution emergency, a California Independent System Operator (CAISO) or Los Angeles Department of Water and Power (LADWP) Stage 3 emergency, or the utility needs to reduce power to the port and/or terminal because of a sudden and reasonably unforeseeable natural disaster, such as, but not limited to, an earthquake, flood, or fire; or
  - (B) When the utility providing electrical power notifies the terminal operator(s) to reduce the use of grid-based electrical power in response to a transmission or distribution emergency, a CAISO or LADWP Stage 3 emergency, or to avoid a Stage 3 emergency if one is anticipated. The emergency event ends when CAISO or LADWP cancels the Stage 3 emergency or the utility notifies the terminal operator(s) that reduction in the use of grid-based electrical power is no longer necessary. The port may contact the terminal operator(s) on behalf of the utility if such an agreement exists between the utility and the port.
- (73) “United States flag Vessel” when used independently means either a United States government vessel or a privately owned United States flag commercial vessel.

- (74) “Vessel” means watercraft used, or capable of being used, as a means of transportation. For the purposes of this Control Measure, “vessel” is used interchangeably with the term “ocean-going vessel.”
- (75) “Vessel Arrival” means the date and time that a vessel is initially tied to a berth with first line.
- (76) “Vessel Commissioning” means the process undertaken by the vessel operator and terminal operator to ensure that the shore power equipment on the vessel is compatible with the shore power equipment on the terminal and that there are no safety issues for both the equipment and the personnel handling the connection.
- (77) “Vessel Departure” means the date and time that the a vessel casts off the last line.
- (78) “Vessel Incident Event (VIE)” is an exception provided to vessel fleets to allow for a limited number of incidents where a vessel operator does not reduce emissions as required during a vessel visit.
- (79) “Vessel Operator” means any person who decides where a vessel is to call or who is in direct control of the vessel. The party in direct control of the vessel may be a third-party hired to carry cargo or passengers for the person under a charter agreement to operate the vessel. Direct control does not include the vessel master or any other member of the vessel crew, unless the vessel master or crew member is also the owner of the vessel or decides where a vessel is to call.
- (80) “Vessel Owner” means any party with an ownership interest in the vessel. The owner may be an individual or multiple parties.
- (81) “Vessel Type” means a categorization of ocean-going vessels distinguished by the main cargo the vessel carries into the following types: bulk/general cargo, container, passenger, refrigerated cargo, ro-ro, and tanker vessels.
- (82) “Visible Emissions” means any particulate or gaseous matter which can be detected by the human eye.
- (83) “Visit” means the time period from when the vessel is “Ready to Work” to “Pilot on Board”.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

### **Section 93130.3 Applicability.**

- (a) General applicability.

Except as provided in section 93130.4 Exceptions, this Control Measure applies to:

- (1) any person who owns, operates, charters, or leases any United States or foreign-flag ocean-going vessel that visits a California port, terminal, or berth;
- (2) any person who owns, operates, or leases a port, terminal, or berth located where ocean-going vessels visit; and
- (3) any person who owns, operates, or leases CARB approved emission control strategy for ocean-going vessel auxiliary engines or tanker auxiliary boilers.

All responsible parties may be held jointly and severally liable.

(b) Federal requirements.

Nothing in this Control Measure shall be construed to amend, repeal, modify, or change any applicable federal regulations, including any United States Coast Guard regulations or requirements. Any person subject to this Control Measure shall ensure compliance with both federal regulations (including any United States Coast Guard regulations) and the requirements of this Control Measure, including but not limited to, where applicable, obtaining any necessary approvals, exceptions, or orders from the United States Coast Guard. To the extent any requirements in this Control Measure conflict with any applicable federal regulation, the requirements of the federal regulation shall prevail.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

#### **Section 93130.4 Exceptions.**

The requirements of this Control Measure do not apply to:

(a) Non-stop voyages.

- (1) Ocean-going vessel voyages that do not stop at a California port, terminal, or berth including:
  - (A) Stopping and anchoring required by the United States Coast Guard;
  - (B) Stopping necessary due to force majeure or distress as defined in the "Responsibility of States for Internationally Wrongful Acts (2001)", which is incorporated herein by reference; or
  - (C) A stop made solely to render assistance to persons, vessel, or aircraft in danger or distress.
- (2) The following voyages are considered a "stop" and do not qualify for the exemption:

- (A) Innocent passage of an ocean-going vessel that engages in any of the prejudicial activities specified in United Nations Convention on the Law of the Seas 1982, Article 19, subpart 2 as it read on November 16, 1994; or
- (B) The passage of vessel(s) that are otherwise scheduled or intended to call at a port or terminal facility for any reasons other than the three enumerated reasons listed in subsection (a)(1).

(b) Government and military vessels.

The requirements of this Control Measure do not apply to government or military vessels. However, government or military vessels are encouraged to act in a manner consistent, as far as is reasonable and practicable, with this section.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

**Section 93130.5 CARB Approved Emission Control Strategy.**

(a) Executive Order requirement.

No person may operate an emissions control strategy, other than shore power, at a port or terminal for compliance with this Control Measure unless it receives approval by CARB through an Executive Order. The Executive Order shall provide compliance instructions for each emission control strategy and include requirements that each responsible party must follow in order to use that strategy.

(b) Requirement to reduce emissions.

The emission control strategy must reduce emissions for vessel visits, unless:

- (1) The visit is subject to an exception in sections 93130.4, 93130.8, or 93130.10 of this Control Measure; or
- (2) The person uses a TIE or a VIE for the visit as provided in section 93130.11 of this Control Measure; or
- (3) The person pays the remediation fund payments for the visit or portion of a visit as provided in section 93130.15 of this Control Measure; or-
- (3)(4) The person has implemented emission reductions as provided in sections 93130.5(d)(7).

(c) Shore power.

Shore power is a CARB approved emission control strategy. If distributed generation is used to supply shore power, the electricity generated must meet the following emissions standards:

- (1) NOx emissions no greater than 0.03 gram per kilowatt-hour (g/kW-hr);
- (2) PM emissions equivalent to the combustion of natural gas with a fuel sulfur content of no more than 1 grain per 100 standard cubic foot
- (3) Distributed generation GHG emissions must be grid-neutral; and
- (4) Ammonia emissions no greater than five parts per million on a dry volume basis (ppmdv), if selective catalytic reduction (SCR) is used.

(d) Requirements for CARB approval of an emission control strategy.

(1) Emission Reductions

Except as provided in Section 95130.5(d)(7), Fto receive CARB approval, a person must demonstrate that the emission controls strategy achieves emission rates less than 2.8 g/kW-hr for NOx, 0.03 g/kW-hr for PM2.5, and 0.1 g/kW-hr for ROG for auxiliary engines. Additionally, for strategies approved after 2020, GHG emissions from the strategy must be grid-neutral for the year that the technology is granted an Executive Order. Default emission rates of auxiliary engines on ocean-going vessels are 13.8 g/kW-hr for NOx, 0.17 g/kW-hr for PM2.5, and 0.52 g/kW-hr for ROG.

(2) Tanker Vessels.

Except as provided in 95130.5(d)(7), Ffor tanker vessels with steam driven pumps, unless the tanker is using shore power to reduce emissions from auxiliary engines, a person must demonstrate that the CARB approved emission control strategy achieves emission rates less than 0.4 g/kW-hr for NOx, 0.03 g/kW-hr for PM2.5, and 0.02 g/kW-hr for ROG for tanker auxiliary boilers. Default emission rates of tanker auxiliary boilers on ocean-going vessels are 2.0 g/kW-hr for NOx, 0.17 g/kW-hr for PM2.5, and 0.11 g/kW-hr for ROG

(3) Already approved strategies

Where CARB has already issued an Executive Order for strategies under California Code of Regulations, title 17, section 93118 (e)(4), these are approved as a CARB approved emission control strategy. These strategies can operate under their Executive Order until 2025 before a person needs to apply for an extension in section 93130.5 (i)(1) of this Control Measure and demonstrate the strategies ability to meet all the requirements of this section including being grid neutral.

(4) SCR Strategy

Emission control strategy utilizing SCR shall have ammonia slip no greater than 5 ppmdv, and shall continuously test ammonia slip and NOx

(5) Warranty

The applicant must provide a warranty that meets the following:

- (A) The manufacturer of each emission control strategy shall warrant for 10 years when a unit is purchased that the strategy is:
    - i. Designed, built, and equipped to conform, at the time of sale, with this Control Measure; and
    - ii. Free from defects in materials and workmanship which cause the failure of a warranted part to no longer be identical in all material respects to that part as described in the manufacturer's application for certification.
  - (B) The applicant of the emission control strategy system shall provide the end user with maintenance practices set forth by the manufacturer.
- (6) When a person sells or leases a unit, the person must conduct in-use compliance testing of the strategy to demonstrate that the expected percentage of emissions reductions being achieved. The person must report the results to the Executive Officer within 30 days. If testing shows the unit does not meet the emission requirements set forth in section 93130.5 (d)(1) the unit cannot be used to satisfy the emission requirements of this regulation.

#### (7) Alternative Emission Reduction Strategy

(a) As an alternative to meeting the requirements in subsections (d)(1) and (d)(2) above, upon approval of the Executive Officer, a person subject to the requirements of this section may apply for and implement an Alternative Emission Reduction Strategy. At a minimum, the Alternative Emission Reduction Strategy must contain provisions meeting the following requirements:

- i. By no later than the compliance dates in section 95130.7(b) and 95130.7(c), the applicant shall fully implement measures to reduce NOx, ROG and PM2.5 emissions from vessels operating in Regulated California Waters and/or from onshore sources with emissions originating within 5 miles of the port or terminal.
- ii. The NOx, ROG and PM2.5 emission reductions achieved under the Alternative Emission Reduction Strategy shall be calculated as the difference between baseline year mass emissions of NOx, ROG and PM2.5 from the applicant's sources covered in the Strategy, and emissions that would have occurred from those same sources in that baseline year emissions if the Alternative Emission Reduction Strategy had been in place that year. The baseline year shall be based on best available emissions data from 2016 or a representative alternative year, subject to approval by the Executive Officer.

iii. The NOx, ROG and PM2.5 emission reductions to be achieved under the Alternative Emission Reduction Strategy must achieve either (1) no less than an 80% reduction versus baseline year emissions, or (2) reductions no less than the difference between the applicant's at-berth vessel emissions in the baseline year and at-berth vessel emissions that would have been realized that same baseline year if the applicant had met the NOx, ROG and PM2.5 emission rates in subsections (d)(1) and (d)(2).

iv. All emissions reductions to be achieved by the Alternative Emission Reduction Strategy must be real, permanent, quantifiable, enforceable and surplus to any NOx, ROG and PM2.5 reductions already required by existing U.S. law or regulation in effect as of December 31, 2016.

(e) Application process.

- (1) Before submitting an application requesting approval from CARB for an emission control strategy, an applicant shall submit a test plan to the Executive Officer for conducting the emissions reduction testing, durability testing, and a timeline for testing.
- (2) The applicant shall submit an application that includes all source test data only after the applicant receives CARB approval for the test plan.
- (3) If the Executive Officer approves of the application, the applicant's strategy will be considered a "CARB approved emission control strategy" and shall become a compliance option for the type(s) of vessel visits for which the emission control strategy is approved, when used in a manner that is consistent in accordance with all the conditions of the approval.

(f) Test plan requirements.

- (1) A test plan shall include:
  - (A) The contact persons, phone numbers, names, and addresses of person submitting the test plan.
  - (B) Description of the emission control strategy's principles of operation. A schematic depiction of the components and operation must be included. It is the responsibility of the applicant to demonstrate that the qualifying strategy relies on sound principles of science and engineering to achieve emission reductions.
  - (C) Description of testing to be conducted to demonstrate emission reductions and durability.

- (D) Timeline for all emissions reduction testing and durability testing, including an estimate for the testing's duration and the number of vessel visits needed to complete proposed testing.

(2) Durability.

The applicant of an emission control strategy shall demonstrate, to the satisfaction of the Executive Officer, the durability of the applicant's emission control strategy through an actual field demonstration. If the applicant has demonstrated the durability of the equipment (identical in design and components) in a prior verification or has demonstrated durability through field experience, the applicant may request that the Executive Officer accept the previous demonstration in fulfillment of this requirement. In evaluating such a request, the Executive Officer may consider all relevant information including, but not limited to, the similarity of baseline emissions and application duty cycles, the relationship between the emission control group used in previous testing and the current emission control group, the number of engines tested, evidence of successful operation and user acceptance, and published reports.

(3) Test plan disapproval.

If, after reviewing the test plan, the Executive Officer determines that the applicant has not made a satisfactory demonstration that its strategy relies on sound principles of science and engineering to achieve emission reductions at the rates required for certification or if the test plan is incomplete, the Executive Officer shall notify the applicant of the disapproval in writing within 30 calendar days of receiving the test plan. The applicant may choose to withdraw from the application process or submit additional materials and clarifications.

(4) Test plan approval.

Within 45 calendar days after determining the test plan is satisfactory, the Executive Officer shall issue a test plan approval letter to the applicant.

(g) Source testing.

A person shall use source testing to demonstrate that a proposed emission control strategy achieves the performance standards in section 93130.5-(d) of this Control Measure. Testing must be done by certified third party source testers specified in the test plan. Alternative test methods or emission verifications may be used when specified in the test plan upon written approval from the Executive Officer. The following requirements shall apply to source testing conducted under this Control Measure, unless the Executive Officer has provided written approval of alternative applicable test methods or emission verifications specified in the test plan:

- (1) NO<sub>x</sub>, N<sub>2</sub>O, CO<sub>2</sub>, CO, CH<sub>4</sub>, and Diesel PM or PM<sub>10</sub>, shall be measured using ISO 8178 Test Procedures: ISO 8178-1: August 15, 1996(E) ("ISO 8178 Part 1"); ISO 8178-2: August 15, 1996(E) ("ISO 8178 Part 2"); and ISO 8178-4: August 15, 1996(E)

(“ISO 8178 Part 4” August 15, 1996), respectively, all of which are incorporated herein by reference;

- (2) PM<sub>2.5</sub> is calculated using the factor of weight fraction of PM<sub>2.5</sub>/TPM based on CARBs speciation data for PM size fractions (“PMPROF REF (Excel) - Reference number for PM profiles,” July 8, 2019, incorporated herein by reference). For MGO, the factor is 0.92;
  - (3) ROG shall be calculated as a fraction of the TOG, set forth in CARB’s Off-Road Diesel HC to Rog/Tog Ratio (“FRAC (Excel) - Fraction data for source categories,” February 21, 2019, incorporated herein by reference). For MGO, the factor is 0.856 for internal combustion engines and 0.946 for boilers. TOG shall be measured using Method 25A (40 CFR Pt. 60, App. A-7, Method 25A, December 23, 1971), which is incorporated herein by reference;
  - (4) CO<sub>2</sub>E for a control system shall be calculated as follows  $\text{lbs CO}_2\text{E} = (\text{lbs CO}_2 + 25 * \text{lbs CH}_4 + 298 * \text{lbs N}_2\text{O})$ . CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O shall be measured before and after the control strategy, and include any uncontrolled auxiliary sources for the control strategy using the test methods specified in section 93130.5(g)(1) and 93130.5(g)(3) in this Control Measure. Strategies that use a fuel with a CARB Low Carbon Fuel Standard certified pathway may apply a reduction to CO<sub>2</sub>E by the factor of the carbon intensity of the fuel to the carbon intensity of the standard fuel;
  - (5) Grid-neutral shall be determined by calculating the ratio of the CO<sub>2</sub>E to the measured MWh of the control system which value must be lower than the state output emission rate;
  - (6) Ammonia slip shall be measured using the Bay Area Air Quality Management District Source Test Procedure ST-1B, Ammonia Integrated Sampling, dated January 20, 1982, which is incorporated herein by reference, or other equivalent CARB or district approved test method(s);
  - (7) The sulfur content of fuels shall be determined pursuant to International Standard ISO 8754 (as adopted on July 15, 2003), which is incorporated herein by reference;
  - (8) Exhaust Flow Rate shall be measured using CARB Method 100, Procedures for Continuous Gaseous Emission Stack Sampling (as amended July 28, 1997), which is incorporated herein by reference; and
  - (9) Engine Work shall be determined by measuring the total power output in MWh of the control strategy’s generators electrical output during the test periods.
- (h) Application Submittals to CARB.

- (1) All applications, correspondence, and reports relating to source testing shall be submitted to CARB addressed to:  
CHIEF, TRANSPORTATION AND TOXICS DIVISION  
CALIFORNIA AIR RESOURCES BOARD  
1001 I STREET  
SACRAMENTO, CA 95814
  - (2) Verbal submissions do not constitute acceptable application formats.
  - (3) Supporting data in electronic format may be accepted as part of the application at the discretion of the Executive Officer.
  - (4) Applications shall follow the format and include the contents described in CARB's Recommended Emissions Testing Guidelines for Ocean-Going Vessels (dated June 20, 2012), which is incorporated herein by reference.
  - (5) CARB may allow electronic or e-mail submittal with instructions on the CARB website.
  - (6) The Executive Officer shall determine whether the application is complete. If incomplete, the Executive Officer will notify the applicant within 30 calendar days requesting additional information required to complete the application.
- (i) CARB approval of the control strategy.

Within 90 calendar days after an application has been deemed complete, the Executive Officer shall act to approve or disapprove the application. The Executive Officer shall notify the applicant of the decision in writing and identify any terms and conditions that are necessary for any party to use the CARB approved emission control strategy. The approval of an emission control strategy is valid for 5 years, unless it is revoked by CARB as set forth in section 93130.5 (i)(3).

- (1) Extensions of CARB approved emission control strategy.  
If the applicant wishes to extend an approval of a CARB approved emission control strategy, it must apply to do so within 6 months of the end date of the approval to ensure the Executive Order does not lapse. The applicant may apply for an extension by submitting an extension application to the Executive Officer asserting that the strategy has not changed and is still effective, following to the requirements specified in subsection (h) above.
- (2) Modifications to a CARB approved emission control strategy.
  - (A) Proposed modifications to the design or operation of a CARB approved emission control strategy that have any potential to affect the emissions control effectiveness or operational

performance must be reviewed and approved by the Executive Officer before they are implemented.

- (B) Failure to obtain Executive Officer approval before modifying the design or operation of a CARB approved emission control strategy is a violation, and may also be grounds for revocation of CARB's approval, as set forth in subsection 93130.5 (i)(3).
- (C) The applicant shall describe in detail the design modification along with an explanation of how the modification will change the operation and performance of the strategy. The applicant shall submit additional test data, durability data, engineering justification and analysis, or any other information deemed necessary by the Executive Officer to address the differences between the modified and original designs, and to ensure that the strategy's reductions are maintained.
- (D) A modification includes, but is not limited to:
  - i. Any change of materials used in, or specifications of, the control strategy;
  - ii. Any change to the components, component design, composition, materials, or reagent usage;
  - iii. Any change to the sensors, part sizes, or sizing methodology;
  - iv. Any change to the monitoring and notification system control; logic, algorithms, operating parameters; or
  - v. Any proposed change to a portion of the approval.
- (E) The Executive Officer will reissue the approval with updates to reflect the modifications if he or she determines that the modifications have no material effect on the control strategy, or if the modifications are found to affect the control strategy but the strategy's emission reductions still meet the requirements in section 93130.5(d) of this Control Measure.

(3) Revoking a CARB approved emission control strategy.

If an applicant modifies the design or operation of a CARB approved emission control strategy without review and approval pursuant to subsection (2) above, the Executive Officer may revoke its approval of the emission control strategy. To resume compliance using the strategy, the applicant must re-submit an application and receive a new approval.

(j) Review of CARB approved emission control strategy.

- (1) At a minimum, emission control technologies shall be tested annually to demonstrate that the expected percentage of emissions reductions being achieved.

- (2) The applicant shall provide the results of such testing to the Executive Officer by December 31, annually.
- (3) The Executive Officer may modify the testing frequency as he or she deems appropriate.
- (4) The Executive Officer may request that the owner or operator of a CARB approved emission control strategy conduct periodic emission source testing or other types of monitoring to verify the proper operation of alternative control technologies or distributed generation equipment, or to verify the emission rate of an auxiliary engine.

(k) Records Retention

- (1) Records made pursuant to Section 93130.5 shall be kept for a minimum of five years. This information shall be supplied to the Executive Officer within 30 days of a request from CARB staff.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

**Section 93130.6 Opacity Requirement.**

- (a) No person shall discharge or cause the discharge from any ocean-going vessel at berth and at anchor, into the atmosphere, any visible emissions of any air pollutant, for a period of periods aggregating three minutes in any 1 hour from any operation on the vessel that is:
  - (1) As dark as the Ringelmann 2, as published by the United States Bureau of Mines (May 1967), which is incorporated by reference; or
  - (2) Of such opacity as to obscure an observer's view to a degree equal to or greater than the Ringelmann 2.
- (b) The California time aggregate method and the United States Environmental Protection Agency Opacity Test Method 9 (40 CFR Pt. 60, App. A-4, December 23, 2017), which is incorporated herein by reference will be used to analyze the readings to determine compliance.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510, 41511, and 41701, Health and Safety Code.

**Section 93130.7. Vessel Operator Requirements.**

Vessel operators that visit a berth or terminal in California shall meet the following requirements, [except as provided in section 95130.5\(d\)\(7\)](#). Any failure to perform any specific items in this section shall constitute a separate violation for each day that the failure occurs.

- (a) Shore power requirements for at berth emission reductions.

**Vessel** operators with commissioned shore power vessels shall plug in to shore power on each and every visit to a compatible shore power berth.

(b) Requirements for vessel auxiliary engines.

Vessel operators shall reduce auxiliary engine emissions to the performance standards set forth in section 93130.5(d)(1) of this Control Measure through use of a CARB approved emission control strategy while at berth by the date specified for each vessel type in this section unless the visit qualifies for an exception identified in sections 93130.4, 93130.8, or 93130.10 of this Control Measure. A summary of responsibilities is provided in section 93130.17 of this Control Measure.

<b>Table 1: Compliance Start Dates by Vessel Type</b>	
<b>January 1, 2021</b>	Container and refrigerated cargo vessels
<b>January 1, 2021</b>	Passenger vessels
<b>January 1, 2025</b>	Roll-on roll-off vessels
<b>January 1, 2027</b>	Tanker vessels that visit the ports of Los Angeles or Long Beach
<b>January 1, 2029</b>	All remaining tanker vessels

(c) Requirements for tanker auxiliary boilers on tanker vessels with steam driven product pumps.

Vessel operators shall reduce boiler emissions to the performance standards set forth in section 93130.5(d)(2) of this Control Measure through use of a CARB approved emission control strategy while at berth by the date specified for each vessel type in this section unless the visit qualifies for an exceptions identified in sections 93130.4, 93130.8, or 93130.10 of this Control Measure. A summary of responsibilities is provided in section 93130.17 of this Control Measure.

<b>Table 2: Compliance Start Dates for Tanker Vessels with Steam Driven Product Pumps</b>	
<b>January 1, 2027</b>	Tanker vessels with steam driven product pumps that visit the ports of Los Angeles or Long Beach
<b>January 1, 2029</b>	All remaining tanker vessels with steam driven product pumps

(d) Visits by vessels with on-board control strategies.

If the CARB approved emission control strategy is operated solely on the vessel, vessel operators shall confirm in writing with terminal operator that the equipment is operational and will be used, prior to the vessel’s arrival at a California berth.

(e) Vessel compliance checklists.

Vessel operators shall complete all items in the checklist to ensure compliance under the Control Measure:

- (1) At least 7 calendar days before arrival, the vessel operator shall communicate in writing with the terminal operator and operator of the CARB approved emission control strategy to coordinate the use of a CARB approved emission control strategy and do all of the following if the vessel operator is using a CARB approved emission control strategy:
  - (A) Request use of a CARB approved emission control strategy; and
  - (B) Supply the terminal operator and the operator of the CARB approved emission control strategy with information about the compatibility of the vessel with the intended CARB approved emission control strategy.
- (2) Ensure the vessel is commissioned as required by the terminal operator.
- (3) Use shore power or another CARB approved emission control strategy during the vessel visit.
  - (A) Begin using shore power or another CARB approved emission control strategy within 1 hour after “Ready to Work”.
  - (B) Cease using shore power or another CARB approved emission control strategy no sooner than 1 hour before “Pilot on Board.”
- (4) Report the following visit information to CARB electronically within 7 calendar days of departure, using local time for all dates and times:
  - (A) Vessel name;
  - (B) Vessel IMO number;
  - (C) Vessel type;
  - (D) Vessel operator contact information, including fleet, name, address, email address, and telephone number;
  - (E) Port, terminal, and berth visited;
  - (F) Vessel arrival time and vessel departure time;
  - (G) Vessel shift to another berth (must be reported as a separate visit), where applicable;
  - (H) Type of CARB approved emission control strategy used, where applicable;
  - (I) Date and time when vessel declared as “Ready to Work”;

- (J) date and time when a CARB approved emission control strategy is begins reducing emissions and date and time when a CARB approved emission control strategy stops reducing emissions, where applicable;
  - (K) Type of fuel used in auxiliary engine(s) and auxiliary boiler(s);
  - (L) Sulfur content of fuel used in auxiliary engine(s) and auxiliary boiler(s), where applicable;
  - (M) Amount of fuel used in auxiliary engine(s) and boiler(s), during vessel visit, where applicable;
  - (N) Date and time pilot on-board in preparation for departure;
  - (O) Information specified in the approved compliance strategy's Executive Order compliance instructions;
  - (P) Information if a vessel uses an exception, including the type of exception, a detailed description, including dates and times, and any relevant correspondence (e.g. emails) documenting the visit exception;
  - (Q) Information if a vessel uses the remediation fund, including detailed description of the allowed circumstance outlined in section 93130.15 of this Control Measure, the number of days/hours the event took place, and the tier rating of the auxiliary engine; and
  - (R) Information if a TIE or VIE is used for the visit including the person who authorized the use of the TIE or VIE.
- (f) Send accurate and complete reporting to CARB.
- (1) Vessel compliance information submitted to CARB shall:
    - (A) Be written in the English language;
    - (B) Attest that the information submitted is true, accurate and complete, signed by the Responsible Official under penalty of perjury; and
    - (C) Be submitted to CARB in writing to:
 

CHIEF, TRANSPORTATION AND TOXICS DIVISION  
CALIFORNIA AIR RESOURCES BOARD  
1001 I STREET  
SACRAMENTO, CA 95814
  - (2) CARB may also allow online submittal to a CARB reporting system or e-mail with instructions on the CARB website.
- (g) Records Retention

- (1) Records made pursuant to Section 93130.7 shall be kept for a minimum of five years. This information shall be supplied to the Executive Officer within 30 days of a request from CARB staff.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

### **Section 93130.8 Vessel Visit Exceptions.**

Vessel operators are exempt from the operational requirements in section 93130.7 of this Control Measure if any of the following occurs.

- (a) Vessel safety and emergency events.

The emission reduction requirements of section 93130.7 and section 93130.9 of this Control Measure do not apply during a portion of the visit that a responsible official reasonably determines that compliance with section 93130.7 would endanger the safety of the vessel, its crew, its cargo or its passengers because of severe weather conditions, a utility event or other extraordinary reasons beyond the master's reasonable control. All safety and emergency events are subject to review and audit by the Executive Officer. This exception applies if approved and only as long as the event occurs and only to the extent necessary to secure the safety of the vessel, its crew, its cargo, or its passengers and provided that the master:

- (1) Take all reasonable precautions after the conditions necessitating the exception have ended to avoid or minimize repeated claims of exception under this subsection; and
- (2) Include with the reporting requirement of section 93130.7(e)(4) of this Control Measure all documentation necessary to establish the conditions necessitating the safety exception and the date(s), local time, and location. All required documentation must be in the English language.

- (b) Bulk and general cargo vessels.

Bulk and general cargo vessels are not subject to the vessel auxiliary engine requirements in sections 93130.7(b) of this Control Measure, and are only required to report their vessel visit activity under section 93130.7(e)(4) of this Control Measure starting January 1, 2021.

- (c) Vessel commissioning.

The first vessel commissioning visit made by a vessel to a terminal may be an exception as long as the vessel was able to successfully connect to shore power during that visit. Documentation of a successful vessel commissioning

must be submitted with the vessel visit reporting requirements of section 93130.7(e)(4) of this Control Measure. Additional vessel commissioning visits may qualify for exception if approved by CARB in writing where the vessel operator demonstrates:

- (1) The commissioning process could not be accomplished in a single visit; or
  - (2) The terminal requires that the vessel be recommissioned.
- (d) Research.

Vessel visits that participate in testing of an alternative technology may be an exception provided that the vessel operator:

- (1) Receives a CARB approved test plan for the alternative technology prior to arrival;
  - (2) Participates in testing in accordance with the approved test plan;
  - (3) Keeps a copy of the approved test plan on the vessel at all times;
  - (4) Provides a copy of the approved test plan to CARB staff upon request; and
  - (5) Reports all information including the use of the research exception pursuant to section 93130.7(e)(4) of this Control Measure.
- (e) Previously unregulated vessels.
- (1) Until January 1, 2023, previously unregulated vessels are not subject to the vessel auxiliary engine requirements in sections 93130.7(b) of this Control Measure.
  - (2) Vessel operators are required to report their vessel visit activity under section 93130.7(e)(4) of this Control Measure.
- (f) Vessels visiting a low activity terminal.
- (1) The specific requirements for vessel categories in section 93130.7 and section 93130.9 of this Control Measure do not apply to vessel visits to low activity terminals as specified in section 93130.10(a) of this Control Measure.
  - (2) Vessel operators are required to report their vessel visit activity under section 93130.7(e)(4) of this Control Measure starting on January 1, 2021.
- (g) Vessel incident event (VIE) and terminal incident event (TIE).
- (1) The requirements of section 93130.7 and 93130.9 of this Control Measure do not apply during a visit if the fleet operator uses a VIE or terminal operator uses a TIE as specified in section 93130.11 of this Control Measure.

- (2) Vessel operators are required to report their vessel visit activity under section 93130.7(e)(4) of this Control Measure.
- (h) Remediation.
  - (1) The requirements of this Control Measure do not apply during a visit that qualifies and uses the remediation fund option in section 93130.15 of this Control Measure.
  - (2) Vessel operators are required to report their vessel visit activity under section 93130.7(e)(4) of this Control Measure.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

### **Section 93130.9 Terminal Operator Requirements.**

Terminal operators that receive ocean-going vessels in California shall meet the following requirements, [except as provided in section 95130.5\(d\)\(7\)](#). Any failure to perform any specific items in this section shall constitute a separate violation for each day that the failure occurs.

- (a) Shore power requirements for at berth emission reductions.
  - (1) Operators of terminals with berths equipped to receive compatible shore power vessels must connect these vessels to shore power when visited by a commissioned shore power vessel.
  - (2) The terminal operator is responsible for commissioning vessels equipped with compatible shore power.
  - (3) If the commissioned shore power vessel is berthed in a way that prevents it from connecting to shore power, the terminal may use a TIE or must provide an alternative CARB approved emission control strategy compatible with the vessel.
- (b) Visits to terminals without shore power.

Terminals without shore power are responsible for arranging a CARB approved emission control strategy for each visit by vessels with requirements for auxiliary engines or tanker auxiliary boilers in section 93130.7 (b) or 93130.7 (c) of this Control Measure. If neither the vessel nor the terminal has shore power, then it is the shared responsibility of both parties to arrange a CARB approved emission control strategy for this visit.

- (c) Visits by vessels with on-board control strategies.

If the CARB approved emission control strategy is operated solely on the vessel, terminal operators are required to confirm with vessel operators that the equipment is operational and will be used, prior to the vessel's arrival at a California berth.

(d) Terminal operator compliance checklist.

Terminal operators shall complete the following items in this checklist to ensure compliance under the Control Measure:

- (1) At least 7 calendar days before arrival, the terminal operator shall communicate with the vessel operator and operator of the CARB approved emission control strategy in writing to coordinate the use of a CARB approved emission control strategy. If the vessel operator is using a CARB approved emission control strategy, the terminal operator shall supply the vessel operator with information about the terminal's compatibility with the intended CARB approved emission control strategy.
- (2) For shore power:
  - (A) Ensure shore power vessels are commissioned for shore power at the terminal they are visiting or notify vessel operator if commissioning is required.
  - (B) Position vessel appropriately to enable use of shore power or the CARB approved emission control strategy.
  - (C) Record power meter reading before starting shore power;
  - (D) Plug in vessel within 1 hour of vessel "Ready to Work";
  - (E) Disconnect shore power no more than 1 hour before "Pilot on Board"; and
  - (F) Record power meter reading after disconnecting from shore power.
- (3) Report the following vessel visit information within 7 calendar days of the vessel's departure, using local time for all dates and times:
  - (A) Vessel name;
  - (B) Vessel IMO number;
  - (C) Port, terminal and berth visited;
  - (D) Terminal operator contact information, including name, address, email address, and telephone number;
  - (E) Arrival date and time;
  - (F) Departure date and time;
  - (G) CARB approved emission control strategy used;
  - (H) If CARB approved emission control strategy was provided by the terminal, or terminal and vessel shared arrangement responsibility, start and end date and time of emission control;

- (I) For shore power visits, the terminal must report the power meter readings at the time of shore power connection and after disconnection;
  - (J) Information specified in the approved compliance strategy's compliance instructions;
  - (K) Information relating to any exception claimed by the terminal during the visit, including a detailed description of the exception and documentation detailing the exception, and any relevant correspondence (e.g. emails) documenting the visit exception;
  - (L) Information if a terminal uses the remediation fund, including detailed description of the allowed circumstance outlined in section 93130.15 of this Control Measure, the number of days/hours the event took place, and the tier rating of the vessel's engine; and
  - (M) Information if a TIE or VIE is used for the visit including the person who authorized and if a TIE or VIE was used.
- (e) Send accurate and complete reporting to CARB.
- (1) Terminal compliance information submitted to CARB shall:
    - (A) Be written in the English language;
    - (B) Attest that the information is true, accurate and complete, signed by the Responsible Official under penalty of perjury, and
    - (C) Be submitted to CARB in writing to:
 

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  - (2) CARB may also allow online submittal to a CARB reporting system or e-mail with instructions on the CARB website.
- (f) Construction or repair.
- The terminal operator is responsible for providing an alternative CARB approved emission control strategy for vessels to reduce emissions if the CARB approved emission control strategy for the berth is unavailable due to construction or repair. Terminals also have the option of using a TIE or remediation fund for construction or repair.
- (g) Records Retention
- (1) Records made pursuant to Section 93130.9 shall be kept for a minimum of five years. This information shall be supplied to the Executive Officer within 30 days of a request from CARB staff.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

### **Section 93130.10. Terminal Exceptions.**

The terminal-related requirements of this Control Measure in section 93130.9 are subject to certain exceptions, set forth in this section.

(a) Vessel visits to a low activity terminal.

- (1) The at berth emission reduction requirements of section 93130.7 and section 93130.9 of this Control Measure do not apply during a visit if the vessel visits a low activity terminal.
- (2) For each vessel type listed in section 93130.7(b), a terminal that receives fewer than 20 visits in both 2019 and 2020 is initially considered a low activity terminal for that vessel type.
- (3) A low activity terminal that receives 20 or more visits per year for two consecutive calendar years from a vessel type no longer qualifies for the low activity terminal exception for that vessel type and is required to reduce emissions starting January 1 of the following year.
- (4) Terminal operators shall report vessel visit information under section 93130.9 (d)(3) of this Control Measure.

(b) Bulk and general cargo vessels.

Terminals that receive bulk and general cargo vessels are not required to arrange for CARB approved emission control strategies for their visits. Terminals are only required to report the vessel visit information for bulk and general cargo vessels under section 93130.9 (d)(3) of this Control Measure starting January 1, 2021.

(c) Terminal safety and emergency events.

The at berth emission reduction requirements of section 93130.7 and section 93130.9 of this Control Measure do not apply during a visit if a responsible official reasonably determines that compliance with this section would endanger the safety of the terminal, or its staff because of severe weather conditions, a utility event, or other extraordinary reasons beyond the terminal's reasonable control. All safety and emergency events are subject to review and audit by the Executive Officer. This exception applies if approved and only as long as the event occurs provided that the terminal operator:

- (1) Take all reasonable precautions after the conditions necessitating the exception have ended to avoid or minimize repeated claims of exception under this subsection; and

- (2) Include with the reporting requirements of section 93130.9(d)(3) of this Control Measure all documentation necessary to establish the conditions necessitating the terminal safety exception and the date(s), local time, and location. All required documentation must be in English.

(d) Research.

Vessel visits that participate in testing of an alternative technology may be excluded from the at berth emission reduction requirements in section 93130.7 and section 93130.9 of this Control Measure. Research visits are subject to reporting requirements 93130.9(d)(3) of this Control Measure. To qualify for a research exception, the following conditions must apply:

- (1) A research visit to a terminal must have a CARB approved research exception prior to arrival;
- (2) A terminal must confirm and record a visit's research exception status with CARB prior to arrival; and
- (3) Any testing must be conducted in accordance with the approved test plan.

(e) Terminal incident event (TIE) and vessel incident event (VIE).

The at berth emission reduction requirements of section 93130.7 and section 93130.9 of this Control Measure do not apply during a visit if the vessel fleet uses a VIE or the terminal operator uses a TIE specified in section 93130.11 of this Control Measure. Terminal operators shall report vessel visit information under section 93130.9 (d)(3) of this Control Measure.

(f) Remediation.

The at berth emission reduction requirements of section 93130.7 and section 93130.9 of this Control Measure do not apply during the portion of a visit that qualifies and uses the remediation fund option in section 93130.15 of this Control Measure. Terminal operators shall report vessel visit information under section 93130.9(d)(3) of this Control Measure.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

### **Section 93130.11. Vessel Incident Events (VIE) and Terminal Incident Events (TIE).**

A VIE or a TIE accommodates a limited number of situations where a vessel does not reduce emissions during a visit.

(a) Granting VIEs and TIEs.

- (1) The fleet that is designated in a vessel’s visit report will be granted VIEs based on a percentage of fleet vessel visits to a California port between January 1 and December 31 in the previous year. The terminal operator that is designated in a vessel’s visit report will be granted TIEs based on a percentage of vessel visits to the terminal between January 1 and December 31 in the previous year. In 2021, VIEs and TIEs will be granted by CARB staff by January 1, 2021. Each year after, VIEs and TIEs will be granted by CARB staff on February 1 of that year.
- (2) These percentages are listed in the table in section 93130.11(b) of this Control Measure. The number of VIEs and TIEs granted is rounded to the nearest whole number. Since visit information is not available initially, in 2021, VIEs and TIEs will be determined by the fleet 2019 recordkeeping requirements in California Code of Regulations, title 17, section 93118.3(g)(1)(B) and wharfinger data in section 93118.3(g)(3)(A) of the previous at berth regulation.
- (3) The fleet operator will be able to assign each received VIE to a visit made by a vessel in the fleet. The terminal operator will be able to assign each received TIE to a visit made by a vessel to the terminal.

(b) Table of VIEs and TIEs rates.

<b>Table 3: VIEs and TIEs Rates by Vessel Type per Year</b>											
		<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030+</b>
<b>TIEs</b>	<b>All Terminals</b>	15%	15%	15%	15%	5%	5%	5%	5%	5%	5%
<b>VIEs</b>	<b>Container/ Reefer</b>	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	<b>Passenger</b>	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	<b>Ro-ro</b>					5%	5%	5%	5%	5%	5%
	<b>LA/LB Tankers</b>							5%	5%	5%	5%
	<b>Other Tankers</b>									5%	5%

(c) Expiring VIEs and TIEs.

VIEs and TIEs expire on January 31 of the year after they are granted. VIEs can only be used at the port for which they are granted and by the fleet they are granted to and TIEs can only be used at the terminal for which they are granted.

(d) Retiring VIEs and TIEs.

VIEs and TIEs are limited in number and can be used for infrequent situations listed in section 93130.17 of this Control Measure. Fleet operators and terminal operators must report the use of a VIE or TIE with the vessel visit report in sections 93130.7(e) and 93130.9(d) of this Control Measure. VIEs and TIEs cannot be traded with other fleets, terminals, or any other entity.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

**Section 93130.12. CARB Approved Emission Control Strategy Operator Requirements.**

CARB approved emission control strategy operators shall fulfill the following responsibilities:

- (a) Maintain subcontractor services and agreements.
  - (1) Maintain a list of all subcontracted service providers and the services performed by each, maintaining copies of all agreements with service providers.
  - (2) Provide copies to CARB upon request of any agreement with service providers.
- (b) CARB approved emission control strategy checklist.

CARB approved emission control strategy operators shall complete all of the following items in this checklist for each vessel visit to ensure compliance under the Control Measure. Any failure to perform any specific items in this section shall constitute a separate violation for each day that the failure occurs.

- (1) Notification. At least 7 calendar days before a vessel's arrival, the operator of the CARB approved emission control strategy must coordinate in writing with the vessel operator and terminal operator for the use of the strategy and supply the vessel operator with information about the compatibility with the vessel and terminal of the CARB approved emission control strategy.

- (2) Operational. During the visit, the operator of the CARB approved emission control strategy shall:
- (A) Begin use of control strategy within 1 hour of vessel “Ready to Work”;
  - (B) Record inlet and outlet levels of emissions during the visit; and
  - (C) Continue using control strategy until at least 1 hour before “Pilot on Board”.
  - (D) Ensure vessels are operating on CARB compliant distillate marine fuel.
- (3) Reporting. The operator of the CARB approved emission control strategy shall report the following information regarding the vessel visit within 7 calendar days of vessel departure, using local time for all dates and times:
- (A) Vessel name;
  - (B) Vessel IMO number;
  - (C) Vessel type;
  - (D) Port, terminal and berth visited;
  - (E) Vessel operator contact information, including name, address, email address, and telephone number;
  - (F) Terminal operator contact information, including name, address, email address, and telephone number;
  - (G) Arrival date and time of the vessel;
  - (H) Departure date and time of the vessel;
  - (I) Dates and times when a CARB approved emission control strategy starts controlling emissions and finishes controlling emissions; and
  - (J) Vessel emissions while control strategy operated for the following categories:
    - i. NO<sub>x</sub> emissions in g/kW hr;
    - ii. PM<sub>2.5</sub> emissions in g/kW hr; and
    - iii. ROG emissions in g/kW hr.

(4) Malfunction Reporting.

The operator of the CARB approved emission control strategy shall report within 24 hours to CARB by electronic means, the following information regarding any malfunction that is expected to create emissions in excess of any applicable emissions limitation for a period greater than 1 hour. If electronic notification is not immediately possible, telephone notification or

notification at the beginning of the next working day is acceptable. The notification must include the following information:

- (A) Identification of the equipment causing the emissions in excess of any applicable emissions limitation;
- (B) Magnitude, nature, and cause of the excess emissions;
- (C) To the extent known, time and duration of the excess emissions;
- (D) Description of the corrective actions taken or expected to be taken to remedy the malfunction and to limit the excess emissions;
- (E) Information sufficient to demonstrate, to CARB's Executive Officer's reasonable satisfaction, that the malfunction was not caused in any way by poor maintenance, negligent operation, or any other reasonably preventable upset condition or equipment breakdown; and
- (F) Readings from any continuous emission monitor used in the emission control strategy and readings from any ambient monitors nearby.

(5) Corrective Action Report.

Within 7 calendar days after a malfunction has been corrected, the operator of the CARB approved emission control strategy shall submit a written report to CARB that includes:

- (A) A statement that the malfunction has been corrected, the date of correction, and proof of compliance with all applicable CARB approval requirements;
- (B) The specific cause of the malfunction;
- (C) A description of any preventive measures taken and/or to be taken; and
- (D) A statement affirming under penalty of perjury that the malfunction was not caused entirely or in part by poor maintenance, careless operation, poor design, or any other preventable condition or preventable equipment breakdown.

(6) Records Retention

- (A) Records made pursuant to Section 93130.12 shall be kept for a minimum of five years. This information shall be supplied to the Executive Officer within 30 days of a request from CARB staff.

(7) All information submitted to CARB shall:

- (A) Be written in the English language;
- (B) Attest that it is true, accurate, and complete, signed by the Responsible Official under penalty of perjury; and

(C) Be submitted to CARB in writing to:  
CHIEF, TRANSPORTATION AND TOXICS DIVISION  
CALIFORNIA AIR RESOURCES BOARD  
1001 I STREET  
SACRAMENTO, CA 95814

(D) CARB may also allow online submittal to a CARB reporting system or e-mail with instructions on the CARB website.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

### **Section 93130.13. Port Requirements.**

(a) Port infrastructure.

Ports with terminals not excluded under the thresholds set forth in section 93130.10(a) Terminal Exceptions of this Control Measure, shall provide equipment or necessary infrastructure that is outside of terminal operators' contractual ability to provide and which will enable a terminal to comply with this Control Measure including but not limited to necessary underground infrastructure, conduit, cabling, ducting, and shore power vaults.

(b) Cessation of obligation.

If a terminal operator and/or vessel operator elects to purchase and use CARB approved emissions control equipment that does not need port assistance or infrastructure to operate in compliance with this Control Measure, then the port has no additional responsibility for that equipment.

(c) Wharfinger data.

All operators of a public or private California port or independent marine terminal shall provide wharfinger data to the Executive Office of CARB annually by January 31st of the following calendar year, regardless of visit activity. At a minimum, the wharfinger information shall include for each visit to the port:

- (1) Name of the vessel;
- (2) Vessel type;
- (3) Name, address, email and telephone number for Company operating the vessel;
- (4) IMO number for each vessel;
- (5) Berth used by the vessel; and

- (6) Date(s) and time the vessel was initially tied to the berth and subsequently released from the berth.
- (d) Send accurate and complete reporting to CARB.

Port reports and wharfinger information submitted to CARB shall:

- (1) Be written in the English language;
- (2) Attest that it is true, accurate, and complete, signed by the Responsible Official under penalty of perjury; and
- (3) Be submitted to CARB in writing to:  
CHIEF, TRANSPORTATION AND TOXICS DIVISION  
CALIFORNIA AIR RESOURCES BOARD  
1001 I STREET  
SACRAMENTO, CA 95814
- (4) If available, CARB may also allow electronic or e-mail submittal with instructions on the CARB website.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

#### **Section 93130.14. Terminal and Port Plans and Interim Evaluation.**

- (a) Terminal plans.

- (1) Terminal plan requirements.

Beginning in 2021, terminal operators shall submit a terminal plan that discusses how the terminal will comply with the requirements for ocean-going vessels visiting each berth, [or the requirements for achieving reductions from alternative sources as provided in 93130.5\(d\)\(7\)](#). For vessel categories with compliance dates after 2021, the terminal operator shall submit plans with the most likely control strategy. As an alternative, Ports may submit plans for their terminal operators.

- (2) Terminal plan submission dates.

Terminal operators shall submit terminal plans to CARB by the following dates:

- (A) Container, refrigerated cargo, passenger terminals: July 1, 2021;
- (B) Ro-ro terminals: December 1, 2021;
- (C) [LA/LBAII](#) tanker terminals, [complying with 93130.5\(d\)\(7\)](#): December 1, 2021;
- (D) All ~~other~~ tanker terminals, [complying with 93130.5\(d\)\(1\)-\(2\)](#): ~~December 1, 2021~~ [July 1, 2024](#); and
- (E) Low-use terminals that exceeds the terminal threshold shall

submit a terminal plan by July 1 the following year.

- (F) Ro-ro and tanker terminals shall revise and resubmit terminal plans on the following schedule, which must reflect any changes to the terminal since the initial plan.
  - i. Ro-ro terminals: February 1, 2024;
  - ii. LA/LB tanker terminals: February 1, 2026; and
  - iii. All other tanker terminals: February 1, 2028

### (3) Terminal plan information.

Except for terminals complying with section 93130.5(d)(7), the terminal plan shall include discussion of necessary infrastructure modifications needed to reduce emissions from ocean-going vessels at a terminal. For each strategy implemented at a terminal, the terminal plan and shall include:

- (A) Identification and description of all necessary equipment, including whether it will be located on the vessel, wharf, shore, or elsewhere;
- (B) Number of vessels expected to visit the terminal using the strategy;
- (C) List of each berth with geographic boundary coordinates;
- (D) Identity of berth(s) where equipment will be used;
- (E) Terminal/port specific berthing restrictions;
- (F) Schedule for implementing equipment; and
- (G) Division of responsibilities between the terminal operator and the port, including contractual limitations applicable to the terminal, relevant to enacting the infrastructure required by each terminal's plan; and
- (H) A terminal claiming that a physical and/or operational constraint will delay its ability to implement its preferred CARB-approved control strategy to achieve emission reductions from vessels at berth according to the requirements of section 93130 et seq, must also include with its terminal plan a technical feasibility study evaluating if there are any other emission control options that could be implemented more quickly at the terminal.

### (4) Alternative Terminal Plan Information

- (A) For at-berth emission reductions, the information in section 93130.14(a)(3);
- (B) Identification and description of all vessel and/or onshore sources from which alternative reductions will be achieved;

(C) Schedule for completing work necessary to achieve alternative reductions; and

(D) Reported NOx, ROG and PM2.5 emissions data from 2016 (or other approved baseline year) for all vessel and/or onshore sources from which alternative reductions will be achieved.

(4)(5) All terminal plans shall be signed by the applicable terminal's Responsible Official under penalty of perjury and are subject to verification by enforcement staff.

(b) Port plans.

(1) Port plan requirements.

Port operators shall submit a plan showing proof that the necessary terminal infrastructure modifications, or the requirements for achieving reductions from alternative sources as provided in 93130.5(d)(7), are being developed or have been completed and/or report any modifications still required in order for all of the Port's terminals with control requirements to reduce emissions of vessels at berth or achieve alternative emissions reductions as provided in 93130.5(d)(7). Ports should use terminal plans as basis for developing port plans, and may submit terminal plans on behalf of one or more of the port's terminal operators.

(2) Port plan submission dates

Port operators shall submit port plans to CARB by the following dates:

(A) Container, refrigerated cargo, passenger terminals: July 1, 2021;

(B) Ro-ro terminals: December 1, 2021;

(C) ~~LA/LB~~ All tanker terminals, complying with 93130.5(d)(7):  
December 1, 2021;

(D) ~~All Non-LA/LB~~ All tanker terminals, complying with 93130.5(d)(1)-(2):  
~~December 1, 2021~~ July 1, 2024;

(E) Updated plan by July 1 the following year after any new terminal at the port exceeds the annual visit threshold.

(3) Port plan information.

Except for ports with terminals complying with 93130.5(d)(7), ~~the~~ port operator shall include in its port plan a discussion of necessary infrastructure modifications needed to reduce emissions from ocean-going vessels at a terminal, and shall. ~~For each strategy implemented at a berth, the plan must~~ include all of the following:

(A) Identification and description of which strategy each applicable terminal will use for compliance;

(B) Identify any equipment purchases and/or construction that are in progress or must still be completed to reduce emissions;

- (C) Provide schedule for installing equipment and/or any necessary construction projects;
- (D) Identify terminals where equipment will be used;
- (E) Listing of each terminal with geographic boundary coordinates;
- (F) Specify any port specific berthing restrictions; and
- (G) List the division of responsibilities between the terminal and the ports for enacting the infrastructure required by each terminal's plan.

#### (4) Alternative Port Plan Information

For ports with terminals complying with section 93130.5(d)(7), the port plan shall include:

- (A) For at-berth emission reductions, the information in section 93130.14(b)(3);
- (B) Identification and description of all vessel and/or onshore sources from which alternative reductions will be achieved;
- (C) Schedule for completing work necessary to achieve alternative reductions; and
- (D) Reported NOx, ROG and PM2.5 emissions data from 2016 (or other approved baseline year) for all vessel and/or onshore sources from which alternative reductions will be achieved.

(4)(5) All port plans shall be signed by the applicable port's Responsible Official under penalty of perjury and are subject to verification by enforcement staff. If port plan schedules are not met, they are subject to enforcement actions.

(c) Approval of terminal or port plan plans.

Within 90 calendar days following submittal of a terminal plan under section 93130.14(a) or a port plan under section 93130.14(b), CARB shall notify the applicable terminal operator or port of any deficiencies in the contents of the plan (as set forth in sections 93130.14(a) and (b) respectively), and/or in the plan's demonstration that the terminal or port is making good faith efforts to facilitate use of a CARB-approved control strategy at each berth. If CARB does not notify the applicable terminal operator or port of any such deficiencies, the plan shall be deemed acceptable on the 90th day following submittal.

(d) Interim evaluation for tanker and ro-ro technology.

CARB staff will facilitate the completion of a feasibility study to assess the progress-~~made in adopting~~ control technologies for use with tanker and ro-ro vessels, as well

as the status of landside infrastructure improvements that may be needed to support emission reductions at ro-ro and tanker terminals. By July 1, 2023, staff will publish analysis and findings results of the feasibility study in a report and make it available for public review at least 30 calendar days prior to presenting the report to the Board at a public meeting. The feasibility study will be conducted by a reputable third party with marine engineering expertise and will include the following elements:

- (1) Engagement with key stakeholders (e.g. vessel and terminal operators, emission control vendors, marine engine and marine boiler experts, etc.) along with regulatory agencies (CARB, USCG, CSLC, BCDC, IMO, etc.), to assess and document the applicability, safety, reliability, cost-effectiveness and operability of potential candidate vessel- and land-based capture and/or control strategies.
- (2) Identification of unique characteristics of affected terminals and Ro-Ro and tanker ship classes that may affect the applicability, safety, reliability, cost-effectiveness and/or operability of each candidate vessel- and land-based capture and/or control strategy.
- (3) A final determination regarding the applicability, safety, reliability, cost-effectiveness and/or operability of each candidate vessel- and land-based capture and/or control strategy, and identification of the criteria employed to make that determination.
  - (A) For each technology determined to be feasible, a full hazard and operability study (HAZOP) shall be conducted on the identified technology, and the feasibility study shall propose a set of design standards that will comply with MOTEMS and other existing regulations, and that can support the full development of the technology.
  - (B) If no technology is determined to be feasible, identify the specific requirements and/or changes (if any) which will need to be met before the technology can be considered feasible.

(e) Results of the interim evaluation for tanker and Ro-Ro technology.

- (1) If a technology or set of technologies is determined to be feasible, CARB staff in consultation with the third party marine engineering firm will assess the compliance deadlines in this Section to determine if adjustments need to be made. CARB staff shall initiate formal rulemaking to adjust the deadlines in this Section if it is determined that

the technology cannot be implemented under the current schedule. If staff finds that the compliance deadlines for ro-ro or tanker vessels need to be extended, the report will include recommendations to initiate staff's development of potential formal regulatory amendments.

(2) If no technology is determined to be feasible, CARB staff will initiate formal rulemaking to exempt or exclude Ro-Ro and/or tanker vessels from this Section of the regulation.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

### **Section 93130.15 Remediation Fund Use**

This section sets forth an additional compliance option which may be used under limited circumstances where vessels and/or terminal operators have made certain enforceable commitments to controlling emissions at berth. Even if the emissions are not controlled for all or part of a vessel visit, under certain circumstances, a vessel may qualify to remediate emissions, as set forth in this section.

- (a) For a vessel or terminal operator to utilize the remediation fund, a remediation fund administrator must be established with a Memorandum of Understanding executed with CARB under section 93130.16 of this Control Measure to manage the funds generated at that port or independent marine terminal.
- (b) Vessel operators, terminal operators, and ports may request to use the remediation fund option in the following circumstances, if the request is supported by compelling documentation that demonstrates the eligibility of the request, consistent with the criteria in this section, as determined by CARB.
  - (1) Terminal equipment repairs – a terminal has invested in shoreside control equipment, and maintains that equipment according to manufacturer recommendations, but that equipment has failed and is being repaired, or new or replacement equipment has been ordered in a timely manner, but has not been received.
  - (2) Vessel equipment repairs -- a vessel operator has invested in shore power or other on-board control equipment, and maintains that equipment according to manufacturer recommendations, but that equipment has failed and is being repaired, or new or replacement equipment has been ordered in a timely manner, but has not been received.
  - (3) Delays with operation of existing control strategy – a vessel visits a berth and all parties have taken the required actions to use a CARB-approved control strategy, but the visit fails to achieve the

full emission reductions required under section 93130.5 of this Control Measure due to a delay or interruption in controlling emissions. If CARB-approved emission control strategy operator is under contract to reduce emissions from that vessel visit and a malfunction causes or contributes to a delay or interruption in emissions control, that operator must have notified CARB of the malfunction according to the provisions of section 93130.12(b)(4) of this Control Measure for that visit to be eligible to use the remediation fund for the uncontrolled hours of the visit.

- (4) Terminal construction project – a terminal has invested in shoreside control equipment, and maintains that equipment according to the manufacturer recommendations, but takes that equipment out of service to allow a planned terminal upgrade or construction project that cannot safely be performed with the terminal side control equipment operating.
  - (5) A terminal plan deemed acceptable under section 93130.14(c) of this Control Measure identifies a physical and/or operational constraint that is delaying the implementation of a CARB-approved emission control strategy at the terminal.
- (c) For excess vessel emissions that are otherwise required to be reduced under section 93130.5 of this Control Measure, the vessel operator, terminal operator, or port may elect to request use of the remediation fund option for each hour of uncontrolled emissions during a vessel visit if all of the criteria in this section 93130.15 of this Control Measure are met. Such request shall be submitted to CARB electronically within 7 calendar days of the vessel's departure, according to the requirements of section 93130.7(e) for vessel operators, section 93130.9(d) for terminal operators, and section 93130.13 for ports.
  - (d) For each request to use the remediation fund option, CARB shall evaluate the request to determine if the requirements of this section have been met and the request is eligible. If the party requesting use of the remediation fund option fails to adequately support its eligibility for that option based on the criteria in subsection (c), above, to CARB's satisfaction, then CARB may deny that request. Within 30 calendar days of receipt of each request, CARB shall notify the requestor whether the visit or visits are eligible to use the remediation fund option. Ineligible requests to use the remediation fund for a vessel visit shall result in that visit being considered non-compliant with this regulation.
  - (e) Within 30 calendar days of CARB's determination of eligibility, the requestor shall transfer a sum equal to the number of hours of excess emissions times the applicable hourly payment to the CARB-approved fund administrator, according to the specific payment provisions established by that administrator in its Memorandum of Understanding with CARB. Each partial hour of excess emissions shall be counted as full hour for the purpose of calculating the payment. These

payments are intended to cover the administrator’s cost to achieve emission reductions through incentive activities in the communities exposed to the excess emissions, including 10 percent for administration expenses.

- (f) Remediation fund hourly amount.

<b>Table 4: Remediation Fund Hourly Amount</b>		
<b>Vessel Type</b>	<b>Hourly Remediation Payment Beginning in 2021*</b>	
	<b>Normal Rate</b>	<b>Tier III Rate</b>
<b>Container, Reefer, Ro-ro</b>	\$1,900	\$1,100
<b>Tanker with electric pumps</b>	\$1,600	\$1,000
<b>Tanker with steam driven pumps</b>	\$3,400	\$2,700
<b>Passenger vessels with capacity under 1,500 combined passengers and crew</b>	\$5,300	\$3,200
<b>Passenger vessels with capacity of 1,500 or more combined passengers and crew</b>	\$12,000	\$7,100
* Remediation payments used by vessel operators shall be reduced by 20 percent for IMO Tier III tanker vessels with steam driven pumps, and 40 percent for all other IMO Tier III vessels.		

- (g) Prior to the beginning of each odd numbered calendar year, the hourly remediation payment amounts set forth in this section shall be adjusted by considering the current Consumer Price Index values published by the Bureau of Labor Statistics relative to 2019, to determine the hourly remediation payment amounts for that calendar year and the subsequent year. CARB shall post any updates to the hourly remediation payment on its website.
- (h) For requests to use the remediation fund option for multiple vessel visits over an extended time period, the requestor may seek a prospective eligibility determination from CARB before the relevant visit occurs. Upon CARB’s determination of eligibility, the requestor shall report data on each vessel visit within the required 7 days, and shall make payments at least monthly to the remediation fund administrator until the equipment is operational again and payments have been made for all uncontrolled vessel visits.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

**Section 93130.16. Remediation Fund Administration.**

This section sets forth the criteria for CARB approval of an entity to administer a

remediation fund for individual ports and independent marine terminals, and the requirements for approved administrators to manage those funds. The intent of the remediation fund is to mitigate the community impact of the excess emissions from vessel visits that did not reduce emissions at berth to the required levels, as set forth under section 93130.15. It is CARB's intention that the monies from the remediation fund achieve emission reductions not otherwise required by law or regulation by funding incentive activities that comply with adopted CARB guidelines on existing incentive programs.

- (a) CARB staff shall notify, in writing, the local air quality management districts and air pollution control districts with jurisdiction in the communities adjacent to covered ports and independent marine terminals of the opportunity to apply to administer the remediation funds.
- (b) Each district may elect to submit a written application, within 120 calendar days of notification, to the Executive Officer to administer remediation funds for that district's geographic area.
- (c) Applications shall include the following information:
  - (1) Description of the applicant's experience implementing incentive programs for heavy-duty diesel vehicles and off-road equipment, with a focus on the Carl Moyer Program, Proposition 1B Program, or Community Air Protection Incentives, or similar programs for mobile and/or stationary sources of air pollution.
  - (2) Technical knowledge of engines, vehicles, equipment, and/or stationary air pollution sources that would be eligible for incentives.
  - (3) Remediation activity types and applicable CARB incentive program guidelines the fund administrator will use to recruit, evaluate, select, fund and track incentive activities.
  - (4) Demonstration of the applicant's capacity to administer the fund, including: personnel resources; operating budgets; accounting and legal support; activity tracking, emission reduction quantification, reporting mechanisms, and outreach experience.
  - (5) The ability to establish a separate account, and track deposits and payments, solely for the remediation fund.
  - (6) The proposed timeline for recruiting and funding incentive activities, and for those activities becoming operational to reduce emissions, once remediation funds are deposited into the applicant's separate account. For efficiency, these milestones may be aligned with existing solicitations, obligation, and liquidation deadlines for other incentive programs.
- (d) CARB shall review submitted applications to determine whether the applicant is eligible and all required information is included in the application. CARB shall verify that:

- (1) The applicant is eligible to administer a remediation fund based on the criteria in subsection (c) above;
  - (2) The application is complete, the responses demonstrate the applicant's capacity to successfully administer the remediation fund to the satisfaction of CARB; and
  - (3) The application includes a resolution from the applicant's governing board authorizing the applicant to participate in the remediation fund program.
- (e) If CARB determines that the conditions in subsection (d) above have been met, CARB will notify the applicant and execute a Memorandum of Understanding with the applicant to enable the applicant to serve as the remediation fund administrator for ports and independent marine terminals in that air district's geographic area.
- (f) If the air district with jurisdiction in the region that includes a covered port or independent marine terminal does not execute a Memorandum of Understanding with CARB to administer the remediation fund, CARB may invite non-profit organizations in the region with the demonstrated capacity and substantial experience administering incentive programs to apply. Any invited organization that wishes to participate must demonstrate no conflict of interest with the intended purpose of the remediation fund. CARB may approve a non-profit organization as the remediation fund administrator following the procedures and requirements of this section.
- (g) CARB will post executed Memoranda of Understanding, and each successful applicant's application, on its public website.
- (h) Each Memorandum of Understanding shall include the following minimum elements:
- (1) Parties, contact information, effective date and term.
  - (2) Environmental justice: The fund administrator agrees to conduct its programs in a manner that ensures the fair treatment of all people in the State.
  - (3) Emission reductions: The fund administrator agrees to use remediation funds for incentive activities that directly benefit communities impacted by excess emissions from the port or independent marine terminal, and achieve emission reductions consistent with CARB's most recent applicable incentive program guidelines for: Carl Moyer Program, Proposition 1B: Goods Movement Emission Reduction Program, or Community Air Protection Incentives. Fund administrators shall seek to prioritize eligible activities in communities that are also identified by CARB under the AB 617 Community Air Protection Program or disadvantaged communities as defined by the Secretary for Environmental Protection. While at berth remediation funds can be administered as part of an existing incentive program, the

remediation funds cannot be used in place of any required match funding.

- (4) Incentive activity types and applicable guidelines: The fund administrator agrees to recruit, evaluate, select, fund and track incentive activities in conformance with the requirements of the applicable guidelines for the incentive program or programs identified in the application.
- (5) Schedule: The fund administrator will identify anticipated major milestones for implementing emission reduction projects once remediation monies have been received by the administrator.
- (6) Reporting requirements: The fund administrator is responsible for submitting to CARB semi-annual reports covering fiscal activity and remediation activities funded, including, but not limited to, recipient, type, location, and estimated emission reductions achieved.
- (7) Recordkeeping requirements: The fund administrator agrees to retain fund records, e.g., solicitations, applications, invoices, contracts, and correspondence, for 3 years after activity completion.
- (8) Oversight: The fund administrator agrees to allow ongoing evaluations, reviews, and fiscal audits by CARB, other State agencies, or their designees.
- (9) Records access: The fund administrator agrees to allow CARB or its designees access to evaluate or audit fund records.
- (10) Enforcement: The fund administrator authorizes CARB or its designee to inspect incentive activities to ensure compliance with CARB requirements.
- (11) Administration expenses: The fund administrator may retain up to 10% of the remediation funds collected for its direct and reasonable expenses incurred to implement the incentive program.
- (12) Earned interest: The fund administrator agrees to maintain records and report on interest earned on remediation funds, and to expend earned interest according to the provisions of the MOU.
- (13) Non-performance provisions: The fund administrator agrees that the following is a non-exhaustive list of the circumstances that constitute non-performance under this MOU. These circumstances include, but are not limited to:
  - (A) Failure to comply with the provisions of this Control Measure for remediation fund administrators or the CARB-approved guidelines of the applicable incentive programs.
  - (B) Failure to obligate or expend remediation funds within established timelines, or to show timely interim progress to meet these timelines.

- (C) Insufficient performance or widespread deficiencies with remediation fund oversight, enforcement, record keeping, contracting provisions, inspections, or any other fund element as determined by CARB.
  - (D) Misuse of remediation funds.
  - (E) Funding of ineligible incentive activities or other items.
  - (F) Exceeding administration fund allotment.
  - (G) Insufficient, incomplete, or faulty incentive activity documentation.
  - (H) Failure to provide required documentation or reports requested from CARB, or other State agencies, in a timely manner.
  - (I) Poor performance as determined by a review or fiscal audit.
- (14) Remedies: The fund administrator agrees to provisions to remedy non-performance, including:
- (A) A corrective action plan.
  - (B) Transfer of collected remediation monies to an alternative fund administrator identified by CARB.
  - (C) Constraints on opportunity to administer future remediation funds.
  - (D) Termination of the Memorandum of Understanding.
- (15) Indemnification: The fund administrator agrees to indemnify and hold harmless the State for any liability arising out of the performance by the fund administrator.
- (16) Entitlements: The fund administrator agrees to comply with all laws, ordinances, regulations, and standards in administering remediation activities, including by obtaining any permits or approvals necessary to undertake the activities funded by the remediation fund, and complying with all environmental review requirements associated with such activities.
- (17) Severability: The remaining provisions of an agreement continue in effect even if a court holds a specific provision invalid.
- (18) Force majeure: CARB and fund administrator are not liable for any delay or failure in performance resulting from war, natural disasters, and other acts beyond their control.
- (19) Amendments: The amendments shall only occur by mutual agreement in writing and signed by all parties.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

## **Section 93130.17 Summary of Responsibilities.**

This Control Measure has shared responsibilities between all parties involved in reducing emissions from ocean-going vessels. The following table outlines a summary of responsibilities and how the terminal or vessel operator can apply exceptions, VIEs, TIEs, and remediation fund.

<b>Table 5: Summary of Responsibilities</b>				
<b>Circumstances that may qualify for a VIE/TIE or remediation</b>				
<b>Circumstances</b>	<b>Exception</b>	<b>VIE/TIE</b>	<b>Remediation Fund</b>	<b>Responsible Parties</b>
<b>Safety/emergency, research, or vessel commissioning</b>	X			
<b>Visits without reductions</b>		X	*	Terminal, Vessel
<b>Vessel control equipment repair</b>		X	X	Vessel
<b>Terminal control equipment repair</b>		X	X	Terminal, Port
<b>Terminal upgrades/construction</b>		X	X	Terminal, Port
<b>Delays, but reduction occur</b>		X	X	Terminal, Vessel
<b>CAECS failure</b>		X	X	Vessel, CAECS operator
*In general, all visits may use a VIE or TIE if available, but not all visits qualify for remediation. See section 93130.15(b) of this Control Measure				

<b>Table 5: Summary of Responsibilities (Continued)</b>		
<b>Circumstances that will be evaluated for non-compliance</b>		
<b>Circumstances</b>		<b>Responsible Parties</b>
<b>Berth</b>	<b>Vessel</b>	
<b>Has shore power</b>	<b>Does not have shore power</b>	Vessel
<b>No shore power, but has other CAECS</b>	<b>Has shore power</b>	Terminal, Port
<b>No shore power, but has other CAECS</b>	<b>Does not have shore power</b>	Terminal, Port, Vessel
<b>Has other CAECS</b>	<b>No shore power, but doesn't allow CAECS</b>	Vessel

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

### **Section 93130.18 Violations.**

- (a) Any person subject to this Control Measure who fails to comply with any provision, prohibition, limit, standard, criteria, or requirement in this Control Measure is subject to the penalties, injunctive relief, and other remedies specified in Health and Safety Code sections 38580, 39764, 42400 et seq., 43016, other applicable sections in the Health and Safety Code, and other applicable provisions as provided under California law for each violation. Nothing in this Control Measure shall be construed to limit or otherwise affect any penalties or other remedies available under federal law.
- (b) Any failure to meet any provision, prohibition, limit, standard, duty, criteria, or requirement in this Control Measure shall constitute a single, separate violation of this Control Measure for each day that a vessel operates without using a CARB approved emission control strategy.
- (c) Violating the recordkeeping or reporting requirements in this Control Measure shall constitute a single, separate violation of this section for each day that the applicable recordkeeping or reporting requirement has not been met.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 39674, 41510, 41511, and 43016, Health and Safety Code.

### **Section 93130.19 Sunset.**

The requirements specified in this Control Measure shall cease to apply if the United States adopts and enforces requirements that will achieve emissions reductions within the Regulated California Waters equivalent to those achieved by this Control Measure. Equivalent requirements may be from IMO regulations adopted and enforced by the United States, or may be contained in regulations adopted or enforced by the United States Environmental Protection Agency. This Control Measure shall remain in effect until the Executive Officer issues written findings that federal requirements are in place that will achieve equivalent emissions reductions within the Regulated California Waters and are being enforced within the Regulated California Waters.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

### **Section 93130.19 Severability.**

If any section, paragraph, subparagraph, sentence, clause, phrase, or portion of this Control Measure is held invalid, unconstitutional, or unenforceable by any court of competent jurisdiction, such portion shall be deemed as a separate, distinct, and independent provision, and such holding shall not affect the validity of the remaining portions of the Control Measure.

Note: Authority cited: Sections 38560, 38562, 39600, 39601, 39658, 39659, 39666, 43013, and 41511, Health and Safety Code. Reference: Sections 38510, 38530, 38562, 38566, 38580, 39600, 39650, 39658, 39659, 39666, 41510 and 41511, Health and Safety Code.

MEETING  
STATE OF CALIFORNIA  
AIR RESOURCES BOARD

DEFREMERY PARK RECREATION CENTER  
1651 ADELIN STREET  
OAKLAND, CALIFORNIA

THURSDAY, DECEMBER 5, 2019  
10:00 A.M.

JAMES F. PETERS, CSR  
CERTIFIED SHORTHAND REPORTER  
LICENSE NUMBER 10063

1 includes an interim evaluation in 2023. So staff have set  
2 ambitious implementation timelines for realizing the  
3 health benefits of this regulation as early as possible,  
4 but we also realize there may be some uncertainty with  
5 adapting these technologies for new vessel types and also  
6 with the infrastructure developments that may be required.

7 Now you may hear today that technology does not  
8 exist for ro-ro and tanker vessels or that staff's  
9 proposed timelines are too aggressive.

10 Now, technology manufacturers have assured CARB  
11 staff that there are engineering solutions for both ro-ro  
12 and tanker vessels. And shore power has actually been  
13 used on tanker vessels here in California.

14 And while there are no current capture and  
15 control projects that are occurring yet for ro-ro and  
16 tanker vessels in California, staff have been able to  
17 analyze multiple terminal infrastructure projects really  
18 to assess the timelines that are required to complete  
19 existing projects. And we feel the timelines that are  
20 proposed here are aggressive but feasible.

21 However, to address the uncertainty of the  
22 timelines for these new vessel types, CARB staff propose  
23 an interim evaluation in 2023 to assess the progress of  
24 adapting technology for new vessel types and also the  
25 necessary infrastructure improvement projects that might

1 based on the fact that it would have to meet some  
2 emissions level. And so it doesn't prescribe that a  
3 tanker would have to use shore power, or the bonnet  
4 system, or on-board. It is flexible in that manner.

5           So we would, at this point, as I think Nicole  
6 mentioned and there's a picture in one of the slides is  
7 that shore power has been and is in use at a terminal in  
8 Long Beach at T121. And so it's -- it is demonstrated to  
9 be effective for tankers. We up here do not want to  
10 downplay the role of safety for tankers for any vessel  
11 categories. And so safety is going to be the important  
12 concern with any emission control technology. And any of  
13 the technologies will have their own specific components  
14 that will have to be designed with safety in mind.

15           And so currently, we think that the two probably  
16 most likely technologies are either the capture and  
17 control systems. And those are effective because there  
18 doesn't have to be any vessel infrastructure done, right?  
19 A vessel can show up that doesn't have any shore power  
20 infrastructure on the vessel and it can be controlled.

21           And so that, I think, is one reason why we  
22 consider the capture and control systems likely for  
23 tankers. But tankers could use a combination of, say for  
24 example, cleaner tier 3 engines that are coming up in the  
25 future with maybe a diesel particulate filter on board.

1 comments to the docket on this item will remain open until  
2 December 9th, 2019. After that date, if it's determined  
3 that additional modifications are appropriate, the record  
4 will be reopened and a 15-day Notice of Public  
5 Availability will be issued. And the staff has already  
6 indicated that they do intend to do that.

7           So it will be reopened, and there will be another  
8 15-day Notice of Availability, and then the public may  
9 submit more written comments on proposed changes, which  
10 will be considered and responded to in the Final Statement  
11 of Reasons for the regulation.

12           Written comments that are received after December  
13 9th, but before the notice -- the 15-day notice is issued  
14 do not get considered as part of the official record. So  
15 I think in plain English what that means is this  
16 regulation is going to come back to the Board with some  
17 proposals for amendments included. We don't have a date  
18 second -- set for that yet, but we certainly heard a lot  
19 of testimony that people would like that to be sooner  
20 rather than later. And I hope that the staff can do its  
21 work expeditiously, so that we can -- so that we can hear  
22 it quickly.

23           Now, before we turn to the resolution that's  
24 before the Board, I want to ask for Board members who have  
25 additional comments on what they've heard to speak. And



March 20, 2020

Jared Blumenfeld, Secretary  
California Environmental Protection Agency  
1001 I Street  
Sacramento, California 95812

Mary Nichols, Chair  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95812

**Subject: Impact of COVID-19 on At-Berth Regulatory Schedule**

Dear Secretary Blumenfeld and Chair Nichols:

The spread of COVID-19 is disrupting the entire world. The impact has been particularly difficult to manage in an industry based upon the international movement of goods and people. Necessary precautions to address COVID-19 have already made compliance with the existing At-Berth Rule difficult and, at times, impossible. Travel bans and self-quarantines have already kept key personnel from reaching vessels and terminals. Many vessel sailings were cancelled from China and vessel schedule will take months to restabilize. Here in the United States, while we are still in the early stages of the spread of this disease, industry has already documented to your staff the many instances of our inability to conduct routine maintenance, repairs, or vessel commissioning as a result of COVID-19 restrictions.

In addition to the challenges that this public health crisis poses to industry compliance with the existing shorepower regulation, we will also be impacted with respect to promulgation of a new proposed rule. We appreciate that your staff has already delayed the release of the 15-Day package for the At Berth amendments and is considering extending deadlines for comments. Unfortunately, that is not enough. Based on the recent study from Imperial College London, this outbreak will not subside for months with the peak in the United States not reached until June 2020. As a result of the extraordinary disruptions to normal business operations associated with this crisis, it will be impossible for the regulated community, spread across the world, already dealing with limitations with respect to our ability to comply with the current regulation to also participate in the rulemaking process for months.

With respect to implementation, it is unclear when personnel and vendors will be able to travel again to begin making necessary improvements to comply with the requirements of any amended rule. The proposed rule compliance date was already very aggressive, and our Coalition has consistently and repeatedly raised concerns that compliance was infeasible even under the best of circumstances due to the operational and infrastructure changes to be implemented.

As a result of the COVID-19 circumstances described above and in anticipation of other extenuating factors arising from this crisis that may come to light in the coming months, we respectfully request that the regulatory schedule be paused until January 2021 when this crisis is over and its full impacts have been assessed.

We look forward to continuing our good working partnerships and positive relationships with the Agency and the Air Resources Board during these trying times.

Sincerely,

**California Association of Port Authorities  
Pacific Merchant Shipping Association  
World Shipping Council**

**Cruise Lines International Association  
Western States Petroleum Association**



March 24, 2020

Jared Blumenfeld  
Secretary  
California Environmental Protection Agency  
1001 I Street  
Sacramento, California 95812

Mary D. Nichols  
Chair  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Secretary Blumenfeld and Chair Nichols:

On behalf of the California Association of Port Authorities (CAPA) and the International Longshore and Warehouse Union (ILWU), we are writing to request a pause in the development of the currently pending At-Berth regulatory package. Our industry and workers are currently managing the COVID-19 crisis, which has resulted in a shelter-in-place order for the State of California. As our state manages the current health crisis, the health and safety of our communities and of the critical workers, who continue to work to keep goods moving through the supply chain, is our top priority.

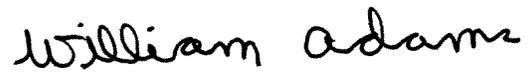
CAPA represents the eleven public seaports in California, including three of the largest container ports in the nation – Los Angeles, Long Beach and Oakland – as well as eight smaller ports situated along the coast from Humboldt to San Diego, and along inland waterways in West Sacramento and Stockton. The ILWU was formed by dockworkers in 1934 and represents 40,000 men and women in Oregon, Washington, California, Alaska and Hawaii, on the docks and in other industries.

Given the current crisis, we request that the At-Berth regulatory package process be delayed until January of 2021. This pause would afford ports and port workers time to get through the COVID-19 outbreak and navigate its economic impacts prior to enacting a regulatory change that could complicate economic recovery. COVID-19 is changing the tourism and goods movement industry in ways that we do not yet fully comprehend; it would be appropriate to consider these changes into the rulemaking process. For example, the Port of San Diego has already experienced a precipitous drop in revenues related to the complete halt of the tourism industry with a projected fiscal year end (June 31, 2020) deficit of \$30 million. Of course, the halt of the tourism industry also means a significant drop in work for port workers.

CAPA and ILWU desire a strong partnership with CARB to reduce emissions, improve the environment, and maintain jobs. We remain committed to these shared goals and we are merely asking for a pause in a pending regulatory process during this unprecedented health crisis. Therefore, we request a pause in the At-Berth regulatory process until January of 2021 in order to focus on the current pressing issues and

for all parties to better understand the long-term shifts that will be occurring in the tourism and goods movement industries. Thank you for your consideration.

Sincerely,

A handwritten signature in blue ink that reads "William Adams". The letters are cursive and connected.

William E. Adams  
President  
International Longshoreman and Warehouse  
Union

A handwritten signature in blue ink that reads "Eugene D. Seroka". The signature is stylized and cursive.

Eugene D. Seroka  
Chairman  
California Association of Port Authorities





April 15, 2020

The Honorable Gavin Newsom  
 Governor, State of California  
 State Capitol  
 Sacramento, CA 95814

Dear Governor Newsom:

We deeply appreciate your aggressive leadership responding to the coronavirus pandemic. The business community is also helping where possible by providing essential services, having employees work remotely, and of course providing support for our workers and communities. Like you, our businesses are keenly focused on meeting this crisis and finding a path to recovery. The interconnectedness of our economy and its supply chains means the reverberation of shutting down public gatherings and non-essential outings has been felt by every Californian.

You have already taken preliminary actions to mitigate some of the burdens on individuals and private employers as they deal with the vast economic consequences, including directing tax agencies to delay the income tax filing deadlines and suspending the California WARN act for employers who have unexpectedly been required to shut down their businesses with little notice. We are grateful for these efforts so far but

believe there is much more to be done to ease the economic pain being visited on employers and their workers throughout the state.

Our organizations recommend the Administration urgently act to pause non-essential state regulatory functions that will not impact measures designed to protect imminent harm to human health. Specifically, we urge you to issue an Executive Order temporarily suspending all pending new rulemaking, as well as any rules or amendments first taking effect after your stay-at-home order of March 19, 2020, not urgently needed to protect public health, for all state agencies and commissions for at least six months.

Since public participation is an integral part of the development of new regulations and proposed rules, regulators must protect due process rights of regulated entities and the public. As businesses direct their focus to providing essential services and protecting their workforce, they will lose the capacity to meaningfully contribute to draft regulations or proposals from state agencies, boards, and commissions. Nor is there an accessible platform for stakeholders to participate on a virtual basis that is also equipped to accommodate widespread public comments or participation.

We are aware of the following agencies that are still moving forward with proposed rulemaking, which can be postponed during this emergency without affecting public health and safety, or the state's response to the COVID-19 crisis. As we become aware of others, we will advise you.

- Draft Supplemental Guidance by the Department of Toxic Substances Control: Screening and Evaluating Vapor Intrusion, for which public comment is due April 30.
- Department of Fish & Wildlife Commission - Petition to List the Southern California/Central Coast Evolutionarily Significant Unit (ESU) of Mountain Lions as Threatened under the California Endangered Species Act (CESA), submitted by the Center for Biological Diversity and the Mountain Lion Foundation – Hearing April 16.
- California Department of Housing and Community Development (HCD) - Multifamily Housing Program (MHP) 2020 Draft Guideline amendments: Comments deadline May 5.
- Air Resources Board (ARB) - Vessels at berth regulation: Comments deadline May 1.
- ARB Transportation Refrigeration Unit regulation: Comments deadline April 27 (extended 30 days from March 27)
- ARB Advanced Clean Trucks: Expected public comment deadline approximately week of May 11-22.
- ARB Public Hearing on adoption of the proposed amendments to the Regulation on the Commercialization of Alternative Diesel Fuels (ADF) – April 23.
- State Water Resources Control Board (SWRCB) Microplastics in Drinking Water: Comments deadline April 24. On Board agenda 6/16/20.
- SWRCB Hexvalent Chromium MCL Staff workshop 4/27/20: Comments deadline May 15.
- SWRCB Drinking Water Fees: Comments deadline May 15.
- Water Board Once Through Cooling Extensions: Comments deadline May 11.
- CalRecycle – SB 1383 Regulatory Language – Comments deadline May 20.

Employers should also have an extended period of time to implement regulations that have not yet taken effect, for at least 90 days following the end of both a local and statewide shelter-in-place order. We are aware of the following upcoming regulations and will advise of others as we become aware:

- CEQA guidelines adopted by the Natural Resources Agency implementing SB 743 changes on analysis and mitigation of VMT thresholds.
- Suspend the enforcement of AB 827 that is set to take effect July 1, 2020, as it applies to amusement parks. Before the Legislature went into emergency recess, the author of AB 827 was moving rapidly his clean-up urgency legislation, AB 1506, to clarify application of the original bill. With the Legislature on indefinite recess, amusement parks would be expected to spend substantial sums for compliance – even if not open for business;
- California Consumer Privacy Act regulations, set to take effect July 1, 2020.

- State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State – implementation date May 28, 2020.

We believe that Californians' health and safety will not suffer from a pause in these regulatory processes, and that state regulators can accommodate these changes to their schedules. We appreciate your urgent attention to this matter.

Sincerely,

A handwritten signature in black ink, appearing to read 'Allan Zaremberg', with a large, stylized flourish extending to the right.

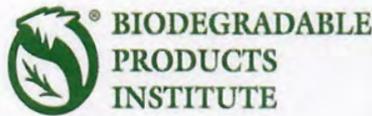
Allan Zaremberg  
President, CEO  
California Chamber of Commerce

On behalf of the above organizations

AZ:JB:ll



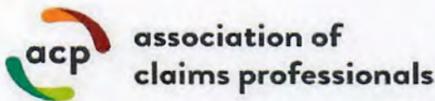
International Council of Shopping Centers



CROWLEY®



FRAGRANCE CREATORS ASSOCIATION™



April 10, 2020

**Via Electronic Delivery**

The Honorable Gavin Newsom  
Governor, State of California  
State Capitol Building  
Sacramento, CA 95814

**Subject: Request for Postponement of Deadlines for Pending Policy and Regulatory Initiatives.**

Dear Governor Newsom,

The undersigned organizations thank you for your leadership in guiding California through the uncharted territory of the COVID-19 pandemic. We appreciate the open lines of communication your administration has maintained to address emerging problems in real time. This unprecedented public health crisis requires all parties to work together for the greater good of California and its citizens.

We write you now asking you to direct all state agencies to postpone near-term rulemaking and related deadlines to allow a reasonable period of time for meaningful public participation in decision making processes. We also ask that you direct state agencies to be judicious in exercising enforcement authority while businesses make unprecedented changes to their operations to help reduce the spread of the virus.

The business community has been working diligently to adapt to shelter in place orders. Businesses that are still in operation have reduced staffing levels to comply with social distancing guidelines and other health-related measures. Employee focus has necessarily been diverted from normal workload to COVID-19 response. A "business as usual" approach from state regulatory agencies conflicts with the administration's directives to focus limited resources on protecting employee health and safety while continuing to provide essential goods and services to the public.

Many rulemaking and policy development initiatives were either launched or already in process at the front end of the COVID-19 crisis. As the following few examples attest, several of the pending deadlines pertain to environmental and workplace-related initiatives:

- Cal-Recycle SB 1335 Implementation: Cal-Recycle is in the process of developing regulations for determining the types of food service packaging that are reusable, recyclable, or compostable. Cal-Recycle opened a formal comment period on March 13 which is scheduled to close on April 28.
- State Water Resources Control Board Economic Feasibility Guidance: The SWRCB issued a "White Paper" on Evaluation of Economic Feasibility as the first step in developing a new drinking water standard for hexavalent chromium. The White Paper was released on March 6 with a comment deadline of April 27. The SWRCB also announced three public workshops scheduled for mid-April. This guidance is expected to set precedents for all future state drinking water standards.
- Air Resources Board Transport Refrigeration Unit, Commercial Harbor Craft, and Vessels At-Berth Regulations: The public comment deadlines on these multiple

proposed amendments to existing regulations on our state's "essential service" supply chain were extended to April 27, April 30, and May 1, respectively. All the critical supply chain functions provided by these freight sectors are essential to the delivery of medical equipment, pharmaceuticals, fresh foods and other vital products currently in short supply.

- Cal-EPA Supplemental Vapor Intrusion Guidelines: This draft guidance, which could have significant negative impacts on in-fill development and affordable housing projects, was issued in mid-February. Public workshops originally scheduled for early April have been postponed until further notice and the public comment deadline extended by 30 days to June 1.
- Office of Environmental Health Hazard Assessment Public Health Goals: OEHHA announced on March 27 that it is initiating development of PHGs for 1,4 dioxane and NDMA in drinking water with a solicitation for scientific information on health effects. This notice indicates an April 27 deadline for public comments.
- Cal-OSHA Indoor Heat Illness Prevention Regulations: Cal-OSHA is nearing completion of work required by the Office of Administrative Law to approve a notice of proposed rulemaking, which would commence a 45-day public review and comment period. As currently drafted, this proposed regulation will impact thousands of businesses statewide.

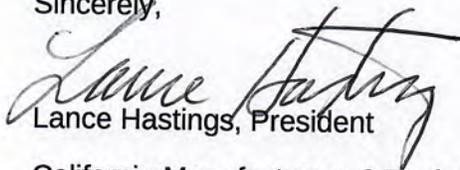
Continuing to advance new regulatory initiatives in the current environment will undermine public participation and lead to poorly informed decisions that may present unintended and undesirable consequences. While the extensions granted to date are appreciated, they are being issued on a piecemeal basis and are inadequate given uncertainty about the duration of the crisis. Therefore, in recognition of the overwhelming impact of the COVID-19 response effort, all pending regulatory proceedings including informal pre-rulemaking activities should be postponed for a reasonable period of time after shelter in place orders are lifted.

In addition to regulatory initiatives, some industries such as food production and processing, continue to receive 60-day notices of intent to sue under Proposition 65. The Attorney General should recognize that many businesses are uniquely vulnerable to predatory litigation practices while they focus on responding to the COVID-19 crisis and should prioritize these cases for state intervention.

The undersigned groups want to make clear that we are simply seeking a short-term stay in state regulatory agendas while we do our part to support California's response to this public health crisis. We remain committed to working with the state toward practical and sustainable regulations and to meeting existing regulatory requirements to the maximum extent feasible.

Thank you again for your time and continued leadership in these difficult times. We appreciate your consideration of our urgent requests. Please contact me if you have any questions at [lhastings@cmta.net](mailto:lhastings@cmta.net) or (916) 527-4334.

Sincerely,



Lance Hastings, President

California Manufacturers & Technology Association

Cc: Ann O'Leary, Governor's Office, Chief of Staff  
Jared Blumenfeld, Secretary, Environmental Protection Agency  
Joaquin Esquivel, Chair, State Water Resources Control Board  
Katrina Hagen, Director, Department of Industrial Relations  
Ken DaRosa, Acting Director, CalRecycle  
Lauren Zeise, Director, Office of Environmental Health Hazard Assessment  
Mary Nichols, Chair, Air Resources Board

American Chemistry Council  
American Coatings Association  
Association of Claims Professionals  
Association of Home Appliance Manufactures  
Association of Plastic Recyclers  
Biodegradable Products Institute  
Building Owners and Managers Association of California  
California Business Properties Association  
California Construction and Industrial Materials Association  
California Farm Bureau Federation  
California Food Producers  
California Fuels & Convenience Alliance  
California Independent Petroleum Association  
California Independent Petroleum Association  
California Railroads  
California Restaurant Association  
California Retailers Association  
CAWA - Representing the Automotive Parts Industry, and the Auto Care Association  
Chemical Industry Council of California  
Commercial Real Estate Development Association  
Consumer Brands Association  
Crowley  
Dart Container Corporation  
Foodservice Packaging Institute  
Fragrance Creators Association  
Industrial Environmental Association  
International Council of Shopping Centers  
National Elevator Industry, Inc.  
Official Police Garage Association of Los Angeles  
Pacific Merchant Shipping Association  
Pactiv, LLC  
Plastics Industry Association  
Representing Household and Commercial Products  
The American Waterways Operators

The California League of Food Producers  
The Western Plastics Association  
West Coast Lumber & Building Material Association  
Western Independent Refineries Association  
Western States Petroleum Association

## Tab 7

# CALIFORNIA LEGISLATURE

STATE CAPITOL  
SACRAMENTO, CALIFORNIA  
95814

April 21, 2020

Mary D. Nichols, Chair  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

Re: Rulemaking Impacting Essential Services Freight Transportation

Dear Chair Nichols,

The COVID-19 crisis has posed a fundamental threat to California's public health and our economy. In light of the economic impacts of this extraordinary event, it is imperative that the state government not only commit to slowing the spread of the virus, but also take the steps needed to protect our state's economy and employment opportunities for our working families.

Preserving the operations of our freight transportation system will be key to protecting our economy, keeping medical supplies moving, and ensuring that products are available on our store shelves during this unprecedented crisis. We thank Governor Newsom for recognizing that our goods movement industry and supply chains are "essential services" that must remain up and running during the pandemic. Without a fully functioning supply chain, we risk disrupting the delivery of critical medical supplies, the distribution of groceries, and billions of dollars in personal income, job opportunities, and tax revenue.

**As such, we request that the California Air Resources Board (CARB) put all current and proposed rulemakings regarding freight transportation and harbor craft on hold until January 2021.** This will ensure that the state can focus our essential transportation assets on delivering critical goods and providing transportation mobility options during this crisis.

We share CARB'S goal of protecting our air quality and the belief that we must base any new regulations on science, facts, air quality modeling, cost-effectiveness, and minimizing any negative impact on the statewide economy.

Over the past several weeks, COVID-19 has fundamentally transformed life as we know it in California, and it may take several months after the conclusion of this crisis before we can understand what the new baseline of our economy and environment will look like. Therefore, it is necessary for regulators to pause and reevaluate any proposed regulations based on our new reality once the crisis has subsided.

We are hopeful that by January 2021, we can evaluate COVID-19's impact on our state and work together to achieve the best environmental and economic outcomes for all Californians.

Sincerely,



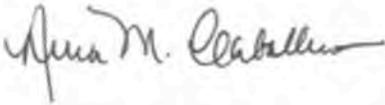
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Patrick O'Donnell  
Assembly District 70



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Patricia C. Bates  
Senate District 36



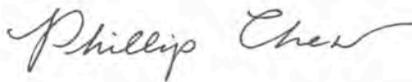
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Anna M. Caballero  
Senate District 12



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Wendy Carrillo  
Assembly District 51



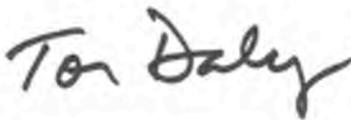
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Phillip Chen  
Assembly District 55



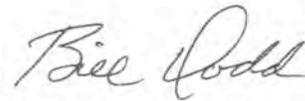
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Jordan Cunningham  
Assembly District 35



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Tom Daly  
Assembly District 69



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Bill Dodd  
Senate District 3



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Tyler Diep  
Assembly District 72



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Heath Flora  
Assembly District 12



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Vince Fong  
Assembly District 34



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Jim Frazier  
Assembly District 11



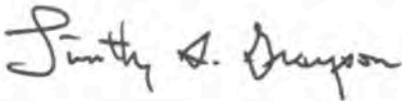
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James Gallagher  
Assembly District 3



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Mike A. Gipson  
Assembly District 64



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Timothy S. Grayson  
Assembly District 14



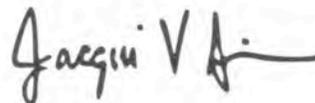
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Shannon Grove  
Senate District 16



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Melissa Hurtado  
Senate District 14



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Jacqui Irwin  
Assembly District 44



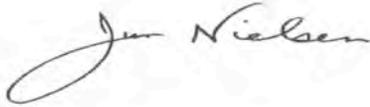
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Chad Mayes  
Assembly District 42



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John M. W. Moorlach  
Senate District 37



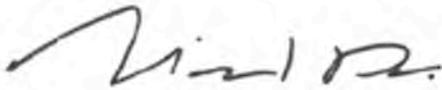
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Jim Nielsen  
Senate District 4



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Jay Obernolte  
Assembly District 33



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Richard Pan  
Senate District 6



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Jim Patterson  
Assembly District 23



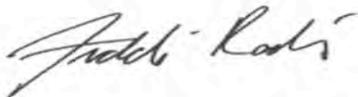
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Sharon Quirk-Silva  
Assembly District 65



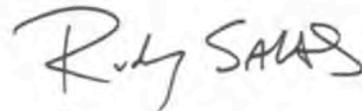
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James C. Ramos  
Assembly District 40



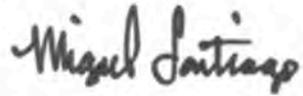
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Freddie Rodriguez  
Assembly District 52



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Rudy Salas  
Assembly District 32



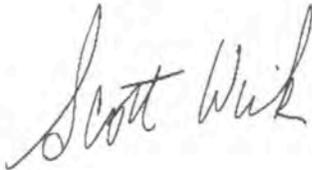
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Miguel Santiago  
Assembly District 53



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Thomas J. Umberg  
Senate District 34



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Scott Wilk  
Senate District 21

cc: The Honorable Gavin Newsom, Governor  
The Honorable Eleni Kounalakis, Lieutenant Governor  
Jared Blumenfeld, Secretary for Environmental Protection, CalEPA  
Chris Dombrowski, Acting Director, Governor's Office of Business and Economic Development

## Tab 8



April 27, 2020

Ms. Catherine Reheis-Boyd  
President  
Western States Petroleum Association  
1415 L Street, Suite 900  
Sacramento, CA 95814

Dear Ms. Reheis-Boyd:

This letter is in response to your request that our firm evaluate the effects of the COVID-19 pandemic on the estimates in the California Air Resources Board (CARB) Standardized Regulatory Impact Assessment (SRIA) of the *Ocean-Going Vessels at Berth* proposal, as modified by the “15-day changes” document released on March 26, 2020.

### **Background and Proposed Regulation**

The proposed regulation would expand the type and number of ships that must use shore electrical power or an alternate recapturing method to reduce emissions while at berth. Existing rules require most container ships, refrigerated ships and cruise ships to use shore power when docked in ports rather than run their auxiliary engines to create electricity for lighting, air conditioning or operation of shipboard equipment. Alternatively, these ships can continue to use auxiliary engines but then must connect to an on-shore or barge-based capture and control system. The current regulations are in place at six ports: Los Angeles, Long Beach, Oakland, San Diego, San Francisco and Hueneme.

Key provisions of the proposed regulation (as modified by the 15-day changes) would:

- Make smaller container, reefer and cruise ships subject to the shore power regulation. Those requirements would phase-in beginning in 2021.
- Make roll-on/roll-off (ro-ro) ships subject to the shore power regulation starting in 2024.
- Expand the requirement to include tankers beginning in 2025 at the Los Angeles and Long Beach terminals, and elsewhere in 2027. In addition to auxiliary engines, the proposal would require large tankers to reduce emissions from boilers used to power steam-driven pumps involved in offloading crude oil, unless shore power is installed.

- Expand the ports and terminals covered in the regulations. Ports, including refinery docks, in Northern California in or near cities such as Stockton, Richmond, Rodeo, Benicia and Martinez, would now be covered.
- Allow vessel and terminal operators to meet berth emission reduction requirements through an approved “innovative concept.” The concept, which according to CARB would most likely be used at smaller ports, allows vessel or terminal operators to achieve targeted emissions savings through an alternative project. These concepts would only qualify to the extent they are not required by regulation, including future regulations and AB617 Community Emission Reduction Plans.

## CARB Estimates of the Proposal’s Impact

CARB estimates that the proposed regulation would have the following impacts:

- A total net cost of \$2.40 billion for the period 2021 to 2032 and avoided adverse health outcomes worth \$2.44 billion for the same period.
- Unit costs of regulation in 2030 of \$1.30 per Twenty-Foot Equivalent Unit (TEU) for container or reefer vessels, \$5.25 per cruise passenger, \$7.49 per automobile moved on a ro-ro ship, and less than a penny per gallon of finished product for products moved by tanker.
- Net decreases in economic activity over the 2021 to 2032 period due to added regulatory costs and reduced productivity, offset in a few years by new construction activity.
  - By the final year of the projection period (2032), *decreases* of:
    - \$297 million in gross state product;
    - 2,385 jobs;
    - \$234 million in personal income; and
    - \$90 million in private investment.

## Methodology and Assumptions Behind CARB’s Estimate

**Methodology:** CARB’s estimates were based on a multiple-step process:

- Information was developed by CARB staff regarding such factors as costs of permitting, planning, engineering, construction, equipment, installation, and operations, and maintenance.
- These assumptions were then entered into a proprietary economic forecasting and policy analysis model licensed by REMI. The REMI model integrates input-output, computable general equilibrium, econometric, and economic geography methodologies to estimate the impacts of cost changes and other factors on the

broader economy. A basic feature of computable general equilibrium models is that their outputs are highly sensitive to changes in economic assumptions.

**Key assumptions.** The REMI economic model starts with a baseline set of economic assumptions that tie to the California Department of Finance (DOF) forecasts made in the Spring of 2019. At the time, DOF projected that U.S. and California economies would experience moderate but sustained economic growth through 2022, as follows:

- 1) Employment increasing by an average of 1 percent per year,
- 2) Personal income increasing by 4 percent per year, and
- 3) U.S. real gross domestic product increasing by 2 percent per year.

The May 2019 population projection indicated that California would add about 2.4 million people between 2019 and 2032.

Other inputs into CARB’s estimates included diesel price projections and “industry growth factors.” The diesel price projections were based on U.S. Energy Information Administration’s (EIA) October 2018 estimate, which assumed steady growth in diesel prices, from \$2.80 per gallon in 2019 to \$5.03 by 2032. The industry growth factors are intended to capture the impacts of expected growth in port volume over time. They are used by CARB for its baseline emissions estimates and most of its cost estimates. The growth factors are based on a combination of projections supplied by U.S. Federal Highway Administration’s Freight Analysis Framework (FAF) 65 and, where available, from individual ports. Using these estimates, CARB assumes growth factors of 77 percent for container vessels, 79 percent for cruise ships, 52 percent for ro-ro vessels, and 14 percent for tankers.

## Impact of COVID-19 On CARB’s Assumptions

Every key economic assumption in the CARB estimate of the proposed regulation has been dramatically affected by the COVID-19 pandemic. Fuel prices, economic output, jobs, international trade and waterborne port activity will all be sharply lower than anticipated in any economic forecast made prior to March of this year. Given the emerging expectation that recovery from the historic COVID-19-related downturn will be slow (see discussion below), we expect the economic measures will remain below the levels assumed in the CARB projections for several years to come. This will, in turn, have impacts on CARB’s estimates of (1) baseline emissions, (2) emissions reduction and health-related savings resulting from the proposal, (3) costs and savings to the ports, terminals, and vessel operators, and (4) broader economic impacts of the proposed regulation.

49-30

**Recent economic developments.** The COVID-19 pandemic has led to a global economic contraction that is more severe than the 2008-2010 Great Recession. Nationally, new claims for unemployment insurance totaled 26 million over the five weeks ending on April 23. Over the three weeks ending on the same date, California processed about 3.4 million unemployment claims. These claims represent about 17 percent of the U.S. and California

workforces, respectively. Turmoil in global oil markets have driven the price of West Texas Crude downward, to less than \$17 per barrel as of April 23, 2020.<sup>1</sup>

**Department of Finance comments.** On April 10, the California Department of Finance (DOF) sent a budget letter to the Legislature alerting them to the dramatic impact that the COVID-19 pandemic is having on the California economy and state budget. In the letter, DOF indicated that the effects of the downturn will be felt immediately, that the California unemployment rate could peak at a rate higher than the Great Recession of 2008, and that economic softness could persist into 2020-21 and additional years depending on the pace of recovery to local, state, and national economies. It referenced a multi-year recession alternative included in its January budget, and indicated that actual increases in unemployment would be much larger.

**Other recent forecasts.** Recent national economic forecasts show a similarly dark picture for the U.S. economy. On April 23, the Congressional Budget Office released its first post COVID-19 forecast, which showed a 5.6 percent decline in inflation-adjusted gross domestic product in 2020, followed by a subdued increase of 2.8 percent in 2021.<sup>2</sup> (For context, real GDP fell by a cumulative total of 2.6 percent in the first two years of the 2008-2010 recession, which was considered to be the most severe since the 1930s.) CBO's projected level of unemployment is 11.4 percent for 2020 and 10.1 percent in 2021. The primary reason that CBO's forecast anticipates only a modest rebound in 2021 is its expectation that social distancing will continue (albeit at a lesser rate) through the first half of 2021.

Other forecasts show equally sharp declines in 2020, and, under some scenarios, an extended period of subdued economic activity.<sup>3</sup> Factors that could result in long-term declines include permanent downsizing of some sectors and occupations due to such factors as reduced travel, changes in consumer spending patterns, workplace practices (e.g., more home-based workers, more reliance on technology, less travel), and shifts in global supply chains.

## Areas Where A Changing Economic Outlook Will Impact Estimates of the Proposed Regulation

Following are examples of areas where the weaker post COVID economic outlook will affect CARB's outdated estimates of the proposed regulation's impact.

**Less port activity under the baseline.** As noted earlier, the CARB estimates assume substantial growth in vessel visits through 2032. However, trade flows and port activity are

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<sup>1</sup> Price accessed on Oilprice.com April 23, 2020. <https://oilprice.com/oil-price-charts/45>

<sup>2</sup> "CBO's Current Projections of Output, Employment, and Interest Rates and a Preliminary Look at Federal Deficits for 2020 and 2021." Congressional Budget Office, April 24, 2020. <https://www.cbo.gov/publication/56335>.

<sup>3</sup> See for example, S&P Global Ratings, Economic Research: COVID-19 Deals A Larger, Longer Hit to Global GDP. <https://www.spglobal.com/ratings/en/research/articles/200416-economic-research-covid-19-deals-a-larger-longer-hit-to-global-gdp-11440500>

highly sensitive to changes in the state, national, and global economic environments.<sup>4</sup> Based on current economic realities, vessel activity will grow by considerably less than what was assumed in the SRIA. Beyond the general impacts of an economic recession on port volume, we believe it is possible, potentially likely, that the COVID pandemic will have lasting impacts on growth in cruise ship totals, further reducing port activity in the state.

The reduction in vessel activity will lower the level of baseline emissions, which in turn affects the amount of potential emission reductions and health benefits that can be realized from the regulation.

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On the cost side, the methodology used by CARB scales the great majority of regulatory costs upward and downward in proportion to the size of the projected industry growth factor. Hence, we would expect reduced vessel activity to lower its estimate of regulatory costs. However, we note that not all of the costs associated with the proposed regulation will rise or fall in line with the industry growth factor. We would expect, for example, infrastructure-related costs to the terminals themselves to have both fixed and variable components. Because these fixed costs would be spread over fewer visits, a reduction in activity would *raise* per-vessel regulatory costs.<sup>5</sup>

**Cost shifting.** The SRIA analysis assumes that a significant share of the major costs associated with the land-based shore-power and capture and control systems will be initially be borne primarily by ports. However, the impact on ports is assumed to be lessened by two factors: (1) the major capital costs are annualized over a 20-year life for terminal equipment; and (2) some, perhaps most, of the costs will be shifted – from ports to terminal operators through lease increases, and from terminal operators to vessel owners and owners of discretionary cargo through rate increases. Thus, the ultimate incidence of the proposed regulation is assumed to be shared by entities around the world.

However, a couple of points are worth noting. First, the required infrastructure costs are not revenue-producing. Consequently, it is not possible to finance them through the traditional revenue-bonding mechanisms used by ports. While it may be reasonable to assume that some of the port authorities could handle the major expenses imposed by this proposal without reducing other expenditures during good economic times, the situation is markedly different when the economy is soft, even at the larger ports. Under such circumstances, regulatory costs are more likely to squeeze out other port projects that are potentially productivity-enhancing or emissions-reducing (at a more cost-effective rate).

Second, the impact on ports is magnified by the fact that it is more difficult to shift costs onto vessel owners and owners of discretionary cargo when these entities are facing their own financial hardships in a depressed economy. If a smaller portion of the regulation's

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<sup>4</sup> As an example, cargo tonnage through the Port of Los Angeles grew by 50 percent between 2002 and 2007, but plunged 17 percent the following year, and did not return to the pre-recession level for a decade. Source: Tonnage Statistics/Port of Los Angeles. <https://www.portoflosangeles.org/business/statistics/tonnage-statistics>

<sup>5</sup> As noted in the on page 26 of SRIA report, "As terminal visit activity decreases, the cost effectiveness of installing emissions control equipment becomes worse, as there are fewer vessels calling at the terminal to use the equipment and to help recoup the costs of installing, operating, and maintaining the equipment."

costs are borne by discretionary cargoes and vessel visits, then a larger portion of those costs will necessarily be borne by Californians. In a growing market, it may be reasonable to assume that the cost-incidence of a proposed regulation will be shared broadly by cargo owners and consumers around the world. However, when markets are less robust, those costs will become more concentrated in this state.

**Fuel-related savings estimate.** CARB's estimate of net costs incurred by vessel operators using port power includes vessel equipment and maintenance costs. But these costs are partly offset by fuel savings, since the vessels would no longer have to run their auxiliary engines when in port. The estimated amount of fuel savings is based on the marine gas-oil price of \$763/metric ton (actual cost in April 2019), adjusted using the U.S. Energy Information Administration's (EIA) price projections for transportation diesel fuel. The EIA projection, made in October 2018, assumed that diesel prices would rise from \$2.80 per gallon in 2018 to \$3.39 in 2020, \$4.30 by 2025 and \$5.03 by 2030. (The same forecast assumed that West Texas crude oil would rise from \$50 per barrel in 2018 to \$72 per barrel by 2020, \$100 per barrel by 2025, and \$120 per barrel by 2030. As noted earlier, the price as of April 24 of this year was \$17 per barrel.) If lower crude-oil prices persist, the avoided costs will be substantially *less* than assumed in the CARB estimate, and net costs of the regulation will be *higher*.

**Competitiveness.** The SRIA indicates that the proposed regulation will increase costs to California ports and the vessels that visit them. It also indicates that it is not possible to determine the impact of the higher costs on cargo diversions. It asserts that studies exploring the relationship between general cost increases and cargo diversion have come to varying conclusions; and in cases where effects were found, they were the result of cost increases that were much larger than those that were estimated to result from the proposed regulation.

We recognize that shipping decisions are based on a variety of factors in addition to costs, including logistical considerations and access-to-markets. However, we also believe that cost considerations become more important when economic conditions deteriorate, and shipping margins become tighter. This may be particularly true for some of the Northern California ports, newly affected by this proposed regulation, that are closer to the port in Tacoma, Washington. For this reason, we believe it would make sense to revisit these potential cost impacts on California port competitiveness in light of the new economic realities.

## Conclusion

The COVID-19 virus has fundamentally altered the economic landscape. The Department of Finance May 2019 economic forecast and the EIA fuel price projections, and other inputs used by CARB to develop the benefits, costs, and economic impacts of the proposed regulation, are no longer credible. For these reasons, CARB's existing SRIA would not accurately inform its Board and members of the public of the true economic impacts of the proposed regulation, and needs to be revised. It makes sense to delay action on the

proposed regulation at least until the economy emerges from the current crisis, and the post-COVID-19 outlook becomes clearer. At that point, CARB should re-estimate the proposal's impacts based on assumptions that more accurately reflect the economy in the post-COVID-19 world.

Please feel free to contact me if you have any questions about the information contained in this letter. I can be reached at (916) 761-2574.

Sincerely,

A handwritten signature in black ink that reads "Brad Williams". The signature is written in a cursive style with a long horizontal flourish extending to the right.

Brad Williams  
Chief Economist  
Capitol Matrix Consulting

Enclosure: Author Biography

## Author Biography

**Brad Williams** joined Capitol Matrix Consulting (CMC) in 2011 after serving in various positions in California state government for nearly 33 years. During the past nine years at CMC, Mr. Williams has been involved in hundreds of projects covering energy and regulatory policy, economic forecasting, economic impact analysis, and state and local government taxation and finance. During his prior three decades in state government, Mr. Williams served in key positions in the State Treasurer's office, Assembly Appropriation Committee and the Legislative Analyst's Office, where he was chief economist and Director of Budget Overview and Fiscal Forecasting. During his government career, Mr. Williams was regarded one of the state's top economic and fiscal experts, and he was recognized by the Wall Street Journal as the most accurate forecaster of the California economy in the 1990s.

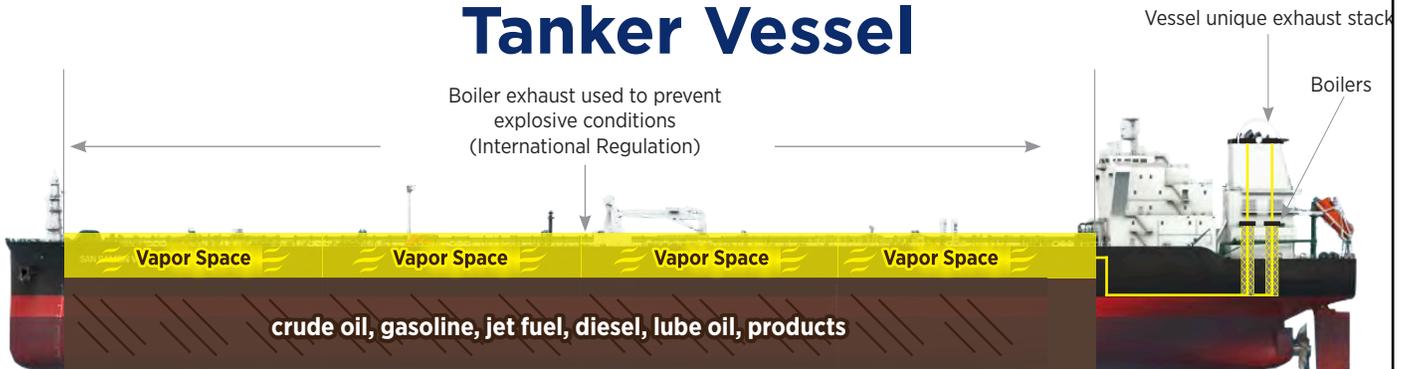
# Stack Capture is not ready for pilot testing on tankers

**A Feasibility Study is needed first to ensure all safety and operational conditions are taken into consideration because:**

- Tankers are different from cargo vessels and have more safety considerations than container vessels

- Stack Capture systems will disrupt tanker boiler systems used to prevent explosive conditions.
- Stack Capture connections need to be vetted by U.S. and international maritime regulators and organizations

## Tanker Vessel



## Container Vessel



49-32

### Container Vessels



### Tankers



Equipment Type	Container Vessels	Tankers
<b>Boilers</b>	<ul style="list-style-type: none"> <li>• Small composite boilers</li> <li>• Heats fuel for propulsion fuel and makes hot water</li> <li>• Not regulated by proposed At-Berth Regulation</li> </ul>	<ul style="list-style-type: none"> <li>• Very large boilers</li> <li>• Provides steam to drive cargo pumps and heats cargos</li> <li>• Exhaust gas used to make cargo space not explosive (required by international regulations)</li> <li>• Regulated by proposed at berth regulation</li> </ul>
<b>Cargo</b>	<ul style="list-style-type: none"> <li>• Containerized cargo</li> <li>• Transferred by shore cranes</li> </ul>	<ul style="list-style-type: none"> <li>• Flammable petroleum products (crude oil, gasoline, jet fuel, diesel, lube oils etc...)</li> <li>• Transferred with ship steam driven pumps</li> </ul>
<b>Notes</b>	<ul style="list-style-type: none"> <li>• No hazardous cargo zones</li> </ul>	<ul style="list-style-type: none"> <li>• Large hazardous cargo regulated area</li> <li>• Vessel are always required to be ready to move from the berth in 30 minutes or less</li> </ul>

ARTICLES ([HTTPS://IFFMAG.MDMPUBLIS](https://iffmag.mdmpublis))

## A crude oil tanker exploded – Why is that unusual?



TOM GULDNER ([HTTPS://IFFMAG.MDMPUBLISHING.COM/AUTHOR/TOMGULDNER/](https://iffmag.mdmpublishing.com/author/tomguldner/)) - 10/12/2018



On August 15, 2018 an explosion rocked the VLCC Desh Vaibhav. The vessel had just off-loaded 270,000 mt of crude from the Persian Gulf and her tanks were empty at the time of the explosion. Tragically, several crew members were killed in the incident.

The explosion is reported to have occurred in a forward empty tank. Now, we all know that an empty tank can be more dangerous than a full tank. A full tank usually does not have enough of a vapor space to allow a flammable atmosphere. The empty tank is filled with the vapors from its previous cargo. In this case, the previous cargo was crude oil whose vapors are extremely flammable.

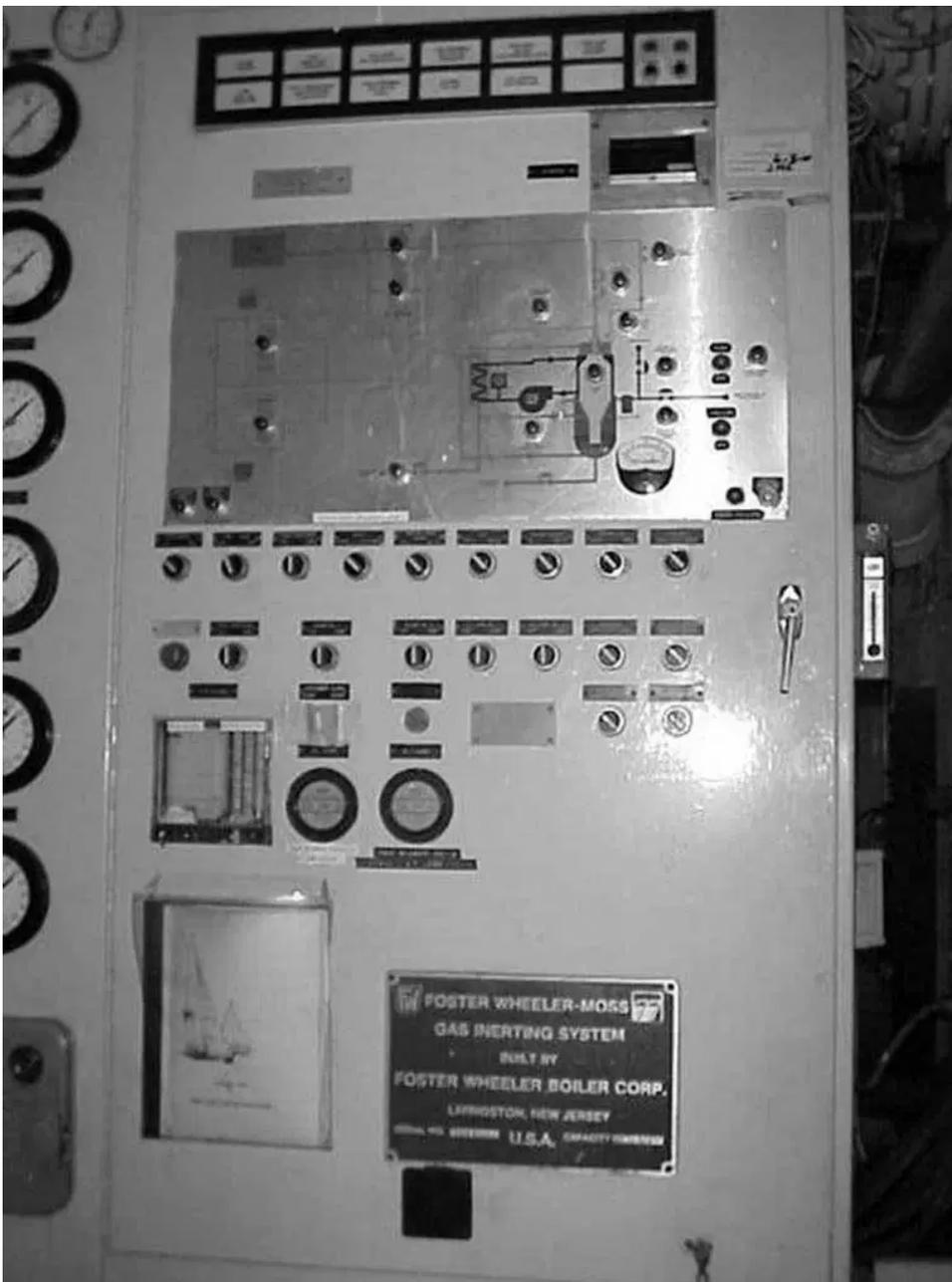
49-32  
cont.

Many experts at the time stated that due to the tanks previous cargo the explosion was not unusual. One would think that this was a logical conclusion. Flammable vapors can explode if they are confined.

So, why do I say that it should it be unusual to hear that this empty crude oil tank exploded? And, why is important that land-base firefighters care about this at all?

First, lets look at the history of the marine transport of crude oil. Many years ago, crude oil tankers were merely single hulled vessels with very few safety features. There were also not many restrictions on the venting of the tanks after unloading. In fact, many times after unloading, the tank covers were just left open to allow the tanks to vent by themselves. These openings were supposed to be covered with a flame screen but that was often either not done or the flame screens were not well maintained, and many contained holes.

If the vapors escaping the venting tanks reached a source of ignition and those vapors were within the flammable range, the vapors would ignite and burn back to the open tank causing a devastating explosion.



Inert Gas Generator.

One such incident occurred on Dec. 17, 1976 in Los Angeles harbor aboard the SS Sansinena, a tanker ship which had just unloaded her cargo of 20 million gallons of crude oil. The cargo tanks were left open to vent the tanks. This venting was legal at the time if there was a sufficient breeze. On this night however, the breeze was very slight and the heavy crude oil vapors wafted along the deck until they found an ignition source. The resulting explosion killed 9 people, broke the ship in two, and blew the deck off the ship and sent it 200 feet inland.

That incident changes some of the rules and even prompted some changes to tanker design. The SS Sansinena had a mid-ships bridge with an officer accommodation area over the product tank. After this explosion no accommodation blocks could be located above the product tanks. Another change will be mentioned below.

So, that's for a tanker at dock. The VLCC Desh Vaibhav was underway when the explosion occurred. Let's go back in history again to look at this issue. Many years ago, numerous crude oil tankers were experiencing explosions mid-ocean while returning home after discharging their cargo. Investigators were looking for any hot work being performed during the explosion which might have led to the ignition of vapors.

In many cases the crews were adamant that there was no hot work being carried out at the time of the explosion. However, the consensus of the investigators and the ship owners at the time was that the crew members were lying about the hot work because the only other operation being carried out at the time of the explosion was the washing of the tanks.

At that time tank cleaning was being carried out with water, under high pressure, ejected from nozzles either permanently mounted in each tank or from portable nozzles which would be brought out and mounted into deck openings. Again, these nozzles were only using water. That could not cause an ignition.....Or could it?

After many of these explosions, which damaged or destroyed the vessels and killed many crew members, the owners wanted a review of the water washing procedures. Engineers were able to duplicate the tank cleaning procedure for study and found that when the water left the end of the nozzle and was traveling to the sides of the tank the stream built up a static electric charge. Just as the water stream was about to touch the side of the tank the electric charge would jump, in the form of a spark, from the stream to the tanks wall. The atmosphere inside of the tank with the crude oil residue was highly flammable and confined in the tank. The explosion was so violent that it often blew holes in the vessels decks and hull plating and in many cases caused the total loss of the ship.

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cont.



Image purporting to show the blast damage aboard the Vaibhav.

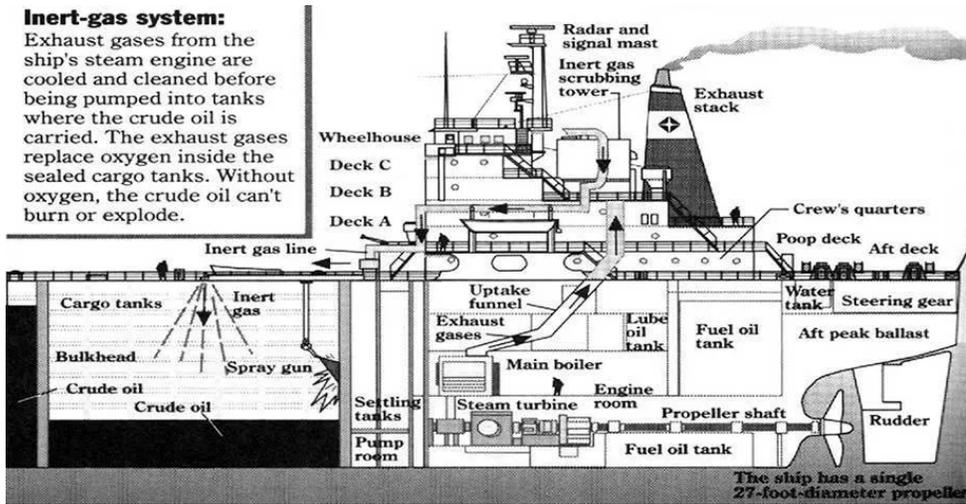
We have just found another issue that need regulations. It was determined that tankers with flammable cargos would need to be fitted with a “gas inerting system”. In 1974 the US Coast Guard formulated regulations requiring Inert Gas Systems (IGS) on all crude oil tankers over 100,000 tons that were built AFTER 1974. This rule did not affect existing ships and only applied to ships operating in US waters. After the SS Sansinena disaster the rule was extended to include all oil tankers over 20,000 tons and operating in US waters. The International reaction took much longer to provide regulatory measures to counter this problem.

In 1982, the International Maritime Organization (IMO) rules required IGS on all new oil tankers above 20,000 deadweight built after May 1982. The IMO rule was amended in May 1985 to include existing tankers.

What exactly is a Gas Inerting System? In a cargo tank containing flammable vapors there will be a vapor area above the cargo which can be flammable if there is or was a flammable cardo in that tank. If we inject another gas, which is inert, and will not support combustion, into that vapor space in enough quantities, there will no longer be a flammable atmosphere.

The International Convention for Safety of Life at Sea (SOLAS) 1974 requires the Inert Gas System be capable of delivering inert gas with an oxygen content in the inert gas main of not more than 5% of volume. By maintaining a positive pressure in the cargo tanks at all times, with an atmosphere not having an oxygen content greater than 8% by volume, the tank atmosphere is rendered non-flammable. For an added safety margin, the figure of 5% is used.

And where do we find this inert gas? One of the most common inert gasses is Nitrogen. Many ships with IGS systems will have nitrogen generators aboard. However, this can be expensive.



Inert Gas System.

But someone in the marine community looked up that his vessels exhaust stack and said, "that's an inert gas being ejected out into the atmosphere. Why don't we use that to inert the tanks and save money! And they did.

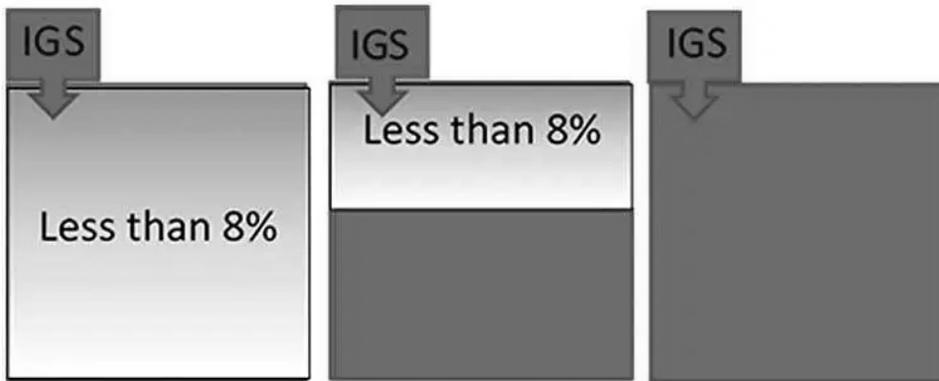
Most IGS systems aboard tankers today are supplied by the vessels own exhaust gas. Of course, the gasses must be cooled and cleaned before you would inject it into a cargo tank. That is why these vessels also have exhaust gas scrubbers. The cleaned exhaust gas is inserted into the vapor area of the cargo tank until the oxygen content of the vapor area is below 5%. At that percentage there can be no combustion.

When the ship is off-loading, the inert gas is continued to fill the empty cargo space and maintain the inert atmosphere. When the tanks are filled the surplus inert gas is vented out of risers on the deck or the vapors are returned to the loading facility.

Some of these vessels will have both the exhaust gas IGS and a Nitrogen generator which would be used as a back-up should the ships engine shut down or be unable to keep the O2 level below 5%

Safety alarms are set to go off if the oxygen level increases and the loading/un-loading operation would be shut down until the condition is corrected.

So, let us get back to my initial question from the start of this article. Why is it unusual that the VLCC Desh Vaibhav exploded? That vessel should have had a required IGS system which, if operating properly, should have made an explosion inside of a cargo tank impossible.



IGS using exhaust gas.

We will have to wait for a full investigation to find the answer but I'm willing to bet that something failed aboard which prevented the IGS system from doing its job.

This is important to land-based Firefighters because the first question I, as a marine firefighter responding to a fire aboard a tanker either loading or unloading would be, "Is the IGS system functioning properly? What is the O<sub>2</sub> level in the tanks?"

If the IGS system is not operating properly then both firefighters and mariners should be aware that the International SOLAS regulations for Inert Gas Systems requires that the system can be augmented from outside sources via required fixed piping for that purpose.

And if you're a mariner, those questions should be even more important. You will be on that vessel while its underway and you will not be able to just evacuate to the dock as I would!

<https://www.facebook.com/sharer.php?>  
Until next time. Stay safe out there.

49-32  
cont.

SECRETARIAT D'ETAT AUX TRANSPORTS ET A LA MER  
INSPECTION GÉNÉRALE DES SERVICES DES AFFAIRES MARITIMES  
Bureau enquête — accidents / mer ( BEAmer )

**TECHNICAL  
REPORT OF THE  
INQUIRY INTO THE  
EXPLOSION**

**(one fatality)**

**ON BOARD THE OIL TANKER**

**CHASSIRON**

**ON 13TH JUNE 2003**

**OFF BAYONNE**

**=\*\*=**

49-33



## **1\* CIRCUMSTANCES**

On 12<sup>th</sup> June 2003 the *CHASSIRON* called at Bayonne from Donges to unload the cargo of her 386<sup>th</sup> voyage consisting of 3 parcels distributed as follows :

- **Cargo tanks 1 (P & S) : domestic heating oil**
- **Cargo tanks 2, 3, 4, 5 (P & S) : gas oil**
- **Cargo tanks 6 (P & S) : unleaded mogas (98 octane)**

She left Bayonne for Donges at 0500 on 13<sup>th</sup> June 2003 to take on an identical but differently distributed cargo load.

- **Cargo tanks 1 (P & S) : unleaded mogas (98 octane)**
- **Cargo tanks 2, 3, 4, 5 (P & S) : gas oil**
- **Cargo tanks 6 (P & S) : domestic heating oil.**

After the vessel got under way, the pumpman and the boatswain began tank washing operations on Tank 1 (P & S) and 6 (P & S).

At 0709 they had just begun washing cargo Tanks 6 (P & S), which had previously contained mogas, when there was a very loud whistling sound immediately followed by an explosion and fire in Cargo tank 6. The boatswain who was standing by himself near the cargo manifold, was unhurt. The pumpman who was near Cargo tank 6 port was first reported missing and a search was carried out in the sea, but he was eventually found dead in the after part of Cargo tank 6 port. The deck of the vessel was ripped open from the bridgehouse to the manifold and the bulkheads of Cargo tanks 5 and 6 were severely damaged.

The fire was brought under control at 0800.

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cont.



Considerable nautical and aeronautical resources were deployed by the CROSS-A to help in the search for the pumpman on the one hand, and to fight the fire on the other hand.

A 6-man assessment team comprising representatives of the Bayonne office of the Bordeaux Ship Safety Centre, and the Bayonne harbourmaster's office as well as the Bayonne pilot and tug services went on board at 1052. After the situation had been assessed, the vessel was granted permission to return to Bayonne where she berthed at 1348.

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cont.

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## 7\* CONCLUSIONS

Up to now it has not been possible to determine unequivocally the origin of the ignition source which caused the explosion. Nevertheless, two possibilities have been retained :

- a source of mechanical origin due to the malfunction of the cargo pump,
- a source of electrostatic origin which could have been produced by a lack of equipotentiality of the cargo pump or tank washing machine, or (but this is less likely) by deterioration of the coating of the tank surfaces (spots of rust were observed at the bottom of the tank).

The air/unleaded grade 98 mogas ATEX in Tank 6 starboard only needed a few microjoules energy to ignite.

Four sequences were considered :

- **a deflagration detonation transition;**
- **a "bang box" phenomenon (high-pitched whistling sound) followed by a generalized explosion;**
- **the rapid propagation of a deflagration from one tank to another;**
- **an explosion in one tank resulting in combustion phenomena (multiple explosions) in other tanks.**

According to the analysis of the accident, the damage sustained was the result of the domino effect of a series of successive explosions (three in all) in a deflagration regime.

49-33  
cont.



The observations made by the BEAmer investigators and the INERIS specialists favour the hypothesis that the first explosion took place somewhere near the bottom of Tank 6 starboard (in all likelihood near the cargo pump), followed by a second explosion in Tank 6 port caused by the propagation of the heat of the first explosion and a third and final explosion due to the ignition of the gas oil vapour in Tank 5 port.

The noise heard just before the explosion, which was described as a whistling sound, could have been the noise made by turbulent combustion in a small confined space and, as such, would have been the "initial" event characteristic of the explosion. It could also have been due to a rise in pressure inside in the tank, the noise being made by gases escaping through the small inspection hatch just before the explosion, or again, it could have been due to friction between moving parts.

Among the factors which may have helped to trigger the explosion :

- **the operation of the pressure venting valves during unloading, opening the small inspection hatches for tank inspection and tank cleaning, the technique of injecting compressed air to strip the submerged pumps all led to the ingress of air which provided the oxidizer making it possible for an explosive mixture to form;**
- **the unleaded grade 98 mogas carried was of the "summer", less volatile variety; its vapour pressure was therefore lower than that of the "winter" product. This reduction of the vapour pressure brought it closer to the flammable range;**
- **tank washing operations set up turbulence zones within the tanks.**

Bearing in mind the low flash point of the unleaded grade 98 mogas and its temperature (25.2°C) before unloading commenced , it can be affirmed that the weather conditions had no influence on the formation of an air/unleaded grade 98 mogas ATEX during unloading.

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cont.



Tank cleaning was carried in the usual way. The pumpman was very experienced as regards tank cleaning but human error cannot be excluded. Dropping a tool, for example.

As regards firefighting, the destruction of the fire line on deck and the absence of sectioning valves on the engine-room fire main meant that the firefighting system was not immediately available (it was necessary to wait for the damaged section to be sectioned off by means of a plug). Further sectioning valves should be installed so that the fire main in the engine room remains available for use in the event that other sections of the system become unserviceable.

Finally, as a preventive measure, the use of electrostatically non-insulating paints or coatings for tank surfaces should be preferred

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# Industry supports calls for IGS on small tankers

11 Apr 2017 by Riviera Newsletters

A year after 8,000 dwt tanker newbuildings were required to fit inert gas systems, many agree this is an arbitrary limit



**A year after 8,000 dwt tanker newbuildings were required to fit inert gas systems, many agree this is an arbitrary limit**

“How big a blast can you accept?” That was how Rune Damsgaard, business director of the nitrogen-generating system maker Air Product, summed up the debate about the 8,000 dwt threshold for tanker newbuildings to be equipped with fixed inert gas systems. It was adopted by IMO’s Maritime Safety Committee (MSC) at its 93rd meeting in May 2014, came into effect at the start of last year, and applies to tankers of that size and above when carrying certain cargoes.

But ships smaller than that are also at risk of explosion. One such was *Doola No 3*, a 6,500 dwt product tanker that exploded while it was cleaning its tanks after offloading a full cargo of gasoline in January 2012. Only five of its 16 crew survived, and three casualties were never recovered. The Korean Maritime Safety Tribunal report highlighted management and operational errors: the tanks had not been adequately gas-freed, and most of the crew’s clothing “contained polyester fibres, which are highly conducive to static.”

Discussing the incident with *Tanker Shipping & Trade*, Mr Damsgaard suggested that, whatever the cause in that case, when a tank is inerted “it will forgive mistakes”.

Alfa Laval business development manager Rob Fortanier made a similar point, saying that most failures on a tanker are the result of human error or incorrect operation. Although the risk of an explosion is lower on smaller tanks, “human error can never be 100 per cent prevented, so “if safety is first, then you need inert gas on smaller vessels,” he said.

At Coldharbour Marine, which makes the Sea Guardian inert gas system (IGS), commercial manager Phil Hughes echoed that sentiment. “Inerting systems should be fitted to smaller vessels, particularly on newbuildings,” he said.

But Erik Taule, general manager for IGSs at Wärtsilä Moss, provided a reality check. He agreed that “statistics do not lie: size does not dictate explosions.” But “the market does not show any signs of implementing safety systems that are not required under rules and regulations,” he added. In his experience, no customer has asked for an IGS to be included in a quote involving vessels below 8,000 dwt.

Even with the lower tonnage limit, it will be some time before a significant proportion of



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## Editor's Choice



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**Flashpoint, not size, is what matters**

If a ship's size should not be used to determine whether it needs an inert gas system (IGS), what is the alternative? When IMO debated the changes to Solas in 2007, Intertanko's delegation proposed that its cargo's flashpoint should be the deciding factor.

It is an approach supported by Rune Damsgaard, business director of the nitrogen-generating system maker Air Products. He pointed out to *Tanker Shipping & Trade* that offshore supply vessels, irrespective of their size, already have to have nitrogen systems for carrying low flashpoint liquids. So the principle already exists.

Class notations might be one way of indicating what cargoes a ship could carry, he suggested. Chemical tanker notations already reflect this, based on their tank construction and equipment outfitting, so a similar notation could be devised based on a tanker's inerting system.

By this assessment, for example, a tanker destined for a long-term charter to carry vegetable oil would not need an IGS, whatever its size. It must be carried in a ship classed to carry IMO type 2 chemicals that, depending on its size, will be fitted with an IGS that is never used apart from when it is tested. "The rules should be more in balance with real life," Mr Damsgaard said.

49-34  
cont.



TANKER SHIPPING & TRADE



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## Tab 13

### List of Inaccurate Staff and Public Statements CARB Hearing on At Berth Rule – Dec. 5, 2019

- p. 5:19-24: “Further emissions reductions from ocean-going vessels at berth are needed to provide public health benefits to the port communities that are already heavily burdened by air pollution from port-related freight sources, as well as to contribute to our ozone and greenhouse gas reduction goals.”
  - The evidence in the record does not support the view that reductions at berth are likely to be any significant contributor to achieving ozone and greenhouse gas reduction goals, or that such reductions will yield any measurable net public health benefit.
  - Also, Staff’s estimate of growth in emissions is inaccurate, as it only relies on the 2016 Mercator report and the Freight Analysis Framework
  
- p. 7:16-22: “But staff has taken this opportunity to really connect with our port communities and work closely with them and the maritime industry in order to develop a regulation that’s really health protective, but also takes into account the unique operations that occur in our ports here in the State.”
  - Also p. 14:4-6: “Now, to develop this proposed regulation, staff has conducted extensive community and industry outreach.”; 13-19 “We’ve also had the opportunity to thoroughly engage with our maritime industry. We’ve gotten the opportunity to visit many of the vessels, ports, and terminals that would be included in this regulation. And again, the tour gave our staff a much better insight to understand the unique layouts and operations of some of these vessels, terminals, and ports.”
  - Staff has largely rejected data from industry showing that the regulations are not likely to reflect the public health benefits staff claim.
  
- p. 13:6-11: “Now, after full implementation of the existing regulation in 2020, there are no additional measures on the books to continue reducing the remaining health benefits -- or sorry, the health burdens that are associated with our ocean-going vessels at berth.”
  - The suggestion that the existing regulation would not continue to reduce health burdens and emissions after 2020 is not true. The existing regulation imposes aggressive diesel engine operational time limits and emission reduction requirements that apply indefinitely, and those limits and reductions have gotten more and more stringent over the past 10 years. Electricity provided to vessels at berth must meet minimum NOx, PM and CO emissions standards. Vessels visiting a terminal equipped to provide compatible shore power must use that power in every visit to that berth. These are measures that will continue to yield health benefits well beyond 2020.
  
- p. 14:21-24: “So through this extensive interaction, staff was able to craft a proposal that we believe is aggressive, yet technically feasible.”
  - Also, p. 26:10-12: “Now, technology manufacturers have assured CARB staff that there are engineering solutions for both ro-ro and tanker vessels.”

- The technology providers may have assured staff that engineering solutions can be developed at some future date, but they have not stated that solutions currently exist or that implementation can be assured within the proposed timeline. As WSPA has discussed with CARB staff on numerous occasions, the evidence demonstrates that implementing the necessary infrastructure at tanker terminals cannot be accomplished feasibly and safely within the rule’s deadlines. Moreover, there is no way to know whether the proposal as currently designed is ultimately feasible without conducting a feasibility study.
  - Moreover, technology providers have not assured staff that feasibility is already demonstrated. *See, e.g.*, Initial Statement of Reasons Appendix C-1 (SRIA), p. 81: “During meetings between staff, tanker industry stakeholders, Tri-Mer and CAEM, Tri-Mer stated that a feasibility study would be needed at each terminal to determine how the technology would be incorporated into the terminal’s operations.”
  
- pp. 25:24-25 to 26:1-6: “So I also mentioned earlier that the proposed regulation also includes an interim evaluation in 2023. So staff have set ambitious implementation timelines for realizing the health benefits of this regulation as early as possible, but we also realize there may be some uncertainty with adapting these technologies for new vessel types and also with the infrastructure developments that may be required.”
  - This is not a matter of mere “uncertainty with adapting these technologies for new vessel types and also with the infrastructure developments that may be required.” CARB staff have not established in the **first** instance that the current state of technology would even allow for tanker adoption at private marine terminals.
  
- p. 26:12-13: “And shore power has actually been used on tanker vessels here in California.”
  - The evidence does not reflect that this has been done at scale anywhere for oil tankers calling on private marine terminals.
  - Other statements in the transcript itself rebut this claim. *See* p. 106 (Port of Long Beach (“POLB”) tanker demonstration is unique), p. 114 (T. Umenhofer response to Board member Gioia), pp. 118-119 (B. McDonald response)
  
- p. 26:16-20: “[S]taff have been able to analyze multiple terminal infrastructure projects really to assess the timelines that are required to complete existing projects. And we feel the timelines that are proposed here are aggressive but feasible.”
  - As industry has communicated to staff, the existing projects staff have looked at do not begin to reflect the massive and complex level of work that would be required at terminals to construct equipment that would even have a chance at meeting this regulation.
  
- pp. 26:21-27:1 – “However, to address the uncertainty of the timelines for these new vessel types, CARB staff propose an interim evaluation in 2023 to assess the progress of adapting technology for new vessel types and also the necessary infrastructure improvement projects that might be going on.”

49-35  
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- This proposed interim evaluation, not due until in December 2022, would not “address the uncertainty of the timelines for these new vessel types.” This is not just about “uncertainty of timelines”; this is about whether compliance with the regulation as written is feasible at all for marine terminals hosting oil tankers. The current regulation imposes hard deadlines for tanker compliance, regardless of the results of the interim evaluation. So, terminals will be bound by those deadlines irrespective of the actual feasibility of these measures in that timeframe, and would be completely dependent on CARB choosing to adopt new deadlines, which this regulation would not require it to do.
  - Board member Gioia, on pp. 153-158, expresses concern about long permitting time frames, referencing his own experience.
  
- p. 27:10-18: “And most importantly, as seen here on slide 20, the health benefits of the proposed regulation outweigh the costs. And looking at real costs for the regulation, so in other words those costs that might be passed down to the consumer, we’re looking at the total cost of the proposed regulation are expected to be minimal on a per unit basis, for example, less than one cent for a gallon of fuel.”
  - See also p. 28:9-12: “So the projected NOx reductions of 46 percent and diesel PM reductions of 52 percent at full implementation of the proposal are shown here on slide 22.”
  - See also pp. 28:19-29:1: “Now, as a result of the projected emissions reductions achieved by staff’s proposal, a reduction in potential cancer risk of 55 percent is projected for the ports of Los Angeles, Long Beach, and Richmond. And non-cancer related benefits are also expected in association with staff’s proposal, including 16 avoided emergency room visits, 72 avoided hospital [ad]missions, and 230 avoided premature deaths.”
  - The evidence does not establish that the health benefits would outweigh the costs, as CARB staff consistently overstate the expected health benefit versus the baseline and understate the implementation costs to industry.
  
- p. 28:2-7: “Now, an important highlight on this slide is the \$10 million that CARB has earmarked for a capture and control system for tankers. Now, it’s staff’s intent that a tanker terminal would use these available funds to demonstrate capture and control technology use on tanker vessels here in California.”
  - The fact that CARB has earmarked this \$10 million evidences that capture and control has not been demonstrated on tanker vessels, and belies the claim that stack capture and control has somehow already been shown to be feasible. Capture and control is not ready for field demonstration on tankers, and it would be unsafe to attempt one at this time. Not only is a feasibility study required, but industry would need to first perform engineering to address the unique safety considerations of tankers and the diverse configurations of the worldwide tanker fleet. If the technology shows promise, it can lead to a field demonstration, but only as the final step.
  
- pp. 30:23-31:2, 11-15: “Now, staff is also proposing to develop a process for industry to pursue innovative emissions reductions concepts, if they can be proven to achieve extra

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or early emissions and exposure reductions in impacted port communities without a delay . . . Now, these concepts would be limited in duration and only acceptable until the infrastructure needed for the regulation is completed. They would not provide an out [from the] At Berth Regulation and the process would include an opportunity for public review.”

- *See also* pp. 49:24-50:5: “BOARD MEMBER TAKVORIAN: So we can't have this temporary solution occurring and all the effort going into that and then the permanent solution fix being worked on afterwards? TRANSPORTATION AND TOXICS DIVISION CHIEF ARIAS: Correct. This is not in lieu of ultimate regulatory compliance.”
  - *See also* p. 174, Takvorian: innovative alternatives shouldn't be a “way out”; and p. 183, Mary Nichols, interim review should not provide “a potential off ramp.”
  - Industry stakeholders clearly stated to CARB staff that alternatives like those discussed would need to be **in lieu of** the proposed reduction requirements for tankers visiting terminals, not in addition to the regulation, or only available for the time needed to build infrastructure.
  - These statements reflect staff's assumption that, even if the emission capture and control technology is not feasible today, it will be in the future, so that alternatives or “innovative concepts” would only be necessary as a “bridge” to the ultimate control technology. But this is only an assumption; no evidence exists today that the currently proposed capture and control systems for tanker terminals would ever be reasonably safe and feasible. The rule needs to provide for permanent alternatives that can still accomplish the same reductions in mass emissions, but feasibly and more cost-effectively than the proposed rule. *See also* WSPA's more detailed comments on the Innovative Concept proposal in our letter on the 15-Day Changes.
- 
- p. 37:5-9: “So we would, at this point, as I think Nicole mentioned and there's a picture in one of the slides is that shore power has been and is in use at a terminal in Long Beach at T121. And so it's -- it is demonstrated to be effective for tankers.”
    - From POLB – T121 Marathon Terminal does have shore power capability that is being used by one tanker vessel, but that vessel is unique because it uses diesel electric engines. The rest of the vessels visiting the Port are not capable of shore power retrofits, as their boilers cannot be electrified. *See* POLB letter to CARB dated December 9, 2019, Comments on the Proposed Regulation Order, “Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port”, p. 2.
  
  - p. 54:11-16: Sara Rees, South Coast Air Quality Management District staff, stated: “For ro-ro vessels, we are suggesting an earlier compliance date of 2023 instead of 2025 for the ports of Los Angeles and Long Beach. We're requesting this as ro-ro vessels have similar operational power requirements as container vessels and currently approved technologies can be utilized by these vessels.”
    - *See also* p. 26:10-12: “Now, technology manufacturers have assured CARB staff that there are engineering solutions for both ro-ro and tanker vessels.”

49-39  
cont.

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- On the contrary, according to POLB’s December 9, 2019 letter (p. 1): “The implication that RoRo vessels could utilize current emission capture and control technology is not true. The technology for RoRo vessels will need to be engineered to accommodate the greater reach requirements of the RoRo vessels and different stack configurations. A technology capable of scrubbing RoRo emissions has never been demonstrated to date.”

49-40  
cont.

- pp. 78:22-79:14: A resident of Point Richmond stated that “there are sites which can implement these requirements in a significantly shorter time. For example, there the Chevron's Long Wharf dock, which is leased from the State of California. Four hundred vessels a year, sometimes four at a time, dock there, running their auxiliary diesel engines 24 hours a day, and spewing diesel particulates borne by the prevailing wind directly into the City of Richmond. These vessels referred to as lighters by Chevron as -- but as tankers by a layman, are part of a shuffle of perhaps only a dozen different -- distinct vessels. Chevron, which has its own electric power plant and can provide electricity in any quantity, and of any type required to allow these ships to heat the crude oil and pump it up to the refinery without running their diesel engine. Chevron was asked to do this almost five years ago, during refinery modernization but refused to do so.”
  - This statement from a lay member of the public is incorrect.

Chevron’s two existing Cogeneration plants, built in the 1990s, are fully subscribed to support existing refinery operations as the refinery is a net importer of power from PG&E under normal operating conditions. Any incremental power demands as a result of construction or operational activities needed to comply with CARB’s At Berth regulation would require either construction of an additional Cogen to support shore power, or additional purchased power supplied from PG&E to support the capture and control system. This means that Chevron and/or PG&E would have to build electrical infrastructure to support either proposed emission reduction technology.

49-41

The duration of time necessary for this project to be implement at any marine terminal is driven by the following factors: (1) development and testing feasibility of a technology that is safe and suitable for tankers and tanker boilers; (2) design and engineering; (3) completing the CEQA process and obtaining any required permits; (4) procurement of novel equipment developed for this application; and (5) construction in compliance with existing federal, state and local requirements, including species-specific construction windows within San Francisco Bay. To complete the above steps, Chevron has previously provided comments to CARB that the it estimates the above process to take approximately 10 years, and possibly longer, from start to finish. In contrast to the commenter’s statement, it would take Chevron longer to construct the required equipment than most other terminals, because Chevron’s terminal has four operating berths that must remain operational throughout construction to minimize the risk of supply disruptions to the Bay Area.

Chevron Richmond Long Wharf sees upwards of 200 unique vessels calling its Wharf in any given year, not a dozen as mistakenly stated by the commenter,

further complicating the feasibility and timeline for implementing the stack-based capture and control system and shore power.

49-41  
cont.

- pp. 81-89: Staff describes the AMEC system, allegedly an existing feasible capture and control system. This is based on the Coalition for a Safe Environment comments.
  - WSPA understands that the system referenced is a capture and control system for container vessels located at the Port of Long Beach, and has not been designed or tested for tankers.

49-42

- pp. 145-148, in a response to a commenter who misunderstood the summary of CEQA impacts, Chair Nichols stated that the environmental analysis “is not intended to say that there’s any harm that we know of that would come about as a result of implementing this regulation.” CARB counsel stated “[w]e didn’t want to suggest that those changes are going to be really considerable or environmentally harmful” and “we would expect that the local government that approves those infrastructure changes would implement those mitigation measures.”

- The Draft Environmental Analysis (“Draft EA”) discloses numerous environmental impacts that are potentially significant and unavoidable. In addition, as discussed in WSPA’s December 3, 2019 comments and our comments on the 15-Day Changes, the Draft EA understates and fails to adequately address numerous environmental impacts. Even for a regulation intended to benefit air quality, CARB cannot downplay environmental impacts from implementation; disclosing and mitigating such adverse side-effects is the purpose of CEQA review. Moreover, the time needed for local governments to conduct project-level CEQA review that would result in mitigation measure implementation is one of the key reasons that the deadlines are infeasible, as explained in WSPA’s December 3, 2019 comments.

49-43

- pp. 154-159; Board member Gioia is receptive to innovative alternatives whether reductions come from ship or on shore so long as the reductions are additional as required for offsets.
  - *See also* Board members Balmes, Riordan, Mitchell, pp. 165-167, all of whom express interest in obtaining truck emission reductions from alternatives to the proposed regulation.
  - *See also* p. 140 where an environmental justice advocate supports the alternative of truck electrification as a “tremendous opportunity.”
  - If the terminal operators have implemented truck electrification or some other alternative to CARB’s satisfaction, in the period beyond the deadlines while the feasibility of an at berth system is still being explored, there would be no reason to stop and undo the already working alternative and instead implement an at berth control system at a later date. Requiring operators to do so would be arbitrary and capricious double-counting, unnecessary to address emissions already offset by the alternative. *See also* WSPA’s more detailed comments on the Innovative Concept proposal in our letter on the 15-Day Changes.

- p. 168:17-23: “In the course of developing this regulation, staff has done two things. One, in 2018, we did a technology assessment. And part of that technology assessment looked at different technologies, what they were feasible -- what -- how they were feasible, areas that they needed improvement. So that in itself was a portion of the feasibility study.”
  - CARB OGV Technology Assessment looked at the technologies available to date but did not include a formal engineering assessment to evaluate the readiness to control emissions from other vessel types.
  
- p. 169:9-21: “And so in terms of a feasibility study, we feel that between those two documents that we have done a feasibility study. And we have found that these technologies, they exist already, they can be adapted to tankers. We do feel there are safety challenges that are going to have to be addressed during the design. There are going to be site-specific issues that need to be addressed during design and engineering. And so I think our position is that we have done a feasibility study. We need the regulatory certainty now to move into the process, where we're actually looking at design and site-specific engineering projects for these different tanker terminals.”
  - The “two documents” referenced here are the Initial Statement of Reasons (“ISOR”) for the Proposed Regulation and the CARB’s Draft Technology Assessment: Ocean Going Vessels (May 2018). A detailed assessment of both documents and their inadequacies as feasibility studies is attached as Attachment A to this Tab 13, “Review of the ‘Feasibility Study’ for the Proposed At Berth Regulation.
  - Staff has not done a robust feasibility assessment to date. The CARB berth analysis is not a technical document, but simply an aggregation of terminal operator and harbor pilot opinions, and Google Maps review.
  - The berth analysis should have been based on an engineering assessment of the infrastructure required at the terminals. In addition, costs used by CARB in the ISOR are based on conversations with technology developers, rather than real cost quotes.

## Attachment A

### Review of the “Feasibility Study” for the Proposed At Berth Regulation

ARB has concluded that the most likely emission control system for tankers is a shore-based capture and control system (“SBCC”); ES-26 ISOR. At the December 5, 2019 CARB Board hearing, CARB Staff (Bonnie Soriano, video marker 3:38) claimed they have completed a feasibility study for SBCC for tankers at marine terminals. They claim the [2018 Technical Assessment](#) and [ISOR](#) amount to a feasibility study that examines:

1. cost
2. cost-effectiveness
3. market availability
4. ability to scale up
5. safety issues.

This claim was false and misled Board members and the public. Neither document shows how existing capture and control technologies can be adapted to tankers at marine terminals, or that such a technology has been developed. The documents acknowledge the need to re-design and scale up existing technologies because tankers and marine terminal environments are unique, but provides no discussion of how those technologies can be re-designed, omits any discussion of industry’s safety concerns, and defers safety studies. As shown below, the 2018 Technical Assessment and ISOR do not identify existing applications of SBCC for tankers at marine terminals and therefore, CARB cannot claim SBCC is feasible for tankers at marine terminals

49-45

#### I. 2018 CARB Technical Assessment

- A. **Only three pages (out of 147) discuss the state of shore/barge-based emission control systems.**
- B. **The document does not identify any existing SBCCs in a marine terminal and tanker application.** It only identifies two technologies (METS-1 and AMECS) which are barge-based, in use at a port, and only on container vessels. There is no discussion of how adaptable these technologies are to tankers and/or marine terminal environments.

From pages 70-71 of the Technical Assessment:

### Shore- and Barge-Based Emission Control Systems (connected at dockside)

#### 1. Technology Description

Shore-based emission control systems include exhaust gas scrubbing technologies and after-treatment technologies that allow for the capture of auxiliary engine emissions as they exit the stack and treat the exhaust before it is released to the atmosphere. There are also shore side electrical pumps to assist in offloading product from tankers (typically steam turbine pumps are used for offloading). There are currently two barge based systems on the market: the Marine Exhaust Treatment System-1 (METS-1) developed by Clean Air Engineering Maritime, Inc., and the Advanced Marine Emissions Control System (AMECS) developed by Advanced Cleanup Technologies, Inc. These systems are both located at POLA/POLB, and are used by container vessels as an alternative technology to fulfill emission reduction requirements at berth to comply with CARB's At-Berth Regulation.

Figure III-8: AMECS Barge System



The barge based exhaust cleanup systems captures the vessel's exhaust directly from the exhaust stack, using long, flexible ducting to transfer the exhaust smoke back to the barge to be cleaned. Flexible ducting is brought by crane to the vessel's stack. The current systems operate under a strong vacuum to reduce any leakage of air from the

70

NOT shore-based

NOT marine terminals. NOT tanker vessels

Only discussion of shore-based system. Future demonstration is NOT for atanker. NOT for a marine terminal.

Technology is "demonstrated" based on METS-1 and AMECS. Again, NOT shore-based, NOT on tankers, NOT at a marine

exhaust. Once on the barge, the system reheats the exhaust and injects urea so that a selective catalytic reduction system can remove NOx. The system also passes the exhaust through a particulate filter. In addition to engine exhaust, these systems have the potential to also capture and clean boiler exhaust.

Bonnet technology can also be utilized via a land-based system. A shoreside system demonstration is currently planned for use on bulk vessels at POLA beginning in 2018.

#### 2. System/Network Suitability and Operational/Infrastructure Needs

Barge-based exhaust cleanup systems are capable of connecting to a vessel's stacks with a crane mounted ducting system. The barge is towed in place with a tug boat next to a vessel at-berth. These systems have the potential to capture and control the emissions from a range of vessels at berth, and possibly from vessels while anchored. There are times when the barge may be unable to safely connect to a vessel. For example, there may be safety concerns if a crane works a vessel while opposite the barge or if strong winds are occurring. Additionally, the control barge may share the same footprint of a bunker barge, so when vessels are being refueled at-berth, the vessel may be unable to use the barge based control system. Different vessel types may also have different concerns. Providers of barge-based systems are aware of many of these operational concerns, however, and take steps to mitigate them. Taking operational challenges into consideration, a barged based emission control system may be a cost effective option for reducing emissions from vessels that visit infrequently or are unable to connect to shore power, with little to no modification to the vessel.

#### 3. Technology Readiness

To meet the goal of eliminating at-berth ship emissions, continued work on alternative shore power technology is needed to assist vessels and terminals where shore power infrastructure is not feasible or available. Alternative shore power technologies have been demonstrated and are now being deployed. Two systems, the Marine Exhaust Treatment System version 1 (METS-1) and the Advanced Maritime Emission Control System (AMECS) received approval in 2015 for use on container vessels as an alternative to shore power for compliance with CARB's At-Berth Regulation. Clean Air Engineering's METS-1 was developed at POLA as part of a terminal lease obligation. Advanced Cleanup Technologies' AMECS was developed through San Pedro Bay Ports Technology Advancement Program (TAP).

**C. The report agrees with industry that more work (i.e. feasibility study) is needed to demonstrate the technology.**

From page 71 of the Technical Assessment:

6. Next Steps to Demonstrate and Deploy Technology

Although these shore-based and barge-based emission control systems are effective at reducing PM and NOx emissions on container vessels, more testing is needed on other vessel types, including tankers, auto carriers, general cargo, and bulk cargo. Additional work with stakeholders is needed to identify and implement methods (e.g., incentives, regulations, and lease agreements) to encourage or require deployment of additional shore power or alternative shore power systems beyond what's needed to comply with CARB's At-Berth Regulation.

**D. The report acknowledges problems with using SBCCs on tanker boilers**

From page 104 of the Technical Assessment:



Auxiliary boilers are not presently subject to CARB's At-Berth Regulation since they provide steam rather than electrical power. However, they are subject to the low sulfur fuel requirements in both CARB's OGV Clean Fuel Regulation and the federal ECA. These fuel requirements significantly reduce their PM and SOx emissions, and their NOx emissions are already low compared to diesel engines. Additional reductions may also be possible in the future by utilizing new control technologies. One possible control strategy is the use of a barge or land-based bonnet capture and control emissions control technologies discussed in Section III.E. Bonnet capture and control systems are designed to control auxiliary diesel engines, but could potentially also be used to capture and control tanker boiler emissions. Current designs may not be suitable to control the large exhaust volumes from tanker boilers offloading petroleum products, but if the current designs prove to be effective in controlling emissions from smaller emissions sources, it may be possible that they could be scaled up to handle the larger exhaust volumes from tanker boilers.

## II. ISOR

- The ISOR does not show that a SBCC for tankers at marine terminals is available on the market.
- The ISOR does not address how a SBCC can be designed to operate safely for tankers at marine terminals.
- The ISOR discusses the need to scale up existing capture and control, but does not provide an existing example.
- Therefore, the ISOR cannot reasonably estimate cost or cost-effectiveness of SBCC.

**A. CARB omits industry’s safety concerns of land-based systems. CARB does not provide an example of SBCC adapted for tankers.**

From page ES-30 of the ISOR

The infographic for section A consists of two red callout bubbles on the left and a white text box on the right. The top bubble contains the text: "CARB omits industry's safety concerns over land-based systems." The bottom bubble contains: "No working designs for tanker vessels." The text box on the right contains the following text: "For tanker vessels, CARB staff assume the preferred approach to reducing emissions at berth will involve capture and control systems based on conversations with industry members and representatives. Tanker vessel operators have expressed safety concerns with barge systems and indicate the method of capture and control would be land-based, which may require significant infrastructure improvements to the existing tanker terminals across the state. Controlling the auxiliary engines and boilers at berth also mean that the existing capture and control systems will likely need to be able to handle a higher amount of exhaust gas, and as a result may need to be re-designed and scaled up accordingly. Because of the extent of engineering and infrastructure work needed to adapt the existing technologies for use on tanker vessels, CARB staff propose a January 1, 2027, compliance date for tankers visiting regulated terminals at POLA and POLB, and a January 1, 2029 compliance date for the remainder of the tanker terminals across California." A vertical bracket on the right side of the text box is labeled "49-46".

**B. CARB does not provide an example of any capture and control system adapted for marine terminal environments**

From page ES-30 of the ISOR:

The infographic for section B consists of a red callout bubble on the left and a white text box on the right. The callout bubble contains the text: "CARB acknowledges unique environment of marine terminals, but does not explain how existing SBECT can be adapted to operate safely." The text box on the right contains the following text: "During these conversations, CARB staff learned that the process of improving infrastructure at the POLA and POLB was typically faster than in Northern California, due to additional permitting and conservation requirements placed on terminals in the San Francisco Bay.<sup>56</sup> The terminal infrastructure in Northern California may require more complex infrastructure improvements as the Northern California marine oil terminals (also referred to as "long wharves" can stretch out over a mile into the San Francisco Bay and Carquinez Straits, and can be affected by harsher weather conditions and stronger currents than their Southern California counterparts. Figures ES-17 and ES-18 show an example of the two main tanker terminal types in California." A vertical bracket on the right side of the text box is labeled "49-47".

From page I-32 of the ISOR:

The infographic for section B consists of a red callout bubble on the left and a white text box on the right. The callout bubble contains the text: "The two approved capture and control systems are barge-based used at ports. They are not designed or used for tankers at marine terminals." The text box on the right contains the following text: "Thus far, CARB staff has issued Executive Orders formally approving two barge-based system designs (by two manufacturers), consistent with the provisions of the Existing Regulation. Approval required "real world" demonstration of the effectiveness of each system in both capturing and controlling emissions on a number of vessels at berth. The calculated performance of the system must consider the emissions from the small engine on the barge. Each system has continuous emissions monitoring to detect any problems with performance over time." Below this is a second paragraph: "Terminals with wider channels may readily accommodate a barge alongside a vessel at berth, but terminals with narrow channels may not be able to physically fit a barge without blocking navigation in the channel. At many of Northern California's independent marine terminals, there are also potential constraints resulting from the impacts of tidal flows and from prohibitions on impeding the transit of other vessels in designated shipping lanes (between the supports of an adjacent bridge, for example)." A vertical bracket on the right side of the text box is labeled "49-47".

**C. The only SBCC is a prototype not used for tankers at marine terminals, nor is there discussion on how it can be adapted.**

From page I-33 of the ISOR:

This is the ONLY discussion of a land-based system. Still, not used for tankers at marine terminals.

This approach is essentially a land-based version of the barge-based system described above. There is one prototype unit in operation (Figure I-23) that is semi-mobile (the system can be moved along the dock by truck). Once the unit is in place on the dock, the system's articulated arm raises and places the ducting over the vessel stack. The system captures and routes the vessel exhaust emissions from auxiliary engines and boilers to the landside control technology.

**Figure I-23: Land-Based Capture and Control System**



Like the barge-based system, this compliance option would capture emissions from both auxiliary engines and boilers at berth. It reduces emissions of DPM, PM2.5, NOx, ROG, and black carbon. However, it can result in a slight increase in GHG emissions if a combustion engine is used to power the system. Future versions could be zero-emissions on-site, powered by grid electricity, batteries, or fuel cells.

**D. The report does not demonstrate that a SBCC can be designed and operated safely for tankers at marine terminals. Safety studies have not been performed.**

From page III-22 of the ISOR

The report provides for more time to build infrastructure for tankers at marine terminals, but DOES NOT explain how existing technologies can be adapted to tankers in marine terminals.

Safety studies HAVE NOT been performed because a system has not been designed

Staff proposed to split the implementation schedule into two phases for tankers. Tanker terminals at POLA and POLB would phase in first in 2027 due to fewer infrastructure upgrade challenges. The earlier date for POLA and POLB tanker terminals also highlights the pressing need for NOx reductions in the South Coast Air Basin. All other tanker terminals including the Northern California terminals would be scheduled to phase in at 2029. Combining the challenges of installing significant infrastructure and unique permitting requirements placed on terminals in the San Francisco Bay region, a longer timeline is expected for any infrastructure project being undertaken for the Northern California tanker terminals.

Regardless of location, safety studies need to be performed to ensure all safety consideration are met, given that the tanker vessels carry explosive cargos. In addition, comprehensive site-specific engineering and design work needs to be accomplished prior to implementation.

## The Feasibility Study for the 2007 At Berth Regulation

In contrast, before CARB started developing concepts for the 2007 At Berth regulation, it completed a [cold-ironing feasibility study report](#) that identified three categories of information that affirmed the proposed control technology (cold-ironing) was feasible **for vessels at locations** the rule proposed to regulate. These included the third-party technical feasibility studies commissioned by ports and existing/planned applications of cold-ironing (some excerpts shown below). Based on these sources of information, the report can and discusses cost-effectiveness.

For the proposed At Berth regulation, CARB's 2018 Technical Assessment and ISOR do not demonstrate, how SBCC is feasible **for tankers at marine terminals**, but assumes they will be and imposes control requirements and compliance deadlines. Cost and cost-effectiveness discussions are premature because the technology has not been developed for tankers at marine terminals. WSPA has invited CARB to partner and conduct a feasibility study to properly inform the proposed regulation, but it has so far declined.

### Port of Long Beach

In April 2003, the Port of Long Beach commissioned ENVIRON International to conduct a study on the feasibility of connecting ships to electricity rather than running their auxiliary engines while docked at the Port. The study, "Cold Ironing Cost Effectiveness Study," was released in March 2004, and it evaluated

### Port of San Francisco

In October 2004, the Port of San Francisco commissioned ENVIRON to conduct a study on the feasibility of providing shore power at the new passenger ship terminal at Piers 30-32. The new terminal is scheduled for completion in 2008. The feasibility study was required as part of the permit conditions set by the San Francisco Bay Conservation and Development Commission. In this study, four passenger ships that currently visit the Port were evaluated for potential cold-ironing candidates. One of these ships, the Dawn Princess, is already cold-ironed when at port in Juneau, Alaska. The cost estimates used in the report included high- and low-end estimates for ship-side conversions and shore-side

The following are descriptions of cold-ironing installations already operating on the West Coast.

### China Shipping Terminal at Port of Los Angeles

The Port of Los Angeles retrofitted the China Shipping Terminal to include a shore-power infrastructure as part of a lawsuit settlement with the Natural Resources Defense Council (NRDC), the Coalition for Clean Air, and local community groups. The settlement requires a minimum of 70 percent of ship calls to this berth, on an annual average, to utilize shore power. Two ships began connecting to shore power in June 2004. According to the Port's Stipulated Judgment Quarterly Report for the third quarter of 2005, there are now 15 China Shipping vessels that are equipped with shore power. During the first three quarters of 2005, shore power was used for 28 out of 39 ship calls to Berth

### Princess Cruises Ships in Juneau, Alaska

Princess Cruises began cold-ironing its ships berthed at the South Franklin St. dock in Juneau in 2001. The shore power operations were installed in response to community concerns over the smoke emissions from passenger ships visiting in the summer. During the summer cruise season, the air is stagnant over Juneau and the emissions from the ships' auxiliary engines significantly reduce visibility.

According to Princess Cruises, there are currently six ships that are equipped to cold-iron when at port in Juneau. If two of these ships are in port at the same time, only one ship is cold-ironed because the South Franklin Street dock has only one berth. According to Juneau's 2005 Cruise Ship Roster, 38 passenger ships visited Juneau last summer, including all six of Princess's shore-power-equipped ships. One of these ships never berthed at the South Franklin Street dock; however, the five Princess Cruises ships that did cold-iron represented 93 out of 586 total ship visits to Juneau in 2005 (or 16 percent).

### C. Future Cold-Ironing Installations

The following are descriptions of shore power installations planned for ports in California as well as ships that have already been built with cold-ironing capabilities.

#### NYK Atlas at Port of Los Angeles

The Port of Los Angeles is currently building a shore-side infrastructure at berths 212-221 (Yusen Terminal) to provide power to a container ship (NYK Atlas) when in port. The NYK Atlas was equipped with shore-power capabilities when built. The ship first arrived at the Port in August 2004 and made a total of five visits that year. The NYK Atlas is one of 36 NYK ships that visited the Port in 2004, with the other 35 vessels making a total of 107 ship visits. Shore-side construction for this installation is expected to be completed by early 2006. At this site, 6.6 kV will be provided at a plug on the wharf (a "wharf box"). Two cables that are housed on a cable reel on the Atlas will be lowered down the side of the ship via a roller guide and connected to the wharf box. Because the Atlas uses 6.6 kV, no transformer will be needed for this cold-ironing application.

#### Other Sites Planned at the Port of Los Angeles

The Port has indicated that all new shore-side power infrastructures for container ships will include a 6.6 kV plug at the wharf. Transformers, connection cables, cable reels, and plugs will be expected to be included on the ships, not at the wharf. However, the Port is considering an innovative approach of housing a portable power-transfer system, which includes a transformer, cables, and cable

## Tab 14

### Response to Coalition for Safe Environment Presentation

#### Slide 3

“Electric Shore power and SECT Technologies are Feasible”

- There are no certified, approved, or tested shore power connections or Ship Emissions Control Technologies (SECT) for tankers at tanker terminals.
- There is no standard electrical connection for tankers at this time. Any connection will need to meet strict standards to allow connection during hazardous cargo transfer operations.
- No SECT system has been tested or proven to connect to a large tanker boiler.
- These technologies have been shown to work on dry non-hazardous bulk cargo vessels, but development of safe interfaces capable of servicing tankers during hazardous cargo operations will require significant research, development, and testing.

“Electric shorepower and SECT Technologies are proven technologies”

- SECT has been proven for a specific vessel type, however there are several challenges to ensure that this technology can be safely implemented on tankers during hazardous cargo transfer.
- A standard shorepower interface must be developed to allow a safe connection at terminals that conduct hazardous cargo transfer. This connection must be retrofitted to tankers which are not currently required to have shorepower connections.
- SECT systems proven for other vessels are undersized and do not have adequate safety system interfaces to ensure safe connection to tanker boilers that are essential equipment for hazardous cargo transfer and storage.

49-49

#### Slide 4

“All Ports & Shipping Companies can use SECT until their electrical infrastructure is built”

- Current SECT systems are significantly undersized for tanker boilers.
- Current SECT systems are barge based and are not allowed alongside during hazardous cargo operations to ensure tankers can clear a berth during emergencies.

#### Slide 5

~ Use existing state-of-the art off-the-shelf proven technologies

- These technologies are not adequate in size and are not designed for hazardous cargo environments.

~ Do Not require any modification of a ship

- It is highly likely that modifications to tankers would be required to ensure a safe and reliable interface between tankers and SECT systems. The extent of such required modifications is unknown since no system has been designed for tankers.

~ Do Not require any modification of terminal infrastructure

- It has been accepted that barge based systems alongside tankers are not feasible.
- It is anticipated that most if not all terminal berths would be unable to accept structural loading from mobile systems and mobile cranes, so permanent infrastructure would be required. In addition, portable or mobile equipment must be rated for use in hazardous electric area classifications.

49-50

~ Do Not require any additional special permits

- Constructing a shore side SECT system will require major construction and permitting that will take on the order of a decade to complete.
- California Environmental Quality Act (CEQA) mandates that any project requiring discretionary approvals must be evaluated for environmental impacts, including impacts to marine resources, visual and aesthetic impacts, and safety.

49-51

- Some examples of permitting agencies with jurisdiction over marine terminals include California State Lands Commission, the US Army Corps of Engineers, California Department of Fish and Wildlife, US Fish and Wildlife Service/National Marine Fisheries Service, San Francisco Bay Coastal Development Commission and the Regional Water Quality Control Board each of which requires a discretionary approval that may be deemed “special” or supplemental to normal terminal operations.

49-51

~ Can be built Stationary On-Dock or Mobile On-Barge

- As documented, barge based systems are not feasible alongside tankers
- Constructing a shore side SECT system will require major construction and permitting that will take on the order of a decade to complete.
- New dock space will need to be constructed to support the scrubber systems and cranes at most marine oil terminals. This will create cumulative and substantial impacts to the marine environment for the scope of this regulation.

49-52

~ Work on any category class of ship

- No system has been tested on large marine boilers associated with tanker vessels.
- No similar shore system that works with tankers has been proven to work with the wide variety of tankers and tanker boilers that will call on California oil terminals.
- Tankers require significant safety considerations due to the transfer of hazardous cargo
- No SECT barge-based or shore-side system has been designed to reach to the stack of a tanker-sized vessel.
- CARB has not evaluated the safety risk of deploying a SECT system on a tanker and its potential to cause boiler overpressure and risk of vessel fire or explosion. This technology has not been proven or demonstrated to safely “work” on tanker vessels.
- Vendor AEG expressed concern regarding the variety of tanker ship spark arrestors on their stacks and SECT’s current inability to accommodate those spark arrestor designs with existing technology. AEG stated vessel-specific coupling devices would need to be created for each individual ship, spark arrestor and stack diameter. CARB’s rulemaking baseline of 2016 indicated over 1,600 tanker vessel visits to California, with many visiting no more than one time per year.

49-53

~ Capture & Treat Emissions from both Auxiliary Engines & Boilers

- No system has been tested on large tanker boilers.
- SECT builders expressed concerns about their system working at low flow rates and during dynamic changes in flow as cargo transfer rates change.
- SECT vendors have stated in stakeholder meetings with CARB in 2019 that the SECT technology is not ready for tankers and has not been tested.

**Slide 6**

AMECS has undergone risk evaluations by both the American Bureau of Shipping (ABS) and Det Norske Veritas (DNV)

- These risk evaluations did not include hazard review of interfacing with large marine boilers and their unique operational characteristics.
- Most significantly, in spite of these evaluations these systems are still not built to any recognized standard or certification.

49-54

# INTERNATIONAL LONGSHORE & WAREHOUSE UNION



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Letter  
52

May 1, 2020

Mary D. Nichols, Chair  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

## **Re: Delay At-Berth Regulations – California’s Economic Recession**

Chair Nichols:

On behalf of the International Longshore and Warehouse Union (ILWU), I am writing to request a postponement in the development of the pending At-Berth regulatory package. The California Air Resources Board’s (CARB) Initial Statement of Reasons supporting At-Berth regulations made a number of predictions that are no longer likely because of the COVID-19 pandemic. The ILWU supports improving air quality in the communities where we work and live. However, the current health crisis and resulting economic recession have caused a decrease in work for port workers. The proposed regulations would impose financial burdens on terminal operators and ports that would result in additional job loss. Given the current crisis, and for the reasons detailed below, the proposed At-Berth regulations should be postponed until January 2021 and, at that time, CARB should conduct a new economic analysis on the proposed regulations.

### **California’s Economic Recession – COVID-19 Pandemic**

CARB released its Initial Statement of Reasons on October 15, 2019 when California’s unemployment rate was at a record low (below 4 percent). In December 2019, the State of California added 12,600 non-farming jobs. However, in March 2020, California’s economy came to a halt as the State of California and local governments issued Stay at Home Orders in response to the COVID-19 outbreak. Then, California’s unemployment rate jumped to 5.3 percent and 99,500 non-farming payroll jobs were lost. This is the State’s largest unemployment rate increase on record since 1976. In the last week of March 2020, more than one million Californians filed for unemployment. The number of individuals on unemployment increased in April 2020, many private businesses have permanently closed, and local governments are facing major fiscal deficits.

CARB’s Initial Statement of Reasons for the At-Berth regulations stated, “Staff anticipates an increase in cargo shipping activity in upcoming years...”, and highlighted a report published by Mercator International in 2016 estimating “that cargo activity in the United States will grow 50 percent between 2021 and 2032, as measured in TEUs, with activity at the POLA and POLB projected to grow by 57 percent.”

However, from January 2020 to April 2020, cargo volumes have continued to decrease at California’s ports because of the COVID-19 pandemic. Specifically, ports in California have experienced the following declines:

- The Port of Oakland experienced a 7.4 percent decrease in cargo volume in March 2020 compared to March 2019;
- The Port of Long Beach experienced a 6.4 percent decrease in cargo volume in March 2020 compared to the March 2019; and
- The Port of Los Angeles experienced a 30.9 percent decrease in cargo volume in March 2020 compared to March 2019.

Clearly, a new economic analysis is needed as CARB cannot rely on pre-COVID-19 forecasts.

### **Roll on, Roll off Vessels and Job Losses**

CARB's Initial Statement of Reasons asserts that the regulations "provide job opportunities for emission control equipment manufacturers and installers, as well as engineering and construction companies." However, in addition to not accounting for the COVID-19 health crisis, the Initial Statement of Reasons fails to consider the number of jobs that will be lost as roll on, roll off Vessels go to other ports that do not impose At-Berth regulations. Roll on, roll off vessels can and will take vehicles to ports outside of California, which will eliminate port workers jobs. CARB ignores this economic impact.

52-1

Small ports in California generate a large portion of their revenue from the importation of vehicles from overseas manufacturers. In the last two months, these ports have seen a substantial decrease in vehicle imports as California's car dealers' inventory is overstocked and consumers are not making vehicle purchases. The United States is expected to see a 26.6 percent decrease in domestic vehicle sales, which is the lowest volume since 2010. Further, global light-duty vehicle production is expected to drop 21.1 percent due to the COVID-19 virus pandemic this year.

According to CARB's Initial Statement of Reasons for roll on, roll off vessels, "to utilize shore power, every vessel in a fleet would have to be retrofit for shore power to maintain maximum flexibility. Shore power installations would also require significant electrical infrastructure upgrades. Most roll on, roll off terminals resemble parking lots and do not have a large amount of existing electrical equipment." Small ports do not have the economic resources to make such large investment during the current economic crisis. Many of the fiscal assumptions that were used for the initial rule-making need to be revisited and revised based on updated economic analysis and changed conditions across industries due to the COVID-19 pandemic. The At-Berth regulations, at this time, would place a substantial fiscal burden on small ports that are seeing a substantial decrease in the movement of the commodities, such as automobiles, that make them viable.

### **Port Liability**

Ports and port workers contribute to make California one of the top economies in the world. Under the proposed regulations, beginning in 2021, ports and terminal operators will be required to submit plans regarding how terminals will comply with the requirements for ocean-going vessels visiting each berth. However, complying with these requirements for many ports is unattainable as ports do not have billions of dollars to build the infrastructure, especially during an economic

Mary D. Nichols

May 1, 2020

Page 3

recession. The regulations propose burdensome requirements and penalties on ports which will deter cargo from coming to the State of California because ports and terminal operators will not be able to comply as current economic resources are limited.

52-2

Jobs at ports are middle class jobs that cannot be replaced. These jobs are a key ingredient to the economic wellbeing of the surrounding communities. CARB must take into consideration that the proposed regulations will result in job loss, which will have a devastating impact on families that have worked for generations at the ports and need these jobs now more than ever.

The ILWU looks forward to working with CARB to improve air quality in our communities in harmony with the maintenance and creation of jobs.

Sincerely,



William E. Adams

International President

International Longshore and Warehouse Union

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Mary D. Nichols

May 1, 2020

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Sincerely,



William E. Adams

International President

International Longshore and Warehouse Union

ac:opeiu29/afl-cio



May 1, 2020

Heather Arias  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Submitted Electronically

Comments on CARB Proposed At-Berth Regulation

Dear Ms. Arias:

On behalf of the Port of Hueneme (Port) we are submitting this comment letter on the 15 Day version of the At Berth Regulation Draft. We appreciate the opportunity to comment on this draft regulation and encourage the California Air Resources Board (CARB) to consider delaying the implementation of these proposed changes as the hypothetical growth in future emissions is no longer possible given the current global economic depression and to provide more time to analyze how the economic fallout from the COVID-19 pandemic affects the California ports. The Port is in full support of statewide emissions reductions and has implemented a comprehensive clean air plan since 2013 which includes a \$15 million shorepower system which has helped reduce the emission of diesel particulate matter from Port vessels by more than 80% since 2008! The Port has installed the only reference grade air quality monitors in the adjacent community, and is building infrastructure on Port, partially funded by CARB, to power a new generation of zero emission cargo handling equipment as part of its pursuit of decarbonized, zero emission operations. The Port has worked to coordinate with CARB staff on the development of these new proposed regulations as Hueneme and our compliance characteristics and business model is unique amongst California ports.

#### Corona Virus Pandemic

In light of the historic upheaval caused by the global COVID-19 pandemic, we respectfully ask for CARB to consider the severity of the economic situation that is developing, and its effects on California's citizens and their ability to do basic things like pay rent and put food on their family's table. With record national unemployment and the wheels of trade grinding to a stop, an unprecedented downturn is beginning which will reverberate through our economy for many years to come. California's ports and their cargo movement partners are scrambling to stave off this downturn while working hard, day and night, on the critical jobs of moving essential goods like fresh foods and medical equipment.

At the present time, it is impossible for us to forecast the full impacts associated with this global pandemic; however, based on the current status of unemployment filings within the U.S. (more than 30 million in 6 weeks), the level of small business stimulus already exhausted at the National level (more than \$500 billion), it is clear that the US economy whose circulatory system is goods movement is in the early stages of a massive economic depression. Initial estimates based on the current data available are estimating that this downturn will be the most severe since the great depression of nearly 100 years ago.

BOARD OF HARBOR COMMISSIONERS

Jess Herrera President

Jess Ramirez Vice Pres

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Dr. Manuel M. Lopez Co

Mary Anne Rooney Cor

Letter  
55

PORT MANAGEMENT

Kristin Decas CEO & Port Director

Foreign Trade Zone #205



WORLD TRADE CENTER®  
OXNARD



CARB has long argued that the expansion of the current At Berth rule is required due to the growth in emissions over the next decade from unregulated vessel calls. CARB forecasted that significant emissions increases will result from growth in vessel calls to the California ports that are not subject to the current At Berth rule. However, the COVID pandemic and economic downturn is already significantly curtailing ship calls to the ports of California including the Port of Hueneme. This downturn is expected to continue for several years, especially at the Port of Hueneme due to our specialized cargo. Due to this reduction in forecasted ship visits, the increase of emissions which this new rule seeks to curtail will likely not be occurring.

#### Hueneme Specific Situation:

While ports statewide will see reductions of vessel calls and subsequent loss of operating revenue, of greatest concern locally is the Port of Hueneme and its impacts. The Port generates over 15,834 jobs in our local economy, and provides 2,536 direct jobs to our immediate community. The Port is a legacy industry serving as a vital economic pipeline for over five generations of Californians and the 4<sup>th</sup> largest employer in Ventura County.

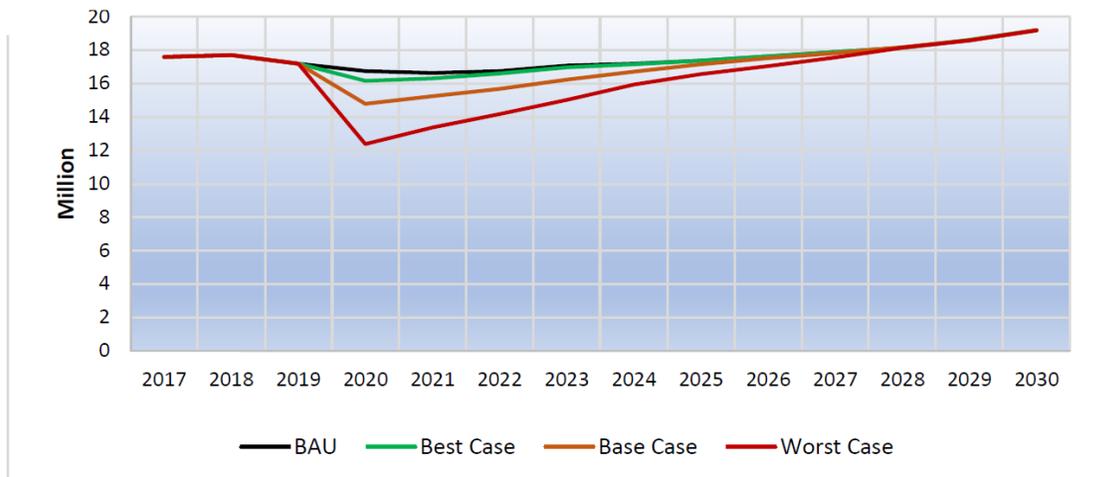
Not only is the Port critical to the region's economy, produce growers throughout California's central valley and coast also rely on the Port to export their produce to Central and South America. The Port's imported produce and goods are distributed to 15 states across America. The auto cargo moving through the Port generates nearly 60% of the Port's annual revenue. Facts about Hueneme and Auto related trade:

- 85% of our imported value annually is cars
- 33% of our imported tonnage annually is cars
- 40% of our exported value annually is cars
- 17% of our exported tonnage annually is cars

Forecasts for the global auto industry predict as much as a 20% decrease in sales from 2019 in 2020. In addition, 6 of the Port's top 10 partners by value of trade have shut down automotive production due to COVID-19 prevention. Also, 60% of our trading partners by value (cars) have shut down their automotive production plants to prevent virus spread. This link shows the numbers and countries the Port does business with. <https://www.ustradenumbers.com/port/port-hueneme-calif/>

The figure below shows the estimated impact to the auto sales industry in the US under three different impact severity scenarios. What is evident from this graph is under the different scenarios, recovery is several years out. Most of the economic models being analyzed presently are presuming that the impacts will be greater than those even estimated in late March or even early April, and that the worst case scenario of those early guesses is much more likely than the preliminary rosier guesses. This means for the Port, auto business may not return to pre-COVID numbers until 2025 or later. This means that the number of vessel calls from RORO ships will be suppressed for the next five years or longer.

**Figure 4.1 US Automotive Sales Volume Forecast Under 3 Scenarios 2017-2030 (units)**



Source: Automotive from Ultima Media

Therefore, the Port encourages CARB to delay implementing this new rule change until a clearer understanding develops of the economic condition of the State as the pandemic matures. This rule will require ports and terminals to invest hundreds of millions of dollars in new infrastructure, which these entities will have to pay for by raising their costs for their cargo customers. For the Port this means funding new infrastructure that will likely cost approximately \$10 million at a time when its revenues have decreased by more than 50% because of the COVID depression. This situation is going to be putting a huge economic handicap on the California ports (and by result the entire State economy) and thus a significant competitive disadvantage just as the economy is trying to recover post-COVID. Raising the cost of doing business in California and making it less competitive at the time when all ports nationwide will be scrambling to get business is the opposite of how to help the California economy and families recover from this economic devastation. When the Country is facing record levels of unemployment and family food insecurity, keeping people employed and growing opportunities for employment should be our focus. Jeopardizing the ability of California ports to keep business and create commerce connectivity that grows jobs is a poor path forward for the State in this current situation.

#### Ongoing Shorepower Challenges

The Port would also like to update CARB on the ongoing challenges of operating a heavily utilized shorepower system. The Port has been endeavoring since the installation in 2014 of its shorepower system to make it available to its customers for all required calls. Maintaining a fully functional array of shorepower vaults to facilitate customer compliance and enable the incredible emissions reductions made possible by the current regulations has been a top priority for Port staff. Nearly six years after the implementation of this regulation, the ports around the State continue to struggle to meet the requirements of this regulation in its current form. The lead times in acquiring parts, availability of qualified vendors to conduct repairs or maintenance all continue to be challenges which can lead to unavailability of shorepower vaults sometimes for weeks on end. For example, the Port just three weeks ago had the



annual preventative maintenance completed on its six vaults by the qualified electrical contractor. Less than two weeks later several of the vaults were plagued by outages with faults in additional parts. These systems are complicated, expensive and dangerous to operate. However, that being said, the Port is fully committed to continuing the operation of these systems.

In closing, the Port is committed to cleaner air for our local community. Many of us, including my family, live in the community surrounding the Port. Our Port community wants to be a part of the solution. For us to continue reducing emissions for mobile sources like RoRo vessels, we need accurate data and resources to thoughtfully develop a solution that can be implemented effectively. As we know, timing is everything, and in the midst of a global pandemic and economic recession, a 6 month pause in this rule making process will enable science and data to determine the best solution for these circumstances.

For us to succeed in this joint effort of a cleaner environment for existing and future generations, we need all hands on deck. We look forward to being a part of the solution, and respectfully ask for your consideration of this request.

Sincerely,

*Giles Pettifor*

Giles Pettifor,  
Environmental Manager



We write today to provide comment on the proposed rewrite of the Control Measure for Ocean-Going Vessels At Berth regulation. This letter presents the Port of Hueneme's (Port) updated comments on status of California Air Resources Board's (CARB) new proposed At Berth Regulations. In light of our extensive comments which are reproduced below unchanged from our 2017 and 2019 comments, we will update CARB with briefer commentary herein which is largely based upon the information and discussion conducted at the recent CARB Board meeting on December 5, 2019.

- The Port would first like to state unequivocally that it is in full support of regulating the emissions from Ocean Going Vessels (OGV) and has partnered with CARB and our local air district to achieve substantial emission reduction progress since the implementation of the first At Berth regulation. Thanks to the combination of the clean fuel rules and the current At Berth regulation **the Port has seen as greater than 84% reduction in the emission of diesel particulate matter from OGV at berth in the Port since 2008.**
- The Port believes that this rule rewrite has the potential to achieve further emissions reductions from OGV, however in order to ensure that the Port can continue its role as the engine which drives substantial regional economic activity, enabling employment of more than 15,000 people, these proposed revisions must be conducted in a manner which pursue the most cost effective reductions in emissions. For the Port, CARB is seeking to apply requirements for further emissions reductions which would be nearly completely reliant upon a technology that is not currently commercially available and is not yet approved for use by CARB. This alternative control system (ACT) will likely be a system which captures emissions from OGV and physically or chemically removes the pollutants from the exhaust gases. These systems are large, heavy, and technically complicated in their design and operation. The implementation of one of these systems at the Port will take substantial resources and time. **This is not to imply that the Port is in opposition to the use of an ACT system for emissions reductions in any way!** However as a steward of public funds the Port does not take lightly the responsibility of investing in a yet unproven technology which may have a cost equivalent to a third of its annual revenue.
- The CARB Board seemed during the December 5<sup>th</sup> meeting to favor moving the date of compliance for requiring an ACT for Roll On Roll Off (RORO) vessels from 2025 to 2023. At the present time the Port presumes that the State of California will require that the ACT system operate as a zero emission system which will require it to be powered by electrical power. Current barge based emissions capture systems use diesel fuel and produce significant emissions through the use of heavy machinery and generators to power the emissions filter process. Presently the Port is nearly at the maximum of its available electrical power ceiling as it seeks to continue the implementation of zero emission technologies on Port. Adding additional power load to the Port will require additional power supply from its utility provider Southern California Edison (SCE). SCE has notified the Port that the regional circuitry upgrades needed to supply the Port with additional power will be of such scale as to take three to five years to complete and cost \$30-50 million dollars. This utility upgrade would preclude the Port from being able to operate a zero emissions ACT by 2023.
- As noted, the annual revenue of the Port is approximately \$16-18 million dollars annually. It is estimated that additional shoreside power capacity at the Port would cost approximately \$20 million dollars. An ACT system for the Port is estimated to cost \$5-7 million dollars.

Additionally, the Port has only six major customers which move cargo through the Port enabling those 15,000 jobs. As noted in previous comment letters, some of the communities surrounding the Port are State designated disadvantaged communities and the Port takes seriously its role of providing the types of jobs which can enable individuals to reach ladders of opportunity. Port related jobs can bring families out of poverty and are increasingly uncommon in the state of growing economic disparity in Ventura County and the State in general. The loss of a single customer would have major economic implications to the surrounding region as each direct Port job has a multiplier creating an additional five to six jobs in the community.

- During the meeting on the 5<sup>th</sup>, many in the audience and the Commissioners stated that it would be “large multinational corporations” who would be forced to pay for these regulations and therefore the impact would be minimal amongst the “billions” which these corporations make in profits. Unfortunately, the reality is that most of the cost of these regulations will be carried by the State’s ports. Goods movement is a global system of connectivity which is structured to move goods from their location of manufacture to their location of consumption. The “large multinational corporations” involved in this process have a growing amount of choice when it comes to choosing a path through this supply chain and the ports of California are not their only choice for offloading their goods. Ports in the Gulf of Mexico and in other states along the Pacific Coast can be significantly cheaper. Rates of cargo diversion away from California will increase as California ports raise their rates to help fund the needed infrastructure improvements required by these new regulations. California ports will continue to lose market share and employment opportunities for local citizens, especially in areas already suffering from a lack of middle class jobs as the costs of doing business in California continues to increase. Additionally, the local demand for goods shipped from overseas will not diminish and that market will continue to demand fast cheap shipping for a plethora of goods from fresh produce to consumer goods. These goods will still have to reach consumers in California and when shipped into out of State ports will be trucked back into local stores and warehouses resulting in significant net increases in emissions of toxic pollutants and greenhouse gases.
- As part of its conversations with CARB over the last two years of the development of this proposed regulation, the Port has sought to make clear to the CARB staff how unique the characteristics of the Port are, and how these characteristics directly impact how it would comply with the proposed regulation. Due to our size and physical constraints solutions that work for ports like Los Angeles or Oakland are typically not well suited for application at Hueneme. However, the Port sought to show CARB that we are in full support of their goals to further reduce emissions from the Port. Thus, in an effort to help ensure that currently uncaptured emissions originating from the at berth time of the currently unregulated fleet could be reduced in the most cost effective way, the Port put together a list of potential projects which could achieve significant emissions reductions in the near term future and potentially at a lower cost. These “alternatives” were brought forward in a good faith effort to show the potential for in-lieu emissions reductions which could be financed in part by those customers of the Port in the unregulated fleets. Following months of collaborative communication with CARB staff, it was unexpected to the Port that the discussion at the December 5<sup>th</sup> meeting centered around these projects in no way being undertaken in lieu of the new requirements and could be required in the interim when direct compliance was infeasible on the short term. Thus it appears that CARB intends to require the Port and its customers operating RORO vessels be required to implement

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the alternative projects which the Port proposed on an earlier timeline and not in lieu of any of the requirements of the proposed regulations. As noted by some of the audience members the operation of a modern seaport berth is a highly technical, dangerous, and expensive ballet of many players all of whom play a part in successfully moving cargo safely and efficiently. In applying new regulations into this system, the “devil is in the details,” as noted by several CARB Board members during the meeting on the 5<sup>th</sup>. As implied by Board members during this meeting, if CARB were to propose a scheme in which the alternative projects proposed by the Port were to be required as a short term compliance step, any such regulation would have to ensure that it was procedurally and legally sound, scientifically valid, and equitable to those parties subject to the rule.

- In closing the Port wishes to reiterate again, that it is fully on-board with further reducing emissions from its operations and has multiple efforts underway at present including:
  - Writing in conjunction with the Ventura County Air Pollution Control District, its own clean air plan which will assess a brand new emission inventory for all Port activities and operations; and
  - Has just installed the first reference grade air quality monitors at a local elementary school which once running and calibrated will provide current air quality information to the local community; and
  - Writing a Port wide electrical master plan which will help to guide the extensive engineering analyses and future scenario assessment needed to continue the Port on its plans toward zero emissions; and
  - In 2020 installing infrastructure including switchgear, transformers, conduit and plugs to plug in a new generation of zero emission electric cargo handling equipment at the Port, and
  - Will be operating in conjunction with partners, an electric hybrid mobile harbor crane as well as a zero emissions hydrogen fuel cell Class 8 heavy duty truck prototype, and the first electric terminal trucks within the next two years.

The Port is committed to maintaining its critical role of being the economic engine for the region while growing its leadership in the path to a future of zero emission, sustainable goods movement. The Port envisions an equitable future in which economic opportunities and a clean, decarbonized environment are accessible locally and which both provide and give back to future generations.

Sincerely,

Giles Pettifor,  
Environmental Manager



Spring 2019 Comments:

Our comments on the current process include:

- It is imperative that CARB identify the potential for real and profound economic impacts (especially at smaller, niche ports) as well as increased state-wide emissions, (from the diversion of cargo to out of state ports) which may result from increased costs associated with the proposed regulation. Without a cost benefit analysis on a port by port basis the real impact of these changes cannot be ascertained. The Port wishes to document its request prior to **CARB's moving forward that the regulation process must include the completion of a full cost benefit analysis at each of the subject ports!** These costs should be made clear in comparison against the quantity of emissions that will be reduced at each individual port subject to the new regulations.
- **CARB needs to identify the quantified emission reductions it is seeking to achieve via the implementation of the new regulations.** This targeted volume reduction should then be applied to the modelled emissions of each port, on a port by port basis to determine what is the scientifically calculated emission reduction goal. Bringing verified, valid emissions data into the analyses for this regulatory process will ensure that the cost benefit analysis, which must accompany this effort, is as accurate as possible. The emissions of each port are different as well as the basin status and these characteristics should be reflected in CARB's analyses.
- CARB estimates of **port emissions for each port subject to the regulations should be scientifically valid, using the best available science and valid methodologies** that both CARB and the subject ports concur are valid. CARB's reduction target should be applied to the agreed upon inventory emissions amount to ensure fair calculation of responsibility.
- **The costs of proposed emissions reductions should be grounded in emissions costs generated for other similar State programs** such as the Carl Moyer technology retrofit program.
- Many ports statewide, including the Port, are investing in developing air quality plans specifically tailored to their own emissions inventory, physical and logistical characteristics of their cargo and waterfront setting, as well as their own community inputs and resource availability. These **local plans should be recognized when appropriate as real alternatives to the regulations and are avenues to emission reduction opportunities not currently contemplated by CARB as they are quantifying strategies to meet emission reduction goals.**



## **As follows the original fall of 2017 Comment Letter from the Port to CARB:**

### **I. Introduction**

The Port of Hueneme (Port) would like to thank the California Air Resources Board (CARB) for this opportunity to provide formal comments on the proposed amendments to the existing At Berth Regulations. The Port enjoys a long history of working cooperatively with both CARB and the Ventura County Air Pollution Control District (APCD) and looks forward to continuing these productive relationships to ensure success in future emission reduction programs.

Our collective efforts realized the installation of shoreside power vault and substation systems to enable the plug in of regulated refrigerated vessel fleets. At the forefront of new and innovative technologies, California leads not only the nation, but the world with shoreside capabilities. In leading the world with clean technology, we become the first to learn how to tackle the challenges inevitable with new technologies. This comment letter puts forth recommendations to address those challenges and respectfully requests that getting the first phase of the regulations perfected be the main purpose of the at-berth regulation amendments.

In the workshops of August 28 and September 7, 2017, CARB presented the concept of expanding its regulatory authority to new fleets, a concept which need thoughtful consideration, particularly as we continue to iron out the challenges with existing systems under the current regulations. As a partner in sustainable economic development, we urge CARB to consider the potential of very real impacts to local economies and pursue a cost-benefit analysis of the socio-economic impacts of the proposed amendments prior to promulgation of regulations mandating requirements on all vessel calls. Further, the true air quality benefit to a given air quality basin coupled with the actual costs of the expanded amendments needs to be fully understood to ensure the enactment of sound public policy consistent with the Governor's Executive Order B-32-15<sup>1</sup> which calls for transitions to zero emission, efficiency and increased competitiveness.

The Port appreciates the challenge CARB faces in drafting these regulations with a level of detail and forethought which accounts for the inherent complexities of the global maritime industry as well as the unique characteristics of California's ports and in a way which does not place an undue burden on these ports and put them at a competitive disadvantage. Working together we can find a solution that meets our mutual goals. The following comments provide important data and strategies to best inform future policy and regulation specific to the Port of Hueneme. The ultimate goal being to find a tangible pathway forward to achieve ambitious air quality improvements while supporting the economic backbone of socioeconomically distressed communities.

### **II. Environmental Profile**

#### ***Port of Hueneme's Environmental Framework***

Located at nexus of vibrant coastal communities, precious coastal wetlands, and Pacific Ocean pathways to our global trade partners, the Port takes very seriously its stewardship of the environment. As part of

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<sup>1</sup> [http://dot.ca.gov/hq/tpp/offices/ogm/cs\\_freight\\_action\\_plan/main.html](http://dot.ca.gov/hq/tpp/offices/ogm/cs_freight_action_plan/main.html)



this responsibility the Port focuses particularly on its surrounding communities of Oxnard and Port Hueneme, its commissioning jurisdictions. The Port exists to serve these communities as an economic center providing employment, tax revenue and trade benefits for local citizens. The Port also strives to minimize potential impacts to these communities as it is nestled in adjacent to homes, schools and businesses. Due to the proximity of these sensitive receptors, air quality is of particular interest to the Port, and the Port works every day to take steps to minimize impacts to air quality. In an effort to demonstrate the seriousness with which the Port takes these duties of protecting the environment, the Port adopted an Environmental Management Framework (EMF) in 2012. The EMF outlines the strategic efforts the Port will undertake to protect the environment, and covers eight environmental elements including:

1. Community engagement
2. Sustainability
3. Air Quality
4. Water Quality
5. Soil and sediment
6. Marine resources
7. Energy management
8. Climate change adaptation

Since adopting this proactive agenda of sustainability, the Port has pursued the integration of the elements of the EMF into its daily operations as well as long term planning. Progress has been made every year since, and in 2016 the Port became the first port in California to be certified by Green Marine, the preeminent third party environmental certification organization for marine facilities. The Port is fully committed to making environmental progress in every way that it can as it grows and changes with the global economy.

While the Port moves forward with the implementation of its EMF, it must work to expend its limited resources in a manner that balances maintenance of critical Port infrastructure with investments in new equipment and technology which help the Port to comply with regulations and improve environmental performance. For this reason, the Port is continually looking for solutions that are both cost efficient and effective for the Port's characteristics, its operations and the local community.

The Port is unique in many ways that set it apart from both the large Ports of Los Angeles/Long Beach (LA/LB) and other smaller ports like San Diego or Stockton. As the Port was constructed with private funds in the 1930's it is not a California State Tidelands Port, which gives the Port more control over its operations, more accountability directly to its commissioning communities and the ability to operate more nimbly. The Port operates on 120 dockside acres and while this is smaller than other ports, the Port is very efficient with its limited space and constantly strives to use every bit of it as efficiently as possible.

### **III. Port Hueneme's Air Quality Basin and Port Emissions**

**RECOMMENDATION: Apply the attainment status of Ventura County air basin to any regulation impacting the Port and consider the emissions data and growth rates specific to the Port as opposed to that of the LA/LB air basin or the Ports of LA/LB.**



Air quality regulation respective to a port or similar emission source should begin with a very simple analysis with two major local components:

1. Basin Status - Historical and current air quality within the basin in which the port operates.
2. Emissions - Current and estimated future quantity and quality of the port's emissions.

When beginning with these two components, it becomes clear how different the Port is from LA/LB.

### 1. Basin Status

It is not just the Port's physical setting and operations which are different from nearby LA/LB, the air quality within its surrounding basin is also very different. Table 1 presents the projected dates of attainment with National Ambient Air Quality Standards (NAAQS) for the air basins surrounding both the Port and LA/LB. The ozone standards are shown as this pollutant has the potential to exacerbate respiratory illness symptoms in sensitive populations including children and the elderly and those with inflammatory airways or asthma, and is of particular concern for community health activists.

Ozone Standard	Attainment Date	
	VC Basin	LA Basin
2008 - 8hr.	2020	2032
2015 - 8hr.	2026	2037

Table 1 Comparison Dates of NAAQS Attainment for Ventura County and Los Angeles Air Basins

Table 1 makes clear that the air quality within the air basin around the Port is now and will continue to be substantially better than that of LA/LB. The air quality within Ventura County has steadily improved during the last twenty five years even while the County's population has grown by more than 30% during that time period as clearly shown in Figure 1. Despite this growth in population, Figure 2 shows that the average ozone concentrations within the County have decreased over time, driving the reductions in days over the NAAQS metric that are shown in Figure 1.

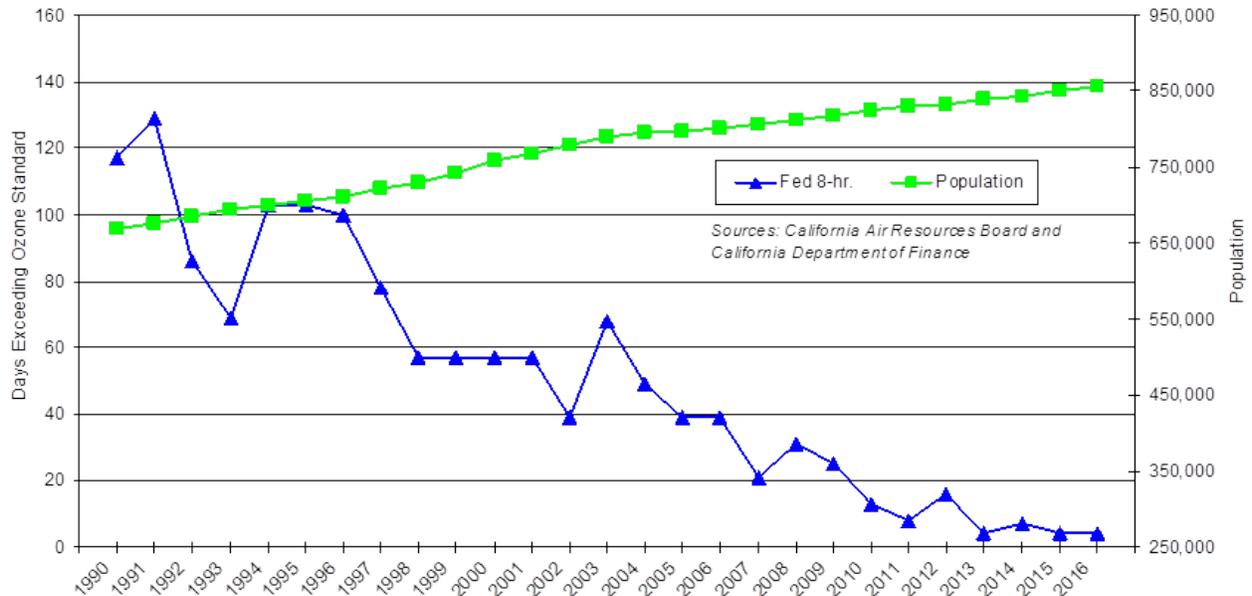


Figure 1 Ventura County Days Over Federal Ozone Standard vs. Population Growth.

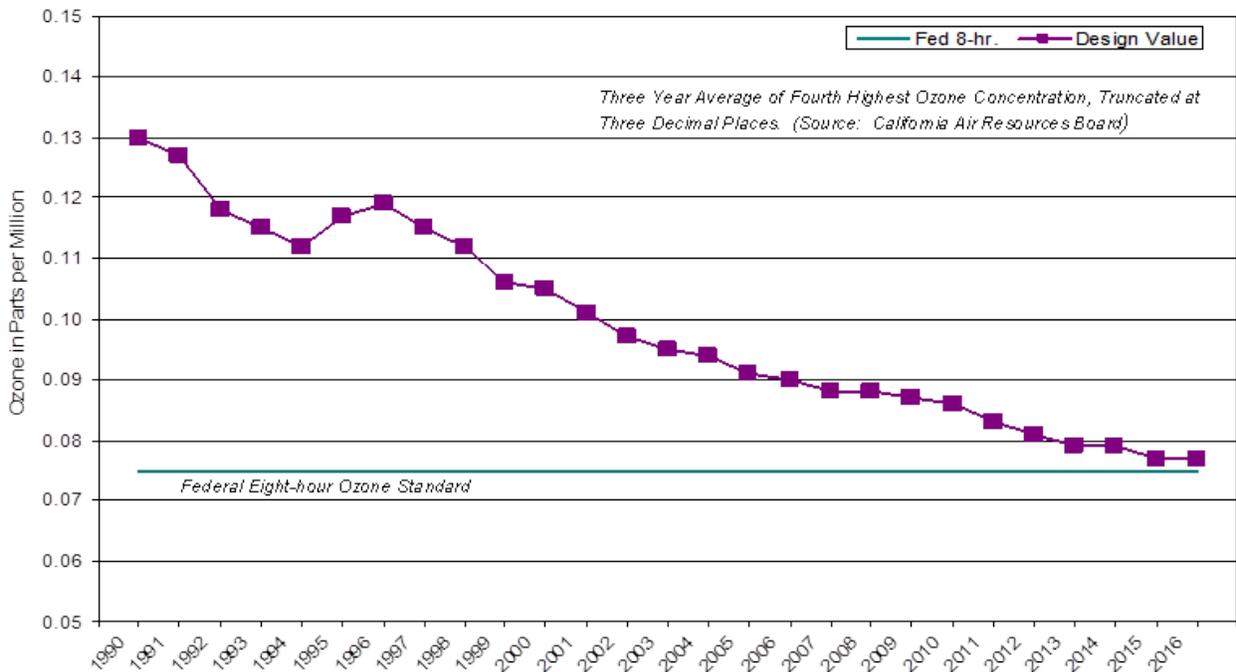


Figure 2 Ventura County 8-Hour Ozone Values

2. Emissions

**OGV Emissions**



Not only is the Ventura County air quality substantially better than that of the LA basin, a great deal of the air pollution within the air basins of Ventura County come from emissions from ocean going vessel (OGV) traffic offshore that is bound for LA/LB. The air basin over Ventura County extends three nautical miles offshore and is called the South Central Coast (SCC) Basin, while the basin which extends from three to one hundred nautical miles offshore is called the Outer Continental Shelf (OCS) Basin. CARB calculates attainment status for the SCC Basin using a photochemical model which incorporates emissions from both basins, meaning that transitory OGV emissions from LA/LB bound vessels in the OCS directly impact air quality in the SCC. When the pollutant quantities emitted by OGVs in both basins are analyzed, it becomes clear how much of a negative contribution is made by the OCS OGV, passing inside of the Channel Islands, as the majority of trans-Pacific traffic does, in transit to LA/LB.

Table 2 shows the estimated pollution contribution from OGV in both the SCC and OCS basins, while Figure 3 uses these numbers to clearly show how much greater the OCS portion is than that of the SCC basin, where the Port is located and represents a considerably low contribution to the problem.

		2020		2035	
Basin		ROG	NO <sub>x</sub>	ROG	NO <sub>x</sub>
OGV Emissions*	SCC	0.04	<b>0.84</b>	0.06	<b>1.07</b>
	OCS	0.86	<b>12.54</b>	1.6	<b>9.63</b>

Table 2. Emissions from Ocean Going Vessels within Ventura County SCC and OCS Basins<sup>2</sup>

<sup>2</sup> Ventura County Air Pollution Control District. *Final 2016 Air Quality Management Plan*. 2016

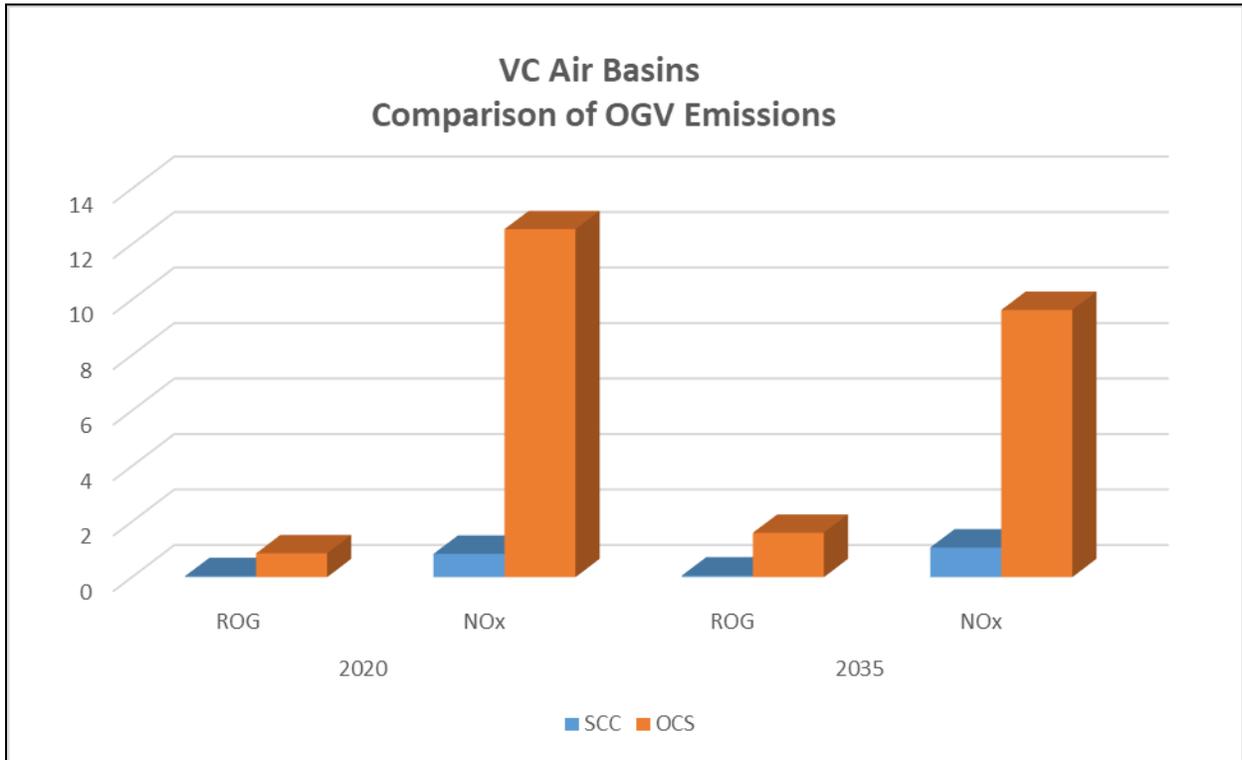


Figure 3. Emissions from Ocean Going Vessels within Ventura County SCC and OCS Basins

These numbers make it clear that Ventura County is coming from a very different place with regards to ambient air pollution levels. Essentially, the Ventura County basin's status quo is so much lower than LA/LB that it does not make sense to apply the same assumptions about emission related impacts for the Port. This point is extremely important to the proposed regulation amendments.

CARB's ongoing emission inventory analysis makes assumptions about growth rates of OGV business at California ports. CARB is applying estimated growth in OGV traffic in various vessel classes to calculate growth in emissions, rationalized by the assumption that more OGV activity means more engine use, which equates to proportional increases in emissions. During this process, the ports were lumped into regions for simplified assessments. The Port was thus included in the same region as LA/LB. Consequently, the growth rate of a significantly larger port complex with extremely different growth estimates was used in the emissions calculations as a surrogate for the Port. Due to a number of reasons, including the size constraints of the Port's berths and shore-side area, the growth rates of LA/LB are in no way accurate for the Port, and would grossly overestimate the anticipated growth of the Port and its future emissions. This would in turn overestimate the potential for impact on local air quality and potential for human health effects. The inaccurate growth numbers CARB used for the Port were: an increase in refrigerated carriers by almost 44% and roll-on roll-off vessels of over 80% by 2025. The Port has calculated as part of its own business planning a more modest growth rate of approximately 30% over 30 years. The emissions associated with this growth forecast should be applied to any policy impacting the Port.



**Criteria Pollutant Emissions**

Within the air basin of Ventura County, the Port is a fairly small contributor of pollutants as evidenced in Table 3. The Port’s emissions of all of the assessed criteria pollutants, except NO<sub>x</sub>, contribute less than one percent of the Ventura County SCC air basin’s totals! The Port has worked in the last decade to implement operational changes and new technologies to reduce emissions, such as the addition of shore power, and through investments in efficiencies to reduce delays in cargo movement. In comparison to the Port’s 2008 emissions, and despite an increase in vessel calls and goods throughput, the Port has seen a reduction in nearly all of assessed criteria pollutants including carbon dioxide, VOCs, particulate matter and SO<sub>x</sub>.

<b>Port of Hueneme Compared to Port of LA, VCAPCD, SCAQMD Emissions</b>						
<b>Criteria Pollutants</b>	<b>VOC tons/day</b>	<b>CO tons/day</b>	<b>NO<sub>x</sub> tons/day</b>	<b>PM 10 tons/ day</b>	<b>PM 2.5 tons/day</b>	<b>SO<sub>x</sub> tons/day</b>
Port of Hueneme Total	0.05	0.2	1.6	0.02	0.01	0.01
Total VCAPCD Emissions	45	169.5	60	29.1	10.5	17.0
Port of Los Angeles	1.1	5.2	22	0.4	0.4	0.4
SCAQMD Total Emissions	640	2,735	673	346	127	70
Port of Hueneme % of VCAPCD	0.1%	0.1%	2.7%	0.06%	0.1%	0.1%
Port of LA % of SCAQMD	0.2%	0.2%	3.2%	0.12%	0.3%	0.5%

Table 3. Port Hueneme Emissions Contribution to VCAPCD Totals<sup>3</sup>

<sup>3</sup> VCAPCD emissions data obtained from California Air Resources Board. 2015. [https://www.arb.ca.gov/app/emsmv/emssumcat\\_query.php?F\\_YR=2015&F\\_DIV=-4&F\\_SEASON=A&SP=2009&F\\_AREA=DIS&F\\_DIS=VEN](https://www.arb.ca.gov/app/emsmv/emssumcat_query.php?F_YR=2015&F_DIV=-4&F_SEASON=A&SP=2009&F_AREA=DIS&F_DIS=VEN). (accessed September 2017).

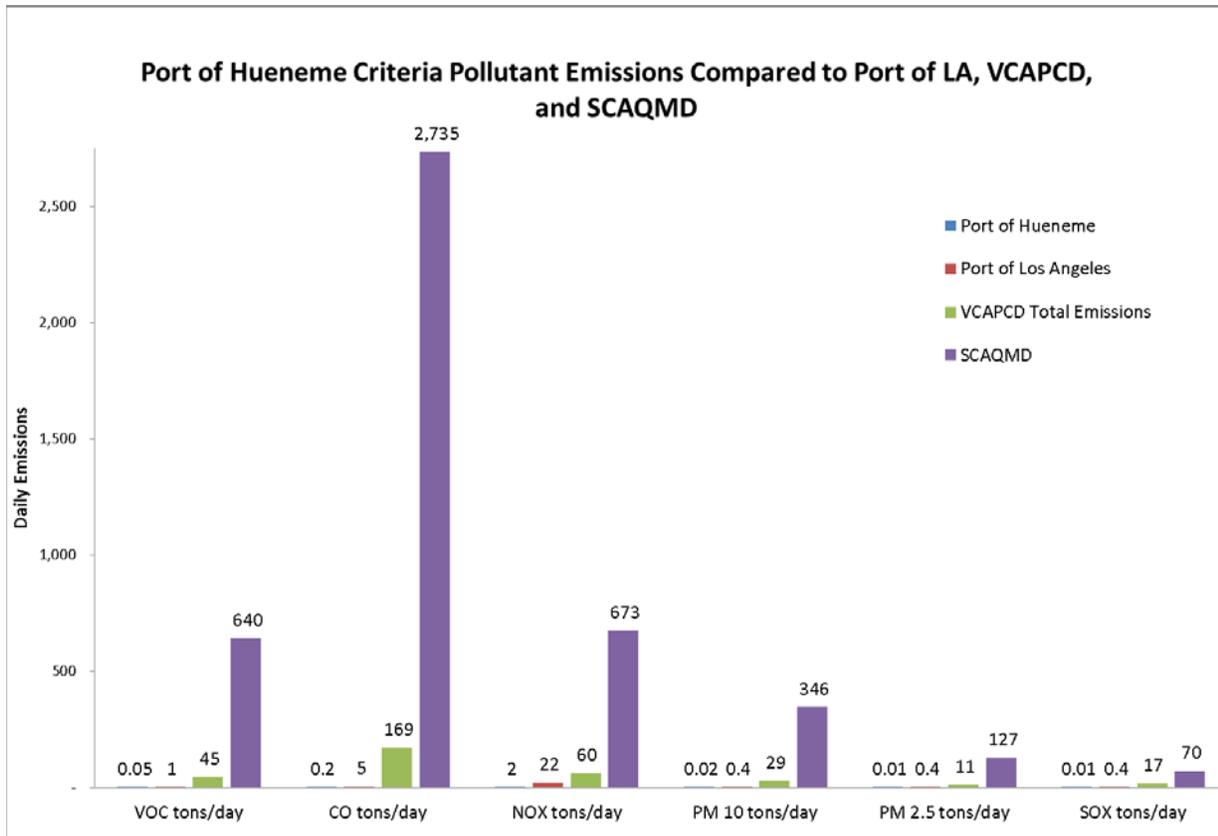


Figure 4. Emissions Comparison of Port of Hueneme to VCAPCD, Port of LA, and SCAQMD<sup>4</sup>

#### IV. Economic Profile

**RECOMMENDATION: Perform a robust cost-benefit analysis to understand the impacts of the proposed Amendments to the At-Berth Regulations to both the economy and the environment for the various business segments proposed to be regulated.**

##### *State of the Local Economy and the Importance of the Port*

The Port is one of the most productive and efficient commercial trade gateways for niche cargo on the West Coast. The Port is governed by five locally elected Port Commissioners from the communities of Oxnard and Port Hueneme. The Port moves \$9 billion in goods each year and consistently ranks among the top ten U.S. ports for automobiles and fresh produce. Port operations support the community by bringing \$1.5 billion in economic activity and creating 13,633 trade-related jobs. Trade through the Port

<sup>4</sup> California Environmental Protection Agency Air Resources Board. 2015 Estimated Annual Average Emissions: South Coast AQMD [https://www.arb.ca.gov/app/emsinv/emseic1\\_query.php](https://www.arb.ca.gov/app/emsinv/emseic1_query.php) (accessed September 2017).  
South Coast Air Quality Management District. Final 2016 Air Quality Management Plan 2017 <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf?sfvrsn=15> (accessed September 2017).



generates more than \$93 million in direct and related state and local taxes, which fund vital community services.

As shown in Table 4, the median household income in Oxnard is \$54,524 and \$49,627 in Port Hueneme. Both Oxnard and Port Hueneme median household incomes are lower than Ventura County’s \$71,451. Oxnard median household income is lower than the state of California and Port Hueneme median household income is also lower than California’s level of \$58,916. Port Hueneme’s per capita income is 33 percent less than Ventura County and Oxnard’s per capita income is even less than the county per capita income, measuring at 42 percent less.

	California	Ventura County	Oxnard	Port Hueneme
<b>Income: 2014B</b>				
Average Household Income	\$87,744	\$99,452	\$74,377	\$64,251
Median Household Income	\$58,916	\$71,451	\$54,524	\$49,627
Per Capita Income	\$30,268	\$32,724	\$18,921	\$21,889
Avg Income Growth 2000-2010	33.0%	31.1%	26.6%	30.9%
Avg Income Growth 2014B-2019	15.3%	14.0%	14.9%	13.8%

Table 4. Median Household Income & Per Capita Income (2014)<sup>5</sup>

**Poverty and Misery Index**

The measure is an index known as the “Misery Index,” which is made up of eight socioeconomic indicators, applied to 11 areas (called Neighborhood for Learning or NfLs) in Ventura County. The eight indicators are: the poverty rate among children age 5 and under; the percentage of women-led households with children 5 and younger who are below the poverty line; the percentage of adults 25 and older without a high school diploma; the percentage of people who speak English “less than very well”; the portion of schoolchildren eligible for subsidized lunches; the portion of students classified as English learners; and the percentage of students who tested at “below proficient” for math and language arts. The percentages are added together and weighted equally for the index.

As seen in Table 5, this index illustrates the deep socioeconomic divides in Ventura County. At one end of the spectrum is Oak Park, where more than 98 percent of the adult population has a high school diploma, and not a single child under the age of 6 lived below the poverty line in 2011. Oak Park’s score on the index the sum of the percentages on eight different risk measures — was 37.2, less than one-third the score of the next area, the Conejo Valley. In Oxnard, El Rio and Port Hueneme the total index was more than 10 times as high as Oak Park. In El Rio, for example, 45.9 percent of households led by a woman, with children 5 or younger, were living in poverty.

<sup>5</sup> 2015, Easy Analytic Software, Inc.(EASI®) All Rights Reserved, Alteryx, Inc.

**“Misery Index” for Ventura County  
Neighborhoods for Learning (NFL) (2011)**

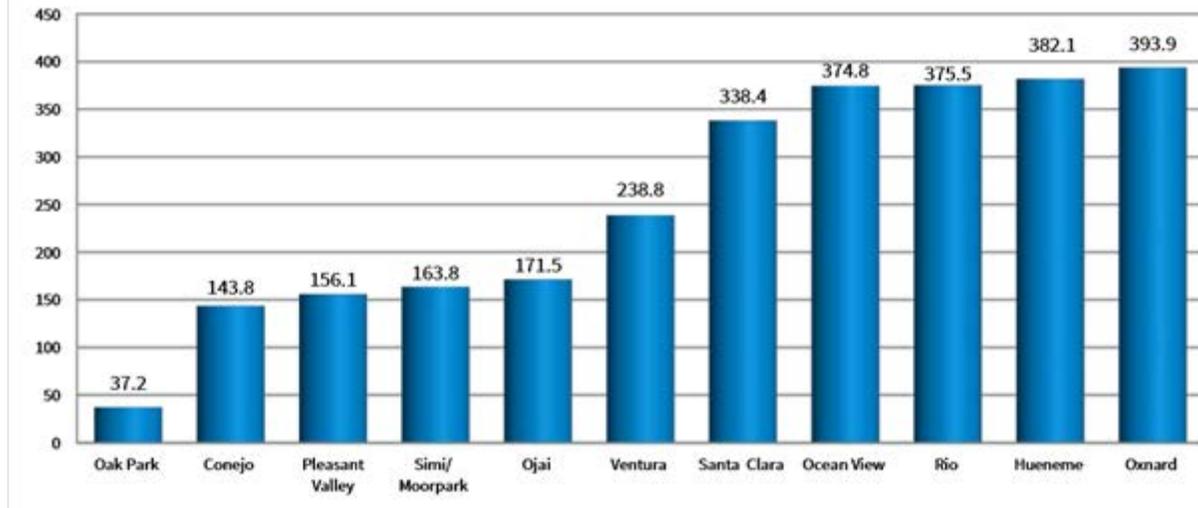


Table 5. Misery Index for Ventura County (2011)<sup>6</sup>

***Business Environment and Challenges of At Berth Regulations***

***Automotive Category***

Cargo throughput at the Port is dominated by two product lines, fresh fruit and automobiles. While demand and business for fresh fruit is fairly constant, the demand for automobiles is much more elastic and subject to broader global economic influences. The American public will likely purchase a banana in good economic times and bad, yet that is not the case with automobiles. In general, automobile transportation is a competitive business in which margins are small and competition is significant between carriers and amongst ports seeking to attract new business. In addition, many global carrier companies have large fleets of roll on roll off (RORO) vessels which travel on global routes that frequently change following the demand for specific product. For example, a global shipping company that has a significant presence in the Port and globally operates a fleet of approximately 120 RORO vessels, may only have half of their fleet call at the Port on an average year. Often, one vessel will call on the Port once a year, or once every two to five years. Due to the high costs to retrofit even a single vessel, this company would be very unlikely to retrofit all sixty vessels in order to comply with the proposed amendments. Thus, two choices would remain: the Port could purchase an emissions capture system for use by this company, or they could choose to move some portion of their automobile business to ports outside of California. The emission capture system would likely have to be a shore-side system as the Port does not have the space to be able to operate a barge mounted system and continue normal vessel operations. Yet, no shore-side systems are available as of yet, nor are any approved for use by CARB. This is an uncertain option to base compliance plans upon.

<sup>6</sup> VCCA 2015 State of the Region Ventura County Report



If shipping lines chose to pursue the retrofit of a few vessels, they would become the only ones capable of calling at California ports. However, this places the company at a disadvantage globally by having the entire state of California only serviceable by a specific set of vessels and not others. This is problematic for air quality as well, as the shipping lines will have to operate inefficiently. When vessels are not being used efficiently it results in greater emissions and high costs to the consumer. Logistically, many shipping lines will begin to look to the Pacific Northwest and Gulf ports to import their automobiles. Once imported, they will simply place them on trucks or rail and send them to California. The demand is in California, and they will find the cheapest way to get the automobiles here. Furthermore, this option leads to much more air pollution, the very consequence CARB is working so diligently to reduce.

John Martin, a nationally recognized maritime economist, conducted a study on the economic impact of the Port of Hueneme. He concluded that the Port is responsible for over 13,633 jobs, and \$1.5 billion in economic activity for the region. The study also highlighted the Port's \$93 million annual contribution to state and local taxes. If our customers decide to ship to other states, these jobs, economic activity, and tax revenues will be lost. Being located in a disadvantaged community where the city of Oxnard has a 24% poverty rate, higher than the state's average, makes the economic opportunity of the Port paramount to the citizens of this region. The Port not only provides jobs, but family sustaining jobs.

The Port's customers are not exempt from property taxes because they purchase property off Port. This means that all those imports and exports are generating the \$93 million that is then reinvested in the schools, fire, police, healthcare, social services, and even our local AQMD. The Port services three automobile shipping lines. For just one of those to relocate means a loss of one third of the jobs, economic impact, and tax revenues over night. The Martin study found that the At Berth amendments as analyzed could have the potential impact on the local economy of the loss of:

- More than 2,700 jobs; and
- \$300 million in economic activity annually; and
- More than \$200 million in salaries and local consumption; and
- \$25 million in of State and local taxes

In addition, to these socioeconomic impacts, business leakage from the Port to the Pacific Northwest ports, would have a substantial environmental costs as well. Emissions from the automobiles being delivered to distant markets like Los Angeles and Phoenix are accounted for with a U.S. Department of Transportation emission ton monetization rate. The emissions and subsequent costs resulting from vehicles being driven the increased distances to vehicle markets which are beyond that of delivery from the Port would be a cost of the proposed amendments and are shown in Table 6.



	Truck Miles		Ton Miles Penalty		Emissions Cost
	Portland to:	Huneme to:	Mileage Penalty	Ton Miles	Annual
San Francisco	645	364	281	21,053,236	\$1,462,071
Los Angeles	975	70	905	225,140,993	\$15,635,232
Seattle	171	1147	-976	-10,791,163	-\$749,407
Portland	0	975	-975	-10,852,054	-\$753,636
Denver	1252	1079	173	1,906,395	\$132,392
Phoenix	1345	444	901	36,290,883	\$2,520,271
Salt Lake City	775	752	23	258,967	\$17,984
Las Vegas, NV	982	325	657	14,125,214	\$980,945
<b>Total Emissions Cost</b>					<b>\$19,245,853</b>

Table 6. Total Emissions Costs for Vehicle Deliveries Resulting from Business Leakage from Port of Hueneme

The Martin Study identifies the worst-case scenario, but the true global nature of the Ro-Ro fleets would make the carriers very reluctant to retrofit their vessels when alternatives just up the coast and in Mexico and Canada exist. The competitive threat is very real. The extent to which the regulations could cause such leakage merits further evaluation and study for both the economic and environmental impacts before regulations are promulgated.

***Break Bulk Project Cargo Category***

Another important business segment to the Port is break bulk project cargo which contributes about 4% of the Port’s revenue. This business line is extremely important to the Port’s overall competitiveness and the thousands of jobs it supports. 100% requirement to reach zero emission for this vessel type call, would cause the industry to virtually disappear. These vessels make one time calls to ports to load and unload special cargoes, and may never return for another call at the Port. By way of example the largest crane in the world from Arizona, came to Hueneme for a one time move to China. These types of pieces frequently move through the Port on a different vessel on each occasion. A retrofit would not be justified in the eyes of an ocean carrier for a single voyage, thus potentially eliminating this business segment at the Port.

To best understand the implications of the proposed amendments, all business types at the Port need to be evaluated and the opportunity costs understood, again calling the need for a cost-benefit analysis to inform the draft regulations.

***Tanker Business Category***

The Port operates a distribution hub for liquid fertilizer product which is an essential tool for the massive agricultural industry of Ventura County. This \$2 billion industry relies of timely delivery of fertilizer which is delivered to the Port by tanker vessel currently service by the Champion Tankers line. Champion operates about 20 tankers globally approximately six of which may visit the Port annually. This vessel category is subject to many of the same global economic challenges as any other ocean carrier and thus would reflect the same business challenges in justifying an expensive vessel retrofit or the risks of developing a fleet of captured California-only tankers.

**V. Proposed Elements for Inclusion in At Berth Amendments**



The Port is providing these comments not out of any effort to avoid regulation or doing its part to improve air quality in the region. The Port is fully committed to making progress to reduce emissions at the Port in a manner that is effective in addressing the pollutants which are most problematic in the surrounding areas and cost effective in reducing those emissions. It is clear to the Port that a one size fits all compliance pathway will not be effective in fairly applying emission reductions across the ports of California. Furthermore, smaller ports like Hueneme and its surrounding communities which rely on the Port for employment, will carry a much greater burden and are more at risk of serious negative economic consequences if the proposed amendments move forward without specific accommodations for smaller ports including Hueneme.

For these reasons, the Port would like to propose the following solutions to integrating a more equitable and realistic approach into the proposed amendments.

#### **Alternative 1: Fix Current At-Berth Regulations**

Under this alternative the Port recommends that the proposed amendments be shelved until the problems effecting the current regulations are solved. Presently under the existing At Berth regulations, several problems impact compliance attainment for vessels and fleet owners, and the Port believes that air quality would best be served by fixing these challenges before adding significant increases in the breadth of these regulations and thus compounding the level of regulatory complexity and compliance challenges by orders of magnitude. The current three hour plug in rule for shore power seems to be an arbitrary number which is difficult under even the best circumstances for a vessel to comply with. In numerous instances small delays or unforeseen events result in connections taking more than three hours, and missing the mark eliminates any incentive for continuing the attempted connection and thus negates potential emissions reductions. A sliding scale of compliance could be contemplated in which the duration at berth under shore power would be applied to a compliance total. A second confounding factor is the limited availability of technology vendors capable of providing support, system service and spare parts for shore power systems. Currently one company services all of the shore power systems in the State with one electrical engineer, this scenario leads to significant delays in servicing shore power equipment which results in vessel calls operating off of ship power and resulting emissions. It is challenging to not envision a situation in which these same types of problems will plague the emission reduction technologies which are currently being touted as significant solutions to reducing emissions from vessels including bonnet capture systems or similar technologies with the proposed amendments.

#### **Alternative 2: Delayed Application of Requirements and Development of Local Air Plans**

Under this scenario, smaller ports would fall subject to the proposed amendments after a set period of time such as ten years. During this intervening period, smaller ports would continue to be subject to the current At-Berth regulations. During this time, larger ports would be working with industry to develop and refine emissions control technologies including bonnet capture equipment and on-board scrubbers to such a degree that initial problems typical of any new technology could be worked out before they are required in all ports. Presently there are already problems with getting the resources needed from technology vendors to support ports with shore-side power systems in need of repair, and it is easy to envision a similar situation occurring with bonnet capture systems in the future. By implementing a delay for small ports, owners of vessel fleets visiting smaller ports would have time to assess new technologies and make informed decisions about retrofitting their fleets with new emission control technologies. In addition, smaller ports would have time to pursue the additional funds needed to invest in emission control technologies such as bonnet capture systems.



In addition, CARB had requested from the Port and its customers estimates of a specific cost point, a “tipping point” at which the burden on complying with the proposed amendments would drive business to leave the Port and move to a less expensive port such as Portland, Tacoma or the Gulf Coast. In discussion with customers of the Port, it has become clear that they are uncomfortable disclosing or even discussing such a cost due to the sensitive nature of disclosing strategic business planning with such detailed proprietary financial information, particularly in the highly competitive business segment of global vehicle shipping. However, one benefit of delaying the application of the proposed amendments to the smaller ports would be that in the interim time market forces would reach equilibrium between vendors of new control technologies and vessel owners and port authorities and make more clear how the increased regulatory costs of the At Berth amendments translate into increased operational costs and a resulting loss of business to other regions with lower compliance costs. This approach creates the opportunity to quantifiably measure leakage without impacting the most vulnerable ports. Delayed implementation would also enable ports time during which to begin coordination with local air pollution control agencies on developing local solutions.

### **Alternative 3 - Regional Targets and Solutions**

Under this scenario, ports would be allowed to achieve compliance with the proposed amendments through the implementation of a locally developed plan which would achieve reductions in air pollutants equivalent to those of the proposed At-Berth amendments but through other efforts. A large percentage of the emission reductions, such as 75%, would have to take place at the port or adjacent port owned properties so that the benefits of these plans would be felt in the immediate communities around the ports which are most impacted by their emissions. These plans would be tailored specifically to a port’s surrounding air basin, including NAAQS attainment dates, and its community needs and problem pollutants. These plans would be developed in partnership with their local Air Pollution Control District or Air Quality Management District with final approval from CARB.

The Port has begun the collaborative development process of a more comprehensive air quality plan that the Port is calling its Port of Hueneme Reducing Emissions and Supporting Health Plan (PHRESH Plan). The PHRESH Plan will be focused on developing Port specific strategies for reducing air pollutant emissions within the Port’s direct operations or financial control. The PHRESH Plan will be tailored to the Port’s features, equipment and operations and will assess a range of feasible reduction methodologies and source control technologies which could be implemented. The focus will be on achieving the most cost-effective solutions that provide the greatest amount of feasible reductions.



*Additional Specific Comments on Proposed Amendments to the At Berth Regulations*

Comment #1:

The Port strongly encourage CARB to conduct a socioeconomic assessment of the proposed amendments incorporating a full cost-benefit analysis due to the potential impacts of the concepts currently being discussed. As outlined above, the Port cannot emphasize enough the potential of economic harm which could result from the loss of small numbers of customers at the State's smaller ports.

Comment #2:

The Port frequently receives military cargo for the U.S. military which arrives on civilian vessels. The Port requests that CARB clarify if this situation would result in the vessel being exempt from the regulations due to the nature of its cargo.

Comments #3:

Some vessel lines are already developing and launching new vessels which call at the Port which incorporate onboard emissions controls technologies. The Port requests that CARB clarify whether this type of vessel will be exempted from the regulations or be grandfathered in.

Comments #4:

The Port requests clarification on the size of tanker vessels which will be subject to the regulations.

Comment #5:

There was discussion during the workshop of requiring ports to report vessel data to CARB under a new, streamlined reporting regimen. The Port requests clarification of this change and notes that altering the nature of the relationship between the Port and its clients could negatively influence it especially when regulatory compliance documentation is involved.

Comment #6:

The Port's customers encourage CARB making available grant funding or other incentive to offset the significant labor costs associated with shore power connections, which can total over \$5,000 per call and at times exceed the cost of electricity used during the call.

We greatly appreciate the opportunity to provide these comments, and we look forward to working with CARB further on this important regulatory action. Please contact us if you have any questions or comments regarding this letter or its contents.

Sincerely,

Christina Birdsey,  
Chief Operating Officer,  
Port of Hueneme



WORLD SHIPPING COUNCIL  
PARTNERS IN TRADE

**World Shipping Council Comments**  
to the  
**California Air Resources Board (CARB)**  
on the  
**Proposed 15-Day Changes to the Control Measure**  
**for Ocean Going Vessels at Berth**

1 May 2020

The World Shipping Council (WSC) is a non-profit trade association that represents the liner shipping industry, which is comprised primarily of operators of containerships, vehicle carriers, and roll-on/roll-off (ro-ro) vessels. Together, WSC's members operate approximately 90% of the world's liner vessel services. Vessels operated by WSC members make frequent calls in California ports, and WSC's members would be directly and substantially affected by the proposed rule.<sup>1</sup>

On 9 December 2019, WSC filed lengthy comments, with specific and practical recommendations to address each comment, with CARB on its proposed control measure for ocean going vessels at berth. We appreciate that CARB has incorporated several of our recommendations into its package of 15-day changes to the proposed rule. We are concerned, however, that CARB has not addressed a number of important policy recommendations that would help ensure California's updated at-berth regulations are practicable, provide a fair and reasonable compliance pathway for regulated vessels, and achieve the state's emissions reduction goals.

Before turning to our detailed comments on the 15-day changes, we first wish to comment on two critical issues: 1) the impact of the COVID-19 pandemic on the regulated community's ability to implement the rule according to the planned implementation schedule, should the rule be adopted by the Board, and 2) the rule's planned expansion to new classes of vessels, namely ro-ro vessels, on an accelerated timeline, despite the lack of compliance options for these vessels and no detailed cost-benefit analysis supporting this move.

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<sup>1</sup> A full description of the Council and a list of its members are available at [www.worldshipping.org](http://www.worldshipping.org).

Impact of COVID-19 Pandemic: The world is grappling with arguably the worst pandemic in more than a century. To prevent the spread of COVID-19, citizens and companies around the world are living and working under severe restrictions. The resulting global economic contraction is deepening and causing tremendous uncertainty for consumers and the shipping industry that supplies and feeds them. Shipping companies and many other businesses are struggling to remain in business as demand has plummeted. Shipping industry efforts are focused on maintaining services, keeping crews safe and transporting relief supplies.

While CARB has been working for the past several years in collaboration with the regulated community on amendments to its at-berth regulations, no one could have predicted that the COVID-19 outbreak would occur just as the proposed rule was being finalized. The rule will require a range of substantial changes that are operational, procedural and infrastructure-related. While we understand the motivations to take the proposed rule forward to the Board for approval, we have serious concerns about the ability of liner vessel operators and the parties that they must rely on to comply with the rule (ports, terminals and emissions capture system operators, etc..) to implement the rule by 1 January 2021. **We therefore respectfully recommend that CARB delay formal action and implementation of the rule until after the COVID-19 outbreak is under control and the regulated community can properly implement the rule’s requirements.**

Expansion to Ro-Ro Vessels: We continue to have major concerns with CARB’s proposal to expand, and now accelerate, the applicability of the at berth regulations to ro-ro vessels (including vehicle carriers), which comprise a large number of discrete vessels, only a small percentage of which make infrequent and very short port calls in California. **No evidence has been presented by CARB that demonstrates that a cost-effective and practicable pathway exists for controlling ro-ro vessels’ auxiliary emissions. CARB’s analyses also fail to address the major operational, safety and cost issues the proposed emissions capture systems pose for ro-ro vessels or to account for the emissions generated by these control systems and the tug boats need to maneuver them to and from the vessels.** In short, there has been no compelling data presented that supports or concludes that the emissions generated at berth by these ships is significant or that the cost per ton of emissions reduced warrants the extensive investments that regulation here would require.

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WSC’s comments and recommendation on CARB’s 15-day Changes the Proposed Regulation Order follow for your consideration. Questions on these comments should be directed to Doug Schneider of the WSC staff at [dschneider@worldshipping.org](mailto:dschneider@worldshipping.org).

1. Definitions (Section 93130.2 (b)):

- a. Ready to Work: CARB proposes to replace the references to the U.S. Coast Guard and U.S. Customs and Border Protection with “*all government authorities with jurisdiction over the vessel visit*”. We support this change as it addresses the fact that “Ready to Work” should not occur until any government entities that has jurisdiction over the vessel visit has cleared the vessel. **While the above described change is helpful, we recommend that**

CARB insert in the amended definition the following after “*netting down*” and before “*all*”: “, the ramp is down and secure (if applicable), required shore side labor technicians are present, and”. These changes to the “Ready to Work” definition are needed to accommodate vessels equipped with ramps (which would not therefore use a gangway) and to note the presence of labor technicians that are essential to hooking the vessel up to shore power or to an alternative compliance method.

- b. Visit: CARB proposes to add language to this definition that states that “a vessel move from one berth to another is considered a new visit at each subsequent berth”. **We recommend that the words “at a different marine terminal” be inserted after the word “another”** so shifts within a single marine terminal, which occur infrequently but may be done when an operational problem is encountered at the initial berth, would not constitute a new vessel visit. To correspond to the above change, the words “at a different marine terminal” must also be inserted after the word “berth” in Section 93130.7(e)(4)(I).

2. CARB Approved Emissions Control Strategy (CAECS) Operators (Section 93130.5):

- a. Executive Order (Section 93130.5 (a)): We support CARB’s proposed amendments to this section, as they make clear that emissions control strategy operators must be approved by CARB and eliminate confusion about the Executive Order’s applicability to emissions control strategies that are deployed not from the terminal or port property, but from a barge.
- b. Requirements for CARB Approval (Section 93130.5 (d)): Under current CARB at-berth regulations, LNG-fired auxiliary engines are treated as an approved control option. The proposed rule would, however, require time-consuming and costly testing of LNG-fired auxiliary engines before they may apply for CARB approval. This will discourage investments in a promising alternative to oil fired auxiliaries. We therefore recommend that CARB retain the provisions in the current at-berth regulations that designate LNG-fired auxiliaries as an approved control option.

3. Vessel Operator Requirements (Section 93130.7):

- a. General Requirement (Section 93130.7): Section 93130.7 contains checklist items that a commissioned shore power equipped ship will **not** be able to complete unless the terminal/port and/or CAECS operator completes their obligations under the rule. Section 93130.7’s statement that “Any failure to perform any specific items in this section shall constitute a separate violation...” could thus be used to penalize a shore power equipped ship that **cannot** complete all of the vessel checklist items in 93130.7(e) because the terminal/port or CAECS operator failed to meet its rule obligations.

**To correct this issue, we recommend that the second sentence in the opening paragraph of Section 93130.7 be replaced with:**

*“Any failure to perform any specific items in this section shall constitute a separate violation for each calendar day that the failure occurs, except to the extent a vessel operator cannot perform any requirement due to (1) a terminal and/or port’s failure to comply with the portions of this Control Measure that impose requirements upon terminals and/or ports, and/or (2) a CARB Approved Emission Control Strategy Operator’s failure to comply with the portions of this Control Measure that impose requirements upon CARB Approved Emission Control Strategy Operators.”*

- b. Shore Power Requirements (Section 93130.7 (a)): CARB proposes to replace the words “compatible shore power berth” with language that requires vessels to be plugged into shore power on visits to terminals where the port or terminal has commissioned the vessel’s shore power equipment or deemed the vessel to be compatible based on the vessel’s previous commissioning to another berth. While CARB’s intent with these changes may be to eliminate confusion with respect to the meaning of the term “compatible”, further changes are needed to make it clear that the port or terminal may not use this provision to dictate to vessels on which side they must be able to plug in to shore power. **We therefore recommend that 93130.7 (a) be replaced with the following:**

*“(a) Shore power requirements for at berth emissions reductions.*

*Vessel operators with shore power vessels that have been commissioned by the terminal (or port) at which the vessel will call (or deemed compatible based on a previous commissioning) shall plug in to shore power on each visit to the terminal. Commissioning of vessel shore power equipment should be based on the following technical standards: IEC/ISO/IEEE 80005-1/80005-2 and IEC 62613-1.”*

- c. Compliance Dates and Applicability to Ro-Ro Vessels (Section 93130.7(b)): As noted in the introduction of these comments, the proposed rule and supporting analyses have failed to provide an adequate rationale and analyses of the costs and benefits of regulating ro-ro auxiliary emissions. CARB is now proposing in Table 1 to advance the compliance date for ro-ro vessels one year to require compliance starting 1 January 2024.

CARB has estimated that the control cost per ton of emissions reduced for ro-ro vessels is \$53,600. Even using that cost estimate, which we believe is low<sup>2</sup>, it is worth noting for comparison that CARB estimated that the control cost per ton of emissions reduced for containerhips is \$13,500. When asked what cost-benefit threshold was used to decide which classes of vessels to regulate and which not to regulate, CARB staff reported that there is no threshold and that the decision to regulate ro-ro emissions was

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<sup>2</sup> Starcrest Consulting Group, LLC, published in December 2019 a ro-ro cost analysis study for PMSA and the Ports of Los Angeles and Long Beach. The study estimated that the costs to control ro-ro auxiliary emissions ranges from approximately \$115,000 to \$200,000 per weighted ton of emissions. A copy of this study may be found in the CARB at-berth docket at: <https://www.arb.ca.gov/lispub/comm/bccommlog.php?listname=ogvatberth2019>.

based simply on aggregate emissions. There has been no considered analysis of the costs and benefits of regulating ro-ro auxiliary emissions versus the operational realities associated with regulating this class of vessels, which is comprised of a large number of discrete vessels, only a small percentage of which make infrequent and very short port calls (on average 14 hours and short as 8 hours) in California. We also note that ro-ro auxiliary emissions occur in distinctly different geographic locations, where their impacts and the related cost-benefit analyses for controlling those emissions may be quite different.

Furthermore, shore power infrastructure for ro-ro vessels is not emerging in California ports or in any other U.S. or international ports where ro-ros call. This is because: ro-ros operate less like liner vessels and more like tramp vessels (without scheduled, recurring calls to defined port calls<sup>3</sup>), making shore-side power infrastructure difficult to set up; ro-ros would need to go through expensive electrical system retrofits because container-based shore power units (e.g. AMP's) are not a realistic option; and ro-ros don't typically carry dedicated electricians that container vessels have (because ro-ros don't carry refrigerated containers).

CARB is predicating its regulation of ro-ros on the premise that barge or land-based emissions capture and control technologies will become a viable and practicable emissions control option. Experience to date with the two-existing barge-based capture and control service providers has demonstrated that those services are often unreliable, are exceedingly costly, and would pose substantial operational and safety problems for ro-ros. For example, that systems cannot be used in windy weather, cannot always reach ro-ro stacks (which may be 40 meters laterally and 40 meters above the waterline), and often prevent simultaneous alongside bunkering operations. If ro-ros cannot bunker in port, they may be forced to bunker at anchorages, which would generate auxiliary emissions as well as primary engine emissions from tugboats used to move bunkering barges to and from the anchorage.

We also note that barge-based capture and control systems need to be moved into position, by tugboats after the ro-ro has been secured to the pier. This consumes a substantial amount of time, which increases the cost of control per hour of emissions because ro-ro calls are already very short. A related factor that has not been adequately considered is the tug emissions generated to move the barge-based capture and control system to and from the ro-ro vessels and other vessels that may require barge-based emissions control strategies. As a result, emissions from tugboat operations can significantly offset the emissions reductions gained by requiring ro-ro to use capture and control systems during their vessel calls. The capture and control systems also use

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<sup>3</sup> Within the ro-ro industry, the term "semi-liner" is used to describe ro-ro operations. It is often the case that ro-ros that call California do so as part of "round the world" (RTW) services, which means, by definition, the vessels in those services are infrequent visitors to California. A typical RTW service takes about 4 months, so vessels operating in those services may only make 2-3 calls to California per year.

generators for power that need to be factored into the total impact analysis for regulating ro-ro auxiliary emissions.

Shore-based capture and control systems also pose problems for controlling ro-ro emissions. While one land-based system is being trialed (and we do not know if it is being trialed for use with container ships or ro-ros, which is an important operational distinction), no commissioned land-based systems exist today. We understand that land-based systems would not be a practicable control option at many existing California ro-ro terminals because the piers on which the shore-based control systems would sit could not support the weight of the systems. Furthermore, such systems could only serve one vessel at a time and would obstruct cargo operations as ro-ro stacks are located near the stern where the ramp is located. Ro-ro operators need to be able to stage, maneuver and park cargo all along the already space-constrained quay side. Even if this technology could be built and deployed, the limitations related to use of the systems in windy weather remain as does the need to factor in the generator GHG emissions the control systems would produce.

57-2

**For the reasons discussed above, we recommend that CARB not proceed with plans to regulate ro-ro auxiliary emissions in 2024 and instead monitor ro-ro emissions and the ongoing development of technologies that may in the future provide a viable and economically achievable compliance option for these vessels.**

d. Vessel Compliance Checklists (Section 93130.7 (e)):

- Shore Power Connection Time: While we appreciate that CARB proposes to modify § (3) (A) to require vessels to begin using shore power or another CAECS within two hours after “Ready to Work”, we still have concerns that a substantial number of arriving vessels would be unable to meet this requirement. As we have previously noted, establishing shore power connections must be done safely by longshore technicians, who may not be immediately available given their other extensive responsibilities. Unreasonably short time limits for connecting high-voltage systems could pose safety risks to workers, result in unnecessary damage to the equipment, and subject a substantial percentage of compliant vessel calls to noncompliance for tasks the vessel cannot control.

57-3

One of our Member lines that has large number of shore power compatible vessels calling at terminals in California computed how the proposed connection time would affect that company’s compliance rate. Using data for 265 vessel calls in 3 ports from 2019-2020, the company found that under the proposed requirement to connect within two hours after “Ready to Work”, between 14 and 18% of vessel calls would fail to comply. A two-hour connection deadline remains unacceptable and would subject a large percentage of otherwise compliant vessels to penalties. **We therefore recommend that vessels be required to begin using shore power or another CAECS within three hours after “Ready to Work”.**

- Shore Power Disconnection Time: § (3) (B) would require vessels to cease using shore power no sooner than one hour before “Pilot on Board”. There will be situations in which this is not a practicable disconnection deadline for ocean carriers because of delayed vessel departures due to weather or vessel traffic or if labor unplugs the vessels early due to their own shift schedules. Using data for 265 vessel calls in 3 ports from 2019-2020, a WSC member line that has substantial operations in California found that under the proposed requirement to disconnect no sooner than one hour before “Pilot on Board”, between 9 and 11% of vessel calls would fail to comply. **We therefore recommend that the shore power disconnection time be no sooner than two hours before “Pilot on Board”.**
  - Post-Visit Reporting: CARB proposes in § (4) to require reporting of information for each visit to a California terminal within 30 days of vessel departure instead of the previously proposed 7 days of vessel departure. While we support the proposed modification as it is an improvement over the previous proposal, **we recommend that CARB consider allowing vessel operating companies to submit batched visit information for all of their vessels that call California on a monthly or quarterly basis. We also recommend that CARB develop an online system/dashboard into which each vessel (and terminal) operator would upload its post-visit reports. The dashboard should provide each operator with an updated snapshot of its compliance as well as VIE/TIE allowances versus usage and other relevant metrics for the designated fleet.**
4. Vessel Visit Exceptions (Section 93130.8): We continue to support CARB’s inclusion in this section of all vessel visit exceptions, including those for safety and emergency events, vessel commissioning, research, previously unregulated vessels, vessels visiting low activity terminals, vessel incident events (VIE) and terminal incident events (TIE), remediation fees, and innovative concepts. We also support CARB’s inclusion of a procedure for dealing with situations in which a vessel is unable to complete an at-berth system commissioning visit in a single call to the terminal.
5. Terminal Operator Requirements (Section 93130.9):
- a. General Requirement: We continue to support CARB’s decision to include in the proposed rule clear and appropriate obligations for marine terminals and ports to, among other things, provide the shore side infrastructure to connect ships to at-berth power and to connect commissioned ships in a timely manner when they call. These are functions that commercial ships cannot themselves perform and lack commercial power to require. Including these requirements in the regulation will establish balanced obligations for ships and the terminals they call and will set clear expectations regarding what ports and marine terminals will need to do to fulfill their obligations under the rule.

- b. Commissioning (Section 93130.9 (a)(2)): While we do not believe it was CARB's intent, the proposed amendment could be read as allowing ports or terminal operators to dictate on which side vessels seeking to have their installed shore power systems commissioned must connect. This is unacceptable. Vessel operating companies have spent billions of dollars to retrofit vessels to be able to connect to shore power pursuant to CARB's regulations. Vessel shore power equipment is designed to enable the vessel to connect to shore power on one, but not both, sides and the vessel has no ability to quickly switch the equipment to the other side. We see no reason why this section needs to include a reference to the location on which the shore power equipment is installed. **We therefore strongly recommend that this provision be replaced with the following: "(2) The port or terminal is responsible for commissioning vessels fitted with installed shore power equipment."**
6. VIEs and TIEs (Section 93130.11):
- a. Exclusion of Innovative Concept Visits in VIE and TIE Allocations (Section 93130.11 (a)): We support the allocation of VIEs based on company vessel fleets and support CARB's proposal to exclude from the annual VIE allocations visits made under an innovative concept covered under Section 93130.17 of the rule.
- b. VIE and TIE Rates (Section 93130.11 (b)): The table on page A-39 of the proposed rule indicates that all vessels would be granted VIEs for 5% of their previous year vessel calls. Terminals would initially be granted TIEs for 15% of the terminal's annual vessel visits. That allocation would fall to 5% in 2025. We think that the VIE percentage needs to be increased to account for the fact that this proposed rule will require all containerships and refrigerated cargo vessels to use at-berth power when the rule becomes effective. While many of the issues that have previously prevented commissioned vessels from connecting to at-berth power have been shore side infrastructure-related, we anticipate, based on historical compliance data, that more than 5% of vessel fleets will be unable to comply due to onboard equipment problems, the need to rotate vessels into and out of California services for required surveys and dry-dockings, and due to unpredictable commercial demands that may require shipping companies to deploy or phase-in non-commissioned vessels to meet U.S. import and export trade needs. Furthermore, there are only two CAECS currently in operation and they offer services only in the Ports of Los Angeles and Long Beach. The lack of available CAECS (e.g. in ports such as Oakland) reinforces the need to temporarily increase the VIE percentage. **With the above considerations in mind, we recommend that CARB temporarily increase the VIE allocation for 2021-2024 to 10 percent per year.**
- c. Requests for Additional VIEs and TIEs (Section 93130.11 (c)): We support CARB's proposed process through which a vessel operating company may request additional VIEs to accommodate either a new fleet or growth in the number of visits for an existing fleet. **Since vessel operators may encounter situations that warrant additional VIEs that could not be anticipated by 1 December, we recommend that CARB modify 93130.11 (c) by**

inserting the following after the third full sentence: *“(Note: CARB staff will consider, and respond within 60 calendar days, to written requests for additional VIE and TIEs submitted at any time during the year)”*.

- d. VIE and TIE Expiration (Section 93130.11 (d)): The proposed rule states that VIEs and TIEs would expire on January 31 of the year after they are granted. To address consistently challenging market conditions during the winter months, **we recommend that CARB allow companies to carry over any unused TIEs or VIE until June 30 of the year after they were granted.**
7. CAECS Operator Requirements (Section 93130.12): We commend CARB for including in this proposed rule responsibilities and requirements for CAECS operators. Since these operators will provide essential emissions control services, it is logical that the operators themselves will be subject to checklist obligations and penalties for failing to meet their obligations under the rule. This is particularly important given the historical problems vessel operators have encountered with CAECS operators who, despite having a confirmed booking and contract with a vessel operator, may not show up on time, may cancel a booking on short notice or may breakdown during control operations. When a vessel or marine terminal contracts for CAECS services, the vessel or marine terminal cannot control whether and when the CAECS operator shows up or provides proper control services.

**We therefore recommend that, when a CAECS operator fails to provide contracted emissions control services to a vessel or marine terminal, the compliance burden and any penalties for noncompliance be initiated solely against the CAECS operator.** We also recommend that CARB amend the visit reporting deadline for CAECS operators consistent with our recommendations for vessel visit reporting (discussed above in part 5.c.iii of these comments).

WSC also believes, as we have communicated in earlier meetings and comments, that it is important to discourage or restrict the use of alternative control emission control technologies in container ports where the clear objective of the existing rule was to facilitate connections to shore-side power. **Encouraging or facilitating further expansion of alternative emission control technologies in container terminals undermines the investments made in retrofitting the container fleet and could lead to an absurd and unfavorable outcome in which shore-power equipped container ships are expected to use alternative emission control technologies that are inefficient, often unreliable, and only available at high cost.** In short, expansion of emission capture systems in container terminals and ports undermines existing carrier investments and undermines the rules effectiveness in delivering emission reductions that are achieved through the most cost-effective and efficient pathway.

8. Terminal and Port Plan Requirements (Section 93130.14): WSC supports the provisions that require CARB approval of shore-side infrastructure plans applicable to ports and terminals. How well these obligations are implemented will have a significant impact on the

future program and whether the rule delivers the expected air quality benefits. We note that the port and terminal plan submission deadlines occur, for container, refrigerated cargo and passenger terminals, six months *after* the vessels that call those ports and terminals must comply with the rules. **We strongly encourage CARB not to initiate penalties against vessels that encounter compliance difficulties at ports and terminals where the shore power infrastructure is not yet fully in place.**

**WSC also believes that there would be value in explicitly articulating in the revised rule that port and terminal plans should include, among other things:** a) appropriate changes to existing infrastructure design (e.g., inadequate electrical sub-station/electrical vault configurations); b) expansion of existing electrical infrastructure in container ports to accommodate future rule requirements to enable 95% of all shore power equipped container ship calls to be accommodated through shore-side power; and c) that approved plans include a realistic timeframe for design and construction consistent with the final regulatory dates promulgated in the final rule.

9. Interim Evaluation of New Control Technologies (Section 93130.14 (d)): Should CARB proceed with plans to regulate ro-ro auxiliary emissions, the interim (now 2022) evaluation of control technologies and landside infrastructure will be essential in determining if operationally-practicable controls of ro-ro emissions are commercially available and cost-effective. **If CARB's interim evaluation determines that such control technologies are not practicable and commercially available at the terminals used by ro-ro vessels, then CARB will need to push back the compliance deadline. We also recommend that CARB include in its interim evaluation a detailed cost-benefit analyses for controlling ro-ro auxiliary emissions using available control technologies.**
10. Remediation Fund Users (Section 93130.15): **We recommend that CARB expand the list of circumstances in which vessel operators may use the remediation fund to include vessels that make infrequent calls to California ports (e.g. less than 3 calls per year).** This is a logical regulatory approach for addressing infrequent calling vessels (e.g. vessels rotated in to California to address increased demand or "extra loaders" brought in to ease port congestion) because it would enable the vessels to have a compliance option if CAECS operators, which have limited operations, are not available or operational for a particular visit. **We also request that CARB confirm that if a vessel's request to use the remediation fund for a particular visit is denied by CARB, the vessel may use a VIE for that visit instead of being subject to penalty action.**
11. Innovative Concept Compliance Option (Section 93130.17): WSC supports in general CARB's proposal to include the use of innovative concepts as compliance options for regulated parties to reduce emissions. We are concerned, however, that some of the conditions for approval of an innovative concept are unreasonable and may make it impossible or at least highly improbable for an innovative concept to be approved. **We therefore recommend the following changes to Section 93130.17:**

- Delete § (a) (3), which would unrealistically require reductions “in excess of any other state, federal or international rule, regulation, statute or any other legal requirement...”;
- Amend § (a) (4) by replacing “three” with “ten” in the last sentence. This change would allow for emissions reductions up to ten miles away from the port or marine terminal called by the vessel;
- Amend § (a) (7) by increasing the length of the compliance period to five years, which is more reasonable given the amount of analysis and effort needed to prepare and obtain approval of an innovative compliance option;

12. Summary of Responsibilities (Section 93130.17): We offer the following comments on Table 6:

- We support the inclusion of “CAECS operator” as a responsible party for circumstances in which there are delays, but emissions reductions occur.
- The last row suggests that in the case of a CAECS failure, the vessel, terminal and the CAECS operator would be held responsible. We note that nowhere else in the matrix is a party held responsible for a circumstance completely outside of its ability to control. An arriving vessel has absolutely no ability to control whether a CAECS system will work properly. The proper function and maintenance of a CAECS is up the CAECS operator. **We therefore recommend that “vessel” be removed from the list of responsible parties when a CAECS has a failure.**

###

May 1, 2020

Clerk of the Board  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Transmitted via email

[cotb@arb.ca.gov](mailto:cotb@arb.ca.gov)

[https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=ogvatberth2019&comm\\_period=A](https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=ogvatberth2019&comm_period=A)

**Subject: COMMENTS ON PROPOSED 15-DAY CHANGES TO THE CONTROL MEASURE FOR OCEAN-GOING VESSELS AT BERTH  
FROM CRUISE LINES INTERNATIONAL ASSOCIATION (CLIA)**

Dear Clerk:

Thank you for the opportunity to comment. CLIA has appreciated working with CARB staff during the informal and formal process for this At-Berth Regulation. CLIA will also be signing on to the PMSA Coalition comment letter on the proposed At-Berth Regulation and agree with their comments. CLIA also agrees with the World Shipping Council comments. This letter outlines the concerns with the proposed At-Berth Regulation that are cruise-line specific:

**GENERAL COMMENTS:** It is still the position of the cruise lines and other industry coalition vessel operators that this new proposed regulation should not go forward for the existing regulated fleet. Instead, we believe corrections to the existing rule for currently regulated fleets would still achieve similar emission reductions without requiring the cruise lines and cargo vessels to completely change their reporting and methodologies that took many years to develop in order to be compliant with the regulation. Having to comply with the new regulation while cruise lines are grappling with the severe economic impacts to this industry as a result of COVID-19 will be unnecessarily difficult. Although CLIA appreciates the many changes that staff has included in this latest draft, the cruise lines continue to have major concerns that this regulation will result in non-compliance for vessels that have been complying with shore power technology since 2014. The draft regulations have also already caused the loss of cruise line visits for those vessels that visit California ports only two to four times per year. This is because, unlike other types of vessels, the only option for cruise lines to comply with this regulation currently is the use of shorepower. This pending requirement necessitated that companies with vessels that call infrequently in California that do not have shore power make the decision to yield calling on ports in California.

58-1

**COMMENTS SPECIFIC TO CRUISE VESSELS:**

CLIA provided detailed comments on the previous version of the At-Berth Regulation on December 7<sup>th</sup>, 2019. Those comments are still relevant to this 15-day version of the regulations and appear in a shortened form below along with comments related specifically to the revisions in the 15-day draft.

**“Previously Unregulated Vessels” Definition, Loss of Fleet Average System, and Elimination of “Non-frequent Flier Rule”:** These regulations still extend the compliance date for non-frequent fliers in currently regulated fleets by two years to 2023, which is appreciated. Unfortunately, this amendment came too late for non-frequent fliers with cruises scheduled in 2020 and 2021, which has already resulted in changed itineraries to avoid calls in California for those two years and beyond. The ISOR and SRIA do not properly analyze the possibility of vessel diversions and their economic impact. These infrequent cruise vessel calls are particularly subject to diversion. This is especially true without the existing fleet average compliance system, which could allow the cruise lines to accommodate these non-frequent fliers. Out of hundreds of cruise vessels worldwide, only a limited number continually visit California and are equipped with shorepower. The more specialized world cruises and relocating cruise vessels may visit

California once every two to four years and only a few ports each visit, using entirely different cruise ships each time. **This means that these vessels would be able to use these \$2 million systems only 8 – 16 hours every one or two years.** We agree with the World Shipping Council that the remediation fund should be expanded to allow vessels making infrequent calls to use the fund.

**Vessel Incident Events (VIEs) and Terminal Incident Events (TIEs):** Rather than using a fleet average to allow the flexibility that vessels need to deal with normal incidents beyond their control, this rule sets up a complicated and limited number of passes each year through VIEs and TIEs. The VIEs and TIEs are also provided for just one port, even if vessels call 3 different terminals - for instance in SD-LA/LB-SF - severely limiting their number, availability or usefulness. The VIEs and TIEs system is most punitive to vessels making fewer calls and those without an option to use alternative compliance options. The VIEs and TIEs are then dropped by 2029. As noted, this system is unrealistic and uncertain, leaving ships without knowing if they have incurred a violation or if they are in non-compliance, even if it is the result of something beyond their control.

**Limited Exceptions and No Alternative Compliance Option for Cruise Vessels:** The fact that there are no existing approved alternative compliance technologies that can be used by the cruise lines leaves cruise vessels at a major disadvantage in attempting to comply with this at berth rule. Without fleet averaging, and without the ability of the vessel itself to determine compliance with many requirements in this regulation because they must rely on CARB to make a separate decision after the ship has left port, the regulation leaves compliance completely uncertain for extended periods of time. This is a major flaw in this regulation.

**Remediation Fund Use:** This remediation fund would apply only to vessels that already have complied with the rule by installing on-board shore power technology, or that are using an alternative if a vessel can use an alternative, for circumstances beyond the control of the vessel operator. Vessels won't know for up to 30 days after requested if such request to use the fund is granted by CARB, and ineligible requests to use the remediation fund for a vessel visit will result in that visit being considered non-compliant with this regulation. Why should vessels be in violation of, or non-compliance with, a regulation under the listed scenarios that, as a practical matter, cannot be controlled 100% of the time - particularly if they will not know their compliance status until they have left port? The reality is that companies will not "plan to be non-compliant" as that would surely subject them to a violation. These issues are of concern to cruise vessels because they cannot use the existing approved alternative compliance options. The criteria for vessels to qualify for the remediation fund, like the VIEs and TIEs, should be clearly stated to allow the vessels to know at the time a problem arises that they either can or cannot use the fund.

**Remediation Fund Hourly Amount:** The regulation continues to require extremely high remediation fees, even though shorepower is already installed on the ships. The fee will be assessed on a per hour rate when many of the scenarios cannot be resolved within hours or days, but rather months. This is extremely punitive for an equipment part that is not available quickly, for instance. It is particularly punishing for large cruise ships which are subject to the highest \$12,000 per hour fee since they have no alternative compliance measure identified by CARB that will work on a cruise ship. At \$12,000 per hour, if an equipment part takes 3 months to obtain, the fee for cruise ships could be in the millions. The methodology for these charges should be revised to be fairer among various vessel types, and longer-term issues should be assessed at lower rates. Without these changes, the remediation fee acts not like a fair alternative emission control option, but rather a major penalty that is usually reserved for willful or intentional violations.

**Compatible Shorepower Berth Definition for Side of Ship Where Connection is Available:** CLIA appreciates that the regulation has been amended to clarify that the terminal is responsible for ensuring that shorepower vessels can plug into shorepower in a berth or position that will accommodate the on-board shorepower connection on the side of the ship that the connection is installed.

**Terminal and Port Plans and Interim Evaluation:** CLIA has no objection to the terminal and port plans specifically, however we still have a major problem with the timing of these plans and the complete lack of compliance dates for the terminals to actually comply with the components of the plan so that vessels can hook up as intended by the

rule. Vessels, however, must actually plug in or use the alternative for each visit to a berth by January 1, 2021. This is a complete disconnect between the timeline for vessels to comply with the rule and the timeline for terminals and ports to provide the infrastructure to the vessels to make sure they can plug in. A set implementation date should be established for the terminals and ports to provide the shorepower infrastructure for each vessel visit and the compliance timeline for the vessels should match that date. Just relying on TIEs if infrastructure at the terminals is not available will not remedy this issue. Do the ports feel confident that they have enough infrastructure to meet the requirements for currently regulated vessels and berth them on the correct side of the ships now and after additional vessel types are added?

**Compliance for Low Activity Terminals:** This regulation will require low activity ports that receive 20 or more visits per year for two consecutive years to begin compliance with this regulation. Cruise lines visit several of these low activity terminals and are concerned that a small terminal or port will not be able to gear up that quickly to provide power and install shorepower.

**Ongoing Timing Concerns:** This draft does not include dates by which a number of key requirements either must be approved by CARB or implemented, leaving vessels without the ability to determine compliance for an uncertain amount of time. That is not a fair process for ships that have been in compliance with the previous regulation since 2014. For instance, in addition to no final date by which the port and terminal plans must be implemented and infrastructure in place, there is no date by which CARB is required to review, audit and approve the checklist report or approve a request for a second or subsequent commissioning to qualify for an exemption; there is no guaranteed date by which online reporting will be available; there is no deadline by which CARB must notify entities regarding the opportunity to administer the remediation fund; and the remediation fund administrator may take months to get organized and operational, leaving the use of the fund unavailable for vessels to use as a compliance option in the interim.

**Liability:** The regulation adds a requirement at the end of the draft that “all responsible parties may be held jointly and severally liable for violating this Control Measure”. This should be clarified to be consistent with the liability/responsibility for ports, terminals, vessels and alternative compliance operators laid out in Table 6 and 7. Otherwise, it appears that all parties are liable no matter what the circumstances, which is in conflict with many other sections of the draft regulation.

Sincerely,



Donald Brown - VP, Maritime Policy  
Cruise Lines International Association

## Comment 63 for To Consider Proposed Control Measure for Ocean-Going Vessels At Berth (ogvatberth2019) - 15-1.

First Name: Fred  
Last Name: Hottinger  
Email Address: frh119@me.com  
Affiliation: Sapphire Tower HOA

Subject: Proposed Control Measure for Ocean-Going Vessels At Berth  
Comment:

Please allow me to suggest a careful read of the attached articles from the NYT on 3/28/2020 and from the HuffPost on 3/31/2020 and then, in the light of this, please explain to the residents in the Columbia district of San Diego why the Port of San Diego still allows the deadly pollution from cruise ships, ferry boats and excursion boats to go on.

I am a resident of downtown San Diego, along with 40,000 other people. The cruise ships dock extremely close to our high-density residential neighborhood and the pollution caused when the ships are not connected to shore power is toxic. The ships contaminate the whole downtown, but are especially dangerous for residents in the half-mile radius of the terminal, including the high-density populations of Columbia, Marina and Little Italy Districts, with high-rise condominiums, apartment complexes and hotels. Over 1400 hotel rooms are across the street from the ships and many residents are literally one block from the cruise ship terminal, a distance of about 800 ft.

I don't believe CARB is considering the proximity of the ships to the residential population in its rule making. A one size fits all scenario for rule-making does not work since the health and welfare of thousands of people is being put at risk. The San Diego cruise ship terminal is very different than Los Angeles/Long Beach's and should be treated differently.

1. We are pleased that ships in fleets will be required to connect to shore power Jan 1, 2021. I want ALL cruise ships to meet this requirement, no exceptions, at the San Diego cruise ship terminal. Cruise lines already had years to convert their ships. If they want to dock in San Diego they should not pollute the neighborhood and people's lungs and homes.
2. Maintain the current timeframe standards, or make them tougher, to connect to shore power. One hour after the ship docks to berth is acceptable. Changing this connection time to 2 hours after Ready to Work, in our situation, is unacceptable. Vessels and the Port need to make sure that the connections are maintained and labor is available to connect in one (1) hour. Please do not lower standards by allowing two(2) hours or more to connect to shore power. After all, when ships come in at speeds of 7-12 kn and with long prior notification of & permission from the Port of San Diego
3. San Diego's Port Authority allows cruise ships to re-start their engines 1/2 hour before leaving the berth. We want that to

continue. A one hour timeframe to pollute is not necessary. Every hour the cruise ships are allowed to pollute downtown puts our health at increased risk.

4. In order for the Port of San Diego to meet the connection requirements already proposed, it needs money to build the additional infrastructure to provide a second connection to shore power. Please provide the resources to make this happen for the Port's readiness by Jan 1, 2021.

Sincerely,  
Fred Hottinger  
Vice President Sapphire Tower Home Owner Association

Attachment: [www.arb.ca.gov/lists/com-attach/132-ogvatberth2019-BWQFaIMgWXpSOwdr.zip](http://www.arb.ca.gov/lists/com-attach/132-ogvatberth2019-BWQFaIMgWXpSOwdr.zip)

Original File Name: AirPollution.zip

Date and Time Comment Was Submitted: 2020-05-01 14:35:48

No Duplicates.

# Now Is the Time to Take Care of Your Lungs. Here's How.

By Zoë Schlanger March 27, 2020



A doctor examined a C.T. scan in a temporary coronavirus hospital in Wuhan, China, this month. Agence France-Press — Getty Images

If you are one of the millions of Americans breathing polluted air, you may be at a greater risk of catching the coronavirus and of having a more severe infection.

The reasons are twofold. First, air pollution can cause or aggravate respiratory illnesses like asthma or chronic obstructive pulmonary disease. And those illnesses can make you [more susceptible to the worst effects of](#)

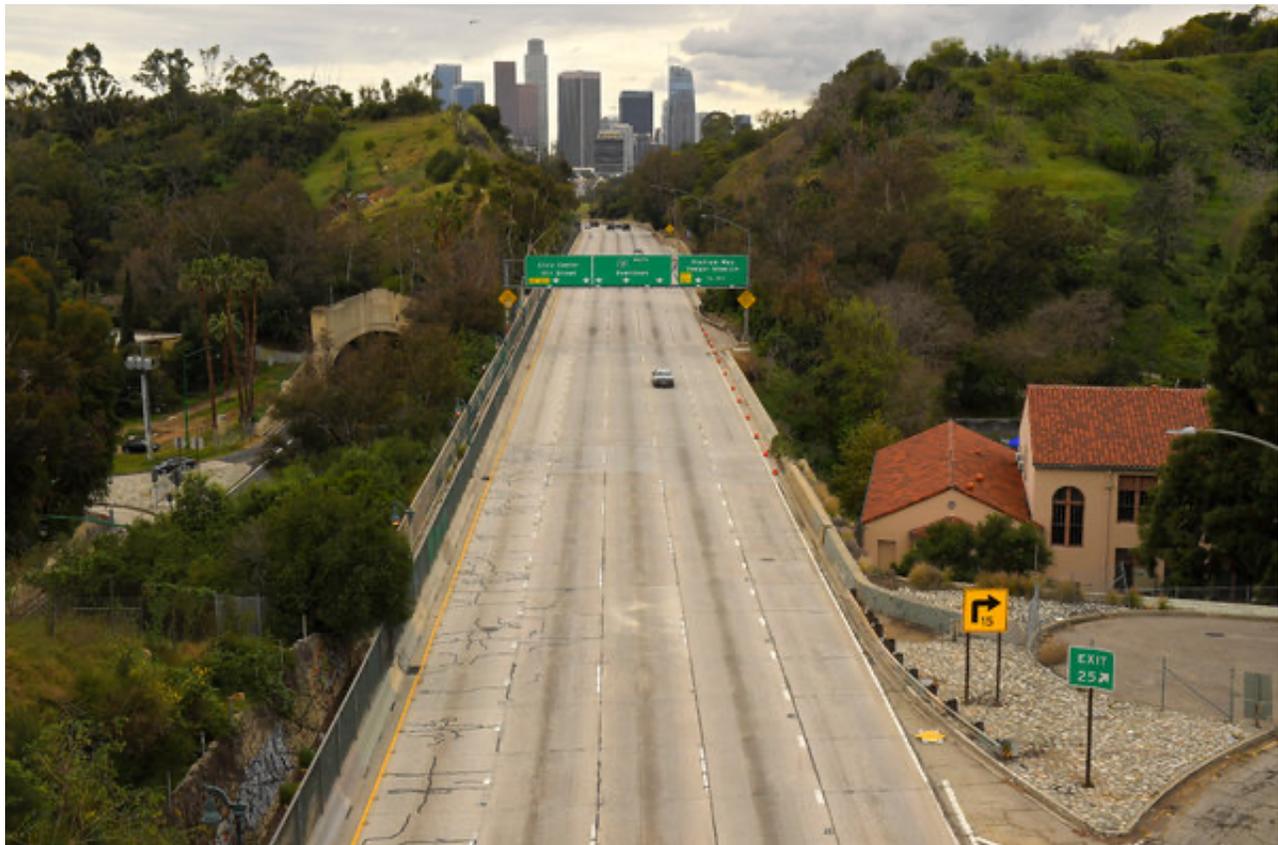
63-1

[lung infections](#). Second, exposure to air pollution is known to raise the chance of contracting viruses in the first place, regardless of underlying health conditions.

“Increased pollution increases susceptibility to infection,” said Dr. Meredith McCormack, a spokeswoman for the American Lung Association and associate professor of pulmonary and critical care at Johns Hopkins University. “All things being equal, a person exposed to air pollution would likely have a worse outcome if they were exposed to coronavirus.”

63-1  
cont.

Air pollution has dropped off sharply in many parts of the world recently, as businesses shut down and people stay home to avoid spreading the virus. Dr. McCormack said that was great for reducing hospitalizations from acute exposure to bad air, which can happen when a region’s pollution levels suddenly spikes.



## [Traffic and Pollution Plummet as U.S. Cities Shut Down for Coronavirus](#)

[A satellite that detects pollution linked to cars and trucks shows declines over major metropolitan areas, including Los Angeles, Seattle, and New York.](#)

But, she noted, “even in the setting of this pandemic, there will still remain areas of high exposure.” Power plants and refineries, for example, are considered essential and are unlikely to close. Moreover, even if pollution is down for now, chronic exposure can’t be mended so quickly. For a person living with daily pollution exposure, the damage to their respiratory and immune system is done.

Exposure to chronic air pollution is often linked to race and poverty. In the United States, people of color are much more likely to live in a place with poor air quality. And [toxic pollution sites are usually close to low-income neighborhoods](#). Around 18 million people whose incomes meet the federal definition for poverty [live in areas with some of the worst air quality in the country](#).

That’s the bad news. The good news is, while exposure to outdoor air pollution is often out of our hands, that’s less true of indoor air pollution. And, even though you might not expect it, indoor air can sometimes be worse than outdoor air.

Now that many of us are cooped up at home, indoor air quality is even more important.

Dr. McCormack, who is currently treating patients with Covid-19, stressed the importance of avoiding secondhand smoke indoors — and if you smoke, trying to quit.

"If you have a smoker in the home the particulate matter could be much higher indoors than outdoors," she said. If you smoke and you can't quit, do everything you can to avoid exposing other people to your smoke, like stepping outside. The same goes for people who vape.

Sign up to receive our daily **Coronavirus Briefing**, an informed guide with the latest developments and expert advice.

Frying foods or cooking without good ventilation can also increase indoor air pollution. Nitrogen oxides from gas stoves are a known respiratory irritant, as is the fine particulate matter that is [most likely wafting off your roasts](#). You should turn on the ventilation hood above your stove and open windows if you can.

One caveat: For people living in proximity to major sources of pollution, opening a window might not be a good idea. That's where an air purifier might be worth the investment if you can afford it.

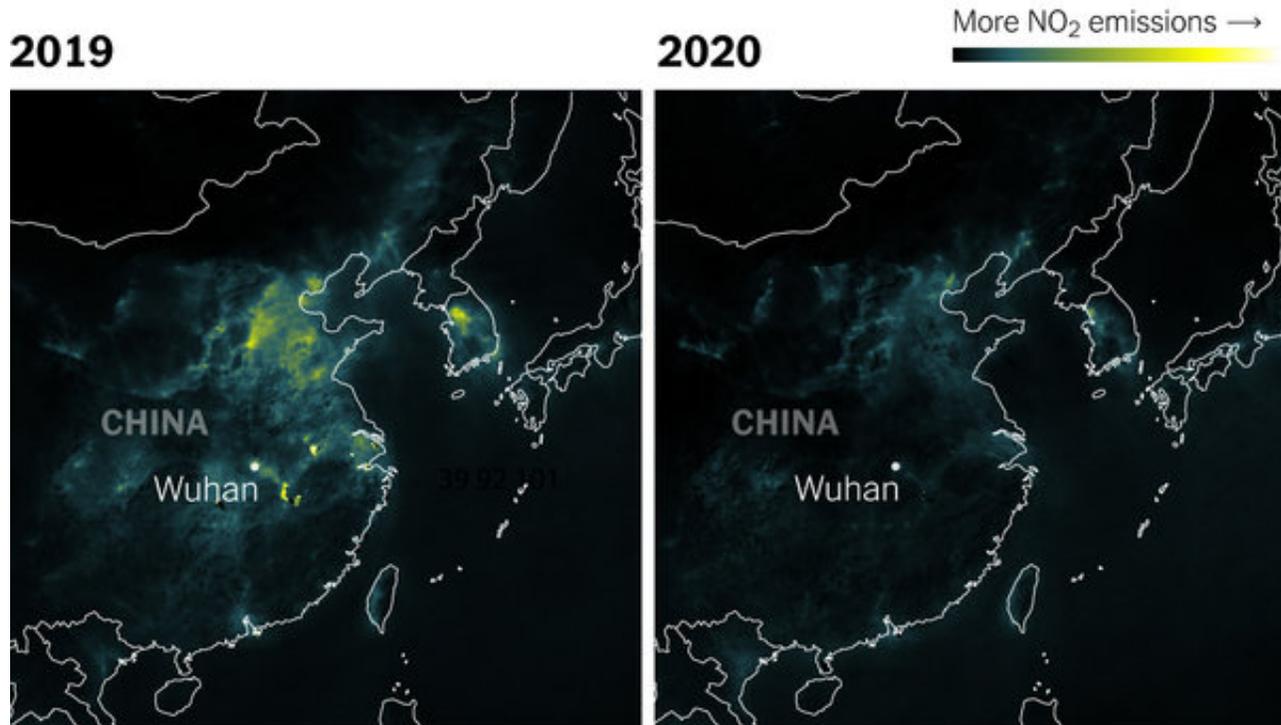
It's important to think about allergens, too. If you smell anything musty around your home, you should investigate. "Mold aggravates asthma," Dr. McCormack said. "This might be the time to address a damp spot or water damage problems."

This might also be the time to pest-proof your home. Mice and cockroaches can provoke asthma. Dr. McCormack suggested filling cracks around the house that might let in pests and taking care to properly store food that might entice them.

Finally, if you're taking maintenance medication for asthma, like an inhaler, don't forget to use it. "Remembering to take it can be challenging, particularly at a time like this when we aren't in the same routines," Dr. McCormack said. But it's an important step to protect yourself, particularly

now.

“With indoor pollution, we have a lot of control over more aspects of our exposure,” Dr. McCormack said. “In addition to a source of risk, it’s a source of opportunity. It’s a good time to change habits.”



## [Watch the Footprint of Coronavirus Spread Across Countries](#)

[A satellite that detects pollution from human activity shows how the coronavirus is shutting down whole countries.](#)



May 1, 2020

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**Subject: Industry Coalition Comments on the Supplemental 15-Day Notice, including the Initial Statement of Reasons, Environmental Assessment, Standardized Regulatory Impact Analysis, and Supporting Regulatory Documents**

Thank you for the opportunity to comment on the proposed At Berth Regulation. This coalition of industry stakeholders appreciates the opportunity to work with California Air Resources Board (CARB) staff during the course of this regulatory development on behalf of our ocean carrier, marine terminal operator, and other maritime industry member companies.

However, we are concerned that this rulemaking process is proceeding in the midst of a global crisis as our member companies are engaged in responding to the COVID-19 crisis by developing and *implementing* emergency procedures to address active coronavirus cases and prevent further infections, ensuring that their staff and communities are safe, and maintaining the supply chains that allow the U.S. and international response efforts to be executed and our communities to successfully shelter-in-place. As a result, their ability to review, understand, and comment on proposed regulations is severely constrained. CARB's indifference to meaningful stakeholder engagement is disappointing, particularly in the midst of a crisis. This coalition previously reached out to California Air Resources Board (CARB) and Cal/EPA outlining the impacts of the crisis on our industries (Attachment A) and the need for a pause in rulemaking during this crisis. Unfortunately, no response was ever received.

**Vastly Different Economic Circumstances**

The scale of the current crisis is unprecedented. As discussed in the analysis from Capitol Matrix (Attachment B), every key economic assumption in the CARB estimate of the proposed regulation has been dramatically affected by COVID-19 and the ensuing shelter-in-place orders. IHS Markit economists over the course of one week in March lowered their projection for 2020 US real GDP growth from a decline of 1.7 percent to a decline of 5.4 percent.<sup>1</sup> The impact to the maritime industry is even larger.

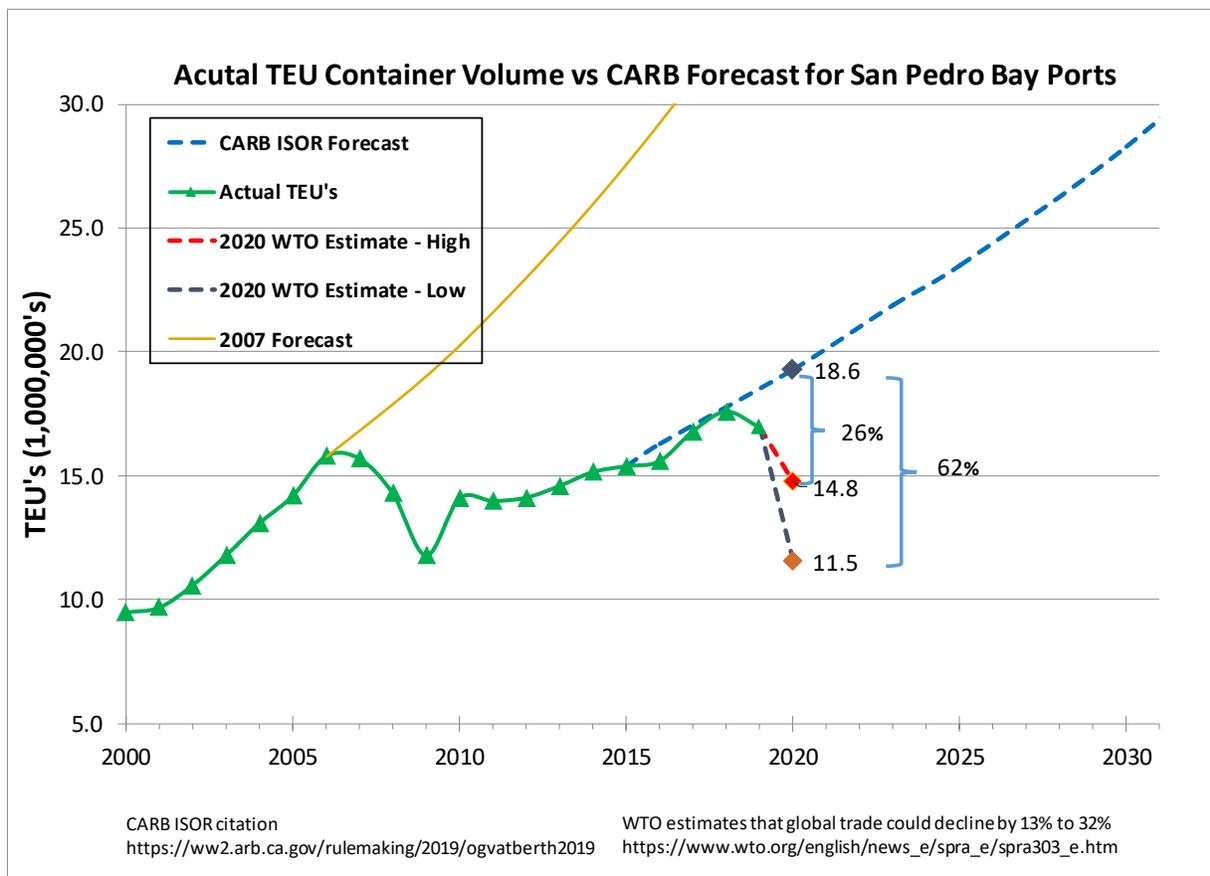
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<sup>1</sup> [https://www.joc.com/maritime-news/container-lines/container-industry-fallout-coronavirus-linger-2021\\_20200407.html](https://www.joc.com/maritime-news/container-lines/container-industry-fallout-coronavirus-linger-2021_20200407.html)

The World Trade Organization (WTO) has estimated that global trade could decline up to 32% this year.<sup>2</sup> As a result of this crisis, the analyses on which this rule is based are out of date and no longer valid.

*Containerships*

According to SeaIntelligence, 435 sailings have been eliminated globally due to the COVID-19 crisis, with around 20% of trans-Pacific sailings blanked for much of the second quarter.<sup>3</sup> The ISOR analysis is predicated on strong growth assumptions based on a number of forecasts. Questions about those assumptions were raised prior to the current crisis. For example, the ISOR analysis assumes that from 2016 (the inventory base year) through 2020 cargo at the ports of Long Beach and Los Angeles would grow 4.5% per year. Last year (before the current crisis), the two ports declined 3.3%. Since the crisis, the decline has accelerated, with year-over-year declines in January (-5.1%), February (-16.9%), and March (-19.7%). Before even considering the rest of the year, the current crisis means the emissions inventory contained in the ISOR is wrong. That gap only grows if the rest of 2020 is forecast based on WTO projections as shown in the figure below.



<sup>2</sup> [https://www.wto.org/english/news\\_e/spra\\_e/spra303\\_e.htm](https://www.wto.org/english/news_e/spra_e/spra303_e.htm)

<sup>3</sup> <https://www.seatrade-maritime.com/containers/container-line-blank-sailings-increase-435>

By the end of this year, the baseline forecast used in the ISOR will overestimate cargo volumes by between 26% and 62%. While it would be nice to claim that this cargo disruption is unprecedented and that cargo volumes will quickly return to normal, there is historic precedent that we are facing a long climb out. Prior to the Financial Crisis, the 2007 Forecast estimated that cargo volumes would grow to 65 million TEU by 2030. Following the decline from the last recession, cargo volumes never recovered to their pre-recession levels of growth (see chart above). Similarly, the impact of the crisis is also not likely to be short-lived. A new McKinsey study estimates that recovery in the USA could take until 2023.<sup>4</sup> With each year, the gap between the ISOR forecast and reality will grow larger, further distorting the analyses predicated on the forecast. Whatever the next decade holds for cargo growth, the only thing that is certain is that it is not represented by the strong growth forecast contained in the ISOR.

The estimates of benefits, emissions estimates, costs, cost-effectiveness, and health impacts, which presume the rate of growth contained in the ISOR, are now no longer valid. Even if growth were to immediately resume at levels assumed in the ISOR, cargo volumes and resulting activity will likely be millions of containers off from the cargo volume estimate.

68-1

#### *Cruise Ships*

The economic impact of COVID-19 on the cruise industry is substantial. The suspension of operations will have a pronounced detrimental impact on families and communities globally. Of the 421,000 industry supported jobs in the United States, 12% are in California, yielding 49,369 jobs in The Golden State and generating \$3.26 billion in total wages and salaries.

The cruise industry is vital to California's economy. The major ports of Los Angeles, Long Beach, San Diego, and San Francisco host millions of passengers and crew, producing direct onshore spending and contributing \$2.5 billion annually to the state of California.

While suspending operations is critical for the health and safety of passengers and crew amid the COVID-19 pandemic, the impact on the economy is extensive. When the voluntary suspension was announced in mid-March to cease operations until mid - April, the jobs of 3,159 Californians were lost, amounting to \$163 million in wages and \$185 million in direct spending. Nearly 70 jobs in California are lost each day the cruise industry remains in suspension of operations. If the suspension continues through June, the loss of direct spending will be \$427 million and a stifling loss of 7,557 jobs, amounting to a \$391 million loss in wages.

#### *Tankers*

In a similar fashion, fuel consumption has precipitously declined as a result of the crisis. With an unprecedented number of people filing jobless claims that need and demand for fuel has plummeted. The U.S. Energy Information Agency showed a significant drop in demand in gross refinery inputs in its latest Weekly Petroleum Status Report<sup>5</sup>, as presented in the graph below. Refinery demand will directly impact demand for liquid bulk vessels calling California ports. How fuel demand will recover following

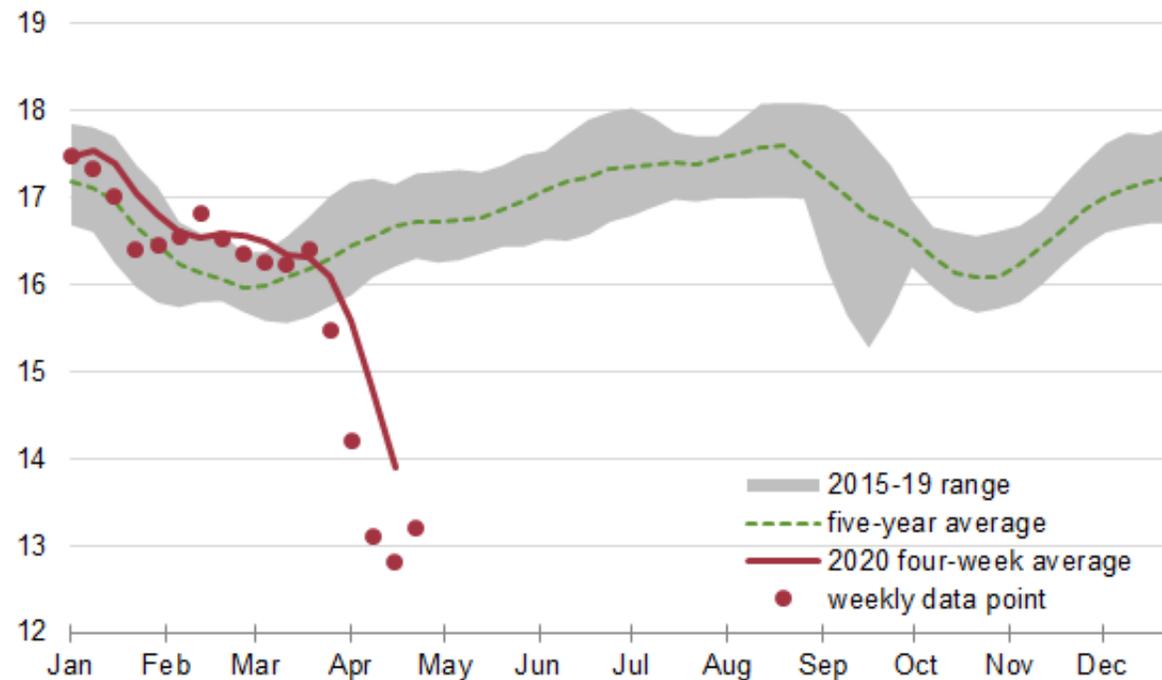
<sup>4</sup><https://www.mckinsey.com/~media/mckinsey/business%20functions/risk/our%20insights/covid%2019%20implications%20for%20business/covid%2019%20march%2025/covid-19-facts-and-insights-march-25-v3.ashx>

<sup>5</sup> [https://www.eia.gov/petroleum/weekly/archive/2020/200429/includes/analysis\\_print.php](https://www.eia.gov/petroleum/weekly/archive/2020/200429/includes/analysis_print.php)

the crisis and whether there will be fundamental shifts in transportation and fuel consumption is unknown at this time. Again, it is clear that the forecasts contained in the ISOR no longer represent a reasonable expectation of future activity of tankers in California. New analysis is necessary to determine how future demand for liquid bulk imports will change as a result of the COVID-19 crisis.

**Figure 1. U.S. gross refinery inputs**

million barrels per day



Source: U.S. Energy Information Administration, *Weekly Petroleum Status Report*

#### Ro/Ros

The crisis is also forecast to impact auto sales in this country and globally. Decreased auto sales will translate into reduced Ro/Ro activity. A forecast by Automotive from Ultima Media<sup>6</sup> indicates that it will take most of this decade for auto sales to return to their pre-crisis levels. The base case scenario has volumes declining from 2019 by 14%. In a worst-case scenario, volume declines would plunge 28% from 2019 levels.

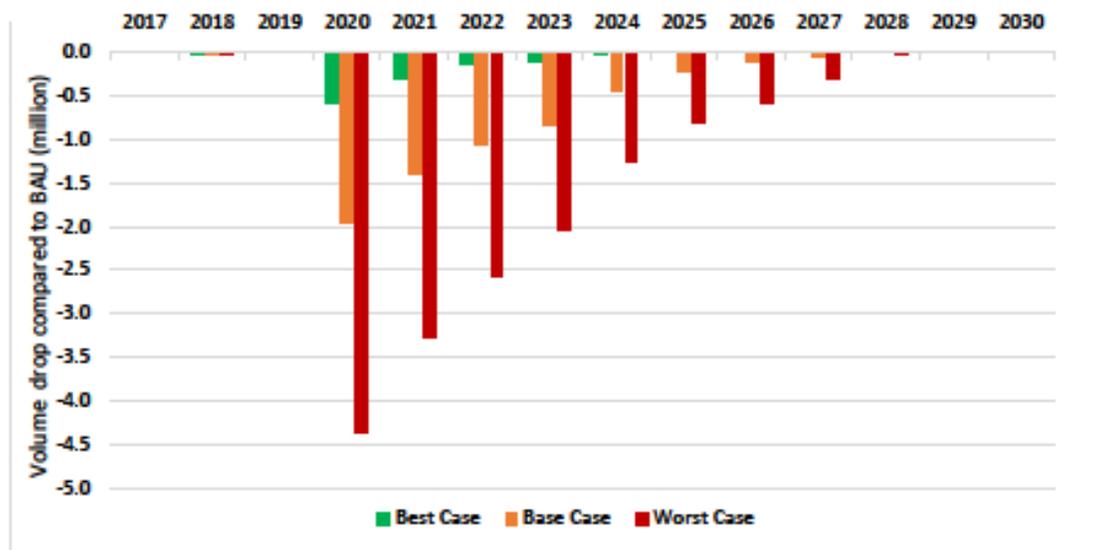
<sup>6</sup> <https://www.automotivemanufacturingsolutions.com/insight/global-vehicle-demand-forecast-2020-2030-the-drastic-impact-of-the-coronavirus-crisis/40396.article>

**US Automotive Sales Volume Forecast Under 3 Scenarios 2017-2030 (units)**



Source: Automotive from Ultima Media

**US Automotive Sales Volume Drop Compared to BAU Under 3 Scenarios 2017-2030 (units)**



Source: Automotive from Ultima Media

As was the case for other vessel categories, the forecast upon which the Ro/Ro analysis was conducted is no longer valid. While the Automotive from Ultima Media forecast slightly growing by the end of the decade, the proposed rule is based on a growth rate that would see Ro/Ro activity 83.5% higher than

2016 levels in the ports Los Angeles and Long Beach by 2030 and 31.9% higher at the Port of Hueneme<sup>7</sup>. These numbers are not realistic or a reasonably foreseeable outcome of the current economic climate.

The ISOR must be revised to take these significant effects into account. California is already responding to the economic reality in other arms of the government. On April 10, the California Department of Finance (DOF) sent a budget letter to the Legislature alerting them to the dramatic impact that the COVID-19 pandemic is having on the California economy and state budget<sup>8</sup>. In the letter, DOF indicated that the effects of the downturn will be felt immediately, that the California unemployment rate could peak at a rate higher than the Great Recession of 2008, and that economic softness could persist into 2020-21 and additional years depending on the pace of recovery to local, state, and national economies. It referenced a multi-year recession alternative included in its January budget, and indicated that actual increases in unemployment would be much larger.

California's Legislative Analyst's Office (LAO) acknowledged the scope of the economic change that the State is witnessing<sup>9</sup>. In a document titled "Preliminary Assessment of the Economic Impact of COVID-19" released on April 16, 2020, the LAO declared that "Job Loss and Abrupt Halting of Economic Activity Make It Clear That We Have Entered a Recession". This assessment was initially confirmed with news reports of 1<sup>st</sup> Quarter GDP results<sup>10</sup>.

### **Correct the Projections and Analyses**

First, CARB should pause the rulemaking and begin working with the port authorities to develop new cargo volume and cruise visits projections that will serve as the basis for re-analysis of the proposed rule. Second, CARB should revise its assumptions based on the comments previously submitted by stakeholders that demonstrate costs have been underestimated and emission reductions and health benefits have been overestimated. Finally, CARB should re-evaluate baseline emissions, proposed emission reductions, health benefits, costs, and cost-effectiveness based on a revised forecast and assumptions.

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### **Previous Comments Unaddressed**

The industry coalition is concerned that our comments on the ISOR were not addressed or considered. Extensive technical comments on cost, infrastructure, and feasibility were submitted with supporting information. In fact, some of the proposed "15-Day Changes" are diametrically opposed to the evidence submitted to CARB. As an example, substantial evidence, in the form of engineering analysis and previous comparable examples, was submitted by both industry and port authorities demonstrating that more time was needed to ensure successful compliance with the rule. Those concerns and that evidence appears to have been dismissed, with CARB staff proposing to accelerate already unachievable timelines. Accordingly, we request that CARB staff review and respond to all industry comments prior to Board consideration of the proposed regulation.

<sup>7</sup> <https://ww3.arb.ca.gov/regact/2019/ogvatberth2019/apph.pdf>

<sup>8</sup> [http://dof.ca.gov/budget/COVID-19/documents/4-10-20\\_COVID-19\\_Interim\\_Fiscal\\_Update\\_JLBC\\_Letter.pdf](http://dof.ca.gov/budget/COVID-19/documents/4-10-20_COVID-19_Interim_Fiscal_Update_JLBC_Letter.pdf)

<sup>9</sup> <https://lao.ca.gov/handouts/FO/2020/Preliminary-Assessment-of-the-Economic-Impact-of-COVID-19-041620.pdf>

<sup>10</sup> <https://www.latimes.com/politics/story/2020-04-29/u-s-economy-in-clear-sign-of-recession-shrinks-4-8-in-first-quarter-due-to-coronavirus>

### **Proposed Changes Are Not Consistent with “15-Day Change” Requirements**

Accelerating deadlines in the rule by 33% for tankers and 25% for Ro/Ros with no evidence to support the feasibility of the proposal is not a reasonably foreseeable change to the proposed regulation. As a result, these changes are not appropriate for a “15-Day Change” notice. The changes substantially alter the impact and implementation of the proposed rule. CARB staff should recirculate the proposed changes as a “30-Day Change” notice.

The purpose of the “15-Day Change” notice is to provide flexibility for *de minimis* changes that do not require substantial new analysis. The proposed changes have required concurrent changes to every element of the analysis: costs, emissions inventory, and health benefits. Even worse, the impact of an accelerated schedule on costs are not disclosed, eliminating the opportunity for stakeholders to provide comment on the change.

### **Increased Costs Not Disclosed**

Accelerating the schedule increases costs in multiple ways. However, the “15-Day Change” notice provides no detail on how costs increased. There is only a vague statement that total program costs have increased by \$210 million. It attributes increased costs to the accelerated schedule and to the inclusion of the Innovative Concept section but does not identify what those costs are or how they arise. The nature and mix of costs are important to understanding the economic impact. As the Department of Finance (DOF) pointed out in its comment of the Standardized Regulatory Impact Assessment (SRIA):

“the SRIA must include non-annualized capital costs. Capital costs are almost half of the direct costs of the package. However, because new facilities are required for compliance, these capital costs may not be spread evenly across the effective period of the regulation as ARB assumes, but will depend on the ability of parties to finance up-front costs. The SRIA should disclose the cost of capital construction to the year the money will actually be spent, as well as the assumed amortization.”

The proposed acceleration of the deadline compounds the issue that DOF identified. Without detailed information on the increased costs, it is impossible to assess and provide impacts for those increased costs.

### **Innovative Concepts**

Another major proposed change would allow the use of certain “Innovative Concepts” (IC) to meet compliance obligations. CARB staff present the “Innovative Concepts” provisions as an alternative compliance pathway but the proposal would fail to serve that purpose as currently written. A number of changes are necessary in order for the IC section to be workable.

- A fleet averaging concept should be a defined path within the IC section. Fleet averaging, as a program whose parameters are known, should not be subject to the unnecessary restrictions for new concepts. Given the known success of fleet averaging to reduce emissions, it is not

necessary to create uncertainty by having a three-year term with extension subject to uncertain approval.

- There should not be a set term for IC plans. As written, the IC section requires regulated parties to repeatedly apply for and receive CARB approval to use an “Innovative Concept” for limited three-year terms. Different concepts may require different terms in order to recoup any necessary investment. A one-size-fits-all approach is unwarranted and unnecessary. The term for any IC can be determined individually.
- While IC must be “surplus” at the time of creation, CARB could revoke or decline to renew approval if the emission reduction became subject to regulation at a future date or by any CARB-approved AB 617 Community Emission Reduction Plan. The IC section should be modified to recognize IC reductions without this limitation.
- Limiting the location of IC emissions reductions only to “adjacent” communities and distances no greater than 3 nautical miles may have unintended consequences. Neither “adjacent” nor “community” are defined in the Proposed Regulation, so it is unclear how close an area would need to be in order to be deemed “adjacent,” and where the boundaries of that area would end. The IC section should be modified to encourage any project (adjacent or not) that would benefit the port and terminal communities.
- The IC section sets a deadline for submitting a proposal. This implies that IC will not be considered after 2021. We do not believe it was the intention of staff to limit development of IC to the first six to twelve months of the proposed rule’s implementation. The deadline should be removed and replaced with the process for IC plan review at any date such plans are submitted in the future.
- The prohibition on public funding for ICs is too broad. Funding may come from different sources, including federal, other states, or other nations. In addition, such a prohibition would exclude demonstration projects. Fleets that are likely to engage in ICs, including fleet averaging, are also likely to participate in demonstration projects sought by CARB or other air quality agencies. Being innovative should not prohibit technology advancement.
- The requirement that “if no environmental review is determined to be required by a local lead agency, the applicant must submit documentation from the local lead agency explaining environmental review is not required” does not make sense in the context of the California Environmental Quality Act (CEQA). It is not normal for an agency to affirmatively state it is not taking action under CEQA; it simply does not act. The environmental review provision should be limited to the review of CARB’s action, if any. If CARB determines environmental review is necessary, it must conduct that review unless another lead agency is identified. CEQA already contains provisions for addressing conflicts between multiple lead agencies. If CARB determines that its action does not require environmental review, it is not necessary to determine if other lead agencies may exist.

- Revocation of the IC plan provides for a 30-day notice. This is likely to be inadequate for an ocean carrier to transition to original provisions of the rule. The risk of a 30-day transition at the uncertain end of a three-year program is enough to prevent an ocean carrier opting to implement an IC. The IC section should include a nine-month transition period upon revocation of an IC plan.

### **Accelerated Deadlines are Unachievable**

As was demonstrated in multiple industry comment letters, the original deadlines were unachievable. The rule demonstrated this absurdity by requiring facility plans to ensure compliance six months after compliance is required. The only engineering analysis in the record was submitted by the ports of Long Beach and Los Angeles that demonstrated, based on actual past experience, that more time was necessary to implement the proposed rule. No engineering analysis was conducted by CARB and no information has been made part of the record to support the accelerated deadlines. The accelerated deadlines for tanker and Ro/Ro vessels cannot be achieved.

### **LCFS Considerations**

The economic analysis presented by CARB shows Low Carbon Fuel Standard (LCFS) credit-derived revenue offsetting electricity, labor, and infrastructure costs without restriction. At the time of this letter, CARB LCFS staff is still preparing guidance on the "Use of Proceeds" under the LCFS regulation. As a result, it has not been clear what costs are eligible for offsets on the LCFS "Use of Proceeds" requirements. Please confirm that shore power-related electricity, labor, and infrastructure costs are eligible offsets for shore power-generated LCFS credit revenue.

### **Summary of Proposed 15-Day Changes and Impacts on Costs Inconsistent with Proposed Regulation**

The summary of the impacts on costs states that emission reductions can be achieved for \$30,000 per weighted ton and the cost analysis for the proposed regulation has been updated to reflect that cost assumption based on information from PMSA and WSPA. The referenced PMSA email concerned the appropriate value of the remediation fund since the purpose of the remediation fund is to replace unmitigated auxiliary engine emissions. If CARB staff believes that number accurately reflects the costs to offset uncontrolled emissions, the hourly remediation fund rate should be adjusted to reflect that. If CARB does not believe that the \$30,000 per weighted ton estimates of cost reflect the cost of replacement emission reductions, then the cost estimate prepared by CARB should reflect the higher value used to establish the remediation fund rate. CARB should not select higher and lower costs in order to achieve a preferred outcome depending on each situation.

### **Fundamental Problems with Emissions Inventory Unresolved**

Even before addressing the changes brought about by the COVID-19 crisis, the emissions inventory has not addressed known problems as described in previous industry stakeholder comment letters. The inventory overestimates growth, resulting in a significant overestimation of the proposed rule's emissions benefit. The inventory does not consider the emission reductions associated with Proposition 1B funding requiring emission reductions of 90% under the existing rule – 10% more than the proposed

rule. This results in the inappropriate attribution of emission reductions from existing requirements to the proposed rule. The emissions inventory also inappropriately caps emission reductions under the existing rule at 80%. Every vessel with a call greater than 15 hours will result in emission reductions greater than 80%. In San Pedro Bay, where calls greater than 100 hours are typical, emission reductions can exceed 97%. Yet, no reason is given in the emissions inventory for capping emission reductions. The inventory must be updated to reflect these issues.

CARB inventory staff have acknowledged these issues in a variety of phone calls and emails with stakeholders and have indicated that these issues will be resolved sometime this summer. That does a disservice to both the public and decisionmakers in understanding the benefits of the proposed rule changes.

**Additional CEQA/EA Considerations**

In addition to the previous issues described in this letter that require additional evaluation under the California Environmental Quality Act (CEQA), the changes to the proposed regulation will result in the need for revised environmental assessments. Among the proposed changes, the lead time for tankers will be reduced by 33% and for Ro/Ros by 25%. These changes represent significant new information and a substantial change to the project description that triggers the recirculation of the environmental assessment under CEQA. In addition, by accelerating the deadlines, more infrastructure work will be required over a shorter period of time. A foreseeable consequence is that overlapping construction will lead to higher peak emissions. The California Environmental Quality Act (CEQA) requires that these changes be evaluated.

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The COVID-19 crisis and its impact on future cargo volumes, emissions, and benefits of the proposed regulation also represents significant new information requiring review, analysis, and recirculation of the environmental assessment. As described earlier, forecasts used in the analysis of the proposed regulation may overestimate activity by 62% by the end of this year alone! The environmental assessment must be revised to reflect this new reality.

**Timed Connection Requirement**

CARB staff has revised the one-hour limit on the connect and disconnect times for shore power to a two-hour connect time limit and one-hour disconnect time limit. While it is appreciated that the infeasibility of the one-hour requirement was acknowledged, a two-hour requirement is still arbitrary and capricious and not based on any evidence that it is safe or feasible. As we have said in previous letters, the existing rule permits multiple connection strategies, some of which will require more than one hour. More importantly, the shore power connection process requires individual people to manhandle heavy, high-voltage equipment and energize that equipment – sometimes in adverse weather conditions. Under no circumstances should that work be performed under a stopwatch. The two-hour requirement would likely be ineffective because any exceedance of the one-hour requirement would likely result in a safety exemption being sought, as having labor move faster handling high voltage equipment would be fundamentally unsafe.

CARB staff has still provided no basis on which it can be assumed that connection times can be consistently and safely accelerated. In fact, no data is available from CARB justifying the previous one-hour connection window or the new two-hour connection window.

**Reporting for Bulk Vessels Should Be Eliminated**

The reporting requirements for general cargo and bulk vessels add a real, quantifiable burden to bulk and general cargo vessel operators, but do not advance any emissions reduction program in California. The State should not impose costly reporting requirements for the sole sake of collecting more information, particularly when there is no planned use for that data. If CARB identifies a future need for such data, it is readily available through alternative sources such as marine exchanges or port authorities. There are even existing regulatory tools in place like the OGV fuel rule that CARB can use to obtain vessel information and ensure significant emission reductions. There is no reasonable basis to place a permanent, costly reporting burden for no measurable or identified benefit.

Sincerely,

***California Association of Port Authorities  
Pacific Merchant Shipping Association  
World Shipping Council***

***Cruise Lines International Association  
Western States Petroleum Association***

Attachment A: Industry Coalition Letter "Impact of COVID-19 on At-Berth Regulatory Schedule",  
March 20, 2020

Attachment B: Capitol Matrix Consulting Report, April 27, 2020

Attachment A:  
Industry Coalition Letter  
Impact of COVID-19 on At-Berth Regulatory Schedule  
March 20, 2020



March 20, 2020

Jared Blumenfeld, Secretary  
California Environmental Protection Agency  
1001 I Street  
Sacramento, California 95812

Mary Nichols, Chair  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95812

**Subject: Impact of COVID-19 on At-Berth Regulatory Schedule**

Dear Secretary Blumenfeld and Chair Nichols:

The spread of COVID-19 is disrupting the entire world. The impact has been particularly difficult to manage in an industry based upon the international movement of goods and people. Necessary precautions to address COVID-19 have already made compliance with the existing At-Berth Rule difficult and, at times, impossible. Travel bans and self-quarantines have already kept key personnel from reaching vessels and terminals. Many vessel sailings were cancelled from China and vessel schedule will take months to restabilize. Here in the United States, while we are still in the early stages of the spread of this disease, industry has already documented to your staff the many instances of our inability to conduct routine maintenance, repairs, or vessel commissioning as a result of COVID-19 restrictions.

In addition to the challenges that this public health crisis poses to industry compliance with the existing shorepower regulation, we will also be impacted with respect to promulgation of a new proposed rule. We appreciate that your staff has already delayed the release of the 15-Day package for the At Berth amendments and is considering extending deadlines for comments. Unfortunately, that is not enough. Based on the recent study from Imperial College London, this outbreak will not subside for months with the peak in the United States not reached until June 2020. As a result of the extraordinary disruptions to normal business operations associated with this crisis, it will be impossible for the regulated community, spread across the world, already dealing with limitations with respect to our ability to comply with the current regulation to also participate in the rulemaking process for months.

With respect to implementation, it is unclear when personnel and vendors will be able to travel again to begin making necessary improvements to comply with the requirements of any amended rule. The proposed rule compliance date was already very aggressive, and our Coalition has consistently and repeatedly raised concerns that compliance was infeasible even under the best of circumstances due to the operational and infrastructure changes to be implemented.

As a result of the COVID-19 circumstances described above and in anticipation of other extenuating factors arising from this crisis that may come to light in the coming months, we respectfully request that the regulatory schedule be paused until January 2021 when this crisis is over and its full impacts have been assessed.

We look forward to continuing our good working partnerships and positive relationships with the Agency and the Air Resources Board during these trying times.

Sincerely,

**California Association of Port Authorities  
Pacific Merchant Shipping Association  
World Shipping Council**

**Cruise Lines International Association  
Western States Petroleum Association**

Attachment B:  
Capital Matrix Consulting Report  
April 27, 2020



April 27, 2020

Ms. Catherine Reheis-Boyd  
President  
Western States Petroleum Association  
1415 L Street, Suite 900  
Sacramento, CA 95814

Dear Ms. Reheis-Boyd:

This letter is in response to your request that our firm evaluate the effects of the COVID-19 pandemic on the estimates in the California Air Resources Board (CARB) Standardized Regulatory Impact Assessment (SRIA) of the *Ocean-Going Vessels at Berth* proposal, as modified by the “15-day changes” document released on March 26, 2020.

## **Background and Proposed Regulation**

The proposed regulation would expand the type and number of ships that must use shore electrical power or an alternate recapturing method to reduce emissions while at berth. Existing rules require most container ships, refrigerated ships and cruise ships to use shore power when docked in ports rather than run their auxiliary engines to create electricity for lighting, air conditioning or operation of shipboard equipment. Alternatively, these ships can continue to use auxiliary engines but then must connect to an on-shore or barge-based capture and control system. The current regulations are in place at six ports: Los Angeles, Long Beach, Oakland, San Diego, San Francisco and Hueneme.

Key provisions of the proposed regulation (as modified by the 15-day changes) would:

- Make smaller container, reefer and cruise ships subject to the shore power regulation. Those requirements would phase-in beginning in 2021.
- Make roll-on/roll-off (ro-ro) ships subject to the shore power regulation starting in 2024.
- Expand the requirement to include tankers beginning in 2025 at the Los Angeles and Long Beach terminals, and elsewhere in 2027. In addition to auxiliary engines, the proposal would require large tankers to reduce emissions from boilers used to power steam-driven pumps involved in offloading crude oil, unless shore power is installed.

- Expand the ports and terminals covered in the regulations. Ports, including refinery docks, in Northern California in or near cities such as Stockton, Richmond, Rodeo, Benicia and Martinez, would now be covered.
- Allow vessel and terminal operators to meet berth emission reduction requirements through an approved “innovative concept.” The concept, which according to CARB would most likely be used at smaller ports, allows vessel or terminal operators to achieve targeted emissions savings through an alternative project. These concepts would only qualify to the extent they are not required by regulation, including future regulations and AB617 Community Emission Reduction Plans.

## CARB Estimates of the Proposal’s Impact

CARB estimates that the proposed regulation would have the following impacts:

- A total net cost of \$2.40 billion for the period 2021 to 2032 and avoided adverse health outcomes worth \$2.44 billion for the same period.
- Unit costs of regulation in 2030 of \$1.30 per Twenty-Foot Equivalent Unit (TEU) for container or reefer vessels, \$5.25 per cruise passenger, \$7.49 per automobile moved on a ro-ro ship, and less than a penny per gallon of finished product for products moved by tanker.
- Net decreases in economic activity over the 2021 to 2032 period due to added regulatory costs and reduced productivity, offset in a few years by new construction activity.
  - By the final year of the projection period (2032), *decreases* of:
    - \$297 million in gross state product;
    - 2,385 jobs;
    - \$234 million in personal income; and
    - \$90 million in private investment.

## Methodology and Assumptions Behind CARB’s Estimate

**Methodology:** CARB’s estimates were based on a multiple-step process:

- Information was developed by CARB staff regarding such factors as costs of permitting, planning, engineering, construction, equipment, installation, and operations, and maintenance.
- These assumptions were then entered into a proprietary economic forecasting and policy analysis model licensed by REMI. The REMI model integrates input-output, computable general equilibrium, econometric, and economic geography methodologies to estimate the impacts of cost changes and other factors on the

broader economy. A basic feature of computable general equilibrium models is that their outputs are highly sensitive to changes in economic assumptions.

**Key assumptions.** The REMI economic model starts with a baseline set of economic assumptions that tie to the California Department of Finance (DOF) forecasts made in the Spring of 2019. At the time, DOF projected that U.S. and California economies would experience moderate but sustained economic growth through 2022, as follows:

- 1) Employment increasing by an average of 1 percent per year,
- 2) Personal income increasing by 4 percent per year, and
- 3) U.S. real gross domestic product increasing by 2 percent per year.

The May 2019 population projection indicated that California would add about 2.4 million people between 2019 and 2032.

Other inputs into CARB’s estimates included diesel price projections and “industry growth factors.” The diesel price projections were based on U.S. Energy Information Administration’s (EIA) October 2018 estimate, which assumed steady growth in diesel prices, from \$2.80 per gallon in 2019 to \$5.03 by 2032. The industry growth factors are intended to capture the impacts of expected growth in port volume over time. They are used by CARB for its baseline emissions estimates and most of its cost estimates. The growth factors are based on a combination of projections supplied by U.S. Federal Highway Administration’s Freight Analysis Framework (FAF) 65 and, where available, from individual ports. Using these estimates, CARB assumes growth factors of 77 percent for container vessels, 79 percent for cruise ships, 52 percent for ro-ro vessels, and 14 percent for tankers.

## Impact of COVID-19 On CARB’s Assumptions

Every key economic assumption in the CARB estimate of the proposed regulation has been dramatically affected by the COVID-19 pandemic. Fuel prices, economic output, jobs, international trade and waterborne port activity will all be sharply lower than anticipated in any economic forecast made prior to March of this year. Given the emerging expectation that recovery from the historic COVID-19-related downturn will be slow (see discussion below), we expect the economic measures will remain below the levels assumed in the CARB projections for several years to come. This will, in turn, have impacts on CARB’s estimates of (1) baseline emissions, (2) emissions reduction and health-related savings resulting from the proposal, (3) costs and savings to the ports, terminals, and vessel operators, and (4) broader economic impacts of the proposed regulation.

68-5

**Recent economic developments.** The COVID-19 pandemic has led to a global economic contraction that is more severe than the 2008-2010 Great Recession. Nationally, new claims for unemployment insurance totaled 26 million over the five weeks ending on April 23. Over the three weeks ending on the same date, California processed about 3.4 million unemployment claims. These claims represent about 17 percent of the U.S. and California

workforces, respectively. Turmoil in global oil markets have driven the price of West Texas Crude downward, to less than \$17 per barrel as of April 23, 2020.<sup>1</sup>

**Department of Finance comments.** On April 10, the California Department of Finance (DOF) sent a budget letter to the Legislature alerting them to the dramatic impact that the COVID-19 pandemic is having on the California economy and state budget. In the letter, DOF indicated that the effects of the downturn will be felt immediately, that the California unemployment rate could peak at a rate higher than the Great Recession of 2008, and that economic softness could persist into 2020-21 and additional years depending on the pace of recovery to local, state, and national economies. It referenced a multi-year recession alternative included in its January budget, and indicated that actual increases in unemployment would be much larger.

**Other recent forecasts.** Recent national economic forecasts show a similarly dark picture for the U.S. economy. On April 23, the Congressional Budget Office released its first post COVID-19 forecast, which showed a 5.6 percent decline in inflation-adjusted gross domestic product in 2020, followed by a subdued increase of 2.8 percent in 2021.<sup>2</sup> (For context, real GDP fell by a cumulative total of 2.6 percent in the first two years of the 2008-2010 recession, which was considered to be the most severe since the 1930s.) CBO's projected level of unemployment is 11.4 percent for 2020 and 10.1 percent in 2021. The primary reason that CBO's forecast anticipates only a modest rebound in 2021 is its expectation that social distancing will continue (albeit at a lesser rate) through the first half of 2021.

Other forecasts show equally sharp declines in 2020, and, under some scenarios, an extended period of subdued economic activity.<sup>3</sup> Factors that could result in long-term declines include permanent downsizing of some sectors and occupations due to such factors as reduced travel, changes in consumer spending patterns, workplace practices (e.g., more home-based workers, more reliance on technology, less travel), and shifts in global supply chains.

## Areas Where A Changing Economic Outlook Will Impact Estimates of the Proposed Regulation

Following are examples of areas where the weaker post COVID economic outlook will affect CARB's outdated estimates of the proposed regulation's impact.

**Less port activity under the baseline.** As noted earlier, the CARB estimates assume substantial growth in vessel visits through 2032. However, trade flows and port activity are

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<sup>1</sup> Price accessed on Oilprice.com April 23, 2020. <https://oilprice.com/oil-price-charts/45>

<sup>2</sup> "CBO's Current Projections of Output, Employment, and Interest Rates and a Preliminary Look at Federal Deficits for 2020 and 2021." Congressional Budget Office, April 24, 2020. <https://www.cbo.gov/publication/56335>.

<sup>3</sup> See for example, S&P Global Ratings, Economic Research: COVID-19 Deals A Larger, Longer Hit to Global GDP. <https://www.spglobal.com/ratings/en/research/articles/200416-economic-research-covid-19-deals-a-larger-longer-hit-to-global-gdp-11440500>

highly sensitive to changes in the state, national, and global economic environments.<sup>4</sup> Based on current economic realities, vessel activity will grow by considerably less than what was assumed in the SRIA. Beyond the general impacts of an economic recession on port volume, we believe it is possible, potentially likely, that the COVID pandemic will have lasting impacts on growth in cruise ship totals, further reducing port activity in the state.

The reduction in vessel activity will lower the level of baseline emissions, which in turn affects the amount of potential emission reductions and health benefits that can be realized from the regulation.

68-6

On the cost side, the methodology used by CARB scales the great majority of regulatory costs upward and downward in proportion to the size of the projected industry growth factor. Hence, we would expect reduced vessel activity to lower its estimate of regulatory costs. However, we note that not all of the costs associated with the proposed regulation will rise or fall in line with the industry growth factor. We would expect, for example, infrastructure-related costs to the terminals themselves to have both fixed and variable components. Because these fixed costs would be spread over fewer visits, a reduction in activity would *raise* per-vessel regulatory costs.<sup>5</sup>

**Cost shifting.** The SRIA analysis assumes that a significant share of the major costs associated with the land-based shore-power and capture and control systems will be initially be borne primarily by ports. However, the impact on ports is assumed to be lessened by two factors: (1) the major capital costs are annualized over a 20-year life for terminal equipment; and (2) some, perhaps most, of the costs will be shifted – from ports to terminal operators through lease increases, and from terminal operators to vessel owners and owners of discretionary cargo through rate increases. Thus, the ultimate incidence of the proposed regulation is assumed to be shared by entities around the world.

However, a couple of points are worth noting. First, the required infrastructure costs are not revenue-producing. Consequently, it is not possible to finance them through the traditional revenue-bonding mechanisms used by ports. While it may be reasonable to assume that some of the port authorities could handle the major expenses imposed by this proposal without reducing other expenditures during good economic times, the situation is markedly different when the economy is soft, even at the larger ports. Under such circumstances, regulatory costs are more likely to squeeze out other port projects that are potentially productivity-enhancing or emissions-reducing (at a more cost-effective rate).

Second, the impact on ports is magnified by the fact that it is more difficult to shift costs onto vessel owners and owners of discretionary cargo when these entities are facing their own financial hardships in a depressed economy. If a smaller portion of the regulation's

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<sup>4</sup> As an example, cargo tonnage through the Port of Los Angeles grew by 50 percent between 2002 and 2007, but plunged 17 percent the following year, and did not return to the pre-recession level for a decade. Source: Tonnage Statistics/Port of Los Angeles. <https://www.portoflosangeles.org/business/statistics/tonnage-statistics>

<sup>5</sup> As noted in the on page 26 of SRIA report, "As terminal visit activity decreases, the cost effectiveness of installing emissions control equipment becomes worse, as there are fewer vessels calling at the terminal to use the equipment and to help recoup the costs of installing, operating, and maintaining the equipment."

costs are borne by discretionary cargoes and vessel visits, then a larger portion of those costs will necessarily be borne by Californians. In a growing market, it may be reasonable to assume that the cost-incidence of a proposed regulation will be shared broadly by cargo owners and consumers around the world. However, when markets are less robust, those costs will become more concentrated in this state.

**Fuel-related savings estimate.** CARB’s estimate of net costs incurred by vessel operators using port power includes vessel equipment and maintenance costs. But these costs are partly offset by fuel savings, since the vessels would no longer have to run their auxiliary engines when in port. The estimated amount of fuel savings is based on the marine gas-oil price of \$763/metric ton (actual cost in April 2019), adjusted using the U.S. Energy Information Administration’s (EIA) price projections for transportation diesel fuel. The EIA projection, made in October 2018, assumed that diesel prices would rise from \$2.80 per gallon in 2018 to \$3.39 in 2020, \$4.30 by 2025 and \$5.03 by 2030. (The same forecast assumed that West Texas crude oil would rise from \$50 per barrel in 2018 to \$72 per barrel by 2020, \$100 per barrel by 2025, and \$120 per barrel by 2030. As noted earlier, the price as of April 24 of this year was \$17 per barrel.) If lower crude-oil prices persist, the avoided costs will be substantially *less* than assumed in the CARB estimate, and net costs of the regulation will be *higher*.

**Competitiveness.** The SRIA indicates that the proposed regulation will increase costs to California ports and the vessels that visit them. It also indicates that it is not possible to determine the impact of the higher costs on cargo diversions. It asserts that studies exploring the relationship between general cost increases and cargo diversion have come to varying conclusions; and in cases where effects were found, they were the result of cost increases that were much larger than those that were estimated to result from the proposed regulation.

We recognize that shipping decisions are based on a variety of factors in addition to costs, including logistical considerations and access-to-markets. However, we also believe that cost considerations become more important when economic conditions deteriorate, and shipping margins become tighter. This may be particularly true for some of the Northern California ports, newly affected by this proposed regulation, that are closer to the port in Tacoma, Washington. For this reason, we believe it would make sense to revisit these potential cost impacts on California port competitiveness in light of the new economic realities.

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## Conclusion

The COVID-19 virus has fundamentally altered the economic landscape. The Department of Finance May 2019 economic forecast and the EIA fuel price projections, and other inputs used by CARB to develop the benefits, costs, and economic impacts of the proposed regulation, are no longer credible. For these reasons, CARB’s existing SRIA would not accurately inform its Board and members of the public of the true economic impacts of the proposed regulation, and needs to be revised. It makes sense to delay action on the

proposed regulation at least until the economy emerges from the current crisis, and the post-COVID-19 outlook becomes clearer. At that point, CARB should re-estimate the proposal's impacts based on assumptions that more accurately reflect the economy in the post-COVID-19 world.

Please feel free to contact me if you have any questions about the information contained in this letter. I can be reached at (916) 761-2574.

Sincerely,

A handwritten signature in black ink that reads "Brad Williams". The signature is written in a cursive style with a long horizontal flourish at the end.

Brad Williams  
Chief Economist  
Capitol Matrix Consulting

Enclosure: Author Biography

## Author Biography

**Brad Williams** joined Capitol Matrix Consulting (CMC) in 2011 after serving in various positions in California state government for nearly 33 years. During the past nine years at CMC, Mr. Williams has been involved in hundreds of projects covering energy and regulatory policy, economic forecasting, economic impact analysis, and state and local government taxation and finance. During his prior three decades in state government, Mr. Williams served in key positions in the State Treasurer's office, Assembly Appropriation Committee and the Legislative Analyst's Office, where he was chief economist and Director of Budget Overview and Fiscal Forecasting. During his government career, Mr. Williams was regarded one of the state's top economic and fiscal experts, and he was recognized by the Wall Street Journal as the most accurate forecaster of the California economy in the 1990s.

May 1, 2020

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[https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=ogvatberth2019&comm\\_period=A](https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=ogvatberth2019&comm_period=A)

**Subject:** PMSA Comments on the Supplemental 15-Day Notice for the At Berth Regulation and Related Environmental Assessment

PMSA appreciates the opportunity to comment on the proposed At Berth Regulation and Supplemental 15-Day Notice. The following comments are inclusive of the Supplemental 15-Day Notice as well as the Initial Statement of Reasons, Environmental Assessment, Standardized Regulatory Impact Analysis, and Supporting Regulatory documents.

PMSA is submitting extensive comments on behalf of its member companies which are providing critical and essential services in the midst of the global COVID-19 pandemic. However, we are concerned that this rulemaking process is proceeding during this crisis as our member companies are engaged in responding to this crisis by developing and *implementing* emergency procedures to address active coronavirus cases and prevent further infections, ensuring that their staff and communities are safe, and maintaining the supply chains that allow the U.S. and international response efforts to be executed and our communities to successfully shelter-in-place. As a result, meaningful public participation in this rulemaking is significantly impaired as the ability of the impacted and regulated industry to review, understand, and comment on proposed regulations is severely constrained at this time.

In a previous letter on March 20, 2020, industry stakeholders including PMSA reached out to the California Air Resources Board (CARB) and Cal/EPA outlining the impacts of the crisis on our industries and requesting consideration of a pause in this rulemaking during the crisis. No specific response to this letter was ever received. PMSA believes that the transformative effects of this crisis as laid out in this letter rise to the level of needing a pause and reassessment.

*Material and Significant Changes in Economic and Environmental Circumstances*

The scale of the current crisis is unprecedented. Every key economic assumption in the CARB estimate of the proposed regulation has been dramatically affected by COVID-19 and the ensuing shelter-in-place orders. IHS Markit economists over the course of one week in March lowered their projection for 2020 US real GDP growth from a decline of 1.7 percent to a decline of 5.4 percent.<sup>1</sup> The impact to the

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<sup>1</sup> [https://www.joc.com/maritime-news/container-lines/container-industry-fallout-coronavirus-linger-2021\\_20200407.html](https://www.joc.com/maritime-news/container-lines/container-industry-fallout-coronavirus-linger-2021_20200407.html)

maritime industry is even larger. The World Trade Organization (WTO) has estimated that global trade could decline up to 32% this year.<sup>2</sup> Consequently, the analyses on which this rule is based are out of date and no longer valid.

*Previously Faulty Assumptions On Containership Growth Rates are Now Even More Facially Incorrect*

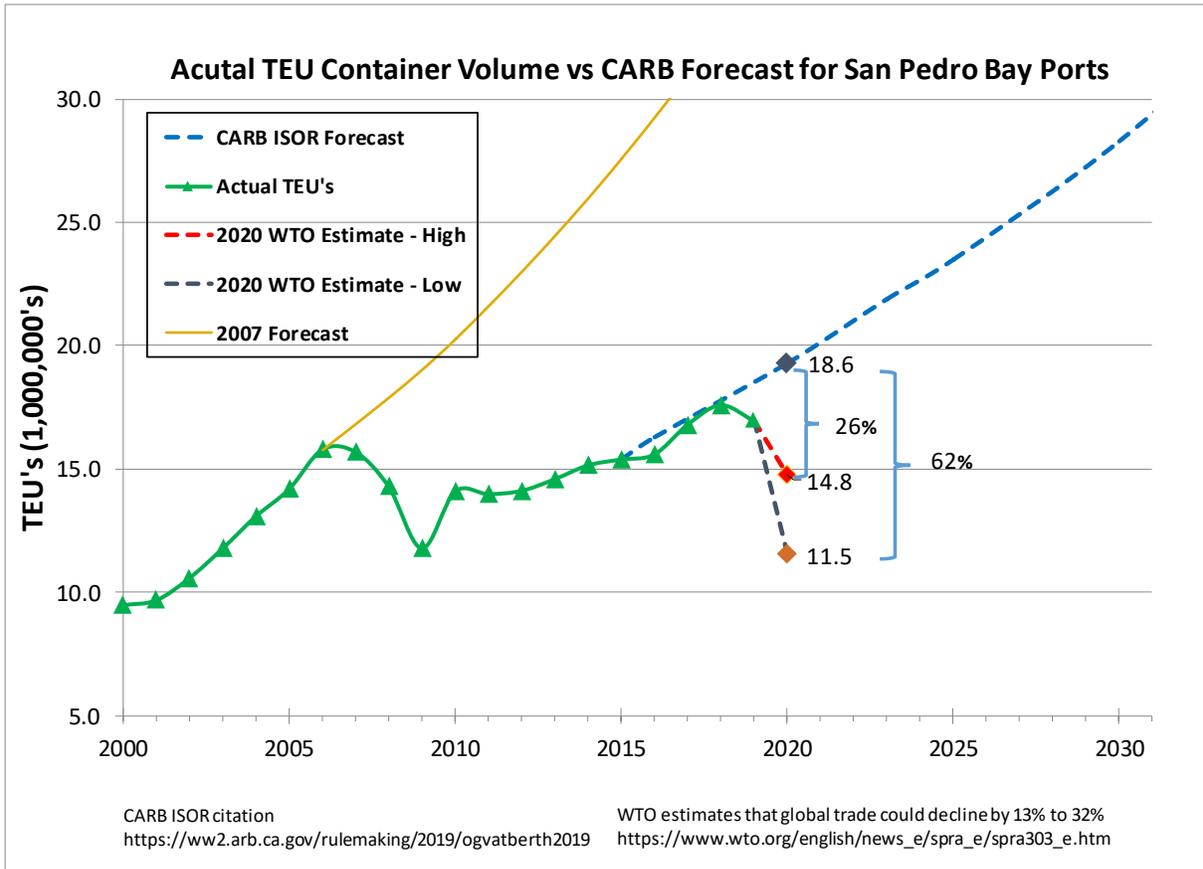
The underlying ISOR/SRIA analysis, upon which the 15-day Notice relies as well, is predicated on strong growth assumptions based on a number of forecasts. Prior to the current crisis, those forecasts were in doubt. For example, the analysis assumes that from 2016 (the inventory base year) through 2020, cargo at the ports of Long Beach and Los Angeles would grow 4.5% per year. Last year (before the current crisis), cargo throughput at the two ports declined 3.3%.

Since the crisis, the decline has accelerated, with year-over-year declines in January (-5.1%), February (-16.9%), and March (-19.7%). Before even considering the rest of the year, according to SeaIntelligence, 435 sailings have already been eliminated due to the COVID-19 crisis,<sup>3</sup> the current market upheaval means the emissions inventory contained in the ISOR, SRIA, and the 15-day Notice is wrong. That gap only grows if the rest of 2020 is forecast based on WTO projections, as shown in the figure below for the San Pedro Bay Ports:

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<sup>2</sup> [https://www.wto.org/english/news\\_e/spra\\_e/spra303\\_e.htm](https://www.wto.org/english/news_e/spra_e/spra303_e.htm)

<sup>3</sup> <https://www.seatrade-maritime.com/containers/container-line-blank-sailings-increase-435>



By the end of this year, the baseline forecast used in the ISOR will overestimate cargo volumes by between 26% and 62%.

While everyone hopes that the economic and cargo disruptions posed by this unprecedented crisis are short-lived and temporal, there is no enunciated or clear justification for a theory that cargo volumes will quickly return to normal. To the contrary our experience and the historic precedent is that we are facing a long climb out. Prior to the Financial Crisis, the 2007 Forecast estimated that cargo volumes would grow to 65 million TEU by 2030. Following the decline from the last recession, cargo never recovered to their pre-recession levels of growth and it took a decade just to re-establish pre-recession volumes (see chart above).

Similarly, even if the pandemic itself is temporal as we all hope, the impact of the crisis is not likely to be short-lived. A new McKinsey study estimates that recovery in the USA could take until 2023.<sup>4</sup> With each year, the gap between the ISOR forecast and reality will grow larger, further distorting the analyses predicated on the forecast. Lloyd's List reported that in the view of BIMCO's chief shipping analyst, any recovery in container shipping will come from an extremely low base and that the global health crisis had "ruined every forecast and projection" for the sector. The report continued that "BIMCO expects no V-shaped recovery 'nor any other letter in that game', but a slow and gradual return to what will become a 'new normal'."<sup>5</sup>

Whatever the next decade holds for cargo growth, the only thing that is certain is that it is not represented by the strong growth forecast contained in the ISOR. The estimates of benefits, emissions estimates, costs, cost-effectiveness, and health impacts, which presume the rate of growth contained in the ISOR, are now no longer valid. Even if growth were to immediately resume at levels assumed in the ISOR, cargo volumes and resulting activity will be millions of containers off from the cargo volume estimate.

#### *Ro/Ros*

The crisis is also forecast to impact auto sales in this country and globally. Decreased auto sales will translate into reduced Ro/Ro activity. A forecast by Automotive from Ultima Media<sup>6</sup> indicates that it will take most of this decade for auto sales to return to their pre-crisis levels. The base case scenario has volumes declining from 2019 by 14%. In a worst-case scenario, volume declines would plunge 28% from 2019 levels.

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<sup>4</sup><https://www.mckinsey.com/~media/mckinsey/business%20functions/risk/our%20insights/covid%2019%20implications%20for%20business/covid%2019%20march%2025/covid-19-facts-and-insights-march-25-v3.ashx>

<sup>5</sup> <https://lloydslist.maritimeintelligence.informa.com/LL1132152/No-quick-fix-for-box-shipping>

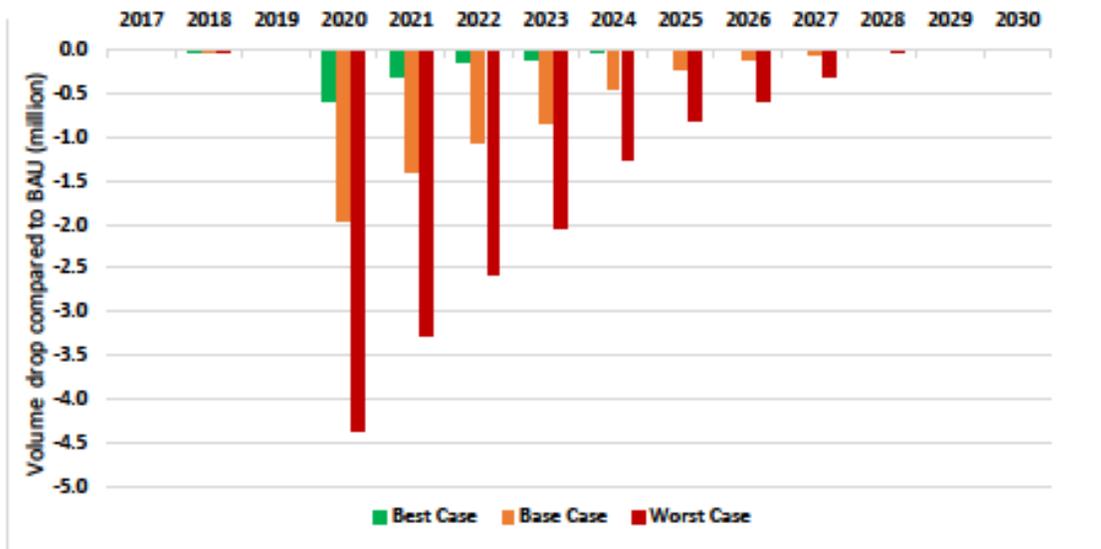
<sup>6</sup> <https://www.automotivemanufacturingsolutions.com/insight/global-vehicle-demand-forecast-2020-2030-the-drastic-impact-of-the-coronavirus-crisis/40396.article>

**US Automotive Sales Volume Forecast Under 3 Scenarios 2017-2030 (units)**



Source: Automotive from Ultima Media

**US Automotive Sales Volume Drop Compared to BAU Under 3 Scenarios 2017-2030 (units)**



Source: Automotive from Ultima Media

As was the case for other vessel categories, the forecast upon which the Ro/Ro analysis was conducted is no longer valid. While the Automotive from Ultima Media forecast auto sales slightly growing by the end of the decade, the proposed rule is based on a growth rate that would see Ro/Ro activity 83.5% higher than 2016 levels in the ports Los Angeles and Long Beach by 2030 and 31.9% higher at the Port of Hueneme<sup>7</sup>. These numbers are not realistic or a reasonably foreseeable outcome of the current economic climate.

In order to be meaningful, accurate, and facilitate CARB's stated policy goals, the ISOR must be revised to take into account these effects and their material and significant impacts.

CARB is already well aware of the fact that the economics of the current pandemic are material to the State of California, and must act consistently with the state government's stated evaluation of our new economic reality. On April 10, the California Department of Finance (DOF) sent a budget letter to the Legislature alerting them to the dramatic impact that the COVID-19 pandemic is having on the California economy and state budget<sup>8</sup>. In the letter, DOF indicated that the effects of the downturn will be felt immediately, that the California unemployment rate could peak at a rate higher than the Great Recession of 2008, and that economic softness could persist into 2020-21 and additional years depending on the pace of recovery to local, state, and national economies. It referenced a multi-year recession alternative included in its January budget, and indicated that actual increases in unemployment would be much larger.

CARB also should maintain DOF consistency when addressing material and significant changes in its ISOR, SRIA, and 15-Day Notice by noting the California's Legislative Analyst's Office (LAO) description of the scope of the economic change that the State is witnessing and the wide-ranging variables and uncertainty associated with the rates, scope, and scale of a potential recovery.<sup>9</sup> In a document titled "Preliminary Assessment of the Economic Impact of COVID-19" released on April 16, 2020, the LAO declared that "Job Loss and Abrupt Halting of Economic Activity Make It Clear That We Have Entered a Recession". This assessment was initially confirmed with news reports of 1<sup>st</sup> Quarter GDP results<sup>10</sup>.

#### *Analyses Must Be Revised in Light of New Data*

CARB cannot proceed now without knowingly ignoring material and significant changes to the economic and environmental impact data upon which all of its rulemaking and CEQA clearance documents rely. Therefore, proceeding now, without revising its analyses in light of new data would be untenable. PMSA does not request that CARB cease work on amendments to the At Beth regulation, as some have unfortunately characterized these comments; to the contrary, we are asking that CARB program staff

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<sup>7</sup> <https://ww3.arb.ca.gov/regact/2019/ogvatberth2019/apph.pdf>

<sup>8</sup> [http://dof.ca.gov/budget/COVID-19/documents/4-10-20\\_COVID-19\\_Interim\\_Fiscal\\_Update\\_JLBC\\_Letter.pdf](http://dof.ca.gov/budget/COVID-19/documents/4-10-20_COVID-19_Interim_Fiscal_Update_JLBC_Letter.pdf)

<sup>9</sup> <https://lao.ca.gov/handouts/FO/2020/Preliminary-Assessment-of-the-Economic-Impact-of-COVID-19-041620.pdf>

<sup>10</sup> <https://www.latimes.com/politics/story/2020-04-29/u-s-economy-in-clear-sign-of-recession-shrinks-4-8-in-first-quarter-due-to-coronavirus>

work closely with stakeholders to ensure that rulemaking proceed properly. We recommend that the Board direct its staff to proceed in the following order: First, CARB should pause the rulemaking and begin working with the port authorities to develop new cargo volume and cruise visits projections that will serve as the basis for re-analysis of the proposed rule. Second, CARB should revise its assumptions based on the comments previously submitted by stakeholders that demonstrate costs have been underestimated and emission reductions and health benefits have been overestimated. Finally, CARB should re-evaluate baseline emissions, proposed emission reductions, health benefits, costs, and cost-effectiveness based on a revised forecast and assumptions.

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*Previous Comments Unaddressed and Incorporates Previous Comments by Reference*

Independent of the material and significant crisis-related changes noted above, PMSA is concerned that our comments on the Initial Statement of Reasons (ISOR) were not addressed or considered in the 15-Day Notice. Extensive technical comments on cost, infrastructure, and feasibility were submitted with supporting information. PMSA incorporates by reference our comment letter, dated December 9, 2020, on the ISOR<sup>11</sup>. Accordingly, we request that CARB staff review and respond to all industry comments prior to Board consideration of the proposed regulation.

*At Berth Regulation Should Be Bifurcated*

The new proposed regulatory framework proposes a single structure for the regulation of disparate vessel types despite the persistence of the same disparities which existed at the time of the initial rulemaking.

Under the existing rule, container, cruise, and refrigerated vessels have been able to successfully comply through a fleet average approach that encourages long-term planning and incentivizes overcompliance in order to manage trade uncertainty. Carriers voluntarily over comply in order to preserve flexibility to accommodate trade surges, vessel redeployments, or unexpected equipment repair/maintenance. The proposed structure would eliminate any incentive to over comply and encourage carriers and terminals to exhaust available Vessel Incident Event (VIE)/Terminal Incent Event (TIE) allowances to reduce cost.

CARB should maintain a fleet average approach for the existing regulated fleet in order to ensure its continued success and consider the creation of a separate regulatory structure for any expansion fleets.

The preservation of the existing regulatory structure for currently regulated fleets and consideration of a new regulation for expansion to new fleets can be achieved in a manner which does not impact any projected emissions reductions. It is simply an acknowledgment of the original bifurcation by CARB of vessel fleets over a decade ago and the continued investments and emissions reductions progress made by the currently regulated fleets in expectation of the durability and continuation of the current regulatory program for the foreseeable future.

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<sup>11</sup> <https://www.arb.ca.gov/lists/com-attach/61-ogvatberth2019-B2tQMwZkAAhSyM0d.pdf>

During the December 5<sup>th</sup> CARB hearing, Board members directed staff to investigate bifurcation of the proposed rule, recognizing the disparate nature of the fleets the proposed rule attempts to regulate. The 15-Day Notice does not provide that any such investigation occurred or discuss why CARB staff remains opposed to proceeding with amendments to the current regulation for currently regulated vessel fleets in order to achieve their rulemaking goals. Accordingly, PMSA again requests that the Proposed At Berth Control Measure be bifurcated, consistent with Board direction, into one set of amendments for the existing fleet regulations and another entirely new regulation which is exclusively applicable to expansion fleets.

*2021 Implementation Date is Infeasible and Accelerated Deadlines are Unachievable*

As was demonstrated in multiple comment letters, the original deadlines were unachievable. The rule demonstrated this absurdity by requiring facility plans to ensure compliance six months after compliance is required. The only engineering analysis in the record was submitted by the ports of Long Beach and Los Angeles that demonstrated, based on actual past experience, that more time was necessary to implement the proposed rule. No engineering analysis was conducted by CARB and no information has been made part of the record to support the accelerated deadlines proposed in the 15-Day Notice. The accelerated deadlines for tanker and Ro/Ro vessels cannot be achieved.

It is also unfair to the existing regulated fleets to provide essentially no transition period from the current regulatory structure into the new proposed regulatory structure. Given the COVID-19 timeline and impacts described above, along with delays to the adoption of the rule by CARB and OAL resulting from the crisis and additional time built into the rulemaking calendar, prior infeasibility concerns regarding the potential implementation date of 2021 are now even more acute.

*US EPA Waiver Requirements Also Render 2021 Implementation Impossible*

One of the primary reasons to amend the current rule (as opposed to creating an entirely new regulation in its stead) is to maintain the effectiveness of the existing regulation, which already has a waiver from the United States Environmental Protection Agency (USEPA) granted under §209(e)(2) of the Clean Air Act in 2011. CARB sought and was granted the waiver from USEPA as the existing At Berth regulations implement emissions standards applicable to the running of auxiliary engines while at berth in California's ports. (76 FR 77515) This waiver was granted after previous auxiliary engine emissions standards were determined to be unenforceable by ARB without the prior issuance of a US EPA §209(e)(2) waiver and after objection to the waiver by PMSA. See *Pacific Merchant Shipping Association v. Goldstene*, 517 F.3d 1108 (9th Cir., 2008).

Now that the industry has invested an estimated \$1.8 billion in the equipment and infrastructure necessary to make the current shore power regulation a workable framework for vessel and port operations in California, PMSA believes that the tremendous investment in the existing emissions reductions infrastructure on vessels, and on shore by ocean carriers, marine terminals, and ports under the existing waiver needs to be protected and preserved. The US EPA waiver process is one component of the Clean Air Act that ensures the preservation of the current and previously adopted regulatory

structure in a uniform manner nationwide, as an alternative emissions standard over and above or in addition to a US EPA standard, and that the adoption or change to any existing uniform rule is completed in the best interests of the currently regulated vessel fleets, CARB, and the entire United States.

Preservation of the current rule and existing waiver by continuing the existing regulation and bifurcation of the amendment process into currently regulated fleets and currently non-regulated fleets also maintains the clear and unambiguous legal status of the existing emissions standards under the current law, avoids any disputes over the authority of ARB to enforce emissions standards on vessels at berth upon the effective date for new amendments, and takes advantage of the existing waiver in order to foster continued national standardization of shore power rules for vessels which have already made a substantial investment in the retrofits necessary to comply.

By contrast, the proposed rulemaking abandons the current rule and the current waiver, and instead promulgates a new emissions standard for not just the newly proposed regulated vessel categories but also for existing regulated vessel categories, ports, and marine terminals.

Regulations for vessels at berth, including specifically any newly promulgated emissions standards, are legally unenforceable without the provision of a new waiver. Such a waiver request from CARB might not even be properly before the USEPA for consideration by January 1, 2021, and it is not reasonable to expect that one would be granted in that time period. PMSA views the elimination of the current rule and existing waiver as an unnecessary complication that should be studiously avoided. We would instead ask that ARB keep the current rule for the currently regulated fleets and make amendments to this existing rule which are either consistent with the existing waiver or which could be addressed with US EPA within the context of the existing waiver via future amendment.

If for no other reason than to maintain legal clarity and consistency within the At Berth program, CARB should take every step possible to ensure that the existing US EPA waiver remains in place and controls the lawful extent of CARB enforcement until a new waiver is granted.

*Proposed Changes Are Not Consistent with "15-Day Change" Requirements*

Accelerating deadlines in the rule by 33% for tankers and 25% for Ro/Ros with no evidence to support the feasibility of the proposal is not a reasonably foreseeable change to the proposed regulation. As a result, these changes are not appropriate for a "15-Day Change" notice. The changes substantially alter the impact and implementation of the proposed rule. CARB staff should recirculate the proposed changes as a "30-Day Change" notice.

The purpose of the "15-Day Change" notice is to provide flexibility for *de minimis* changes that do not require substantial new analysis. The proposed changes have required concurrent changes to every element of the analysis: costs, emissions inventory, and health benefits. Even worse, the impact of an

accelerated schedule on costs are not disclosed, eliminating the opportunity for stakeholders to provide comment on the change.

*De Facto Establishment of a New Ambient Air Quality Standard*

The 15-Day changes proposed for the At-Berth Regulation include an acceleration of health benefits to the public, which in turn purportedly justify increased costs. However, those health benefits are based, in part, on an “Incidences per Ton” analysis to determine reduced mortality and morbidity outcomes. This is the use of a new air quality standard and a deviation established State and National Ambient Air Quality Standards and/or reduction of risk from an identified Toxic Air Contaminant.

The use of standard metrics has long been established through public processes that set standards for ambient air quality standards or identifying the toxicity of specific contaminants. Through a public process, CARB must provide the scientific basis for public scrutiny that the agency will later rely upon to establish new rules that move the State toward achieving the air quality standards or reducing risk exposure.

The analyses contained in the ISOR and 15-Day changes has deviated from this long-standing approach. In addition to the traditional analysis of risk reduction, the document presents the morbidity and mortality benefits of the proposed regulation as a result of a reduction in particulate matter through the “Incidents per Ton” analyses. The analyses purport health benefits even in areas that are in attainment for the health-protective ambient PM standards. However, CARB has not established through any public process the basis of these analyses. There has been no public process to determine at what concentrations health impacts occur or if there is an appropriate standard, if any, that the State should be seeking to achieve.

The analyses imply that there is no ambient concentration of particulate matter that does not result in health impacts. In essence, the Health Analyses is establishing a new *de facto* ambient particulate matter standard of zero parts per billion. By contrast, ambient air quality standards, identification of toxic air contaminants, and even the framework of health risk analyses have been subject to extensive public review.

The use of a new standard that has not been subject to a public review process is fundamentally an underground regulation. CARB is able to provide justification for new regulations without subjecting the *de facto* standard implied by the analyses to its own broad public review. CARB should immediately remove the “Incidents per Ton” as a basis for the proposed rule. The approach itself has not gone through its own extensive public review; it should not be relied upon as justification for the draft regulatory concept.

*CAECS Responsibilities*

PMSA appreciates the changes that make clearer the responsibilities of CARB approved emission control strategies (CAECS) operators. However, the revisions do not go far enough in laying out clear lines of

responsibility. For instance, Table 6 still identifies Terminal and Vessel as potentially responsible for CAECS failure, in addition to the CAECS operator. Only the CAECS operator should be responsible for failure of a CAECS system. In addition, Section 93130.15 makes clear that CAECS are eligible for use of the Remediation Fund, but Section 93130.12 only requires a CAECS operator to remediate excess emissions if excess emissions occur beyond three days. Under the proposed language, it is unclear which party is responsible for the first three days of excess emissions or if emissions must be remediated for connection delays. This ambiguity must be corrected to make clear that the CAECS operator is responsible for all excess emissions from performance in terms of arrival, connection, and departure and performance in terms of emissions control.

*Liquid Bulk Vessels Must Be Regulated Equitably and Consistently Across Proposed Rules*

CARB is attempting to promulgate multiple rules impacting vessel operations simultaneously, but the proposed rules are internally inconsistent. With respect to the proposed regulatory framework for the proposed At Berth Regulation and the proposed Harbor Craft Regulation, the results of these two rules will bifurcate vessels serving the same trades resulting in inequitable and inconsistent regulation. Both traditional liquid bulk vessels and articulated tug barges (ATBs), which are ocean-going tanker vessels, are proposed to be regulated substantially differently. Both vessel types move liquid bulk cargoes, ply interstate and international trade lanes, and operate substantially outside California waters. Both vessels should be treated similarly under an air quality regulatory framework. In fact, ATBs meet the CARB definition of an ocean-going vessel and should be regulated as such. Nonetheless, CARB has proposed to treat the vessel categories differently and without providing evidence why ATBs should be regulated differently. CARB should revise the proposal and not arbitrarily exclude ATBs under the definition of ocean-going vessels.

*Increased Costs of Proposed 15-Day Changes Not Disclosed, Detailed, or Analyzed*

The 15-Day Changes propose accelerating the schedules of compliance for vessels which increases costs in multiple ways. However, the “15-Day Change” notice provides no detail on how costs are increased. There is only a vague statement that total program costs have increased by \$210 million. It attributes increased costs to the accelerated schedule and to the inclusion of the Innovative Concept section but does not identify what those costs are or how they arise. The nature and mix of costs are important to understanding the economic impact. As the Department of Finance (DOF) pointed out in its comment on the Standardized Regulatory Impact Assessment (SRIA):

“the SRIA must include non-annualized capital costs. Capital costs are almost half of the direct costs of the package. However, because new facilities are required for compliance, these capital costs may not be spread evenly across the effective period of the regulation as ARB assumes, but will depend on the ability of parties to finance up-front costs. The SRIA should disclose the cost of capital construction to the year the money will actually be spent, as well as the assumed amortization.”

The proposed acceleration of the deadline compounds the issue that DOF identified. Without detailed information on the increased costs, it is impossible to assess and provide impacts for those increased costs.

#### Remediation Fund

The language restricting the use of Remediation Funds in Section 93130.16 is so broad as to potentially bar any conceivable project and must be revised. The restriction on projects identified in AB 617 Community Emission Reduction Programs (CERP) is inappropriate on two counts. CERPs are not enforceable and there is no guarantee that projects identified in CERPs will be initiated. As a result, CERPs actually outline projects that should be prioritized for funding from sources such as the At Berth Remediation Fund. In addition, CERPs represent communities that the State has identified for new investment. The proposed language would functionally cut off identified communities from a funding source.

The prohibitive language is also too broad on legal requirements and Memoranda for Understanding (MOUs). All projects that can possibly be envisioned for use under the Remediation Fund will be subject to some legal agreement on implementation. Agencies establish MOUs specifically to identify potential emission reduction opportunities and facilitate access to various funding mechanisms. Mitigation measures are often subject to constraints on available funding. All agreements and MOUs are contracts that result in enforceable legal requirements. Without these tools, the projects that CARB envisions cannot be completed.

PMSA proposes that the Remediation Fund have the same limitation that CARB always uses for incentive programs that the projects result in emission reductions that are real, quantifiable, verifiable, enforceable, and surplus. Each of these elements have a long history in delivering emission reductions to local communities. The addition of other language only serves to obscure what projects could be eligible and would likely result in counter-productive restrictions on the use of funds in port communities.

#### Innovative Concepts

Another major proposed change would allow the use of certain “Innovative Concepts” (IC) to meet compliance obligations. CARB staff present the “Innovative Concepts” provisions as an alternative compliance pathway, but as currently written the proposal would fail to serve that purpose. A number of changes are necessary in order for the IC section to be workable.

- A fleet averaging concept should be a defined path within the IC section. Fleet averaging, as a program whose parameters are known, should not be subject to unnecessary restrictions for new concepts. Given the known success of fleet averaging to reduce emissions, it is not necessary to create uncertainty by having a three-year term with extension subject to uncertain approval.

- There should not be a set term for IC plans. As written, the IC section requires regulated parties to repeatedly apply for and receive CARB approval to use an “Innovative Concept” for limited three-year terms. Different concepts may require different terms in order to recoup any necessary investment. A one-size-fits-all approach is unwarranted and unnecessary. The term for any IC can be determined individually.
- While ICs must be “surplus” at the time of creation, CARB could revoke or decline to renew approval if the emission reduction became subject to regulation at a future date or by any CARB-approved AB 617 Community Emission Reduction Plan. The IC section should be modified to allow IC reductions without this limitation.
- Limiting the location of IC emissions reductions only to “adjacent” communities and distances no greater than 3 nautical miles may have unintended consequences. Neither “adjacent” nor “community” are defined in the Proposed Regulation, so it is unclear how close an area would need to be in order to be deemed “adjacent,” and where the boundaries of that area would end. The IC section should be modified to encourage any project (adjacent or not) that would benefit the port and terminal communities.
- The IC section sets a deadline for submitting a proposal. This implies that ICs will not be considered after 2021. We do not believe it was the intention of staff to limit development of IC to the first six to twelve months of the proposed rule’s implementation. The deadline should be removed and replaced with a process for IC plan review at any date such plans are submitted in the future.
- The prohibition on public funding for ICs is too broad. Funding may come from different sources, including federal, other states, or other nations. In addition, such a prohibition would exclude demonstration projects. Fleets that are likely to engage in ICs, including fleet averaging, are also likely to participate in demonstration projects sought by CARB or other air quality agencies. Being innovative should not prohibit technology advancement.
- The requirement that “if no environmental review is determined to be required by a local lead agency, the applicant must submit documentation from the local lead agency explaining environmental review is not required” does not make sense in the context of the California Environmental Quality Act (CEQA). It is not normal for an agency to affirmatively state it is not taking action under CEQA; it simply does not act. The environmental review provision should be limited to the review of CARB’s action, if any. If CARB determines environmental review is necessary, it must conduct that review unless another lead agency is identified. CEQA already contains provisions for addressing conflicts between multiple lead agencies. If CARB determines that its action does not require environmental review, it is not necessary to determine if other lead agencies may exist.

- Revocation of an IC plan provides for a 30-day notice. This is likely to be inadequate for an ocean carrier to transition to original provisions of the rule. The risk of a 30-day transition at the uncertain end of a three-year program is enough to prevent an ocean carrier opting to implement an IC. The IC section should include a nine-month transition period upon revocation of an IC plan.
- For the reasons described above regarding the Remediation Fund, PMSA proposes that ICs have the same limitation that CARB always uses for determining whether a proposed project results in “real” emission reductions. Any proposed IC should result in emission reductions that are real, quantifiable, verifiable, enforceable, and surplus. Each of these elements have a long history in delivering emission reductions to local communities. The addition of other language only serves to obscure what projects could be eligible.

#### LCFS Considerations

The economic analysis presented by CARB shows Low Carbon Fuel Standard (LCFS) credit-derived revenue offsetting electricity, labor, and infrastructure costs without restriction. At the time of this letter, CARB LCFS staff is still preparing guidance on the “Use of Proceeds” under the LCFS regulation. As a result, it has not been clear what costs are eligible for offsets on the LCFS “Use of Proceeds” requirements. Please confirm that shore power-related electricity, labor, and infrastructure costs are eligible offsets for shore power-generated LCFS credit revenue.

#### Summary of Proposed 15-Day Changes and Impacts on Costs Inconsistent with Proposed Regulation

The summary of the impacts on costs states that emission reductions can be achieved for \$30,000 per weighted ton and the cost analysis for the proposed regulation has been updated to reflect that cost assumption based on information from PMSA and WSPA. The referenced PMSA email concerned the appropriate value of the remediation fund, since the purpose of the remediation fund is to replace unmitigated auxiliary engine emissions. If CARB staff believes that number accurately reflects the costs to offset uncontrolled emissions, the hourly remediation fund rate should be adjusted to reflect that. If CARB does not believe that the \$30,000 per weighted ton estimates of cost reflect the cost of replacement emission reductions, then the cost estimate prepared by CARB should reflect the higher value used to establish the remediation fund rate. CARB should not select higher and lower costs in order to achieve a preferred outcome depending on each situation.

#### Fundamental Problems with Emissions Inventory Unresolved

Even before addressing the changes brought about by the COVID-19 crisis, the emissions inventory has not addressed known problems as described in previous industry stakeholder comment letters. The inventory overestimates growth, resulting in a significant overestimation of the proposed rule’s emissions benefit. The inventory does not consider the emission reductions associated with Proposition 1B funding, requiring emission reductions of 90% under the existing rule – 10% more than the proposed

rule. This results in the inappropriate attribution of emission reductions from existing requirements to the proposed rule. The emissions inventory also inappropriately caps emission reductions under the existing rule at 80%. Every vessel with a call greater than 15 hours will result in emission reductions greater than 80%. In San Pedro Bay, where calls greater than 100 hours are typical, emission reductions can exceed 97%. Yet, no reason is given in the emissions inventory for capping emission reductions. The inventory must be updated to reflect these issues.

CARB inventory staff have acknowledged these issues in a variety of phone calls and emails with stakeholders and have indicated that these issues will be resolved sometime this summer. That delay does a disservice to both the public and decisionmakers in understanding the benefits of the proposed rule changes.

Additional CEQA/EA Considerations

In addition to the previous issues described in this letter that require additional evaluation under the California Environmental Quality Act (CEQA), the changes to the proposed regulation will result in the need for revised environmental assessments. Among the proposed changes, the lead time for tankers will be reduced by 33% and for Ro/Ros by 25%. These changes represent significant new information and a substantial change to the project description that triggers the recirculation of the environmental assessment under CEQA. In addition, by accelerating the deadlines, more infrastructure work will be required over a shorter period of time. A foreseeable consequence is that overlapping construction will lead to higher peak emissions. The California Environmental Quality Act (CEQA) requires that these changes be evaluated.

69-3

The COVID-19 crisis and its impact on future cargo volumes, emissions, and benefits of the proposed regulation also represents significant new information requiring review, analysis, and recirculation of the environmental assessment. As described earlier, forecasts used in the analysis of the proposed regulation may overestimate activity by 62% by the end of this year alone! The environmental assessment must be revised to reflect this new reality.

Timed Connection Requirement

CARB staff has revised the one-hour limit on the connect and disconnect times for shore power to a two-hour connect time limit and one-hour disconnect time limit. While it is appreciated that the infeasibility of the one-hour requirement was acknowledged, a two-hour requirement is still arbitrary and capricious and not based on any evidence that it is safe or feasible. As we have said in previous letters, the existing rule permits multiple connection strategies, some of which will require more than one hour. More importantly, the shore power connection process requires individual people to manhandle heavy, high-voltage equipment and energize that equipment – sometimes in adverse weather conditions. Under no circumstances should that work be performed under a stopwatch. The two-hour requirement would likely be ineffective because any exceedance of the one-hour requirement would likely result in a safety exemption being sought, as having labor move faster handling high voltage equipment would be fundamentally unsafe.

69-4

CARB staff has still provided no basis on which it can be assumed that connection times can be consistently and safely accelerated. In fact, no data is available from CARB justifying the previous one-hour connection window or the new two-hour connection window under the original ISOR or in the 15-Day Change Notice.

#### Opacity Requirement

The proposed rule establishes an opacity limit for vessels at anchorage. Such a requirement conflicts with established International Maritime Organization (IMO) and USEPA emissions standards for vessels. USEPA rules preempt state and local emissions standards for oceangoing vessels. While not quantified as a typical numerical standard but a limit based on Ringelmann values, an opacity limit is clearly an engine emissions standard for an operating vessel – even if that operation is at anchorage. Such standards should be promulgated for new engines and done so through existing IMO/USEPA framework. Accordingly, CARB should eliminate the proposed emissions standard from the regulation. Moreover, the novel treatment of vessels At Anchorage should be removed from the regulation for vessels At Berth as they present fundamentally different topics of regulation, on fundamentally different subjects of regulation, and often impact completely separate and different off-road engines. The inclusion of an entirely new class of potential engines, fuel, and emissions standards in this rulemaking is unsupported by significant data in the ISOR, SRIA, or 15-Day Change Notice, and is also subject to the granting of a waiver by USEPA separate and independent of the existing waiver approved for the current regulation.

#### Commissioning

In discussions with CARB staff, PMSA understands that the proposed requirement that “[t]he port or terminal operator is responsible for commissioning vessels equipped with compatible shore power that is installed on the side of the vessel facing the wharf when berthed” means that upon the commissioning visit of a vessel to a terminal, the terminal can indicate whether their terminal will commission the vessel starboard side to or port side to, consistent with the design and operation of the terminal. PMSA believes that ports and terminal operators are responsible for commissioning vessels without the need for the enunciation of such responsibility in regulation as issues of berthing should be privately agreed to between the terminal operator and ocean carrier and not be prescriptively enforced through regulatory mechanism. PMSA recommends that CARB strike all prescriptive language on berthing orientation and allow terminal operators and ocean carriers to actively manage these issues privately amongst the two parties for peak efficiency.

#### Reporting for Bulk Vessels Should Be Eliminated

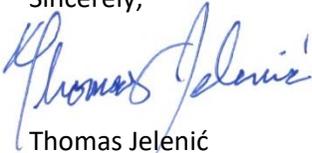
The reporting requirements for general cargo and bulk vessels add a real, quantifiable burden to bulk and general cargo vessel operators, but do not advance any emissions reduction program in California. The State should not impose costly reporting requirements for the sole sake of collecting more information, particularly when there is no planned use for that data. If CARB identifies a future need for such data, it is readily available through alternative sources such as marine exchanges or port authorities. There are even existing regulatory tools in place like the OGV fuel rule that CARB can use to

obtain vessel information and ensure significant emission reductions. There is no reasonable basis to place a permanent, costly reporting burden for no measurable or identified benefit.

We appreciate the opportunity to provide these comments on the 15-Day Change Notice and to incorporate all prior correspondence on the proposed regulation documents, including under CEQA, by reference. PMSA respectfully requests that CARB staff directly address all original and supplemental technical issues, including those which address the underlying economic and emissions inventory analyses and how those analyses have materially and significantly changed since their publication, prior to calendaring this proposed rulemaking before the CARB Boardmembers so the public and the Boardmembers can consider the actual facts, impacts, and considerations which exist with respect to the adoption of the substantive amendment of the existing At Berth Regulations.

69-5

Sincerely,



Thomas Jelenić  
Vice President



May 1, 2020

Clerk of the Board  
California Air Resources Board  
1001 I Street  
Sacramento, Ca. 95814  
Electronic Submittal: <http://www.arb.ca.gov/lispub/comm/bclist.php>

Re: Marathon Petroleum Corporation's comments on the California Air Resources Board proposed Control Measure For Ocean Going Vessels at Berth regulation.

Dear Chairwoman Nichols and Honorable Board Members.

Marathon Petroleum Corporation (MPC) appreciates this opportunity to provide comments on the proposed Control Measure For Ocean Going Vessels at Berth regulation, the "At-Berth regulation". MPC is a refiner, logistics provider and marketer of petroleum products in California. MPC through subsidiaries, owns and operates two refineries located in Northern and Southern California. Each refinery relies on Ocean Going Vessels (OGV's) every day to make deliveries to its terminals so its refineries can turn crude oil into products that residents and visitors to the state rely on every day to make their lives better. We are a member of the Western States Petroleum Association (WSPA), and we support and incorporate by reference the comments submitted to the Board by WSPA for the 15-day draft.

MPC takes pride in the safety of its operations and strives to enhance the lives of its employees and the communities where we operate. It is because of our marine operations expertise, that we have been very engaged in this rulemaking including hosting multiple tours of our operations to CARB management, staff and Board Members. MPC believes it is well positioned to contribute to the At-Berth rulemaking dialogue and appreciate CARB's willingness to consider our input on a few key items and final recommendations.

The At-Berth regulation is intended to reduce emissions from a single component of arguably the most complex logistics system in the world, on some of the largest machines in the world. Establishing a state regulation by which an OGV must reduce emissions at berth in a safe and cost effective manner is extremely challenging due to lack of feasible or proven technology for our industry application. Unfortunately, this proposed regulation does not consider these technology challenges and the time it takes to prove feasibility on a large scale.



These challenges have been compounded by the accelerated compliance deadlines which are not supported in the 15-day package.

- **MPC is concerned the accelerated regulatory expectation is placing added safety risk to its operations.** If a terminal were to choose a land-based capture system as its compliance method of choice with these changes it will now have two less years to ensure the machinery will function safely. This is a significant loss of time given the equipment has never been demonstrated on a tanker boiler or its potential hazards studied industry-wide.
- **MPC has long held the opinion compliance with this rule would require on the order of ten plus years given the infrastructure requirements and unique environments our terminals exist in.** CARB does not substantiate how a tanker vessel or terminal operator would require two less years to construct and install projects to control emissions. Stakeholders engaged in this rulemaking process over the last few years have seen three major revisions to compliance dates with little to no changes to available technologies to achieve the reductions. The 15 day changes to the compliance dates for the POLB/POLA and at all other terminals, is lacking any analysis for justification.
- **Assumptions used to determine cost impacts due to the accelerated compliance deadlines in the 15-day package are not available.** CARB indicates the changes will increase compliance costs from the initial \$2.2 billion to \$2.4 billion, a change of about 10 percent. But CARB fails to illustrate how this 10 percent cost increase is proportional to a 33 percent decrease in time to comply for the POLB and 25 percent decrease for all other terminals.
- **Accelerated compliance dates in the 15-day package to potentially require use of the remediation fund on an extended basis.** The remediation fund compliance option is intended to be used in limited circumstances. However, the accelerated compliance dates could cause operators to resort to having to use the option for a longer period of time. The terminal plan will provide a list of known constraints to CARB including those out of an operators control, such as permitting, availability of necessary equipment or labor to meet the compliance deadlines. MPC recommends that the regulation not require an operator to utilize the remediation fund compliance option if the operator is acting in good faith, investing in a CAECS or Innovative Concept, in accordance with an approved plan.

72-1



Lastly, as proposed, this regulation illustrates the barriers to cost effective emission reduction solution from OGV's. CARB's 2020 SRIA for this rulemaking determined the cost effectiveness for this regulation to be \$83,159 per weighted ton of emissions. In comparison, referencing California's 2016 State Implementation Plan (Benefits p3, and Table 5) a cost effectiveness value of \$12,000 per weighted ton of emissions results. The difference in cost effectiveness is driven by the scope of infrastructure projects at the terminals to support the identified technologies. MPC asks CARB to continue focusing on more cost effective emission reduction opportunities within the state, this will allow for emission reduction technologies associated with OGV's to mature.

For all these reasons MPC recommends CARB take the following steps:

- 1) Provide more time for regulated parties to comply. Given MPC's prior guidance any project to install equipment identified in the proposed regulation as a CARB Approved Emission Control Strategy (CAECS) would require ten plus years, pending the outcome of a feasibility study, more likely compliance dates for the POLB/POLA would be 2031 and all other terminals 2036.
- 2) Take advantage of the additional rulemaking time provided by Governor Newsome's Executive Order N-40-20, extending APA deadlines by 60 days to re-engage with stakeholders to address residual concerns.

MPC appreciates this opportunity to submit comments on the At-Berth regulations 15-day proposed amendments. Please contact me at 916.462.5063 with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Brian McDonald'.

Brian McDonald  
Marathon Petroleum Corporation | Policy and Regulatory Affairs  
[BCMcdonald@Marathonpetroleum.com](mailto:BCMcdonald@Marathonpetroleum.com)

**Second  
15-Day  
Comment  
Period  
Letters**

July 22, 2020

California Air Resources Board  
Attention: Clerk's Office  
1001 I Street  
Sacramento, CA 95814

**Re: Second 15-Day Changes to the Control Measure for Ocean-Going Vessels At Berth ("At-Berth Rule")**

California Air Resources Board:

On behalf of Crowley Maritime Corporation (Crowley), we thank you for the opportunity to comment on the second 15-day changes to the At-Berth Rule proposed by California Air Resources Board ("CARB"). As the largest operator of tankers and ATBs in the United States, Crowley, whose tankers and ATBs operate regularly in California ports, is directly affected by the proposed regulation.

ATBs carry 15% of the clean petroleum products annually transported to and from California, and are a significant part of the ocean-going vessel traffic calling at California ports today. Crowley's ATBs of more than 120,000 bbl. capacity are the functional equivalent of ocean-going tankers and they should not be excluded from the At-Berth Rule.

Crowley fully supports the environmental goal of the At-Berth Rule to reduce emissions from ocean-going vessels docked at California ports. The current measure, which amends and supersedes the existing 2007 At-Berth regulation, offers CARB the opportunity to extend the At-Berth Rule to all categories of ocean-going vessels calling at California ports, including ATBs. Therefore, Crowley has, since the spring of 2019, consistently demanded that ATBs be included in the At-Berth Rule in order to achieve the maximum benefit of localized harmful emissions reductions, particularly for at-risk California communities.

By the second 15-day changes, CARB has focused on the operations of certain categories of vessels affected by the At-Berth Rule and proposed changes designed to achieve improved emissions reductions to benefit Californians living in the vicinity of its ports. The second 15-day changes thus provided CARB with the ideal opportunity to further strengthen the At-Berth Rule by the inclusion of ATBs. To date, CARB has failed to take this opportunity, and should do so now.

The second 15-day changes amend the definitions provision of the control measure, section 93130.2(b). These changes highlight the inconsistency of the definition used for ATBs and CARB's rationale for the ATB exclusion.

In the second 15-day changes, CARB amends the definition of ATB, subsection (b)(7), which now reads as follows:

“Articulated tug barge” means a tanker barge [sic] that is mechanically linked with a paired tug that functions as one vessel. For the purposes of this Control Measure, articulated tug barges are not considered ocean-going vessels<sup>1</sup>.

This definition makes clear that CARB defines an ATB as a tank vessel that functions as one vessel. This is correct: An ATB is an innovative, highly efficient, and flexible form of modern tank vessel. An ATB carries cargo in a tank barge with a double hull configuration, equipped with sumped cargo tanks, remote radar gauging, two ballast pumps, a dual-mode inert gas vapor collection system and other systems, and is propelled and maneuvered by a high-horsepower tug that is physically a part of the whole vessel, positioned in a notch in the stern of the barge, and attached by rigid, articulating pins. ATBs function as a single unit in a system that allows for improved maneuverability and sea-keeping. By definition, an articulated tug barge is an ocean-going vessel that functions “as one vessel.”

This definition is belied by CARB's stated rationale for excluding ATBs from the At-Berth Rule. In the Initial Statement of Reasons (“ISR”), CARB states as its sole reason offered for excluding ATBs from the At-Berth Rule is the following:

“When an articulated tug barge is fully connected, it may meet the definition of an ocean-going vessel, as defined in this chapter (Section 93130.2(b)). However, despite being defined as a subcategory of tankers, articulated tug barges are considered a barge and a tug separately.” [ISR, p. IV-6.]

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<sup>1</sup> Under subsection (b)(82), the term “vessel” is used interchangeably with the term “ocean-going vessel.” The ATB definition in subsection (b)(7) is therefore internally inconsistent.

This statement of a purported rationale for the ATB exclusion is unsupported by reference to any industry studies, analyses or definitions, particularly as to under what circumstances, and by whom, an ATB in operation could be “considered” to be “a barge and a tug separately”. CARB offers no insight as to the source of its stated rationale, which is not borne out by Crowley’s experience of its ATB operations. During operations in California waters, an ATB of over 120,000 bbl. capacity is the functional equivalent of an ocean-going tanker. Based on their California operations, Crowley’s ATBs cannot be “considered a barge and a tug separately”.

When the rationale given in the Initial Statement of Reasons is compared to the definitions section in the second 15-day changes, the reason for the ATB exclusion is shown to be circular and entirely arbitrary. Where a barge and tug are separated, they do not and cannot function “as one vessel”. According to the regulations, as confirmed by the second 15-day changes, an “articulated tug barge”, *by definition*, functions as one vessel, not as “barge and tug separately”. A separated barge and tug therefore do not, and cannot, meet the regulatory definition, in section 93130.2(b)(7), of “articulated tug barge”.

In excluding ATBs from the At-Berth Rule, CARB failed to consider all relevant industry and environmental factors, and so it did not demonstrate any a rational connection between those factors, the choice made, and the purposes of the enabling statute. Under the circumstances, the only conclusion that can be drawn is that the continuing exclusion of ATBs from the definition of “ocean-going vessels” in the At-Berth Rule, as set forth in section 93130.2(b)(50) of the second 15-day changes, is that CARB refuses to reconsider an arbitrary and capricious decision it made at the outset of this regulatory process. CARB should now reverse this ATB exclusion before the final rule is submitted.

1-1

A Crowley ATB of at least 120,000 bbl. capacity should be regulated like any other ocean-going tank vessel. Crowley submits that, by including ATBs from the At-Berth Rule, CARB will not only improve air quality for at-risk communities in the vicinity of California’s ports, but it will also strengthen the At-Berth Rule by making it internally consistent and removing the arbitrary and capricious exclusion of a significant portion of ocean-going vessels calling in California.

CARB’s consideration of the second 15-changes affords an opportunity for CARB to delete the ATB exclusion in section 93130.2(b)(50). This exclusion that does not further the purpose of the At-Berth Rule to reduce emissions from ocean-going vessels docked at California ports and is operationally and practically unjustifiable.

Yours respectfully,

**CROWLEY MARITIME CORPORATION**

**Art Mead** Digitally signed by Art  
Mead  
Date: 2020.07.22 09:07:52  
-04'00'

Art Mead  
*Vice President & Chief Counsel*  
*Government and Regulatory*



South Coast  
Air Quality Management District

21865 Copley Drive, Diamond Bar, CA 91765-4182  
(909) 396-2000 • www.aqmd.gov

Letter  
2

*Office of the Executive Officer*  
*Wayne Nastri*  
909.396.2100, fax 909.396.3340

July 23, 2020

CARB Board Members  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

Re: Second 15-Day Changes on the Proposed Control Measure for Ocean-Going Vessels At Berth

Dear Honorable Board Members:

Thank you for the opportunity to comment on the Second 15-Day Changes for the Proposed Control Measure for Ocean-Going Vessels At Berth. South Coast AQMD staff appreciates the efforts by CARB staff in making subsequent modifications to the originally proposed regulation through two 15-day changes to address comments from all stakeholders.

As stated in our letter dated November 26, 2019, NO<sub>x</sub> emissions in our Basin need to be reduced by 45% and 55% beyond all existing regulations by 2023 and 2031, respectively, to meet the upcoming deadlines for attaining federal ozone standards. Ocean-going vessels (OGVs), combined with harbor craft, will represent the single largest source of NO<sub>x</sub> emissions in the Basin by 2023. Therefore, it is absolutely essential to maximize both short-term and long-term reductions in the proposed regulation to help achieve our attainment goals.

We support the adoption of the proposed At-Berth regulation with the Second 15-Day Changes and offer the following recommendations for your consideration:

### Compliance Date Changes

Under the latest changes, CARB staff proposes to delay the compliance start date for container ships, reefers and cruise ships by two years from 2021 to 2023 and allow these vessels to remain under the existing At-Berth Regulation without any additional controls beyond 2020. Although we recognize the potential economic impact on the maritime industry due to the coronavirus pandemic, we are concerned with the negative impact of this proposed change on NOx and diesel particulate matter (DPM) emissions. Based on data provided in the second 15-day document, the proposed delay in the compliance date would result in increased NOx emissions at berth by 0.74 ton per day (tpd) in 2021 and 0.79 tpd in 2022 (and 0.01 tpd of DPM in 2021 and 2022) in our Basin compared to the initially-proposed regulation in December 2019. Given the significant contribution of emissions from these vessels, uncertainties regarding potential impact of the pandemic on marine industry, and the need to achieve early reductions for our local port communities and the regional air quality, we believe the proposed two-year delay is too long. Instead, South Coast AQMD staff recommends a maximum one-year delay to provide a reasonable level of relief to the marine industry which will start the compliance date for container ships, reefers and cruise ships on January 1, 2022.

2-1

For RoRo vessels, South Coast AQMD staff supports the proposed change to return the compliance start date to 2025 as originally proposed. Staff also supports accelerating the compliance start dates for tankers by two years from 2027 to 2025 for tanker vessels visiting the Ports of Los Angeles and Long Beach and from 2029 to 2027 for tanker vessels visiting other ports (first 15-day changes).

### Innovative Concept

South Coast AQMD staff supports the innovative concept provision proposed in the first 15-day changes which provides options for the regulated entities to achieve equivalent emissions reductions through implementation of alternative control strategies in the port communities. The Second 15-Day Changes proposes to extend the compliance period for approved innovative concepts from three years to up to five years. South Coast AQMD staff is agreeable to this proposed extension as long as the benefits of the approved alternative control strategies are monitored, evaluated and quantified based on credible and transparent methodologies to ensure that the emissions reductions achieved are real, surplus, quantifiable and enforceable.

The proposed regulation is a significant rulemaking for the South Coast Air Basin. South Coast AQMD staff strongly supports the adoption of the Proposed At Berth Regulation as achieving emissions reductions from OGVs will be essential in meeting the ozone attainment deadlines in our Basin as well as providing considerable public health benefits in the port communities. We are also fully committed to continue to work collaboratively with CARB staff in the development and implementation of innovative programs to reduce emissions from OGVs and other sources.

Sincerely,

A handwritten signature in black ink, appearing to read "Wayne Natri", with a stylized flourish at the end.

Wayne Natri  
Executive Officer

WN:SR:ZP:BC



July 24, 2020

Ms. Mary D. Nichols, Board Chair  
Mr. Richard Corey, Executive Officer  
California Air Resources Board  
1001 I Street  
Sacramento, California 95812

Submitted via docket as directed at: <http://www.arb.ca.gov/lispub/comm/bclist.php>  
Also transmitted via email

Cc (email): Heather Arias, Bonnie Soriano, Angela Csondes, Nicole Light

**Subject: Maersk Comments on the Second Public Availability of Modified Text and Availability of Additional Documents and Information for the Proposed Control Measure for Ocean-Going Vessels At Berth, Board item ogvatberth2019**

Dear Board Chair Nichols and Mr. Corey,

Thank you for this opportunity to comment on the Second Public Availability of Modified Text and Availability of Additional Documents and Information for the Proposed Control Measure for Ocean-Going Vessels At Berth, Board item ogvatberth2019. We have provided five sets of written comments in 2019 - 2020 (March 8, March 26, June 10, December 6 and April 29th), as well as less formal communications including analyses of arrival time feasibilities. We also provided input and analyses to PMSA and the World Shipping Council to incorporate in their consolidated industry comments.

Maersk is an integrated international container logistics company, operating about 750 container vessels globally as well as marine terminals, warehouses and other essential supply chain functions. Each year 45 to 60 of our vessels make over 500 calls in California ports. Typically, each of these international vessels spends less than 5% of its operable lifetime in the waters of any one state or country. Network changes and vessel redeployments are an essential part of supply chain operations.

Maersk has long been an environmental leader in shipping. Since 2008 we have reduced our fuel consumed and related emissions by 43% on a per container per kilometer basis. We have committed to a 60% reduction and to launch a first carbon-neutral vessel by 2030 on our way to zero carbon emissions shipping by 2050. In the past Maersk voluntarily used dramatically cleaner fuels in California ports, and supported establishing both the California fuel rule and the North American Emissions Control Area. We are committed to going beyond compliance to



achieve environmental excellence and hope these comments will be taken in the constructive spirit with which they are offered.

We appreciate that some of our previous comments were considered and adopted and look forward to CARB's full response to comments. The comments in this letter will focus on the changes made in the Second 15-day package.

1. The notice and proposed regulatory language modifying the implementation, transition and reporting timelines are clear and well-written, and the use of strikeout formats to designate the changes was very helpful.
2. We greatly appreciate the 2-year continuation of the existing regulation and date adjustments to address the timeline inconsistencies identified the proposed rule, move past the worst of the COVID-19 disruptions, and conduct a thorough interim review. During this time the performance of the currently regulated fleets can be determined under the final requirements of the existing rule and related provisions such as Proposition 1B, which were implemented as of 1/1/2020.
3. **Plans and infrastructure timing:** The revised timeline is not fully aligned with public works project timing in the ports. For example, terminal and port plans are due December 2021, with CARB approval lasting up to 90 days. We question whether the required infrastructure improvements can then be funded, permitted and in place to support the 1/1/2023 implementation of the new rules for the currently regulated fleets. This is particularly troubling due to the lack of viable alternative CAECS in most California ports.

4-1

Recommendations:

- Include a provision to allocate additional VIEs or TIEs in locations where the necessary infrastructure improvements cannot be achieved in the allotted time.
- Consider allowing unlimited use of the remediation fund or other alternatives to achieve timely reductions and enable compliance in the gap between the vessel compliance dates and completion of needed infrastructure projects.
- Consider allowing use of the remediation fund in situations where no alternatives CAECS are feasible.
- During the 2 years before implementation of the new rule clarify the application and compliance options for lay-by berths and repair berths, where usage and access are by definition variable. Data on these facilities is limited, so the interim review should be used to determine any practicality issues and if needed, adjust the low activity terminals provisions.

4. **Interim review:** As directed by the Board on June 25<sup>th</sup>, the Interim review scheduled December 2021 should now cover the full shore power program. We look forward to working with CARB Staff during this period.

The interim review should address issues regarding rule implementation raised by stakeholders over the next two years. As work on implementation continues, it will be critical to resolve issues, including the sufficiency of TIEs/VIEs, incorporation of fleet averaging under Innovative Concepts or CARB Approved Emission Control Systems (CAECS), sufficient compliance pathways for non-frequent fliers, and other issues identified in this letter. This period should also enable updating of the emissions inventory projections.

5. **Innovative Concepts:** The Innovative Concepts (IC) section of the proposed regulation remains extremely complex. Changes should be considered to make the concept more viable as a long-term compliance option.

- a. We support the increase of the term from three to five years. This change will be helpful in encouraging investments. However the window of opportunity for proposals remains overly short, with plans due no later than 12/2021. This greatly limits the usefulness of this concept. CARB should consider ways to encourage innovation in emissions reductions by lengthening the opportunity to propose additional ICs after 2021.
- b. Section 93130.17(a)(3) and following, starting on page A-61, are extraordinarily complex and restrictive, stating:

*“(3) The proposed innovative concept must achieve emissions reductions that .... are early or in excess of: (1) any other state, federal or international rule, regulation, statute or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity); or (2) of an emissions reduction strategy identified in an AB 617 ..program...”*

*“(6) The proposed innovative concept must achieve emissions reductions that exceed any reductions other wise required by law, regulation or*



**MAERSK**

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Charlotte NC 28273

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*legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario"*

*"(12) No innovative concept shall be partially or fully funded with a public incentive program."*

These and other restrictions in this section appear to exclude participation by:

- Technologies or operational programs that have been part of a Technology Advancement program in California (e.g., SPBP CAAP), other states, the EU or elsewhere in the world.
- Any technology or program that might conceivably become part of an AB 617 plan that includes an Indirect Source Rule or other broadly defined community recommendation.

We also question how the applicant and CARB staff are to ensure that there are no disqualifying regulations or issues anywhere globally, and who will define the "conservative business-as-usual scenarios."

Recommendations:

- Section 93130.17 should be clarified and streamlined in order to achieve the needed reductions without discouraging innovation or participation in technology demonstrations and incentive programs in other parts of the world (e.g. Canada).
- In addition, it should be clearly stated that CARB's Low Carbon Fuel Credits are not considered to be incentives under this section.

## 6. Allocation of VIEs and TIEs: Section 93130.11

- a. Section 93130.11(a)(1) calls for reporting of vessel visits to CARB by January 7<sup>th</sup>. This seven-day period is inconsistent with the 30-day reporting required in other sections. Please clarify whether this report is a simple vessel call count or the full individual call reports for each vessel call that would normally be reported in 30 days.

We fully recognize and support the need for operators to know the VIE/TIE allocation as early as feasible in the year. However large vessels arriving on December 31 may have longer calls due to the holidays, so full data may not yet be available. Occasionally a vessel may still be alongside.

Recommendation: We suggest that either a simple actual vessel arrival/departure schedule be accepted for this purpose, or that preliminary

reports be allowed by Jan. 7<sup>th</sup> for calls after Dec. 7<sup>th</sup>, with updates allowed for those calls when full details are available.

- b. Section 93130.11(a)(1) also excludes calls made under Innovative concepts from being part of the VIE/TIE allocation. Provisions should be made for situations where the innovative concept is not available due to expiring approval or other technical or operational issues.
  - c. Section 93130.11(a)(3) has been aligned with the revised timeline. However the 5% values shown for vessel operators are not sufficient based on the analyses we submitted to CARB over the last year. This should be reviewed further during the period prior to implementation and specifically addressed in the interim review.
  - d. Section 93130.11(e): We appreciate the clarification that TIEs and VIEs can be used as needed by the owner.
7. **Liabilities:** The liability provisions in the new rule should be clarified before January 2023. The proposed rule still calls for joint and several liability for violating the control measure. This conflicts with the basic premise that the new rule should define clear requirements and responsibilities for each participant: ports, terminals, vessels and alternative compliance operators.

Thank you again for this opportunity to comment on the proposed regulatory language. We stand ready to work with CARB and other stakeholders over the next two years to identify and address practical issues and achieve a smooth transition.

Sincerely,

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**Subject: Industry Coalition Comments on Second Supplemental 15-Day Notice, Proposed Regulation of Oceangoing Vessels At Berth**

Thank you for the opportunity to comment on the proposed At Berth Regulation. This coalition of industry stakeholders appreciates the opportunity to work with California Air Resources Board (CARB) staff during regulatory development on behalf of our maritime industry member companies and stakeholders, including oceangoing vessel operators, marine terminals, and ports.

The second 15-Day Notice provides for changes to the regulatory structure of the proposed At Berth Regulation and addresses some of the concerns that this coalition has raised during rule development. In particular, we believe changes to the effective date for proposed new rules to incorporate the existing regulated fleet from 2021 to 2023 and for restoring the originally proposed Ro/Ro effective date are steps in the right direction. These amendments provide some short-term continuity and an opportunity for future improvements. However, the latest 15-Day changes do not resolve numerous implementing, operational, and feasibility hurdles in this complex rule, and this coalition remains concerned that many of the foundational and technical issues that have been raised over the course of this rulemaking have not yet been addressed or responded to by the time of proposed rule adoption. Given these outstanding issues, if CARB adopts the rule as proposed, we envision that continued heavy lifting and future changes to this regulation will be necessary in order to facilitate a successful implementation.

**New Effective Date Provides an Opportunity to Address Challenges for Existing Regulated Fleets**

Industry stakeholders appreciate the revised effective date of 2023 for the application of the proposed rule to the existing regulated fleets. This date will allow all stakeholders an opportunity to continue to work with CARB staff to improve the rule structure and to ensure that any final rule will not penalize vessels, terminals and ports which have already committed to a shore power compliance pathway and are currently complying with the existing rule. This industry coalition remains concerned that the proposed rule as currently written and conceived cannot be successfully complied with even by vessels which are currently compliant with and have made required investments in shore power under the current regulation. Resolution of these concerns will only occur with concerted additional efforts to

create a robust fleet-averaging construct or other new avenues for compliance prior to 2023. Given the limited time, the industry stakeholders request that the Board direct staff to continue meetings with stakeholders to address and resolve outstanding issues regarding the current regulated fleet.

### **CARB Must Still Address Challenges for Expanding Regulation to Additional Fleets**

With respect to expansion of the scope of the existing rule, serious concerns remain regarding the feasibility and true cost-effectiveness of controlling tanker and Ro/Ro vessels. The opportunity to address these concerns regarding Ro/Ro vessels will benefit from the proposed 15-Day Changes to reapply the original date of implementation in this sector. However, it is imperative that CARB work with the impacted fleets to address outstanding concerns prior to commencement of the technical review period.

### **Interim Evaluation**

The text of the interim evaluation contained in the proposed regulation presupposes the feasibility of emission control technology for tanker and Ro/Ro vessels. The language should be clear that the interim evaluation will evaluate the feasibility of technology to control emissions successfully and cost-effectively from tankers and Ro/Ro vessels. The ability to package the existing technology to reduce emissions in exhaust streams in a manner that can safely operate on tanker and Ro/Ro vessels is an open question. The technology has a number of technical, safety, and operational constraints it must overcome. At the same time, any proposed system needs to also abide by Coast Guard, OSHA, and other regulatory requirements, while not being prohibitively expensive. The interim evaluation should be clear that it will evaluate all considerations that would impact the success of new control technologies.

With that in mind, the demonstrations proposed by CARB staff will be inadequate to inform the interim evaluation. First there are no proposed demonstrations to address Ro/Ro vessels. The configuration of Ro/Ro vessels make reaching the exhaust challenge an engineering challenge. The height and reach needed for such vessels will result in larger counterweights and increasing system weight. It is not known if such a system can be successfully placed on a barge or existing wharf structures. The only way to answer these questions is with a demonstration that must be completed before the interim evaluation is conducted. The proposed demonstration for tanker vessels will be unable to inform the interim evaluation. With a presentation date of December 2022, it is likely that the demonstration will not even be operating before CARB staff must prepare their evaluation and is not expected to be complete until long after the interim evaluation is complete. An interim evaluation that is not informed by a complete demonstration is mere speculation.

The interim evaluation should also address issues regarding rule implementation raised by stakeholders over the next two years. As work on implementation continues, it will be critical to resolve issues, including the sufficiency of TIEs/VIEs, incorporation of fleet averaging under Innovative Concepts or CARB Approved Emission Control Systems (CAECS), sufficient compliance pathways for non-frequent fliers, and other issues identified in this letter.

**Innovative Concepts**

This coalition appreciates proposed changes to the Innovative Concepts (IC) of the proposed regulation but believes that these changes remain insufficient. While increasing the term to five years does provide some additional certainty for select regulated parties to propose an innovative concept, it still fails to provide the long-term assurance necessary to make it a viable compliance pathway. A number of other changes should be considered to make the concept viable.

- A fleet averaging concept should be a defined path within the IC section. Fleet averaging, as a program whose parameters are known, should not be subject to unnecessary restrictions for new concepts. Given the known success of fleet averaging to reduce emissions, it is not necessary to create uncertainty by having a five-year term with extension subject to uncertain approval. In addition, concerns remain that at this time it is unknown how fleet averaging would be handled under the IC provisions and that CARB staff cannot describe or even assure that fleet averaging is consistent with all the requirements of the IC provisions.
- While IC must be “surplus” at the time of creation, CARB could revoke or decline to renew approval if the emission reduction became subject to regulation at a future date, or by any CARB-approved AB 617 Community Emission Reduction Plan. The IC section should be modified to allow IC reductions without this limitation.
- Limiting the location of IC emissions reductions only to “adjacent” communities and distances no greater than 3 nautical miles may have unintended consequences. Neither “adjacent” nor “community” are defined in the Proposed Regulation, so it is unclear how close an area would need to be in order to be deemed “adjacent,” and where the boundaries of that area would end. The IC section should be modified to encourage any project (adjacent or not) that would benefit the port and terminal communities.
- The IC section sets a single, one-time deadline for submitting a proposal. This implies that ICs will not be considered after December 1, 2021. The deadline should be removed and replaced with a process for IC plan review at any date such plans are submitted in the future. In addition, if IC will be used to facilitate fleet averaging, the ability to use fleet averaging should be available beyond 2021. Fleets will encounter different circumstances over the life of this regulation that may allow them to comply with the proposed regulation versus making use of a fleet average approach. New fleets may want to enter the California market after the 2021 deadline and this ensures they will be forever precluded from using fleet averaging. The original rule contained a similar fixed date requirement for alternative technologies, CARB staff eventually were forced to revise that through the use of an “Advisory”. As a result, we strongly recommend that IC applications be accepted continuously with the understanding that CARB needs a minimum lead time before an approved application becomes effective.
- The prohibition on public funding for ICs is too broad. Funding may come from different sources, including federal, other states, or other nations. In addition, such a prohibition would exclude demonstration projects. Fleets that are likely to engage in ICs, including fleet averaging,

are also likely to participate in demonstration projects sought by CARB or other air quality agencies. Being innovative should not prohibit technology advancement.

- Revocation of the IC plan provides for a 30-day notice. This is likely to be inadequate for an ocean carrier to transition to original provisions of the rule. The risk of a 30-day transition at the uncertain end of a five-year program is enough to prevent an ocean carrier opting to implement an IC. The IC section should include a nine-month transition period upon revocation of an IC plan.

### **Industry Grappling with the Effects of COVID-19**

The scale of the current crisis is unprecedented. The World Trade Organization (WTO) has estimated that global trade could decline up to 32% this year.<sup>1</sup> As a result of this crisis, the analyses on which this rule is based are out of date and no longer valid. The ISOR analysis is predicated on strong growth assumptions based on a number of forecasts. Questions about those assumptions were raised prior to the current crisis. For example, the ISOR analysis assumes that from 2016 (the inventory base year) through 2020 container cargo at the ports of Long Beach and Los Angeles would grow 4.5% per year. Last year (before the current crisis), the two ports declined 3.3%. Since the crisis, the decline has accelerated, with year-over-year declines in January (-5.1%), February (-16.9%), March (-19.7%), April (-11.4%), May (-13.7%), and June (-10.3%). For the first six months of the year, the two ports are down 12.5% over the same period last year. Before even considering the rest of the year, the current crisis means the emissions inventory contained in the ISOR is wrong. That gap only grows if the rest of 2020 is forecast based on WTO projections. By the end of this year, the baseline forecast used in the ISOR will overestimate cargo volumes by between 26% and 62%.

The economic impact of COVID-19 on the cruise industry is substantial. The suspension of operations will have a pronounced detrimental impact on families and communities globally. Of the 421,000 industry supported jobs in the United States, 12% are in California, yielding 49,369 jobs in The Golden State and generating \$3.26 billion in total wages and salaries.

In a similar fashion, fuel consumption has precipitously declined as a result of the crisis. With an unprecedented number of people filing jobless claims that need and demand for fuel has plummeted. Refinery demand will directly impact demand for liquid bulk vessels calling California ports. It is clear that the forecasts contained in the ISOR no longer represent a reasonable expectation of future activity of tankers in California.

The crisis is also forecast to impact auto sales in this country and globally. Decreased auto sales will translate into reduced Ro/Ro activity. The base case scenario has volumes declining from 2019 by 14%. In a worst-case scenario, volume declines would plunge 28% from 2019 levels. The Automotive from Ultima Media forecast auto sales slightly growing by the end of the decade, the proposed rule is based on a growth rate that would see Ro/Ro activity 83.5% higher than 2016 levels in the ports of Los Angeles

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<sup>1</sup> [https://www.wto.org/english/news\\_e/spra\\_e/spra303\\_e.htm](https://www.wto.org/english/news_e/spra_e/spra303_e.htm)

and Long Beach by 2030 and 31.9% higher at the Port of Hueneme<sup>2</sup>. These numbers are not realistic or a reasonably foreseeable outcome of the current economic climate.

The estimates of benefits, emissions estimates, costs, cost-effectiveness, and health impacts, which presume the rate of growth contained in the ISOR, are now no longer valid. Even if growth were to immediately resume at levels assumed in the ISOR, cargo volumes and resulting activity will likely be millions of containers off from the cargo volume estimate.

**Projections and Analyses Must Be Revised**

During the June 25<sup>th</sup> hearing, CARB staff acknowledged that the COVID-19 crisis has impacted existing and future cargo volumes in California ports. Staff also stated that the current crisis will have disparate effects across the maritime industry, with the timeline to recovery being long. Even before the current crisis, this coalition submitted data demonstrating that the cargo and resulting emissions estimates were wrong. The crisis has amplified those errors. The derived data from the cargo forecasts has led to unreliable information presented in the updated emissions forecast. As stated in the letter on the first 15-Day Notice<sup>3</sup>, cargo volumes in 2020 for the ports of Los Angeles and Long Beach will be at least 26% below the values contained CARB’s data set. CARB staff has not addressed any of forecast issues raised in the prior letter. As a result, all dependent analyses, including rule emissions benefits, health benefits, CEQA review including the Statement of Overriding Considerations, and cost-effectiveness, will all be based on flawed data. CARB should re-evaluate baseline emissions, proposed emission reductions, health benefits, costs, and cost-effectiveness based on a revised forecast and assumptions.

5-1

**Fundamental Problems with Emissions Inventory Unresolved**

Even before addressing the changes brought about by the COVID-19 crisis, the emissions inventory has not addressed known problems as described in previous industry stakeholder comment letters. The inventory overestimates growth, resulting in a significant overestimation of the proposed rule’s emissions benefit. The inventory does not consider the emission reductions associated with Proposition 1B funding, requiring emission reductions of 90% under the existing rule – 10% more than the proposed rule. This results in the inappropriate attribution of emission reductions from existing requirements to the proposed rule. The emissions inventory also inappropriately caps emission reductions under the existing rule at 80%. Every vessel with a call greater than 15 hours will result in emission reductions greater than 80%. In San Pedro Bay, where calls greater than 100 hours are typical, emission reductions can exceed 97%. Section 93118.3(e)(4)(A) of the current regulation explicitly states that any vessel using grid power is assumed to reduce emissions 90%. Yet, no explanation or reason is given in the emissions inventory for capping emission reductions at 80%. The inventory must be updated to correct these issues.

5-2

CARB inventory staff have acknowledged these issues in a variety of phone calls and emails with stakeholders and have indicated that these issues will be resolved sometime this summer. That delay does a disservice to both the public and decisionmakers in understanding the benefits of the proposed rule changes.

<sup>2</sup> <https://ww3.arb.ca.gov/regact/2019/ogvatberth2019/apph.pdf>

<sup>3</sup> <https://www.arb.ca.gov/lists/com-attach/137-ogvatberth2019-UzpXP1w5UnQCd1lm.pdf>

**Timed Connection Requirement**

CARB staff has revised the one-hour limit on the connect and disconnect times for shore power to a two-hour connect time limit and one-hour disconnect time limit. While it is appreciated that the infeasibility of the one-hour requirement was acknowledged, a two-hour requirement is still arbitrary and not based on any evidence that it is safe or feasible. As we have said in previous letters, the existing rule permits multiple connection strategies, some of which will require more than one hour. More importantly, the shore power connection process requires individual people to manhandle heavy, high-voltage equipment and energize that equipment – sometimes in adverse weather conditions. Under no circumstances should that work be performed under a stopwatch. The two-hour requirement would likely be ineffective because any exceedance of the one-hour requirement would likely result in a safety exemption being sought, as having labor move faster handling high voltage equipment would be fundamentally unsafe.

CARB staff has still provided no basis on which it can be assumed that connection times can be consistently and safely accelerated. In fact, no data is available from CARB justifying the previous one-hour connection window or the new two-hour connection window.

**VIEs/TIEs**

This industry coalition remains concerned that the number of Vessel Incident Events (VIEs) and Terminal Incident Events (TIEs) are insufficient to ensure rule compliance. An analysis prepared by Starcrest Consulting Group previously submitted, demonstrated that there are insufficient VIEs/TIEs available to ensure compliance for known issues identified by CARB. As discussed earlier, VIEs/TIEs will be needed for unknown and unexpected changes in trade, vessel deployments or equipment failures and maintenance. If VIEs/TIEs are not increased, CARB will penalize ocean carriers and terminals for already known and unavoidable circumstances.

**Previous Comments Continue to Be Unaddressed**

Over the course of the rule development, this coalition, individually and collectively have submitted numerous comment letters<sup>4</sup> and all of those previous comments are incorporated herein by reference and they reserve all rights thereto. No direct responses have yet been provided. This coalition, again, renews its request that CARB staff review and respond to all substantive industry comments prior to Board consideration of the proposed regulation. Hundreds of pages of technical comments, data, and information have been provided to CARB during the entirety of this process. None of which has been agreed to, refuted, or rebutted. An iterative rulemaking process can only exist if CARB staff directly *responds* to the data submitted by stakeholders during the process, and the earlier in the process, the better the outcome for all.

**Conclusion**

The industry coalition looks forward to the opportunity to continue to improve the proposed rule and ensure successful and full compliance can be achieved. The rule in its current form remains problematic with a number of issues that will make full compliance unachievable at times, but these 15-Day Changes

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<sup>4</sup> <https://www.arb.ca.gov/lispub/comm/bccommlog.php?listname=ogvatberth2019>

to move the effective date of the proposed rule to 2023 for the existing regulated fleet will allow stakeholders to continue to work with CARB staff to address these issues.

Sincerely,

***California Association of Port Authorities  
Pacific Merchant Shipping Association  
World Shipping Council***

***Cruise Lines International Association  
Western States Petroleum Association***



WORLD SHIPPING COUNCIL  
PARTNERS IN TRADE

## **World Shipping Council Comments**

to the

### **California Air Resources Board (CARB)**

on the

## **SECOND PROPOSED 15-DAY CHANGES TO THE CONTROL MEASURE FOR OCEAN- GOING VESSELS AT BERTH**

27 July 2020

The World Shipping Council (WSC) is a non-profit trade association that represents the liner shipping industry, which is comprised primarily of operators of containerships and roll-on/roll-off (ro-ro) vessels (including vehicle carriers). Together, WSC's members operate approximately 90% of the world's liner vessel services. Vessels operated by WSC members make frequent calls in California ports and WSC's members would be directly and substantially affected by the proposed rule.<sup>1</sup>

In addition to participating in CARB workshops, webinars and informal discussions, WSC has filed two rounds of formal, written comments on this proposed rule - on 9 December 2019 in response to the proposed control measure and on 1 May 2020 in response to the first round of 15-day changes to the proposed control measure. Each of our comments on the proposed rule has been accompanied by a specific and practical recommendation to address the issue discussed in the comment.

While we indeed appreciate the changes that CARB staff has made to the proposed control measure in response to WSC's comments, we note that few of our comments and recommendations on the first round of 15-day changes have been incorporated into the proposed rule. This concerns us because our comments contain policy and technical recommendations that will help ensure California's revised at-berth rules are practicable, provide a fair and reasonable compliance pathway for regulated vessels, and achieve the state's emissions reduction goals.

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<sup>1</sup> A full description of the Council and a list of its members are available at [www.worldshipping.org](http://www.worldshipping.org).

Before turning to our detailed comments on the second round of 15-day changes, we offer the following higher-level comments on three elements of the proposed rule:

***Support for Adjusted Implementation Dates:*** WSC supports the proposed adjustment of the new rule's implementation dates. One of the main benefits of this adjustment is that it will put the infrastructure implementation and assessment steps in the correct order. Under the original proposed rule, port and marine terminal infrastructure plans to comply with the rule would not be due to CARB staff for review and approval until six months *after* the rule's requirements took effect. Under the proposed adjustment, CARB will be able to review and approve port and marine terminal infrastructure plans more than a year before the new implementation date takes effect for existing regulated vessels. The infrastructure plan information submitted to CARB by ro-ro ports and terminals will also be an important input to the December 2022 interim evaluation of control technologies for ro-ro auxiliary emissions.

***Need for Robust Ro-Ro Feasibility Analysis as Part of the Interim Evaluation:*** Under the proposed rule, CARB staff will publish in December 2022 the findings of an "interim evaluation" of emissions control technologies as well as landside infrastructure to control auxiliary emissions from ro-ro vessels and other classes of vessels that may in the future be subject to the rule. While we appreciate CARB staff's expansion of the scope of the interim evaluation to include shoreside infrastructure and information from port and terminal infrastructure plans, we strongly encourage CARB to expand the interim review so that it includes an assessment of the feasibility of controlling ro-ro auxiliary emissions, including a detailed cost versus benefit analyses based on updated ro-ro vessel visit, emissions and control technology information.

***Innovative Concepts Option:*** WSC supports the proposed extension of the period during which an innovative concept (IC) may be used as a compliance option from three to five years. Along with that change, we recommend that CARB eliminate the December 2021 IC application deadline and develop a process through which IC applications may be submitted on a rolling basis. This change would help encourage innovation to develop and deploy new emissions reduction technologies that may not be ready by December 2021. Finally, we wish to note that, in describing the IC option, CARB staff has indicated that it could be used by regulated vessel fleets to comply with the at-berth requirements. The provision, however, makes only an indirect reference to vessel fleets when it notes that visits made under an IC are not counted towards a fleet's vessel incident exceptions. We therefore recommend that CARB add a new sub-paragraph under the general requirements section (93130.17 (a)) that states that ICs may be used as a compliance option by regulated vessels, vessel fleets, ports and marine terminals.

WSC's additional technical comments and recommendations on CARB's second round of 15-day changes to the proposed control measure follow. Our comments are listed in the order that the issues appear in the proposed rule. Please direct any questions on these comments to Doug Schneider of the WSC staff at [dschneider@worldshipping.org](mailto:dschneider@worldshipping.org).

1. **Definitions** (Section 93130.2 (b)):

- a. **Ready to Work**: We recommend that CARB amend this definition by inserting the following after “netting down” and before “all”: “, the ramp is down and secure (if applicable), required shore side labor technicians are present, and”. These changes are needed to accommodate vessels equipped with ramps (which would not therefore use a gangway) and to note the presence of labor technicians that are essential to hooking the vessel up to shore power or to an alternative compliance method.
- b. **Visit**: We recommend that the words “at a different marine terminal” be inserted after the word “another” so shifts within a single marine terminal would not constitute a new vessel visit. To correspond to the above change, the words “at a different marine terminal” must also be inserted after the word “berth” in Section 93130.7(e)(4)(I).

2. **CARB Approved Emissions Control Strategy (CAECS) Operators** (Section 93130.5):

- a. **Requirements for CARB Approval** (Section 93130.5 (d)): Under current CARB at-berth regulations, LNG-fired auxiliary engines are treated as an approved control option. The proposed rule would, however, require time-consuming and costly testing of LNG-fired auxiliary engines before they may apply for CARB approval. This will discourage investments in a promising alternative to oil-fired auxiliaries. We therefore recommend that CARB retain the provisions in the current at-berth regulations that designate LNG-fired auxiliaries as an approved control option.

3. **Vessel Operator Requirements** (Section 93130.7):

- a. **Amendment to General Requirement Provision** (Section 93130.7): This section contains vessel checklist items that a commissioned shore power equipped ship cannot complete unless the terminal/port and/or CAECS operator complete their checklist obligations under the rule. Section 93130.7’s statement that “Any failure to perform any specific items in this section shall constitute a separate violation...” could thus be used to penalize a shore power equipped ship that could not complete its checklist items because the terminal/port or CAECS operator failed to meet its obligations. To correct this issue, we recommend that the second sentence in the opening paragraph of Section 93130.7 be replaced with:

*“Any failure to perform any specific items in this section shall constitute a separate violation for each calendar day that the failure occurs, except to the extent a vessel operator cannot perform any requirement due to (1) a terminal and/or port’s failure to comply with the portions of this Control Measure that impose requirements upon terminals and/or ports, and/or (2) a CARB Approved Emission Control Strategy Operator’s failure to comply with the portions of this Control Measure that impose requirements upon CARB Approved Emission Control Strategy Operators.”*

- b. **Amendment to Shore Power Provision** (Section 93130.7 (a)): Changes are needed to eliminate ambiguity and prevent this provision from being used to dictate to vessels on which side they must be able to plug in to shore power. We recommend that 93130.7 (a) be replaced with:

*“(a) Shore power requirements for at berth emissions reductions.*

*Vessel operators with shore power vessels that have been commissioned by the terminal (or port) at which the vessel will call (or deemed compatible based on a previous commissioning) shall plug in to shore power on each visit to the terminal. Commissioning of vessel shore power equipment should be based on the following technical standards: IEC/ISO/IEEE 80005-1/80005-2 and IEC 62613-1.”*

- c. **Expansion to Ro-Ro Vessels** (Section 93130.7(b)):

WSC continues to have significant concerns with CARB’s proposal to expand the applicability of the at berth regulations to ro-ro vessels (including vehicle carriers). Ro-ro vessels make infrequent and very short port calls in California. Over the course of a year, each vessel in a ro-ro fleet may call only 2 or 3 times and for a very short period of time. This means the CARB’s at berth emissions requirement would become applicable to all ro-ro vessels that may at some point in a given year call California. The problem is that ro-ro vessels and the terminals they call have limited viable or cost-effective compliance options.

CARB is predicating its regulation of ro-ro auxiliary emissions on the premise that barge or shore-based emissions capture and control technologies will become a viable and practicable emissions control option. Experience to date with the existing barge-based capture and control service providers has demonstrated that those services are often unreliable, are exceedingly costly, and would pose substantial operational and safety problems for ro-ros. For example, the systems cannot be used in windy weather, cannot always reach ro-ro stacks (which may be 40 meters laterally and 40 meters above the waterline), and often prevent simultaneous alongside bunkering operations. Shore-based emissions capture systems may be better able to reach ro-ro stacks, but obstruct shoreside cargo operations, may not be useable in windy weather and exceed the load bearing capabilities at many of the terminals in California where ro-ro vessels must call.

6-1

CARB has estimated that the control cost per ton of emissions reduced for ro-ro vessels is \$53,600. Even using that cost estimate, which we believe is low<sup>2</sup>, it is worth

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<sup>2</sup> Starcrest Consulting Group, LLC, published in December 2019 a ro-ro cost analysis study for PMSA and the Ports of Los Angeles and Long Beach. The study estimated that the costs to control ro-ro auxiliary emissions ranges from approximately \$115,000 to \$200,000 per weighted ton of emissions. A copy of this study may be found in the CARB at-berth docket at: <https://www.arb.ca.gov/lispub/comm/bccommlog.php?listname=ogvatberth2019>.

noting for comparison that CARB estimated that the control cost per ton of emissions reduced for containerships is \$13,500. When asked what cost-benefit threshold was used to decide which classes of vessels to regulate and which not to regulate, CARB staff reported that there is no threshold and that the decision to regulate ro-ro emissions was based simply on aggregate emissions. There has been no considered analysis of the costs and benefits of regulating ro-ro auxiliary emissions. We also note that ro-ro auxiliary emissions occur in distinctly different geographic locations, where their impacts and the related cost-benefit analyses for controlling those emissions may be quite different.

In summary, CARB’s proposal fails to demonstrate that a cost-effective and practicable pathway exists for controlling ro-ro vessels’ auxiliary emissions, fails to address the major operational, safety and cost issues emissions capture systems pose for ro-ro vessels and fails to account fully for the emissions generated by emissions capture systems. Compelling ro-ro carriers to try to comply with the rule using the operationally impractical, complex and costly emissions capture systems on the market is not appropriate and will delay the adoption and benefits of more practicable zero-emission technologies that still need to be developed.

WSC therefore recommends that CARB not proceed with the proposal to regulate ro-ro auxiliary emissions and instead monitor ro-ro emissions and the ongoing development of technologies that may in the future provide a viable and economically achievable compliance option for these vessels.

d. **Vessel Compliance Checklists** (Section 93130.7 (e)):

- **Shore Power Connection Time:** While CARB proposes to modify § (3) (A) to require vessels to begin using shore power or another CAECS within two hours after “Ready to Work”, a substantial number of arriving vessels would still be unable to meet this requirement. Establishing shore power connections must be done safely by longshore technicians, who may not be immediately available given their other extensive responsibilities. Unreasonably short time limits for connecting high-voltage systems could pose safety risks to workers, result in unnecessary damage to the equipment, and subject a substantial percentage of compliant vessel calls to noncompliance for tasks the vessel cannot control. We therefore recommend that vessels be required to begin using shore power or another CAECS within three hours after “Ready to Work”.
- **Shore Power Disconnection Time:** § (3) (B) would require vessels to cease using shore power no sooner than one hour before “Pilot on Board”. There will be situations in which this is not a practicable disconnection deadline for ocean carriers because of delayed vessel departures due to weather or vessel traffic or if labor unplugs the vessels early due to their own shift schedules. We therefore recommend that the shore power disconnection time be no sooner than two hours before “Pilot on Board”.

6-2

- **Post-Visit Reporting:** We support CARB’s proposal in § (4) to require reporting of information for each visit to a California terminal within 30 days of vessel departure instead of the previously proposed 7 days of vessel departure. We recommend that CARB develop an online system/dashboard into which each vessel (and terminal) operator could upload its post-visit reports. The dashboard should provide each operator with an updated snapshot of its compliance as well as VIE/TIE allowances versus usage and other relevant metrics for the designated fleet.

**4. Terminal Operator Requirements** (Section 93130.9):

- a. **General Requirement:** We support CARB’s decision to include in the proposed rule clear and appropriate obligations for marine terminals and ports to provide the shore side infrastructure to connect ships to at-berth power and to connect commissioned ships in a timely manner when they call. These are functions that commercial ships cannot themselves perform and lack commercial power to require. Including these requirements in the regulation will establish balanced obligations for ships and the terminals they call and will set clear expectations regarding what ports and marine terminals will need to do to fulfill their obligations under the rule.
- b. **Commissioning** (Section 93130.9 (a)(2)): This proposed change could be read as allowing ports or terminal operators to dictate on which side vessels seeking to have their installed shore power systems commissioned must connect. Vessel shore power equipment is designed to enable the vessel to connect to shore power on one, but not both, sides and the vessel has no ability to quickly switch the equipment to the other side. We strongly recommend that this provision be replaced with the following: “(2) *The port or terminal is responsible for commissioning vessels fitted with installed shore power equipment.*”

**5. VIEs and TIEs** (Section 93130.11):

- a. **Exclusion of Innovative Concept Visits in VIE and TIE Allocations** (Section 93130.11 (a)): We support the allocation of VIEs based on company vessel fleets and support CARB’s proposal to exclude from the annual VIE allocations visits made under an innovative concept covered under Section 93130.17 of the rule.
- b. **VIE and TIE Rates** (Section 93130.11 (b)): The proposed VIE allocation (5%) needs to be increased to account for the fact that the rule will require all containerships and refrigerated cargo vessels to use at-berth power. We anticipate, based on historical compliance data, that more than 5% of vessel fleets will be unable to comply due to onboard equipment problems, the need to rotate vessels into and out of California services for required surveys and dry-dockings, and due to unpredictable commercial demands that may require shipping companies to deploy or phase-in non-commissioned vessels to meet U.S. import and export trade needs. With the above considerations in mind, we recommend that CARB increase the VIE allocation for the first three years after implementation to 10 percent per year.

- c. **Requests for Additional VIEs and TIEs** (Section 93130.11 (c)): Since vessel operators may encounter situations that warrant additional VIEs that could not be anticipated by 1 December, we recommend that CARB modify 93130.11 (c) by inserting the following after the third full sentence: “(Note: CARB staff will consider, and respond within 60 calendar days, to written requests for additional VIE and TIEs submitted at any time during the year)”.
  - d. **VIE and TIE Expiration** (Section 93130.11 (d)): To provide more flexibility, particularly to address chaotic market conditions, we recommend that CARB allow companies to carry over any unused TIEs or VIE until June 30 of the year after they were granted.
6. **Terminal and Port Plans** (Section 93130.14): WSC believes that there would be value in explicitly articulating in the revised rule that port and terminal plans should include, among other things: a) appropriate changes to existing infrastructure design (e.g., inadequate electrical sub-station/electrical vault configurations); b) expansion of existing electrical infrastructure in container ports to accommodate to enable all shore power equipped container ship calls to be accommodated through shore-side power; and c) that approved plans include a realistic timeframe for design and construction consistent with the final regulatory dates promulgated in the final rule.
7. **Interim Evaluation of New Control Technologies** (Section 93130.14 (d)): Please see our comments and recommendations on page 2 of this document.
8. **Remediation Fund Users** (Section 93130.15): We recommend that CARB expand the list of circumstances in which vessel operators may use the remediation fund to include vessels that make infrequent calls to California ports (e.g. less than 3 calls per year). This is a logical regulatory approach for addressing infrequent calling vessels (e.g. vessels rotated in to California to address increased demand or “extra loaders” brought in to ease port congestion) because it would enable the vessels to have a compliance option if CAECS operators are not available or operational for a particular visit.
9. **Innovative Concept Compliance Option** (Section 93130.17): Please see our comments and recommendations on page 2 of this document.
10. **Summary of Responsibilities** (Section 93130.18): The last row in Table 6 suggests that in the case of a CAECS equipment failure or failure to perform, the vessel, terminal and the CAECS operator would be held responsible. This is not appropriate and creates ambiguity with respect to compliance. The vessel operator has no ability to control the performance or maintenance of a CAECS operator. Under this rule, CAECS operators will be CARB approved, regulated entities that are subject to penalty action for noncompliance. If a CAECS operator fails to meet its obligations under the rule, the CAECS operator alone should be subject to penalty action or an exception (e.g. if the equipment failure was due to a safety issue). We

therefore recommend that “vessel” and “terminal” be removed from the list of responsible parties in Table 6 when a CAECS has an equipment failure or failure to perform.

###

July 27, 2020

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**Subject: Cruise Lines International Association (CLIA) Comments on Second Supplemental 15-Day Notice - Proposed Regulation of Oceangoing Vessels At Berth**

Dear Clerk:

Thank you for the opportunity to comment on the proposed At Berth Regulation Second 15-Day Changes. CLIA on behalf of the cruise lines that visit California ports appreciates the opportunity over the last few years to work with California Air Resources Board members and staff directly and through the Industry Coalition during regulatory development of this rule.

The Second 15-Day Notice provides for changes to the regulatory structure of the proposed At Berth Regulation and includes one very important change requested by CLIA and the Industry Coalition: the ability for the currently regulated fleet to continue to use the existing fleet average rule for at least an additional two years from 2021 to 2023. These amendments provide the ability for cruise line fleets to continue in compliance with the existing shore power rule as has been the case since 2014 when the original rule went into effect, and which is particularly important given the extreme impacts the COVID-19 pandemic has had on cruise line operations. Importantly, it also provides an opportunity for discussions over the next two years to address issues that remain to be adequately addressed in the new rule for fleets. Those issues are discussed below. In addition, CLIA supports the Industry Coalition Second Supplemental 15-Day Notice comments.

**CLIA SUPPORTS THE NEW EFFECTIVE DATE TO ALLOW TIME TO ADDRESS ONGOING CONCERNS WITH THE NEW RULE AND DEVELOP OPTIONS FOR FLEETS**

As previous comments stated, CLIA and the industry coalition have serious concerns with the proposed rule, particularly that it contains provisions that will result in noncompliance even though these existing regulated ships have been in compliance since the existing shore power rule was put in place. CLIA supports the delay of implementation of the new regulation until January 1, 2023 for existing regulated fleets and welcome using this time to continue meetings with staff to discuss concerns that remain to be resolved in the new regulation, and determine solutions that meet the needs of fleets and allow them to remain in compliance.

**CLIA REQUESTS STAFF DEVELOP SUFFICIENT COMPLIANCE PATHWAYS FOR NON-FREQUENT FLIERS TO AVOID REQUIRING THESE VESSELS TO CONTINUE TO PULL CALLS OUT OF CALIFORNIA**

The cruise lines request that CARB staff work over the next year with cruise lines and other stakeholders that have non-frequent fliers to find an alternative compliance option for vessels that rarely or unexpectedly visit California ports. The goal will be to allow cruise vessels to continue to make 4 or fewer calls in California without being forced to either put in shore power that is rarely used or eliminate calls in California ports to stay in compliance. CARB has unfortunately classified these non-frequent fliers as “unregulated” because they are exempted from the existing At Berth rule.

Out of hundreds of cruise vessels worldwide, only a limited number continually visit California and are equipped with shore power. Cruise vessels that are visiting California ports only once every few years cannot support the huge investment in shore power and ongoing maintenance required, but unfortunately also cannot use the existing CARB-approved alternative compliance option. In addition, although the draft rule did change the implementation date for non-frequent fliers to 2023, unlike fleets, that deferral did not give these global and transition cruises an option but to pull calls out of California. The cruise sector sets itineraries years in advance and the previously pending 2021 regulations already forced a reduction in the number of planned calls in 2021 and 2022 from “nonfrequent flier” ships.

Without clarity on the 2023 regulation sometime in the next year, these vessels will have the same result in 2023 and 2024. While the extension of the current regulation for the regulated fleet is helpful, losing the ability of non-frequent fliers to call on

California ports during this two-year extension would detrimentally impact these lines as well as prohibit many additional calls to California ports, specifically those transiting to and from Alaska. The more specialized world cruises and relocating cruise vessels may visit once every two to four years and only a few ports each visit, using entirely different cruise ships each time. This means that these vessels would be able to use these \$2 million systems only 8-16 hours every one or two years.

A different flexible alternative is critical for these vessels to avoid displacing this trade that though fewer in overall numbers are still financially significant to impacted California ports that will lose additional calls. It is also important to note that the ISOR and SRIA do not properly analyze the possibility of future vessel diversions as well as those that have already occurred, and their economic impact.

**CLIA SUPPORTS MOVING UP PORT AND TERMINAL PLAN DUE DATES SO THEY ARE IN PLACE PRIOR TO 2023, BUT ARE CONCERNED THAT THERE ARE NO DATES BY WHICH PLANNED INFRASTRUCTURE MUST BE IN PLACE**

CLIA appreciates that the rule has been amended to require port and terminal plan due dates by December 1, 2021, before 2023. However, assurances should be included in the rule that shoreside shore power infrastructure will be available to meet the increased port calls required beginning in 2023.

**CLIA REQUESTS THAT THE FOCUS OF THE INTERIM EVALUATION BE EXPANDED**

The interim evaluation due now December of 2022 should be specifically expanded to address issues regarding rule implementation raised by stakeholders. As work on implementation continues, it will be critical to resolve issues, including incorporation of fleet averaging under Innovative Concepts or CARB Approved Emission Control Systems (CAECS), finalizing sufficient compliance pathways for non-frequent fliers, and addressing other issues identified in this letter, previous CLIA comments, and the Industry Coalition letters.

**CLIA REQUESTS THAT LIABILITY BE CLARIFIED**

By 2023, the liability provisions in the new rule should be clarified. The new proposed rule still requires joint and several liability for violating the control measure, which conflicts with specific liability/responsibility for ports, terminals, vessels and alternative compliance operators in other sections of the rule.

**CLIA'S PREVIOUS COMMENTS STILL APPLY REGARDING UNRESOLVED CONCERNS WITH THE NEW PROPOSED RULE**

There remain a number of comments previously submitted by CLIA that are unresolved with the new rule:

- the new rule remains extremely complex and doesn't work well for fleet-based companies - which has the potential to place vessels in compliance since 2014 in noncompliance;
- an alternative compliance option to shore power should be available for vessels that cannot use the only existing CARB-approved alternative compliance option;
- the remediation fund hourly amount of \$12,000 per hour is punitive for cruise vessels and acts like a major penalty usually reserved for willful or intentional violations – in addition, a more reasonable per hour rate should also be considered as a compliance option for non-frequent fliers;
- a phase-in period should be allowed for low activity terminals suddenly being added to the rule based on activity;
- ongoing issues remain with the checklist, the timed connection requirement, and compliance decisions being made long after the vessel leaves port leaving vessels unsure of possible violations until after a California port visit.

Again, thank you for your consideration of these comments.

Sincerely,



Donald Brown  
VP, Maritime Policy  
Cruise Lines International Association

July 27, 2020

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[https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=ogvatberth2019&comm\\_period=2](https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=ogvatberth2019&comm_period=2)

**Subject: OGV At Berth -- PMSA Comments on Second Supplemental 15-Day Notice**

On behalf of its ocean carrier and marine terminal operator member companies, the Pacific Merchant Shipping Association (PMSA) appreciates the opportunity to comment on the latest version of the proposed At Berth Regulation for Oceangoing Vessels. The second 15-Day Notice provides for changes to the regulatory structure of the proposed At Berth Regulation that address some of the concerns that PMSA has raised during rule development that result from the elimination of the current regulation and its replacement with an entirely new enforcement regime.

PMSA and its members are proud of our record of compliance with the current Vessel At Berth regulation and the significant emissions reductions that we have achieved from our operations. Changing the effective date for the existing regulated fleet from 2021 to 2023 in the proposed rule validates this success and will maintain the current regulation for two more years without any degradation in emissions controls. This is beneficial in that it will forestall unnecessary rule change impacts, provide regulatory and enforcement compliance continuity for the existing regulated fleet, and give all stakeholders and CARB an additional opportunity for making improvements to the proposed new measure. PMSA remains concerned that many of the issues that have been raised during this rulemaking have not yet been addressed or even responded to substantively, and we would respectfully request that the Board commit to taking this additional time to address these issues and concerns prior to the implementation of a new regulatory regime in 2023.

PMSA has been pleased to work with CARB staff for many years on the implementation and enforcement of the current regulation and on addressing the potential changes in this proposed measure. We incorporate herein by reference all of our previous comments, reports, and submissions during the informal rulemaking and formal rulemaking periods, including the technical evaluation work of third-party consultants regarding the proposed rule. We are also proud to work with a coalition of diverse cross-industry stakeholders who have been working to create a cost-effective and technologically feasible set of conditions for rule expansion for the past several years, including a comprehensive alternative proposal. PMSA continues to associate itself with the comments of the industry coalition consisting of CAPA, CLIA, PMSA, WSPA and WSC.

**New Effective Date Provides an Opportunity**

PMSA is concerned that the proposed rule cannot be successfully complied with by many fleets which have invested significant resources into a working shore power system and are plugging in at ports and terminals which are similarly equipped and compliant with the current regulation. These concerns are amplified given the realities and uncertainties present in the maritime industry. Therefore, the revised effective date of 2023, which allows for these fleets to continue to operate under current law, is appreciated. This date will allow PMSA and its members to continue to work with CARB staff to improve the rule structure without risking temporal non-compliance for shore power equipped vessels. In addition, serious concerns remain regarding the feasibility and true cost-effectiveness of controlling tanker and Ro/Ro vessels and this framework should provide benefits for those fleets as well.

**US EPA Waiver Required for 2023 Implementation**

CARB sought and was granted the waiver from USEPA for the existing At Berth regulations which implement emissions standards applicable to the running of auxiliary engines while at berth in California's ports. (76 FR 77515) This waiver was granted after previous auxiliary engine emissions standards were determined to be unenforceable by ARB without the prior issuance of a US EPA §209(e)(2) waiver and after objection to the waiver by PMSA. See *Pacific Merchant Shipping Association v. Goldstene*, 517 F.3d 1108 (9th Cir., 2008). The US EPA waiver process is one component of the Clean Air Act that ensures the preservation of the current and previously adopted regulatory structure in a uniform manner nationwide, as an alternative emissions standard over and above or in addition to a US EPA standard, and that the adoption or change to any existing uniform rule is completed in the best interests of the currently regulated vessel fleets, CARB, and the entire United States. More importantly, regulations for vessels at berth, including specifically any newly promulgated emissions standards, are legally unenforceable without the provision of a new waiver.

Now that CARB has set the effective date for changes to the existing At Berth Rule in 2023, it should clearly and affirmatively lay out its schedule for seeking an obtaining a new waiver for the new At Berth Regulation from the U.S. Environmental Protection Agency, or it should create a clear compliance pathway for currently regulated vessel fleets which is consistent with the existing waiver.

**Proposed Rule's Joint & Several Liability and Indirect Source Approach is Unnecessary**

An indirect source rule is a regulation which assigns a liability and responsibility to a facility to reduce indirect mobile source emissions which that facility does not control, when the mobile source can be directly regulated to reduce emissions through a traditional emissions standard, engine standard, or other in-use standard.

We are concerned that many of these hallmarks are present in the proposed control measure when they were successfully avoided in the current regulation. Ports and marine terminals at present are responsible for the provision of shoreside power infrastructure and operational support and manning under the current rule, and that will not change under the proposed rule. These entities can be held accountable for such responsibilities, but they cannot be held liable for an emissions standard violation

by an off-road engine on a vessel over which they have no control. This proposal seeks to do just that by establishing a novel and unnecessary Joint & Several Liability measure for vessel emissions.

Assigning a vessel's emissions standard liability to a port or marine terminal must be avoided. The creation of third-party liability for vessel emissions for a marine terminal is just as misplaced as trying to hold a vessel operator responsible for the actions of a marine terminal operator once at berth. These should all be treated as independent bases of responsibility and given independent measures of reporting and review. PMSA has proposed multiple bases upon which these liabilities may be established and believes that continued investment in compliance can be maintained without the establishment of a new liability regime.

#### **Projections and Analyses Must Be Revised**

During the June 25<sup>th</sup> hearing, CARB staff acknowledged that the COVID-19 crisis has impacted existing and future cargo volumes in California ports. Staff also stated that the current crisis will have disparate effects across the maritime industry, with the timeline to recovery being long. Even before the current crisis, data was submitted demonstrating that the cargo and resulting emissions estimates were wrong. The crisis has amplified those misapplications and projections.

The derived data from the cargo forecasts has led to unreliable information presented in the updated emissions forecast. As stated in the letter on the first 15-Day Notice<sup>1</sup>, cargo volumes in 2020 for the ports of Los Angeles and Long Beach will be at least 26% below the values contained CARB's data set. CARB staff has not addressed any of forecast issues raised in the prior letter.

More information continues to become available demonstrating the problems attendant to the existing CARB forecasts and inventories. PMSA recently released an analysis<sup>2</sup> that provides the most recent annual data on the loss of containerized trade market share experienced by U.S. West Coast ports, including Los Angeles, Long Beach, and Oakland in recent years. This analysis demonstrates the accelerating market share erosion of California ports. As a result, all dependent analyses, including rule emissions benefits, health benefits, CEQA review including the Statement of Overriding Considerations, and cost-effectiveness, will all be based on flawed data. CARB should re-evaluate baseline emissions, proposed emission reductions, health benefits, costs, and cost-effectiveness based on a revised forecast and assumptions.

#### **Interim Evaluation**

The text of the interim evaluation contained in the proposed regulation presupposes the feasibility of emission control technology for Ro/Ro vessels. The language should be clear that the interim evaluation will evaluate the feasibility of technology to control emissions successfully and cost-effectively from

<sup>1</sup> <https://www.arb.ca.gov/lists/com-attach/137-ogvatberth2019-UzpXP1w5UnQCd1Im.pdf>

<sup>2</sup> <https://www.pmsaship.com/wp-content/uploads/2019/12/Briefing-Paper-Loss-of-Market-Share-at-U.S.-West-Coast-Ports.pdf>

Ro/Ro vessels since there is no existing technology to reduce emissions in exhaust streams in a manner that can safely operate on tanker Ro/Ro vessels in operation. The technology which is currently in demonstration has a number of technical, safety, and operational constraints it must overcome. At the same time, any proposed system needs to also abide by Coast Guard, OSHA, and other regulatory requirements, while not being prohibitively expensive.

The interim evaluation should be clear that it will evaluate all considerations that would impact the success of new control technologies, including the configuration of Ro/Ro vessels, which make reaching the exhaust an engineering challenge. The only way to answer these questions is with a demonstration that must be completed before the interim evaluation is conducted. With a presentation date of December 2022, it is likely that the demonstration will not even be operating before CARB staff must prepare their evaluation and is not expected to be complete until long after the interim evaluation is complete. An interim evaluation that is not informed by a complete demonstration is mere speculation.

The interim evaluation should also address issues regarding rule implementation raised by PMSA and other maritime industry stakeholders over the next two years. As work on implementation continues, it will be critical to resolve issues, including the sufficiency of TIEs/VIEs, incorporation of fleet averaging under Innovative Concepts or CARB Approved Emission Control Systems (CAECS), sufficient compliance pathways for non-frequent fliers, and other issues identified in this letter.

#### **Industry Grappling with the Effects of COVID-19**

The scale of the current crisis is unprecedented. The World Trade Organization (WTO) has estimated that global trade could decline up to 32% this year.<sup>3</sup> As a result of this crisis, the analyses on which this rule is based are out of date and no longer valid. The ISOR analysis is predicated on strong growth assumptions based on a number of forecasts. Questions about those assumptions were raised prior to the current crisis. For example, the ISOR analysis assumes that from 2016 (the inventory base year) through 2020 container cargo at the ports of Long Beach and Los Angeles would grow 4.5% per year. Last year (before the current crisis), the two ports declined 3.3%. Since the crisis, the decline has accelerated, with year-over-year declines in January (-5.1%), February (-16.9%), March (-19.7%), April (-11.4%), May (-13.7%), and June (-10.3%). For the first six months of the year, the two ports are down 12.5% over the same period last year. Before even considering the rest of the year, the current crisis means the emissions inventory contained in the ISOR is wrong. That gap only grows if the rest of 2020 is forecast based on WTO projections. By the end of this year, the baseline forecast used in the ISOR will overestimate cargo volumes by between 26% and 62%.

The estimates of benefits, emissions estimates, costs, cost-effectiveness, and health impacts, which presume the rate of growth contained in the ISOR, are now no longer valid. Even if growth were to immediately resume at levels assumed in the ISOR, cargo volumes and resulting activity will likely be millions of containers off from the cargo volume estimate.

<sup>3</sup> [https://www.wto.org/english/news\\_e/spra\\_e/spra303\\_e.htm](https://www.wto.org/english/news_e/spra_e/spra303_e.htm)

**Innovative Concepts**

PMSA appreciates proposed changes to the Innovative Concepts (IC) of the proposed regulation but believes that these changes remain insufficient. While increasing the term to five years does provide some additional certainty for select regulated parties to propose an innovative concept, it still fails to provide the long-term assurance necessary to make it a viable compliance pathway. A number of other changes should be considered to make the concept viable.

- A fleet averaging concept should be a defined path within the IC section. Fleet averaging, as a program whose parameters are known, should not be subject to unnecessary restrictions for new concepts. Given the known success of fleet averaging to reduce emissions, it is not necessary to create uncertainty by having a five-year term with extension subject to uncertain approval. In addition, concerns remain that at this time it is unknown how fleet averaging would be handled under the IC provisions and that CARB staff cannot describe or even assure that fleet averaging is consistent with all the requirements of the IC provisions.
- While IC must be “surplus” at the time of creation, CARB could revoke or decline to renew approval if the emission reduction became subject to regulation at a future date, or by any CARB-approved AB 617 Community Emission Reduction Plan. The IC section should be modified to allow IC reductions without this limitation.
- Limiting the location of IC emissions reductions only to “adjacent” communities and distances no greater than 3 nautical miles may have unintended consequences. Neither “adjacent” nor “community” are defined in the Proposed Regulation, so it is unclear how close an area would need to be in order to be deemed “adjacent,” and where the boundaries of that area would end. The IC section should be modified to encourage any project (adjacent or not) that would benefit the port and terminal communities.
- The IC section sets a single, one-time deadline for submitting a proposal. This implies that ICs will not be considered after December 1, 2021. The deadline should be removed and replaced with a process for IC plan review at any date such plans are submitted in the future. In addition, if IC will be used to facilitate fleet averaging, the ability to use fleet averaging should be available beyond 2021. Fleets will encounter different circumstances over the life of this regulation that may allow them to comply with the proposed regulation versus making use of a fleet average approach. New fleets may want to enter the California market after the 2021 deadline and this ensures they will be forever precluded from using fleet averaging. The original rule contained a similar fixed date requirement for alternative technologies, CARB staff eventually were forced to revise that through the use of an “Advisory”. As a result, we strongly recommend that IC applications be accepted continuously with the understanding that CARB needs a minimum lead time before an approved application becomes effective.

- The prohibition on public funding for ICs is too broad. Funding may come from different sources, including federal, other states, or other nations. In addition, such a prohibition would exclude demonstration projects. Fleets that are likely to engage in ICs, including fleet averaging, are also likely to participate in demonstration projects sought by CARB or other air quality agencies. Being innovative should not prohibit technology advancement.
- Revocation of the IC plan provides for a 30-day notice. This is likely to be inadequate for an ocean carrier to transition to original provisions of the rule. The risk of a 30-day transition at the uncertain end of a five-year program is enough to prevent an ocean carrier opting to implement an IC. The IC section should include a nine-month transition period upon revocation of an IC plan.

**Fundamental Problems with Emissions Inventory Unresolved**

Even before addressing the changes brought about by the COVID-19 crisis, the emissions inventory has not addressed known problems as described in previous industry stakeholder comment letters. The inventory overestimates growth, resulting in a significant overestimation of the proposed rule’s emissions benefit. The inventory does not consider the emission reductions associated with Proposition 1B funding, requiring emission reductions of 90% under the existing rule – 10% more than the proposed rule. This results in the inappropriate attribution of emission reductions from existing requirements to the proposed rule. The emissions inventory also inappropriately caps emission reductions under the existing rule at 80%. Every vessel with a call greater than 15 hours will result in emission reductions greater than 80%. In San Pedro Bay, where calls greater than 100 hours are typical, emission reductions can exceed 97%. Section 93118.3(e)(4)(A) of the current regulation explicitly states that any vessel using grid power is assumed to reduce emissions 90%. Yet, no explanation or reason is given in the emissions inventory for capping emission reductions at 80%. The inventory must be updated to correct these issues.

CARB inventory staff have acknowledged these issues in a variety of phone calls and emails with stakeholders and have indicated that these issues will be resolved sometime this summer. That delay does a disservice to both the public and decisionmakers in understanding the benefits of the proposed rule changes.

**Timed Connection Requirement**

CARB staff has revised the one-hour limit on the connect and disconnect times for shore power to a two-hour connect time limit and one-hour disconnect time limit. While it is appreciated that the infeasibility of the one-hour requirement was acknowledged, a two-hour requirement is still arbitrary and capricious and not based on any evidence that it is safe or feasible. As we have said in previous letters, the existing rule permits multiple connection strategies, some of which will require more than one hour. More importantly, the shore power connection process requires individual people to manhandle heavy, high-voltage equipment and energize that equipment – sometimes in adverse weather conditions. Under no

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circumstances should that work be performed under a stopwatch. The two-hour requirement would likely be ineffective because any exceedance of the one-hour requirement would likely result in a safety exemption being sought, as having labor move faster handling high voltage equipment would be fundamentally unsafe.

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cont.

CARB staff has still provided no basis on which it can be assumed that connection times can be consistently and safely accelerated. In fact, no data is available from CARB justifying the previous one-hour connection window or the new two-hour connection window.

### **VIEs/TIEs**

PMSA is concerned that the number of Vessel Incident Events (VIEs) and Terminal Incident Events (TIEs) are insufficient to ensure rule compliance. An analysis prepared by Starcrest Consulting Group previously submitted, demonstrated that there are insufficient VIEs/TIEs available to ensure compliance for known issues identified by CARB. As discussed earlier, VIEs/TIEs will be needed for unknown and unexpected changes in trade, vessel deployments or equipment failures and maintenance. If VIEs/TIEs are not increased, CARB will penalize ocean carriers and terminals for already known and unavoidable circumstances.

### **Previous Comments Continue to Be Unaddressed**

PMSA has submitted numerous letters under its own name and in cooperation with other maritime stakeholders<sup>4</sup>. Those comments are incorporated herein by reference. This includes numerous technical comments which have not been formally addressed or responses provided. We request that CARB staff review and respond to all industry comments before Board consideration of the proposed regulation. The rulemaking process should be an iterative process in order to develop a rule that achieves air quality goals in a manner that creates the least burden and at the lowest cost. The purposes of the informal rulemaking period should be to ensure stakeholders have an opportunity to lay out issues *and* have those issues responded to. Hundreds of pages of comments, data, and technical information have been provided to CARB, all of which are awaiting a response. An iterative rulemaking process can only exist if CARB staff *responds* to the data submitted by stakeholders during the process.

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<sup>4</sup> <https://www.arb.ca.gov/lispub/comm/bccommlog.php?listname=ogvatberth2019>

**Conclusion**

While the current form of the proposed rule remains problematic with a number of issues that will make full compliance unachievable at times, the fact that the effective date of the proposed rule has now been set for 2023 will allow all PMSA to continue to work with CARB staff to address these issues. PMSA looks forward to opportunity to continue to improve the proposed rule and ensure successful and full compliance can be achieved.

Sincerely,

A handwritten signature in blue ink that reads "Thomas Jelenić". The signature is written in a cursive style with a large initial 'T'.

Thomas Jelenić  
Vice President

# SAN PEDRO BAY PORTS

# CLEAN AIR ACTION PLAN

July 26, 2020

Richard Corey  
California Air Resources Board  
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(Submitted electronically to:

[https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=oqvatberth2019&comm\\_period=1](https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=oqvatberth2019&comm_period=1))

Dear Mr. Corey:

**SUBJECT: SECOND 15-DAY CHANGES TO THE PROPOSED CONTROL MEASURE FOR OCEAN-GOING VESSELS AT BERTH**

The Port of Long Beach and Port of Los Angeles (Ports) appreciate this opportunity to provide comments on the California Air Resources Board (CARB) Second 15-Day Changes Package for the Proposed Control Measure for Ocean-Going Vessels at Berth released on July 10, 2020. This latest iteration of rulemaking reflects some of our ongoing discussions with CARB staff on the proposed rulemaking for over the past two years, and we very much appreciate your staff's willingness to engage on these issues.

We are facing an unprecedented public health crisis, which has and will continue to have significant adverse economic impacts on the maritime industry and the world at large. The Ports have experienced a 12.52% decline in cargo throughput over the first half of 2020, compounding the challenges we have experienced due to the global trade wars and the ongoing loss of market share. We will continue to closely monitor and evaluate economic developments, but anticipate these impacts will continue to reverberate throughout the industry for many years to come.

In light of this, we recommend that your Rule include a mechanism that allows for a timely reassessment of the regulation with greater flexibility in the event that economic conditions warrant it. For example, as regulatory requirements go into effect, the Ports suggest that "check-ins" or other types of assessment steps can occur that will allow the various stakeholders to be a part of the implementation process, and assure that the steps envisioned can be implemented.

After reviewing the Second 15-Day Changes for the At Berth Regulation, the Ports offer the following comments.



Port of LONG BEACH  
THE GREEN PORT

Port of Long Beach | Environmental Planning  
415 W. Ocean Blvd | Long Beach, CA 90802  
562.283.7100



THE PORT  
OF LOS ANGELES

Port of Los Angeles | Environmental Management  
425 S. Palos Verdes Street | San Pedro, CA 90731  
310.732.3675

*The San Pedro Bay Ports Clean Air Action Plan was developed with the participation and cooperation of the staff of the US Environmental Protection Agency, California Air Resources Board and the South Coast Air Quality Management District.*

- While the 2025 implementation timeline for Roll-On/Roll-Off ships (RoRos) is better than the previous proposal for 2024, as articulated in the Ports previous joint letter from April 29, 2020, the Ports remain concerned that this industry will not be able to develop, commercialize, and widely deploy the required technology within this timeframe. Respectfully, the Ports still support the previously requested a timeline for RoRo implementation of 2027.
- Development of tanker vessel emission capture and control technology is nascent. We believe the 2025 timeline is infeasible, and a deadline of 2029 will be necessary. The hurdles to overcome the safety challenges associated with the tanker vessels are significant, and a hazard assessment must be conducted. We understand you plan to release a \$10 million solicitation to fund development, testing, and certification of this technology. According to your webinar hosted on July 15, you anticipate the selected project demonstration to conclude by 2025. This does not leave any time for production, purchase, and implementation of the remaining eight systems required in the San Pedro Bay according to your agency's Berth Analysis.
- The steep cost of this regulation - \$2.23 billion - will have a substantial impact on the industry. The combined impact of the global trade wars, COVID-19, and implementation of more stringent regulatory requirements will likely result in additional cargo diversion, and consequently, excess emissions at non-California ports. Declining harbor revenues, lack of available cap-and-trade revenues, and competing funding needs for reduction of emissions from other sources have decreased the availability resources for implementation of this measure. The Ports ask that you appropriate significant funding during this time to make this rulemaking successful while ensuring our California ports remain competitive. Previously, the Ports requested at least \$200 million to support technology advancement and deployment. We reiterate this request, and ask that these dollars be appropriated to both RoRos and tankers statewide.

10-1

Lastly, we would like to highlight a new issue regarding the Interim Evaluation language:

- The Interim Evaluation, to be published by December 2022, is going to be critical in defining progress the industry will have made towards achieving the requirements of the new At Berth Regulation. A significant amount of data will need to come from ports, terminal operators, vessel operators, and any grant funded demonstration projects. It is unclear in the new regulatory language whether or not industry data will be accepted. We request that the development of the recommendations from this Interim Evaluation be based upon data provided by those organizations impacted directly, and the process for including data is transparent.

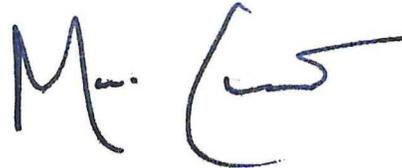
We thank you and your staff for your recommendations to their Board on June 25, 2020, and we thank your Board for recognizing the uncertain and unprecedented challenges the port industry faces today. While we agree we need the emission reductions from vessels at berth in order to move the needle on public health and clean air for our communities, we do continue to diverge on the level of effort it will take, the cost, and the time needed for successful implementation of this measure. The Ports are committed to working closely with your staff on developing the Proposed Control Measure for Ocean-Going Vessels at Berth and look forward to ongoing dialogue on these issues.

Please feel free to reach out to Morgan Caswell, Port of Long Beach Manager of Air Quality Practices at (562) 283-7138 or via email at [morgan.caswell@polb.com](mailto:morgan.caswell@polb.com) or Teresa Pisano, Port of Los Angeles Marine Environmental Supervisor at (310) 732-3057 or via email at [tpisano@portla.org](mailto:tpisano@portla.org), with any specific questions.

Sincerely,



EUGENE SEROKA  
Executive Director  
Port of Los Angeles



MARIO CORDERO  
Executive Director  
Port of Long Beach

cc: Bonnie Soriano, CARB (via email [Bonnie.Soriano@arb.ca.gov](mailto:Bonnie.Soriano@arb.ca.gov))  
Angela Csondes, CARB (via email [Angela.Csondes@arb.ca.gov](mailto:Angela.Csondes@arb.ca.gov))  
Nicole Light, CARB (via email [Nicole.Light@arb.ca.gov](mailto:Nicole.Light@arb.ca.gov))



July 27, 2020

Ms. Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on Second Notice of Public Availability of Modified Text and Availability of Additional Documents and Information

Dear Ms. Csondes:

The Port of Oakland (Port) appreciates this opportunity to comment on the Proposed Control Measure for Ocean-Going Vessels At Berth (Proposed Control Measure). The Port notes that this is its seventh (7<sup>th</sup>) comment letter on the topic. The Port has not received written responses to any of its previous comments and has concerns about this rulemaking process. Given that several of the Port's outstanding questions are substantive, the Air Resources Board members are being asked to vote on the regulation before our technical and feasibility concerns have been addressed and answered. As a result, this process risks becoming a "check the box" exercise rather than a meaningful exchange leading to an improved regulation that will continue to meet our mutual objectives of reducing emissions from seaport sources.

Briefly, the Port must reiterate the following comments:

- The Port of Oakland has no feasible Alternative Compliance Method
- The foundational analysis for the Proposed Control Measure is flawed
- The complex TIE/VIE regime is ripe for conflict
- The current at-berth regulation is successful and should be maintained for containerships

Before offering details for the items above, the Port would like to acknowledge several recent changes that have moved the Proposed Control Measure in a positive direction. These include allowing containerships to stay under the 2007 At-Berth Regulation until 2023, extending the Innovative Concepts timeframe to five years, and providing a process to request additional

TIEs/VIEs to accommodate anticipated growth in vessel calls. The Port appreciates these changes and notes that some of them are partially responsive to concerns the Port has raised.

### **The Port has No Feasible Alternative Compliance Method**

According to CARB's own analysis, the Port of Oakland has no feasible alternative compliance method at three out of four of its terminals (representing 83% of the Port's call volume). This means that carriers that might choose to rely on a barge-mounted bonnet system for compliance at the San Pedro Bay Ports will not have a compliance option in Oakland, where the only feasible compliance method is shore power. This puts the Port of Oakland at a substantial disadvantage, especially as compared to alternative gateways outside California in Tacoma, Seattle, Vancouver, and Prince Rupert, for example. Diverting cargo to distant seaports can lead to increased emissions, undermining the purpose of the regulation.

We still need to understand how ARB staff will address these practical concerns about creating an alternative compliance method that is infeasible for the overwhelming majority of ship operations at the Port of Oakland, given the major negative impacts that could result (decreased Port competitiveness, loss of market share, diverted cargo, increased emissions, etc). This is a matter than needs to be addressed before the Board considers the adoption of the Proposed Control Measure.

### **The Foundational Analysis for the Proposed Control Measure is Flawed**

The analysis that serves as the foundation for this rule both underestimates the efficacy of the current At-Berth Regulation *and* overstates the benefit of the Proposed Control Measure. The discrepancies listed below need to be addressed prior to approval of the Proposed Control Measure.

CARB staff appear to be unwilling to modify certain data that underpin the benefits of this rule if they are in conflict with a desired outcome. CARB staff have acknowledged that there are significant discrepancies between data assumptions and actual observed practices that could impact the analysis, but there has been little-to-no follow through to correct these data gaps. We are concerned that a refusal to incorporate Oakland's 2016 baseline data or to officially update the expected cargo growth rate for Oakland or to remove the incorrect 80% cap on the benefit of the current regulation, will produce a distorted result that justifies a changed rule for containerships based on faulty assumptions.

- a. The emissions benefit calculation caps the benefit of the current regulation at 80%. This is incorrect because it ignores demonstrated overcompliance due to 1) the provision requiring every vessel capable of plugging in to do so, 2) the long call durations at the San Pedro Bay Ports resulting in ~96% emission reductions, 3) the fact that some infrequent callers are plugging in even though they are not required to do so, and 4) the required 90% compliance rate for shore power systems that received grant funding.

The artificial 80% benefit cap is not even internally consistent within CARB's own documents. According to page 22 of the 2007 regulation (text copied in below),

11-1

CARB assumes 90% reductions for any ship that plugs in. Why does the analysis cap the benefit of the 2007 regulation at 80%?

11-1  
(cont'd)

**(4) Control Factors**

**(A) The emissions from vessels using grid power in lieu of the vessel's auxiliary engines when the vessels are at berth are presumed to be reduced by 90 percent.**

- b. CARB's 2016 baseline data for shore power operations in Oakland are neither reliable nor reflective of actual usage. Comparing summaries by vessel class size to the Port of Oakland's own data (used for billing and subject to audit), the values are off by up to 40% in critical areas. Port staff discussed this problem with CARB staff and showed them the comparison during a phone call on January 15, 2020. CARB staff offered to investigate the issue and spot check some data points to try to understand it better. To date, nothing has happened. Port staff have continued to raise this issue, but it remains unaddressed and unresolved. The baseline data are critical for accurately evaluating any future benefits of the Proposed Control Measure, so this needs to be addressed.
- c. As recognized by CARB staff, the assumed growth rate for the Port Oakland is too high and does not comport with any recent or anticipated cargo trends. The inventory assumes an unreasonably aggressive 5% compounded annual growth rate for the Port of Oakland. CARB staff agreed it should be lowered to 2.2% to be in line with the recently finalized Bay Area Seaport Forecast (by Tioga Group for the San Francisco Bay Conservation and Development Commission, dated May 22, 2020). CARB staff said they would address this in summer 2020, but that does not seem to have happened and does not appear to be scheduled before the Board votes on this item. This is also a critical factor that, if left unaddressed, would artificially inflate any future emissions from OGV operations in Oakland and overstate the benefit of the Proposed Control Measure.

The Port suggests that CARB staff resolve all three of these issues *before* a vote is taken on the Proposed Control Measure. These adjustments may change the outcome of the cost-benefit analysis, and hence the need for containerships to be placed under the Proposed Control Measure.

The Port has kept meticulous shore power records and would be happy to share information and provide reliable data sets to CARB.

**The complex TIE/VIE regime is ripe for conflict**

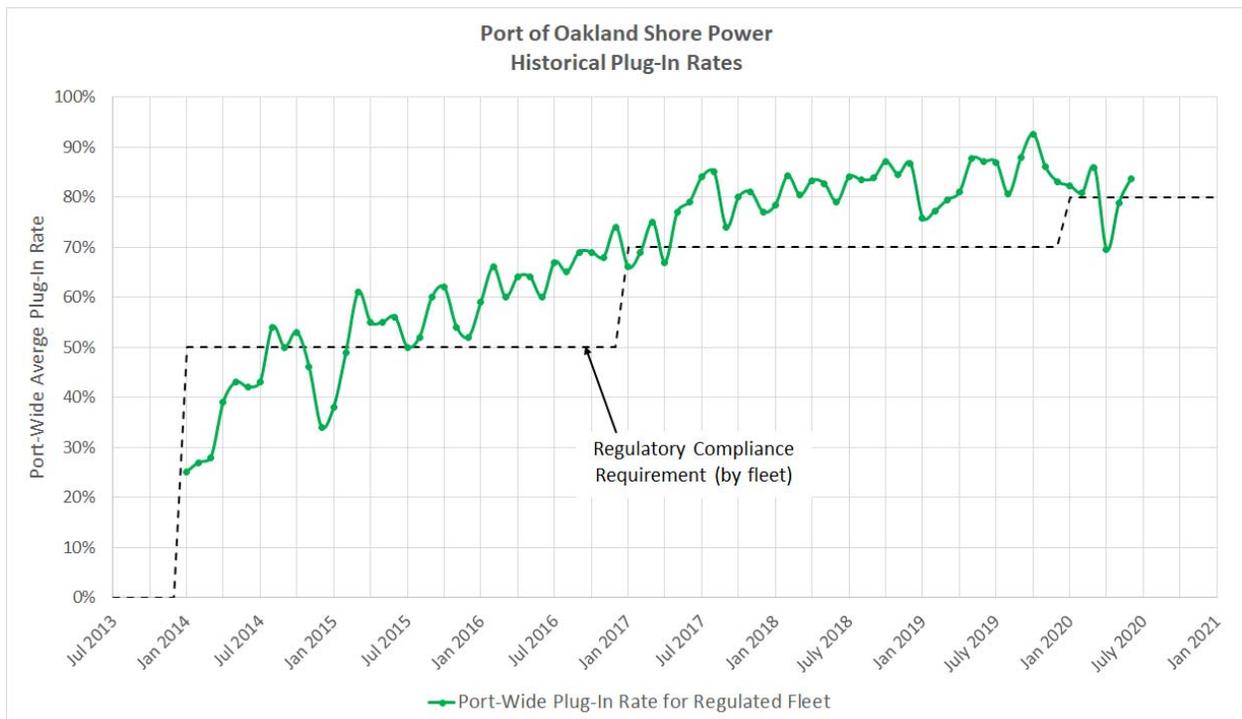
The Port is concerned about the Proposed Control Measure's potential to create conflict and disputes rather than collaboration among terminal operators, vessel operators and the local seaport. The Port has expressed this concern to CARB in previous correspondence. Given the Port's extensive experience working with our marine terminal operators and shipping lines on compliance with the At-Berth regulation, it is curious that CARB staff would not be receptive to

the Port’s know-how and operational concerns. Specifically, the Port is very concerned about the complex regime of TIEs and VIEs and the interplay with fleets that choose the Innovative Concepts route. For example, a terminal operator that has expended its TIE budget for the year would be incentivized to give more favorable berth assignments to ships on the TIE/VIE regime over ships on the fleet averaging regime. There are many foreseeable scenarios where a missed plug-in is not clearly the fault of the vessel owner or the terminal operator. How will CARB staff navigate these grey areas?

The Port recommends that CARB maintain the framework of the existing At-Berth Regulation for containerships.

### The Current At-Berth Regulation is Successful and Should be Maintained for Containerships

The current At-Berth Regulation has proven to be successful for containerships. The graph below shows the Port of Oakland’s shore power plug-in rate since 2014 for the regulated fleet.<sup>1</sup> This graph underscores the effectiveness of the current At-Berth Regulation.



Clearly, ships coming to the Port of Oakland consistently over-perform in terms of the required regulatory compliance plug-in rates. The temporary decline in plug-ins in Spring 2020 was due to the Port’s inability to perform vessel commissioning due to COVID-19, however the Port fully expects the plug-in percentages to rise since the Port resumed commissioning in May 2020.

CARB staff have given presentations indicating that the Innovative Concepts provision will allow for regulated vessel fleets to use fleet averaging methods to comply with the Proposed

<sup>1</sup> Steamships and infrequent callers not subject to the current regulation are not included in this graph.

Control Measure. However, that is not explicitly stated in the regulation language. The provision for fleet averaging to be used as an Innovative Concept must be included in the language of the regulation to give carriers certainty. Otherwise, CARB staff could change their mind about its acceptability. Further, the Innovative Concept rule has one single application deadline, December 1, 2021. Does that mean that fleets entering the California market in 2022 are not allowed to use fleet averaging? What about fleets that start using the TIE/VIE regime but then wish to switch to fleet averaging, would that be allowed? CARB needs to include certainty about fleet averaging, and a mechanism to allow it after December 1, 2021.

The Innovative Concept provision is a step in the right direction. But for simplicity's sake, if the current regime is already acceptable as an Innovative Concept, why not let the current regime stay in place? Why force the carriers to re-apply every five years for a proven method that is already working? The application process with public review is burdensome, the five-year limit injects uncertainty, and the one-time application deadline is an unfair barrier for future fleets.

The Port of Oakland recommends that CARB maintain the framework of the existing At-Berth Regulation for containerships. California's container shipping industry has successfully coalesced around this existing regulation, is complying well with the regulation and is achieving the desired compliance levels and air quality reduction outcomes.

## **Closing**

Lastly, the Port of Oakland reiterates that today's July 27, 2020, letter is the Port's seventh (7<sup>th</sup>) letter to CARB providing comments and expressing concerns about the Proposed Control Measure. The Port has expended considerable time and personnel resources combing through the proposed regulation and raising substantive concerns about many different aspects of the rule as well as the data upon which it is based.

To date, CARB staff have not provided written responses to the questions and comments posed in the Port of Oakland's first six letters. The Port has attached the previous six letters to today's letter, and specifically requests detailed responses to each of the questions raised in all the Port's letters. The Port believes that CARB's expressed intention to provide meaningful stakeholder engagement requires timely, substantive written responses to questions and comments made by the Port of Oakland and other stakeholders.

The Port of Oakland is fully engaged and committed to reducing at-berth emissions and increasing shore power usage. The Port firmly believes that California's container terminals can achieve the desired outcomes of the Proposed Control Measure without getting mired in an unnecessarily complicated new regulation that is analytically flawed and presents the potential for conflict among seaports, terminal operators and vessel owners and operators.

The Port of Oakland looks forward to working with CARB on the emissions inventory and associated analyses. Please contact Ms. Tracy Fidell, P.E., Port Associate Environmental Planner/Scientist at [tfidell@portoakland.com](mailto:tfidell@portoakland.com) with any follow-up questions and responses.

Sincerely,

Richard Sinkoff  
Director of Environmental Programs and Planning

CC:

Kristi McKenney, Chief Operating Officer  
Michele Heffes, Port Attorney  
Bryan Brandes, Maritime Director  
Matthew Davis, Director of Governmental Affairs

Attachments (Prior letters to CARB):

- 1) June 25, 2020 Port letter to CARB re: Comments for CARB Board Meeting on June 25, 2020, Agenda Item 20-6-4: Public Meeting to Hear an Informational Update on Control Measure for Ocean-Going Vessels at Berth
- 2) May 1, 2020 Port letter to CARB re: Comments on March 26, 2020 Notice of Availability of Modified Text for Proposed Control Measure for Ocean-Going Vessels at Berth (15-day changes)
- 3) December 2, 2019 Port letter to CARB re: Comments on October 15, 2019, Draft Proposed Control Measure for Ocean-Going Vessels at Berth and Supporting Documents
- 4) June 10, 2019 Port letter to CARB re: Comments on May 10, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents
- 5) February 15, 2019 Port letter to CARB re: Comments on *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor
- 6) January 31, 2019 Port letter to CARB re: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor



June 25, 2020

Ms. Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments for CARB Board Meeting on June 25, 2020, Agenda Item 20-6-4: Public Meeting to Hear an Informational Update on Control Measure for Ocean-Going Vessels At Berth

Dear Ms. Csondes:

The Port of Oakland (Port) appreciates the opportunity to comment on the Proposed Control Measure for Ocean-Going Vessels At Berth (Proposed Control Measure). The Port understands that the California Air Resources Board (CARB) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (current At-Berth Regulation), with the goal of having the new rule in place in 2021.

Briefly, the Port has the following comments:

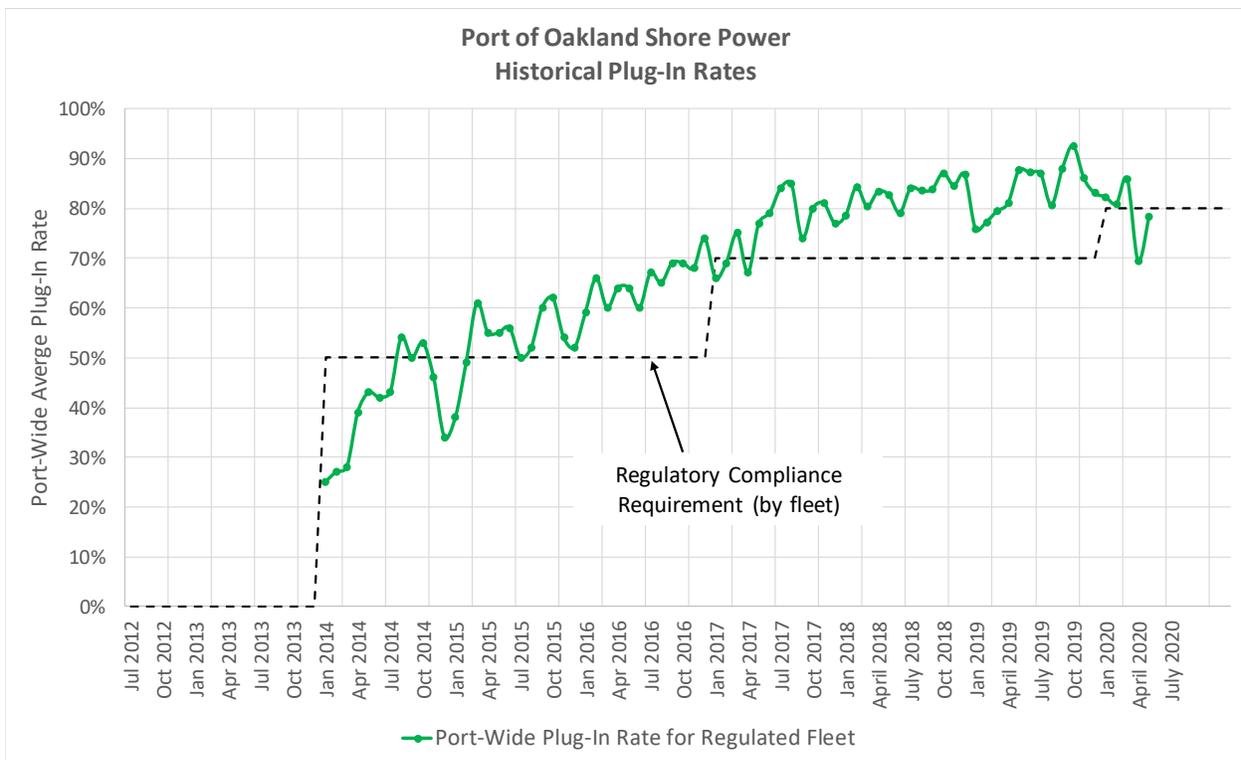
- The current at-berth regulation is successful and should be maintained for containerships
- The Port of Oakland has no feasible Alternative Compliance Method
- The foundational analysis for the Proposed Control Measure is flawed
- TIEs vs. VIEs create a potential for conflict

Before giving detailed comments on the regulation, the Port questions whether CARB's timeline for implementing the Proposed Control Measure is still appropriate and feasible. As CARB is aware, California and U.S. seaports and goods movement industry stakeholders are responding to an unprecedented global economic and public health crisis. The maritime industry, which includes California and U.S. seaports, is included within the transportation critical infrastructure sector defined by the Department of Homeland Security. The maritime industry, operating under extraordinarily challenging public health, safety and financial conditions due to the COVID-19

pandemic, has swiftly reprioritized and reallocated scarce personnel and financial resources to ensure the continuity of essential supply chain services to the public, communities, businesses and local, state and federal government agencies around the United States. It seems problematic and inattentive to these challenges for CARB to require California seaports, terminal operators, and shipping companies to divert their limited resources and attention to this rulemaking process and subsequent requirements when lives and jobs are at risk. We respectfully request that CARB place the rulemaking process on “pause” to allow the maritime industry to focus its resources and attention on the performance of its critical supply chain functions and services in response to the COVID-19 pandemic. CARB could use this time to refine the analysis that serves as the foundation for the Proposed Control Measure

**The Current At-Berth Regulation is Successful and Should be Maintained for Containerships**

The current At-Berth Regulation has proven to be successful for containerships. The graph below shows the Port of Oakland’s shore power plug-in rate since 2014 for the regulated fleet.<sup>1</sup> This graph underscores the effectiveness of the current At-Berth Regulation.



It is clear that ships coming to the Port of Oakland consistently over-perform in terms of the required regulatory compliance plug-in rates. The decline in plug-ins in April 2020 was due to

<sup>1</sup> Steamships and infrequent callers not subject to the current regulation are not included in this graph.

the Port's inability to perform vessel commissioning due to COVID-19, however the Port fully expects the plug-in percentages to rise since that the Port resumed commissioning in May 2020.

The Innovative Concepts provision provides a pathway "for regulated vessel fleets to continue using fleet averaging methods to comply with the Proposed Regulation." If the current regime is already acceptable as an Innovative Concept, why not let the current regime stay in place? Why force the carriers to re-apply every three years for a proven method that is already working? The application process with public review is burdensome and the three-year limit injects uncertainty.

The Port of Oakland recommends that CARB maintain the framework of the existing At-Berth Regulation for containerships. California's container shipping industry has successfully coalesced around this existing regulation, is complying well with the regulation and is achieving the desired compliance levels and air quality reduction outcomes.

### **The Port has No Feasible Alternative Compliance Method**

According to CARB's own analysis, the Port of Oakland has no feasible alternative compliance method at three out of four of its terminals (representing 83% of the Port's call volume). This means that carriers relying on a barge-mounted bonnet system for compliance at the San Pedro Bay Ports will not be able to call Oakland, where the only feasible compliance method is shore power. This puts the Port of Oakland at a substantial competitive and operational disadvantage, especially as compared to its competitor ports outside California in Tacoma, Seattle, Vancouver, and Prince Rupert. Diverting cargo to distant seaports leads to increased emissions, undermining the purpose of the regulation.

### **The Foundational Analysis for the Proposed Control Measure is Flawed**

The analysis that serves as the foundation for this rule both underestimates the efficacy of the current At-Berth Regulation *and* overstates the benefit of the Proposed Control Measure. The discrepancies listed below need to be addressed.

- a. The emissions benefit calculation caps the benefit of the current regulation at 80%. This is incorrect because it ignores demonstrated overcompliance due to 1) the provision requiring every vessel capable of plugging in to do so, 2) the long call durations at the San Pedro Bay Ports resulting in ~96% emission reductions, and 3) the fact that some infrequent callers are plugging in even though they are not required to do so.
- b. CARB's 2016 baseline data do not seem reliable. Comparing summaries by vessel class size to the Port of Oakland's own data (used for billing and subject to audit), the values are off by up to 40% in critical areas.
- c. As recognized by CARB staff, the assumed growth rate for the Port Oakland is too high. The inventory assumes a 5% compounded annual growth rate (CAGR) for the Port of Oakland, which CARB staff have agreed should be lowered to 2.2% to be in line with the recently finalized Bay Area Seaport Forecast (by Tioga Group for the San Francisco Bay Conservation and Development Commission, dated May 22,

2020). Considering the current COVID-19 crisis and the related documented decline in cargo throughput at California seaports, the 5% CAGR is highly speculative and unreliable at best and should not serve as the analytical basis to estimate projected emissions reductions and cost-effectiveness of the Proposed Control Measure.

CARB inventory staff have acknowledged these issues in a many phone calls and emails to Port of Oakland staff. CARB staff members have said that they will address these issues in Summer 2020, which is too late to make the required adjustments or revisions under the proposed rulemaking and adoption schedule.

The Port suggests that CARB take the time available now during the COVID-19 crisis to reassess its baseline data, compliance assumptions, and inventory calculations. The Port has kept meticulous shore power records and would be happy to share information and provide reliable data sets to CARB.

### **TIEs vs. VIEs and the Potential for Conflict**

The Port is concerned about the Proposed Control Measure's potential to create conflict and failure rather than collaboration among terminal operators, vessel operators and a local seaport. The Port of Oakland has expressed this concern in previous correspondence (i.e., letters submitted in the public record) to CARB. Specifically, the Port is very concerned that the proposed complex regime of TIEs and VIEs will lead to disputes, rather than collaboration, among terminal operators, vessel operators, and a local seaport. It is doubtful whether CARB enforcement staff possesses the necessary dispute resolution expertise to referee the foreseeable conflicts. Again, the Port of Oakland recommends that CARB maintain the framework of the existing At-Berth Regulation in place for containerships.

### **Closing**

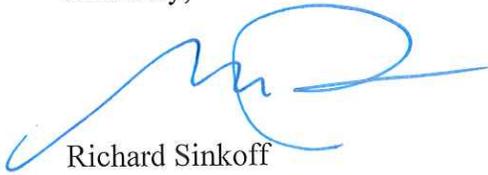
Lastly, the Port of Oakland notes that today's June 25, 2020, letter is the Port's sixth (6<sup>th</sup>) letter to CARB providing comments and expressing concerns regarding the Proposed Control Measure. (See attachments to this letter, below.) The Port has expended considerable time and personnel resources combing through the proposed regulation and raising substantive concerns and questions about many different details of the proposed regulation and the data upon which it is based.

To date, CARB staff have not provided written responses to the questions and comments posed in the Port of Oakland's first five letters. The Port has attached the previous five letters to today's letter, and specifically requests detailed responses to each of the questions raised in all the Port's letters. The Port believes that CARB's expressed intention to provide meaningful stakeholder engagement requires that CARB timely and diligently provide substantive written responses to questions raised and comments made by the Port of Oakland and other stakeholders.

The Port of Oakland is fully engaged and committed to reducing at-berth emissions and increasing shore power usage. The Port firmly believes that California seaports can achieve the desired outcomes of the existing shore power rule without getting mired in an unnecessarily complicated new regulation that is analytically flawed and presents the potential for conflict among seaports, terminal operators and vessel owners and operators.

The Port of Oakland looks forward to working with CARB on the emissions inventory and associated analyses. Please contact Ms. Tracy Fidell, P.E., Port Associate Environmental Planner/Scientist at tfidell@portoakland.com with any follow-up questions and responses.

Sincerely,



Richard Sinkoff  
Director of Environmental Programs and Planning

CC:

Kristi McKenney, Chief Operating Officer  
Michele Heffes, Port Attorney  
Bryan Brandes, Maritime Director  
Matthew Davis, Director of Governmental Affairs

Attachments (Prior letters to CARB):

- 1) May 1, 2020 Port letter to CARB re: Comments on March 26, 2020 Notice of Availability of Modified Text for Proposed Control Measure for Ocean-Going Vessels at Berth (15-day changes)
- 2) December 2, 2019 Port letter to CARB re: Comments on October 15, 2019, Draft Proposed Control Measure for Ocean-Going Vessels at Berth and Supporting Documents
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- 5) January 31, 2019 Port letter to CARB re: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor



May 1, 2020

Ms. Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on March 26, 2020 Notice of Availability of Modified Text for Proposed Control Measure for Ocean-Going Vessels at Berth (15-day changes)

Dear Ms. Csondes:

The Port of Oakland (Port) appreciates the opportunity to comment on the rulemaking materials posted March 26, 2020, for the Proposed Control Measure for Ocean-Going Vessels At Berth (Proposed Control Measure). The Port understands that the California Air Resources Board (CARB) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (current At-Berth Regulation), with the goal of having the new rule in place in 2021.

The Port of Oakland has a very successful shore power program, underscoring the effectiveness of the current At-Berth Regulation. In 2018, 83% of regulated vessel calls<sup>1</sup> at the Port of Oakland drew shore power, surpassing the regulatory requirement of 70% compliance. The plug-in rates at the Port of Oakland are increasing as more carriers retrofit their vessels for shore power. In 2019, the success rate for the regulated fleet was 84% and year to date for 2020, the rate is tracking at 83%. Once safety exemptions are taken into consideration, compliance is much higher, surpassing 90% at some berths.

Before listing comments on the regulation, the Port questions whether CARB's timeline for implementing the Proposed Control Measure is still appropriate and feasible. As CARB is aware, California and U.S. seaports and goods movement industry stakeholders are responding to an unprecedented global economic and public health crisis. The maritime industry, which

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<sup>1</sup> Steamships and infrequent callers (<25 calls/year) are exempt from the current regulation.

includes California and U.S. seaports, is included within the transportation critical infrastructure sector defined by the Department of Homeland Security. The maritime industry, operating under extraordinarily challenging public health, safety and financial conditions due to the COVID-19 pandemic, has swiftly reprioritized and reallocated scarce personnel and financial resources to ensure the continuity of essential supply chain services to the public, communities, businesses and local, state and federal government agencies around the United States. It seems problematic and inattentive to these challenges for CARB to require California seaports, terminal operators, and shipping companies to divert their limited resources and attention to this rulemaking process when lives and jobs are at risk, especially since many of the proposed measures are not due to take effect for several years. We respectfully request that CARB place the rulemaking process on “pause” to allow the maritime industry to focus its resources and attention on the performance of its critical supply chain functions and services in response to the COVID-19 pandemic.

### **Specific Comments and Questions on the Proposed Control Measure**

1. One of the Port of Oakland’s main concerns about the Proposed Control Measure is its potential to create conflict and failure rather than collaboration among terminal operators, vessel operators and a local seaport. The Port of Oakland has expressed this concern in previous correspondence to CARB (see attachments to this letter, below). Specifically, the proposed complex regime of TIEs and VIEs has the potential to lead to disputes, rather than collaboration, among terminal operators, vessel operators, and a local seaport. Similarly, the proposed requirement for each port to prepare a “Port plan” and agree upon a “division of responsibilities” between terminal operators and the local seaport adds another potential arena of conflict for each port and its terminal tenants. It is doubtful whether CARB enforcement staff possess the necessary dispute resolution expertise to referee the foreseeable conflicts. The Port of Oakland recommends that CARB maintain the framework of the existing At-Berth Regulation in place for containerships. California’s container shipping industry has successfully coalesced around this existing regulation and has demonstrated consistent overcompliance with the rule.
2. According to the 15-day changes, the Innovative Concepts provision provides a pathway “for regulated vessel fleets to continue using fleet averaging methods to comply with the Proposed Regulation.” If the current regime is already acceptable as an Innovative Concept, why not let the current regime stay in place? Why force the carriers to re-apply every three years for a proven method that is already working? The Port suggests that CARB allow current fleet averaging methods to stay in place for all carriers who desire it without the need to constantly re-apply every three years. The shipping industry thrives on certainty.
3. According to CARB’s own analysis, the Port of Oakland has no feasible alternative compliance method at three out of four of its terminals (representing 83% of the Port’s call volume). This means that carriers relying on a barge-mounted bonnet system for compliance at the San Pedro Bay Ports (SPBP) will not be able to call Oakland, where the only feasible compliance method is shore power. This puts the Port of Oakland at a real disadvantage, especially as compared to its competitor ports in Tacoma, Seattle, Vancouver, and Prince Rupert. Diverting cargo to distant seaports only serves to increase emissions, undermining the purpose of the regulation.

4. The inventory that serves as the foundation for this rule is flawed. It underestimates the efficacy of the current regulation and overstates the benefit of the Proposed Control Measure. The discrepancies listed below invalidate the conclusions of CARB's analysis.
  - a. CARB's 2016 baseline data do not seem reliable. Comparing summaries by vessel class size to the Port of Oakland's own data (used for billing and subject to audit), the values are off by up to 40% in critical areas.
  - b. The inventory calculation caps the benefit of the current regulation at 80%, which disregards current overcompliance primarily due to 1) the provision requiring every vessel capable of plugging in to do so, 2) the long call durations at the SPBP resulting in ~96% emission reductions, and 3) the fact that some infrequent callers are in fact plugging in even though they are not required to do so.
  - c. As recognized by CARB staff, the assumed growth rate for the Port Oakland is too high. The inventory assumes a 5% compounded annual growth rate (CAGR) for the Port of Oakland, which CARB staff have agreed should be lowered to 2.2%. Considering the current COVID-19 crisis and the related documented decline in cargo throughput at California seaports, it is evident that the 5% CAGR is speculative at best and should not serve as the analytical basis to estimate projected emissions reductions and cost-effectiveness of the Proposed Control Measure.

CARB inventory staff have acknowledged these issues in a variety of phone calls and emails to Port of Oakland staff. CARB staff members have said that they will address these issues in Summer 2020, which is obviously too late to make the required adjustments or revisions under the proposed rulemaking and adoption schedule.

The Port suggests that CARB take the time available now during the COVID-19 crisis to reassess its baseline data, compliance assumptions, and inventory calculations. The Port has kept meticulous shore power records and would be happy to share information and provide reliable data sets to CARB.

5. Lastly, the Port of Oakland notes that today's May 1, 2020, letter is the Port's fifth letter to CARB providing comments and expressing concerns regarding the Proposed Control Measure. (See attachments to this letter, below.) The Port has expended considerable time and personnel resources combing through the proposed regulation and raising substantive concerns and questions about many different details of the proposed regulation and the data upon which it is based. To date, CARB staff have not provided written responses to the questions and comments posed in the Port of Oakland's first four letters. The Port has attached the previous four letters to today's letter, and specifically requests detailed responses to each of the questions raised in all the Port's letters. The Port believes that CARB's intention to provide meaningful stakeholder engagement requires that CARB timely and diligently provide substantive written responses to questions raised and comments made by the Port of Oakland and other stakeholders.

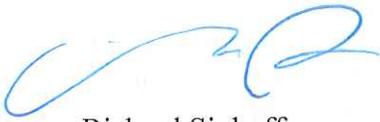
## **Closing**

The Port of Oakland appreciate the opportunity to review the 15-day changes to the Proposed Control Measure. As the Port of Oakland's maritime air quality policies and plans – Maritime

Air Quality Improvement Plan (2009) and Seaport Air Quality 2020 and Beyond Plan (2019) – emissions inventories, and shore power records and data show, among other policies and documents, the Port of Oakland is fully engaged and committed to reducing at-berth emissions and increasing shore-power usage. However, the Port believes that California seaports can achieve the desired outcomes of the existing shore power rule without getting mired in an unnecessarily complicated new regulation that is analytically flawed and presents the potential for conflict among seaports, terminal operators and vessel owners and operators.

The Port of Oakland looks forward to working with CARB on the emissions inventory and associated analyses. Please contact Tracy Fidell, P.E., Port Associate Environmental Planner/Scientist at [tfidell@portoakland.com](mailto:tfidell@portoakland.com) with any follow-up questions and responses.

Sincerely,



Richard Sinkoff  
Director of Environmental Programs and Planning

CC:

Kristi McKenney, Chief Operating Officer  
Michele Heffes, Port Attorney  
John Driscoll, Maritime Director  
Matthew Davis, Director of Governmental Affairs

Attachments (Prior letters to CARB):

- 1) June 10, 2019 Port letter to CARB re: Comments on May 10, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents
- 2) January 15, 2019 Port letter to CARB re: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor
- 3) February 15, 2019 Port letter to CARB re: Comments on *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor
- 4) December 2, 2019 Port letter to CARB re: Comments on October 15, 2019, Draft Proposed Control Measure for Ocean-Going Vessels at Berth and Supporting Documents



June 10, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on May 10, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the rulemaking materials posted May 10, 2019, for the Proposed Control Measure for Ocean-Going Vessels At Berth (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. On May 10, 2019, CARB posted the revised text of the Proposed Control Measure, and provided, as supporting documents, the presentation from the May 14 and May 16, 2019 public workshops, Cost Inputs and Assumptions in PDF format, and Cost Estimates in Excel format.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGVs”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting detailed information from marine terminal operators. The Port posts shore power usage statistics, reasons for equipped vessels not plugging in, and cost information on our shore power website: <https://www.oaklandseaport.com/development-programs/shore-power/>. In 2018, 75% of all calls to the Port drew shore power.

Public comments on the Proposed Control Measure are due to CARB June 10, 2019. Port staff understand CARB will then finalize the regulatory language and prepare an Initial Statement of

Reasons (“ISOR”) to release on October 18, 2019, with public comment on the ISOR closing on December 2, 2019. The CARB Governing Board is scheduled to hear the Proposed Control Measure on December 5, 2019. Do CARB staff intend to respond to public comment on the ISOR? Three days does not leave time for meaningful CARB response to public comment or public review of subsequent changes to the Proposed Control Measure. Port staff suggest a minimum of 14 days for CARB staff to review and respond to public comment, and for the public to review any changes, before the Proposed Control Measure can be heard.

The Proposed Control Measure includes the concept of an Incident Exemption, which is new since CARB published its draft Proposed Control Measure in August 2018. Vessel fleets would be granted Vessel Incident Exemptions (VIEs) and terminals would be granted Terminal Incident Exemptions (TIEs). Starting in 2021 for container ships and terminals, VIEs and TIEs would be granted at levels of 5% of the previous calendar year’s calls. CARB stated at the May 14, 2019, public workshop that the expected plug-in level for the container fleet is 90% in 2021.

Port staff submit the following comments and questions, divided into the topic areas of the draft regulatory text of the Proposed Control Measure, the presentation from the May 14, 2019 and May 16, 2019 public workshops, and the Cost Inputs and Assumptions in PDF format.

### **Comments and Questions on the Draft Regulatory Text of the Proposed Control Measure**

1. Port staff request clarification on the definition of “necessary infrastructure...that will enable a terminal to comply with this Control Measure” in Section 93130.10(b) of the Proposed Control Measure and what, in this context, “subject to verification by [CARB] enforcement staff” means. From Table XI Berth and Terminal Counts, Anticipated Infrastructure Needs, and Unique Vessels of the CARB Cost Inputs and Assumptions in PDF format, it appears that CARB believes that three new shore power vaults “would be installed in response to the Draft Regulation [Proposed Control Measure]...” at the Port. Accordingly Port staff request documentation supporting CARB staff’s berth-by-berth infrastructure analysis and determination that three new shore power vaults would be required at the Port in response to the Proposed Control Measure.
2. Regarding the Terminal and Port Plans required for Container terminals in Section 93130.11 of the Proposed Control Measure, the deadline of June 1, 2020 does not allow for sufficient time after the anticipated adoption of the Proposed Control Measure for ports and terminals to submit plans. Port staff object to the text in Section 93130.11(a) that “[a]s an alternative, Ports may submit plans for their terminal operators.” Ports should not be expected to submit plans for terminal operators. In addition, the statement in Section 93130.10(b) of the Proposed Control Measure that “Ports should use terminal plans as [the] basis for developing port plans” seems to indicate that the deadline for Port Plans should be adjusted to come after the deadline for Terminal Plans.
3. The definition of “Fleet” in Section 93130.2(b)(22) of the Proposed Control Measure does not explain how fleets will be established. What will CARB require at the beginning

of each compliance year to establish fleets? Will this be part of the online Freight Regulations Reporting System (“FRRS”) mentioned in the presentation from the May 14, 2019 and May 16, 2019 public workshops?

Port staff request an initial accommodation for new fleets entering the California market. New entrants should be given an opportunity to estimate the coming year’s ship calls and estimate the number of VIEs to be awarded for the coming year.

The definition of Fleet and the requirements for VIEs also need to be responsive to changes in the shipping industry, for example when businesses merge or alliances change. Likewise, CARB should clarify what provisions will accommodate changes in the terminal industry, such as new terminals or changes in ownership, in the allocation of TIEs.

4. Port staff have two comments regarding vessel commissioning. Port staff request that vessel commissioning events that do not successfully connect to shore power as discussed in Section 93130.7(f)(2) of the Proposed Control Measure be considered eligible for exceptions under the regulation. The commissioning attempt shows that the goal was to reduce emissions through shore power and as such an Exception should be available to operators in this situation. Port staff conduct each vessel commissioning (with the exception of those at the Matson Terminal) to ensure the safety of the vessel, terminal, and workforce. Vessel commissioning is an invaluable safety procedure and should not be penalized under the Proposed Control Measure.

Port staff request that the definition of “Vessel Commissioning” in Section 93130.2(b)(61) of the Proposed Control Measure be expanded to include the case in which the port authority is the commissioning agent, as is the case at the Port of Oakland. Likewise, in Section 93130.7(d)(1) (“If applicable, commission vessel as required by terminal operator”), Section 93130.8(a)(4) (“It is the terminal operator’s responsibility to commission vessels equipped with shore power”), and Section 93130.8(d)(1) (“If applicable, commission vessel for use of shore power”), the commissioning requirement should be determined by the port authority or the terminal operator.

5. The reduction in VIEs and TIEs for Container, Reefer, and Passenger vessels from 5% each to 3% each discussed in Sections 93130.7(g)(1)(A)(ii) and 93130.8(h)(1)(A)(ii) of the Proposed Control Measure serves to increase the usage of the Remediation Fund [Section 93130.12(a)] in and after 2023. Port staff request further information from CARB on when and where the Remediation Fund will be deployed, given that CARB anticipates zero-emissions regulation on trucks, transport refrigeration units, forklifts, and cargo-handling equipment in the time frame of enhanced usage of the Remediation Fund, making those categories ineligible for incentive-funded emissions reductions.

6. The allotted VIEs and TIEs for vessels other than Container, Reefer, and Passenger vessels in Sections 93130.7(g)(1)(A) and 93130.8(h)(1)(A) of the Proposed Control Measure reduce from 5% to 3% after only one year. Port staff note that at the advent of the ATCM, the requirement was 50% of all calls in the first year. An initial expectation of 90% usage does not accommodate the fact that the Proposed Control Measure is the first-of-its-kind requirement for Ro-Ro and Tanker vessels in the world, and the technologies and equipment required do not exist at this time and have not been tested.
7. Regarding the Remediation Fund described in Section 93130.12 of the Proposed Control Measure, what is the procedure and timeline for CARB to approve a public entity to manage the funds generated at the Port?
8. Port staff request clarification from CARB of what constitutes a failure to achieve “full emission reductions” as referenced in Section 93130.12(a)(3) of the Proposed Control Measure, regarding when the Remediation Fund may be used.
9. In response to the suggestion in Section 93130.8(a)(2) of the Proposed Control Measure that a terminal operator should be responsible to interrupt a vessel call to shift the vessel to a berth with shore power if no berth was previously available, Port staff request CARB prepare and share an analysis of harbor craft emissions associated with such a shift at each port. Second to OGV, harbor craft are the second-highest emitting sources of emissions in the Port’s 2017 Emissions Inventory. Given the short duration of the average vessel call to the Port, the suggestion to call additional harbor craft to reduce the remaining hours of an OGV call’s auxiliary emissions could lead to increased overall emissions.
10. Likewise, Port staff question if the suggestion in Section 93130.8(a)(3) of the Proposed Control Measure that a terminal operator should be responsible to provide an alternative CARB-approved emission control strategy if a commissioned shore power vessel is berthed such that it cannot connect to shore power is necessary. CARB’s own analysis in the Cost Inputs and Assumptions in PDF format, Table XI, declares that no barge-based capture and control system is anticipated for the Port.
11. Port staff note that the “power meter readings at the time of shore power connection and disconnection” requested in Section 93130.8(e)(2)(C) of the Proposed Control Measure are typically not available within 7 calendar days of a vessel’s departure, as anticipated by CARB. Power meter readings at the Port are typically available at the close of the calendar month and not sooner.
12. In Section 93130.1 of the Proposed Control Measure, the stated intent of the Proposed Control Measure is “to ensure that operators of ocean-going vessels reduce emissions using a California Air Resources Board (CARB) approved emission control strategy to reduce PM, NOx, and ROG emissions at berth without increasing overall GHG emissions from this Control Measure...” How will CARB monitor GHG emissions after

implementation of the Proposed Control Measure and what is the GHG emissions baseline?

### **Comments and Questions on the presentation from the May 14, 2019 and May 16, 2019 public workshops**

13. On Slide 4 of the presentation for the May 14, 2019 and May 16, 2019, public workshops, CARB staff show OGV at-berth emissions for the entire state. Port staff request to see these emissions totals further tabulated both by port or marine terminal and by vessel type. This is especially important as, per Section 93130.7(g)(2) of the Proposed Control Measure, VIEs are specific to the Fleet-Port pairing they are granted to.
14. On Slides 5 and 29 of the presentation for the May 14, 2019 and May 16, 2019 public workshops, CARB staff show a table of cost effectiveness for this rulemaking. The Port provides specific comments on the cost estimates below. Port staff request to see the total cost estimates and cost effectiveness estimates further tabulated both by port and by vessel type.

### **Comments and Questions on the Cost Inputs and Assumptions in PDF format**

15. In Table V. Auxiliary Engine Effective Power Values, CARB states that it is relying on “the same power values cited in Table 7 of the emission inventory methodology <https://ww3.arb.ca.gov/msei/ordiesel/draft2019ogvinv.pdf>. Values used in cost analysis for container/reefer and tanker vessels are calculated as one kW-average per vessel type, weighted by average vessel kW at each port/terminal and vessel visits to each port/terminal.”

As noted in the Port’s February 15, 2019 letter to CARB regarding the emissions inventory, the emissions inventory relies on the assumption that container vessel effective power is a function of vessel size bin. Will this assumption in the emissions inventory be modified to align with the cost estimate?

16. In Table VI. Duration of Emission Control at Berth, CARB shows that it is estimating statewide emissions reductions based on average duration of emission control at berth per vessel visit. The Port requests an emissions and cost analysis specific to each port or marine terminal and each vessel type. The stated average Container/Reefer duration of emission control at berth of 38.8 hours is about twice the average time for shore power connections at the Port. The difference between Port data and the average shows that the statewide average is not meaningful for the Port, and the conclusions of the averaging analysis may not apply to the Port.
17. Table VIII. Electricity and Fuel Cost Inputs and the associated Cost Estimates in Excel format show that CARB expects 100% of any Low Carbon Fuel Standard (“LCFS”) credits would be reinvested into shore power. It is not guaranteed that the credits would

all be reinvested into shore power. What assumptions did CARB staff make in projecting the LCFS credit value through 2032?

18. Related to the duration of emission control at berth in Table VI, Port staff would like to reiterate that shore power usage at the Port is billed based on hours of use, not kWh drawn. This affects the assumptions in Table VIII. Electricity and Fuel Cost Inputs, as well. While the cost of Pacific Gas & Electric electricity is relevant to the Matson Terminal and the overall discussion of electricity costs, the Port is the utility serving shore power at all but the Matson Terminal.
19. The growth assumptions in Table IX. Growth Factors overestimate actual TEU growth for the Port between 2016 and 2018 and continue to use a 3.9% compound annual TEU growth rate between 2018 and 2032. Port staff request that in addition to this high estimate of TEU growth, CARB prepare an estimate of emissions using a realistic growth estimate. For reference, the Port's CAGR between 2008 and 2018 was 0.4%. Port staff understand that the growth estimates CARB is using for emissions and costs for the Port will align with the vessel fleet projections (such as larger vessels each year) that are being used for the Ports of Long Beach and Los Angeles.
20. Port staff note that the cost of compliance with the existing At-Berth Regulation is high and requires frequent vessel retrofits. In 2018, the Port commissioned or re-commissioned nearly 100 vessels, or about 25% of the ever-commissioned vessel list. The ongoing costs of retrofitting vessels when the line rotation changes, maintaining vessel equipment, and commissioning vessels with the current At-Berth Regulation apply equally to comply with the Proposed Control Measure and should be included in the cost estimates as they are real and necessary costs of compliance with the Proposed Control Measure. The Proposed Control Measure is not additive and incremental to the At-Berth Regulation, but rather a replacement and as such the entire cost to comply with the Proposed Control Measure needs to be factored into the cost effectiveness.

## **Closing**

Port staff appreciate the opportunity to review the Proposed Control Measure and attend the public workshop on May 14, 2019. We look forward to working with CARB on refinements to improve the Proposed Control Measure, emissions inventory, and associated analyses.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,



Colleen Liang, Port Environmental Supervisor, for

**Richard Sinkoff**

Director of Environmental Programs and Planning

Enclosures: January 15, 2019 Port letter to ARB re: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

February 15, 2019 Port letter to ARB re: Comments on *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor



February 15, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* posted January 15, 2019, for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. CARB posted the text of the Proposed Control Measure on August 31, 2018. The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* was prepared in support of the Proposed Control Measure.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGVs”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting detailed information from marine terminal operators and posting that information on the Port’s website for public information purposes.<sup>1</sup>

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<sup>1</sup> <https://www.oaklandseaport.com/development-programs/shore-power/>

The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* document includes emissions from California ports and CARB-defined Marine Terminal Complexes (“MTCs”). The emissions for 2016 are tabulated in Appendix B, while emissions for other years are only represented graphically in figures in the document and in tables published by CARB on November 9, 2018.

Comments on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* are due to CARB February 15, 2019. CARB will then host a public workshop to discuss the emissions on February 26, 2019. After that, Port staff anticipate the need for a revised emissions inventory for the Proposed Control Measure that responds to public comments. The Port provides wharfinger information to CARB annually as required by grant funding obligations. In addition, Port staff request that CARB staff work with the Port to refine assumptions made in the emissions estimates.

Given the scheduling of the public workshop after the public comment period has closed, this letter includes comments and questions that may best be addressed in the workshop. Thus, the Port is providing a list of comments and questions on the draft emissions inventory and topics for discussion at the February 26 public workshop.

**Comments and Questions on the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results***

1. Why was 2016 selected as the baseline calendar year for the emissions inventory? Does CARB plan to conduct in-depth emissions inventories for 2017 and 2018?
2. Table 4 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* shows vessel visit counts to California ports and MTCs in 2016 only. However, current trends are for fewer calls by larger vessels for a given amount of containerized cargo. The discussion on page 25 of the draft clarifies that “vessel practice changes” are not considered, even as the total number of calls is dropping in real time. Since 2013, total annual calls to the Port have been decreasing. Container cargo throughput is thus decoupled from vessel call activity. CARB should expand the vessel growth forecasting for the baseline scenario to include the effects of larger vessels and fewer calls for the same amount of containerized cargo.
3. Table 7 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* relies on the assumption that for all ports and MTCs, container vessel effective power will match that of the Ports of Los Angeles and Long Beach in 2016. The effective power does not appear to be a function of vessel size bin, so the level of detail with which the effective power is classified by CARB-defined size bin is not appropriate. In addition, given the variation between data from the Port of Los Angeles and the Port of Long Beach within the same CARB-defined size bin, the data may not be meaningful when averaged by CARB-defined size bin. CARB should use an average effective power for container vessels regardless of size.

4. The growth rates in the Freight Analysis Framework (“FAF”) for ports and MTCs outside of the San Pedro Bay are at odds with current trends. The FAF assumption for container cargo at the Port of Oakland is a 5% year-over-year growth rate between 2016 and 2020. Actual growth rates between 2016 and 2018 have not kept pace, with current Oakland planning documents estimating about half the FAF compound annual growth rate.<sup>2</sup> CARB should adjust the FAF growth forecasting for the baseline scenario to align with actual trends.
5. Page 27 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* discusses statistical significance in the context of the emission forecasting. If CARB staff have conducted an uncertainties analysis, it should be included in the methodology and results document.
6. Table 15 of the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* does not treat all ports and vessel types equally when assuming “Projected 2020 and Later Time on Shorepower,” without justifying the differences. For instance, CARB assumes container vessels at the Port of Hueneme spend 80% of their time on shore power after 2020, while CARB assumes at the Ports of Los Angeles and Long Beach container vessels spend only 65% of their time on shore power. Impossibly, CARB-defined size bins 7, 9, and 12 container vessels at the Port of Oakland are assumed to spend 100% of their time at berth on shore power.<sup>3</sup> Port staff request further justification for and synchronization of the assumptions for “Projected 2020 and Later Time on Shorepower.”
7. In the discussion of the “static age distribution model” versus a survival and turnover model, CARB staff do not consider the abnormally high number of OGV keels laid in 2015. How did CARB decide that the spike in keels laid in 2015 was not material to estimating NOx emissions through 2050?
8. CARB should revise its assumption that sulfur content in fuel is 0.1% based on the results of enforcement analyses of in-use fuel sulfur. The sulfur content of in-use fuel as sampled by the CARB enforcement team in calendar years 2017 and 2018 is lower than 0.1% by 30% and almost 50%, respectively, presenting information that actual emissions are lower than those estimated by CARB. (As stated on page 12, information from CARB’s enforcement team is already used to determine reduced emissions from reduced engine activity time.)

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<sup>2</sup> <https://www.portfoakland.com/community/environmental-stewardship/maritime-air-quality-improvement-plan/>

<sup>3</sup> Vessels arriving at berth need time to tie lines and lower gangways before they can connect shore power and likewise vessels need time to disconnect from shore power when leaving the berth. With these bookends on each vessel call, a vessel cannot be plugged into shore power for 100% of the time at berth.

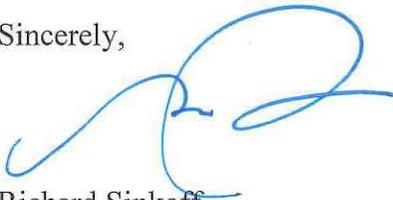
9. CARB should elaborate in the text on the Particulate Matter (“PM”) emission factor for Marine Gas Oil (“MGO”) at 0.1% sulfur. The 2007 Initial Statement of Reasons for At-Berth Regulation rulemaking used a value of 0.25 g/kW-hr for 0.1% S MGO. The *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* uses a PM emission factor of 0.18 g/kW-hr for the same fuel. The root source for OGV auxiliary engine emission factors is stated in both cases as the 2002 Entec study, with no description of why two different values of PM emission factors are used for the same fuel.
10. Please add References to the Table of Contents and to the document (Sources of emission factor information are only included at the end of Appendix A).
11. On page 42, should the last sentence read “it excludes emissions from boilers,” not “it excludes emissions from auxiliary engines”?

### Closing

Port staff look forward to working with CARB to support the updated emissions inventories referred to in the *Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* after the workshop on February 26.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,



Richard Sinkoff  
Director of Environmental Programs and Planning



January 31, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

Subject: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the Preliminary Draft HRA posted November 5, 2018, for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) is planning for the Proposed Control Measure to replace the current Airborne Toxic Control Measure (“ATCM”) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the “At-Berth Regulation”), with the goal of taking the Proposed Control Measure to the CARB Governing Board in December 2019. CARB posted the text of the Proposed Control Measure on August 31, 2018. The November 5, 2018, Preliminary Draft HRA and associated air dispersion modeling files that CARB released December 14, 2018, were prepared in support of the Proposed Control Measure.

The Preliminary Health Analyses document contains two types of assessment, 1) an HRA using air dispersion modeling and impacts estimation guidance from the California Environmental Protection Agency Office of Environmental Health Hazard Assessment (“OEHHA”) and 2) an Incidents per Ton (“IPT”) analysis.

The Port supports CARB’s ongoing efforts to reduce emissions from ocean-going vessels (“OGV”) at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff also track shore power usage in real time, collecting

detailed information from marine terminal operators and posting that information on the Port's web site for public information purposes.<sup>1</sup>

**The key input to the Preliminary Draft HRA is the estimated emissions from vessels at berth, which are not yet final. Emissions estimates need to be final and the Preliminary Draft HRA updated before the Preliminary Draft HRA results can be used.**

CARB conducted two HRAs addressing only the Ports of Long Beach and Los Angeles together and the Richmond Complex. CARB's use of AERMOD and the 2015 OEHHA Risk Assessment Guidelines for HRAs represents current best practices. However, the robustness of the findings is limited by the emissions estimates. Emissions estimates are typically completed before the HRA but in this case are open for public comment and discussion through the end of February 2019, at which point they may be refined.

The air dispersion model AERMOD, which CARB selected for the Preliminary Draft HRA is the preferred model from the US Environmental Protection Agency. Required inputs to AERMOD include meteorological data, emissions information for each pollutant considered, and exhaust parameters for release points. Of these inputs, the estimated emissions are key, since emissions have a direct linear relationship with the estimated ambient concentrations and health impacts from each source.

On November 5, 2018, CARB posted the Preliminary Draft HRA. CARB then posted a hard-coded spreadsheet of "Draft At Berth Emissions Estimates" used in the Preliminary Draft HRA on November 9, 2018, and air dispersion modeling files in mid-December with a public comment period for the Preliminary Draft HRA closing January 31, 2019.

CARB also posted the "Draft: 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results"—for the emissions that were entered into the Preliminary Draft HRA—on January 16, 2019, with a separate public comment period for the emissions methodology and results closing February 16, 2019.

Without greater understanding of the emissions used as data inputs to the air dispersion model and risk estimation calculations, the utility of the Preliminary Draft HRA is limited. Port staff are reviewing the emissions methodology released on January 16, 2019, and are comparing it with the spreadsheet posted November 9, 2018. Port staff look forward to discussing the emissions with CARB staff at the public workshop CARB scheduled for February 26, 2019. After that, Port staff anticipate the need for a revised HRA for the Proposed Control Measure that relies on emissions that have been reviewed and understood by all parties.

The AERMOD input and output files and risk estimation databases CARB provided on December 14, 2018, appear to carry out the methodology discussed in the Draft Preliminary HRA, but further review is not warranted until emissions are finalized. In addition to the

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<sup>1</sup> <https://www.oaklandseaport.com/development-programs/shore-power/>

wharfinger information provided by the Port to CARB annually as required by grant funding obligations, Port staff are happy to work with CARB staff to refine assumptions made in the emissions estimates.

**The role of the Preliminary Draft HRA posted November 5, 2018, in rulemaking for the Proposed Control Measure is not clear.**

The Proposed Control Measure is not an ATCM, in fact its stated purpose is to reduce NO<sub>x</sub>, PM, and GHG but not the toxic air contaminant DPM—which is the focus of the Preliminary Draft HRA. The inclusion of an HRA for any of the ports in California is therefore not a fundamental driver of the Proposed Control Measure (leaving the CARB Governing Board direction, Mobile Source Strategy, and Sustainable Freight Action Plan as drivers). Thus, any reductions in risk shown in the Preliminary Draft HRA are purely informational. Indeed, CARB’s elimination of the At-Berth Regulation ATCM by focusing on a Proposed Control Measure for NO<sub>x</sub> and PM but not DPM seems to imply that no further risk reductions are required.

The Preliminary Health Analyses report announces that the risk reductions of the Proposed Control Measure are “significant,” a term defined in the California Environmental Quality Act (“CEQA”) and used in CARB’s Certified Regulatory Program, but not defined in the CARB rulemaking process. While CARB staff present the percentage of reduction in risk of the Proposed Control Measure over the current At-Berth Regulation, the total residual risk should be compared to that of other source categories to prioritize the need for the Proposed Control Measure.

**Health impacts from Criteria Air Pollutants are managed through SIP Planning, which does not require a new Proposed Control Measure for the container fleet.**

PM<sub>2.5</sub> is a criteria air pollutant, not a toxic air contaminant, and the California Ambient Air Quality Standards (“CAAQS”) and National Ambient Air Quality Standards (“NAAQS”) are the appropriate health-protective standards for PM<sub>2.5</sub>. Regional ambient air concentrations of PM<sub>2.5</sub> are managed to levels below the CAAQS and NAAQS through SIP planning. Even so, CARB’s Mobile Source Strategy calls for an evaluation of emissions reductions from currently unregulated fleets, not the already regulated container fleet which calls Oakland. Thus, SIP planning for PM<sub>2.5</sub> attainment does not mandate an amended At-Berth Regulation to reduce statewide emissions through an “every vessel, every visit” control strategy like CARB staff have proposed.

**The Incidents Per Ton (“IPT”) methodology presented for PM<sub>2.5</sub>, a criteria air pollutant, is not a cost effectiveness metric.**

The IPT methodology provides information on health effects assuming ambient PM<sub>2.5</sub> concentration is the sole contributor to adverse health effects, with a direct linear relationship. The IPT methodology is not, however, part of a cost-effectiveness evaluation. CARB released a “Preliminary Cost Information” document in August 2018 as part of this rulemaking effort,

which relies on the same assumptions as the emissions inventory (which, as discussed above, may need refinement). The preliminary costs data evaluated total costs of the Proposed Control Measure, but not cost effectiveness of proposed measures calculated in terms of cost per ton of emissions removed. CARB has also not yet prepared a socio-economic impact analysis of the proposed rule.

**Closing**

Port staff are interested in working with CARB to improve the current ATCM focused on DPM to allow for 100% compliance. We look forward to seeing enhanced supporting documentation for the CARB emissions estimates and a revised HRA and cost effectiveness analysis once the emissions are updated.

Please contact Catherine Mukai, P.E., Port Associate Environmental Planner/Scientist at [cmukai@portoakland.com](mailto:cmukai@portoakland.com) with any follow-up questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Richard Sinkoff", with a stylized flourish at the end.

Richard Sinkoff  
Director of Environmental Programs and Planning



December 2, 2019

Angela Csondes  
Manager, Marine Strategies Section  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815  
Submitted Via Electronic Comment Log

**Subject: Comments on October 15, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents**

Dear Ms. Csondes:

The Port of Oakland (“Port”) appreciates the opportunity to comment on the rulemaking materials posted October 15, 2019, for the Proposed Control Measure for Ocean-Going Vessels At Berth (“Proposed Control Measure”). The Port understands that the California Air Resources Board (“CARB”) plans to replace the current Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At Berth in a California Port (the current “At-Berth Regulation”) with the Proposed Control Measure, with the goal of taking the Proposed Control Measure to the CARB Governing Board on December 5, 2019 at a special meeting to be held in West Oakland. The Port understands that the CARB Governing Board will not vote on the Proposed Control Measure on December 5, 2019, and that comments are due December 9, 2019.

The Port fully supports CARB’s efforts to reduce emissions from ocean-going vessels at berth and is working diligently to maximize the number of vessel visits using shore power. Port staff work collaboratively with shipping lines to provide education and resources about the shore power program. Port staff track shore power usage in real time, collecting detailed information from marine terminal operators. The Port regularly posts up-to-date shore power usage statistics, reasons for vessels not plugging in, and cost information on the Port’s shore power website: <https://www.oaklandseaport.com/development-programs/shore-power/>.

In 2018, 75% of all vessel calls at the Port of Oakland drew shore power (the number for all vessel calls includes steamships and “infrequent callers” which are both exempt from the current At-Berth Regulation), which surpassed the regulatory requirement of 70% compliance. The plug-in rates at the Port of Oakland continue to increase. For example, in October 2019, 100% of vessels

that were equipped with shore power plugged in and 83% of all vessel calls plugged in. This was the third time in 2019 and the second consecutive month where shore power plug-in rates were above 80%. For 2019, the year-to-date average, including October 2019, was 76%.

The Port has commented on previous drafts of the Proposed Control Measure and various supporting documents, and those previous comment letters are enclosed with this comment letter. The Port appreciates CARB's consideration of its past comments and sets forth its new and continuing comments and concerns below.

### **Comments on Emissions Inventory**

The Port has reviewed Appendix H: 2019 Update to Inventory for Ocean-Going Vessels at Berth: Methodology and Results. This inventory is extremely important, as it lays the foundation for the need for, and cost-effectiveness of, the Proposed Control Measure.

The Port appreciates all the hard work that went into the inventory, and the willingness of CARB staff to attempt to explain their methodology. At the same time, Port staff (along with other public seaport authorities and shipping partners that operate in the State) have struggled to understand the inventory results and implications for both Oakland and the State as a whole. Based on the collective feedback that has been received from stakeholders, CARB staff continues to revisit the baseline and forecasted emissions assumptions with updated calculations and results even as this Proposed Control Measure is being put before the CARB Governing Board. In other words, the methodology and analysis upon which the Proposed Control Measure is based, are still in flux.

To highlight just one particularly notable example, the 2020 estimated total hours at berth divided by typical call durations by vessel size indicate that there will be 2,580 calls for the Port of Oakland in 2020, which is a dramatic departure and increase (a deviation of over 40%) from observed operational realities and shipping trends. For context, the Port of Oakland had 1,175 calls in the first 10 months of 2019, 1,543 calls in 2018, and 1,598 calls in 2017. The same calculation applied to CARB values for the Ports of Los Angeles and Long Beach predicts 2,405 calls in 2020, which means Oakland would see 175 more calls than the Ports of Los Angeles and Long Beach combined. Such an order of magnitude difference has implications for evaluating the effectiveness and potential impact of the Proposed Control Measure and any marginal benefits that could be achieved by it.

Port staff compared the 2016 baseline values used by CARB in the inventory to 2016 actual values recorded at the Port. It appears that CARB's 2016 values for total time at berth are about 8% higher than actual, and that CARB's estimates for average power by ship size (which were derived from values at the ports of Los Angeles and Long Beach) are about 9% higher than actual for Oakland. Additionally, it seems that CARB has underestimated the total activity for the regulated fleet in 2016 by about 11%, which makes it appear that the Proposed Control Measure overestimates projected reductions. These over- and under-estimates do not balance out. In fact, they lead to further discrepancies which are compounded by CARB's assumed 21.5% growth rate which is applied equally across all vessel size bins. The Port understands that this growth rate was

developed from the Federal Highway Administration’s Freight Analysis Framework and requests that CARB explain how this growth rate applies to hours at berth, cargo volumes, emissions, ship calls, and cost.

The Port appreciates CARB staff’s recent acknowledgment that the cargo growth rate for Oakland needs to be adjusted. Port staff and CARB staff have had multiple discussions about the growth rate issue, and the Port understands that CARB will consider instead the Oakland-specific cargo forecast commissioned by the Bay Conservation and Development Commission (“BCDC”)<sup>1</sup>. This will lower the forecasted annual growth rate for Oakland from ~4.6% to a more realistic, but still high, forecast of 2.2%. For reference, the Port’s historical compounded annual growth rate from fiscal year 2008 to fiscal year 2018 was 0.4%.<sup>2</sup>

We look forward to evaluating the results and implications of these revised forecasts when the technical work is presented at a future date by CARB staff. The Port seeks assurance that no CARB vote will proceed until the emission reduction estimates reflect more realistic growth rates, for example as provided in the BCDC report.

The Port appreciates CARB staff’s willingness to apply an “efficiency factor” that acknowledges efficiency gains produced by moving more cargo on fewer, larger ships. One point of caution is that the layering of percentages makes it extremely difficult to follow the logic and relate CARB’s forecasted activity and emissions to any real-world metrics. Small errors and invalid assumptions with an initial set of data points can be magnified as these results are extrapolated into later forecast years, which lead to unrealistic and unreliable conclusions. The Port understands the complexity of the task, but a regulation as important and expensive as the one being proposed needs to be based on data that can be fact-checked, and must include forecasts that are grounded in factual operational data.

As an alternative, the Port of Oakland prefers and requests that CARB re-evaluate the inventory using 2016 baseline values provided by the Port and a Port-specific growth forecast. The Port further requests that the forecast activity levels be related to ship calls, which can be readily understood by all ports, regulatory agency staff as well as by the public. This would be consistent with how the Port tracks shore power usage and compliance. Lastly, and most importantly, the Port asks that these changes be made and the inventory fully peer-reviewed before the CARB Governing Board contemplates further action on the Proposed Control Measure.

### **Broad Concerns about the Proposed Control Measure**

The Port is extremely concerned that the Proposed Control Measure adds a substantial additional regulatory burden and cost to carriers and terminals that are already achieving high levels of plug-ins and emissions reductions. As the Port has discussed with CARB previously along with other California seaports, CARB could achieve more cost-effective emissions reductions from other source categories. In fact, during a conference call with CARB staff on Friday, November 22,

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<sup>1</sup> BCDC is currently amending its Seaport Plan for the San Francisco Bay Area.

<sup>2</sup> From Budget and Finance report at May 23, 2019 Port Board Meeting (File ID 098-19), slide 6.

2019, the Port joined its sister ports in proposing potentially preferred emissions reductions project alternatives based upon readily available specific equipment replacements, which will result in a significant reduction of emissions.

A second broad concern is that the Port of Oakland would be disadvantaged under the Proposed Control Measure because it does not have the option of a CARB approved emission control strategy (“CAECS”) other than shore power. As CARB itself found, the Port of Oakland cannot use a barge-based capture and control (“C+C”) method at three of its four terminals “due to concerns expressed from SF Bar Pilots about wave interaction from passing vessels and channel space and navigational constraints.” (See Appendix E: *Berth Analysis*.) The three terminals cited in CARB’s Appendix E (Everport, Matson, and OICT) account for over 83% of the Port’s call volume.

To elaborate, the potential negative impact to the Port and its carriers, tenants, and the community from the Proposed Control Measure is foreseeable. It is well established that almost every vessel calling Oakland also calls the ports of Los Angeles and Long Beach. Unlike Oakland, the ports of Los Angeles and Long Beach can use a barge-based C+C strategy. What will happen if carriers rely on a barge for compliance at the ports of Los Angeles and Long Beach, and then come to Oakland where a barge is not possible? The Port is very concerned that carriers may bypass Oakland if the Proposed Control Measure is enacted as currently written. Oakland has no feasible C+C alternative<sup>3</sup>, which could put the Port of Oakland at a serious competitive disadvantage.

To address the fact that a barge-based C+C will not work in Oakland, the Port requests that CARB grant Oakland exemptions corresponding to the number of calls that rely on barge-based C+C in Southern California.

As a third concern, the Port understands that the Proposed Control Measure anticipates other emission control strategies such as a land-based C+C system. However, the Port is concerned that landside emissions control approaches were never contemplated for use in the container fleets, have not been analyzed by CARB staff for use in the container shipping trades, and by CARB’s own analysis can result in an increase in greenhouse gas emissions<sup>4</sup>, which would seem to be an unacceptable outcome given the purpose and intent of this rulemaking.

The Port’s fourth concern is the introduction of shared responsibility which potentially creates conflict among vessels, terminals, and ports (see Table 5 of Proposed Control Measure) where none now exists. Upon the adoption of the initial At-Berth Regulation, CARB rightly acknowledged that in a global shipping environment it was not reasonable to expect that every vessel in every fleet would be equipped to receive shore power, hence the creation of fleet compliance averages and an exemption for infrequent callers. The Port has seen that its diligent involvement with carriers and terminals has resulted in a continuous positive trajectory in shore power usage.

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<sup>3</sup> Appendix E of the ISOR, page 12

<sup>4</sup> Appendix C-1 of the SRIA, page 15

The Proposed Control Measure continues the acknowledgement that there will be instances when ships cannot plug in, due to circumstances on the vessel or at the terminal, hence the inclusion of alternative compliance options and a complex regime of Terminal Incident Events (“TIEs”) and Vessel Incident Events (“VIEs”). The Port understands the goal of the TIE and VIE regime, but it creates more problems such as record-keeping and dispute resolution, than it solves. The Proposed Control Measure has no clear grievance or dispute resolution process when conflicts arise

### **Specific Comments on Proposed Control Measure**

1. Regarding the Terminal and Port Plans required for Container terminals in Section 93130.14, the deadline of July 1, 2021 is confusing because the Compliance Start Date listed in Section 93130.7(b) is shown as January 1, 2021. Shouldn’t the Plans and associated 90-day review window be completed prior to requiring compliance?

Port staff object to the text in Section 93130.14(a) that “[a]s an alternative, Ports may submit plans for their terminal operators.” Ports should not be expected to submit plans for terminal operators. In addition, the statement in Section 93130.14(b)(1) that “Ports should use terminal plans as [the] basis for developing port plans” seems to indicate that the deadline for Port Plans should be adjusted to come after the deadline for Terminal Plans.

2. The definition of “Fleet” in Section 93130.2(b)(29) does not explain how fleets will be established. What will CARB require at the beginning of each compliance year to establish fleets? How will this work?

The proposed regulation does not address how or whether VIEs will be granted for new fleets entering the California market, or for fleets that expand. New entrants should be allowed to estimate their annual ship calls and be granted the associated number of VIEs for the coming year. Otherwise, this is a barrier to entry for new fleets because they will be granted zero VIEs in their very first year of operation. This puts California ports at a competitive disadvantage compared to ports in Oregon, Washington, Canada, Mexico, and on the U.S. Gulf and East Coast.

The definition of Fleet and the requirements for VIEs also need to be responsive to changes in the shipping industry, for example when businesses merge or alliances change. It is not clear whether VIEs will be granted on a port-specific or State-wide basis. It is also not clear how disagreements will be resolved on whether a specific instance should use a TIE or a VIE. Will CARB adjudicate these?

3. The Port is glad to see that Vessel Commissioning is specifically exempt from the rule, as listed in visit exception Section 93130.8(c). However, the Port notes that it should not be limited to only the first visit, and should not matter whether the commissioning was successful. What happens if the commissioning was not successful? The Port of Oakland requires that vessels be re-commissioned if they have not been in Oakland for over a year. Further, the same vessel might need commissioning on both port side and starboard side. For these reasons, the same ship might require multiple commissioning trips.

Port staff request that vessel commissioning events that do not successfully connect to shore power as discussed in Section 93130.8(c) be eligible for exceptions under the regulation without the use of a VIE. The commissioning attempt shows that the goal was to reduce emissions through shore power and as such should be an exception in this situation. Port staff conduct each vessel commissioning (with the exception of those at Berths 61-6<sup>5</sup> to ensure the safety of the vessel, terminal, and workforce. Vessel commissioning is an invaluable safety procedure and should not be penalized under the Proposed Control Measure.

The Port requests that the definition of “Vessel Commissioning” in Section 93130.2(b)(76) of the Proposed Control Measure be expanded to include the port authority as the commissioning agent, as is the case at the Port of Oakland. The same language is found in Section 93130.7(e)(2) (“Ensure the vessel is commissioned as required by terminal operator”), Section 93130.8(c)(2) (“The terminal requires that the vessel be recommissioned”), and Section 93130.9(a)(2) “The terminal operator is responsible for commissioning vessels equipped with shore power.”). The commissioning requirement should be determined by the port authority or the terminal operator.

4. The Port requests that the definition of “Ready to Work” in Section 93130.2(b)(55) be expanded to include “Auxiliary Marine Power (AMP) container has been loaded on the ship and is in position, if applicable.” This is crucial for the requirement in Section 93130.9(d)(2)(D) that the vessel be plugged in “within 1 hour of vessel “Ready to Work”.” Many of the ships that call at the Port of Oakland rely on an AMP container to connect to shore power. The AMP container is often domiciled at the terminal and needs to be loaded onto the vessel by a ship-to-shore crane prior to plugging in. Some of the major carriers calling in Oakland rely on an AMP container to use shore power [MOL, NYK, K-Line (the ONE Alliance), Hyundai, and APL]. A vessel is not ready to plug in until the AMP container is in position.

Likewise, the Port requests that the disconnection requirement in Section 93130.9(d)(2)(E) be re-written to accommodate certain situations where the AMP container has been removed from the ship prior to the pilot boarding.

5. The Port appreciates the increase in TIEs to 15% for the first four years of the regulation as listed in Table 3 of Section 93130.11. The Port requests that the number of TIEs and VIEs be rounded *up* to the nearest whole number instead of rounding to the nearest whole number for instances where the number of TIEs or VIEs is calculated at a fraction of ship call as stated in Section 9310.11(a)(2). Any fractional call should be counted as a whole call. For example, if a carrier made 49 calls to a California port in 2019, the VIE calculation

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<sup>5</sup> The Port does not commission vessels at the Matson Terminal because these shore power vaults were installed by the former tenant, APL. The current terminal operator has assumed responsibility for these vaults.

would award 2.45 VIEs at the 5% level. This should be rounded up to three, not down to two.

6. Regarding the Remediation Fund described in Section 93130.15 of the Proposed Control Measure, what is the procedure and timeline for CARB to approve a public entity to manage the funds generated at the Port? What happens if no Remediation Fund administrator is established per Section 93130.15(a)? Does that mean the Remediation Fund would not be an option?
7. Port staff request further information from CARB on when and where the Remediation Fund will be deployed. Given that CARB anticipates zero-emissions regulation on trucks, transport refrigeration units, forklifts, and cargo-handling equipment in the time frame of enhanced usage of the Remediation Fund, would those categories be ineligible for incentive-funded emissions reductions?
8. Port staff note that the power meter readings required in Section 93130.9(d)(2)(C) and (F) and Section 93130.9(d)(3)(I) are not available until the close of each calendar month. This means that it will often not be possible to report the power usage within seven calendar days of a vessel's departure, as required in the Proposed Control Measure.
9. In Section 93130.1 of the Proposed Control Measure, the stated intent of the Proposed Control Measure is "to reduce oxides of nitrogen (NOx), reactive organic gases (ROG), particulate matter (PM), diesel particulate matter (DPM), and greenhouse gas (GHG) emissions from ocean-going vessels while docked at berth at California ports." How will CARB monitor GHG emissions after implementation of the Proposed Control Measure? What is the GHG emissions baseline?
10. The Port requests that maintenance events of landside shore power equipment be included in Section 93130.9(f) along with "construction or repair" so that maintenance events also have the option of using a TIE.
11. The Port requests that the Proposed Control Measure include an exemption for liquefied natural gas (LNG) powered vessels. This would have the desired effect of incentivizing cleaner ships, which would provide significant emission reductions throughout the ship's voyage, not just the small fraction of time while the ship is at berth in California.

## **Conclusion**

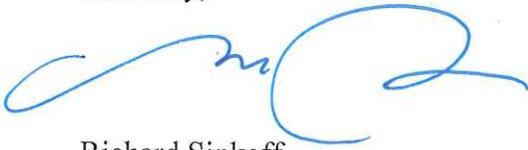
In conclusion, the Port of Oakland is fully committed to reducing emissions, and is proud of the results achieved with its industry and regulatory partners. In fact, the Port is unaware of any other port authority in the world that plugs in as many container vessels on an annual basis as the Port of Oakland. The partnership and collaboration with CARB, the Bay Area Air Quality Management District, and the Port's shipping and marine terminal customers have been a key to the success of

this program. The Port believes that these efforts can be used a model for other states and nations who might seek to reduce localized emission from ships at berth.

Port staff appreciate the opportunity to review and comment on the Proposed Control Measure and attend the public workshop on December 5, 2019. We look forward to continuing to work with CARB towards improving shore power effectiveness, emissions inventories, and associated analyses and to collaborate together to achieve cost-effective and feasible air quality improvements to protect public health.

Please contact Ms. Tracy Fidell, P.E., Port Associate Environmental Planner/Scientist at [tfidell@portoakland.com](mailto:tfidell@portoakland.com) with any follow-up questions.

Sincerely,



Richard Sinkoff  
Director of Environmental Programs and Planning

Enclosures:

- 1) June 10, 2019 Port letter to ARB re: Comments on May 10, 2019, Draft Proposed Control Measure for Ocean-Going Vessels At Berth and Supporting Documents
- 2) February 15, 2019 Port letter to ARB re: Comments on Draft 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor
- 3) January 31, 2019 Port letter to ARB re: Comments on Preliminary Draft Health Risk Assessment (“HRA”) for the Proposed Control Measure for Ocean-Going Vessels At Berth and At Anchor

CC:

Danny Wan, Executive Director  
Michele Heffes, Acting Port Attorney  
Matt Davis, Director of Government Affairs  
Delphine Prevost, Manager Maritime Administration and Finance  
Diane Heinze, Environmental Assessment Supervisor



# Comment Log Display

## Below is the comment you selected to display. Comment 12 for To Consider Proposed Control Measure for Ocean-Going Vessels At Berth (ogvatberth2019) - 15-2.

First Name: Jesse N  
Last Name: Marquez  
Email Address: jnm4ej@yahoo.com  
Affiliation: Coalition For A Safe Environment

Subject: Public Comments Submission  
Comment:

Re: Public Comments Submission In Opposition To Specific Proposed Amendments  
And Requests To Correct And Include Additional Information



Dear CARB Board Members:

The Coalition For A Safe Environment and et all signatory organizations submit these joint public comments on the Proposed Control Measure for Ocean-Going Vessels At Berth Rule Amendments.

We represent a broad base coalition of port community organizations in California and we object to the significant last minute and unacceptable changes to the Proposed Control Measure for Ocean-Going Vessels At Berth Rule. Many of the changes are delays in implementation or compliance which have significant impacts on public health, the environment and climate change. Hundreds of innocent residents and children will die prematurely and hospitalized with the new delays in implementation and compliance. This is an act of Environmental Racism.

12-1

CARB Staff has continuously failed to include 99% of all EJ Community recommendations, requests, information omissions, needed corrections and definitions that have been submitted in writing during the public comment periods. This is an act of Environmental Racism.

12-2

We request that you not approve the Proposed Control Measure for Ocean-Going Vessels At Berth Rule as presented by CARB Staff until the final At Berth Rule includes information corrections, information omissions, additional assessments information, recommendations and requests by the organization in these public comments. CARB Staff ignored 99% of all our concerns, document errors, information omissions, recommendations and requests.

12-2  
(Con't)

See attached complete public comments.

Respectfully submitted,

Jesse N Marquez  
Executive Director  
Coalition For A Safe Environment



Attachment: [www.arb.ca.gov/lists/com-attach/185-ogvatberth2019-AmFTM1U1BSVSMVMM.pdf](http://www.arb.ca.gov/lists/com-attach/185-ogvatberth2019-AmFTM1U1BSVSMVMM.pdf)

Original File Name: CFASE et al CARB At Berth Rule Public Comments Final 7-27-2020 PDF.pdf

Date and Time Comment Was Submitted: 2020-07-27 20:09:23

If you have any questions or comments please contact [Clerk of the Board](#) at (916) 322-5594.

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California Safe Schools  
Del Amo Action Committee  
Action Now  
St. Philomena Social Justice Ministry  
Comite Pro Uno  
350 South Bay Los Angeles  
Frack Free LA County  
West Long Beach Association  
Philippine Action Group for the Environment  
Carson Environmental Commission Member**

July 27, 2020

California Air Resources Board  
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Sacramento, CA 95814  
916-322-5594  
<http://www.arb.ca.gov/lispub/comm/bclist.php>

Su: CARB Second Public Availability of Modified Text & Availability of Additional Documents and/or Information  
Proposed Control Measure for Ocean-Going Vessels At Berth

Re: Public Comments Submission In Opposition To Specific Proposed Amendments  
And Requests To Correct And Include Additional Information

Dear CARB Board Members:

The Coalition For A Safe Environment and et all signatory organizations submit these joint public comments on the Proposed Control Measure for Ocean-Going Vessels At Berth Rule Amendments.

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12-3

Hundreds of innocent residents and children will die prematurely and hospitalized with the new delays in implementation and compliance. This is an act of Environmental Racism.

12-3  
(cont)

CARB Staff has continuously failed to include 99% of all EJ Community recommendations, requests, information omissions, needed corrections and definitions that have been submitted in writing during the public comment periods. This is an act of Environmental Racism.

12-4

We request that you not approve the Proposed Control Measure for Ocean-Going Vessels At Berth Rule as presented by CARB Staff until the final At Berth Rule includes information corrections, information omissions, additional assessments information, recommendations and requests by the organization in these public comments. CARB Staff ignored 99% of all our concerns, document errors, information omissions, recommendations and requests.

## INTRODUCTION

Ocean-Going Vessels commonly known as ships are one of the largest sources of air pollution at ports. Each ship releases 2-4 tons of air pollution daily while docked at a port terminal. Ships burn the dirtiest petroleum fossil fuel product called Bunker Fuel which is actually a thick liquid oil fuel. Ship emissions come from three sources: Main Engines, Auxiliary Engines and Boilers.

The current At Berth Rule requires that ships must use Electric Shorepower or an Equivalent Alternative Ship Emissions Capture and Treatment Technology. The At Berth Rule does not currently apply to all categories of ships.

Ships today are all not complying with the existing At Berth Regulation especially when there is an unexpected interference such as a union labor agreement strike, port terminal failure to hire sufficient truck drivers to unload cargo, port terminals failure to have sufficient chassis to pick up containers and currently the excuse of the Coronavirus pandemic to intentionally not unload product. CARB Staff has not provided information as to the number of ships currently not in compliance with the At Berth Rule. During this time of the Coronavirus there have been over 30 ships outside of the harbor breakwater at-anchor at the Ports of Los Angeles and Long Beach.

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CARB has continuously failed to protect public health and to enforce the law and existing regulations. Environmental Justice Communities are the most vulnerable populations and most disproportionately impacted. CARB continuously bends over backwards to support ports, big box retailers and the shipping industry by manipulating the At Berth Rule to allow ship category exemptions, unreasonable and unjustified reporting and compliance extension deadlines. This is once again an act of Environmental Racism.

We support California's transition to Zero Emission Freight Transportation and Emission Capture and Treatment Technologies. We cannot meet California's air quality standards and reduce our public health crisis with weak regulations, long implementation dates, no technology certification protocols, allowing mitigation measures that by-pass compliance asap and allowing ship exemptions.

We support AB 32 the Global Warming Solutions Act for the reduction of greenhouse gases as soon as possible. CARB continues to delay the earliest implementation of all feasible mitigation measures in the ports and petroleum industries the two largest polluters in the state of California.

### **Electric Shorepower**

Every major port in California is required to have at least one terminal that offers Electric Shorepower. Ships must be retrofitted to be able to plug into Electric Shorepower and most ships have not been retrofitted or because of the design cannot be retrofitted. Some port terminals only offer shorepower on one end or location of a terminal so cannot be used on all ships.

### **Ship Emissions Capture, Control & Treatment Technology**

There is an current existing and CARB Executive Order approved technology that is using basic vacuum cleaner technology to suck-in ship emissions from ship exhaust pipes and then processes these ship air pollution emissions with a series of filters so that clean emissions are released into the atmosphere. Ship Emissions Capture, Control & Treatment Technology can be built on-dock at a terminal, on a barge which can be maneuvered alongside a ship or on a barge near a ship at-anchor.

The AMECS-Advanced Maritime Emissions Control System was the first Ship Emissions Capture, Control & Treatment Technology to be invented by ACTI/AEG and is approved by a CARB Executive Order that complies with the At Berth Rule. ACTI/AEG owns eight US Technology Patents and is the only company to have built both an on-dock system at a terminal that works and an on-barge system tested At-Berth and At Anchor.

### **Electric Shorepower vs Ship Emissions Capture, Control & Treatment Technology**

Electric Shorepower can only stop and prevent about 50% of ship emissions because shorepower can only connect to the Main Engines Exhaust Pipes. Toxic air pollution is still being released into the atmosphere untreated from Auxiliary Boilers. Boilers are used to heat a ship and crude oil in tanker ships. Ships were not designed to allow extra-large cables and supporting equipment etc. to be added later. Ship Emissions Capture, Control & Treatment Technology can capture and treat 99% of emissions and therefore are more effective than shorepower. A large vacuum hose attached to an extendable articulated arm is connected to the Main Engine, Auxiliary Engines and Boilers exhaust pipes.

## **ISSUES**

### **1. Inadequate Public Comment Period Time & Request For 30 Day Extension Of The Public Comment Period**

CARB added 16 new documents under the title of Additional Reference Documents of which the majority have no specific relevance or contribute no significant value of

information. It is impossible for a member of the public to read over 4,000 pages of new information.

CARB should have devoted its time in counting the number of ships at all California ports currently not complying with the At Berth Rule.

CARB should have devoted its time calculating the toxic emissions ships were illegally releasing when not complying with the At Berth Rule.

CARB should have devoted its time in estimating the public health, environmental and greenhouse gas impacts and costs from these illegal emissions.

CARB's Staff continuing reference to meeting the two year regulation amendment and adoption deadline would not be critical if CARB Staff had not completely rewritten the At Berth Rule in the last 5 months and concentrating in delaying the amendment process for five years.

## **2. The Majority Of New Proposed Revisions Are Attempts By CARB Management and Staff To Support The Private Shipping Industry Making Maximum Profits And To Delay Implementation, A Continuing Historical Example of Environmental Racism**

The Environmental Justice Community and Public have already seen CARB Management and Staff delay the At Berth Rule Amendments 5 years with no justification. Public Health in Disadvantaged Communities and Significant Reductions of Toxic Ship Emissions and Greenhouse Gases continues to be a low priority to CARB.

AB 617 Port Communities have already identified ship pollution as a priority reduction requirement in their CERP's (Community Emissions Reduction Plans). CARB has NO LEGAL AUTHORITY to grant any exemptions or extensions of time that it cannot legally validate.

The Environmental Justice Community and Public only requested 4 basic changes:

Commented [J1]:

- That the regulation include all categories of ships with no exemptions
- That the regulation be adopted asap
- That there be no extensions of dates or time to comply with Rule requirements
- That CARB create a standardized industry technology certification protocol

## **3. Major Amendments Were Made That Were Not Requested by EJ Organizations, The Public & CARB Board Members**

CARB management and staff made amendments that were not requested by the EJ Community or the Public nor were they directed by CARB Board members during the public hearings.

CARB management and staff illegally accepted public comment from the shipping industry after the public comment deadline of May 1, 2020 and incorporated some of the shipping industries requests into the current proposal. The purpose of this CARB Informational Hearing is to try to cover up this illegal action by the CARB staff. The public was not allowed or advised they could continue to submit additional public comment.

The majority of Environmental Justice Community and Public Comments that were submitted were not included in the current Amendments.

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#### **4. We Want CARB Approved Ship Emissions Control Technology Certification Requirement No Strategy**

We want to replace the current CARB inappropriate technology approval process of using an Executive Order and want an industry standardized CARB Approved Ship Emissions Control Technology Certification Requirement. EO's allow personal bias, industry and political influence to interfere and approve less qualified companies which is occurring now.

We want no discretionary Executive Officer approval. A technology Applicant either passes or fails a CARB Approved Ship Emissions Control Technology Certification Protocol and Requirements.

A Strategy is only a Goal as clearly stated in all Dictionaries. A Strategy is not a requirement, condition or control measure. We want clearly defined and certified Ship Emissions Technology Control Certification Requirement and Mitigation Measures.

We want all references to CARB Approved Emission Control Strategy (CAECS), emission control strategy, innovative concept and innovative concept compliance terminology to be replaced throughout the regulation with CARB Certified Approved Ship Emissions Control Technology.

The regulation states that, "To receive CARB approval, a person must demonstrate that the emission controls strategy achieves emission ..... The word person must be replaced with "Technology."

#### **Current Available Technologies:**

- A. On-Dock Ship Electric Shorepower
- B. On-Dock Stationary Emissions Capture, Control & Treatment Technology (AMECS)
- C. At-Dock At Anchor Ship Barge Emissions Capture, Control & Treatment Technology (AMECS). Ship is docked but the barge is alongside the ship.
- D. At-Anchor Ship Barge Emissions Capture, Control & Treatment Technology (AMECS) Ship is not docked but anchored in the harbor.

#### **Available In 2020:**

- A. At-Dock Tanker Ship SPUD Barge Emissions Capture, Control & Treatment Technology (AMECS)
- B. At-Anchor Tanker Ship SPUD Barge Emissions Capture, Control & Treatment Technology (AMECS)

**Future Potential Technologies:**

- A. At-Anchor Ship Barge Zero Emissions Electric Fuel Cell Power
- B. Ship On-Board Emissions Capture, Control & Treatment Technology

**5. We Want A CARB Ship Emissions Control Technology Certification Protocol and Procedures**

We are not here to play games or here to allow CARB to continue to obfuscate its responsibilities of failing to establish badly needed standardized shipping industry Technology Certification Requirements, Compliance Protocols and Testing Procedures.

We additionally request that CARB include in the Certification Requirements that the manufacturer and/or seller provide evidence of ownership of technology patents or permission to use Emissions, Capture, Control and Treatment Technologies. CARB has issued an EO's to a company that does not own the patents or rights for its technologies and allowed that they also be awarded CARB grant subcontracts.

The regulation requires a manufacturer to provide a Warranty but Carb Staff is currently waiving those requirements and allowing a company to continue to operate out of compliance and in violation of a CARB Executive Order and CARB Subcontract requirements. i.e. Port of Los Angeles Green OMNI Terminal Project - Clean Air Engineering-Maritime, Inc. Marine Exhaust Treatment System (METS-1) and ShoreKat System.

**6. We Want All Ports & Terminals To Have Specific Compliance Requirements In The Regulation**

CARB staff has created unacceptable non-compliance schemes such as TIE's and VIE's for Ports and Terminals to avoid planning their ship compliance needs in advance, budgeting funds in advance, ordering adequate equipment in advance, building electric utility infrastructure in advance and purchasing sufficient equipment in advance.

12-7

Ships are required to file an Inward Forwarding Manifest with the U.S. Customs and the average ship travel time to the US is 10 days. So Ports and Terminals know in advance when a ship will arrive.

Reference: 19 CFR § 4.7a - Inward manifest; information required; alternative forms

**(xv)** Date of departure from foreign, as reflected in the vessel log (this element relates to the departure of the vessel from the foreign port with respect to which the advance cargo declaration is filed (see § 4.7(b)(2) or § 4.7(b)(4)); the time frame for reporting this data element will be either:

**(A)** No later than 24 hours after departure from the foreign port of lading, for those vessels that will arrive in the United States more than 24 hours after sailing from that foreign port;

The Ports and Terminal Operators can list 99% of all possible worst case scenarios and prepare emergency back-up contingency plans today now.

These are CARB Management and Staff elaborate schemes to allow ships to continue to maximize their profits, pollute our air and waters and allow significant Public Health Impacts to continue in our communities.

12-7

#### **7. Applicability Shall Refer To A CARB Ship Emissions Control Technology Certification Protocol/Procedure**

We do not except the meaningless CARB staff proposed CARB Approved Emissions Control Strategy. We want a CARB Ship Emissions Control Technology Certification Program, Protocols and Procedures to be referenced.

We want all responsible parties, the ports, terminal operators, ships and third party testing companies to be held jointly and severally liable for violating this Control Measure. We do not accept Staffs wording of "may be held Liable." Again another CARB staff attempt to minimize enforcement in EJ Port Communities.

#### **8. We Want No Ship Category Exemptions For Dry Bulk, Break Bulk Or General Cargo Ships**

CARB staff was directed by CARB Board Members at the December CARB Meeting to include Dry Bulk, Break Bulk and General Cargo Ships but staff has failed to include them in Table 1. CARB was presented an engineering firms data in December showing the significant amount of emissions of Dry Bulk, Break Bulk and General Cargo Ships and staff has not provided any evidence or data to validate an exemption.

The following Table 22 illustrates that Bulk Ships are a significant Emissions Source and what the immediate benefits would be under the amended At-Berth Rule.



**Evaluation of the  
Advanced Maritime  
Emissions Control  
System (AMECS)**

AMECS Demonstration  
at the Port of Long  
Beach, California

**Table 22. Emissions Reduced per Vessel**

Vessel Type	PM <sup>1</sup> ton/yr	NOx ton/yr	VOC ton/yr	TOTAL <sup>2</sup> ton/yr	SOx <sup>3</sup> ton/yr
Auto Carrier	135.8	72.7	2.4	210.9	70.2
Bulk	42.3	22.9	0.8	65.9	21.6
Container Ship	242.0	135.0	4.5	381.5	117.4
General Cargo	34.7	17.2	0.6	52.5	19.8
Passenger	386.7	197.4	6.2	590.3	164.9
Reefer	194.8	106.8	3.6	305.2	97.3
Roll-on/Roll-off	102.7	61.1	2.0	165.8	44.5
Tanker	237.2	74.4	2.8	314.4	197.0

<sup>1</sup> Moyer weighting factor of 20 was applied to the PM emissions reduced.

<sup>2</sup> Total emissions only include PM, NOx, and VOC for cost effectiveness calculations.

<sup>3</sup> SOx emissions reduced is provided in this table for informational purposes only.

Examples where Tables exclude Break Bulk Ships:

Table 1: Compliance Start Dates by Vessel Type	
January 1, 2021	Container and refrigerated cargo vessels
January 1, 2021	Passenger vessels
January 1, 2024 <del>2025</del>	Roll-on roll-off vessels
January 1, 2025 <del>2027</del>	Tanker vessels that visit the ports of Los Angeles or Long Beach
January 1, 2027 <del>2029</del>	All remaining tanker vessels

- A. Container Ships
- C. Tanker Ships
- D. Dry Bulk Carrier Ships
- E. General Cargo Ships
- F. RORO-Roll-On Roll-Off Ships
- G. Passenger-Cruise Ships

CARB staff also did not include Dry Bulk, Break Bulk and General Cargo Ships in Terminal Plans. Reference: Section 93130.14. Terminal and Port Plans and Interim Evaluation

CARB staff also did not include Dry Bulk, Break Bulk and General Cargo Ships in Table 4: Remediation Fund Hourly Amount.

<b>Table 4: Remediation Fund Hourly Amount</b>		
<b>Vessel Type</b>	<b>Hourly Remediation Payment Beginning in 2021*</b>	
	<b>Normal Rate</b>	<b>Tier III Rate</b>
<b>Container, Reefer, Ro-ro</b>	\$1,900	\$1,100
<b>Tanker with electric pumps</b>	\$1,600	\$1,000
<b>Tanker with steam driven pumps</b>	\$3,400	\$2,700
<b>Passenger vessels with capacity under 1,500 combined passengers and crew</b>	\$5,300	\$3,200
<b>Passenger vessels with capacity of 1,500 or more combined passengers and crew</b>	\$12,000	\$7,100

CARB staff also did not include Dry Bulk, Break Bulk and General Cargo Ships in Table 5: Innovative Concept Application Due Date.

<b>Table 5: Innovative Concept Application Due Date</b>	
<b><u>Vessel Type</u></b>	<b><u>Due Date</u></b>
<b><u>Container/ Reefer</u></b>	<b><u>July 1, 2021</u></b>
<b><u>Passenger</u></b>	<b><u>July 1, 2021</u></b>
<b><u>Ro-ro</u></b>	<b><u>December 1, 2021</u></b>
<b><u>LA/LB Tankers</u></b>	<b><u>December 1, 2021</u></b>
<b><u>Other Tankers</u></b>	<b><u>December 1, 2021</u></b>

**9. We Want Ship Emissions Compliance At All Ship Locations**

- A. At-Dock
- B. At-Anchor In Port Waters
- C. At- Anchor Outside Of Break Water
- D. At-Anchor In California Coastal Waters

**10. We Do Not Want CAPCOA To Be A Remediation Fund Administrator, CARB Has This Responsibility Or A Qualified Mitigation Non-Profit Foundation**

We do not want CAPCOA or an Air District to be a Remediation Fund Administrator and we do not approve of the use of an unenforceable and unappealable Memorandum of Understanding or "similar agreement". We want a legal signed contract between all parties.

CAPCOA and Air districts have not supported EJ Communities Proposals, Requests, Recommendations, Appeals and Lawsuits 90%+ of the time in the past.

The Harbor Community Benefit Foundation in San Pedro in Southern California and the Rose Foundation in Oakland in Northern California are qualified to administer this Remediation Fund.

**11. We Want No Extension Of Originally Proposed Dates Or Times Compliance Requirements**

CARB staff has proposed numerous date and time extensions which are not necessary.

**12. We Want CARB To Establish Minimum At Berth Rule Port Responsibilities Information Requirements**

We do not want to wait for Ports to take 2-3 years to develop their responsibilities. We want CARB to hold 2-3 public hearings within 6 months to develop preliminary Port Responsibilities. They can be fine-tuned by ports who may have some special circumstances.

**13. We Want No At Berth Rule Interim Requirements**

Any and all requirements must be mandatory and clearly defined. We want no waivers, variances and extensions for non-certified technology. There can be an approved Pilot Project or Test Demonstration in preparation for final CARB Certification.

**14. We Want The At Bert Rule To Include MARPOL ANNEX VI & XIII Engine Requirements & For Ships To Provide Certificate Information**

International Air Pollution Prevention Certificate (IAPPC)

Engine International Air Pollution Prevention Certificate (EIAPPC)

**15. We Want The AT Bert Rule To Include The U.S. EPA North American and U.S. Caribbean Sea Emissions Control Areas Penalty Policy for Violations by Ships of the Sulfur in Fuel Standard and Related Provisions**

The regulation fails to reference and include all international IMO ship mandatory requirements and penalties. We request that CARB research and include all applicable IMO requirements for inclusion in this regulation.

## **16. We Want PM Emissions Standards & Compliance Data In Addition To Opacity Requirements**

There is no definition of Opacity and Opacity Requirements. It essentially means how dark is the black smoke that you see and the volume. You cannot see or see clearly the smoke in the rain, on a foggy day and at night.

Opacity Requirements require a person to take a class and having opacity charts/scales to look at or to confirm an observation. So there is some personal opinion and best judgement allowed

We want to include CARB PM Standards and Testing Requirements included in the regulation.

## **17. We Do Not Want To Expand Use Of Vessel and Terminal Incident Events (VIE's and TIE's) To New & Growing Vessel Fleets & Terminals**

All Ports, Terminal Operating and Shipping Industry have known and will know all new AT Berth Rule Requirements. All Ports and Terminal Operators have had a minimum of five years to prepare for the expansion of the At Berth Rule.

CARB staff has created acceptable non-compliance schemes such as TIE's and VIE's for Ports and Terminals to avoid planning their ship compliance needs in advance, budgeting funds in advance, ordering adequate equipment in advance, building electric utility infrastructure in advance and purchasing sufficient equipment in advance.

These are CARB Management and Staff elaborate schemes to allow ships to continue to maximize their profits, pollute our air and waters and allow significant Public Health Impacts to continue in our communities.

99% of all possible worst case scenarios are already known, can be listed and can be prepared for now, so there is no excuse to not be ready with back-up emergency power, additional emissions control and treatment technologies and including complete shut-down protocols.

All required ship forms, documentation and report requirements already exist, are on-line and there will only be a few changes and updates. 90%+ of all ship forms, documentation and reports can be prepared in advance before arrival at a port.

## **18. CARB's Reference To A Second Qualified Ship Emissions Capture & Control Technology Company Is A Fraud & Example of CARB Management Discrimination Against A Superior Minority Owned Technology Company**

## **19. The Definitions Of Words Has Words That Are Not Defined In The Definitions**

As one example: The definition of Anchorage includes the words “moor” and “California waters,” but there are no definitions of these words.

The average person does not know what the word moor means and does not know how far out in the ocean is the California water boundary.

CARB's failure to include all important word definitions is an attempt to deceive the public as to how far outside a breakwater the At Berth Rule applies. Ports do not want any responsibility to acknowledge, identify, quantify and mitigate ship emissions outside the port. During the Covid-19 Pandemic and other events such as the Ports of Los Angeles and Long Beach ILWU union strikes and ports failures to assure that Terminal Operators had sufficient truck drivers and container chassis resulted in over 30 ships being “At-Anchorage or At-Anchor” outside the breakwater. Ships did not plug-in or use alternative ship emission control, capture and treatment technology so 100's of tons of ship air pollution went unmitigated and public health was negatively impacted. CARB, the AQMD's and Ports took no corrective or remedial action whatsoever.

The term At Anchor is used more often than At Anchorage and should also be included in the definitions.

We want the requirement and definition of Certification to be included in the definitions.

## **20. CARB Staff Has To Stop Making Up Definitions That Confuse The Public & Use Governmental Agency Or Industry Definitions**

CARB staff needs to clean-up definitions. There are numerous errors and omissions.

There is no definition for IMO and does reference all the mandatory worldwide ship requirements that are applicable in this At Berth Rule.

The rule defines Remediation Fund but has no definition of Remediation.

There is a Tanker Boiler definition but fails to state that all ships have and use Boilers. Tanker Ship Boilers are also the largest source of emissions.

There is a Utility definition that is not correct or accurate. One accurate definition of Electric Utility is: An electric utility is a company in the electric power industry that engages in electricity generation and distribution of electricity for sale generally in a regulated market. Where does staff get the word “any person engaged in...?”

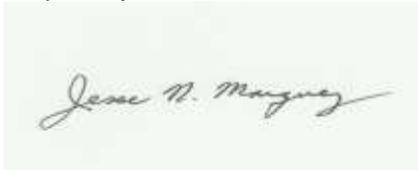
We want a review of all word definitions and all words contained in this regulation.

## **21. CARB Staff has Proposed No Enforcement, Penalties And Fines Section**

We want a chapter or section that clearly outlines and describes CARB's Enforcement, Penalties And Fine Responsibilities.

For additional information the primary contact is Jesse N Marquez for these public comments.

Respectfully Submitted,

A handwritten signature in black ink on a light green rectangular background. The signature reads "Jesse N. Marquez" in a cursive script.

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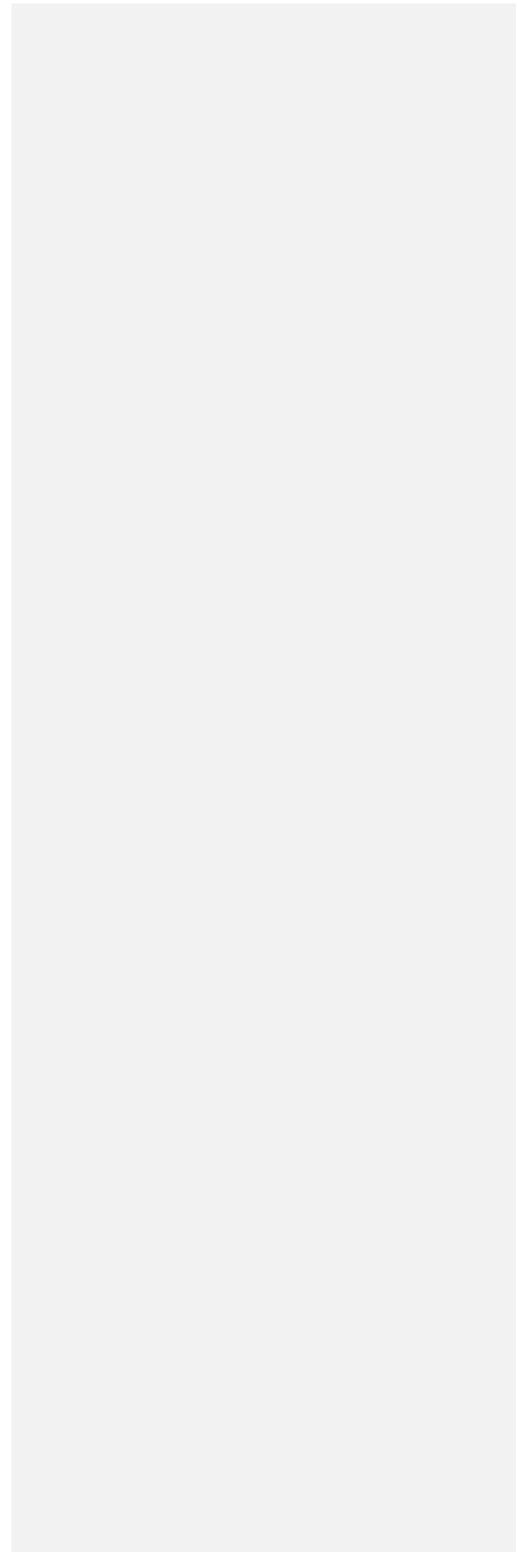
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**Catherine H. Reheis-Boyd**  
President

July 27, 2020

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California Air Resources Board  
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sent via e-mail to: <http://www.arb.ca.gov/lispub/comm/bclist.php>

Re: WSPA Comments on Second “15-Day Changes” to CARB Proposed Control Measure for Ocean-Going Vessels at Berth

To the Clerk of the Board:

This letter supplements comments previously submitted by the Western States Petroleum Association (“WSPA”) on the California Air Resources Board’s (“CARB”) Proposed Control Measure for Ocean-Going Vessels at Berth (“Proposed Regulation”) and its various amendments since its original release on October 15, 2019. WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states.

WSPA is providing these comments in specific response to the Second 15-Day Changes, and as part of a continuing effort to provide feedback on the Proposed Regulation. We incorporate our previous comments submitted on February 15, 2019; March 29, 2019; May 30, 2019; June 14, 2019; August 15, 2019; December 3, 2019; March 6, 2020; and May 1, 2020 by reference herein.

## **I. Summary of Concerns with Second 15-Day Changes**

- The Second 15-Day Changes propose to extend the compliance start dates for container vessels, refrigerated cargo vessels, passenger vessels and roll-on roll-off (“ro-ro”) vessels, but arbitrarily exclude tankers from any compliance schedule relief – based on an incorrect and unsupported claim that the tanker industry has “recovered” from the pandemic. The Second 15-Day Changes must be further revised to provide the lead time necessary for industry to recover from the nation’s current severe economic recession and to conduct the feasibility studies necessary to ensure that new international safety standards are adequately considered, and that tankers are not put at unacceptable risk of explosion or other serious threats to safety.
- The proposed extension of the maximum “Innovative Concepts” compliance period from three years to five years in the Second 15-Day Changes fails to make “Innovative Concepts” a viable compliance alternative for tanker terminals.
- The proposed changes to the “interim evaluation” provisions fail to provide for the feasibility study critically needed for tankers before the Proposed Regulation is adopted.
- The Second 15-Day Changes assume no changes to projected emissions and economic activity in the face of the pandemic, relying instead on increasingly unrealistic and outdated assumptions about future business levels, emissions and potential environmental benefits of the amendments.

- A draft report for a CARB-commissioned study on real-world tanker emissions – “Emissions Evaluation of a Large Capacity Auxiliary Boiler on a Modern Tankers,” dated March 2020 – was made available to WSPA for the first time in early July. The results indicate that Staff’s tanker NOx emissions factor overstates the actual real-world factor by **233%** and overstates the actual tanker PM2.5 emission factor by **2,288%**. Despite these significant inaccuracies in Staff’s assumptions, Staff have not accounted for the findings of this study in the Second 15-Day Changes.

## **II. Adjustments in Compliance Start Years for Regulated Vessels Should Not Arbitrarily Exclude Tanker Vessels**

The Second 15-Day Changes propose adjusting the compliance start dates from 2021 to 2023 for container vessels, refrigerated cargo vessels, and passenger vessels, and from 2024 to 2025 for ro-ro vessels. See Proposed 17 C.C.R. § 93130.7(b). Staff noted that these proposed changes were made “in order to give registered entities additional time to prepare for compliance in light of the current economic downturn.” CARB Second Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information (“Second Notice”), p. 9.

Staff’s claims about “past recession events” do not appear to be supported by actual evidence in the record, nor is it clear what data justify Staff’s assertions about the predicted future “recovery” of tanker vessel visits. Staff provide no evidence in the supporting materials for the Second 15-Day Changes to justify not also affording tanker vessels additional time for compliance. Indeed, in the Second Notice, Staff concede that all of the regulated vessel categories are seeing emissions reductions due to the serious reduction in economic activity and vessel visits attributable to the pandemic, and that all categories will take years “to recover to pre-recession visit levels.” Second Notice, p. 18.

The only indication given as to why tankers are being treated differently came in Staff’s slide presentation to the Board on June 25, 2020, during which Staff claimed that “we’re already starting to see increases in crude imports in May and June, and demand is expected to continue recovering as more people resume normal daily operations. See Transcript of CARB Videoconference Meeting, June 25, 2020 (“Transcript”), p. 329:18-23. But Staff have yet to present the data on which they purport to rely, making it impossible to assess the veracity or accuracy of their statements. Moreover, since the June Board meeting, the resurgence of COVID-19 cases in California has prompted the re-imposition of strict state and local responsive measures, including widespread business closures. Under these circumstances, people are not resuming normal daily operations now or any time soon, and demand cannot be expected to continue recovering.

The available data show that, contrary to Staff’s claim, the tanker industry is suffering significantly from the economic collapse right along with other vessel categories. Energy Information Administration (“EIA”) data through April 2020 show that PADD 5 crude imports, which are dominated by California, have fallen 46% since December 2019. See <https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRIMP51&f=M>. Furthermore, California Energy Commission data show that, compared to 2019 inputs during the same timeframe, California refinery crude inputs were down between 25 and 30 percent during May and June 2020, and down by 32% as of July 17.<sup>1</sup> As the graphs in Tab 2 show, though they are not as low in July 2020 as they were in early May 2020, week to week U.S. crude imports and

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<sup>1</sup> CA Energy Commission Weekly Fuels Watch Report, accessed July 23, 2020 at [https://ww2.energy.ca.gov/almanac/petroleum\\_data/fuels\\_watch/index cms.html](https://ww2.energy.ca.gov/almanac/petroleum_data/fuels_watch/index cms.html) (attached at Tab 1).

exports in 2020 are still far below averages seen in 2019.<sup>2</sup> Total monthly visits of foreign tankers into Southern California ports and terminals went from 35 total visits in January 2020 to just 23 in May and in June 2020, a drop of 34.3%. These same tanker visits as of mid-July were at only 13, tracking for another very low month in July.<sup>3</sup> These data translate to significant reductions in tanker traffic not accounted for in Staff's tanker traffic projections or emissions totals, and stand in direct conflict to Staff's suggestion that the tanker industry is somehow "recovered" from the COVID-19 downturn.

But even if crude imports *were* seeing minor increases at times in May and June 2020, levels of recent activity do nothing to make at-berth capture and control feasible or safe for tanker vessels in the timetables provided in the Proposed Regulation. As we and others have explained in detail in numerous prior comments, the types of emissions capture and control equipment that would be required for tankers in the current Proposed Regulation still have not been proven safe and feasible in real-world operations with tankers at marine terminals. This makes both the original 2027/2029 compliance dates, and the accelerated 2025/2027 compliance deadlines from the First 15-Day Changes, unrealistic and potentially dangerous to attempt to meet, even if eventually determined to be feasible sometime in the future. Indeed, CARB heard undisputed public testimony at the June Board meeting that failing to follow stringent safety measures in managing gases in tanker cargo spaces at berth can lead to catastrophic explosion and loss of human life, as it has in prior real-world incidents. See Transcript, pp. 364-365 (testimony of Capt. Saul Stashower). This issue *alone* warrants giving ports and terminals additional time to conduct necessary feasibility studies in order to determine whether and how at-berth capture and control could be accomplished without risking people's safety.

15-1

The safety concerns associated with tankers – and the critical need to fully understand and account for them in *any* regulation impacting tankers – are further underlined in the new Sixth Edition of the International Safety Guide for Tankers and Terminals ("ISGOTT"), published in June 2020. See "International Safety Guide for Tankers and Terminals," International Chamber of Shipping, *et al.* (6<sup>th</sup> ed. 2020) (attached at Tab 4). The ISGOTT is "widely recognised as the definitive best practice guidance on tanker safety and pollution prevention" (ISGOTT, p. iii), and compliance with ISGOTT measures is mandated under several California statutes and regulations. See California Building Code (Title 24, C.C.R.), Ch. 31F (Marine Oil Terminal Engineering and Maintenance Standards ("MOTEMS") requiring marine oil terminals to meet various ISGOTT standards); 2 C.C.R. §§ 2340(c)(29), 2355(a) (State Lands Commission safety requirements for tanker operations to meet specified ISGOTT provisions). The latest ISGOTT now contains a new Chapter 8 with guidelines on due diligence steps that are to be taken before technologies not yet adopted in the tanker and terminal sector are applied to tankers. Among these diligence steps are directions to review a proposed technology's interface with the vessel's existing systems and processes, preparation of formal risk and impact assessment plans, a study of hazards presented by the new technology, evaluation of consistency with other industry and classification society standards, and analyses of tanker and terminal personnel safety. See ISGOTT, Ch. 8 (Tab 4). ISGOTT Chapter 8 highlights the critical need to assess alternative and emerging technology to ensure that its introduction does not negatively impact tanker and marine

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<sup>2</sup> See U.S. Energy Information Administration, Weekly U.S. Imports of Crude Oil and Weekly U.S. Exports of Crude Oil, Jan-Jul. 2020 (available at <https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=p&s=mcrimp51&f=m>) (attached at Tab 2).

<sup>3</sup> July 2020, Marine Exchange of Southern California, "Major Ship Types By Count; 1-15 July 2020" (attached at Tab 3).

oil terminal safety. These important ISGOTT guidelines reinforce the safety concerns that we have documented throughout this rulemaking process.

15-2

In adhering to the ISGOTT guidance, tanker operators also rely on direction, guidance and approvals for regulatory and standards compliance from classification societies like the American Bureau of Shipping (ABS), a “recognized organization” by the United States Coast Guard and International Maritime Organization (IMO), and member of the International Association of Classification Societies (IACS) with consultative status at the IMO. The ABS has issued a guidance document relating to the numerous steps required to assess feasibility of any new technology on marine vessels before the technology can be adopted for real-world use, including engineering evaluations, risk assessments, engineering designs, creation of a manufacturing plan and quality assurance requirements, functional and model testing, prototype validation, systems integration testing, and ABS review. See ABS, “Guidance Notes on Qualifying New Technologies” (April 2017) (attached at Tab 5) (“ABS Guidance”). These safety, risk and other assessments cannot be short-cut or postponed for a later day. As the ABS Guidance points out, “[t]he qualification activities within each stage employ risk assessments and engineering evaluations that build upon each other in order to determine if the new technology provides acceptable levels of safety in line with current offshore and marine industry practice.” In other words, we cannot simply skip to the “operational stage” without first completing the first stages in the ABS Guidance – *i.e.*, feasibility, concept verification, prototype validation and systems integration.

The record contains no indication that Staff have even reviewed the requirements of the ISGOTT or the ABS Guidance in preparing the Proposed Regulation, let alone evaluated whether the Proposed Regulation meets the due diligence and risk assessment requirements of the ISGOTT. Again, additional time should be provided in the compliance schedule for tankers, as it has for other classes of vessels, in order to allow Staff the time necessary to ensure that the Proposed Regulation takes the new ISGOTT guidelines and the ABS Guidance into consideration. These guidance materials also constitute new information that CARB must take into account in the analysis of hazard impacts in the Final Environmental Assessment for the Proposed Regulation.

15-3

In light of the catastrophic economy-wide impacts of the pandemic, and given the many serious safety concerns that the Proposed Regulation continues to raise for the tanker category, it would be arbitrary and capricious for CARB to adopt changes granting additional time for compliance for all other regulated marine vessel classes “in light of the current economic downturn,” but not for tankers. Building in this extra time is crucial to ensuring that CARB does not rush to force impracticable and potentially dangerous requirements on tankers, terminals and ports.

### **III. The Extension of the Maximum “Innovative Concepts” Compliance Period from Three to Five Years Does Not Make It a Viable Compliance Alternative**

The Second 15-Day Changes also propose extending the time during which an “innovative concept” may be used for compliance from a maximum of three years to a maximum of five years. See Proposed 17 C.C.R. §§ 93130.2(b)(21), 93130.17(a)(7). Staff remarked in the Second Notice that the proposed change is intended “to allow more certainty to innovative concept projects to be used for compliance under the Control Measure.” Second Notice, p. 14.

As we and others have explained in prior comments, the proposed “Innovative Concepts” provisions do not provide the true compliance alternative stakeholders requested – *i.e.*, a compliance option *in lieu of* the currently unworkable requirement to install and operate yet-unproven at-berth capture and control systems. At best, an “Innovative Concept” would provide

a temporary **additional** compliance obligation for stakeholders who choose the option, and after a defined maximum period of time, stakeholders *still* would be required to meet the requirement to install a capture and control system or provide shore power.

Changing this maximum time from three to five years does not address the core problems with the “Innovative Concepts” provisions. Most fundamentally, the Second 15-Day Changes fail to provide any relief from the running deadlines to install at-berth shore power or capture and control systems. Once one or more five-year “Innovative Concept” periods come to an end without CARB renewal (or during such a period if CARB decides to revoke an “Innovative Concept”), stakeholders then would become **immediately** subject to the default 2027/2025 deadlines to install a capture and control system. Far from providing more incentive to tanker terminals to choose the “Innovative Concept” option, a five-year project period would actually provide **less** incentive by increasing the amount of lost investment from funding the Innovative Concept over five years, while leaving the stakeholder with little or no time to install capture and control by the now-accelerated default regulatory deadlines.

#### **IV. The Second 15-Day Changes to the Interim Evaluation Provisions Do Not Substitute for a Proper Feasibility Study**

The Second 15-Day Changes also propose that in the envisioned “interim evaluation” of available control technologies and infrastructure for tankers and ro-ro vessels, CARB Staff will not only review “potential requirements for control technologies for use with bulk and general cargo vessels, and for ocean-going vessels at anchor,” but now also the “control technologies” themselves. See Proposed 17 C.C.R. § 93130.14(d). Staff notes that “[t]his change clarifies that CARB will focus on what technologies are available, and will consider potential requirements for these specific vessel categories (rather than requirements for the control technologies themselves).” Second Notice, p. 14.

The proposed changes to subsection 93130.14(d) do not make the “interim evaluation” an adequate substitute for an actual tanker feasibility study done prior to adopting the Proposed Regulation. As discussed above, Chapter 8 of the June 2020 ISGOTT update provides that all aspects of a proposed technology’s feasibility and safety – including hazards analyses, workability of the proposed interface with existing vessel systems, consistency with classification society and industry standards, and potential risks to tanker and shore-side personnel – must be reviewed **before** implementing the proposed technology, not **after**. See ISGOTT, Ch. 8 (Tab 4).

Throughout this entire rulemaking, WSPA has been urging Staff to conduct a feasibility study concerning the viability and safety of installing capture and control systems for use with tankers, and to assess the results of this study before imposing requirements on tanker vessels. Yet, as currently proposed in the Second 15-Day Changes, section 93130.14(d) would require Staff to publish its report on tanker control technology by December 1, 2022 – nearly two years after portions of this Regulation become effective and a year after tanker terminals are required to submit terminal plans describing how they will comply with the Proposed Regulation.

The Second 15-Day Changes do not remedy the problem by directing that Staff evaluate both the “potential requirements” for control technologies and the “control technologies” themselves. We agree that these are critically important questions for determining whether and how tanker terminals can safely and feasibly comply with the Proposed Regulation. But they need to be answered **before** imposing mandatory compliance deadlines on stakeholders, not two years **later**.

**V. The Second 15-Day Changes Fail to Account for the Massive Economic Disruptions and Changes in Projected Emissions Attributable to COVID-19**

In the Second 15-Day Changes, while Staff finally acknowledge the existence of the coronavirus pandemic, they believe it merits no changes at all to predictions of future economic and vessel activity, likely future emissions, or anticipated health outcomes. According to Staff, “[b]ecause the current circumstances are unique from past recession events, CARB staff expect there may be a reduction in emissions to continue over the next few years from reduced vessel visit activity but outcomes are unknown. Therefore we did not make changes to our inputs or methodologies at this time.”<sup>4</sup> Second Notice, p. 18.

California law prohibits Staff from simply assuming away the most serious national economic calamity since the Great Depression. The Health and Safety Code authorizes CARB to adopt regulations only after finding that they are necessary, technologically feasible, and cost effective given the information made available to CARB Staff. Cal. Health & Safety Code §§ 39602.5(a), 43013(a). California Government Code Section 11346.3(c) further requires the Standardized Regulatory Impact Analysis (SRIA) in this rulemaking to conduct a full analysis of the potential of the Proposed Regulation to impact the creation or elimination of jobs, business, investment and innovation in the California economy, along with an accurate assessment of the health, safety and welfare benefits of the regulation. Cal. Gov. Code § 11346.3(c)(1).

Deciding that the most significant reduction of economic activity in a generation should result in **zero** change to Staff’s pre-pandemic economic and emission assumptions defies logic and is plainly arbitrary and capricious. It allows this rulemaking to proceed on now increasingly inaccurate and unreliable projections of future tanker and other vessel activity in California’s ports and terminals over the next several years. By refusing to account for reduced vessel activity in the future, Staff are choosing to rely on considerably overstated future emissions projections, leading to unrealistically high potential health impacts and, in turn, overstated promises of health benefits. Also, as discussed below, Staff’s failure to disclose recent empirical data on tanker emissions has resulted in even further exaggerated and inaccurate projections for future tanker emissions.

A slower national and California economy over the next several years will very likely lead to reduced vessel trips and growth of vessel traffic over that period. Fewer vessel trips at California ports and terminals will mean lower at-berth emissions. At the very least, this could substantially change Staff’s estimates of the potential health benefits of this measure (likely lower) and the cost-effectiveness of the Proposed Regulation (likely much less cost-effective). Staff are not entitled to ignore these impacts.

The public is not well-served when CARB Staff indulge exaggerated or unrealistic projections of future emissions. As the Legislature has pointed out, “[i]naccurate [emissions] inventories that do not reflect the actual emissions into the air can lead to misdirected air quality control measures, resulting in delayed attainment of standards and unnecessary and significant costs.” See Cal. Health & Safety Code § 39607.3(d). Just because future “[o]utcomes are unknown” does not give CARB Staff permission to ignore them entirely. It is CARB’s legal duty to accurately and fairly assess what impacts the coronavirus pandemic will have on future economic activity and vessel trips at California ports and terminals. Only then can CARB understand the true future emissions

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<sup>4</sup> Notably, Staff found “past recession events” instructive when granting all vessel classes but tankers relaxed compliance schedules, but apparently of no guidance whatsoever in requiring changes to assumptions of future vessel activity, emissions or health outcome assumptions. See Second Notice, p. 18.

impacts of vessel traffic, and therefore, the potential impacts of the proposed measures on health and the actual cost-effectiveness of the Proposed Regulation.

#### **VI. Staff Have Failed to Consider Making Changes to Tanker Emission Assumptions Considering the Compelling Results of a CARB-Commissioned Independent Study on Real-World Tanker Emissions**

The Second 15-Day Changes fail to account for, or even acknowledge, a 2019 study commissioned by CARB on in-service tanker emissions – a study that shows a drastically lower emission factor for tankers than the factor on which Staff are currently relying. In 2019, CARB commissioned engineers at the University of California, Riverside, Bourns College of Engineering Center for Environmental Research and Technology (“CE-CERT”) to conduct a study to evaluate real-world emissions from a modern tanker ship auxiliary boiler in the process of offloading fuel at berth. See Miller, W. et al., “Emissions Evaluation of a Large Capacity Auxiliary Boiler on a Modern Tanker,” Draft Final Report, March 2020 (attached at Tab 6) (“CE-CERT Report”). CE-CERT conducted testing of the boiler in October 2019. The draft report, which is dated March 2020, was only made available to WSPA in early July 2020.

In our February 2019 comment letter on the Proposed Regulation, we expressed concern that the emission factors being used for tanker vessels “do not provide an accurate characterization of the emissions resultant from engines and boilers aboard a modern fleet” and specifically that the “stagnant PM emission factor is of particular concern.” Staff was and still is using a 0.151 g/kWh PM2.5 emission factor and a 1.995 g/kWh NOx emission factor for tanker boilers in its emissions inventory for the Proposed Regulation. These emission factors are based on a 2002 report from Entec compiling data on vessels that were over 20 years old at that time, few of which are still in operation today.<sup>5</sup> Critically, Entec’s boiler emissions factors were derived from boilers using heavy No. 6 fuel oil – *not* the cleaner burning, low sulfur distillate fuels CARB has mandated since 2008. See Entec Report, Ch. 2, p. 16 (“Emission factor measurement data relating to gas turbines and steam turbines are scarce in comparison to diesel engines and thus a greater uncertainty is associated with these factors. For steam turbines, all recent marine emission inventory studies have relied on US data from the early 1980s (US EPA, 1985 and Scott Environmental Technology Inc., 1981). Since no new data has been found in the literature and steam engines are in general being phased out, the same emission factors are proposed here.”) The old NOx and PM2.5 emissions factors for heavy fuel oil are significantly higher than those for the low sulfur distillate fuels burned in tankers today.

Based on empirical observation, the CE-CERT Report observed tanker boiler PM2.5 emissions of 0.022 g/kg-fuel, which (using Staff’s specific fuel consumption figure) converts to a PM2.5 emission factor of 0.0066 g/kWh.<sup>6</sup> ***This empirically-derived emission factor is 96% lower than the tanker PM2.5 emission factor still being used in Staff’s assumptions.***

While it appears results on metals emissions still have yet to be added to the report due to COVID-19 related delays, its PM and NOx data appear to be complete and are directly relevant to the proposed regulation of tanker terminals in this rulemaking. Not only were the CE-CERT Report’s

<sup>5</sup> See “Quantification of emissions from ships associated with ship movements between ports in the European Community,” Entec UK Limited, Final Report (July 2002), Ch. 2 (“Entec Report”) (available at [https://ec.europa.eu/environment/air/pdf/chapter2\\_ship\\_emissions.pdf](https://ec.europa.eu/environment/air/pdf/chapter2_ship_emissions.pdf)).

<sup>6</sup> The emissions factors derived here from the CE-CERT Report were derived using the same approach as the emissions factors calculated by Starcrest for CARB, in order to ensure the numbers cited herein can be meaningfully compared with the numbers used by CARB Staff.

15-5

conclusions based on empirical data from an actual in-service tanker vessel, they also are significantly instructive as to the broader tanker fleet calling at California ports and terminals. PM2.5 emissions from modern boilers are far less than those reflected in Staff's outdated PM2.5 emission factor largely due to changes in the type of fuel used and significant improvements to tanker boiler designs over 40 years. WSPA understands that CE-CERT discussed these findings with a representative from the boiler manufacturer (Alpha Laval) and was told that the improved nozzle designs used in current marine auxiliary boilers and the use of distillate fuel markedly reduced PM2.5 emissions due to less fouling and finer droplets.

If the CE-CERT Report's empirically derived emission factor were used in Staff's emissions estimates for tankers, the projected share of statewide ocean-going vessel ("OGV") PM2.5 emissions attributable to tanker vessels would fall from 50% to 20%. Yet at the June 25 Board hearing, Staff's slide presentation continued to misrepresent tankers' share of overall OGV PM2.5 emissions as 50%. At the June 25 hearing, Staff repeatedly cited this 50% number as an important basis for not adjusting compliance timelines or other requirements in the Proposed Regulation for tanker vessels.

Similarly, the CE-CERT Report observed real-world tanker boiler NOx emissions to be 0.858 g/kWh, which is 57% smaller than the obsolete 1.995 g/kWh factor used by CARB that is based on the 40-year-old study. As with PM2.5, CARB is greatly overestimating the NOx emissions associated with tankers, and thus inflating the associated health benefits. The table below summarizes the differences in the emissions factors measured by the CE-CERT and those used by CARB.

Source	NOx (g/kWh)	PM2.5 (g/kWh)
CE-CERT	0.858	0.0066
CARB	1.995	0.151
Staff Emissions Overstated By	233%	2,288%

The CE-CERT Report establishes that Staff's NOx and PM2.5 assumptions incorrectly overstate actual tanker auxiliary boiler emissions, overstating actual NOx by 233% and overstating actual PM2.5 by a whopping **2,288%**. Thus, the results of the CE-CERT Report must be assessed and incorporated into this rulemaking, and Staff's grossly overestimated PM2.5 and NOx emission factors must be corrected.

Also, the CE-CERT Report leads to potential questions about the validity of other Staff assumptions regarding tanker emissions and the resulting projections of health impacts. Together with refining its estimates of future economic and vessel activity as discussed above, Staff must incorporate these new emissions assumptions (and any other corrected emissions assumptions) into their overall analysis of anticipated future emissions levels, cost effectiveness calculations, and other variables dependent on the tanker emissions estimates.

Regardless of what conclusions are to be drawn from the Report, Staff has a legal duty to disclose and discuss the Report's findings. If Staff believe it is necessary to await a final version of the Report or solicit additional vessel testing before addressing the new emission data in this rulemaking, Staff should delay finalizing the Proposed Regulation.

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WSPA stands ready and willing to assist Staff in doing the hard work necessary to complete a feasibility study, so that we may determine whether at-berth capture and control for tankers can be accomplished safely and in accord with the newest international tanker standards. ***But if this work is not properly completed, lives will be put at risk.*** We remain deeply concerned that Staff have now submitted two revisions of the Proposed Regulation without adequate consideration of the significant health and safety issues posed, and without building in the time necessary for a feasibility study for tankers. This study must be done before imposing compliance mandates on ports and terminals, not years later. In the meantime, Staff cannot pretend that an unprecedented worldwide pandemic will have *no* impact on future economic activity or emissions. Staff must take the time needed to assess the serious economic impacts of COVID-19 and what it will mean in terms of true future emissions from OGVs. Stakeholders and the public deserve to have this rulemaking informed by a full and fair evaluation of the facts as they stand today, not as Staff might have understood them a year ago.

Sincerely,

A handwritten signature in blue ink, reading "Catherine A. Boyd", is positioned above a thin horizontal line.

Attachments

**Western States Petroleum Association  
Comments on Second 15-Day Changes to At Berth Regulation**

**List of Attachments**

<b><u>Tab</u></b>	<b><u>Document</u></b>
1	California Energy Commission Weekly Fuels Watch Report, accessed July 23, 2020, <a href="https://ww2.energy.ca.gov/almanac/petroleum_data/fuels_watch/index_cms.html">https://ww2.energy.ca.gov/almanac/petroleum_data/fuels_watch/index_cms.html</a>
2	U.S. Energy Information Administration, Weekly U.S. Imports of Crude Oil and Weekly U.S. Exports of Crude Oil, Jan-Jul. 2020, <a href="https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=p&amp;s=mcrimp51&amp;f=m">https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=p&amp;s=mcrimp51&amp;f=m</a> )
3	Marine Exchange of Southern California, “Major Ship Types By Count; 1-15 July 2020” (July 2020)
4	International Chamber of Shipping, <i>et al.</i> , “International Safety Guide for Tankers and Terminals,” (6 <sup>th</sup> ed. 2020)
5	ABS, “Guidance Notes on Qualifying New Technologies” (April 2017)
6	Miller, W. <i>et al.</i> , “Emissions Evaluation of a Large Capacity Auxiliary Boiler on a Modern Tanker,” Draft Final Report (March 2020)



# California Energy Commission Weekly Fuels Watch Report

These numbers are based on reports from California refineries, and are subject to refinery revision and Energy Commission verification.

## California Weekly Refinery Production and Stocks Levels (Thousands of Barrels)

### Refinery Input

Production Type	05/08/2020	05/01/2020	Percent Change	One Year Ago	Percent Change



# California Energy Commission Weekly Fuels Watch Report

These numbers are based on reports from California refineries, and are subject to refinery revision and Energy Commission verification.

## California Weekly Refinery Production and Stocks Levels (Thousands of Barrels)

### Refinery Input

Production Type	05/15/2020	05/08/2020	Percent Change	One Year Ago	Percent Change
<b>Crude Oil</b>	7,890	7,472	5.6%	11,355	-30.5%



# California Energy Commission Weekly Fuels Watch Report

These numbers are based on reports from California refineries, and are subject to refinery revision and Energy Commission verification.

## California Weekly Refinery Production and Stocks Levels (Thousands of Barrels)

### Refinery Input

Production Type	05/22/2020	05/15/2020	Percent Change	One Year Ago	Percent Change
<b>Crude Oil</b>	7,857	7,890	-0.4%	11,302	-30.5%



# California Energy Commission Weekly Fuels Watch Report

These numbers are based on reports from California refineries, and are subject to refinery revision and Energy Commission verification.

## California Weekly Refinery Production and Stocks Levels (Thousands of Barrels)

### Refinery Input

Production Type	05/29/2020	05/22/2020	Percent Change	One Year Ago	Percent Change
<b>Crude Oil</b>	7,730	7,857	-1.6%	12,168	-36.5%



# California Energy Commission Weekly Fuels Watch Report

These numbers are based on reports from California refineries, and are subject to refinery revision and Energy Commission verification.

## California Weekly Refinery Production and Stocks Levels (Thousands of Barrels)

### Refinery Input

Production Type	06/05/2020	05/29/2020	Percent Change	One Year Ago	Percent Change
<b>Crude Oil</b>	8,088	7,730	4.6%	12,306	-34.3%



# California Energy Commission Weekly Fuels Watch Report

These numbers are based on reports from California refineries, and are subject to refinery revision and Energy Commission verification.

## California Weekly Refinery Production and Stocks Levels (Thousands of Barrels)

### Refinery Input

Production Type	06/12/2020	06/05/2020	Percent Change	One Year Ago	Percent Change
<b>Crude Oil</b>	8,304	8,088	2.7%	11,500	-27.8%



# California Energy Commission Weekly Fuels Watch Report

These numbers are based on reports from California refineries, and are subject to refinery revision and Energy Commission verification.

## California Weekly Refinery Production and Stocks Levels (Thousands of Barrels)

### Refinery Input

Production Type	06/19/2020	06/12/2020	Percent Change	One Year Ago	Percent Change
<b>Crude Oil</b>	8,413	8,304	1.3%	11,671	-27.9%



# California Energy Commission Weekly Fuels Watch Report

These numbers are based on reports from California refineries, and are subject to refinery revision and Energy Commission verification.

## California Weekly Refinery Production and Stocks Levels (Thousands of Barrels)

### Refinery Input

Production Type	06/26/2020	06/19/2020	Percent Change	One Year Ago	Percent Change
<b>Crude Oil</b>	8,698	8,413	3.4%	11,710	-25.7%



# California Energy Commission Weekly Fuels Watch Report

These numbers are based on reports from California refineries, and are subject to refinery revision and Energy Commission verification.

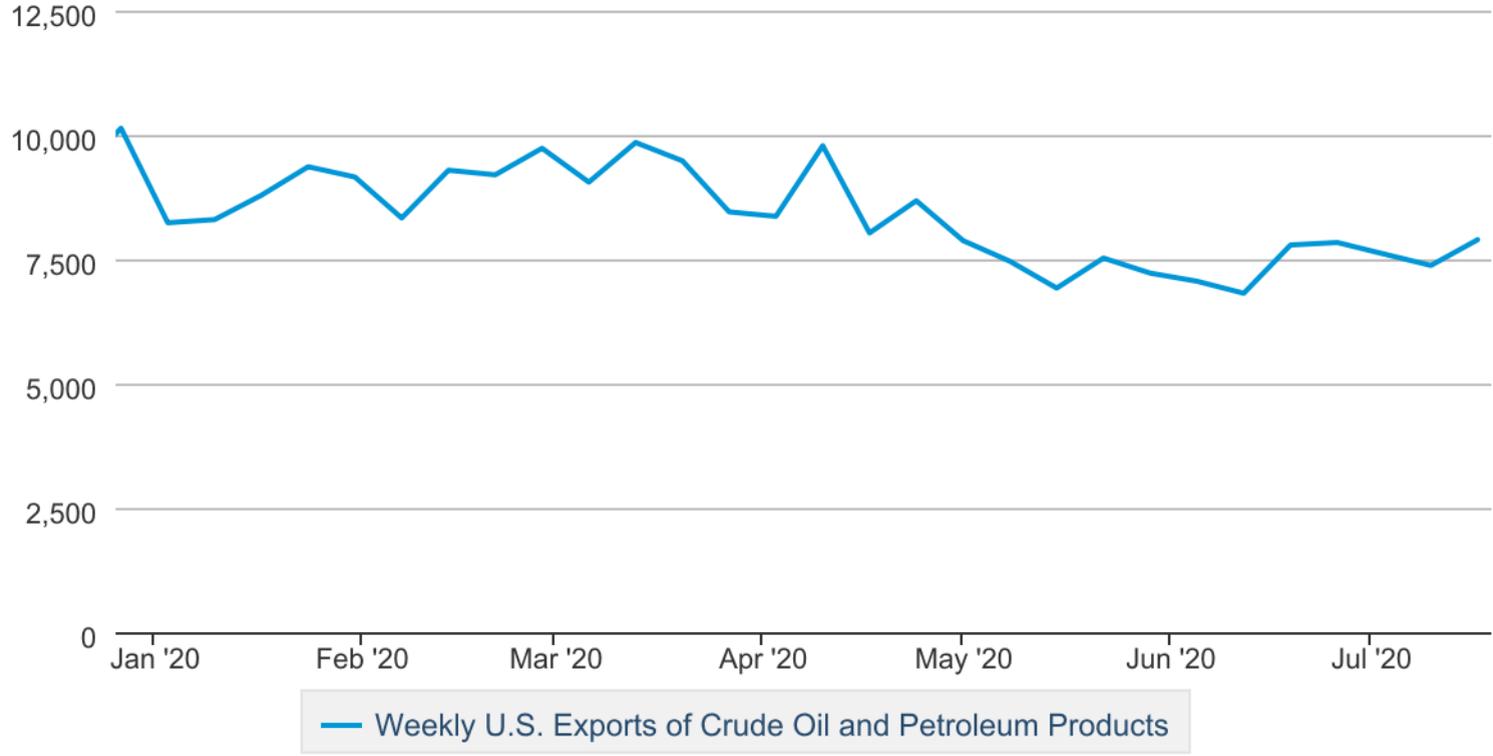
## California Weekly Refinery Production and Stocks Levels (Thousands of Barrels)

### Refinery Input

Production Type	07/17/2020	07/10/2020	Percent Change	One Year Ago	Percent Change
<b>Crude Oil</b>	8,293	8,597	-3.5%	12,189	-32%

# Weekly U.S. Exports of Crude Oil and Petroleum Products

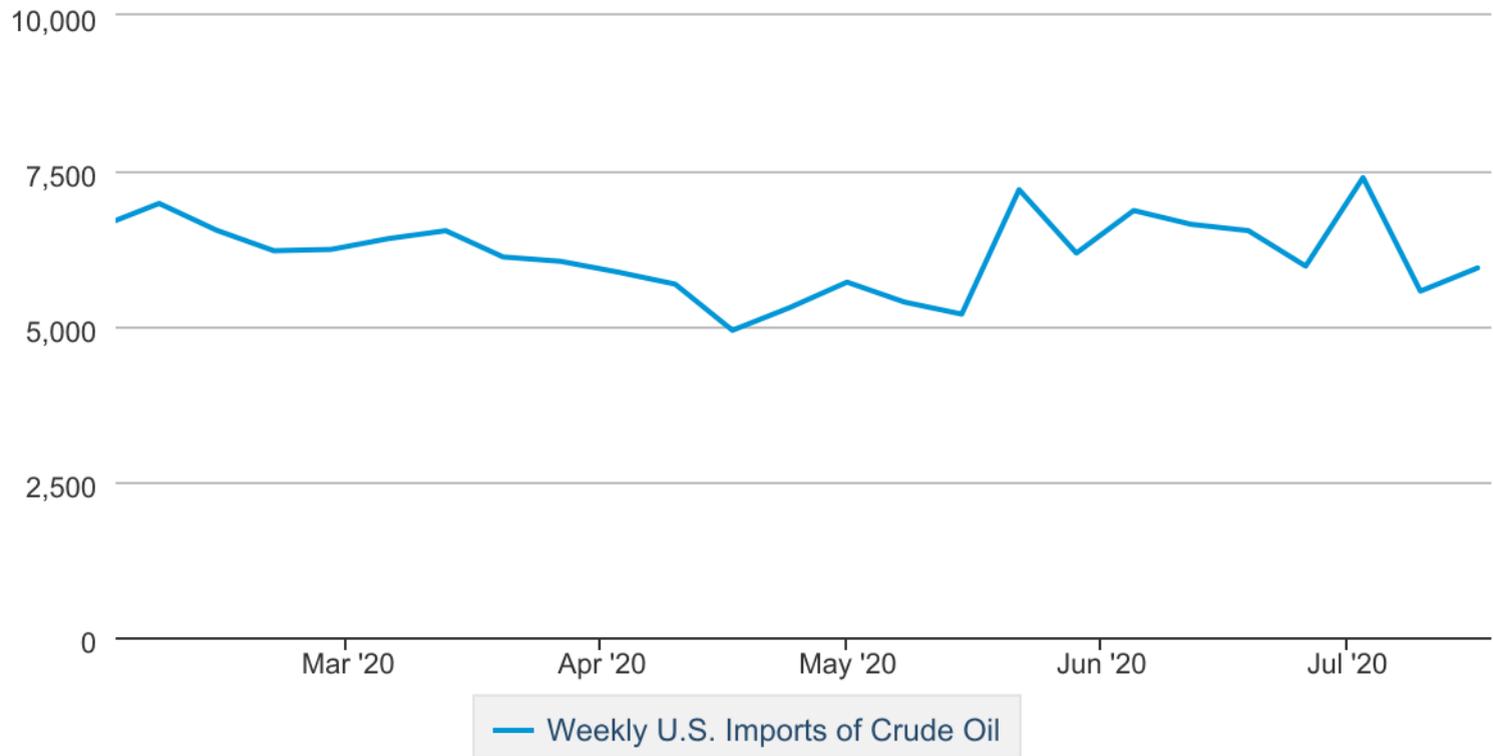
Thousand Barrels per Day



Source: U.S. Energy Information Administration

# Weekly U.S. Imports of Crude Oil

Thousand Barrels per Day



Source: U.S. Energy Information Administration

# Major Ship Types by Count

## 1-15 July 2020



15-Jul-20											Day of Current Month						
2020	2020	2020	2020	2020	2020	2020	2020		Days in 2018-2019		15			Container ships per day average 2018 - 2019			
January	February	March	April	May	June	July		730	Ships per day by type						5.67		
Actual Ship Count								Ships per day Ship Count									
Actual	Actual	Actual	Actual	Actual	Actual	Actual	Type of Ship	2018-2019 Average	January	February	March	April	May	June	July	Type of Ship	
35	33	34	35	23	23	13	Foreign Tankers	1.4	1.1	1.1	1.1	1.2	0.7	0.8	0.9	Foreign Tankers	
172	135	145	156	132	153	86	Container Ships	Color-coding is relative to 2018-2019 average								Container Ships	
5.5	4.7	4.7	5.20	4.4	5.1	5.7	Container Ships per day	5.7	5.5	4.7	4.7	5.2	4.3	5.1	5.7	Container Ships per day	
16	18	22	14	9	6	3	Vehicle Ships	0.6	0.5	0.6	0.7	0.5	0.3	0.2	0.2	Vehicle Ships	
40	31	21	0	0	0	0	Passenger Ships	1.0	1.3	1.1	0.7	0.0	0.0	0.0	0.0	Passenger Ships	
19	15	24	18	10	21	9	Bulk Carriers	0.7	0.6	0.5	0.8	0.6	0.3	0.7	0.6	Bulk Carriers	
6	16	10	1	20	16	3	General Cargo	0.5	0.2	0.6	0.3	0.0	0.6	0.5	0.2	General Cargo	
58	47	50	94	42	37	23	Bunkers Only	1.2	1.9	1.6	1.6	3.1	1.4	1.2	1.5	Bunkers Only	
411	344	371	394	294	305	163	Total										
13.3	11.9	12.0	13.1	9.5	10.2	10.9	Ships/day	12.5	13.3	11.9	12.0	13.1	9.5	10.2	10.9	Ships/day	

# ISGOTT

International Safety Guide for Oil Tankers and Terminals

**Sixth Edition**



International  
Chamber of Shipping  
Shaping the Future of Shipping



IAPH  
International Association  
of Ports and Harbors

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The International Chamber of Shipping (ICS) is the principal international trade association for the shipping industry, representing shipowners and operators in all sectors and trades.

ICS membership comprises national shipowners' associations in Asia, Europe and the Americas whose member shipping companies operate over 80% of the world's merchant tonnage.

Established in 1921, ICS is concerned with all technical, legal, employment affairs and policy issues that may affect international shipping. It represents shipowners with the various intergovernmental regulatory bodies that impact on shipping, including the International Maritime Organization (IMO).

ICS also develops best practices and guidance, including a wide range of publications and free resources that are used by ship operators globally.



Founded in 1970, the Oil Companies International Marine Forum (OCIMF) is a voluntary association of oil companies having an interest in the shipment and terminalling of crude oil, oil products, petrochemicals and gas, and includes companies engaged in offshore marine operations supporting oil and gas exploration, development and production.

Our vision is a global marine industry that causes no harm to people or the environment.

Our mission is to lead the global marine industry in the promotion of safe and environmentally responsible transportation of crude oil, oil products, petrochemicals and gas, and to drive the same values in the management of related offshore marine operations. We do this by developing best practices in the design, construction and safe operation of tankers, barges and offshore vessels and their interfaces with terminals and considering human factors in everything we do.



Founded in 1955, the International Association of Ports and Harbors (IAPH) is a non-profit-making global alliance of 170 ports and 140 port-related organisations covering 90 countries. Its member ports handle more than 60 percent of global maritime trade and around 80 percent of world container traffic. IAPH has consultative NGO status with several United Nations agencies. In 2018, IAPH established the World Ports Sustainability Program (WPSP). Guided by the 17 UN Sustainable Development Goals, it aims to unite sustainability efforts of ports worldwide, encouraging international cooperation between all partners involved in the maritime supply chain. WPSP ([sustainableworldports.org](http://sustainableworldports.org)) covers five main areas of collaboration: energy transition, resilient infrastructure, safety and security, community outreach and governance.

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## Foreword

I am very pleased to introduce the revised Sixth Edition of the *International Safety Guide for Oil Tankers and Terminals*, or *ISGOTT* as it is generally known throughout the global tanker industry and amongst the Member States of the UN International Maritime Organization (IMO).

*ISGOTT*, first published in 1978, is now widely recognised as the definitive best practice guidance on tanker safety and pollution prevention, and is a perfect example of the good cooperation that exists between the IMO and the shipping industry the Organization regulates. The authors of this major publication – the International Chamber of Shipping (ICS), the Oil Companies International Marine Forum (OCIMF) and the International Association of Ports and Harbors (IAPH) – all enjoy consultative status with the IMO and contribute significantly to its work through their active participation at IMO meetings.

I believe that a reason why *ISGOTT* has endured, and is so highly regarded, is the vital complementary role it plays in working alongside the comprehensive framework of global shipping regulation that has been adopted by the IMO to help ensure safe and pollution-free ship operations.

Global maritime regulations, enforced by Flag States, are vital for ensuring that all ships, regardless of flag, can operate safely and efficiently wherever in the world they are trading. However, further detailed guidance on best operational practice is leveraged from the vast experience of industry professionals. Industry publications such as *ISGOTT* are therefore crucial for ensuring that the aims and objectives of IMO instruments, such as the MARPOL and SOLAS Conventions, are achieved in real life.

The safety record and the environmental performance of the tanker industry has improved substantially since the adoption by the IMO of its many Conventions and Codes. This impressive improvement in performance has not been delivered by regulation alone. It is a testimony to the good practices deployed, and constantly refined, by the industry itself and the dedication and huge professionalism of the seafarers and other personnel it employs.

This firm commitment by the industry to continuous improvement is a concept fully embraced by the IMO's ISM Code, and I believe this is clearly demonstrated by the industry's ongoing efforts to keep *ISGOTT* updated.

I fully support the industry-wide collaboration that has made this new edition of *ISGOTT* possible. This is crucial to ensuring that the maritime industry will not only contribute to maintaining and further improving its excellent safety record and reducing its environmental impact, but will also bring us ever closer to the ultimate goal of zero accidents.

**Kitack Lim**  
Secretary-General  
International Maritime Organization

## Introduction to the Sixth Edition

Effective management of health, safety and environmental protection is critical to the tanker and terminal industry and the *International Safety Guide for Oil Tankers and Terminals (ISGOTT)* has become the standard reference on the safe operation of oil tankers and the terminals they serve.

*ISGOTT* was first published in 1978 by combining the contents of the *Tanker Safety Guide (Petroleum)* published by the International Chamber of Shipping (ICS) and the *International Oil Tanker and Terminal Safety Guide* published on behalf of the Oil Companies International Marine Forum (OCIMF). This revision of *ISGOTT* updates and replaces the prior Fifth Edition that was published in 2006 and has been reviewed by OCIMF and ICS together with the International Association of Ports and Harbors (IAPH). In addition, support has also been provided by other industry associations including the International Association of Independent Tanker Owners (INTERTANKO), the Society of International Gas Tanker and Terminal Operators (SIGTTO) and the Society for Gas as a Marine Fuel (SGMF), as well as specialists in topics such as human factors.

Through the combined effort of multidisciplinary subject matter experts from these industry leading organisations, this publication has been enhanced to ensure that it continues to reflect current best practice and legislation and, as a result, will maintain its position as a definitive reference for the safe operation of oil tankers and the marine terminals they visit.

This Sixth Edition encompasses the latest thinking on a range of topical issues including gas detection, the toxicity and the toxic effects of petroleum products (including benzene and hydrogen sulphide), the generation of static electricity and stray currents, fire protection and the growing use of mobile electronic technology.

In addition, the opportunity was taken to include new topics or to significantly reappraise topics previously covered that have undergone a shift in emphasis since the Fifth Edition. These include:

- Enclosed space entry.
- Human factors.
- Safety Management Systems (SMSs), including complementary tools and processes such as permits to work, risk assessment, Lock-out/Tag-out (LO/TO), Stop Work Authority (SWA) and their linkage to the underlying principles of the *International Safety Management (ISM) Code*.
- Marine terminal administration and the critical importance of the tanker/terminal interface.
- Alternative and emerging technologies.
- Bunkering operations, including the use of alternative fuels such as Liquefied Natural Gas (LNG).
- Cargo inspectors.
- Alignment with OCIMF's recently revised *Mooring Equipment Guidelines*.
- Maritime security and linkage to both the *International Ship and Port Facility Security (ISPS) Code* and industry's maritime security *Best Management Practices (BMP)*.

The Ship/Shore Safety and Bunkering Operations Checklists have also been completely revised to reflect changes in the understanding of the impact of human factors in their effective use. The importance of ensuring that individual and joint responsibilities for the tanker and the terminal are clearly communicated before arrival, as well as when alongside, is central to this objective.

The Sixth Edition of *ISGOTT* retains the four section format of:

Part 1 General Information

Part 2 Tanker Information

Part 3 Marine Terminal Information

Part 4 Ship/Shore (Tanker/Terminal) Interface

Care has been taken to ensure that where the guidance given in previous editions is still relevant and accurate, any amendments, changes or deletions have only enhanced the content and not diminished the ethos of ensuring the health, safety and environmental protection of those who use the guide.

The authors believe that *ISGOTT Sixth Edition* continues to provide the best technical guidance on oil tanker and terminal operations. All operators are urged to ensure that the recommendations in this guide are not only read and fully understood, but are also followed through their SMSs and procedures.

## Purpose and Scope

The primary purpose of the *International Safety Guide for Oil Tankers and Terminals (ISGOTT)* is to provide operational advice to assist personnel directly involved in tanker and terminal operations. It makes recommendations for tanker and terminal personnel on the safe carriage and handling of crude oil and petroleum products on tankers and at terminals. It does not, however, provide a definitive description of how tanker and terminal operations are conducted.

To achieve its purpose *ISGOTT* provides guidance on, and examples of, certain aspects of tanker and terminal operations and how they may be managed. Effective management of risk demands SMSs, processes and controls and procedures that can quickly adapt to change. Therefore, the guidance given is, in many cases, intentionally non-prescriptive and alternative procedures may be adopted by operators in the management of their operations. These alternative procedures may exceed the recommendations contained in this guide and are strongly encouraged where they will further enhance the safety objective.

When adopting alternative procedures, operators should follow a risk-based management process that incorporates systems for identifying and assessing the risks and for demonstrating how they are safely managed. Guidance in the Sixth Edition is aimed at further assisting operators of tankers and marine terminals in these principles of safe management. For shipboard operations, this course of action must satisfy the requirements of the ISM Code.

In all cases, the advice given in *ISGOTT* is subject to any international, national or local regulations that may be applicable and is intended only to complement or strengthen those requirements. Companies responsible for the operation of tankers and terminals should ensure that they are aware of any such requirements and ensure full compliance.

It is recommended that a copy of *ISGOTT* is kept and used on board every tanker and in every marine terminal to provide advice on operational procedures and the shared responsibility for operations at the ship/shore interface.

Certain subjects are dealt with in greater detail in other publications issued by the IMO, ICS or OCIMF or by other maritime industry organisations. Where this is the case, an appropriate reference is made and a list of these publications is given in the bibliography.

It is not the purpose of the guide to make recommendations on design or construction of tankers. Information on these matters may be obtained from national authorities and from authorised bodies such as Classification Societies. Similarly, the guide does not attempt to deal with certain other safety related matters, e.g. navigation, helicopter operations and shipyard safety, although some aspects are inevitably touched upon.

It should also be noted that the scope of *ISGOTT* relates only to cargoes of crude oil and petroleum products that are carried in oil tankers, chemical tankers, gas carriers and combination carriers certified for the carriage of petroleum products. Therefore, it does not cover the carriage of chemicals or liquefied gases other than in the context of where they may be used on board oil tankers, e.g. LNG as a marine fuel. The carriage of chemicals and gases as cargo are the subject of other industry guides.

Industry guidance such as *ISGOTT* is based on the best knowledge and information available to the authors. Irrespective of this and the subject matter, or how strong and important the information provided, the industry is not in a position to mandate its own advice. For this reason, industry guidance in *ISGOTT* is characterised by the word 'should'. IMO regulations implemented by national administrations are legally enforceable and, therefore, when *ISGOTT* references such regulations or their implications the term used is 'must'.

Finally, the guide is not intended to encompass offshore facilities such as Floating Production Storage and Offloading Units (FPSOs) and Floating Storage Units (FSUs); operators of such units may, however, wish to consider the guidance given to the extent that good tanker practice is equally applicable to their operations.

Comments and suggestions for improvement are always welcome for possible inclusion in future editions. They may be addressed to any of the three sponsoring organisations as follows:

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## CHAPTER 8

# Alternative and Emerging Technologies

- 8.1 Definition
- 8.2 Examples
- 8.3 Due diligence process

This chapter describes how alternative and emerging technologies can be assessed to make sure they do not affect safety on tankers and terminals. The due diligence process can be used in the tanker's SMS and safety manuals on the terminal. For more detail on alternative and emerging mooring technologies, see OCIMF's *Mooring Equipment Guidelines*.

---

### 8.1 Definition

Alternative technologies are technologies that have a documented track record in another sector but are not yet adopted in the tanker and terminal sector.

Emerging technologies are technologies that do not have a documented track record in any sector but could be developed in the future to improve the safety and the efficiency of the tanker and terminal sector.

In both cases, no known best practice would exist for the tanker and terminal sectors.

### 8.2 Examples

At the time of publication, the following alternative or emerging technologies exist:

- Marine Autonomous Surface Ships (MASS).
- Autonomous Underwater Vehicles (AUV).
- Marine mobile technology, e.g. intrinsically safe electronic tablets and telephones.
- Aerial drones.
- Robotic crawlers.
- Cold ironing.
- Methanol bunkering.
- Hydrogen fuel cell management.
- Electric cell propulsion power supply.

The list is not exhaustive. This guide does not endorse or oppose the listed technologies, but they may be considered for use following a structured due diligence and formal risk assessment process.

## 8.3 Due diligence process

### 8.3.1 Evaluation

Before considering the adoption of an alternative or emerging technology, a preliminary design review should be completed to evaluate the:

- General description and its equivalency to existing technologies.
- Functional description and its equivalency to existing technologies.
- Interface with existing technologies.
- Interface with existing systems and operational processes.
- Preliminary documentation, design drawings, general arrangements, product specifications and applicable codes and standards.
- Detailed formal safety and operational risk assessment plans, including assessments of human factors.
- Any additional design basis documentation.
- Consistency with other industry reference materials, e.g. the World Association for Waterborne Transport Infrastructure (PIANC) or the International Association of Classification Societies (IACS).

### 8.3.2 Impact

The tanker and terminal should complete an impact assessment before agreeing to use an alternative or emerging technology at the marine interface. This process should be documented and ensure that both parties have assessed and understood the risks of using the alternative or emerging technology.

If either the tanker or terminal is unable to complete the impact assessment, they should tell the other party what technology is being used and share any relevant documentation to support its use, e.g. the risk assessment and evaluation reports of design and product specifications.

If the alternative or emerging technology only affects the tanker or the terminal, the above exchange does not need to happen unless a general understanding would be useful.

### 8.3.3 Equivalency

Equivalency should be demonstrated through detailed data analysis of engineering or design studies, prototype and/or on-site testing and experience. Compare the data analysis of the alternative or emerging technology with the existing technology it is replacing or being used alongside.

Equivalency should show that the alternative or emerging technology is at least as good as the existing technology in delivering:

- The safety of tanker and terminal personnel.
- The assurance that the risks continue to be effectively managed.
- Suitable margins of safety that include the probability and consequence of system failure.
- Operational effectiveness and integrity.
- Compliance with applicable regulations, standards and recommended industry guidance and best practices.

### 8.3.4 Formal safety risk assessments

Formal, documented and detailed safety risk assessments should be carried out to understand the risks of using alternative or emerging technologies. It is recommended that personnel conducting these risk assessments:

- Are experienced in the methods of risk assessment being used.
- Have a detailed working knowledge of the alternative or emerging technology, the equivalent existing technology and industry best practices.

Classification Societies, marine consultants or other organisations may provide an independent formal safety risk assessment or guidance on how to effectively evaluate alternative and emerging technologies.

The IMO also provides guidance to administrations for approving alternatives and equivalents in MSC.1/Circ.1455 *Guidelines for the Approval of Alternatives and Equivalents as Provided for in Various IMO Instruments*.

Factors to consider in a formal safety risk assessment of an alternative or emerging technology include:

- Hazards associated with the alternative or emerging technology and/or its equivalency.
- Safeguards incorporated into the design of the alternative or emerging technology, including measures to ensure the safety of personnel.
- Human factors and any risk reducing benefits from adopting the alternative or emerging technology.
- Risk modelling to identify frequencies and potential consequences of hazards.
- Risks related to the local conditions and locally required operations.
- Issues that may require further detailed analysis and testing/evaluation.
- Issues that may require special attention with respect to operations, inspection and maintenance, including personnel, equipment and systems redundancy.
- How the alternative or emerging technology works under different environmental conditions, e.g. air temperature, marine spray or ice.

### 8.3.5 Stakeholder engagement

The number and type of stakeholders involved in evaluating an alternative or emerging technology will depend on its impact and the complexity of its implementation.

Stakeholder mapping is recommended for identifying stakeholders who are important to the evaluation and success of the alternative or emerging technologies.



**GUIDANCE NOTES ON**

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**QUALIFYING NEW TECHNOLOGIES**

**APRIL 2017**

**American Bureau of Shipping  
Incorporated by Act of Legislature of  
the State of New York 1862**

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## Foreword

The marine and offshore industries regularly develop new technologies that have no service history in the proposed application or environment. Often, governing industry codes and regulations do not develop at the same pace as technology. These new technologies have little or no precedent and may be so different from existing designs that the requirements contained in class Rules may not be directly applicable.

These Guidance Notes describe the ABS approach for qualification of new technologies to confirm their ability to perform intended functions in accordance with defined performance requirements. This document also provides details regarding the required submittals and the key interaction points with ABS during the new technology development to benefit from ABS involvement as a trusted advisor.

A systems engineering approach to qualification is introduced in this document that allows for systematic and consistent evaluation of new technologies as they mature from a concept through confirmation of operational integrity in their intended applications. The approach is divided into a five stage process that is aligned with the typical product development phases of a new technology:

- Feasibility Stage
- Concept Verification Stage
- Prototype Validation Stage
- System Integration Stage
- Operational Stage

Completion of qualification activities within each stage of the new technology qualification process results in a Statement of Maturity issued to the client attesting to the maturity level of the new technology. Upon completion of the Prototype Validation Stage, the new technology may be “Type Approved” under the ABS Type Approval Program to limit repeated evaluation of identical designs for eligible products. During the Prototype Validation Stage, if all the engineering evaluations have been completed, a Product Design Assessment (PDA) can be issued prior to further consideration for ABS Type Approval.

The integration of the new technology qualification process with the Novel Concept Class Approval process (as presented within the *ABS Guidance Notes on Review and Approval of Novel Concepts*) provides end users of the qualified technologies with the added benefit that the transition from new technology qualification to Class Approval will be seamless. It provides regulatory agencies with the confidence that all hazards associated with the introduction of the new technology to the market has been systematically identified and mitigated. It is to be noted that when applying these Guidance Notes for certification or classification purposes in conjunction with Novel Concept Class Approval process, the primary driver for classification acceptance will be safety even though there may be additional functional requirements (e.g., reliability) defined by the client.

These Guidance Notes become effective on the first day of the month of publication.

Users are advised to check periodically on the ABS website [www.eagle.org](http://www.eagle.org) to verify that this version of these Guidance Notes is the most current.

*We welcome your feedback. Comments or suggestions can be sent electronically by email to [rsd@eagle.org](mailto:rsd@eagle.org).*

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The information presented herein is intended solely to assist the reader in the methodologies and/or techniques discussed. These Guidance Notes do not and cannot replace the analysis and/or advice of a qualified professional. It is the responsibility of the reader to perform their own assessment and obtain professional advice. Information contained herein is considered to be pertinent at the time of publication, but may be invalidated as a result of subsequent legislations, regulations, standards, methods, and/or more updated information and the reader assumes full responsibility for compliance. This publication may not be copied or redistributed in part or in whole without prior written consent from ABS.



# GUIDANCE NOTES ON QUALIFYING NEW TECHNOLOGIES

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## SECTION 1 Introduction

### 1 Overview

These Guidance Notes describe the ABS approach for qualification of new technologies to confirm their ability to perform intended functions in accordance with defined performance requirements. They also provide details of the required submittals, the ABS review process and the key interaction points with ABS during the new technology development.

This document introduces a systems engineering approach to qualification that allows for systematic and consistent evaluation of new technologies as it matures from a concept through confirmation of operational integrity in its intended application. The approach is divided into a multi-stage process that is aligned with the typical product development phases of a new technology. The qualification activities within each stage employ risk assessments and engineering evaluations that build upon each other in order to determine if the new technology provides acceptable levels of safety in line with current offshore and marine industry practice. The qualification efforts by all stakeholders including the vendor, system integrator and end-user at each stage are recognized and captured within a new technology qualification plan (NTQP). Completion of qualification activities as identified within each stage of the NTQP results in a Statement of Maturity being issued by ABS attesting to the maturity level of the new technology.

The process is also compatible with approaches based on technology readiness levels (TRLs), (e.g. API RP 17N/Q, ISO 16290/NASA, and US DoD); and can be tailored to projects that require the use of multiple pathways to qualification. The comparison of ABS Qualification Stages with industry TRLs can be found in Appendix 2.

It is to be noted that when applying these Guidance Notes for certification or classification purposes in conjunction with Novel Concept Class Approval process, the primary driver for classification acceptance will be safety even though there may be additional functional requirements (e.g., reliability) defined by the client.

### 3 Background

The marine and offshore industries regularly develop new technologies that have no service history in the proposed application or environment. Often, governing industry codes and regulations do not develop at the same pace. These new technologies have little or no precedent and may be so different from existing designs that the requirements contained in class Rules may not be directly applicable.

Marine vessels and offshore units which contain new technological features or designs that are not currently governed by Rules, Guides and existing industry standards may still be qualified and/or approved by ABS through the process described in these Guidance Notes. This qualification is on the basis that the Rules, Guides, and existing industry standards, insofar as applicable, have been complied with, and that special consideration through appropriate risk assessments and engineering evaluations has been given to the new features through the application of these Guidance Notes.

These Guidance Notes are structured to provide a general procedure for vendors/system integrators/end-users to guide them through the process of obtaining Statements of Maturity attesting to the maturity level of new technologies. The process can be applied to technologies seeking qualification independent of class approval or installation on ABS classed assets.

The integration of the new technology qualification process and the Novel Concept Class Approval process provides end users of the qualified technologies with the added benefit that the transition from new technology qualification to Class Approval will be seamless. It provides regulatory agencies with the confidence that hazards associated with the introduction of the new technology has been systematically identified and mitigated.

## 5 Application

These Guidance Notes are in general applicable to all new technologies for offshore units and marine vessels that do not follow typical Rules, Guides, or industry codes or standards. This document provides guidance to parties seeking recognition for the maturity level of a proposed new technology.

A new technology for the purpose of these Guidance Notes is defined as any design (material, component, equipment or system), process or procedure which does not have prior in-service experience, and/or any classification rules, statutory regulations or industry standards that are directly applicable. It is possible to categorize the type of “novelty” in one of four categories:

- i) Existing design/process/procedures challenging the present boundaries/envelope of current offshore or marine applications
- ii) Existing design/process/procedures in new or novel applications
- iii) New or novel design/process/procedures in existing applications.
- iv) New or novel design/process/procedures in new or novel applications

An asset such as a marine vessel or an offshore unit becomes a novel concept if the incorporation of any new technology(ies) appreciably alters its service scope, functional capability, and/or risk profile. Novel concepts are typically presented to ABS for review and class approval following the process in the *ABS Guidance Notes on Review and Approval of Novel Concepts (Novel Concept Guidance Notes)*.

The New Technology Qualification (NTQ) process could be applicable in the following cases:

- i) To qualify new technology that may need to be classed or certified at a later date
- ii) To simultaneously qualify new technology identified while seeking class approval for a novel concept
- iii) To qualify a new technology independent of the need to be classed or certified

If the proposed new technology is intended for incorporation on an asset to be classed by ABS, then it is recommended that the new technology complete up to and including the System Integration Stage of the New Technology Qualification (NTQ) process. In other cases, the level of maturity to which the new technology may be qualified depends on the client’s request. New technology qualification could be requested from ABS at any level of indenture as desired such as component, sub-system or system level.

The process is designed to accommodate cases where multiple vendors, system integrators, and/or end-users need to work together to qualify a combination of new technologies. In such cases, it is important for the teams to work together to integrate technologies as early as possible in order to optimize the process. Even though these Guidance Notes are primarily intended for the qualification of new technologies, the approach could also be applied to qualify existing technologies.

## 7 New Technology Qualification Process

The NTQ process confirms the ability of a new technology to perform its intended functions in accordance with defined performance requirements. The process starts with a comprehensive description of the technology to be qualified, followed by a screening of the technology to reveal the new or novel features that the qualification should focus on.

The process is divided into five sequential stages that progressively qualify the technology from feasible to operational stages as requested. The five qualification stages are:

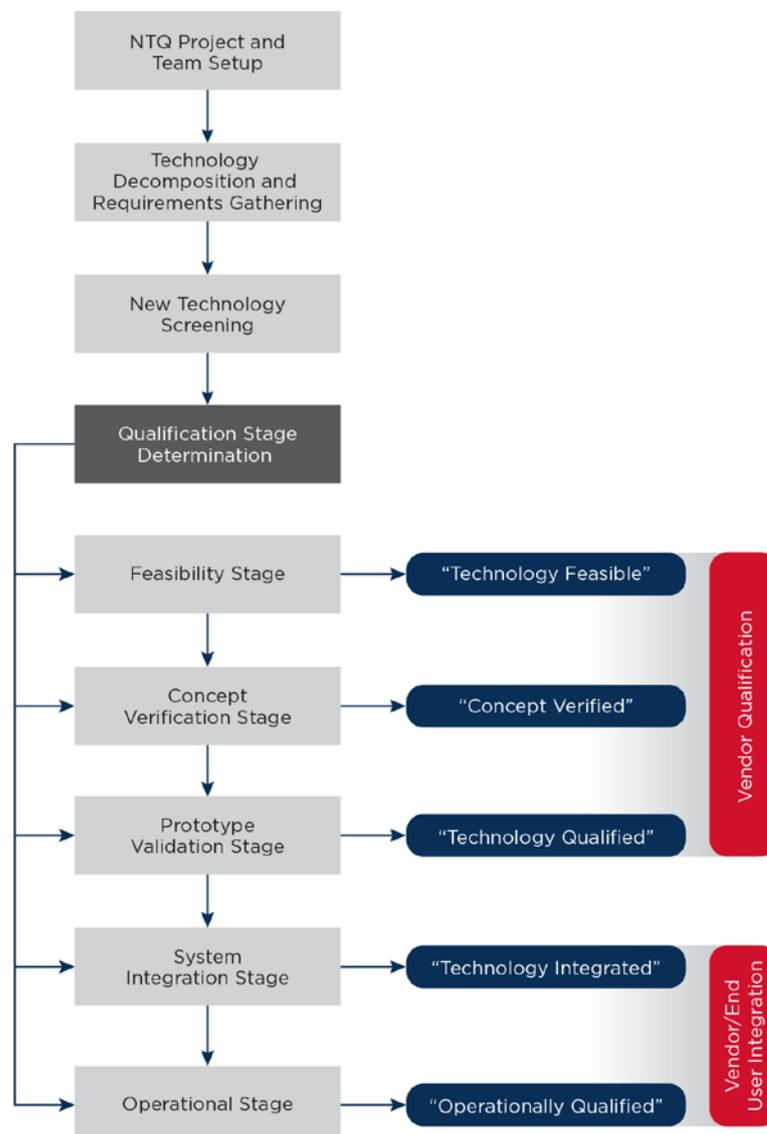
- i) Feasibility Stage
- ii) Concept Verification Stage
- iii) Prototype Validation Stage
- iv) System Integration Stage
- v) Operational Stage

Qualification activities outlined in the New Technology Qualification Plan (NTQP), are to be performed within each stage and should be defined at the end of the previous stage as agreed between the client and ABS. The qualification activities are based on the information available depending on the maturity level and based on the findings and knowledge gained in the previous stages completed. Typically, there are two main sets of activities within each stage, namely, engineering evaluations and risk assessments.

Upon completion of each of the five stages, a Statement of Maturity will be issued to the vendor(s) and the technology can progress to the next stage of maturity. It is envisioned that some vendors may have developed technologies to a level beyond the Feasibility Stage prior to contacting ABS for this qualification service. In such cases, ABS would perform an assessment of the current stage of technology development and endorse the technology with the applicable Statement of Maturity based on this assessment. The technology qualification can then proceed starting at that stage and continuing to the subsequent stages. Additionally, the new technology qualification process can be stopped at any stage, and restarted at an agreed upon time.

Section 1, Figure 1 provides a basic overview of the process along with the Statements of Maturity issued. Further guidance on each topic and deliverables that are to be submitted to ABS for review can be found in later Sections.

**FIGURE 1**  
**New Technology Qualification Process**



## 9 ABS Type Approval Program

New technologies that have completed the Prototype Validation Stage of the NTQ process or have been “Technology Qualified”, and can be consistently manufactured to the same design and specification may be “Type Approved” under the ABS Type Approval Program. During the Prototype Validation Stage, if all the engineering evaluations have been completed, a Product Design Assessment (PDA) can be issued prior to further consideration for ABS Type Approval. The ABS Type Approval Program is a voluntary option for the demonstration of compliance of a system or product with the defined performance requirements as derived from Rules, Guides, or other recognized standards. It may be applied at the request of the vendor or manufacturer. The suitability of the ABS Type Approval Program for the proposed new technology will be determined on a case-by-case basis.

Specific requirements and details regarding the ABS Type Approval Program can be found in 1-1-4/7.7 and Appendix 1-1-A3 of the *ABS Rules for Conditions of Classification (Part 1)*.

## 11 Definitions

*As Low As Reasonably Practicable (ALARP)*. Refers to a level of risk that is neither negligibly low nor intolerably high, for which further investment of resources for risk reduction is not justifiable. Risk should be reduced to ALARP level considering the cost effectiveness of the risk control options.

*Approval*. Confirmation that the plans, reports or documents submitted to ABS have been reviewed for compliance with one or more of the required Rules, Guides, standards or other criteria acceptable to ABS.

*Availability*. Ability of an item to be in a state to perform a required function under given conditions at a given instant of time or over a given time interval, assuming that the required external resources are provided (ISO 14224).

*Boundary*. Interface between an item and its surroundings (ISO 14224).

*Client*. The vendor, OEM, manufacturer, asset owner/operator of the new technology or novel concept, representing any party or parties that have a stake or interest in the design or third party groups working under or for these entities.

*Consequence*. The measure of the outcome of an event occurrence in terms of people affected, property damaged, outage time, dollars lost or any other chosen parameter usually expressed in terms of consequence per event or consequence amount per unit of time, typically per year.

*Controls*. The measures taken to prevent hazards from causing undesirable events. Controls can be physical (e.g., safety shutdowns, redundant controls, added conservatism in design, etc.), procedural (e.g., operating procedures, routine inspection requirements, etc.) and can also address human factors (employee selection, training, supervision).

*Critical Assumption*. An assumption that if found not true will change the conclusions of the study that used such assumption.

*Engineering Evaluations*. Various engineering analysis tools and testing that may be used to support new technology qualification activities. Typical examples include but not limited to the following: Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD), Functional and Performance Testing, Model Testing, System Integration Testing, etc.

*Failure*. The loss of the ability to perform the intended function.

*Failure Causes*. Circumstances associated with design, manufacture, installation, use and maintenance that have led to a failure (ISO 14224).

*Failure Mechanism*. A physical or chemical process resulting in a form of damage which will ultimately lead to failure.

*Failure Mode*. The specific manner of failure that the failure mechanism produces.

*Functional Specification*. Document that describes the features, characteristics, process conditions, boundaries and exclusions defining the performance and use requirements of the product, process or service (ISO 13880).

- Frequency.* The occurrence of a potential event per unit of time, typically expressed as events per year.
- Global Effects.* Total effect an identified failure has on the operation, function or status of the installation or vessel and end effects on safety and the environment.
- Hazards.* Conditions that exist which may potentially lead to an undesirable event.
- Indenture Level.* The level of subdivision of an item from the point of view of maintenance action (ISO 14224).
- Item.* Any part, component, device, subsystem, functional unit, equipment or system that can be individually considered (ISO 14224).
- Local Effects.* Impacts that an identified failure mode has on the operation or function of the item under consideration or adjacent systems.
- Maintainability.* Ability of an item under given conditions of use, to be retained in, or restored to, a state in which it can perform a required function, when maintenance is performed under given conditions and using stated procedures and resources (ISO 14224).
- Manufacturing Assessment (MA).* An inspection of the product during manufacture, an assessment of the quality control system and manufacturing processes that must be satisfactorily completed if the manufacturer wants a product to be labeled “Type Approved” under the ABS Type Approval Program.
- Manufacturing Plan.* Document setting out the specific manufacturing practices, technical resources and sequences of activities relevant to the production of a particular product including any specified acceptance criteria at each stage (ISO 13880).
- Product Design Assessment (PDA).* Technical evaluation of a product for potential use on ABS-classed assets. The process involves ABS Engineers verifying product compliance with manufacturers’ specifications, applicable ABS Rules and national or international standards.
- Quality Assurance and Quality Control.* Typical quality plans and related processes for controlling quality during production.
- Qualification.* The process of confirming, by examination and provision of evidence, that equipment meets specified requirements for the intended use (API RP 17N).
- Qualification Activities.* Usually in the form of risk assessments, engineering evaluations, and testing that is required to be performed in order to mature the new technology to the next stage.
- Qualification Plan.* A document containing the qualification activities listed to mature the new technology to the next qualification stage. This is submitted as a New Technology Qualification Plan (NTQP) report.
- Redundancy.* Existence of more than one means for performing a required function of an item (ISO 14224).
- Reliability.* Ability of an item to perform a required function under given conditions for a given time interval (ISO 14224).
- Risk.* The product of the frequency with which an event is anticipated to occur and the consequence of the event’s outcome.
- Risk Profile.* Description of any set of risks (ISO 31000).
- Technical Specification.* Document that defines technical requirements to be fulfilled by the product, process or service in order to comply with the functional specification (ISO 13880).
- Type Approval.* A voluntary ABS Program for product certification that is used to demonstrate a product manufacturer’s conformance to the Rules or other recognized standards. The Product Design Assessment (PDA) and Manufacturing Assessment (MA) together result in a Type Approval or a “Type Approved” product.
- Validation.* The process of evaluating a production unit (or full scale prototype) to determine whether it meets the expectations of the customer and other stakeholders as shown through performance of a test, analysis, inspection, or demonstration.
- Verification.* The process of evaluating a system to determine whether the product of a given development stage satisfy the approved requirements and can be performed at different stages in the product life cycle by test, analysis, demonstration, or inspection.

## 13 Abbreviations

ALARP	As Low As Reasonably Practicable
API	American Petroleum Institute Recommended Practice
CFD	Computational Fluid Dynamics
FEA	Finite Element Analysis
FMECA	Failure Mode Effects and Criticality Analysis
FTA	Fault Tree Analysis
HAZOP	Hazard and Operability
HAZID	Hazard Identification
HFE	Human Factors Engineering
ITP	Inspection Test Plan
MA	Manufacturing Assessment
MTBF	Mean Time Between Failure
NTQ	New Technology Qualification
NTQP	New Technology Qualification Plan
PDA	Product Design Assessment
PFD	Process Flow Diagram
P&ID	Piping and Instrumentation Diagram
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
RAM	Reliability, Availability and Maintainability
RBD	Reliability Block Diagram
SRDD	Systems Requirements and Description Document
SIT	Systems Integration Test
US DoD	United States Department of Defense



## SECTION 2 Getting Started

### 1 New Technology Qualification Project and Team Setup

Once the client (vendor/system integrator/end-user) requests qualification of a technology using these Guidance Notes, a project kick-off meeting is scheduled. At this meeting, the client presents to ABS a brief overview of their proposed technology along with their expectations, any ongoing qualification activities (if initiated) and project timelines. ABS will advise the client if new technology qualification is the most appropriate path for proceeding and recommend next steps.

The kick-off meeting is followed by the establishment of a new technology qualification team. An important factor for a successful technology qualification is the composition of the qualification team. The qualification process involves the interaction of two teams: the vendor or client team (design team) and the ABS-designated review team.

For each NTQ project, depending on the complexity of the proposed new technology, ABS may establish a special multidisciplinary review team comprised of ABS staff members. The composition of the team will depend on the technical areas involved in the project as well as the physical location of the client's engineering and testing facilities. This will help the client benefit from technical review and comment from our subject matter experts throughout the qualification process. One of the members will be the designated NTQ project lead to act as the client's main point of contact throughout the NTQ process. All ABS team members will be covered under the confidentiality/non-disclosure agreement that is typically signed between ABS and clients for this type of qualification services.

It is encouraged whenever possible to include ABS, system integrators and end users of the new technology early in the qualification process. This will facilitate the identification and alignment of requirements early in the design process avoiding costly design modifications later. If applicable, input from regulatory agencies (including flag Administration) will also help align the qualification activities with requirements or other expectations.

### 3 New Technology Decomposition and Requirements Gathering

#### 3.1 Introduction

The NTQ process follows a systems engineering approach to qualifying new technology. This approach focuses on the following elements:

- Defining goals of the new technology
- Identifying the functional requirements to meet the goals
- Identifying the performance requirements for the functional requirements
- Performing qualification activities to verify and validate the performance requirements

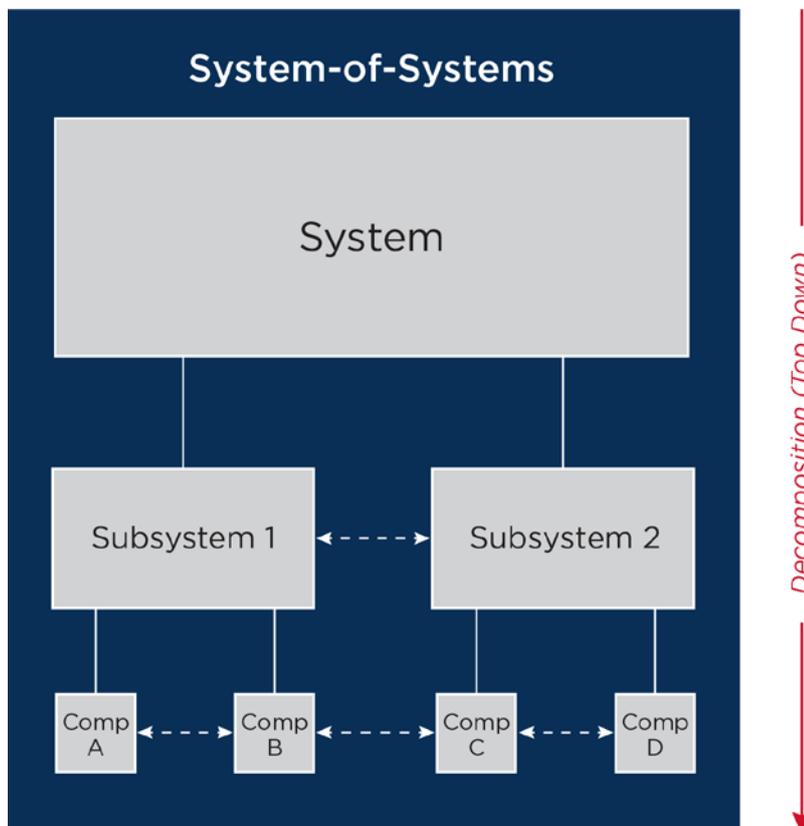
The qualification process starts with a top-down system decomposition, wherein the system is divided into subsystems, which are further broken down into components. This decomposition process is used in order to achieve the following:

- Mapping functional requirements of the system to item(s) (e.g., subsystems or components) identifying ownership of a specific functional requirement,
- Mapping functional requirements to specific performance requirements,
- Confirming that all defined functional requirements can be addressed by configurable items,
- Identifying new technology items prior to determining if qualification is needed and what interactions between items need to be considered.

Depending on the type of item for which the client is seeking qualification, the NTQ process can be tailored. This is applied by considering the different categories of new technology as defined in Subsection 1/5 and understanding what exactly has changed to focus qualification efforts.

The maximum maturity level of the system is based on the individual qualification of each item(s). For example, the overall maturity level of the system is equal or lower than that of the subsystems, which are equal or lower than that of the individual components. The decomposition, system hierarchy and interactions between all items are depicted in Section 2, Figure 1.

**FIGURE 1**  
**New Technology System Hierarchy**



The item for which new technology qualification is desired could be at any level of indenture within the system hierarchy. System-of-Systems (SoS) refers to the larger system with which integration of the new technology could occur. This SoS could be another system or an asset such as a marine vessel or an offshore unit. The asset becomes a novel concept if the incorporation of any new technology(ies) appreciably alters its service scope, functional capability, and/or risk profile.

### 3.3 New Technology System Requirements and Description Document

Properly defining a new technology is a critical aspect of NTQ. For this purpose, a system requirements and description document (SRDD) should be developed for the new technology and maintained throughout the NTQ process. This document defines and sets the baseline requirements for the new technology and may be derived from functional and technical specifications. The requirements will be defined for each level within the system hierarchy as applicable. As the design matures through development and more knowledge is gained through qualification, these requirements may be subject to change. The SRDD will need to be updated accordingly.

#### 3.3.1 Defining System Requirements

*3.3.1(a) Goals.* The goals defined for the new technology should identify the high-level scope, objectives, or requirements that the new technology needs to meet. Goals may be derived from client's needs, mission, measures of effectiveness, environmental or application constraints, program/policy decisions and/or requirements derived from tailored specifications or standards.

*3.3.1(b) Functional Requirements.* Functional requirements define each function that the system is required to perform. The functional requirements should be mapped to specific items that will perform the function and typically includes a description of the function to be performed, the environment within which the function should be performed, the conditions under which the system should start the function and the conditions under which the system should terminate the function.

*3.3.1(c) Performance Requirements.* The performance requirements define how well each functional requirement should be accomplished, and the set of performance metrics including identification of critical performance parameters. The performance requirements can be defined qualitatively at early design stages and progressively more quantitatively during subsequent stages of technology maturation. In case where performance requirements are not defined because of the novelty of the technology, the requirements should be extrapolated from existing Rules, Guides, and/or other industry standards. Any relevant requirements from regulatory agencies or Flag Administration should be also considered. The performance criteria is the acceptance criteria against which the results of each qualification activity is evaluated.

The requirements should be defined according to NATO AVT-092 "Qualification by Analysis" and/or ISO 13879 "Petroleum and natural gas industries – Content and drafting of a functional specification". The aspects to consider for inclusion while defining functional requirements and related performance requirements may vary depending on the new technology to be qualified but typical considerations include:

*3.3.1(d) Design Conditions.* The system design conditions describe all applicable loading requirements under the environmental and operating conditions. This should include, but not be limited to, the natural environment (e.g., temperature and chemical exposure), the induced environment (e.g., vibration and noise), electromagnetic signal environment, and threats. Typical loading and design conditions to be considered include, but are not limited to, the following:

- Pressure and temperature induced loads and fluctuations
- Static and dynamic loads
- Fatigue and fracture effects
- Wear and vibration effects
- Material degradation and associated loss from damage mechanisms
- Accidental loads (as applicable)

*3.3.1(e) System Interface Requirements.* The system interface requirements define all internal and external physical and functional interfaces (e.g., mechanical, electrical, etc.) relevant to the new technology. Interfaces among system elements should also include interfaces with the human element. The system interface definition confirms that various elements of the system can functionally and physically interact with each other and with all external systems they connect to or communicate with. A graphic description of the interfaces can be used when appropriate for clarity.

3.3.1(f) *Human System Integration Requirements.* Human factors play an important role for the system to work safely and effectively in achieving required functions and goals, and should be considered throughout the design life of the new technology. Human factors requirements (ergonomics) define the characteristics of human system interaction in terms of usability, safety, human reliability, performance, effectiveness, efficiency, maintainability, and health. It is important that human factors be considered during early design stages.

Human Factors Engineering (HFE) is a specialized engineering discipline that integrates human behavioral and physical capabilities and limitations with traditional engineering disciplines to produce a human-system interaction that maximizes the best of both, allowing both the human and system to work together in achieving functional and performance requirements.

The focus of HFE is the design of the human-system interface. This includes interfaces between personnel and the hardware, software, and physical environments associated with systems. It also involves the interfaces between personnel, individual tasks, and the overall work system (e.g., its structure, management, policies, and procedures). A good starting point is defining usability requirements which identify user needs and expectations. Usability requirements define the appropriate allocation of functions between users and the technology as well as the measurable effectiveness, efficiency, and satisfaction criteria in specific contexts of use.

During the design process, specific areas, stations, or equipment arrangement that would require concentrated human engineering attention should be defined. Any special requirements, such as constraints on allocation of functions to personnel and communications and personnel/equipment interactions, should be specified. Successful application of HFE depends on a proper process of conducting the appropriate activities in the various stages of the development lifecycle of the system.

Further guidance on Human Factors Engineering can be found in the following references:

- *ABS Guide for Ergonomic Notations*
- *ABS Guidance Notes on the Implementation of Human Factors Engineering into the Design of Offshore Installations*
- *ABS Guidance Notes on the Application of Ergonomics to Marine Systems*
- *ABS Guidance Notes on Ergonomic Design of Navigation Bridges*
- *Standard Human Engineering Program Requirements for Ships and Marine Systems, Equipment and Facilities, Standard 1337. American Society of Testing and Materials (ASTM) (2010)*
- *Common Requirements, Architectural Components & Equipment (C-CR-002). Norwegian Oil Industry Association and the Federation of Norwegian Engineering Industries (NORSOK). (1996)*
- *Working Environment (S-002). Norwegian Oil Industry Association and the Federation of Norwegian Engineering Industries (NORSOK). (2004)*

3.3.1(g) *Maintainability.* Specify the quantitative maintainability requirements that apply to maintenance in the planned maintenance and support environment. Examples are as follows (ISO 29148):

- Time (e.g., mean and maximum downtime, reaction time, turnaround time, mean and maximum times to repair, mean time between maintenance actions)
- Rate (e.g., maintenance staff hours per specific maintenance action, operational ready rate, maintenance time per operating hour, frequency of preventative maintenance)
- Maintenance complexity (e.g., number of people and skill levels, variety of support equipment, removing/replacing/repairing components)
- Maintenance action indices (e.g., maintenance costs per operating hour, staff hours per overhaul)
- Accessibility to components within systems and to parts within components

*3.3.1(h) Reliability.* Reliability describes the ability of a system or component to function under stated conditions for a specified period of time. Reliability requirements determine the robustness, consequences of, and redundancy of the system. Reliability requirements are best stated as quantitative probability statements that are measurable by test or analysis, such as the mean time between failures (MTBF) and the maximum acceptable probability of the failure during a given time period.

*3.3.1(i) Safety and Environment.* Safety and environmental requirements applicable to eliminating or minimizing hazards related to people, environment, and asset.

*3.3.1(j) System Life Cycle Sustainment.* The system life cycle sustainment requirements include activities that relate to sustaining the quality or integrity of the system. Typical requirements include, but are not limited to, support, sparring, sourcing and supply, provisioning, technical documentation, personnel support training for all modes of operation (e.g., installation, hook-up, commissioning, and decommissioning) throughout the life cycle of the system. These requirements should be updated as needed in order to sustain performance.

*3.3.1(k) Data Management and System Security.* For data-intensive systems, the management of information should be defined. The information management requirements should define the information the system receives, stores, generates and exports as well as the backup of the information.

System security requirements define both the surrounding environment (i.e., location) of the system and the operational security requirements. For example, to protect the system from accidental or malicious access, use, or destruction, some protection methods (e.g., access limitations, use of passwords, or the restriction of communications between some areas of the system) can be used. For control systems that govern multiple critical aspects of the assets, insights should be provided for operations, maintenance and support of cyber-enabled systems, to improve security in those systems.

The ABS CyberSafety™ program addresses cyber-enabled systems protection in an extended set of engineering processes that emphasizes human and systems safety. For further guidance on this program refer to the following documents:

- *ABS Guidance Notes on Application of Cybersecurity Principles to Marine and Offshore Operations – ABS CyberSafety™ Volume 1*
- *ABS Guide for Cybersecurity Implementation for the Marine and Offshore Operations – ABS CyberSafety™ Volume 2*
- *ABS Guidance Notes on Data Integrity for Marine and Offshore Operations – ABS CyberSafety™ Volume 3*
- *ABS Guide for Software Systems Verification – ABS CyberSafety™ Volume 4*
- *ABS Guidance Notes on Software Provider Conformity Program – ABS CyberSafety™ Volume 5*

### 3.3.2 System Description

The SRDD is also to include a detailed technology description. This involves additional documentation that could help provide evidence or demonstrate the ability of the technology to meet defined system requirements. The description of the technology typically includes the following:

- i)* Equipment list
- ii)* Comparison with existing similar technologies
- iii)* Lessons learned from similar technologies
- iv)* Possible applicable standards, codes, or industry practices

- v) Relevant engineering documents as applicable:
  - Piping and Instrumentation Diagrams (P&IDs)
  - Heat and material balances
  - Block diagrams
  - Design schematics
  - General arrangements
  - Material specifications including material properties
  - Design analysis methodology and related reports
  - Installation analysis
  - Test reports
- vi) Control and safety system details
- vii) Operational, maintenance, and inspection strategies
- viii) New or unproven manufacturing, assembly, transit, storage, installation, hook-up, testing, commissioning, and decommissioning details
- ix) Quality, health, safety, and environmental philosophies

The SRDD needs to be submitted for ABS review. The SRDD is not intended to be a single consolidated document but a design review package that compiles the relevant documents.

It is recognized that the requirements definition and the supporting description documentation is developed throughout the NTQ process. The submittal only needs to include the information available based on the design maturity of the new technology.

## 5 New Technology Screening

Once the technology has been described, a systematic screening process is needed in order to identify the new or novel elements, characteristics, or environment for which qualification is needed. The decomposed system should be reviewed to identify which of those items are considered new technology, as defined in Subsection 1/5, and which ones are not. The level of effort involved in qualification increases from categories *i*) through *iv*). Items that are not considered new technology could follow the conventional ABS certification process.

For new technology items, it is useful to identify whether similar technology exists and whether relevant Rules, Guides, and/or standards apply wholly or partially for this technology. Identifying the new technology items provides a basis for reducing the qualification scope to only those items that need to be addressed through the NTQ process. The vendors could perform the screening process independently or in a workshop setting with ABS, which will help support/guide the process. Section 2, Table 1 below, is a sample table that can be used for a systematic screening.

**TABLE 1**  
**Systematic Screening Table**

<i>Item</i>	<i>Description</i>	<i>Similar Technology Exists?</i>	<i>Relevant Rules, Guides, or Industry Standards for This or Similar Technology?</i>	<i>New Technology (Yes/No)</i>	<i>New Technology Category (i, ii, iii, iv)</i>	<i>Notes</i>
1		Technology 1, Technology 2...	Standard 1 (partially) Standard 2 (No)...	Yes	<i>i</i>	
2		No	Standard 1 (partially) Standard 2 (partially)...	Yes	<i>iii</i>	
3		This technology exists	N/A	No	N/A	

**Columns:**

*Description:* Description of elements of the new technology item(s) (e.g., subsystems)

*Similar Technology Exists?:* Identify whether similar technologies exist, for example, technologies in other industries (e.g., onshore, aerospace, etc.). If existing technology exists, list them in this column.

*Relevant Standards for This or Similar Technology:* List of any standards applicable to the new technology with short explanation about applicability.

*New Technology (Yes/No):* Decide which technologies are new and which are not.

*New Technology Category:* As defined in Subsection 1/5:

- i)* Existing technology challenging current boundary/envelope
- ii)* Existing technology in new applications
- iii)* New technology in existing applications
- iv)* New technology in new applications

*Notes:* Other information or justification relevant to the screening process (e.g., conditions for applicability of standards, recommendations for qualification, etc.).

The systematic screening results and supporting information is to be submitted for ABS review.

## 7 New Technology Stage Determination

Based on the results from the new technology screening process and review of the SRDD, ABS and the client will agree on a maturity level determination. An appropriate qualification stage will be assigned to proceed, with qualification activities. A detailed questionnaire for determining the technology maturity level and qualification stage can be found in Appendix 3.

A more mature design could result in the ability to start at a later qualification stage, thus minimizing the level of effort and time it takes to complete qualification of the new technology. Once credit has been given to the design maturity and the appropriate qualification stage is determined, the client can proceed through the qualification process outlined in the following Sections:

- Feasibility Stage (Section 3)
- Concept Verification Stage (Section 4)
- Prototype Validation Stage (Section 5)
- System Integration Stage (Section 6)
- Operational Stage (Section 7)

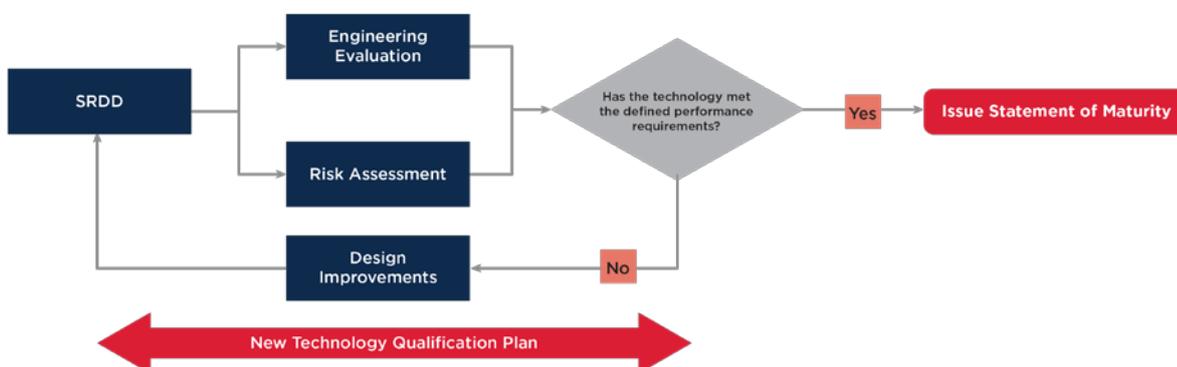
## 9 New Technology Qualification Plan and Activities

The New Technology Qualification Plan (NTQP) defines a roadmap for progressing the new technology through the appropriate qualification stages. The objective of the NTQP is to provide a summary of qualification activities that need to be performed at each stage in order to demonstrate the ability of the new technology to meet the requirements specified in the SRDD.

The initial NTQP should be developed based on the findings in the screening process in Subsection 2/5. The NTQP for each subsequent stage is updated based on the findings from the previous stage activities and discussions between the client and ABS. A NTQP template is provided in Appendix 4.

Qualification within each stage is comprised of a set of iterative activities that include engineering evaluations and risk assessments to verify new technology design. Results of these activities could lead to design improvements or modifications to the requirements specified in the SRDD. All design improvements and/or modifications should be documented in the NTQP with necessary technical justification. Section 2, Figure 2 summarizes the iterative NTQP activities.

**FIGURE 2**  
**New Technology Qualification Stage Iterative Process**



### 9.1 Risk Assessment Requirements

As stated in Subsection 2/9, a risk assessment is to be prepared and submitted to ABS for review.

For a new technology requesting qualification through the NTQ process, a risk assessment is to be performed/updated at each stage as applicable. The risk assessment within the NTQ process will vary from qualitative to quantitative depending on the maturity level and information available at that stage. The primary objective of the risk assessment is to identify technical risks and uncertainties associated with the proposed design and document all foreseeable hazards, their causes, consequences, and potential risk control measures considering the new technology in its proposed application and operating environment. All possible interfaces, and known integrations are to be evaluated as part of this assessment.

All risk assessments performed must consider the following areas:

- i) Personnel safety
- ii) Asset protection
- iii) Environmental protection

It is recommended that the risk assessment be carried out by a multidisciplinary team that includes the design team (vendor) and the end-user. ABS' participation in the risk assessment is also recommended. Appendix 2 of the *ABS Guide for Risk Evaluations for the Classification of Marine-Related Facilities* provides an overview of how to assemble an appropriate risk assessment team.

Prior to performing the risk assessment, a risk assessment plan should be prepared and submitted to ABS for review. The risk assessment plan should include the following information:

- i) Scope of the Assessment
  - a) Description of the proposed new technology including physical and operational boundaries
  - b) Intended service application of the new technology
- ii) Assessment Team
  - a) Subject matter experts/participants/risk analysts, including their background and areas of expertise
- iii) Assessment Preparation
  - a) All available new technology information (e.g., design basis, drawings, procedures, etc.),
  - b) Proposed risk assessment method (e.g., FMECA)
  - c) Proposed risk assessment criteria for evaluation (e.g., risk matrix)

After the risk assessment has been completed, a report that includes the following information should be submitted to ABS for review:

- i) Scope
  - a) Description of the proposed new technology including physical and operational boundaries
  - b) Intended service application of the new technology
- ii) Risk Assumptions and Data References
- iii) Supporting Engineering Documents
  - a) Technical drawings
- iv) Risk Assessment Worksheets (Hazard Register) that
  - a) Identifies hazards associated with the new technology in its current boundary conditions (application and operating environment),
  - b) Identifies scenarios associated with each identified hazard,
  - c) Identifies causes of the hazardous scenario,
  - d) Identifies consequences of the hazardous scenario,
  - e) Identifies existing risk control measures for each hazardous scenario,
  - f) Estimates the likelihood (frequency) and the severity of the consequence,
  - g) Evaluates the risk of the hazardous scenario by measuring it against the acceptable risk criteria agreed upon by the analysis team,
  - h) Identifies and evaluates the need for any recommendations to lower the risk to acceptable levels (design improvements through risk control measures)
- v) Conclusions and Recommendations
  - a) Action items and/or recommendations

Further guidance on developing basic and detailed risk assessment plans can be found in Section 5 and Section 6, respectively of the *ABS Guide for Risk Evaluations for the Classification of Marine-Related Facilities*.

It is recognized that each new technology may be unique in terms of design, operating environment, and application, therefore it is difficult to provide precise guidance on which risk assessment techniques should be used in a given situation. Therefore the selection of risk assessment methodology should be considered on a case-by-case basis and discussed with ABS prior to performing a risk assessment. Some typical recommended risk assessment techniques and their common uses can be found in Section 2, Table 2.

**TABLE 2**  
**Recommended Risk Assessment Techniques**

<i>Type of Study</i>	<i>Description</i>	<i>Common Uses</i>
HAZID	A method to rapidly identify hazards, assess potential consequences, and evaluate existing safeguards of the system. Methods draw upon a highly experienced multi-disciplinary team using a structured brainstorming technique to assess applicability of potential hazards.	<ul style="list-style-type: none"> <li>Used for all types of systems and processes.</li> </ul>
FHA	A functional hazard assessment (FHA) is used to identify and assess the functional failures of a system or subsystem.	<ul style="list-style-type: none"> <li>Used for all types of systems and processes.</li> </ul>
FMEA (Failure Mode and Effects Analysis)	An FMEA is a reasoning approach best suited to reviews of mechanical and electrical hardware systems. The FMEA technique (1) considers how the failure modes of each system component can result in system performance problems and (2) makes sure the proper safeguards are in place. A quantitative version of FMEA is known as failure modes, effects and criticality analysis (FMECA).	<ul style="list-style-type: none"> <li>A design FMEA/FMECA can be used for reviews of mechanical and electrical systems (e.g., fire suppression systems, vessel steering and propulsion systems) to identify design related failures.</li> <li>A process FMEA is often used to identify failures while performing steps within a given process or procedure (e.g., manufacturing, assembly).</li> </ul>
Hazard and Operability (HAZOP) analysis	The HAZOP analysis technique uses special guide words for (1) suggesting departures from design intents for sections of systems and (2) making sure that the proper safeguards are in place to help prevent system performance problems.	<ul style="list-style-type: none"> <li>Used for finding safety hazards and operability problems in continuous process systems, especially fluid and thermal systems. It can also be used to review procedures and other sequential or batch operations.</li> </ul>

Further guidance on risk assessments techniques can be found in the following references:

- *ABS Guidance Notes on Risk Assessment Applications for the Marine and Offshore Oil and Gas Industries*
- *ABS Guidance Notes on Failure Mode and Effects Analysis (FMEA) for Classification*
- *Petroleum and Natural Gas Industries – Offshore Production Facilities – Guidelines on Tools and Techniques for Hazard Identification and Risk Assessment, ISO 17776*
- *Risk Management – Risk Assessment Techniques, ISO 31010*
- *Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment, SAE ARP 4761*

### 9.3 Engineering Evaluation

Engineering evaluations are used to verify and validate that the new technology is capable of performing acceptably with respect to intent and overall safety according to the requirements of each stage. This is achieved gradually for each qualification stage through specific qualification activities as the technology matures and can be found in the NTQP. The types of activities for engineering evaluation are:

- i) *Review Engineering Design Requirements.* As the technology matures, and more detailed design information becomes available, the functional and performance requirements are reviewed/updated as needed.
- ii) *Technical Analyses and Simulations.* Engineering design analyses and simulations are used to verify the technology at the earlier qualification stages
- iii) *Validation Testing.* Functional, model testing, and prototype testing are used to verify that the new technology satisfies all the specified functional and performance requirements.
- iv) *Interface Analyses.* Interface analyses of the technology with existing systems are required and system integration testing is needed in order to fully understand all interactions between the new technology and surrounding systems, including people and the environment.
- v) *Verification of Operability.* Operational testing and the collection of test data are required to verify the new technology satisfy the operational requirements.

- vi) *Verification of Inspectability and Maintainability.* The various components of the new technology must be reviewed to confirm that they can be monitored, inspected and maintained in a manner consistent with existing practice.
- vii) *Quality Assurance and Quality Control (QA/QC) Program.* Establish and maintain an effective quality control procedure(s) and quality acceptance criteria at each stage in accordance with recognized industry standard.

## 9.5 Design Improvements

Based on the results of the engineering evaluation and risk assessment activities, design improvements may be necessary to enhance reliability and safety of the design. The opportunities to improve safety could be through changes or modifications that make the design inherently safer or implementation of appropriate risk control measures. Example design changes include, material changes, reconfiguration, redundancy, and loading requirements.

Any design improvements that are identified and determined necessary as part of further refinement of the new technology is to be re-evaluated against the functional and performance requirements outlined in SRDD. The updated qualification activities should aim to meet these new requirements. Design improvements should be tracked in the NTQP.

The following sections should be considered when improving the design of any new technology.

### 9.5.1 Hierarchy of Risk Control Measures

Inherently safe design exists in something as a permanent and inseparable element. In other words, the risk control measures in place are “built in”, not “added on”. Identification of measures to control risks identified throughout the qualification process can be summarized in the following list:

- i) *Elimination or Substitution.* Elimination of the design element, or the hazard associated with it should always be the first consideration. Careful evaluation may indicate that the functional requirements may be accomplished by another design element.
- ii) *Engineering.* Engineering controls are mechanical or physical features added to the equipment, systems, subsystems, and/or components in order to remove or control the hazard, either by initial design specifications or by applying methods of substitution, minimization, isolation, or ventilation.
- iii) *Administrative.* Administrative controls rely more actively on human action and behavior. Examples of administrative controls include written operating procedures, maintenance and inspection strategies, checklists, safety meetings, alarms, signs, training of personnel.
- iv) *Personal Protective Equipment.* Personal protective equipment (PPE) creates a barrier between the person wearing the PPE and the hazard associated with the job. PPE such as hearing protection, protective clothing, safety glasses, respirators, gloves, welding aprons, and hardhats are methods of controlling hazards.

In general, inherently safe design is more of a philosophical way of thinking rather than a specific set of tools or methods. For example, a hazard might be considered “safe” because it has specific risk reducing measures in place. Inherently safe design asks the question, “can it be safer?”

The goals of inherently safe design can be summarized by the following:

- Fewer and smaller hazards
- Fewer causes that initiate hazardous events
- Reduced severity and consequences (e.g. fatalities, lost time incidents, asset damage, etc.)
- More effective management of residual risk

The inherently safe design approach to achieve goals of safer design should consider elimination or substitution to significantly reduce hazards. The following questions should be asked when considering the design of new technologies with hazardous potential:

1. Can the hazard be eliminated by design improvements?
2. If not, then can the magnitude of the hazard be reduced?
3. Do the alternative designs identified in question 1 and 2 increase the magnitude of other hazards or present new hazards?
4. What other risk control measures (engineering or administrative) are required to manage hazards that remain?

An inherently safe design approach to design improvements is recommended in order to eliminate design elements that are limiting the new technology from meeting defined functional and performance criteria. This philosophy should shift focus on improving design by implementing elimination, substitution, or engineering risk control measures.

### 9.5.2 Management of Change

Design improvements are inevitable during the course of technology design and development and are integral to the process, especially during the early design phases. These improvements can potentially have an impact on risk, and on previously performed qualification activities during the NTQ process. For this reason, it is important that clients establish an appropriate Management of Change (MoC) program. It is recommended that a MoC program be developed to confirm that design improvements are reviewed in a responsible manner by appropriate personnel.

A MoC program is a combination of policies and procedures used to evaluate the potential impacts of a proposed design improvement so that it does not result in unacceptable risks. Developing an effective MoC strategy requires establishing, documenting, and successfully implementing formal policies to evaluate and manage both temporary and permanent modifications including equipment, materials, procedures and conditions.

The techniques used to evaluate the improvement, the people available for review, the time frames for reviewing and implementing the improvement will differ between the design phases. During the early phases, there may be many design improvements, but there will be fewer records to update than if the improvement occurs at a later stage. Tools such as software simulations and preliminary risk analysis can prove extremely valuable when determining design improvements at early stages and are less labor intensive than in later stages.

An effective MoC program requires preparation beyond defining and documenting a policy to outline the system. The following factors are important to successful implementation of a MoC program:

- i) Clear roles and responsibilities
- ii) Appropriate organizational preparation
- iii) A written MoC program manual that includes MoC forms
- iv) Pilot roll-out before the full-scale deployment, training of affected personnel, and
- v) Close attention when integrating MoC with existing programs.

The following references provide more details on Management of Change processes:

- *ABS Guidance Notes on Management of Change for the Marine and Offshore Industries*
- *API RP 750, Management of Process Hazards, American Petroleum Institute, Washington, DC, 1990*
- *API RP 75, Recommended Practice for Development of a Safety and Environmental Management*
- *Program for Offshore Operations and Facilities, American Petroleum Institute, Washington, DC, 2004*
- *Guidelines for Management of Change for Process Safety, Center for Chemical Process Safety CCPS, 2008*



## SECTION 3 Feasibility Stage

### 1 Introduction

A new technology considered for qualification in the Feasibility stage is at an early concept maturity level, where basic research and development activities to identify engineering principles are complete; and a concept formulated along with its functional requirements. A high-level design analysis is performed to verify the concept in the intended application and that the overall proposed level of safety is comparable to those established in Rules, Guides, other recognized industry standards and recommended practices.

In cases where multiple concepts are submitted for ABS review, the overall objective is to work with ABS to identify a concept that proves most feasible for the application with respect to safety and reliability.

### 3 Qualification Activities

#### 3.1 Engineering Evaluation

The engineering evaluation at the Feasibility Stage involves a high-level design verification of the proposed concept. All goals, functional requirements, and performance requirements submitted as part of the SRDD in 2/3.3 are reviewed along with any available high-level engineering design analysis to verify that the proposed concept is feasible.

#### 3.3 Risk Assessment

A high-level risk assessment should be carried out during this stage to identify any preliminary technical risks and uncertainties associated with the proposed concept. The risk assessment should focus on documenting all foreseeable hazards, their causes, consequences, and potential risk control measures considering the new technology in its proposed application and operating environment. Additionally, all possible interfaces and known integrations should be considered. This risk assessment should set the basis for any subsequent qualitative/quantitative assessments that may need to be performed to completely understand the new technology's risk profile. Subsequent assessments may be in the form of additional engineering evaluation or risk assessments.

The results of the risk assessment should be documented and tracked in a hazard register for assessment and implementation in future qualification stages. The primary function of the hazard register should be to demonstrate that hazards and appropriate risk control measures have been identified. Recommendations for additional risk assessments and engineering evaluations are to be documented and submitted as part of the NTQP.

An appropriate risk assessment technique should be selected for this high-level risk assessment and submitted to ABS for review in the form of a risk assessment plan as discussed in 2/9.1. The engineering evaluation documents that support the risk assessment should be available and at an appropriate level of maturity before the risk assessment is performed. The following high-level risk assessment techniques are recommended as options for identifying preliminary technical risks:

- i)* HAZID identifying possible hazards, events, and outcomes related to the impact on personnel, asset, environmental, and reputation
- ii)* Functional FMEA identifying possible failure modes, effects (local and global), causes, and preliminary safeguards including all interfaces (i.e. system to system, system to subsystem, etc.)
- iii)* Functional Hazard Analysis (FHA) identifying system/sub-system functions and hazards associated with those functional failures

A risk assessment report including the hazard register should be prepared. The risk assessment report and the NTQP should be submitted to ABS for review.

There may be specific cases where the information available at this maturity level is limited and a risk assessment technique may not be possible. This scenario will be treated on a case-by-case basis, and ABS will recommend an alternative approach as needed to meet the new technology Feasibility Stage requirement.

## 5 Summary of Submittals

The following qualification activities along with future activities for the Concept Verification Stage should be highlighted in the NTQP and submitted to ABS for review:

### 5.1 Engineering Evaluation

*i)* SRDD

- Design basis, functional specification and/or technical specification of the new technology
- System and function architecture details such as functional flow block diagram
- Design details such as basic engineering drawings and engineering principles associated with further development
- Design analysis methodology and any available preliminary results
- Details regarding physical and functional interface requirements (mechanical, hydraulic, electronic, optical, software, human, etc.)
- Applicable design references, codes, standards and guidelines, and technical justification for any proposed deviations (may be identified independently or during the new technology screening process)
- Lessons learned, references and examples of comparable designs

### 5.3 Risk Assessment

- i)* Risk assessment plan in accordance with 2/9.1
- ii)* The appropriate risk assessment report identified in 3/3.3
- iii)* Hazard Register complete with an action tracking system

## 7 Feasibility Stage Completion: Technology Feasible

Once the above deliverables have been submitted to ABS for review and all specified performance requirements have been verified, then a Statement of Maturity will be issued stating that the technology is feasible. The technology is now ready to proceed to the Concept Verification Stage.



## SECTION 4 Concept Verification Stage

### 1 Introduction

The second stage of the NTQ process is the Concept Verification Stage. The new technology is verified as performing its functions in accordance with defined performance requirements. This is accomplished by performing more detailed engineering studies and physical (or virtual) model testing. Reliability testing of select items may be performed. The operating conditions and the relevant environment are further refined. The functional and performance requirements outlined in the SRDD are re-evaluated, verified, and updated (as needed). The interfaces between configurations are verified against functional and performance requirements.

In addition, the production strategy is developed in the form of a preliminary manufacturing plan. A design risk assessment is carried out to identify technical risks related to design failures. Risk assessments from the Feasibility Stage are reviewed and updated (as needed) based on the design development in this stage.

### 3 Qualification Plan Activities

#### 3.1 Engineering Evaluation

##### 3.1.1 Engineering Design Review

At the Concept Verification Stage, the concept is confirmed and the engineering design is performed to verify that the functionality and performance of the new technology can be satisfied. The subsystem and component level requirements following the systems engineering approach should be defined if not specified at the Feasibility Stage. The objective is to define complete and consistent requirements that an item should have and confirm that the design correctly and completely captures each specification in the system requirements.

The performance requirements should state how the technology will perform its function and how the system requirements will be met. The performance requirements are to be established and should be detailed enough that the technology can be evaluated against the expected performance criteria. In addition, the requirements for the integration of subsystems and components into system prototypes should be defined. The overall configuration of the system should be provided and a preliminary interface analysis should be performed to verify the interfaces between configurations.

Design constraints should be identified and incorporated into the system requirements and design documentation. At this stage, the system requirements should be stated in quantitative measures that can be verified by subsequent numerical or analytical models and model tests. The overall system requirements defined at the Feasibility Stage should be reviewed to confirm continued relevance. Any change should be reviewed and documented with technical justification.

A preliminary manufacturing plan should be developed and should include the manufacturing methods and processes, the facilities, the production schedule, and the quality assurance requirements. The materials used in the system should be determined and reviewed during the qualification process. The technology design documentation is to be submitted for ABS review.

### 3.1.2 Functional and Model Testing

Tests are an essential part of the NTQ process and they can demonstrate the performance of the new technology. The types of tests required depend on the novelty of technology itself and pre-existing experience with similar concepts.

Functional and model tests are used to verify the functionality of the system and its ability to meet the defined functional requirements. Testing is to be performed in the technologies anticipated environment and operating conditions. The objectives of the functional testing are to verify that the system meets the performance and reliability requirements, as well as to verify the results obtained from the analytical models. The functional testing should consider and address the critical failure modes identified during the risk assessments.

For the new materials or those that can have a significant effect on the performance of the system, destructive or non-destructive testing should be used to identify the relevant failure modes and mechanisms or to explore the critical parameters and their effects. The same raw materials or components stated in the material specification for the actual product should be used in the tests. For materials that will degrade over time, materials degradation testing should be performed. Accelerated testing methods may be used to test the lifetime performance of the materials in a shorter time. Additionally, reliability testing for select items may be required.

Before performing any testing, a test plan should be developed and submitted to ABS. The test plan should document the test setup and strategy that will be used to verify that a product meets its design specifications and other requirements. The specific test plans should include the assumptions and constraints, input data, test procedures, expected test results, the parameters to be measured, instrumentation system specifications, and the acceptance criteria for evaluating results. For certain tests, it may be required for an ABS Surveyor to witness the testing activities to verify that it meets performance requirements and confirm the presence of an effective quality control program. Further guidance on function and model testing can be found in references [10], [11], [12] and [13] listed in Appendix 1.

## 3.3 Risk Assessment

The objective of the risk assessment in this stage is to identify technical risks associated with the new technology design to the lowest level of indenture as practicable. The updated concept level design engineering documentation from the Feasibility Stage and the additional engineering documents developed in this stage serve as input to the risk assessment. This design risk assessment should take into account the following:

- Any design modifications from the Feasibility Stage
- Updated functional and performance requirements
- Updated configurations
- Possible interfaces and integrations
- All potential failure modes, failure causes and failure mechanisms in all expected operational modes and life cycle stages
- The effectiveness of existing risk control measures and the need for any additional or more reliable measures
- Closing out any action items (qualification activities) as agreed in the Feasibility Stage

Based on the findings of this risk assessment, additional qualification activities in the form of risk assessments or engineering evaluation may be required to further assist in identifying and assessing the full potential ranges of failure causes, failure mechanisms, consequences and any related uncertainties. These additional studies may be coarse, detailed, or a combination depending on the objective of the study. The results of the risk assessment should be documented and tracked in a hazard register for assessment and implementation in future qualification stages. The resulting qualification activities should be documented within the NTQP. A risk assessment report including the hazard register should be prepared. The risk assessment report and the NTQP should be submitted to ABS for review.

A risk assessment technique that is appropriate for reviewing the new technology design should be selected and submitted as part of the risk assessment plan to ABS. Potential design related failure events in all anticipated operational modes should be evaluated. Typically, for hardware or mechanical systems, a Failure Mode Effects and Criticality Analysis (FMECA) is recommended. The FMECA performed can help evaluate failure modes and corresponding failure causes, failure mechanisms, and the local and global effects of failure. It also includes a criticality analysis which is used to estimate the probability of failure and the severity of the associated consequence. The probability can be qualitative if lacking historical quantifiable data, but quantitative probabilities are preferred. The method of assigning criticality should be included within the risk assessment plan and agreed by ABS prior to the study. Results from the FMECA should be relayed back to the design process of the new technology to facilitate any design improvements or FMEA verification activities. Further guidance on FMECA and related verification activities can be found in the *ABS Guidance Notes on Failure Mode and Effects Analysis for Classification*.

The following risk assessments verifying all technical risks are to be performed and submitted to ABS for review.

- i) Design risk assessment (e.g., FMECA) as described above.
- ii) Update Feasibility Stage risk assessments as needed based on updated design documentation.
- iii) Perform any additional risk assessments identified while verifying the design and/or updating previous risk assessments.

If reliability, availability and maintainability (RAM) targets are defined as part of the functional requirements then a preliminary system RAM analysis should be carried out in this stage. System modeling techniques such as reliability block diagrams (RBD), fault tree analysis (FTA), Markov state diagrams or other established methods should be used to demonstrate the ability of the system to meet the defined performance requirements. The FMECA serves as input to the system reliability models along with the other engineering documentation developed at this stage. A RAM analysis should be prepared and submitted for ABS review. The data sources used, their applicability and any related assumptions should be documented within this report.

## 5 Summary of Submittals

The following qualification activities along with future activities to be addressed in the Prototype Validation Stage should be highlighted in the NTQP and submitted to ABS for review:

### 5.1 Engineering Evaluation

- i) SRDD
  - a) Documents that describe the concept verification design requirements
  - b) Design documents that include but not limited to the configuration, drawings, PFD/P&ID, analytical models, etc.
  - c) Functional and model test plans, test data (as requested), and test results
- ii) Preliminary manufacturing plan

### 5.3 Risk Assessment

- i) Updated risk assessments from the Feasibility Stage (as applicable)
- ii) Updated Hazard Register with updated action items closed out
- iii) Preliminary design risk assessment (e.g., FMECA) report
- iv) Preliminary system RAM analysis report (as applicable)

## 7 Concept Verification Stage Completion: Concept Verified

Once the above have been submitted to ABS for review and all specified performance requirements have been verified, then a Statement of Maturity will be issued stating that the concept has been verified. The technology is now ready to proceed to the Prototype Validation Stage.



## SECTION 5 Prototype Validation Stage

### 1 Introduction

The third stage of the NTQ process is the Prototype Validation Stage. New technology that has matured to this stage has previously completed conceptual functional, performance, and reliability testing in nonspecific environments. The main objective in this stage is to validate with a prototype what was verified in the Concept Verification Stage.

During this stage, the technology is further developed to the point where a prototype or full scale production unit can be manufactured. All engineering studies and design risk assessments are completed and the design is refined to the detailed design. Engineering documents such as detailed drawings, product specifications, manufacturing plan and qualification test procedures are all fully developed. A preliminary system-of-systems interface analyses may be performed and system integration testing plan developed. Process risk assessments may be carried out (as needed) to evaluate relevant procedures and further refine them.

A prototype or full scale production unit is manufactured and all necessary qualification testing is carried out to validate the design. After completing this stage, the new technology has demonstrated that it can perform within the established performance requirements in a simulated or actual environment for an extended period of time.

### 3 Qualification Plan Activities

#### 3.1 Engineering Evaluation

##### 3.1.1 Engineering Design Review

At the Prototype Validation Stage, the engineering design is to confirm that the overall system, down to the lowest component level, has satisfied all system requirements. The performance requirements a technology must meet should be finalized and measurable. In addition, the requirements for system integration, installation, commissioning, operation, maintainability, and decommissioning should be established.

At this point the system has reached the necessary level of maturity to start fabricating, integrating, and testing. Changes in the requirements defined for any items during the previous stages should be reviewed and documented with technical justification.

At this stage, all design analyses and configuration definitions are completed and all design decisions that are outstanding are to be finalized. It is noted that there may be a need to revisit certain analytical and other relevant studies based on results of the prototype test. Detailed drawings including all dimensional requirements, process and instrument details, safety features and ancillary systems are completed as applicable. For load bearing components, all relevant loading and the uncertainty in that loading are analyzed. For process and electrical systems, all associated potential system failure/breakdowns and their associated failure frequencies (if applicable), as well as the consequence and impact on the system from each failure are identified.

In addition, all information (e.g., drawing and data) required for the production of the system are to be finalized. The actual performance of the new technology should be evaluated during prototype testing and compared against existing designs if available. The aforementioned design engineering documents are to be submitted to ABS for review. A preliminary system-of-systems interface analyses and system integration testing plan may be developed at this stage and submitted to ABS for review before the System Integration Stage.

### 3.1.2 Prototype Testing

Prototype testing is intended to prove that the interactions between the systems/subsystems/components under relevant loading and environmental operating conditions can perform reliably as intended. Prototype tests can identify potential failure modes and mechanisms as well as the critical parameters, especially when operational experience in relevant environments is limited or unknown.

Prototype testing can be used to verify the analytical models and the assumptions made during the engineering design process. A test plan which details test techniques, test limits, expected test data, quality assurance requirements should be developed and submitted to ABS for review before prototype testing. Calibration of measuring devices is to be current with manufacturer's quality management system. Calibrations should be traceable to a recognized national standard (e.g., NIST, ANSI, etc.).

For certain new technologies, it may be very difficult to perform prototype testing in the actual environment. In this case, virtual prototype testing in a simulated environment can be performed. However, the virtual prototype testing must be reviewed by ABS to assess that the simulated environments are commensurate with expected operational practices. Analysis tools, such as finite element analysis (FEA) and computation fluid dynamics (CFD), and other methods used should be qualified for application. The prototype testing documents should include inputs, assumptions, boundary conditions, the computational models and appropriately conditioned/reported test results. Prototype test results should be documented and analyzed to determine whether the prototype satisfies specified functional and performance requirements in its actual environment. A prototype test report is to be submitted to ABS for review. Further guidance on prototype testing can be found in references [10], [12], [13] and [14] listed in Appendix 1.

### 3.1.3 Manufacturing

A manufacturing plan should be finalized that includes the manufacturing methods and processes, the facilities, the production schedule, and quality assurance requirements. Quality assurance of the manufacturing process should confirm that the product meets the required specifications. The manufacturing plan should be submitted to ABS for review. Further guidance on developing a manufacturing plan can be found in references [15], [16] and [34] listed in Appendix 1.

### 3.1.4 ABS Survey

Survey during the manufacturing process and prototype testing may be required. The vendor should submit an Inspection Test Plan (ITP) to ABS for review. The ITP should define witness points and hold points as agreed between the vendor and ABS. The ABS Surveyor should witness the manufacturing process and prototype testing to verify that proper manufacturing and prototype testing processes are followed and it meets the quality assurance requirements.

## 3.3 Risk Assessment

The main objective of the risk assessments performed in the Prototype Validation Stage is to validate the final design of the new technology. The design risk assessment (e.g., hardware design FMECA) from the Concept Verification Stage should be reviewed and updated to evaluate changes made to the design and/or other aspects of the new technology description. Changes made to one part of the design or new technology design requirements could have the potential to introduce new technical risks to other previously evaluated parts. The results of other qualification activities in this stage may also serve as input to the updated design risk assessment. Follow-on qualification activities determined from the results of the updated design risk assessment should be included within the NTQP.

For certain new technologies with high consequence severity levels upon failure, if not already addressed by other risk assessments, ABS may recommend that an additional process risk assessment (e.g., process FMECA or HAZOP) is performed. The objective of this risk assessment is to evaluate the potential failures that could occur during specific steps as listed within the procedures. This process risk assessment typically evaluates procedures related to manufacturing (as defined within the final manufacturing plan), testing (prototype and systems integration), installation/integration, commissioning, operations and decommissioning. A risk assessment technique that is appropriate for reviewing these procedures should be selected and

submitted as part of the risk assessment plan to ABS for review. Typically, a process FMECA or HAZOP study is recommended. It is recognized that the scope of this risk assessment depends on the availability of relevant procedures. All interfaces should also be considered when performing this assessment. The recommendations from the study should be used by the engineering design team and the operations team to determine any design improvements or procedural changes necessary before finalizing the design and manufacturing.

Based on the findings of the final design risk assessment and process risk assessment (if applicable), a re-evaluation of all previous risk assessments should be considered. All previous risk assessments should be reviewed against any newly identified failure modes or hazards. Changes made to the design due to findings in these risk assessments should also be checked against the final functional and performance requirements.

Finally, all identified technical risks from the Prototype Validation Stage and risk assessments from previous stages should be appropriately managed through any necessary design improvements. All corresponding action items should be closed in order for the new technology to complete this stage of the NTQ process.

The following final design level risk assessments verifying all technical risks are to be performed and submitted to ABS for review:

- i)* Final design risk assessment (e.g., design FMECA)
- ii)* Final process risk assessment (e.g., process FMECA or HAZOP) if applicable
- iii)* Update all previous risk assessments as needed based on updated final design level documentation
- iv)* Final hazard register based on the final design with all actions items closed out

If applicable, the preliminary RAM analysis should be re-evaluated and finalized. The final RAM analysis report should be submitted for ABS review.

## 5 Summary of Submittals

The following qualification activities along with future activities for the System Integration Stage should be highlighted in the NTQP and submitted to ABS for review:

### 5.1 Engineering Evaluation

- i)* SRDD
  - Review engineering documents that describe the component requirements and the interaction between components, subsystems, and the overall system if applicable.
  - Detailed design documents including detailed drawings, product specifications, process and instrument details, detailed calculations, etc.
  - Prototype test plans, test data (as requested), and test results summarized in a report.
  - Additional qualification testing, data, and results identified in the design risk assessment (e.g., FMECA).
- ii)* Inspection Test Plan (ITP)
- iii)* Detailed manufacturing plan.

### 5.3 Risk Assessment

- i)* The final updated risk assessment reports from the Concept Verification Stage (as applicable).
- ii)* The final design risk assessment (e.g., FMECA) report.
- iii)* The process risk assessment (e.g., process FMECA) report (as applicable).
- iv)* The final system RAM analysis report (as applicable).
- v)* Final hazard register with all action items closed out.

**7 Prototype Stage Completion: Technology Qualified**

Once the above deliverables have been submitted to ABS for review and all specified performance requirements have been verified, then a Statement of Maturity will be issued stating that the technology has been qualified. The technology is now ready to proceed to the System Integration Stage.

**9 ABS Type Approval Program**

Upon completion of the Prototype Validation Stage of the NTQ process, the new technologies that are consistently manufactured to the same design and specification may be Type Approved under the ABS Type Approval Program to limit repeated evaluation of identical designs. During the Prototype Validation Stage, if all the engineering evaluations have been completed, a PDA can be issued prior to further consideration for ABS Type Approval.



## SECTION 6 Systems Integration Stage

### 1 Introduction

The fourth stage of the NTQ process is the Systems Integration Stage. In this stage, discussions between the vendor and end-user are held to understand the compatibility of the technology with final operating system and operating environment. An interface analysis is performed to confirm the compatibility of the item. The technical risks during operations that have not been addressed during previous risk assessments are evaluated and relevant reports updated. All necessary risk control measures are implemented.

The “Technology Qualified” item is then integrated (by installation) with the final intended operating system. All functional and performance requirements of the integrated system as outlined in the SRDD are validated through testing before (or during) commissioning. Plans for in-service survey, inspection, monitoring, sampling and testing (as applicable) are determined.

### 3 Qualification Plan Activities

#### 3.1 Engineering Evaluation

##### 3.1.1 System Interface and Integration Requirement

At this stage the overall technology goals and requirements may remain unchanged. However, specific requirements for system-of-systems functionality and interfaces should be finalized. In addition, the detailed operational performance parameters should be defined and operational procedures should be developed. System interface and integration requirements are to be submitted to ABS for review.

##### 3.1.2 Interface Analysis

It should be analyzed that the addition or incorporation of the new technology does not negatively affect the integrity of the surrounding systems and components. All necessary functional and physical interfaces (e.g., mechanical, electrical, environment, data, human, etc.) and other systems should be reviewed and verified that the new technology does not adversely affect those systems. At this stage, the interfaces should be specified in quantitative limiting values, such as interface loads, forcing functions, and dynamic conditions. The use of tables, figures, or drawings is recommended as appropriate. The vendor/end-user should provide detailed interface control methods or other engineering solutions so that the new technology is compatible with the integrated systems. The complete interface analysis and necessary engineering solutions are to be submitted to ABS for review.

##### 3.1.3 System Integration Testing (SIT)

The operational prototype is built and integrated into the final system. Full interface and function test programs are performed in the intended (or closely simulated) environment. The impact of the new technology on the performance and integrity of other systems as well as the impact of other systems on the new technology itself should be addressed. An initial operational test and evaluation should be performed to assess the operational effectiveness and suitability in the intended environment. The operational test must demonstrate that the operational aspects associated with placing the application in a marine or offshore environment are commensurate with typical operational practice for these facilities. Changes to the technology design or operational procedures may be necessary to address any issues encountered during operational testing. A test plan which details test techniques, test limits, expected test data, quality assurance requirements should be developed and submitted to ABS for review before the system integration testing. All test procedures and test results are to be summarized in a report and submitted to ABS for review.

#### 3.1.4 ABS Survey

Survey during the system integration testing may be required as agreed upon in the system integration test plan. ABS Surveyor will witness the system integration testing to verify that proper testing processes are followed and it meets the quality assurance requirements based on the witness points as agreed between the vendor/end-user and ABS.

An In-Service Inspection Plan (ISIP) to address in-service survey, inspection, monitoring, sampling and testing (as applicable) during operations should be submitted for ABS review.

### 3.3 Risk Assessment

The main objective of the risk assessments performed in the System Integration Stage is to evaluate any technical risks resulting from system integration and operations that have not been previously evaluated as part of the design risk assessment, process risk assessments or other risk assessments in the previous stages. The end-user should manage any additional/residual risks identified through appropriate risk control measures.

An appropriate risk assessment technique should be selected and submitted as part of the risk assessment plan to ABS for review. The use of a process FMECA, HAZOP or HAZID are recommended. The scope of this risk assessment typically includes installation, SIT, commissioning, operations and decommissioning. The assessment should consider all interfaces between the validated prototype and the connected system (system-of-systems). Follow on qualification activities may be determined from the results of the risk assessment such as engineering evaluation, testing, design improvements or procedure changes. These activities should be addressed within the NTQP. All risk control measures should be implemented and any outstanding action items from the risk assessment closed before proceeding with system integration testing and commissioning.

The need for updates to any previously submitted risk assessments or RAM analysis should be evaluated and addressed as appropriate. Updated risk assessment reports including hazard registers, RAM analysis (if applicable) and the NTQP should be submitted for ABS review.

## 5 Summary of Submittals

The following qualification activities along with future activities for the Operational Stage should be highlighted in the NTQP and submitted to ABS for review:

### 5.1 Engineering Evaluation

- i) SRDD
  - All documents that describe requirements for system-of-systems functionality and interfaces.
  - All documents that describe detailed operational procedures and performance parameters.
  - System integration test plans, test data, and test results summarized in a report.
  - Plans for in-service survey, inspection, monitoring, sampling and testing (as applicable) during operations or ISIP.

### 5.3 Risk Assessment

- i) Updated risk assessment reports from the previous stages (as applicable)
- ii) Other applicable technical safety studies (e.g., RAM).

## 7 System Integration Stage Completion: Technology Integrated

Once the above deliverables have been submitted to ABS for review and all specified performance requirements have been verified, then a Statement of Maturity will be issued stating that the technology is integrated. The technology is now ready to proceed to the Operational Stage.



## SECTION 7 Operational Stage

### 1 Introduction

The last stage of the new technology qualification process is the Operational Stage. New technology categorized as “Operationally Qualified” denotes that it has been integrated into the final system and has been operating successfully in service in the relevant operational environment.

Once the technology has been qualified at the Prototype Stage, it must be confirmed that the knowledge gained by the engineering and risk assessment tests and studies is fed into the operational stage, in order to monitor prior assumptions and predictions through in-service field verification. In other words, the first implementation of any new technology should be treated as a first time application to some extent. This Section will outline the necessary activities that must be completed and the information to be supplied to ABS during this stage. It is recommended that the qualification process involves members with operational background in this stage of the project. These members should become familiar with the results of all the previous qualification stages, if they had not participated from the start of the qualification process.

At this stage, the operational objectives, operating environment and the performance requirements established during design are reviewed and applied to define goals for in-service operation. Following successful operation and performance achievement of the goals in the actual operational environment, the technology can be granted a Statement of Maturity.

The activities of the Operational Stage are as follows:

- i) Implementation of in-service survey, inspection, monitoring, sampling and testing plans
- ii) Collection and analysis of reliability, availability, maintainability (RAM analysis) and other operational performance data as needed
- iii) Comparison of operational data above with previously specified performance requirements, goals and criteria
- iv) Performance of root cause analyses for any observed failure and using feedback to introduce modifications for improvement
- v) Comparison of observed parameters with any critical assumptions made during the previous qualification stages and updating calculations as necessary

It is to be noted that when applying these Guidance Notes for classification or certification purposes, the primary driver for classification acceptance will be safety even though there may be additional functional requirements (e.g., reliability, ability to perform as per operational design specification) defined by the client.

### 3 Qualification Plan Activities

The need and extent of special in-service qualification requirements are dependent upon the justifications and risk assessment results during the design and qualification process. System requirements have been started to be defined in the Feasibility Stage of qualification, and they have been updated in later stages as the design evolved. Such requirements have to be translated into specific and quantifiable performance requirements to be attained during operations. Additionally, any critical assumptions made in the risk assessment and engineering evaluations during the four previous qualification stages should be monitored to confirm that operational experience does not disprove them. Taking all the above into consideration, the vendor and/or end-user together with ABS should outline the necessary elements of in-service survey, inspection, monitoring, sampling and testing needed to gain confidence in the real world application of the new technology.

These special requirements can be integrated in the end-user's Asset Integrity Management program. Advanced inspection and maintenance approaches like Reliability Centered Maintenance (RCM) and Risk Based Inspection (RBI) are appropriate strategies to follow since they are based on reliability and risk goals. Data collection and management are very important activities to consider for the in-service qualification stage.

The amount of operational history that is sufficient to verify performance requirements during operations depends on several factors, including actual equipment run time, failure rate and exposure time to failure. Therefore, the time to reach the "Operationally Qualified" status for the proposed new technology will be determined on a case-by-case basis.

All records related to the inspection, monitoring, sampling and testing of the new technology as established by the agreed-upon operational qualification plan or ISIP should be kept and made available for review upon request by ABS at any time. These records will be reviewed periodically to establish the scope and content of the required surveys that should be carried out by ABS.

The following references contain additional guidance for in-service monitoring, sampling, testing and inspection plans:

- *ABS Guidance Notes on Equipment Condition Monitoring Techniques*
- *ABS Guidance Notes on Reliability-Centered Maintenance*
- *ABS Guide for Surveys Using Risk-Based Inspection for the Offshore Industry*
- *ABS Guidance Notes on the Investigation of Marine Incidents*
- *ABS Guide for Hull Condition Monitoring Systems*
- *ABS Guide for Hull Inspection and Maintenance Program*
- *ABS Guide for Building and Classing Subsea Pipeline Systems*
- *API RP 17N Recommended Practice Subsea Production System Reliability, Technical and Integrity Management*

## 5 Summary of Submittals

The output of this stage is a report reviewing the operational data collected, and demonstrating how the specified performance requirements and criteria have been met.

The following items are typical submittals that ABS would expect to receive annually in order to conduct an Operational Stage audit:

- Summary report of results of the inspection, monitoring, sampling and qualification testing activities
- Failure data analysis of critical components
- Non-conformance reports and corrective actions taken.

*Note:* In case of a non-conformance report for a critical component, ABS should be notified as soon as practical.

## 7 Operational Stage Completion: Operationally Qualified

Once the operational experience of the new technology has proven to be successful (i.e., according to the expected performance, for a satisfactory amount of time in the actual operating environment, and meeting criteria acceptable by ABS), then a Statement of Maturity stating the operational qualification of the technology will be issued.



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## APPENDIX 2 Comparison of ABS Qualification Stages with Industry TRLs

### 1 Introduction

Technology Readiness Levels (TRLs) are a method of estimating the maturity level of new technology. There are a wide variety of scales in industry based on the ISO 16290 standard. This standard uses a numerical scale one through nine, with nine representing the most mature. The American Petroleum Institute (API) uses a scale ranging from zero to seven. Although the definitions of these levels differ slightly (space systems vs oil and gas), the fundamental philosophy remains the same. ABS has developed a stage gate process compatible with the wide range of TRLs (API, US DoD, ISO 16290). However, the numbers levels presented have now been replaced by a series of qualification stages. Comparison of the ABS definition and the industry TRLs are provided in the table below.

**TABLE 1**  
**ABS Qualification Stages Comparison with Various Industry TRLs**

<i>ABS Qualification Stage</i>	<i>API RP 17N/Q TRLs</i>	<i>US DoD TRLs</i>	<i>ISO 16290 TRLs</i>
Feasibility Stage	0	1	1
	1	2	2
Concept Verification Stage	2	3	3
		4	4
Prototype Validation Stage	3	5	5
	4	6	6
System Integration Stage	5	7	7
	6	8	8
Operational Stage	7	9	9



## APPENDIX 3 New Technology Stage Determination

### 1 Introduction

In order to estimate the current qualification stage of a proposed a new technology, the following table should be used. These questions serve as general guidance to understand the design maturity of the technology based on completed qualification activities and hence determine the corresponding qualification stage. The client's design team, ABS, and other identified stakeholders should agree upon the qualification stage identified. All supporting documentation justifying affirmative answers are to be submitted to ABS for review. Negative answers will be reviewed on a case-by-case basis in order to determine applicability of the question to the technology.

<i>Qualification Stage</i>	<i>Item #</i>	<i>Question</i>	<i>Yes/No/NA</i>	<i>Evidence to support?</i>
Feasibility Stage	1	Has what is specifically new and/or unique about the concept been clearly identified?		
	2	Has what specifically needs qualification been defined?		
	3	Have potential applications been identified?		
	4	Have fundamental objectives and requirements (e.g., RAM) for the identified application been identified?		
	5	Have basic functionality and durability of the technology been analyzed?		
	6	Have basic principles been observed and reported?		
	7	Have lessons learned from similar technology been reviewed and documented?		
	8	Have basic design calculations been performed?		
	9	Have conceptual research and development been completed?		
	10	Has a preliminary list of reliability drivers been prepared?		
	11	Has a preliminary fitness assessment (physical interfaces, human etc.) been performed?		
	12	Can engineering drawings (basic configurations, interfaces, and/or PFD's or flow charts) and calculations be submitted for review?		
	13	Have any early stage risk assessment and mitigation studies been performed and documented?		
Concept Verification Stage	14	Has the concept functionality been demonstrated by physical models or "mock-ups"?		
	15	Have laboratory scale material testing and degradation mechanisms been performed?		
	16	Have all conceptual design engineering studies been completed?		
	17	Have preliminary function/performance/reliability engineering studies been completed?		
	18	Have reliability drivers been confirmed?		
	19	Is there documentation that RAM requirements can likely be met?		
	20	Has durability been confirmed by testing or calculation?		
	21	Has a viable manufacturing or fabrication scheme been documented?		
	22	Has preliminary qualitative design risk analysis (e.g., FMECA) been documented?		
	23	Have the initial risk assessments been reviewed/updated to identify any additional technical risks?		

**Appendix 3 New Technology Stage Determination**

<i>Qualification Stage</i>	<i>Item #</i>	<i>Question</i>	<i>Yes/No/NA</i>	<i>Evidence to support?</i>
Prototype Validation Stage	24	Have all items in the manufacturing of the technology been specified?		
	25	Has the manufacturing and assembly process been accepted?		
	26	Has a prototype or full scale production unit been manufactured?		
	27	Has the manufacturing and assembly defects been removed by stress screening?		
	28	Has the technology passed basic functionality testing of prototype (physical or virtual) or full scale product to demonstrate fitness and function capability in a simulated or actual operating environment?		
	29	Has a performance data collection system been established and properly documented?		
	30	Has the technology passed performance, durability, and accelerated life tests?		
	31	Is the degradation of function/performance within expected acceptable limits?		
	32	Has the technology passed system reliability analyses?		
	33	Has the operating/destruct limits been established or confirmed?		
	34	Has the degradation limits and rates been established or confirmed?		
	35	Has the required in-service monitoring needs and means been identified?		
	36	Has a process risk assessment (e.g., process FMECA) been performed and documented (if applicable)?		
	37	Has the final design risk assessment (e.g., FMECA) been completed for all life cycle modes (including assembly, transit, storage, installation, hook-up, commissioning, operation, decommissioning) for all interface permutations and properly documented?		
38	Have the residual risk and uncertainty been estimated and properly documented?			
39	Has the reliability study been updated and properly documented?			
System Integration Stage	40	Has the design risk assessment (e.g., FMECA, HAZOP) considering full system interfaces been updated and properly documented?		
	41	Have all other technical risks been identified/addressed and properly documented?		
	42	Has the technology been deployed into a full prototype and fully integrated with the intended system?		
	43	Has the function/performance when connected/integrated into a wider system been fully tested?		
	44	Have all mechanical, hydraulic, optical, electronic, software, etc. and human interfaces been fully addressed and documented?		
	45	Have all system integration requirements been confirmed?		
	46	Has installation/hook-up/testing/commissioning with a wider system been completed as per specifications?		
	47	Is there a data collection system in place to document performance and reliability?		
	48	Has a detailed in-service inspection/monitoring/sampling plan been defined and properly documented?		
	49	Can inspection/monitoring/sampling functionality be validated?		
Operational Stage	50	Has the technology demonstrated acceptable reliability and availability in the targeted operating environment?		
	51	Has the in-field service monitoring, sampling, and inspection plan been successfully implemented?		
	52	Has reliability and integrity performance data been properly collected, analyzed, and documented?		
	53	Have any underperforming components of the technology been identified?		
	54	If so, then has there been any reliability improvements for failed or underperforming components?		

**Appendix 3 New Technology Stage Determination**

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<i>Qualification Stage</i>	<i>Item #</i>	<i>Question</i>	<i>Yes/No/NA</i>	<i>Evidence to support?</i>
Operational Stage (continued)	55	Has there been any performance feedback from projects or suppliers?		
	56	Have any unexpected aspects (e.g., interdependencies or influences on performance) or safety concerns been observed?		
	57	Has the technology been reliable for at least one survey (or maintenance or planned replacement) cycle or agreed upon time period as indicated in the SRDD or in-service inspection plan (ISIP)?		
	58	Has the design risk assessment (e.g., FMECA) been updated with in-service performance data?		
	59	Has the system reliability assessment been updated and properly documented?		



## APPENDIX 4 New Technology Qualification Plan (NTQP) Template

### 1 Introduction

The New Technology Qualification Plan (NTQP) should be a high level document that tracks the maturity level and status of qualification activities. These activities help verify and validate the new technology's ability to qualify all desired NTQ stages. The document is not meant to be a collection of engineering reports, methodologies, test data, or plans. The NTQP is to be updated throughout qualification process.

The following sections provide a recommended template for submitting an NTQP as part of the new technology qualification process.

### 3 New Technology Qualification Plan (NTQP) Template

#### **Executive Summary**

##### **1.0 Introduction**

- Summarize the project objectives.
- Provide an overview of the new technology and its application.
- Describe current status of design and qualification activities.
- Provide key points of contact.

##### **2.0 New Technology Screening and Stage Determination**

###### **2.1 System Requirements Overview**

- Summarize defined system goals, functional and performance requirements (with reference to appropriate SRDD document(s)).

###### **2.2 New Technology Screening**

- Summarize the new technology screening results.

###### **2.3 New Technology Stage Determination**

- Summarize the results of the new technology stage determination process.

##### **3.0 New Technology Qualification Activities**

- For each new technology item being qualified, list all qualification activities including the following details for each activity
  - Summarize the qualification activity (scope, objective and method)
  - Performance Requirement and its source.
  - Identify the stage in which this qualification activity was determined.
  - Provide reference to appropriate engineering evaluation report or risk assessment report (include corresponding hazard register nodes) from which this activity was determined.
  - Scheduled Timelines (start/finish).

- Provide reference to appropriate engineering evaluation or risk assessment reports that documents the results of the qualification activity.
- Comments from the Client & ABS

#### **4.0 References**

##### **Appendices:**

##### **Appendix 1 Summary of Previous Qualification Activities**

List all previously completed qualification activities prior to NTQ process with references to appropriate reports.

# Emissions Evaluation of a Large Capacity Auxiliary Boiler on a Modern Tanker

**Draft Final Report**

Prepared for

California Air Resources Board  
CARB

March, 2020



Source Alpha Laval



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## **Disclaimer**

The statements and conclusions in this report are those of the contractor and not necessarily those of the California Air Resources Board (CARB). The mention of commercial products, their source, or their use in connection with material reported herein is not to be construed as actual or implied endorsement of such products.

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## Acronyms and Abbreviations

$\sigma$	standard deviation
BC	black carbon
CARB	California Air Resources Board
CE-CERT	College of Engineering-Center for Environmental Research and Technology (University of California, Riverside)
CFR	Code of Federal Regulations
cm/s	centimeters per second
CO	carbon monoxide
COV	coefficient of variation
CO <sub>2</sub>	carbon dioxide
DF	dilution factor
eBC	equivalent black carbon
EC	elemental carbon defined by thermal optical methods
EPA	United States Environmental Protection Agency
IMO	International Maritime Organization
ISO	International Organization for Standardization
kPa	kilo Pascal
lpm	liters per minute
ULSFO	low sulfur heavy fuel oil
MGO	marine gas oil
MFC	mass flow controller
ms	milliseconds
MSS	Micro Soot Sensor
NIOSH	National Institute of Occupational Safety and Health 5040 protocol
NIST	National Institute for Standards and Technology
NO <sub>x</sub>	nitrogen oxides
OC	organic carbon defined by thermal optical methods
o.d.	outer diameter
OEM	original equipment manufacturer
PM	particulate matter
PM <sub>2.5</sub>	fine particles less than 2.5 $\mu\text{m}$ (50% cut diameter)
PTFE	polytetrafluoroethylene
QC	quality control
SRL	sample reporting limit
scfm	standard cubic feet per minute
S	sulfur
SO <sub>2</sub>	sulfur dioxide
SO <sub>x</sub>	sulfur oxide
UCR	University of California at Riverside
Stdev.	Standard deviation one sigma

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## Executive Summary

**Introduction:** More than ten years have passed since emissions were measured from the large auxiliary boiler on a Suezmax tanker while it unloaded about one million barrels of crude. Modern vessels use newer boiler designs so it is of interest to measure their emissions. The Alpha Laval unit is an Aalborg OL large capacity auxiliary boiler with a super heater, representative of a modern boiler for tankers. Alpha Laval is a market share leader so data from this unit should provide an important perspective on the emissions from widely-used tanker boilers with the latest technology advances. Further, ships operating within California waters now use low-sulfur distillate fuels so results from this test will show the combined effects of a modern boiler design and the cleaner California fuels.

**Methods:** The test methods utilized International Organization for Standardization (ISO) 8178-4 sampling protocols. The boiler was evaluated at one load representative of normal operation. The emissions measured were regulated gaseous, speciated hydrocarbons C2-C12, aldehydes and ketones, metals, particulate matter mass less 2.5  $\mu\text{m}$  ( $\text{PM}_{2.5}$ ), and PM composition which included elemental and organic carbon (EC and OC) PM. Other methods and practices, sampling dilution, and calculations such as dry to wet correction, followed ISO and Code of Federal Regulations (CFR) recommendations.

**Objectives:** The primary aim of this work is to study the in-use emissions from a modern tanker boiler utilizing California approved MGO low sulfur fuel.

**Results gaseous:** The boiler carbon dioxide ( $\text{CO}_2$ ) emissions were 3026 g/kg-fuel which is similar to previous testing of a modern auxiliary boiler on a container vessel suggesting the results are representative of a properly operated boiler. The nitrogen oxide ( $\text{NO}_x$ ) emissions averaged  $2.86 \pm 0.18$ , carbon monoxide (CO)  $0.06 \pm 0.064$ , and sulfur dioxide ( $\text{SO}_2$ ) 0.94 g/kg-fuel. The  $\text{NO}_x$  emissions were slightly higher, with-in 50%, to previous testing of a modern container vessel auxiliary boiler tested on low sulfur MGO and ULSFO fuels, but over two times lower (2.2) than the emissions on a tanker vessel auxiliary boiler tested on high sulfur HFO fuel.

**Results PM:** The  $\text{PM}_{2.5}$  emissions were  $0.022 \pm 0.004$  g/kg-fuel and were slightly lower compared to previous testing of a modern auxiliary boiler tested on low sulfur MGO and ultra-low sulfur fuel oil (ULSFO) fuels, but over 100 times lower (131) than the PM emissions on a boiler tested on high sulfur heavy fuel oil (HFO). The equivalent black carbon (eBC) emissions were  $0.0012 \pm 0.0004$  g/kg-fuel and were about the same for a previous modern boiler tested, but about 120 times lower than the EC emission reported for an older boiler tested on a tanker. The PM composition is mostly organic (68%) and about 1.5% elemental carbon.

**Results Toxics:** The boiler emissions for Formaldehyde, Acetaldehyde and Acrolein were 0.401, 0.376, and 1.749 mg/kg-fuel. These results compare well with the modern boiler operating on MGO fuel test from a container vessel. Modern boilers operating on MGO fuels appear to have lower Acetaldehyde and Acetone emissions compared to older boiler tested on HFO fuels. The PAMS measurements were at the detection limit of the measurement method and thus, could not be compared properly to the previous testing on an older boiler tested on a high sulfur HFO fuel. These results are useful for updating the model with “less than” type of values. **The metals emissions were... Waiting on data.**

***Summary:*** Modern boilers operating on MGO fuels have lower NO<sub>x</sub> and total PM mass compared to older boilers operating on high sulfur fuels. These results show the benefit of modern boilers operating on low sulfur MGO fuels.

# 1 Background

## 1.1 Marine Boiler Emissions

More than ten years have passed since emissions were measured from a large boiler on a Suezmax tanker while it unloaded about one million barrels of crude. Results of that project were peer reviewed and published (Agrawal et al 2008). The results were an all-inclusive set of regulated and nonregulated emissions factors for criteria pollutants (carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and particulate matter (PM) mass), a greenhouse gas (carbon dioxide (CO<sub>2</sub>)), speciated hydrocarbons needed for human health risk assessments, and a detailed analysis of the PM into its primary constituents (ions, elements, organic, and elemental carbon (EC and OC)). Details on the heavy fuel oil (HFO) and boiler design are found in the publication.

Modern vessels use newer boiler designs so it is of interest to measure their emissions. The boiler tested in this project was an Alpha Laval Aalborg OL large capacity auxiliary boiler with a super heater. Alpha Laval is a market share leader so data from this unit should provide an important perspective on the emissions from widely-used auxiliary boilers with the latest technology advances. Further ships operating within California waters now use low-sulfur distillate fuels so results from this test will show the combined effects of a modern boiler design and the cleaner California fuels.

Marine boilers, called auxiliary boilers, are used for supplying steam and hot water for non-propulsion uses such as fuel heating, galley, cabin space heating, and to drive steam turbines on tankers that offload petroleum crude oil in ports. Boilers can range in size where for container vessels and bulk carriers they tend to be smaller than the ones on a tanker vessel. The boiler tested in this research had a fuel consumption and exhaust flow rate ten times larger than the container vessel auxiliary boiler. Thus, tanker boiler emissions are a of importance to the California Air Resources Board (CARB) to estimate their environmental impacts.

## 1.2 Objective

The objective of this research is to evaluate the emissions from a modern auxiliary boiler on a tanker ship while it offloads fuel with-in a port in Northern California where the main engine is off. The testing followed the same protocol as used in the earlier study with one exception, the method used for measuring the nonregulated air toxics. Following the same protocol of the earlier study will allow a direct comparison of emissions and provide information on the changes in emissions over time.

## 2 Approach

This section outlines the in-use emissions testing approach for the modern boiler on a **xx-class** tanker vessel. This section describes the test article (boiler, fuel, and load point), sampling approach (sample location, sample discussions, and test protocol), measurements (gaseous and PM measurement methods, toxic sampling approach), calculations (exhaust flow determination), and a discussion of the assumptions used in the data analysis. The test article sections cover design details of the boiler operation. The sampling approach describes where the samples were collected from the exhaust, any impact this location may have on the measurement, and the test protocol. The measurements section describes the measurement methods for the gaseous, PM (mass and composition), and toxics samples. The corrections and assumption section provide a discussion on the data and analysis used in this report.

### 2.1 Test article

The boiler, fuel, and test matrix are described in this section.

#### 2.1.1 Boiler

The boiler tested is an Alpha Laval's large capacity auxiliary boiler (2xAalborg OL 50,000 kg/h) installed on a tanker vessel. This boiler design includes a super heater unit, 2xAalborg XW-S with a steam rating of 50,000kg/h. The boiler operation is automatically controlled. A diagram is presented in Figure 2-1 and the OL model specifications are provided in Table 2-1.

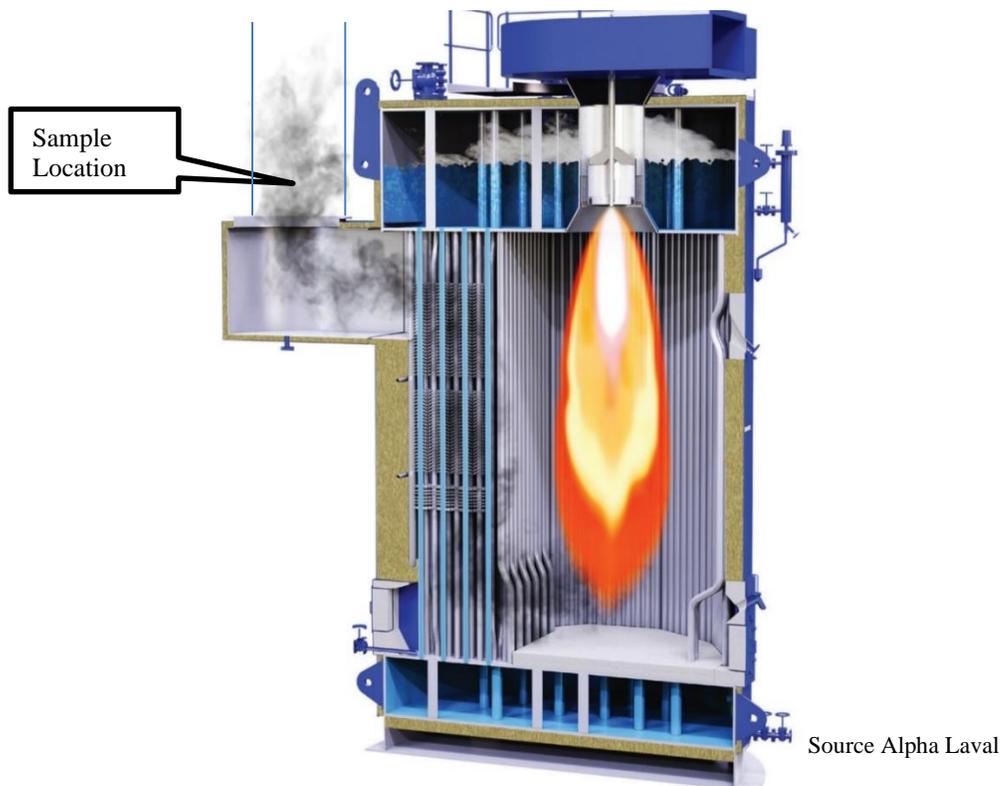


Figure 2-1 Design diagram of large frame boiler series

The test unit represents one of the larger boilers made by Alpha Laval. According to Alpha Laval’s brochure, the unit tested, rated at 50,000kg/h steam capacity, is a boiler near the highest level of steam production that is commercially offered. This suggests the boiler emissions will be of interest to regulators since it is one of the higher emission rate boilers in mass/time for this type of tanker activity.

**Table 2-1 List of Alpha Laval large frame boilers, 50,000 kg/h tested)**

Steam capacity	Design pressure	Thermal output at 100% MCR	Height K (incl. retraction of burner lance)	Diameter D (incl. insulation)	Hight H	Width B	Boiler dry weight*	Boiler operation weight
kg/h	bar(g)	kW	mm	mm	mm	mm	ton	ton
12,500	9	8,800	8,610	2,670	6,310	4,070	16.4	23.3
16,000	9	11,300	8,810	3,070	6,310	4,320	20.5	29.6
20,000	9 / 18	14,100	8,940	3,220	6,460	4,595	24.5 / 28.5	35.5 / 39.2
25,000	18	17,600	10,050	3,320	7,310	4,800	30.3	41.5
30,000	18	21,200	10,360	3,570	7,510	5,200	35.1	48.2
35,000	18	24,700	10,300	3,870	7,360	5,600	40.4	55.8
40,000	18	28,200	10,880	3,870	7,760	5,625	42.6	58.4
45,000	18	31,800	10,870	4,270	7,710	6,125	49.3	68.6
55,000	18	38,800	11,050	4,520	7,760	6,600	56.6	78.5

Source Alpha Laval

### 2.1.2 Test fuels

A standard low sulfur marine gas oil (MGO) fuel was used during this testing. The fuel complies with the CARB’s Fuel Rule for Ocean-Going Vessels, which allows either an MGO or a marine diesel oil (MDO) at or below 0.1% sulfur (S). A fuel sample was taken, and the results show the fuel sulfur was less than 0.1% (S = 0.045% following D4294 and X-ray methods, see Appendix D). The test fuel had a carbon weight fraction of 0.8682 and a hydrogen weight fraction of 0.1286, See Appendix D for analysis report.

### 2.1.3 Test matrix

Typically, a test matrix includes a range of loads, but boilers operation tends to be constant load with periods of on/off control to maintain steam pressure. The fuel oil flow in the boiler is relatively constant while the boiler produces the highest steam rate for the turbine pump needs during land-based transfers (as tested during this project). As the land-based tanks reach their capacity, the boiler fuel rate slows slightly to accommodate a switch-over in the storage tanks.

Figure 2-2 shows the steam rate and fuel consumption for a different, but similarly sized auxiliary marine boiler made by Mitsubishi. The 50,000 kg/h Mitsubishi steam rate boiler shows a maximum fuel oil consumption of 3,787 kg/hr. If we assume the maximum consumption between manufacturers is similar, we can estimate the load on the boiler tested as a percentage of maximum. The measured fuel consumption during this testing was 2,400 kg/hr, suggesting the boiler was operated at an estimated 65% of its maximum design load.

The crew suggested the boiler could be operated at this “65%” state and also at a slightly lower steam rate. As such, there was a desire to test these two load points, but due to time limitations, however, we only had time to test the higher 65% load condition and not the lower load condition. The data in this report represents the 65% load case at a fuel consumption rate of 2,400 kg/hr.

Boiler type		MAC -20B	MAC -25B	MAC -30B	MAC -35B	MAC -40B	MAC -45B	MAC -50B	MAC -55B
Evaporation	kg/h	~ 20,000	~ 25,000	~ 30,000	~ 35,000	~ 40,000	~ 45,000	~ 50,000	~ 55,000
Boiler design pressure	MPa	1.77							
Working steam pressure	MPa	1.57							
Steam temperature	°C	*Saturated temperature to 280							
Boiler efficiency (LHV base)	%	80.5				82.5			
Feed water temperature	°C	60							
Air temperature	°C	38							
Number of burners	-	1							
Fuel oil consumption	kg/h	1,552	1,940	2,328	2,716	3,029	3,407	3,787	4,165

**Figure 2-2 Heat loads and fuel rates for other boilers**

(source Mitsubishi Heavy Ind.)<sup>1</sup>

## 2.2 Sampling approach

This section provides a discussion of the sample locations (PM representativeness and accessibility), and the test protocol (methods of sampling).

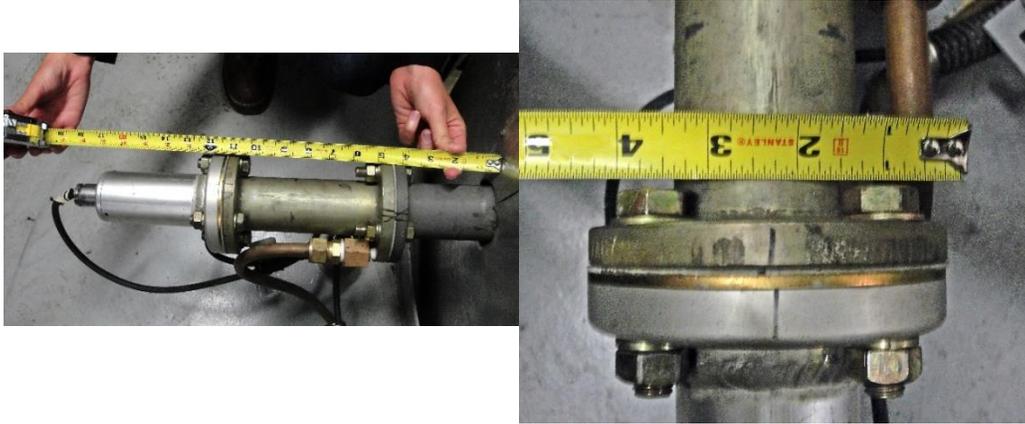
### 2.2.1 Sample locations

Sampling utilized UCR’s partial dilution tunnel system, as outlined in ISO 8178-1, with a direct connection to the exhaust sample, see Appendix A for more details. Several points of access to the exhaust were identified during a site visit months before the testing campaign. The recommended location identified was near the top of the boiler stack where a cross-plume smoke meter was installed. The plume smoke meter was disconnected during testing and reinstalled afterwards, see Figure 2-4 and Figure 2-5. This location is free of bends and is a good location for sampling.



**Figure 2-3 Platform space available for equipment (smoke meter shown)**

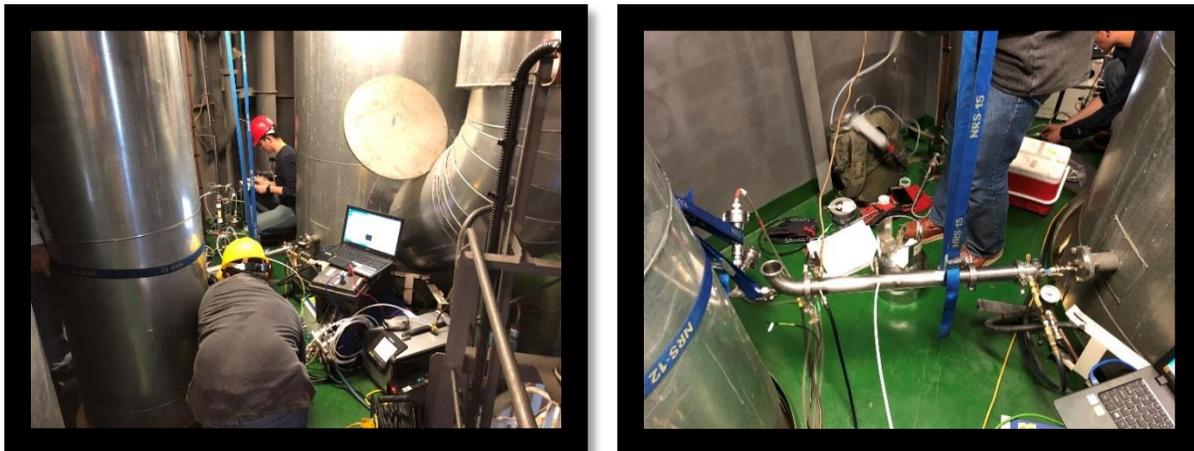
<sup>1</sup> [https://www.mhi-mme.com/products/boilerturbine/auxiliary\\_boilers.html#tab03\\_2](https://www.mhi-mme.com/products/boilerturbine/auxiliary_boilers.html#tab03_2) Auxiliary boiler project specifications.



**Figure 2-4 Dimensions for probe length and flange size**

There were no sample ports prior to the heat exchanging surfaces where one can measure the boiler emissions directly, as can be seen by the boiler layout shown in Figure 2-1. UCR, therefore, utilized the cross-plume smoke meter sample location as the only practical sample location. The length of the sample probe needed to be 12 inches to access a well-mixed exhaust sample using good engineering judgment (which is 10% inside the wall of the exhaust stack where the flow is well mixed). The dimensions show the probe design should be 12 inches, see Figure 2-4 and Figure 2-5.

The dilution tunnel length with the installed cyclone was interfering with the vessel stack to the left in the figure shown below, see Figure 2-5. The tunnel would fit with the cyclone removed. Since this was the only suitable sample location the cyclone had to be removed in order to collect any samples from the boiler. The impact of this decision is provided in Section 2.5.



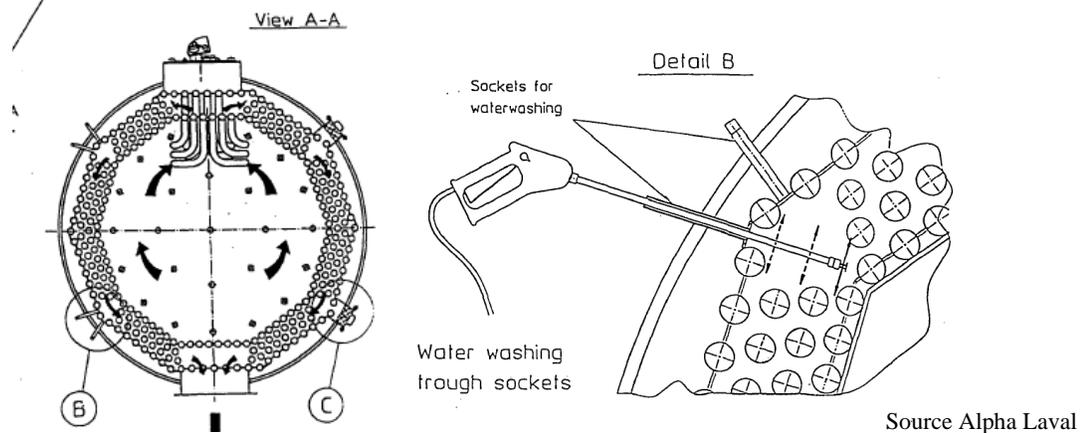
**Figure 2-5 Boiler tunnel setup: thermopile probe removed for sampling**

### **2.2.2 PM fouling discussion**

Sampling after a heat exchanging surfaces, like a boiler, can be a source for PM adsorption and desorption because these surfaces heat and cool in the presence of PM where thermophoretic loss/accumulation (Hind 2<sup>nd</sup> Edition 1999) can be significant. During boiler-on conditions, the hot

boiler exhaust gas heats the cool boiler tubes and PM can adsorb on the surfaces. As the tube surfaces can get hot, PM may start to desorb. Then, during periods of boiler-off condition (reduced water heating), the heat exchanger surfaces will cool until the next cycle. The adsorption and desorption of PM on a boiler surface can be described by thermophoretic loss models in Hind (2<sup>nd</sup> Edition 1999). When PM is adsorbed onto the surface, stack PM emission factors can be underestimated over short periods of time (measured in hours). This suggests the location for the sample probe is important to try and be before the surfaces and the condition of the boiler cleaning is important.

The boiler heat exchanger surfaces do include cleaning recommendations of the heat exchanger surfaces. According to the Aalborg manual, the boiler cleaning is performed by routine air blasts and occasional water blasts. The rate of cleaning varies with the quality of the fuel and the indications from the installed smoke meter. The water blasts are performed when boiler performance declines. There are several access ports for these water blast ports, see Figure 2-6. According to discussions with the crew the boiler was in a clean state, thus suitable for our emission testing.



**Figure 2-6 Cleaning setup for an Aalborg boiler**

### 2.2.3 Test protocol

The boiler load was operated for more than 30 minutes at the highest power possible to warm the engine and stabilize emissions. Repeats of the same load are performed prior to changing loads (i.e. mode 1, 1, 1 change load, mode 2, 2, 2 load change...). Based on experience testing OGVs, repeating test points with this approach is needed to manage the time it takes between different load points and to prevent issues when navigating in areas with speed restriction. For this testing, however, only one load point was performed so there were not conditions to wait for. In general, at each steady state test mode, the protocol requires the following:

- Allow the gaseous emissions to stabilize before measurement at each test mode (minimum 10 minutes as per ISO). This was possible on the ME and AE tests, but due to strict time constraints on the boiler this guide was not followed, but emissions were stable regardless.
- Measure gaseous and PM concentrations for at least 3 minutes and no longer than 30 minutes (such that approximately 500 $\mu$ g of filter mass is collected at a minimum dilution ratio of 4:1). For the boiler tests the filter weights averaged 100  $\mu$ g even with long sampling times of 40 minutes.

- Measure direct stack exhaust mass flow rate via EPA Method 2. Additionally, UCR recorded the fuel consumption of the boiler using discussions with vessel crew.
- Calculate emission factors from the measured pollutant concentration data and calculated mass flow rates.

### 2.3 Measurements

Like other marine tests, the measurement of exhaust concentrations followed the CARB<sup>2</sup> and IMO<sup>3</sup> protocols, see Appendix A for an in-depth description of UCR’s marine sampling system. A dilution tunnel is connected directly to the exhaust stack without the need for a transfer line. The flow in the dilution system eliminates water condensation in the dilution tunnel and sampling systems and maintains the temperature of the diluted exhaust gas at <52°C before the filters.

An overview of UCR’s partial dilution system is shown in Figure 2-7. Raw exhaust gas is transferred from the exhaust pipe (EP) through a sampling probe (SP) and the transfer tube (TT) to a dilution tunnel (DT) due to the negative pressure created by the venturi (VN) in DT. The gas flow rate through the TT depends on the momentum exchange at the venturi zone and is therefore affected by the absolute temperature of the gas at the exit of TT. UCR’s marine testing is directly connected to the stack so to minimize PM losses. The dilution ratio targeted and verified for this testing project was 10:1 and the actual dilution ratio was 7:1.

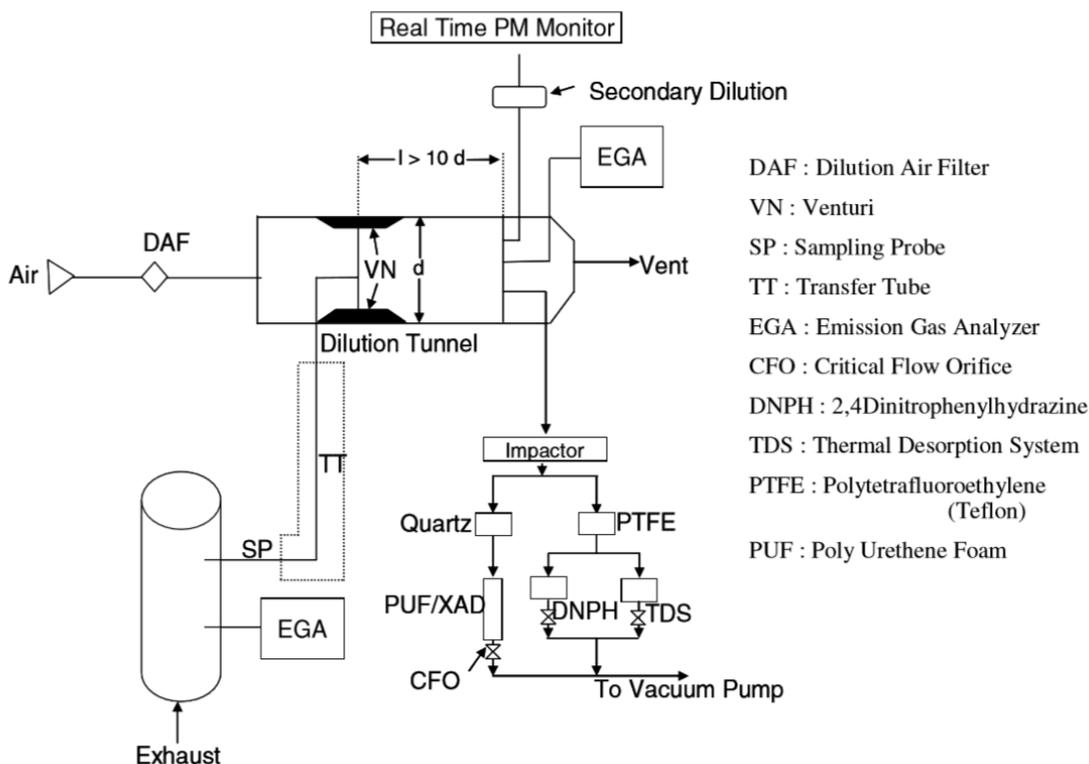


Figure 2-7 Sample schematic utilized

<sup>2</sup> California Air Resources Board, *Recommended Emissions Testing Guidelines for Ocean-going Vessels*, <https://www.arb.ca.gov/ports/marinevess/documents/emissionstest/OGV%20Test%20Guidelines.pdf>, (2012)

<sup>3</sup> ISO 8178-1 Reciprocating internal combustion engines - Exhaust emission measurement - Part 1: *Tested measurement of gaseous and particulate exhaust emissions*

<sup>1</sup> For this testing the TDS and PUF were not utilized and Suma canisters were collected from the secondary dilution system. Additionally, raw Suma canister grab samples were collected and analyzed.

ISO cautions that the advantages of partial flow dilution systems can be a source of sampling problems such as: losing particulates in the transfer tube, failing to take a representative sample from the engine exhaust and inaccurately determining the dilution ratio. UCR includes standard methods for each marine application to ensure these concerns are managed properly.

### 2.3.1 Gaseous and PM emissions

Best recommended practices for OGV exhaust gas measurements follow 40 CFR Part 1065 for PM measurements with specific details following ISO 8178-1 for dilution and exhaust gas sampling. The measurement approach is summarized here, with more details available in Appendix A.

**Gaseous:** The concentrations of gases in the diluted exhaust tunnel was measured with a Horiba PG-350. Nitrogen Oxides (NO<sub>x</sub>) utilize a heated chemiluminescence detector (HCLD), carbon monoxide (CO) and sulfur dioxide (SO<sub>2</sub>) utilize non-dispersive infrared absorption (NDIR) with cross flow modulation, and oxygen (O<sub>2</sub>) utilize a zirconium oxide sensor. Major features of the PG-350 include a built-in sample conditioning system (5 deg C) with sample pumps, data storage on a flash drive, integrated mist and particle filters, and a thermoelectric cooler. The performance of the PG-350 was tested and verified under the U.S. EPA and ETV programs.

Gaseous concentrations were measured directly from the dilution tunnel and from raw exhaust during dilution ratio verification. Dry-to-wet corrections were performed using calculated water concentration from the exhaust and the dilution tunnel.

**Table 2-2 Summary of Emissions Measured by UCR**

Species Sampled			
NDIR CO	NDIR CO <sub>2</sub>	CLD NO <sub>x</sub>	Photoacoustic eBC
NDIR SO <sub>2</sub>	Total PM <sub>2.5</sub> Gravimetric method	PM EC/OC NIOSH method	

**Particulate Matter (PM) mass:** UCR’s PM measurements use a partial flow dilution system that was developed based on the ISO 8178-1 protocol, detailed information is provided in Appendix A. Total PM mass less than 2.5 um diameter (PM<sub>2.5</sub>) is measured from the diluted exhaust gas according to the Code of Federal Regulations (CFR) 40 CFR Part 1065. UCR utilizes 47 mm 2um pore Teflon filters (Whatman Teflo) weighed offline with UCR’s UPX2 Mettler Toledo micro balance (0.1 ug resolution) in a temperature, humidity, and particle-controlled environment. The microbalance is operated following the weighing procedures of the CFR. Before and after collection, the filters are conditioned for a minimum of 24 hours in an environmentally controlled room (RH = 45%, T = 21 C, 9.5 C dew point) and weighed daily until two consecutive weight measurements were within 3µg.

**PM Composition:** The project measured PM composition which comprises elemental carbon (EC) and organic carbon (OC). OC/EC analysis was performed on samples collected on 2500 QAT-UP Tissuquartz Pall (Ann Arbor, MI) 47 mm filters that are preconditioned at 600°C for 5 h. A 1.5 cm<sup>2</sup> punch is cut out from the quartz filter and analyzed with a Sunset Laboratory (Forest Grove, OR) Thermal/Optical Carbon Aerosol Analyzer according to the NIOSH 5040 reference method. The PM composition filters were sampled from UCR dilution tunnel at a targeted flow rate of 15 slpm.

**Metals:** The metal analysis has not been performed at this time. It will be performed on the Teflon PM samples using X-Ray Fluorescence (XRF) from an offline analytical method. The filters were first weighed then will be sent out for XRF analysis. The method offers analysis of elements (Na through Pb) represented by 38 elements. XRF is an EPA approved, non-destructive analytical method (IO-3.3) wherein a filter is bombarded with X-ray energy. The subsequent excitement of electrons can be measured when the electrons fall back to their valence state, releasing energy in the process. Each element has a “fingerprint” of energy discharges which are measured to determine the quantity of each element.

**Equivalent black carbon (eBC).** Bond et al (2013) provided a definition of black carbon (BC) measurement methods as they relate to characterizing climate impacts. The photoacoustic measurement method is considered to be an equivalent BC method (denoted as eBC), the NIOSH thermal optical method is an apparent elemental carbon measure of BC (denoted as EC), single particle soot photometers such as the laser-induced incandescence measure the refractory nature of BC (denoted as rBC), and particle soot absorption photometers such as the Aethalometer and MAAAP instruments measure the equivalent BC (denoted as eBC). The instrument utilized for BC measurements in this study was UCR’s in-house photoacoustic real-time analyzer (AVL MSS-483) which represents the eBC measurement method as defined by Bond and is utilized here for consistency. The photoacoustic measurement method is a reliable and robust measurement for quantifying marine BC where the PM fractions vary significantly and have been shown to impact the EC measurement method (Bond et al 2013 and Johnson et al 2016). The photoacoustic measurement was sampled from the same dilution tunnel used for the gravimetric and NIOSH filter samples.

### **2.3.2 Toxics**

CARB utilizes speciation estimates from boiler emissions that are used in the emission inventory and air quality models. These models are lacking toxic data from marine boilers. As such, additional toxic samples were utilized for the boiler tests. These included aldehydes and ketones, speciated hydrocarbons, and metals. All the toxic samples were collected from the dilution tunnel as shown in Figure 2-7. Additionally, two speciated hydrocarbon samplers were collected directly from the raw stack to improve measurement sensitivity.

**Total Gaseous Non-Methane Organics (TGNMO)** concentrations are often measured using a total hydrocarbon analyzer with a field ionization detector (FID). However, these devices have a flame and are not usually allowed on a tanker vessel. For this project diluted exhaust samples were collected in SUMMA® canisters, equipped with flow controllers and subsequently analyzed for TGNMO at Atmospheric Analysis and Consulting (AAC) an off-site laboratory.

**PAMS** AAC also analyzed the SUMMA canisters for VOC's and BTX to process the total PAMS impact of the speciated HCs. They used the TO-12/PAMS method which provides the data for VOCs including light toxics (BTX and butadiene) and the PAMS profile needed for air quality modeling. With this method, the analysis provides concentrations of the following hydrocarbons.

Ethylene	3-Methylpentane	Styrene
Acetylene	1-Hexane	O-Xylene
Ethane	N-Hexane	N-Nonane
Propylene	Methylcyclopentane	Isopropylbenzene
Propane	2,4-Dimethylpentane	N-Propylbenzene
Isobutane	Benzene	M-Ethyltoluene
1-Butane	Cyclohexane	P-Ethyltoluene
N-Butane	2-Methylhexane	1,3,5-Trimethylbenzene
Trans-2-Butene	2,3-Dimethylpentane	O-Ethyltoluene
Cis-2-Butene	3-Methylhexane	1,2,4-Trimethylbenzene
Isopentane	2,2,4-Trimethylpentane	N-Decane
1-Pentane	N-Heptane	1,2,3-Trimethylbenzene
N-Pentane	Methylcyclohexane	M-Diethylbenzene
Isoprene	2,3,4-Trimethylpentane	P-Diethylbenzene
Trans-2-Pentene	Toluene	N-Undecane
Cis-2-Pentene	2-Methylheptane	N-Dodecane
2,2-Dimbutane	3-Methylheptane	
Cyclopentane	N-Octane	
2,3-Dimethylbutane	Ethylbenzene	
2-Methylpentane	M/P-Xylenes	

Note in the earlier tanker measurement project, VOC adsorbed molecules starting about C<sub>4</sub> (butadiene) through C<sub>12</sub> were collected on a multi-bed carbon bed composed of molecular sieve, activated charcoal, and carbotrap resin. The VOC included toxics such as 1,3 butadiene; benzene; toluene; ethylbenzene and xylenes. This method was not used during this testing campaign.

**Aldehydes and ketones:** Carbonyls (aldehydes and ketones) were collected on 2,4-dinitrophenylhydrazine (DNPH) coated silica cartridges (Waters Corp., Milford, MA) behind the Teflon filter. A critical flow orifice was used to control the 1.0 LPM flow through the cartridge. Sampled cartridges were sealed and stored at a cold temperature and later extracted using 5 mL of acetonitrile with the liquid then injected into Agilent 1100 series high performance liquid chromatograph (HPLC) equipped with a diode array detector. The HPLC column was similar to a 5µm Deltabond AK resolution (200cm x 4.6mm ID) with upstream guard column. The HPLC sample injection, and operating conditions are set up according to the specifications of the SAE 930142 HP protocol (Siegl, W et al 1993). The DNPH samples were collected from the dilution tunnel. Due to time limitations and sample difficulties only one valid sample was collected.

**Metals:** The metal analysis was performed on the Teflon PM samples using X-Ray Fluorescence (XRF) from an offline analytical method utilizing the same Teflon filters used to determine the

PM<sub>2.5</sub> mass. The filters were first weighed then sent out for XRF analysis. The method offers analysis of elements (Na through Pb) represented by 38 elements. XRF is an EPA approved, non-destructive analytical method (IO-3.3) wherein a filter is bombarded with X-ray energy. The subsequent excitation of electrons can be measured when the electrons fall back to their valence state, releasing energy in the process. Each element has a “fingerprint” of energy discharges which are measured to determine the quantity of each element.

### **2.3.3 Exhaust flow**

The calculated emission factor requires the measurement of the engines exhaust flow rate. The exhaust gas flow can be determined by the following methods:

1. Direct Measurement Method (**utilized**)
2. Carbon Balance Method (not available, lacking measured fuel consumption)
3. Air and Fuel Measurement Method (not available)
4. Air Pump method (not possible on boilers only engines)

Although there are four accepted methods for measuring flow rate, the direct measurement approach was most suitable for boiler testing. Direct exhaust flow measurement is complex and requires long straight sections which is not typically available on OGVs exhaust systems. Thus, direct measurement has not been a preferred method at UCR for engine exhaust flow, where fuel flow measurement has been utilized. For this boiler, there was a suitable straight section for good exhaust flow direct measurement. Thus, direct flow measurement (#1) was utilized for accurate emissions calculations.

The direct measurement system utilized in this project was a type S Pitot tube is used to measure the differential pressure between the counter-flow (static pressure) and parallel-flow (dynamic pressure) directions. This method follows EPA Method 2, see Section 2.4.2 and Appendix E for details.

### **2.3.4 Boiler**

The boiler output was not available for recording and only a single mode was utilized given the short time frame allowed on the vessel. The boiler was operated under normal usage conditions in a high load operation maintaining bulk fuel temperature. It is estimated based on the recorded fuel rate that the boiler load was around 65% of its total capacity.

## **2.4 Calculations**

The calculations are described in this section.

### **2.4.1 Emission factors**

The emissions were collected at the one mode in triplicate to allow for the determination of confidence intervals for the reported means. The triplicate measurements were performed by collecting three samples (i.e. triple or three repeated measurements) at each load point for all the species of interest (gaseous continuous and integrated PM samples). The result is based on the measured mass flow in the exhaust stack, the measured concentration of species, divided by the fuel rate calculated by the carbon balance method utilizing the MGO fuel as specified in Section 2.1.2. An overall single emission factor representing the boiler was determined by dividing the

integrated mass of emissions (g/hr) by the integrated fuel rate (kg-fuel/hr) to get an emission factor of g/kg-fuel for each species presented.

### 2.4.2 Exhaust flow

The exhaust flow calculation follows EPA Method 2 which utilizes a type S Pitot tube is used to measure the differential pressure between the counter-flow (static pressure) and parallel-flow (dynamic pressure) directions, see Figure 2-8. Velocity is calculated using Bernoulli's principle, which states that the pressure in a stream of fluid is reduced as the speed of the flow is increased. The velocity calculation is based off of the temperature, molecular weight of the exhaust gas, static pressure, dynamic pressure, and relative humidity. Measurement of the differential pressure and temperature were repeated at the sampling site several times at different depths inside the duct, including the near side of the duct, in the middle of the duct, and the far side of the duct, see Appendix E for detailed exhaust flow calculation.



Figure 2-8 S-type pitot tube for EPA Method 2

## 2.5 Corrections and assumptions

Ship testing is very complex where space and time are limited, and setup is from instruments which were transported in boxes to the test site and setup. As such, it is expected not everything will go according to plan, but most data on ships is of value since it is hard to come by.

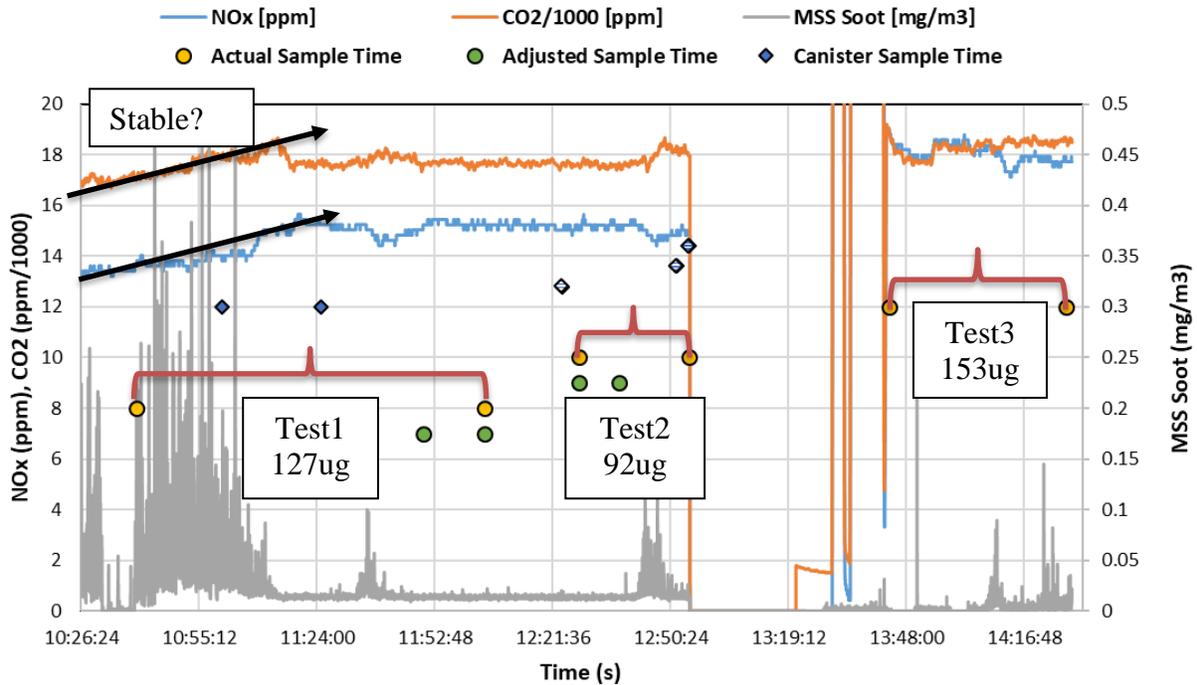
This section was added to discuss three issues that occurred while testing the boiler. These issues may impact the emissions where this section provides context to the quality of the reported data.

### 2.5.1 Emissions stability

There was a small stability issue that occurred at the start of sampling that may impact the gaseous emissions slightly and the eBC more significantly. The stability issue can be seen by the slight increase in CO<sub>2</sub> and NO<sub>x</sub> concentration for the first hour of testing, see Figure 2-9 between 10:30 and 11:30 (note this was after 1-2 hours of boiler stabilizing). The change in NO<sub>x</sub> concentration is small (1 ppm NO<sub>x</sub>) and larger for CO<sub>2</sub> (1.5% CO<sub>2</sub>), but the Test 1 MSS soot measurement (eBC) is five times higher than the steady state measured soot measurement of Test 2, see the grey trace in Figure 2-9. It is not clear what happened between 10:30 and 11:30, but it seems there was a slight change in fuel usage (CO<sub>2</sub> change) and unstable eBC emission (BC desorption, fueling, or other). There was also an impact in the PM filters as can be seen by the color of the

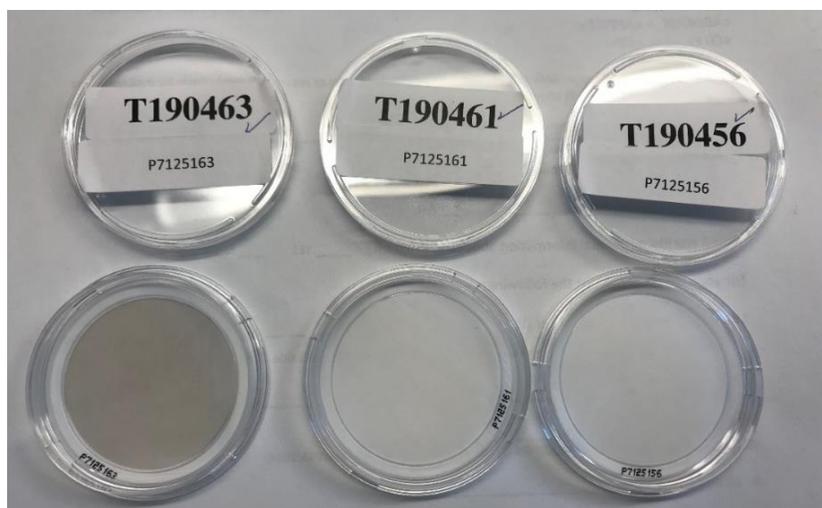
filters, see Figure 2-10. The first filter, Test #1, was darker than Test #2 and #3 supporting what was visible with the real time MSS soot sensor. The overall PM filter mass, however, did not change significantly, as discussed in the next sub section.

Previous testing on a container vessel modern boiler showed that soot concentration (eBC method) was very stable and averaged about 0.01 mg/m<sup>3</sup> during the 8 hours of sampling over three separate days. This would suggest the more representative eBC value is the one between 11:50 and 12:10 for test 1. As such, a re-analysis of the real time data was performed to collect the data for the stable time segment. A re-analysis of the gaseous emissions was also collected for this time period. The original sample durations are shown by orange circles and bars, the modified time segments are denoted by the green circles, see Figure 2-10. The results presented in this are based on the analysis during the green circles. The details of the original and modified data are provided in Appendix F.



**Figure 2-9 Real time emissions for tests 1, 2, and 3**

<sup>1</sup> Orange circles are the original sample times for PM filters, The blue triangles are the stop and stop of the SUMA canisters, green are the revised sample averaging times for the eBC and gaseous emissions.



**Figure 2-10 Sample filters Test 1, 2, and 3**

<sup>1</sup> The filter weights were 127, 153, and 92 ug from left to right.

### **2.5.2 Filter spotting**

During the dilution tunnel installation, the PM cyclone would not fit due to space limitations so it had to be removed, see discussion in Section 2.2.1. Cyclones were introduced into PM samplers to prevent collecting wall accumulated particles, debris in the exhaust, and other objects not emitting directly from the combustion process. Typically, a properly sampled PM filter would not show visible spotting. The spotting on these filters cannot be seen easily with-out some type of magnification, see Figure 2-10 vs Figure 2-11. The mass impact due to the spotting is believed to be small because less than 5% of the total mass is soot and the spotting would likely be soot based accumulation particles. Additionally, the PM mass for the darker filter is less than the PM mass for the other two filters showing that the color of the filter isn't what is causing the higher PM filter weights.

The results for the PM mass filters are presented “as is” where these values maybe be artificially high by 5% due to the filter # 1 eBC instability and the PM spotting. Also, these PM mass emission rates are similar to the recent boiler UCR tested on a container ship and these PM mass emission rates are much lower than a similar crude tanker tested in 2008 (Agrawal et al 2008), so the data is of value to report.

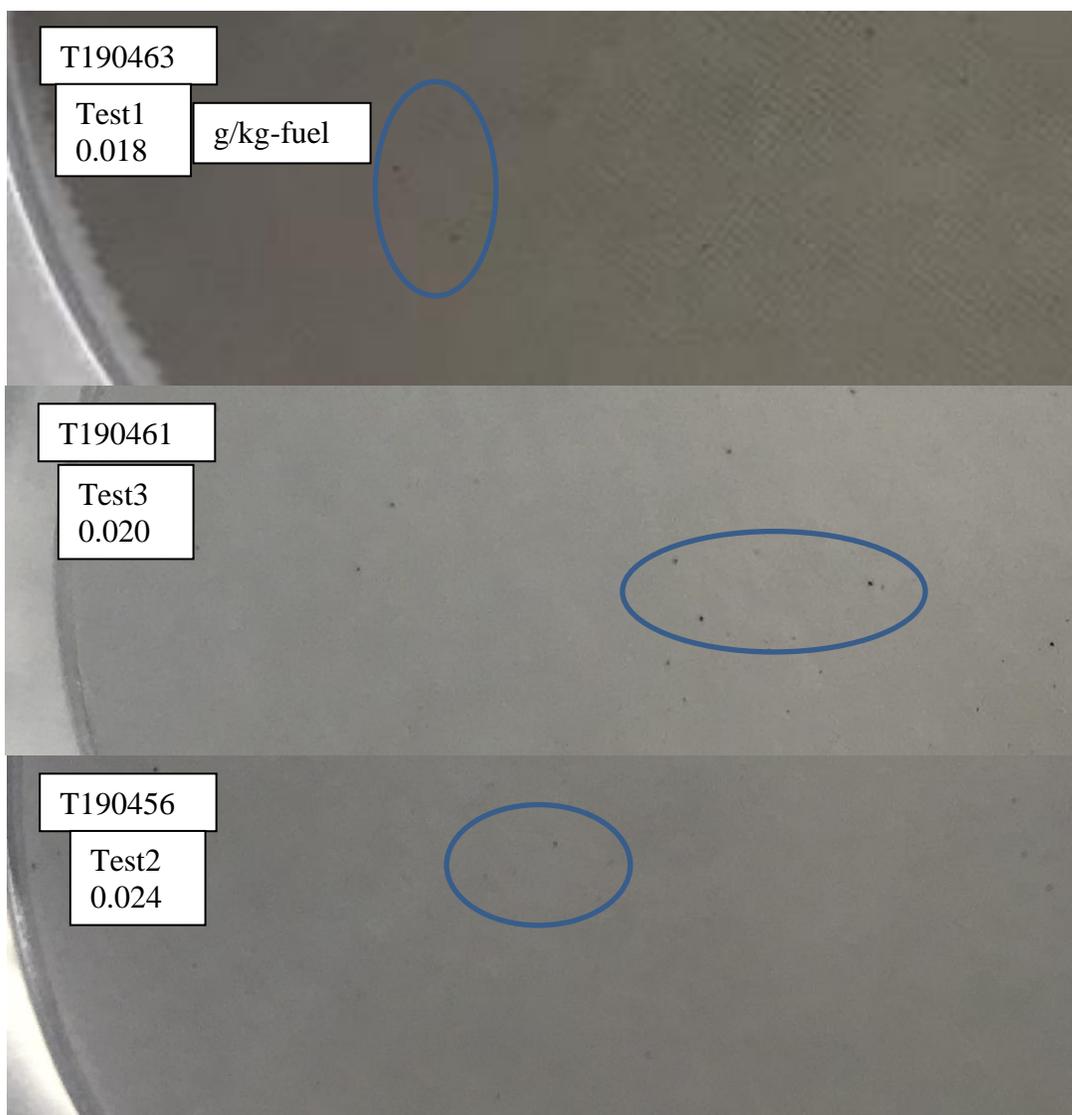


Figure 2-11 Filter spotting for tests 1, 2, and 3 (most observed spotting)

### 2.5.3 Toxics

SUMA canisters samplers were collected from the dilution tunnel between 11:01 and 12:24 and from the raw exhaust after 12:50, see Table 2-3. The dilute samples resulted in detectable quantities of C2-C4 analytes, but for the raw, undiluted samples, all the analyte responses below C5 were below the Sample Reporting Limit (SRL), see Table 2-4. The EPA 3C analysis showed 1.5% CO<sub>2</sub> in the dilute measurement and 10.5% CO<sub>2</sub> in the raw stack sample, suggesting the samplers were labeled and analyzed correctly. This suggests there may be a contamination in the dilution air utilized for the dilute BTEX samples.

The raw samples were used in the report analysis and this finding doesn't impact to overall discussion. Future BTEX samples will consider this impact on our sampling system especially when testing for lighter HC fuels.

**Table 2-3 Summary of BETX sampling locations**

BTEX				
Start Time	Dur	Flow	ID	Comment
hh:mm	min	slpm		
11:01	24	0.5	BTX6123	Dil tunnel
12:24	28	0.5	BTX6121	Dil tunnel
12:52	3	-	BTX6124	Raw stack grab
12:55	3	-	BTX6126	Raw stack grab

**Table 2-4 Summary of BTEX concentrations C2-C4 dilute vs stack discussion**

Analyte	MM		Diulte		Stack	
			#1	#2	#3	#4
Ethylene	28.1	C2H4	<SRL	<SRL	<SRL	<SRL
Acetylene	26.0	C2H2	1.88	<SRL	<SRL	<SRL
Ethane	30.1	C2H6	3.32	3.12	<SRL	<SRL
Propylene	42.1	C3H6	<SRL	<SRL	<SRL	<SRL
Propane	44.1	C3H8	16.1	9.16	<SRL	<SRL
Isobutane	58.1	C4H10	7.14	10.5	<SRL	<SRL
1-Butene	56.1	C4H8	<SRL	<SRL	<SRL	<SRL
1,3-Butadiene	54.1	C4H6	<SRL	<SRL	<SRL	<SRL
n-Butane	58.1	C4H10	2.24	3.44	<SRL	<SRL

### 3 Results

The emission results for the Alfa Laval auxiliary boiler installed on a tanker are described in this section. The results are based on the operation of the boiler under in-use conditions during fuel off-load in a Northern California port. The estimated load condition is 65%. There were some data corrections performed and these corrections are explained in Section 2.5. This section presents the results of the final data set, where all data points are available in Appendix F.

The result section is divided into three sub sections gaseous, PM (PM mass and composition and BC), and toxics. All error bars and standard deviations (stdev) presented are based on one sigma ( $\sigma$ ) uncertainty.

#### 3.1 Gaseous

The gaseous emissions include NO<sub>x</sub>, CO, CO<sub>2</sub>, and SO<sub>2</sub>. The SO<sub>2</sub> emissions were both measured and calculated where the calculated values are used in this report. The gaseous emissions are shown in Table 3-1 (averages), Table 3-3 (stdev) and Figure 3-1. The boiler fsCO<sub>2</sub> emissions were 3026 g/kg-fuel. This is similar (with-in 2%) to previous testing of a modern auxiliary boiler on a container vessel. The close agreement suggests both boiler tests were performed under similar conditions.

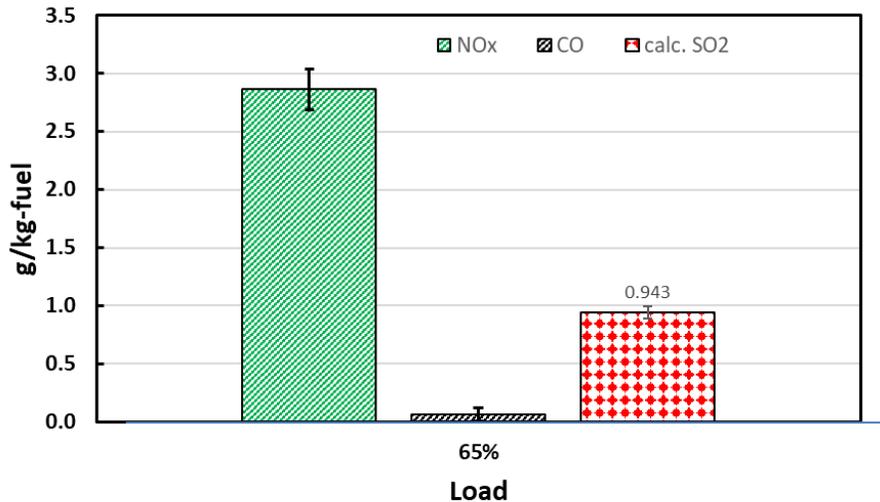
The fuel specific (fs) NO<sub>x</sub> emissions averaged  $2.86 \pm 0.18$ , CO  $0.06 \pm 0.064$ , and SO<sub>2</sub> 0.94 g/kg-fuel. The fsNO<sub>x</sub> emissions were slightly higher, with-in 50%, to previous testing of a modern container vessel auxiliary boiler tested on low sulfur MGO and ULSFO fuels (0.038 S and 0.089 S respectively) (Johnson et al 2019), but over two times lower (2.2) than the emissions on a tanker vessel auxiliary boiler tested on high sulfur HFO fuel (2.85% S) (Agrawal et al 2008). The CO emissions were 6.9 times lower than the boiler operating on HFO fuel. The boiler SO<sub>2</sub> emissions were lower for the low sulfur fuel compared to a high sulfur HFO fuels, lower by a factor of 58 (Agrawal et al 2008). The main difference is a result of the sulfur weight fraction in the fuel.

**Table 3-1 Summary of Emissions Measured by UCR (ave)**

Boiler Load	Carb. FC kg/hr	Units	Average Species					
			NOx	CO	CO2	calc. SO2	PM2.5	PM_eBC
65%	2460.4	g/hr	7051.0	154.7	7445560	2321.0	53.7	2.9
65%	2460.4	g/kg-fuel	2.86	0.064	3026.1	0.943	0.022	0.0012

**Table 3-2 Summary of Emissions Measured by UCR (stdev)**

Boiler Load	Carb. FC kg/hr	Units	Stdev Species					
			NOx	CO	CO2	calc. SO2	PM2.5	PM_eBC
65%	2460.410	g/hr	0.261	0.063	0.434	0.000	0.004	0.0028
65%	2460.410	g/kg-fuel	0.175	0.055	0.162	0.050	0.004	0.0004



**Figure 3-1 NOx, CO, and SO2 boiler emissions (g/kg-fuel)**

<sup>1</sup> SO2 is calculated from sulfur in the fuel and fuel usage.

### 3.2 PM

The PM emissions are organized by PM mass, PM composition (EC, OC, Sulfate), and equivalent BC (eBC), see Section 2.3 for a description of the PM measurement method and definitions.

The PM<sub>2.5</sub> mass and eBC emissions for the boiler are shown in Table 3-1 and Figure 3-2. The average PM<sub>2.5</sub> emissions were  $0.022 \pm 0.004$  g/kg-fuel and the eBC emissions were  $0.0012 \pm 0.0004$  g/kg-fuel. The PM<sub>2.5</sub> emissions were slightly lower, within 50%, to previous testing of a modern auxiliary boiler tested on low sulfur MGO and ULSFO fuels (Johnson et al 2019), but over 100 times lower (131) than the PM emissions on a boiler tested on high sulfur HFO fuel, (Agrawal et al 2008).

The boiler eBC emissions were higher (70%) than the previous testing of a modern boiler (Johnson et al 2018), but the soot concentration in the stack was similar and near the detection limits of the measurement method. This suggests the difference between the eBC emissions from the two modern boilers may be a result of detection limits. eBC emissions were not measured with a micro soot sensor during the 2008 tanker testing, but NIOSH EC mass was measured. The boiler eBC emissions was 120 times lower than the EC emission reported for the tanker operating on high sulfur fuels (Agrawal et al 2008). Johnson has shown the EC measurement method at ratios of EC/OC < 5%, like in Agrawal’s study, are less accurate (Johnson et al 2016), thus it is not clear the benefit of the eBC or EC measurement difference between the modern and older boilers.

The speciated PM (EC, OC, and Sulfate) emissions are shown in Table 3-3 and Figure 3-2. The PM<sub>EC</sub> was 0.56 mg/kg-fuel and the OC<sub>PM</sub> was 21 mg/kg-fuel. The fraction of EC compared to the sum of EC+OC is 2.2% suggesting the EC fraction is low for the boiler emissions and OC fractions are larger. The sulfate PM is still being analyzed, but can be estimated from the fuel sulfur level. This is estimated at 11 mg/kg-fuel for a fuel sulfur level of 0.0483%. With the estimated sulfur the PM composition is calculated to be approximately 68.5% organic, 30% sulfate, and 1.5% elemental.

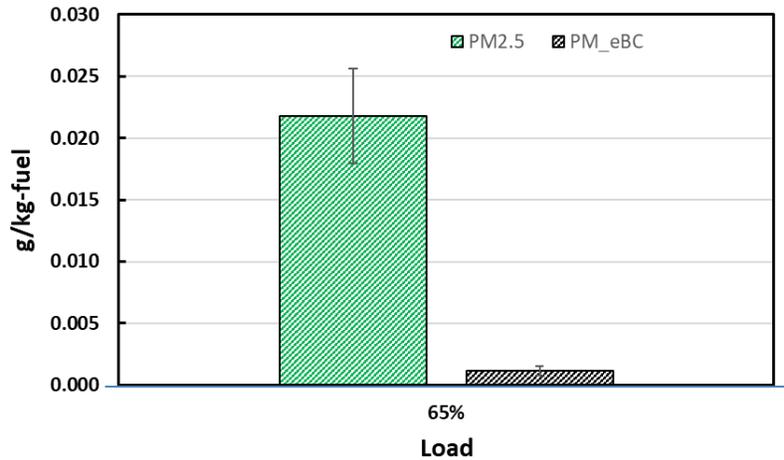
**Table 3-3 Summary of PM composition measured by UCR (ave)**

Boiler Load	Carb. FC kg/hr	Units	Average Species					
			PM_EC	PM_OC	PM_S	PM_TC	PM_OCcor	PM_TCcor
65%	2460.4	g/hr	1.400	51.218	-	79.356	61.461	89.599
65%	2460.4	g/kg-fuel	0.00056	0.021	-	0.032	0.025	0.036

<sup>1</sup> PM\_S is represented as hydrated sulfate ions (H<sub>2</sub>SO<sub>4</sub>·6.55H<sub>2</sub>O), PM\_TC is the sum of PM\_EC+PM\_OC+PM\_S, PM\_OCcor = 1.2\*PM\_OC to correct for the hydrogen bonding estimate, and PM\_TCcor = PM\_EC+PM\_OCcor+PM\_S and should represent the total PM mass and, thus, be comparable to PM<sub>2.5</sub>

**Table 3-4 Summary of of PM composition measured by UCR (stdev)**

Boiler Load	Carb. FC kg/hr	Units	Stdev Species					
			PM_EC	PM_OC	PM_S	PM_TC	PM_OCcor	PM_TCcor
65%	2460.4	g/hr	0.001	0.007	-	0.006	0.008	0.008
65%	2460.4	g/kg-fuel	0.00032	0.004	-	0.003	0.004	0.004



**Figure 3-2 PM<sub>2.5</sub> and eBC emissions (g/kg fuel)**

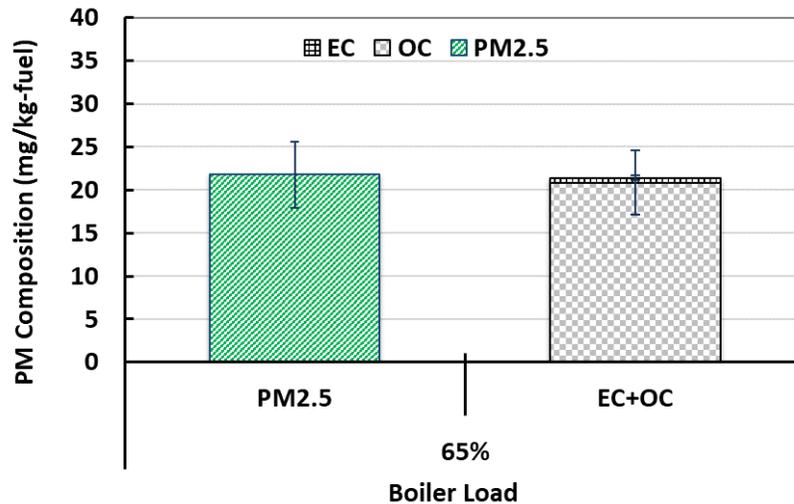


Figure 3-3 PM<sub>2.5</sub> and eBC emissions (mg/kg fuel)

### 3.3 Toxics

Toxics measurements were collected for the boiler tests. These include aldehydes and ketones, speciated hydrocarbons, and metals.

**Aldehydes and ketones:** The aldehydes and ketones are presented in Table 3-5. Only Formaldehyde, Acetaldehyde and Acrolein were analyzed, other species were not reported. The boiler emissions for Formaldehyde, Acetaldehyde and Acrolein were 0.401, 0.376, and 1.749 mg/kg-fuel. These results compare well with the modern boiler operating on MGO fuel from a container vessel. Both modern boilers operating on MGO fuel (container and tanker) emission results showed lower Formaldehyde emissions compared to the container boiler emissions when operating on low sulfur HFO fuel. Additionally, modern boilers operating on MGO fuels appear to have lower Acetaldehyde and Acetone emissions compared to the boiler tested by Agrawal (Agrawal et al 2008).

Table 3-5 Average Aldehydes and ketone emissions by fuel by test load.

Fuel	Load	Fuel Use kg/hr	Units	Formaldehyde	Acetaldehyde	Acrolein
MGO	65%	2460	mg/hr	976.6 ± -	917.0 ± -	4263.1 ± -
MGO	65%	2460	mg/kg-fuel	0.401 ± -	0.376 ± -	1.749 ± -

<sup>1</sup> Statistical student t.test was not performed due to only one sample collected. Expected uncertainty from other replicate tests from boilers is ± 15%.

**BTEX speciated hydrocarbons:** The total PAMS, TNMHC, and selected species are presented in Table 3-6. The total PAMS were low and just above the Sample Report Limit (SRL) at 2 ppb and the total NMHC were 249 ppb on average. On a mass basis, the total PAMS and TNMHC were 0.0033 and 0.516 mg/kg-fuel, see Table 3-7. Other selected speciated HCs (C4-C8) are shown in Table 3-7 which were all below the SRL where the values reported represent an upper limit to their measurement this is why they are reported with the “<” sign. The speciated HCs (C4-C8) are higher during this modern boiler test compared to those reported by Agrawal (Agrawal et al 2008). One reason for the higher emissions in this testing may be due to different

sample detection limits between the laboratories. The full report of speciated HCs (C2-C12) is provided in Appendix F. Also, during the previous study, PAHs were collected which were not collected in this study so that comparison is not available.

**Table 3-6 EPA 3C, total PAMS, and TNMHC results, raw stack**

Analyte	Stack EPA 3C		
	#1	#2	Ave
Dilution Factor	1.97	1.79	1.88
H2	<2.0%	<1.8%	<1.8%
Ar/O2	7.5%	7.5%	7.5%
N2	82.0%	82.0%	82.0%
CO	<0.2%	<0.2%	<0.2%
CO2	10.4%	10.5%	10.5%
CH4	<0.2%	<0.2%	<0.2%
1,3 Butadiene (ppbC)	<SRL	<SRL	<SRL
Total PAMS (ppbC)	1.99	2.04	2.02
TNMHC (ppbC)	309	189	249

**Table 3-7 Selected speciated hydrocarbons (C4-C8) mg/kg-hr**

Analyte	Conc. ppb	mg/kg-fuel
1,3-Butadiene	<SRL	< 0.00907
Benzene	<SRL	< 0.00874
Toluene	<SRL	< 0.00883
m/p-Xylenes	<SRL	< 0.00891
Ethylbenzene	<SRL	< 0.00891
o-Xylene	<SRL	< 0.00891
Total PAMS	2.02	0.00332
TNMHC	249.0	0.516

<sup>1</sup> Total PAMS and TNMHC utilized propane for molar mass. For other species see Appendix F for the full list

**Metals:** The metal results for the boiler at 65% load are shown in Table 3-8 and Table 3-9. The full list of metal results can be found in Appendix F. These are in progress. AQMD agreed to perform this once the quarantine is lifted.

**Table 3-8 Average selected metals with 1  $\sigma$  error bars, 1 of 2**

Fuel	Units	Mg			AL			Si			P			S		
MGO	mg/hr	-	±	-	-	±	-	-	±	-	-	±	-	-	±	-
MGO	mg/kg-fuel	-	±	-	-	±	-	-	±	-	-	±	-	-	±	-

**Table 3-9 Average selected metals with 1  $\sigma$  error bars, 2 of 2.**

Fuel	Units	Cl			V			FE			NI		
MGO	mg/hr	-	±	-	-	±	-	-	±	-	-	±	-
MGO	mg/kg-fuel	-	±	-	-	±	-	-	±	-	-	±	-

## 4 Summary

Emissions measurements were made on from a modern auxiliary boiler on a tanker ship while it offloads fuel with-in a port in Northern California where the main engine was off. The auxiliary boiler was operated on MGO fuel and operated at an estimated 65% load. Emissions were measured following ISO and CFR methods for gaseous, and PM (total mass, elemental, and organic carbon species, sulfated PM). Boiler sampling also include toxics to help the CARB update its boiler emissions inventory. Dilution ratios and filter temperatures, as specified in 1065, were met during this testing.

A summary of the results for the testing is as follows:

- The emissions were slightly unstable at the start of testing, but were found to be stable for the segments analyzed. The reported data set is representative of valid measurements suggesting the results are representative of a properly operating boiler.
- The boiler fuel flow rate was measured at 2460 kg/hr utilizing direct measurement of exhaust flow and carbon balance from emissions species. This agrees well with the reported fuel rate that ranged from 2268 to 2722 kg/hr according to the Chief. The corresponding exhaust flow at the 2460 kg/hr fuel rate was 35,639 m<sup>3</sup>/hr.
- The boiler fuel specific (fs) CO<sub>2</sub> emissions were 3026 g/kg-fuel. This is similar to previous testing of a modern auxiliary boiler on a container vessel.
- The boiler fsNO<sub>x</sub> emissions averaged 2.86 ± 0.18, CO 0.06 ± 0.064, and SO<sub>2</sub> 0.94 g/kg-fuel. The fsNO<sub>x</sub> emissions were slightly higher, with-in 50%, to previous testing of a modern container vessel auxiliary boiler tested on low sulfur MGO and ULSFO fuels, but over two times lower (2.2) than the emissions on a tanker vessel auxiliary boiler tested on high sulfur HFO fuel. The CO emissions were 6.9 times lower than the boiler operating on HFO fuel.
- The boiler fsSO<sub>2</sub> emissions were lower for the low sulfur fuel compared to a high sulfur HFO fuels by a factor of 58
- fsPM<sub>2.5</sub> emissions were 0.022 ± 0.004 g/kg-fuel and were slightly lower to previous testing of a modern auxiliary boiler tested on low sulfur MGO and ULSFO fuels, but over 100 times lower (131) than the PM emissions on a boiler tested on high sulfur HFO fuel. The main difference between boiler PM emissions on low and high sulfur fuels is the sulfur content of the fuel.
- The fs\_eBC emissions were 0.0012±0.0004 g/kg-fuel and were about the same for a previous modern boiler tested, but about 120 times lower than the fsEC emission reported for an older boiler tested on a tanker. The methods were not the same and there may be questions for this large difference.
- The fsPM composition (EC, OC, and Sulfate) were 0.56, 21, and 11 mg/kg-fuel respectively. The sulfute PM emissions were calculated and will be updated with measured values once the state shut down has been lifted.
- The metals emissions were... Waiting on the analysis due to the state shut down.

- The boiler emissions for Formaldehyde, Acetaldehyde and Acrolein were 0.401, 0.376, and 1.749 mg/kg-fuel. These results compare well with the modern boiler operating on MGO fuel test from a container vessel. Modern boilers operating on MGO fuels appear to have lower Acetaldehyde and Acetone emissions compared to older boiler tested on HFO fuels.
- The total speciated HCs (C2-C12) PAMS and TNMHC were 0.0033 and 0.516 mg/kg-fuel. The PAMS measurements were at the detection limit of the measurement method and thus, could not be compared properly to the previous testing on an older boiler tested on a high sulfur HFO fuel.

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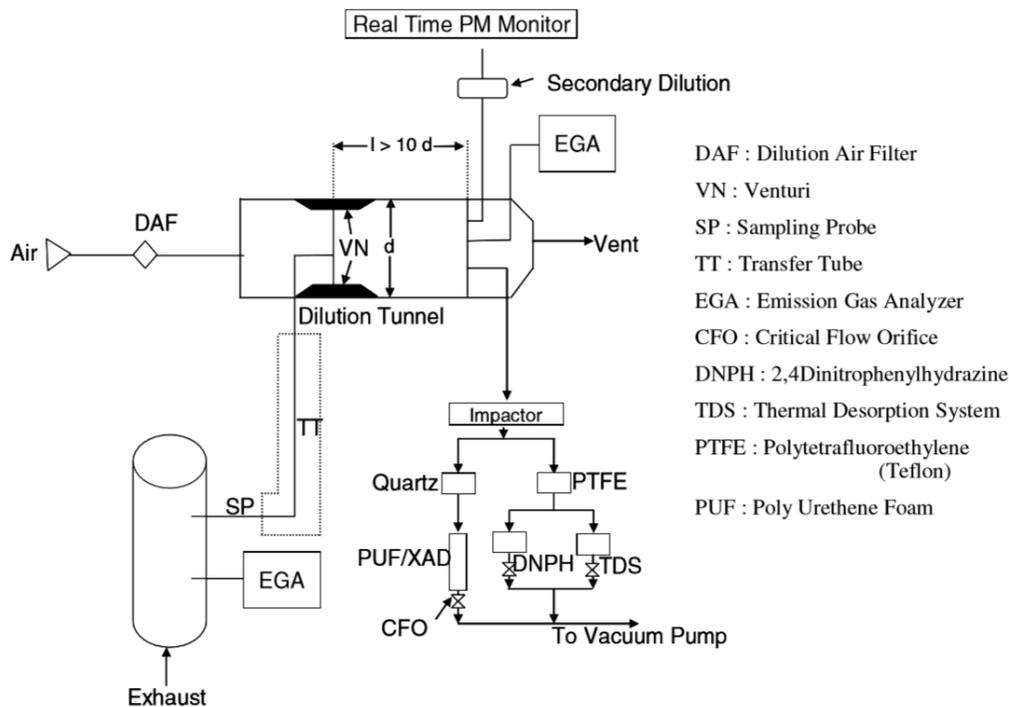
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## Appendix A – Sample Collection Methods

ISO 8178-1<sup>4</sup> and ISO 8178-2<sup>5</sup> specify the measurement and evaluation methods for gaseous and particulate exhaust emissions when combined with combinations of engine load and speed provided in ISO 8178- 4: *Test cycles for different engine applications*. The emission results represent the mass rate of emissions per unit of work accomplished. Specific emission factors are based on brake power measured at the crankshaft, the engine being equipped only with the standard auxiliaries necessary for its operation. Per ISO, auxiliary losses are <5 % of the maximum observed power. IMO ship pollution rules and measurement methods are contained in the “International Convention on the Prevention of Pollution from Ships”, known as MARPOL 73/78<sup>6</sup>, and sets limits on NO<sub>x</sub> and SO<sub>x</sub> emissions from ship exhausts. The intent of this protocol was to conform as closely as practical to both the ISO and IMO standards.

### Gaseous and Particulate Emissions

A properly designed sampling system is essential for accurate collection of a representative sample from the exhaust and subsequent analysis. ISO points out that particulate must be collected in either a full flow or partial flow dilution system and UCR chose the partial flow dilution system as shown in Figure A-1.



**Figure A-1 Partial Flow Dilution System**

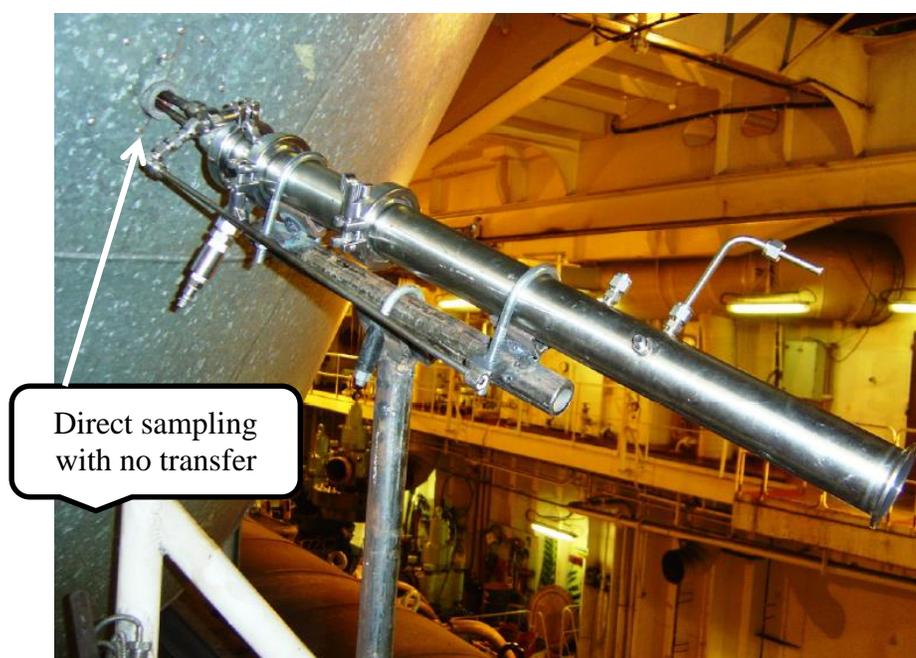
<sup>4</sup> International Standards Organization, ISO 8178-1, *Reciprocating internal combustion engines - Exhaust emission measurement -Part 1: Test-bed measurement of gaseous particulate exhaust emissions*, First edition 1996-08-15

<sup>5</sup> International Standards Organization, ISO 8178-2, *Reciprocating internal combustion engines - Exhaust emission measurement -Part 2: Measurement of gaseous and particulate exhaust emissions at site*, First edition 1996-08-15

<sup>6</sup> International Maritime Organization, *Annex VI of MARPOL 73/78 “Regulations for the Prevention of Air Pollution from Ships and NO<sub>x</sub> Technical Code”*.

The flow in the dilution system eliminates water condensation in the dilution tunnel and sampling systems and maintains the temperature of the diluted exhaust gas at  $<52^{\circ}\text{C}$  before the filters. ISO cautions that the advantages of partial flow dilution systems can be lost to potential problems such as: losing particulates in the transfer tube, failing to take a representative sample from the engine exhaust and inaccurately determining the dilution ratio.

An overview of UCR's partial dilution system is shown in Figure A-1. Raw exhaust gas is transferred from the exhaust pipe (EP) through a sampling probe (SP) and the transfer tube (TT) to a dilution tunnel (DT) due to the negative pressure created by the venturi (VN) in DT. The gas flow rate through TT depends on the momentum exchange at the venturi zone and is therefore affected by the absolute temperature of the gas at the exit of TT. Consequently, the exhaust split for a given tunnel flow rate is not constant, and the dilution ratio at low load is slightly lower than at high load. More detail on the key components is provided in Table A-1.



**Figure A-2 measurement layout on an engine exhaust stack**

### **Dilution Air System**

40 CFR Part 1065 recommends dilution air to be  $20$  to  $30^{\circ}\text{C}$  and ISO recommends  $25 \pm 5^{\circ}\text{C}$ . Both also recommend using filtered and charcoal scrubbed air to eliminate background hydrocarbons. The dilution air may be dehumidified. The system can be described as follows: The pressure is reduced to around 40 psig, a liquid knock-out vessel, desiccant to remove moisture with silica gel containing an indicator, hydrocarbon removal with activated charcoal, and a HEPA filter for the fine aerosols that might be present in the supply air. The silica gel and activated carbon are changed for each field campaign. Figure A-3 shows the field processing unit in its transport case. In the field the case is used as a framework for supporting the unit.

**Table A-1 Components of a Sampling System: ISO Criteria & UCR Design**

Section	Selected ISO and IMO Criteria	UCR Design
Exhaust Pipe (EP)	In the sampling section, the gas velocity is > 10 m/s, except at idle, and bends are minimized to reduce inertial deposition of PM. Sample collection of 10 pipe diameters of straight pipe upstream is recommended and performed where possible. For some tight configurations use good engineering judgment.	UCR follows the ISO recommendation, when practical.
Sampling Probe (SP) -	The minimum inside diameter is 4 mm and the probe is an open tube facing upstream on the exhaust pipe centerline. No IMO code.	UCR uses a stainless steel tube with diameter of 8mm placed near the center line.
Transfer Tube (TT)	<ul style="list-style-type: none"> <li>• As short as possible and &lt; 5 m in length;</li> <li>• Equal to/greater than probe diameter &amp; &lt; 25 mm diameter;</li> <li>• TTs insulated. For TTs &gt; 1m, heat wall temperature to a minimum of 250°C or set for &lt; 5% thermophoretic losses of PM.</li> </ul>	UCR uses a transfer tube of 0.15 m (6 inches). Additionally the sample tube insertion length varies with stack diameter, but typically penetrates at least 10%, but not more than 50% of the stack diameter.
Dilution Tunnel (DT)	<ul style="list-style-type: none"> <li>• shall be of a sufficient length to cause complete mixing of the exhaust and dilution air under turbulent flow conditions;</li> <li>• shall be at least 75 mm inside diameter (ID) for the fractional sampling type, constructed of stainless steel with a thickness of &gt; 1.5 mm.</li> </ul>	UCR uses fractional sampling; stainless steel tunnel has an ID of 50mm and thickness of 1.5mm.
Venturi (VN) --	The pressure drop across the venturi in the DT creates suction at the exit of the transfer tube TT and the gas flow rate through TT is basically proportional to the flow rate of the dilution air and pressure drop.	Venturi proprietary design provided by MAN B&W; provides turbulent mixing.
Exhaust Gas Analyzers (EGA)	One or several analyzers may be used to determine the concentrations. Calibration and accuracy for the analyzers are like those for measuring the gaseous emissions.	UCR uses a 5-gas analyzer meeting IMO/ISO specs



**Figure A-3 Field Processing Unit for Purifying Dilution Air in Carrying Case**

### **Calculating the Dilution Ratio**

According to ISO 8178, “it is essential that the dilution ratio be determined very accurately” for a partial flow dilution system such as what UCR uses. The dilution ratio is simply calculated from measured gas concentrations of CO<sub>2</sub> and/or NO<sub>x</sub> in the raw exhaust gas, the diluted exhaust gas and the dilution air. UCR has found it useful to independently determine the dilution ratio from both CO<sub>2</sub> and NO<sub>x</sub> and compare the values to ensure that they are within ±10%. UCR’s experience indicates the independently determined dilution ratios are usually within 5%. At systematic deviations within this range, the measured dilution ratio can be corrected, using the calculated dilution ratio. According to ISO, dilution air is set to obtain a maximum filter face temperature of <52°C and the dilution ratio shall be > 4.

### **Dilution System Integrity Check**

ISO describes the necessity of measuring all flows accurately with traceable methods and provides a path and metric to quantifying the leakage in the analyzer circuits. UCR has adopted the leakage test and its metrics as a check for the dilution system. According to ISO the maximum allowable leakage rate on the vacuum side shall be 0.5 % of the in-use flow rate for the portion of the system being checked. Such a low leakage rate allows confidence in the integrity of the partial flow system and its dilution tunnel. Experience has taught UCR that the flow rate selected should be the lowest rate in the system under test.

### **Measuring the Gaseous Emissions: CO, CO<sub>2</sub>, NO<sub>x</sub>, O<sub>2</sub>, SO<sub>2</sub>**

Measurement of the concentration of the main gaseous constituents is one of the key activities in measuring emission factors. This section covers the ISO/IMO protocols used by UCR. For SO<sub>2</sub>, ISO/CFR recommends that the concentration of SO<sub>2</sub> is calculated based on the fact that 97.75% of the fuel sulfur is converted to SO<sub>2</sub> (40 CFR Part 1065). UCR agrees with this recommendation and the enclosed SO<sub>2</sub> reported emissions are calculated from fuel sulfur levels.

## Measuring Gaseous Emissions: ISO & IMO Criteria

ISO specifies that either one or two sampling probes located in close proximity in the raw gas can be used and the sample split for different analyzers. However, in no case can condensation of exhaust components, including water and sulfuric acid, occur at any point of the analytical system. ISO specifies the analytical instruments for determining the gaseous concentration in either raw or diluted exhaust gases.

- Non-dispersive infrared analyzer (NDIR) for the measurement of carbon monoxide and carbon dioxide;
- Heated chemiluminescent detector (HCLD) or equivalent for measurement of nitrogen oxides;
- Paramagnetic detector (PMD) or equivalent for measurement of oxygen.

ISO states the range of the analyzers shall accurately cover the anticipated concentration of the gases and recorded values between 15% and 100% of full scale. A calibration curve with five points is specified. However, with modern electronic recording devices, like a computer, ISO allows the range to be expanded with additional calibrations. ISO details instructions for establishing a calibration curve below 15%. In general, calibration curves must be  $< \pm 2\%$  of each calibration point and be  $< \pm 1\%$  of full scale zero.

ISO outlines their verification method. Each operating range is checked prior to analysis by using a zero gas and a span gas whose nominal value is more than 80 % of full scale of the measuring range. If, for the two points considered, the value found does not differ by more than  $\pm 4\%$  of full scale from the declared reference value, the adjustment parameters may be modified. If  $>4\%$ , a new calibration curve is needed.

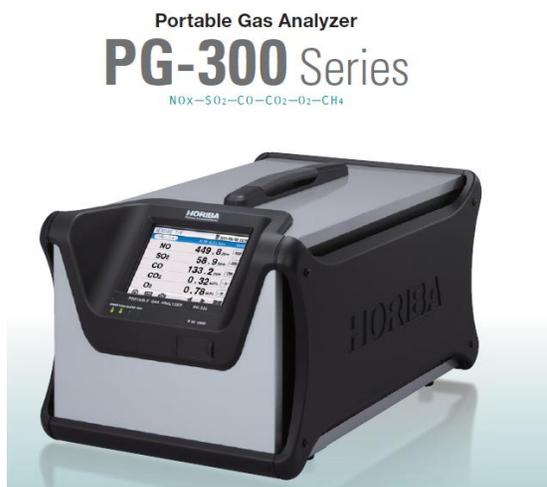
ISO, IMO, and CFR specify the operation of the HCLD. The efficiency of the converter used for the conversion of  $\text{NO}_2$  into  $\text{NO}$  is tested prior to each calibration of the  $\text{NO}_x$  analyzer. 40 CFR Part 1065 requires 95% and recommends 98%. The efficiency of the converter shall be  $>95\%$  and will be evaluated prior to testing.

ISO requires measurement of the effects of exhaust gases on the measured values of  $\text{CO}$ ,  $\text{CO}_2$ ,  $\text{NO}_x$ , and  $\text{O}_2$ . Interference can either be positive or negative. Positive interference occurs in NDIR and PMD instruments where the interfering gas gives rise to the same effect as the gas being measured, but to a lesser degree. Negative interference occurs in NDIR instruments due to the interfering gas broadening the absorption band of the measured gas, and in HCLD instruments due to the interfering gas quenching the radiation. Interference checks are recommended prior to an analyzer's initial use and after major service intervals.

## Measuring Gaseous Emissions: UCR Design

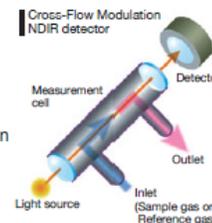
The concentrations of  $\text{CO}$ ,  $\text{CO}_2$ ,  $\text{NO}_x$  and  $\text{O}_2$  in the raw exhaust and in the dilution tunnel are measured with a Horiba PG-250 portable multi-gas analyzer. The PG-250 simultaneously measures five separate gas components with methods recommended by the ISO/IMO and USEPA. The signal output of the instrument is connected to a laptop computer through an RS-232C interface to continuously record measured values. Major features include a built-in sample

conditioning system with sample pump, filters, and a thermoelectric cooler. The performance of the PG-250 was tested and verified under the U.S. EPA ETV program.



**Cross-Flow Modulation advanced efficiency of NDIR analysis**

In PG-300, Cross-Flow Modulation is newly applied to SO<sub>2</sub>, CO, and new CH<sub>4</sub> analyzers. With Cross-Flow Modulation NDIR method, sample gas and reference gas flow into a single measurement cell switching one by one, and it brings about advantages that no optical adjustment is required, the zero point is kept stable, and the sample cell remains clean and it reduces span drift. The equipments will be kept safe for a long time as well. Cross-Flow Modulation Chemiluminescence detection method is already introduced for NO<sub>x</sub> analyzer in previous model and has the same effects as aforesaid analyzers.



**Figure A-4 Gas analyzer setup with measurement cell description**

Details of the gases and the ranges for the Horiba instrument are shown in Table A-2. Note that the Horiba instrument measures sulfur oxides (SO<sub>2</sub>); however, UCR follows the protocol in ISO which recommends calculation of the SO<sub>2</sub> level from the sulfur content of the fuel as the direct measurement for SO<sub>2</sub> is less precise than calculation. When an exhaust gas scrubber is present, UCR recommends measuring the SO<sub>2</sub> concentration after the scrubber since the fuel calculation approach will not be accurate due to scrubber SO<sub>2</sub> removal performance expectations.

**Table A-2 Detector Method and Concentration Ranges for Monitor**

Component	Detector	Ranges
Nitrogen Oxides (NO <sub>x</sub> )	Heated Chemiluminescence Detector (HCLD)	0-25, 50, 100, 250, 500, 1000, & 2500 ppmv
Carbon Monoxide (CO)	Non dispersive Infrared Absorption (NDIR). Cross flow modulation	0-200, 500, 1000, 2000, & 5000 ppmv
Carbon Dioxide (CO <sub>2</sub> )	Non dispersive Infrared Absorption (NDIR)	0-5, 10, & 20 vol%
Sulfur Dioxide (SO <sub>2</sub> )	Non dispersive Infrared Absorption (NDIR). Cross flow modulation	0-200, 500, 1000, & 3000 ppmv
Oxygen	Zirconium oxide sensor	0-5, 10, & 25 vol%

For quality control, UCR carries out analyzer checks with calibration gases both before and after each test to check for drift. Because the instrument measures the concentration of five gases, the calibration gases are a blend of several gases (super-blend) made to within 1% specifications. Experience has shown that the drift is within manufacturer specifications of ±1% full scale per day shown in Table A-3. The PG-250 meets the analyzer specifications in ISO 8178-1 Section 7.4 for repeatability, accuracy, noise, span drift, zero drift and gas drying.

**Table A-3 Quality Specifications for the Horiba PG-250**

<b>Repeatability</b>	±0.5% F.S. (NO <sub>x</sub> : ≤ 100ppm range CO: ≤ 1,000ppm range) ±1.0% F. S.
<b>Linearity</b>	±2.0% F.S.
<b>Drift</b>	±1.0% F. S./day (SO <sub>2</sub> : ±2.0% F.S./day)

### ■ Replacement parts

Replacement part intervals assume 8 hours of operation per day.  
Replacement interval may be more frequent depending on measurement gas conditions and use conditions.

[Consumable Items]

Name	Replace Every (general guideline)	Notes
Mist catcher	3 months	MC-025
Scrubber	3 months	For reference line
Air filter element	2 weeks	For reference line

[Replacement Parts]

Name	Replace Every (general guideline)	Notes
Pump	1 year	Replace when broken
NO <sub>x</sub> converter catalyst	1 year	For NO <sub>x</sub> analyzer*
Zero gas purifier unit catalyst	1 year	*
Ozone generator	1 year	For NO <sub>x</sub> analyzer*
Deozoneizer	1 year	For NO <sub>x</sub> analyzer*
CR2032 battery	5 years	For clock backup
Galvanic O <sub>2</sub> cell	1 year	Replace when broken*

\* Differs depending on model

**Figure A-4b Gas analyzer replacement parts and maintenance**

## Measuring the Particulate Matter (PM) Emissions

ISO 8178-1 defines particulates as any material collected on a specified filter medium after diluting exhaust gases with clean, filtered air at a temperature of  $\leq 52^{\circ}\text{C}$  (40 CFR Part 1065 is  $47\pm 5^{\circ}\text{C}$ ), as measured at a point immediately upstream of the PM filter. The particulate consists of primarily carbon, condensed hydrocarbons, sulfates, associated water, and ash. Measuring particulates requires a dilution system and UCR selected a partial flow dilution system. The dilution system design completely eliminates water condensation in the dilution/sampling systems and maintains the temperature of the diluted exhaust gas at  $< 52^{\circ}\text{C}$  immediately upstream of the filter holders (and is typically below  $47^{\circ}\text{C}$  also). IMO does not offer a protocol for measuring PM and thus a combination of ISO and CFR practices are adopted. A comparison of the ISO and UCR practices for sampling PM is shown in Table A-4.

**Table A-4 Measuring Particulate by ISO and UCR Methods**

	ISO	UCR
Dilution tunnel	Either full or partial flow	Partial flow
Tunnel & sampling system	Electrically conductive	Same
Pretreatment	None	Cyclone, removes $>2.5\mu\text{m}$
Filter material	PTFE coated glass fiber	Teflon (TFE)
Filter size, mm	47 (37mm stain diameter)	Same
Number of filters in series	Two	One
Number of filters in parallel	Only single filter	Two; 1 TFE & 1 Quartz
Number of filters per mode	Single or multiple	Single is typical unless looking at artifacts
Filter face temp. $^{\circ}\text{C}$	$\leq 52$	Same
Filter face velocity, cm/sec	35 to 80.	$\sim 33$
Pressure drop, kPa	For test $< 25$	Same
Filter loading, $\mu\text{g}$	$> 500$	500-1,000 + water w/sulfate, post PM control $\sim 100$
Weighing chamber	$22\pm 3^{\circ}\text{C}$ & RH= $45\%\pm 8$	$22\pm 1^{\circ}\text{C}$ & dewpoint of $9.5^{\circ}\text{C}\pm 1^{\circ}\text{C}$ (typically $< \pm 0.6^{\circ}\text{C}$ )
Analytical balance, LDL $\mu\text{g}$	10	LDL = 3 and resolution 0.1
Flow measurement	Traceable method	Same
Flow calibration, months	$< 3$ months	Every campaign

**Sulfur content.** According to ISO, particulates measured using ISO 8178 are “conclusively proven” to be effective for fuel sulfur levels up to 0.8%. UCR is often faced with measuring PM for fuels with sulfur content exceeding 0.8% and has adopted the 40 CFR Part 1065 sampling methodologies as no other method is prescribed for fuels with a higher sulfur content.

## Calculating Exhaust Flow Rates

The calculated emission factor requires the measurement of the engine’s exhaust flow rate. The exhaust gas flow can be determined by the following methods:

1. Direct Measurement Method
2. Carbon Balance Method
3. Air and Fuel Measurement Method
4. Air Pump method

*Method 1: Direct Measurement of exhaust*

Actual exhaust mass flow rate can be determined from the exhaust velocity, cross sectional area of the stack, and moisture and pressure measurements. The direct measurement method is a difficult technique, and precautions must be taken to minimize measurement errors. Details of the direct measurement method are provided in ISO 5167-1.

*Method 2(a)-Carbon Balance*

Carbon Balance is used to calculate the exhaust mass flow based on the measurement of fuel consumption and the exhaust gas concentrations with regard to the fuel characteristics. The method given is only valid for fuels without oxygen and nitrogen content, based on procedures used for EPA and ECE calculations. Detailed calculation steps of the Carbon Balance method are provided in annex A of ISO 8178-1. Basically: In...lbs fuel/time \* wt% carbon \* 44/12 → input of grams CO<sub>2</sub> per time Out... vol % CO<sub>2</sub> \* (grams exhaust/time \* 1/density exhaust) → exhaust CO<sub>2</sub> per time

Note that the density = (mole wt\*P)/(R\* Temp) where P, T are at the analyzer conditions. For highly diluted exhaust, M ~ of the atmosphere.

*Method 2(b)-Universal Carbon/Oxygen balance*

The Universal Carbon/Oxygen Balance is used for the calculation of the exhaust mass flow. This method can be used when the fuel consumption is measurable and the fuel composition and the concentration of the exhaust components are known. It is applicable for fuels containing H, C, S, O, N in known proportions. Detailed calculation steps of Carbon/Oxygen Balance method is provided in annex A of ISO 8178-1.

*Method 3-Air and Fuel Measurement Method*

This involves measurement of the air flow and the fuel flow. The calculation of the exhaust gas flow is provided in Section 7.2 of ISO 8178-1.

*Method 4-Air Pump Method*

Exhaust flow rate is calculated by assuming the engine is an air pump, meaning that the exhaust flow is equal to the intake air flow. The flow rate is determined from the overall engine displacement, and rpm; corrected for temperature and pressure of the inlet air and pumping efficiency. In the case of turbocharged engines, this is the boost pressure and intake manifold temperature. This method should not be used for diesel engines equipped with additional air input for cylinder exhaust discharge, called purge or scavenger air, unless the additional flow rate is known or can be determined.

**Added Comments about UCR's Measurement of PM**

In the field UCR uses a raw particulate sampling probe fitted close to and upstream of the raw gaseous sample probe and directs the PM sample to the dilution tunnel. There are two gas streams leaving the dilution tunnel; the major flow vented outside the tunnel and the minor flow directed

to a cyclone separator, sized to remove particles  $>2.5\mu\text{m}$ . The line leaving the cyclone separator is split into two lines; each line has a 47 mm Gelman filter holder. One holder collects PM on a Teflon filter and the other collects PM on a quartz filter. UCR simultaneously collects PM on Teflon and quartz filters at each operating mode and analyzes the quartz filters utilizing the NIOSH or IMPROVE methods. UCR recommends the IMPROVE method over the NIOSH.

Briefly, total PM is collected on Pall Gelman (Ann Arbor, MI) 47 mm Teflon filters and weighed using a Mettler Toledo UMX2 microbalance with a 0.1  $\mu\text{g}$  resolution. Before and after collection, the filters are conditioned for 24 hours in an environmentally controlled room ( $22\pm 1\text{ }^\circ\text{C}$  and dewpoint of  $9.5\text{ }^\circ\text{C}$ ) and weighed daily until two consecutive weight measurements are within 3  $\mu\text{g}$  or 2%. It is important to note that the simultaneous collection of PM on quartz and Teflon<sup>TM</sup> filters provides a comparative check of PM mass measured by two independent methods for measuring PM mass.

Sulfur in the fuel produces  $\text{SO}_2$  in the combustion process and some of the  $\text{SO}_2$  becomes  $\text{SO}_3$  in the exhaust and subsequently produces  $\text{H}_2\text{SO}_4\bullet 6\text{H}_2\text{O}$  which is collected on the Teflon filter paper. After the final weights for the particulate laden Teflon filters have been determined a portion of the filter is punched out, extracted with High Performance Liquid Chromatography grade water and isopropyl alcohol and analyzed for sulfate ions by ion chromatography.

### Measuring Real-Time Particulate Matter (PM) Emissions-DustTrak 8520

In addition to the filter-based PM mass measurements, UCR uses a Nephelometer (TSI DustTrak 8520) for continuous measurements of steady-state and transient data. The DustTrak is a portable, battery-operated laser photometer that gives real-time digital readout and has a built-in data logger. It measures light scattered (90 degree light scattering at 780nm near-infrared) by aerosol introduced into a sample chamber and displays the measured mass density in units of  $\text{mg}/\text{m}^3$ . As scattering per unit mass is a strong function of particle size and refractive index of the particle size distributions and as refractive indices in diesel exhaust strongly depend on the particular engine and operating condition, some question the accuracy of PM mass measurements. However, UCR always references the DustTrak results to filter based measurements and this approach has shown that mass scattering efficiencies for both on-road diesel exhaust and ambient fine particles have values around  $3\text{m}^2/\text{g}$ .



Figure A-5 Picture of TSI DustTrak

### Measuring Non-Regulated Gaseous Emissions

Neither ISO nor IMO provide a protocol for sampling and analyzing non-regulated emissions. UCR uses peer reviewed methods adapted to their PM dilution tunnel. The methods rely on added media to selectively collect hydrocarbons and PM fractions during the sampling process for

subsequent off-line analysis. A secondary dilution is constructed to capture real time PM this same tunnel was used for DNPH and Canister samples. In addition, UCR collected raw grab samples of the

## Appendix B – Quality Control

### Pre-test calibrations

Prior to departing from UCR all systems will be verified and cleaned for the testing campaign. This included all instruments used during this testing project. Sample filters are checked and replaced if necessary.

### On-site calibrations

Pre- and post-test calibrations were performed on the gaseous analyzer using NIST traceable calibration bottles. Dilution ratio was monitored and verified at least twice each test day. Leak checks were performed for the total PM<sub>2.5</sub> system prior testing for each setup.

### Post-test and data validation

Post-test evaluation includes verifying consistent dilution ratios between points and data is compared to other test conditions that are similar.

The figure below (Figure B-1) is an example of a chain of custody form. This is the form used to track filter weights from the test to the laboratory. One form for the filter weights, BTEX, and EC/OC. This is just an example of media tracking that is used.

Figure B-2 is an example of UCR certified calibration bottles used for testing. Prior to using a new bottle the old one is verified with the new one as bottles can incorrect in their stated value. It is rare, but can happen.

<b>CE-CERT</b>				<b>Analytical Laboratory</b>			
College of Engineering: Center for Environmental Research and Technology				University of California, Riverside			
				Data Results For TEFLON Filters			
<b>Project Name: Original AEP River Operations - Kentuck</b>				<b>Project Fund #:</b>			
<b>PI/Contact: Wayne Miller</b>				<b>Send Results: Nick Gysel</b>			
Sample ID	Serial ID	Date Received	Initial Weight (mg/filter)	Final Weight (mg/filter)	NET Weight (mg/filter)	Initials	COMMENTS
AT120473	n/a	2/1/2013	191.2060	192.6972	1.4912	MV	
AT120474	n/a	2/1/2013	189.2139	191.2111	1.9972	MV	
AT120475	n/a	2/1/2013	194.4568	196.2289	1.7721	MV	
AT120476	n/a	2/1/2013	190.1723	191.7284	1.5561	MV	
AT120477	n/a	2/1/2013	153.2872	154.4464	1.1592	MV	
AT120478	n/a	2/1/2013	187.4435	188.9519	1.5084	MV	
AT120479	n/a	2/1/2013	182.9071	184.0064	1.0993	MV	
AT120481	n/a	2/1/2013	178.7453	179.3674	0.6221	MV	
AT120482	n/a	2/1/2013	165.5829	166.2499	0.6670	MV	

**Figure B-1 Sample chain of custody form example**

**CERTIFICATE OF ANALYSIS**  
*Primary Standard*

<u>Component</u>	<u>Requested Concentration</u>	<u>Certified Concentration</u>	<u>Analytical Principle</u>	<u>Analytical Accuracy</u>
Carbon dioxide	12 %	11.76 %	L	± 1%
Carbon monoxide	500 ppm	501 ppm	L	± 1%
Nitric oxide	2000 ppm	1929 ppm	U	± 1%
Propane	500 ppm	515 ppm	Q	± 1%
Nitrogen	balance	balance		

Analytical Instruments: **Horiba Instruments Inc.-VIA-510-NDIR-Non-dispersive Infrared**  
**Thermo Environmental-42i-Nitric Oxide Analyzer-Chemiluminescence**  
**Horiba Instruments Inc.-FIA-510-THC- Total Hydrocarbon Analyzer-FID - Flame Ionization Detector**

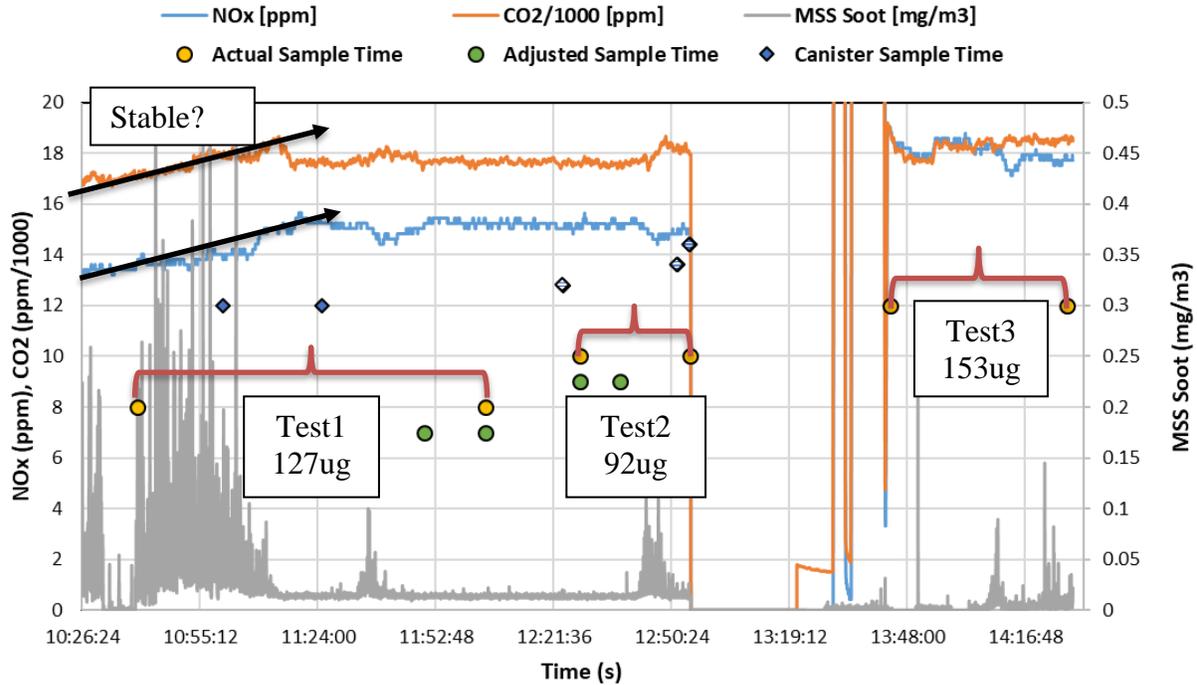
Cylinder Style:	<b>AS</b>	Filling Method:	<b>Gravimetric</b>
Cylinder Pressure @70F:	<b>2000 psig</b>	Date of Fill:	<b>10/31/2012</b>
Cylinder Volume:	<b>140 ft3</b>	Expiration Date:	<b>11/06/2014</b>
Valve Outlet Connection:	<b>CGA-660</b>		
Cylinder No(s):	<b>CC92665</b>		
Comments:	<b>[NOx] = 1947 ppm for reference only. All values not valid below 150 psig.</b>		

Analyst: Chas Manning (LMA)  
**Chas Manning**

Approved Signer: Nelson Ma  
**Nelson Ma**

**Figure B-2 One percent sample protocol gas analysis example**

## Appendix C –Test Assumptions



**Figure C-1: Real Time Response for selected emissions species with test notes**

Initial sample times were chosen based on previous projects and soot levels. Initial sampling was started as soon as possible with a total sample time of 75 minutes. During the second test, a power failure on the ship cut testing short for a total sample time of 27 minutes. The final test sample was started as soon as power was restored and lasted as long as possible for a total testing time of 43 minutes. The real time data shows that all sample times experienced unstable data trends. The first test experienced unstable CO<sub>2</sub>, NO<sub>x</sub>, and Soot data at the beginning of the test most likely due to the boiler not being fully warmed up. The second test experienced soot, NO<sub>x</sub>, and CO<sub>2</sub> spikes toward the end of the test. The third test showed elevated levels of CO<sub>2</sub> and NO<sub>x</sub> for unknown reasons.

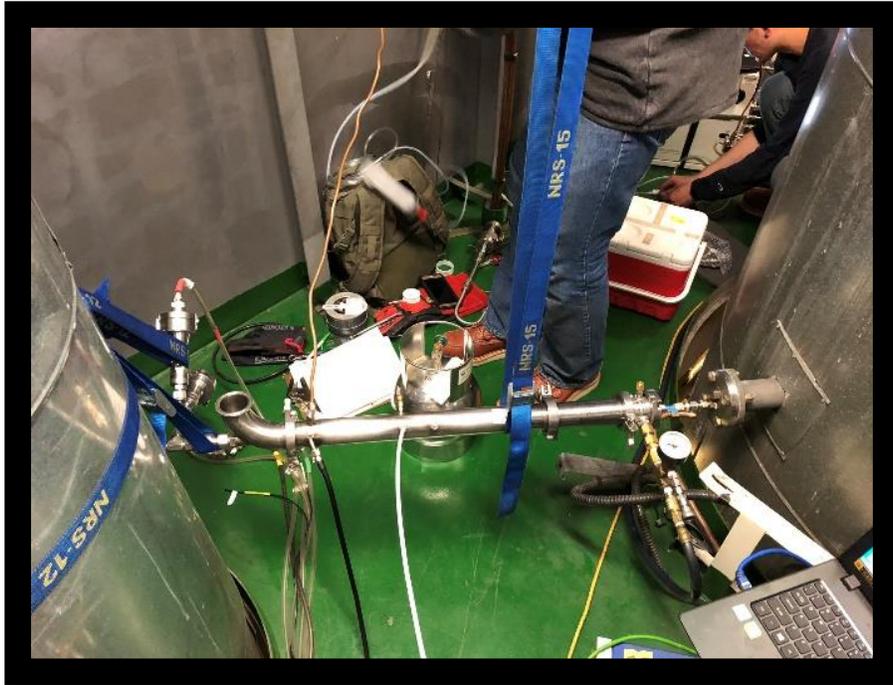


Figure C-2 Installation showing removal of cyclone.

Due to the unstable nature of all 3 test points, modified sampling times were used to capture stable data during the course of testing. PM results were averaged with the soot data from the original tests, and a weighting factor was used to calculate PM mass of the modified sample times.

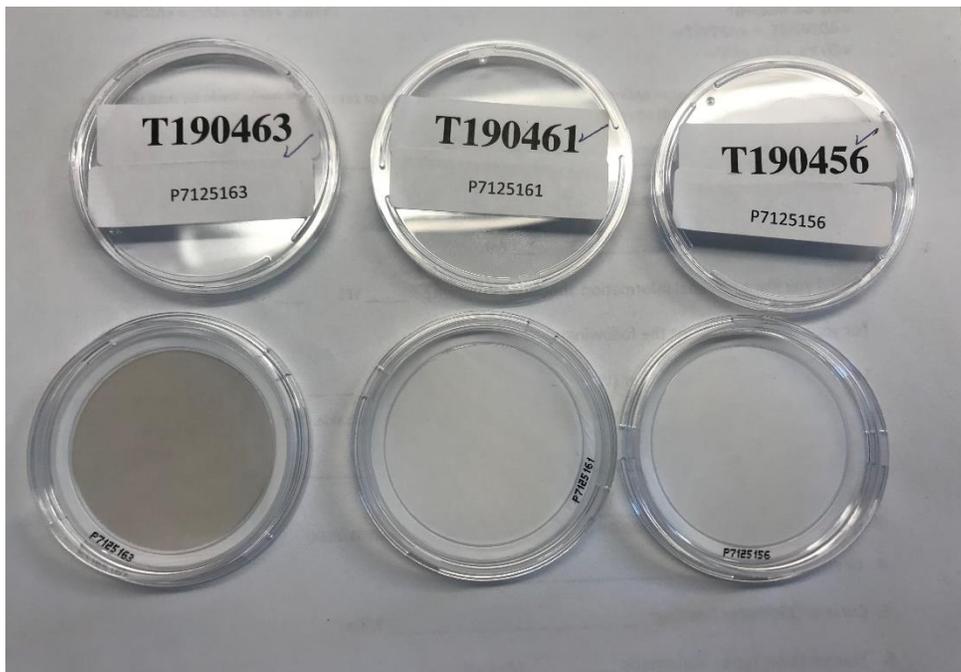


Figure C-3 Sample filters Test 1, 2, and 3

<sup>1</sup> The filter weights were 127, 153, and 92 ug from left to right.



Figure C-4 Sample filter T190463 (medium spotting)



Figure C-5 Sample filter T190461 (heavy-ish spotting)

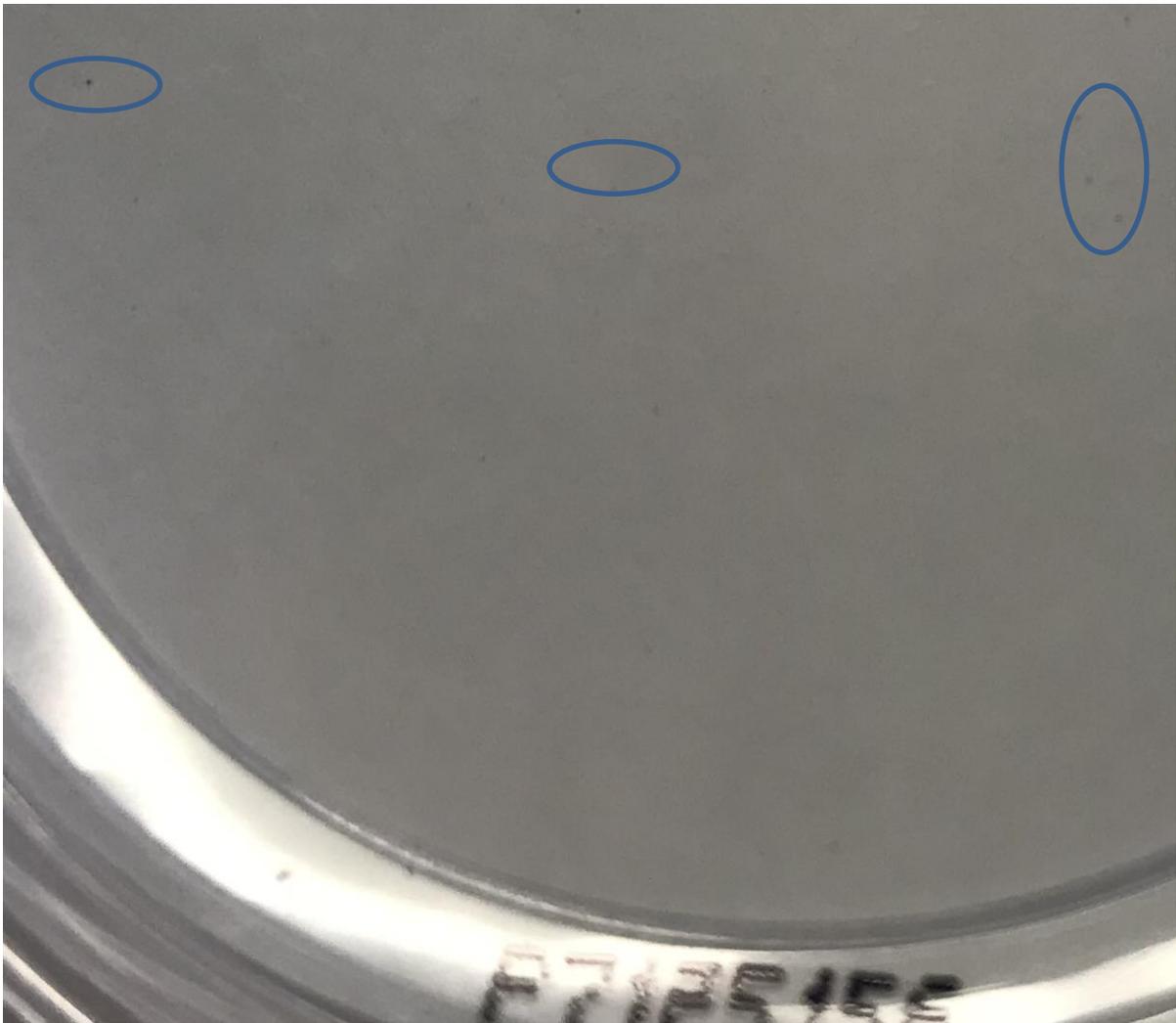


Figure C-5 Sample filter T190456 (light spotting)

## Appendix D –Test Details and Data Records

This Appendix includes vessel and fuel records 1) Maintenance Records, 2) Fuel Analysis, and 3) Engine Screen Shots. These records were collected during testing.

- **Boiler records** - None provided or obtained due to the short amount of time for this testing.
- **Fuel analysis** A fuel sample was collected during our testing and sent out for analysis. The results are shown in the table below.
- **Speciated sample analysis forms.** A copy of the samples sent to the AAC and the methods utilized. Results are summarized in Appendix F.

Southwest Research Institute  
6220 Culebra Road, San Antonio, TX

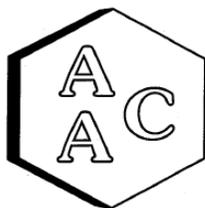
**Test Results**  
Monday, January 27, 2020

Sample Description				SwRI Lab#: 51548
<u>Test Result / Description</u>	<u>Units</u>	<u>Result, Information or Description</u>	<u>Rep#</u>	
SwRI Project Name		<b>oddb</b>	1	
SwRI Lab Number		<b>51548</b>	1	
SwRI SampleID		<b>2193812</b>	1	
Date Sample was Received		<b>1/15/2020 2:50:00 PM</b>	1	
SwRI Work Order Number		<b>82758</b>	1	
SwRI Project Number		<b>1.08.05.11.11831.01.001</b>	1	
Requested/Submitted by		<b>bnelson</b>	1	
Sample Type		<b>diesel</b>	1	
Client/Billing Information				SwRI Lab#: 51548
<u>Test Result / Description</u>	<u>Units</u>	<u>Result, Information or Description</u>	<u>Rep#</u>	
Client Name		<b>UNIVERSITY OF CALIFORNIA</b>	1	
Client Requestor		<b>WAYNE MILLER</b>	1	
PO/TK Number		<b>RT11003973</b>	1	
Primary Sponsor Code		<b>UCR DIESEL</b>	1	
D5291 Determination of Carbon, Hydrogen				SwRI Lab#: 51548
<u>Test Result / Description</u>	<u>Units</u>	<u>Result, Information or Description</u>	<u>Rep#</u>	
Carbon Content	wt%	<b>86.82</b>	1	
Hydrogen Content	wt%	<b>12.86</b>	1	
D4294 Sulfur by Energy-Dispersive X-Ray Fluorescence				SwRI Lab#: 51548
<u>Test Result / Description</u>	<u>Units</u>	<u>Result, Information or Description</u>	<u>Rep#</u>	
Sulfur by X-Ray ppm	ppm	<b>454</b>	1	
D4294 Sulfur by Energy-Dispersive XRF	Mass %	<b>0.045</b>	1	

**NOTE:**

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## Atmospheric Analysis & Consulting, Inc.

CLIENT : UC Riverside  
 PROJECT NAME : UCR  
 AAC PROJECT NO. : 191896  
 REPORT DATE : 11/12/2019

On November 4, 2019, Atmospheric Analysis & Consulting, Inc. received four (4) Six-Liter Summa Canisters for Fixed Gases analysis by EPA 3C. Upon receipt, the samples were assigned unique Laboratory ID numbers as follows:

Client ID	Lab No.	Return Pressure (mmHg)
10:1 Dilute w/ CFO	191896-3083	723.0
10:1 Dilute Grab Sample	191896-3084	622.0
Raw Grab Sample 1252	191896-3085	519.4
Raw Grab Sample 1257	191896-3086	565.6

This analysis is performed in accordance with AAC's Quality Manual. For detailed information pertaining to specific EPA, NCASI, ASTM and SCAQMD accreditations (Methods & Analytes), please visit our website at [www.aaclab.com](http://www.aaclab.com).

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. No problems were encountered during receiving, preparation, and/or analysis of these samples.

The Technical Director or his/her designee, as verified by the following signature, has authorized release of the data contained in this hardcopy report.

If you have any questions or require further explanation of data results, please contact the undersigned.

  
 Sucha Parmar, Ph.D.  
 Technical Director

### Laboratory Analysis Report

CLIENT : University of California, Riverside  
 PROJECT NO : 191896  
 UNITS : ppbC

DATE RECEIVED : 11/04/2019  
 DATE REPORTED : 11/08/2019

#### HYDROCARBONS (C1-C12) SPECIATED

Client ID AACID	Raw Grab Sample 191896-3085			Sample Reporting Limit (SRL) (MRLxDF's)	Raw Grab Sample 191896-3086			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
	Date Sampled	Date Analyzed	Can Dilution Factor		Date Sampled	Date Analyzed	Can Dilution Factor		
	Result	Qualifier	Analysis DF		Result	Qualifier	Analysis DF		
Ethylene	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
Acetylene	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
Ethane	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
Propylene	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
Propane	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
Isobutane	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
1-Butene	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
1,3-Butadiene	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
n-Butane	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
trans-2-Butene	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
cis-2-Butene	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
Isopentane	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
1-Pentene	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
n-Pentane	<SRL	U	1.0	1.97	2.04		1.0	1.79	1.0
Isoprene	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0
trans-2-Pentene	<SRL	U	1.0	1.97	<SRL	U	1.0	1.79	1.0

## Appendix E –Exhaust Flow

The calculation follows EPA Method 2 which utilizes a type S Pitot tube is used to measure the differential pressure between the counter-flow (static pressure) and parallel-flow (dynamic pressure) directions. Velocity is calculated using Bernoulli’s principle, which states that the pressure in a stream of fluid is reduced as the speed of the flow is increased. The velocity calculation is based off of the temperature, molecular weight of the exhaust gas, static pressure, dynamic pressure, and relative humidity. Measurement of the differential pressure and temperature were repeated at the sampling site several times at different depths inside the duct, including the near side of the duct, in the middle of the duct, and the far side of the duct. The equation below is from the EPA Method 2 documents Equation 2-7 and 2-8.

$$V_s = K_p C_p \left[ \frac{\sum_{i=1}^n \sqrt{\Delta P_i}}{n} \right] \sqrt{\frac{T_{s(abavg)}}{P_s M_s}} \quad .Q = 3600(1 - B_{ws}) v_s A \left[ \frac{T_{std} P_s}{T_{s(abavg)} P_{std}} \right]$$

Where:

- A = Cross-sectional area of stack, m<sup>2</sup> (ft<sup>2</sup>).
- B<sub>ws</sub> = Water vapor in the gas stream
- C<sub>p</sub> = Pitot tube coefficient, dimensionless.
- K = 0.127 mm H<sub>2</sub>O (metric units). 0.005 in. H<sub>2</sub>O (English units).
- K<sub>p</sub> = Velocity equation constant.
- M<sub>s</sub> = Molecular weight of stack gas, wet basis, g/g-mole (lb/lb-mole).
- n = Total number of traverse points.
- P<sub>g</sub> = Stack static pressure, mm Hg (in. Hg).
- P<sub>s</sub> = Absolute stack pressure (P<sub>bar</sub> + P<sub>g</sub>), mm Hg (in. Hg),
- P<sub>std</sub> = Standard absolute pressure, 760 mm Hg (29.92 in. Hg).
- Q<sub>sd</sub> = Dry volumetric stack gas flow rate corrected to standard conditions, dscm/hr (dscf/hr).
- T<sub>s(abavg)</sub> = Average absolute stack temperature, °K (°R).
- T<sub>s</sub> = Stack temperature, °C (( °deg:F).
- T<sub>std</sub> = Standard absolute temperature, 293 °K (528 °R).
- V<sub>s</sub> = Average stack gas velocity, m/sec (ft/sec).
- Δp = Velocity head of stack gas, mm H<sub>2</sub>O (in. H<sub>2</sub>O).
- Δp<sub>i</sub> = Individual velocity head reading at traverse point “i”, mm (in.) H<sub>2</sub>O.
- Δp<sub>std</sub> = Velocity head measured by the standard pitot tube, cm (in.) H<sub>2</sub>O.
- Δp<sub>s</sub> = Velocity head measured by the Type S pitot tube, cm (in.) H<sub>2</sub>O.

Table E-1 Summary of direct measurements from the pitot tube sampling

Stack Diam mm	Traverse Side B	Time Start (HH:MM)	Load	Average Pitot DelP			Average Pitot Static P			Temp (C)
				(inH2O)	(mmH2O)	(mmH2O) ^0.5	(inH2O)	(mmH2O)	(mmH2O) ^0.5	
1098.54	Full	8:16	High	0.11	2.90	1.70	0.40	10.11	0.74	223
1098.54	Mid	8:26	High	0.12	3.09	1.76	0.44	11.27	0.83	225
1098.54	Shallow	8:34	High	0.10	2.54	1.59	0.37	9.36	0.69	220

## Appendix F –Raw Data and Analysis

The summary results in this Appendix include raw data used to generate the values in the report including outside laboratory results. The tables of data show the results for boiler for gaseous and PM emissions. The boiler toxic emissions are also listed below. The EC/OC results were sent to an outside laboratory and were analyzed using the NIOSH thermal optical method.

There were only three test points sampled during this testing. As discussed in Section 2.5, the data needed correction due to good engineering judgement that the full sample was not stable. The gray data represents the corrected data (“adjusted”) and the non-gray data in Tables F-1 through F-3 are the original data samples so one can see the impact.

**Table F-1 emissions data per test point for the original data and the “adjusted” data (gray).**

Date	Project Name	Fuel	ATS	Location	Test Mode	Start Time	Sample Duration	DR	Boiler Load	Fuel Rate cacl OEM	Fuel Rate calc Meas	Fuel Rate Used Calcs	Exh Temp	Filter Temp	Stack Pres	Carb. Bal. Exh Flow I	Measured Meth2 Exh Flow II	Exh Flow Utilized		
mm/dd/yyyy	name					hh:mm:ss	min	n/a	Name	kg/hr	kg/hr	kg/hr	C	C	mbar	(scfm)	(m3/hr)	(scfm)	(m3/hr)	m3/hr
10/24/2019	Tanker Boiler Test	MGO	n/a	original	1_1	10:40:00	40.3	7.0	65%	2494.8	2438.1	2438.1	221.8	41.5	0.75	17211	36467	16820	35639	35639
10/24/2019	Tanker Boiler Test	MGO	n/a	original	1_2	12:28:00	27.0	7.0	65%	2494.8	1982.4	1982.4	221.8	42.8	0.91	21167	44849	16820	35639	35639
10/24/2019	Tanker Boiler Test	MGO	n/a	original	1_3	13:44:00	43.0	7.0	65%	2494.8	2516.8	2516.8	221.8	43.6	0.53	16672	35327	16820	35639	35639
10/24/2019	Tanker Boiler Test	MGO	n/a	adjusted	1_1	11:50:00	15.0	7.0	65%	2494.8	2425.1	2425.1	221.8	41.5	0.75	17303	36663	16820	35639	35639
10/24/2019	Tanker Boiler Test	MGO	n/a	adjusted	1_2	12:28:00	10.0	7.0	65%	2494.8	2414.5	2414.5	221.8	42.8	0.91	17379	36824	16820	35639	35639
10/24/2019	Tanker Boiler Test	MGO	n/a	adjusted	1_3	14:08:52	15.0	7.0	65%	2494.8	2541.7	2541.7	221.8	43.6	0.53	16509	34981	16820	35639	35639

**Table F-2 emissions data per test point for the original data and the “adjusted” data (gray). (g/hr basis)**

Date	Test Group	ATS	Test	Start Time	Boiler Load	g/hr													FuelRate Carb.	SO2 calc	H2O Fraction	dil O2 Conc	
mm/dd/yyyy	n/a	n/a	#	hh:mm:ss	%	NOx	CO	CO2	meas. SO <sub>2</sub>	calc. SO <sub>2</sub>	PM2.5	PM_EC	PM_OC	PM_S	PM_TC	PM_OCcor	PM_TCcor	PM_eBC	(kg/hr)	g/hr	%	%	
10/24/2019	original	n/a	1_1	10:40:00	65%	6,475	290.20	7,377,801	761.2	2,299.9	52.8	-	-	-	-	-	-	-	14.16	2,438	2299.9	1.3	18.6
10/24/2019	original	n/a	1_2	12:28:00	65%	5,368	191.00	5,997,762	1,565.0	1,870.1	58.3	-	-	-	-	-	-	-	4.30	1,982	1870.1	1.0	15.1
10/24/2019	original	n/a	1_3	13:44:00	65%	7,883	0.00	7,616,652	2,303.3	2,374.2	60.7	-	-	-	-	-	-	-	1.00	2,517	2374.2	1.3	18.6
10/24/2019	adjusted	n/a	1_1	11:50:00	65%	6,686	234.0	7,338,369	444.1	2,287.6	42.1	-	-	-	-	-	-	-	3.4	2,425	2287.6	1.3	17.7
10/24/2019	adjusted	n/a	1_2	12:28:00	65%	6,677	230.1	7,306,291	479.0	2,277.6	57.4	-	-	-	-	-	-	-	3.4	2,414	2277.6	1.3	17.7
10/24/2019	adjusted	n/a	1_3	14:08:52	65%	7,790	0.0	7,692,020	604.1	2,397.6	61.6	-	-	-	-	-	-	-	1.9	2,542	2397.6	1.3	17.7

**Table F-3 emissions data per test point for the original data and the “adjusted” data (gray). (g/kg-hr basis)**

Date	Fuel	ATS	Test	Start Time	Boiler Load	g/kg-fuel (kg/tonne-fuel)													Calculated Fuel Usag			NOx Cor.	
mm/dd/yyyy	n/a	n/a	#	hh:mm:ss	%	NOx	CO	CO2	meas. SO <sub>2</sub>	calc. SO <sub>2</sub>	PM2.5	PM_EC	PM_OC	PM_S	PM_TC	PM_OCcor	PM_TCcor	PM_eBC	Ship FC	Carb. FC	-	Kh	
10/24/2019	original	n/a	1_1	10:40:00	65%	2.66	0.12	3026	0.312	0.943	0.022	-	-	-	-	-	-	-	0.0058	2494.8	2438	-	-
10/24/2019	original	n/a	1_2	12:28:00	65%	2.71	0.10	3025	0.789	0.943	0.029	-	-	-	-	-	-	-	0.0022	2494.8	1982	-	-
10/24/2019	original	n/a	1_3	13:44:00	65%	3.13	0.00	3026	0.915	0.943	0.024	-	-	-	-	-	-	-	0.0004	2494.8	2517	-	-
10/24/2019	adjusted	n/a	1_1	11:50:00	65%	2.76	0.10	3026	0.183	0.943	0.017	-	-	-	-	-	-	-	0.0014	2494.8	2425	-	-
10/24/2019	adjusted	n/a	1_2	12:28:00	65%	2.77	0.10	3026	0.198	0.943	0.024	-	-	-	-	-	-	-	0.0014	2494.8	2414	-	-
10/24/2019	adjusted	n/a	1_3	14:08:52	65%	3.06	0.00	3026	0.238	0.943	0.024	-	-	-	-	-	-	-	0.0007	2494.8	2542	-	-

Table F-4 Average for all gaseous and PM species (g/hr and g/kg-fuel)

Units	Load	Average Species													Average Calculated Fuel Usage		
		NOx	CO	CO2	meas. SO <sub>2</sub>	calc. SO <sub>2</sub>	PM2.5	PM_EC	PM_OC	PM_S	PM_TC	PM_OCcor	PM_TCcor	PM_eBC	Ship FC	Carb. FC	-
g/hr	65%	7051	155	7445560	509.07	2320.96	53.70	-	-	-	-	-	-	-	2.89	2460	2320.96
g/kg-fuel	65%	2.86	0.06	3026.1	0.21	0.94	0.02	-	-	-	-	-	-	-	0.0012	2495	2460.41

Table F-5 Standard deviation (1 sigma) for all gaseous and PM species (g/hr and g/kg-fuel)

Units	Load	Stdev Species													Average Calculated Fuel Usage		
		NOx	CO	CO2	meas. SO <sub>2</sub>	calc. SO <sub>2</sub>	PM2.5	PM_EC	PM_OC	PM_S	PM_TC	PM_OCcor	PM_TCcor	PM_eBC	Ship FC	Carb. FC	-
g/hr	65%	0.26	0.06	0.43	0.32	0.00	0.00	-	-	-	-	-	-	-	0.0028	0.00	288.50
g/kg-fuel	65%	0.18	0.06	0.16	0.03	0.00	0.00	-	-	-	-	-	-	-	0.0004	0.00	70.60

Table F-6 Summary of results EPA 3C analysis and the selected speciated hydrocarbons

Analyte	Stack EPA 3C								
	#1	#2	Ave						
Dilution Factor	1.97	1.79	1.88						
H2	<2.0%	<1.8%	<1.8%						
Ar/O2	7.5%	7.5%	7.5%						
N2	82.0%	82.0%	82.0%						
CO	<0.2%	<0.2%	<0.2%						
CO2	10.4%	10.5%	10.5%						
CH4	<0.2%	<0.2%	<0.2%						
1,3 Butadiene (ppbC)	<SRL	<SRL	<SRL						
Total PAMS (ppbC)	1.99	2.04	2.02						
TNMHC (ppbC)	309	189	249						
				Table of selected speciated HCs					
				Analyte	Conc. ppb	mg/kg-fuel			
				1,3-Butadiene	<SRL	< 0.00907			
				Benzene	<SRL	< 0.00874			
				Toluene	<SRL	< 0.00883			
				m/p-Xylenes	<SRL	< 0.00891			
				Ethylbenzene	<SRL	< 0.00891			
				o-Xylene	<SRL	< 0.00891			
				Total PAMS	2.02	0.00332			
				TNMHC	249.0	0.516			

Table F-7 Detail of the raw suma canister samples speciated HC (C2-C12) results. All values but two are below the detection limit (SRL)

Analyte	MM_C1	Formula	Raw (ppb)		mg/kg-fuel	Analyte	MM	Formula	Raw (ppb)		mg/kg-fuel
			ID#1	ID#2					ID#1	ID#2	
Ethylene	14.0	C2H4	<SRL	<SRL	< 0.00941						
Acetylene	13.0	C2H2	<SRL	<SRL	< 0.00874	3-Methylhexane	14.3	C7H16	<SRL	<SRL	< 0.00961
Ethane	15.0	C2H6	<SRL	<SRL	< 0.01009	2,2,4-Trimethylpentane	14.3	C8H18	<SRL	<SRL	< 0.00958
Propylene	14.0	C3H6	<SRL	<SRL	< 0.00941	n-Heptane	14.3	C7H16	<SRL	<SRL	< 0.00961
Propane	14.7	C3H8	<SRL	<SRL	< 0.00986	Methylcyclohexane	14.0	C7H14	<SRL	<SRL	< 0.00941
Isobutane	14.5	C4H10	<SRL	<SRL	< 0.00975	2,3,4-Trimethylpentane	14.3	C8H18	<SRL	<SRL	< 0.00958
1-Butene	14.0	C4H8	<SRL	<SRL	< 0.00941	Toluene	13.2	C7H8	<SRL	<SRL	< 0.00883
1,3-Butadiene	13.5	C4H6	<SRL	<SRL	< 0.00907	2-Methylheptane	14.3	C8H18	<SRL	<SRL	< 0.00958
n-Butane	14.5	C4H10	<SRL	<SRL	< 0.00975	3-Methylheptane	14.3	C8H18	<SRL	<SRL	< 0.00958
trans-2-Butene	14.0	C4H8	<SRL	<SRL	< 0.00941	n-Octane	14.3	C8H18	<SRL	<SRL	< 0.00958
cis-2-Pentane	14.0	C5H10	<SRL	<SRL	< 0.00941	Ethylbenzene	13.3	C8H10	<SRL	<SRL	< 0.00891
Isopentane	14.4	C5H12	<SRL	<SRL	< 0.00968	m/p-Xylenes	13.3	C8H10	<SRL	<SRL	< 0.00891
1-Pentene	14.0	C5H10	<SRL	<SRL	< 0.00941	Styrene	13.0	C8H8	<SRL	<SRL	< 0.00874
n-Pentane	14.4	C5H12	<SRL	2.04	0.00968	o-Xylene	13.3	C8H10	<SRL	<SRL	< 0.00891
Isoprene	13.6	C5H8	<SRL	<SRL	< 0.00914	Nonane	14.3	C9H20	1.99	<SRL	0.00966
trans-2-Pentene	14.0	C5H10	<SRL	<SRL	< 0.00941	Isopropylbenzene	13.4	C9H12	<SRL	<SRL	< 0.00896
cis-2-Pentene	14.0	C5H10	<SRL	<SRL	< 0.00941	.alpha.-Pinene	13.6	C10H16	<SRL	<SRL	< 0.00914
2,2-Dimethylbutane	14.4	C6H14	<SRL	<SRL	< 0.00964	n-Propylbenzene	13.4	C9H12	<SRL	<SRL	< 0.00896
Cyclopentane	14.0	C5H10	<SRL	<SRL	< 0.00941	m-Ethyltoluene	13.4	C9H12	<SRL	<SRL	< 0.00896
2,3-Dimethylbutane	14.4	C6H14	<SRL	<SRL	< 0.00964	p-Ethyltoluene	13.4	C9H12	<SRL	<SRL	< 0.00896
2-Methylpentane	14.4	C6H14	<SRL	<SRL	< 0.00964	1,3,5-Trimethylbenzene	13.4	C9H12	<SRL	<SRL	< 0.00896
3-Methylpentane	14.4	C6H14	<SRL	<SRL	< 0.00964	o-Ethyltoluene	13.4	C9H12	<SRL	<SRL	< 0.00896
1-Hexene	14.0	C6H12	<SRL	<SRL	< 0.00941	.beta.-Pinene	13.6	C10H16	<SRL	<SRL	< 0.00914
n-Hexane	14.4	C6H14	<SRL	<SRL	< 0.00964	1,2,4-Trimethylbenzene	13.4	C9H12	<SRL	<SRL	< 0.00896
Methylcyclopentane	14.0	C6H12	<SRL	<SRL	< 0.00941	n-Decane	14.2	C10H22	<SRL	<SRL	< 0.00955
2,4-Dimethylpentane	14.3	C7H16	<SRL	<SRL	< 0.00961	1,2,3-Trimethylbenzene	13.4	C9H12	<SRL	<SRL	< 0.00896
Benzene	13.0	C6H6	<SRL	<SRL	< 0.00874	m-Diethylbenzene	13.4	C10H14	<SRL	<SRL	< 0.00901
Cyclohexane	14.0	C6H12	<SRL	<SRL	< 0.00941	p-Diethylbenzene	13.4	C10H14	<SRL	<SRL	< 0.00901
2-Methylhexane	14.3	C7H16	<SRL	<SRL	< 0.00961	n-Undecane	14.2	C11H24	<SRL	<SRL	< 0.00954
2,3-Dimethylpentane	14.3	C7H16	<SRL	<SRL	< 0.00961	n-Dodecane	14.2	C12H26	<SRL	<SRL	< 0.00953
Total PAMS	14.70	C3H8	1.99	2.04	0.00332						
TNMHC	14.70	C3H8	309	189	0.516						

July 27, 2020

California Air Resources Board

1001 I Street,

Sacramento, California 95814

Via Electronic submittal

**Re: PROPOSED CONTROL MEASURE FOR OCEAN-GOING VESSELS AT BERTH**

The Coalition for Clean air submits these comments in support of the California Air Resources Board's proposed Control Measure for Ocean-Going Vessels ("OGVs") At Berth ("At Berth Regulation"). OGVs cause immense amounts of air pollution globally and particularly when in port when they are closest to people who live near, and work at, California's ports. OGVs are sources of both nitrogen oxide ("NOx") and particulate matter ("PM") emissions, both of which cause grave health impacts. Further, California is in non-attainment of NOx reduction goals under the federal Clean Air Act. Air Districts across the state are working to reduce NOx and other criteria pollutants from stationary sources. Moving OGVs from using diesel auxiliary engines, sources of both NOx and PM, in port to alternatives such as plugging into electrical power or using capture-and-control technology will reduce air pollution and improve public health. As a result, we urge the California Air Resources Board ("ARB") to adopt this regulation at its August meeting and move forward with its implementation as soon as possible.

**I. Public Health Benefits of At Berth Regulation Are Obvious and Relevant**

Our primary reason for supporting the At Berth regulation is to protect public health. As stated in the ARB Staff Report: Initial Statement of Reasons ("SOR," released October 15, 2019), OGV emissions include criteria pollutants, air toxic contaminants, and greenhouse gases. (SOR, ES-2; see also SOR p. I-10.) As stated above, one of the main pollutants from an OGV is NOx. Exposure to NOx can cause respiratory irritation, aggravation of respiratory diseases, especially asthma, causing coughing, wheezing and difficulty breathing, all of which can lead to emergency room visits and hospital admissions for those people affected. (Id.) Negative public health impacts from NOx emissions are a main reason we strongly support adoption of this regulation. "California's combination of unique geography and robust freight contributes to our state experiencing some of the worst air quality in the nation." (SOR, ES-4.)

Another harmful emission from OGV operations is particulate matter ("PM") that can be inhaled into upper airways and lungs, creating respiratory ailments leading to still more public health concerns. The current COVID-19 pandemic provides a sobering demonstration of the need to protect respiratory health: experts have found that exposure to particulate matter increases COVID-19 mortality. ("Exposure to air pollution and COVID-19 mortality in the United States," Xiao Wu MS, Rachel C. Nethery PhD, M. Benjamin Sabath MA, Danielle Braun PhD, Francesca Dominici PhD, Harvard T.H. Chan School of Public Health, Updated April 5, 2020.)

Exposure to PM 2.5 can increase premature mortality, hospital admissions for cardiopulmonary causes, acute and chronic bronchitis, asthma attacks, and respiratory symptoms. The health effects are of particular concern for sensitive groups such as infants, children, the elderly, and those with preexisting heart or lung disease. (SOR, ES-3; see also SOR p. V-15-19, and ARB, “Inhalable Particulate Matter and Health [PM2.5 and PM10]”, August 10, 2017, <https://ww3.arb.ca.gov/research/aags/common-pollutants/pm/pm.htm>.)

Researchers at McGill University followed over a million adults in Toronto and Montreal and their medical records from 1991 to 2016. The studies found:

“New research has linked air pollution nanoparticles to brain cancer for the first time. The ultra-fine particles (UFPs) are produced by fuel burning, particularly in diesel vehicles, and higher exposures significantly increase people’s chances of getting the deadly cancer. Previous work has shown that nanoparticles can get into the brain and that they can carry carcinogenic chemicals.” (The Guardian, Air Pollution Nanoparticles Linked to Brain Cancer for First Time, November 13, 2019 <https://www.theguardian.com/environment/2019/nov/13/air-pollution-particles-linked-to-brain-cancer-in-new-research>.) The article further documented:

“The discovery of abundant toxic nanoparticles from air pollution in human brains was made in 2016. A comprehensive global review earlier in 2019 concluded that air pollution may be damaging every organ and virtually every cell in the human body. Toxic air has been linked to other effects on the brain, including huge reductions in intelligence, dementia and mental health problems in both adults and children. The World Health Organization says air pollution is a “silent public health emergency”.” (Id.)

It is critical that we protect public health in areas near ports; most of which are “disadvantaged communities” and have suffered environmental injustices for years or even decades. These areas tend to be comprised of the working poor and people of color who contend daily with the various and cumulative pollution burdens of goods movement, such as proximity to heavy duty trucks, locomotives, cargo handling equipment and OGVs. (SOR p. II-1,2, p. V-9 and V-15; see also Office of Environmental Health Hazard Assessment, CalEnviroScreen 3.0, June 25, 2018, <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30>.)

The Proposed At Berth Regulation would improve on the existing At Berth Regulation by covering more OGVs and by lowering the visit threshold for determining which ports or terminals are encompassed by the rule. We are supportive of these changes, as they ensure that public health benefits accrue from all ships that visit a California port or independent marine terminal that exceeds 20 OGV visits annually. To continue to apply a regulation to fewer ships and ports would also continue to allow poor air quality to result from those ship visits. As a result, we support the new Regulation whole-heartedly and urge the ARB to implement the regulation beginning on January 1, 2021.

**II. Proposed At Berth Regulation Is a Cost Effective Way to Reduce Emissions and Protect Health**

Although the total price tag of the At Berth Regulation appears high, when measured against the direct health benefits and the actual cost to the average consumer, it is clearly a worthy investment in a cleaner goods movement system and a healthier California populace.

The Proposed At Berth regulation will improve health benefits for all Californians and particularly communities directly impacted by port operations. Specifically, by 2032, the health benefits would total \$2.32 billion from 237 fewer premature deaths, 75 fewer hospital admissions, and 122 fewer emergency room visits statewide, while total costs for all 4 entities to implement would total about \$2.23 billion, while. In addition, potential cancer risks will be reduced by approximately 60%. (SOR VI-1,2.) From the Ports of Long Beach and Los Angeles alone—which are just two of the several ports and independent marine terminals expected to be affected by this rulemaking in California—about 2.4 million residents would have a reduced potential cancer risk from implementing the updated At Berth Regulation. (Id., see also p. V-15, p. III-7.)

The annual cost to the average individual consumer for these substantial health benefits is negligible.

### III. The Proposed 15-Day Changes

A. Delayed Implementation Schedule for Ro-ros Is Unjustified. We oppose moving back the emissions control requirements for these vessels because it will result in greater emissions in 2024. At the June Board meeting, no convincing evidence was introduced to support the rollback; in fact, a persuasive case was made that the delay will prolong the suffering of communities in the San Diego area who are exposed to diesel fumes from ro-ros.

19-1

B. The Innovative Concept Provision Must Retain Safeguards, And Community Steering Committees Must Be Consulted. The innovative concept provision responds to the requests of the Western States Petroleum Association, Pacific Merchant Shipping Association and some ports. We welcome cost-effective alternative projects that achieve equivalent or greater emission reductions in the impacted communities at a lesser cost, but the provision must not become a loophole. Therefore, it is important that the alternatives reduce criteria pollutants at least as much as the controls would in the time frame needed to be in compliance, do not increase greenhouse gas emissions or increase emissions at other ports or terminals, provide additional reductions that would not have otherwise occurred, and do not use public funds. Furthermore, we agree that consideration of any innovative concepts should involve consulting with Community Steering Committees for AB 617 communities affected by at-berth emissions.

Respectfully submitted,

Bill Magavern

Policy Director

Coalition for Clean Air

**Late  
Submittal  
Comment  
Letters**

August 21, 2020

California Air Resources Board  
Attention: Clerk's Office  
1001 I Street  
Sacramento, CA 95814

**Re: Control Measure for Ocean-Going Vessels At Berth ("At-Berth Rule")  
Draft Environmental Analysis CEQA Violations**

California Air Resources Board:

Crowley Maritime Corporation ("Crowley") submits this additional comment, in advance of the Public Hearing on August 27, 2020, addressed to the CEQA<sup>1</sup> violations of the Draft Environmental Analysis, Appendix D to the Staff Report: Initial Statement of Reasons released on October 15, 2019. We ask that it be taken into proper consideration.

**I. Introduction**

While CARB's certified regulatory programs are exempt from certain procedural aspects of CEQA, CARB's actions remain subject to all other CEQA provisions. Moreover, it is the express policy of CARB to prepare staff reports in a manner consistent with the environmental protection purposes of the Board's regulatory program and with the goals and policies of CEQA<sup>2</sup>.

CEQA generally requires state and local government agencies to inform decision makers and the public about the potential environmental impacts of proposed projects, and to reduce those environmental impacts to the extent feasible. CEQA thus requires that the Environmental Analysis that provides the basis for the Board's decision provide full disclosure, a comprehensive analysis of significant environmental impacts, and an assessment of feasible mitigation measures. As explained in the CEQA Guidelines, "public agencies shall not undertake actions concerning the proposed public project that would have a significant adverse effect or limit the choice of alternatives or mitigation measures, before completion of CEQA compliance." 14 Cal. Code Regs., § 15004(b)(2).

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<sup>1</sup> Public Resources Code §21000, *et seq.*

<sup>2</sup> 17 Cal. Code Regs., § 60005(b).

## II. Summary

The Draft Environmental Analysis commits a number of *per se* CEQA violations in connection with its omission to address the environmental impact of the exclusion of articulated tug barges (ATBs) from the At-Berth Rule. As an environmental document, the Draft Environmental Analysis violates CEQA by failing to accurately and comprehensively describe the “project”, failing to analyze the environmental impact of the regulatory policy of excluding ATBs from the At-Berth Rule, and failing to assess the feasibility of mitigation measures. The CEQA violations of the Draft Environmental Analysis are highly significant. Final agency approval of the proposed regulation must be postponed pending lawful completion of the required CEQA procedures.

## III. Comment

Underlying the ATB exclusion is an evident policy to retain the regulation of ATBs under the Commercial Harbor Craft (CHC) regulation, despite the opportunity that the At-Berth Rule now affords for ATBs to be properly regulated alongside, and as, ocean-going tank vessels. This policy is misinformed.

During the past 18 months of this rulemaking process, Crowley, the largest U.S. operator of ATBs in California, has repeatedly, consistently and specifically explained the compelling need for ATBs to be regulated, like other ocean-going tank vessels, under the At-Berth Rule. Crowley takes this position, in part, because it makes no sense to exclude ATBs from the proposed regulation, and, in part, because there is no feasible alternative.

As discussed below, Crowley’s fleet of ATBs cannot operate economically if they are required to be retrofitted as required by the proposed revised CHC. So, if ATBs are not regulated under the At-Berth Rule, Crowley’s ATB fleet will inevitably be withdrawn from California, and the clean petroleum products (CPP) currently transported by ATBs would be carried by increased numbers of Medium Range (MR) tankers.

1-1

Under the circumstances, it makes no sense for CARB to hold onto this policy of excluding ATBs from the At-Berth Rule, which, as addressed below, is wrong-headed and unsupportable. Crowley continues to urge CARB to delete the ATB exclusion. This simple amendment would improve air quality and benefit the communities living in the vicinity of California’s marine terminals.

If the Board is asked to approve the proposed At-Berth rule without removing the ATB exclusion, it cannot do so unless and until the Draft Environmental Analysis complies with CEQA procedures.

#### IV. CEQA Violations

If the proposed regulation is to continue to include the ATB exclusion, the proposed At Berth Rule cannot be approved by the Board based on the Draft Environmental Analysis, because it fails to follow CEQA's procedures.

##### A. Failure to Analyze the Impact of the Regulatory Policy to Exclude ATBs

1-2

##### (i) Failure to Follow CEQA Procedures for Describing the "Project"

The Draft Environmental Analysis fails to analyze the environmental impact and feasibility of mitigation measures arising from the express policy of the proposed regulation to exclude ATBs. This glaring omission stems from the failure of the Draft Environmental Analysis to describe and analyze the proposed regulation adequately. Whether this is a deliberate refusal to draw attention to this policy aspect of the proposed regulation or merely an inadvertent oversight, it is clearly a *per se* CEQA violation.

Under CEQA, the Environmental Analysis must contain a precise description of the project, including "a general description of the project's technical, economic and environmental characteristics."<sup>3</sup> The proper and accurate description of the project is the *sine qua non* of an informative and legally-sufficient environmental document.

The Draft Environmental Analysis does not comply with this CEQA requirement. It begins<sup>4</sup> with CARB's determination that the proposed regulation is a "project" as defined by CEQA, and recites the definition of project set forth in the CEQA Guidelines<sup>5</sup>.

But then the Draft Environmental Analysis continues by never properly describing the regulation. In particular, the Draft Environmental Analysis fails to appreciate that the express exclusion of the ATBs from the At Berth Rule is itself a policy of the proposed regulation, as to which the environmental impact needs to be analyzed and, if possible, minimized or mitigated.

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<sup>3</sup> 14 Cal. Code of Regs., §15124(c).

<sup>4</sup> Draft Environmental Analysis, p.3.

<sup>5</sup> "[T]he whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and that is an activity directly undertaken by any public agency. 14 Cal. Code Regs. §15378(a).

Ignoring the ATB exclusion policy leads the Draft Environmental Analysis to the following incorrect conclusion: “the policy aspects of the Proposed Regulation do not directly change the physical environment”.<sup>6</sup> Based on this misconception, the Draft Environmental Analysis proceeds to confine its analysis to “indirect physical changes to the environment [that] could result from reasonably foreseeable compliance responses taken in response to implementation actions identified in the Proposed Regulation.”

The failure of the Draft Environmental Analysis to follow CEQA’s mandate to describe the regulation accurately is a *per se* CEQA violation. That failure is significant, because, by overlooking what the proposed regulation is intended to achieve, the Draft Environmental Analysis is led to omit entirely any analysis of the environmental impact of the ATB exclusion or whether that impact can be feasibly mitigated. ATBs are not even mentioned in the Draft Environmental Analysis.

(ii) The ATB Exclusion is Manifestly a Policy of the Regulation

The policy of the proposed regulation to exclude ATBs is expressed through specifically inserting an exception into the definition of ocean-going vessels.<sup>7</sup> This policy has no operational basis or rationale.

In the Initial Statement of Reasons, CARB staff state, as the sole reason offered for excluding ATBs from the At-Berth Rule, the following:

“When an articulated tug barge is fully connected, it may meet the definition of an ocean-going vessel, as defined in this chapter (Section 93130.2(b)). However, despite being defined as a subcategory of tankers, articulated tug barges are considered a barge and a tug separately.” [p. IV-6.]

This statement makes no sense whatsoever and is incorrect<sup>8</sup>.

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<sup>6</sup> Draft Environmental Analysis, p.3.

<sup>7</sup> The exclusion is contained in two subsections of the definition section of the proposed regulation, section 93130(b)(7) and (b)(50).

<sup>8</sup> Crowley’s 120,000 bbls. ATBs are modern tank vessel which carry cargo in a double-hulled tank barge equipped with sumped cargo tanks, remote gauging, an inert gas system, and other systems, and is propelled and maneuvered by a high-horsepower tug that is physically a part of the whole vessel, positioned in a notch in the stern of the barge, and attached by rigid, articulating pins, and is itself considered an “ocean going vessel”, under applicable federal law. For the purpose of improved safety and environmental protection, ATBs function as a single unit in a system that allows for better maneuverability and sea-

Under the circumstances, the stated basis for the ATB exclusion is arbitrary and capricious.

The proposed regulation incorporates a definition of tanker vessels<sup>9</sup> and provides<sup>10</sup> a description of an “ocean-going vessel”<sup>11</sup> that exactly describe Crowley’s 550 and 650 Class ATBs. ATBs are unquestionably ocean-going vessels. ATBs operate as a single vessel. As Crowley, the largest operator of tankers and ATBs in the United States, has explained to CARB and its staff during this rulemaking process, ATBs of more than 120,000 bbl. capacity (or at least 20,000 DWT) are the functional equivalent of ocean-going tankers that are the subject of the At-Berth Rule.

Under the circumstances, the exclusion of ATBs from the At-Berth Rule must be recognized for what it is: a deliberate policy determination regarding how ATBs should be regulated. CARB staff have determined, despite consistent and clear information to the contrary from Crowley, that ATBs should not be regulated like other ocean-going tankers, but rather as if they were operating in the same manner as California-based harbor tugs<sup>12</sup>.

The exclusion of ATBs from the proposed At-Berth Rule can only be characterized as an affirmative regulatory policy of CARB’s that ATBs should not be regulated like other ocean-going tank vessels. Under CEQA, the Draft Environmental Analysis is required to

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keeping over separate, conventional tug and wire towed tank barges. By definition, an articulated tug barge is an ocean-going vessel that functions “as one vessel.”

<sup>9</sup> The Initial Statement of Reasons defines tanker vessels as those vessels “designed to carry liquid or gaseous products, including crude oil or other hydrocarbon products, such as Liquid Liquefied Petroleum Gas (LPG), Liquid Natural Gas (LNG); chemicals, such as ammonia, chlorine, and styrene monomer, asphalt, and even fresh water. [ES-2]

<sup>10</sup> See 17 Cal. Code Regs. §93130.2(b).

<sup>11</sup> A vessel “generally greater than 400 feet, weigh more than 10,000 gross tons, and have per-cylinder engine displacement of greater than 30 liter/cylinder”.

<sup>12</sup> There is no rational basis for regulating ATBs as commercial harbor craft. The only initial reason for including ATBs in the CHC regulation was that, before the proposed extension of the At-Berth Rule to cover ocean-going vessels, there was no alternative. But there was never any other operational rationale for regulating ATBs as if they were harbor tugs. Unlike the commercial harbor craft regulated by the CHC regulation, Crowley’s ATB Fleet is not based in California and does not operate predominately in California ports performing operations of harbor tugs. Like other ocean-going tank vessels, Crowley’s ATBs transport cargo, including to and from California marine terminals, and their operations in California waters consist of transit to and from sea and in interstate commerce, maneuvering and conducting cargo operations at berth. They are not harbor tugs.

analyze whether that policy has a significant environmental impact. The Draft Environmental Analysis fails to do so. 1-2 cont.

(iii) The Draft Environmental Analysis Fails to Identify and Analyze the Environmental Impact of the ATB Exclusion Policy 1-3

The environmental impact of the policy of excluding ATBs is the emissions reductions achieved by the proposed At-Berth Rule do not take into account the ATB emissions. The impact of the policy is to deliberately lessen the emissions reductions resulting from the At-Berth rule. The Draft Environmental Analysis ignores this environmental impact and fails to analyze it.

Crowley, however, has done its own analysis, which we offer here by way of an example of the environmental impact assessment that the Draft Environmental Analysis fails to include. Crowley analyzed the emissions profile of one of its 650 Class ATBs, the *Vision/650-10*<sup>13</sup>, based on actual operational conditions<sup>14</sup>:

(a) from or to 3 nm from the harbor entrance before or after maneuvering (Port Zone or “PZ”);

(b) during maneuvering near berth during arrival or departure; and

(c) at berth.

Crowley’s analysis showed the following baseline<sup>15</sup> for ATB emissions for one of its 650 Class ATBs, *Vision/650-10*, assuming compliance with current commercial harbor craft regulations:

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<sup>13</sup> The actual engine specifications of the *Vision/650-10* were used.

<sup>14</sup> For the tug (*Vision*) engines, the assumptions were 50% main engine load in PZ Zone, 20% main engine load in maneuvering zone, and 50% auxiliary engines for all zones. For the barge (650-10) engines, the assumptions were 60% load at berth, using one large (800 BHP) and one small (1202 BHP) engines. All engines use ultra-low sulfur fuel.

<sup>15</sup> The baseline emissions of *Vision/650-10* were calculated using Tier 2 emission factors consistent with California Air Resources Board and the Port of Los Angeles and the Port of Long Beach latest emissions inventories.

	Mode	PM tons per trip	PM2.5 tons per trip	DPM tons per trip	NOx tons per trip	SOx tons per trip	CO2 e MT per trip
Vision	PZ	0.003	0.003	0.003	0.08	0.0001	6.0
650-10	PZ	0.000	0.000	0.000	0.00	0.0000	0.0
Vision	Maneuvering	0.001	0.001	0.001	0.04	0.0000	2.9
650-10	Maneuvering	0.000	0.000	0.000	0.00	0.0000	0.0
Vision	Berth	0.003	0.003	0.003	0.07	0.0001	5.3
650-10	Berth	0.013	0.012	0.013	0.34	0.0003	26.2
Power Plant							0.0
Total		0.020	0.019	0.020	0.53	0.0005	40.4

Crowley further analyzed the emissions that would result if the ATB were regulated under the At-Berth Rule and used the shore power option:

	Mode	PM tons per trip	PM2.5 tons per trip	DPM tons per trip	NOx tons per trip	SOx tons per trip	CO2 e MT per trip
Vision	PZ	0.003	0.003	0.003	0.08	0.0001	6.0
650-10	PZ	0.000	0.000	0.000	0.00	0.0000	0.0
Vision	Maneuvering	0.001	0.001	0.001	0.04	0.0000	2.9
650-10	Maneuvering	0.000	0.000	0.000	0.00	0.0000	0.0
Vision	Berth	0.000	0.000	0.000	0.01	0.0000	0.7
650-10	Berth	0.000	0.000	0.000	0.00	0.0000	0.0
Power Plant							11.3
Total		0.004	0.004	0.004	0.13	0.0001	20.9

Crowley also analyzed the emissions that would result if the ATB were regulated under the At-Berth Rule and employed the option of using Alternative Control Technology:

1-3  
cont.

	Mode	PM tons per trip	PM2.5 tons per trip	DPM tons per trip	NOx tons per trip	SOx tons per trip	CO2 e MT per trip
Vision	PZ	0.003	0.003	0.003	0.08	0.0001	6.0
650-10	PZ	0.000	0.000	0.000	0.00	0.0000	0.0
Vision	Maneuvering	0.001	0.001	0.001	0.04	0.0000	2.9
650-10	Maneuvering	0.000	0.000	0.000	0.00	0.0000	0.0
Vision	Berth	0.000	0.000	0.000	0.01	0.0000	0.7
650-10	Berth	0.003	0.002	0.003	0.07	0.0003	26.2
Power Plant							0.0
Total		0.007	0.006	0.007	0.20	0.0004	35.8

This analysis, which measures the emissions from only one ATB on one trip to a California port, should leave no doubt that CARB's policy decision to exclude ATBs from the At-Berth Rule has an environmental impact:

**Criteria pollutant emissions due to at-berth operations are clearly higher if the ATB exclusion policy is implemented than if CARB were to regulate ATB's, like other ocean-going tank vessels, under the At-Berth Rule.**

CEQA requires that the Draft Environmental Analysis perform an evaluation of the significance of this environmental impact. The Draft Environmental Analysis fails to follow this procedural step and is a *per se* violation of CEQA.

**B. Failure to Analyze Feasible Alternatives to Minimize Adverse Effects**

1-4

CEQA requires that written documentation prepared under a certified regulatory program, such as the Draft Environmental Analysis, must include a description of "mitigation measures to minimize any significant adverse effect on the environment of the activity." CEQA, § 21080.5(d)(3)(A). This obligation to describe mitigation measures

is one of the procedural requirements of CEQA “intended to assist public agencies in systematically identifying both the significant effects of proposed projects and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects.” (§ 21002.)

1-4  
cont.

The Draft Environmental Analysis fails to proceed in the manner required by CEQA. Under CEQA, the Draft Environmental Analysis is required to analyze the feasibility of the alternative to the proposed regulation which will mitigate or minimize the environmental impact of excluding ATBs from the At-Berth Rule. It fails to do so. As has been stated, the Draft Environmental Analysis fails even to discuss ATBs.

1-5

This failure of the Draft Environmental Analysis to undertake the analysis of feasible alternatives is another *per se* violation of CEQA that undermines the entire environmental analysis of the regulation.

The implication is clear, as stated in the Initial Statement of Reasons, that CARB has made the determination that it would prefer to regulate ATBs, as if they were harbor craft, under the CHC regulation. Therefore, in this context, the mitigation analysis must necessarily involve an evaluation of the feasibility of the regulation of ATBs under the revised CHC rules.

CARB’s policy to regulate ATBs under the CHC regulations evidently assumes the adoption of the revised CHC regulations<sup>16</sup>, as to which a rulemaking process is underway. Under CEQA, before the Board approves those revisions to the CHC regulations, a proper, CEQA-compliant environmental review of those revisions must be conducted. That has not occurred. Therefore, CARB is not entitled to take a regulatory action in connection with the At Berth rule based on the assumption that the as-yet unadopted revised CHC regulation might provide an alternative. This is not merely CARB putting the cart before the horse, it is illegal under CEQA.

In this case, however, the impropriety of implementing a policy based on a regulation that has not undergone the proper rulemaking process, and the failure of the Draft Environmental Analysis to determine the feasibility of such a potential future regulation as an alternative, is overshadowed by one simple fact: for Crowley’s ATBs, the revised CHC regulations are not a feasible option. Compliance with the revised CHC regulations, as currently proposed, is commercially prohibitive.

To understand why, the Board needs to understand the commercial context, a matter of feasibility that the Draft Environmental Analysis ignores.

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<sup>16</sup> See, Initial Statement of Reasons, page IV-6.

As U.S.-flagged Jones Act tank vessels, Crowley's large, militarily-useful, greater than 120,000 barrel ATBs are employed in California under charter to oil majors with rates that reflect the speed, efficiency and flexibility of ATBs and allow Crowley's ATBs to compete with MR tankers. Generally-speaking, it is reasonable to propose that Crowley's customers choose to transport clean petroleum products (CPP) in ATBs because Crowley's ATBs compete favorably with MR tankers on cost of transportation. In addition to safety and reliability, economically, refinery customers care mainly about "dollars per barrel delivered" by the vessel from the refinery tank terminal to the distribution tank terminal.

If Crowley ATBs were required to comply with the revised CHC regulation, even assuming the availability of the technology that those revisions contemplate, Crowley estimates that the potential compliance cost for its entire fleet would be prohibitive. As Crowley has commented, including in its letter to CARB of April 29, 2020, the potential cost of retrofitting Crowley's ATB fleet to meet the equipment standards of the CHC revisions would be almost \$126 million. From a commercial perspective, this cost cannot be absorbed by Crowley or through increases in charter rates.

If Crowley were to make such an expenditure to comply with the revised CHC regulations, while, at the same time, MR Tankers enjoy the competitive advantage of operating under the At Berth Rule, it can reasonably be expected that a point will be reached at which the cost of barrels delivered by Crowley's ATBs in California will be significantly more than the cost per barrel delivered by an MR tanker. When this point is reached, ATBs will no longer be employed in the California market. When ATBs are no longer available to the oil majors currently chartering ATBs, the cost of CPP transportation will be greater, and there may be an increase in the cost of CPP paid by California refineries, which will be passed to the California consumer.

Therefore, the impact of imposing the revised CHC upon ATBs, and excluding ATBs from the At-Berth Rule, is likely to be that Crowley's ATBs will no longer operate in California. Given that MR tankers would be regulated under the At-Berth Rule, there would be no way for Crowley's ATBs to compete with MR tankers. This would mean that California's CPP would be transported by MR tankers, and the commercial, safety and environmental benefits of using ATBs would no longer be available.

The proposed revised CHC regulations thus offer no feasible alternative to the At Berth rule, if the ATB exclusion is retained. For Crowley, excluding ATBs from the At Berth rule would have the practical effect of banning its ATBs from California operations.

The Draft Environmental Analysis fails to comply with CEQA procedures to analyze alternatives to minimize the adverse environmental effect of the ATB exclusion. Final agency approval of the proposed regulation must be postponed pending lawful completion of the required CEQA procedures.

**C. Failure to Disclose the Basis for Data**

1-6

CEQA requires full disclosure. The Draft Environmental Analysis is also deficient under CEQA in its failure to disclose whether the data used to calculate the baseline analysis and measure the effect of the At-Berth regulation includes or excludes ATBs. It thus fails to provide the public with any proper basis to determine the claimed impact of the proposed regulation.

This is crucially important. When drawing up the baseline analysis or analyzing the effect of the At-Berth regulation on air quality, failing to take into account ATBs, which account for over half of the Jones Act West Coast CPP vessel fleet, would distort and obscure the true situation. The failure to disclose the nature of the data used undermines the statistical analysis of the Draft Environmental Analysis.

**Conclusion**

Crowley fully supports the overall aims of the At-Berth regulation to reduce harmful emissions and improve air quality for communities living in the vicinity of California's ports and marine terminals. It is evident and remarkable that the proposed regulation's policy of excluding ATBs is inconsistent with this goal. An environmental analysis that complies with CEQA would make that clear and properly inform the Board to delete the ATB exclusion from the At-Berth Rule. The Draft Environmental Analysis, which violates CEQA, should be amended, or the ATB exclusion removed. Final agency approval of the proposed At-Berth cannot be given until the lawful completion of the required CEQA procedures.

Yours respectfully,  
**CROWLEY MARITIME CORPORATION**

Electronically signed  
21-AUG-20 1250 EST  
by Art Mead

Art Mead  
*Vice President & Chief Counsel*  
*Government and Regulatory*