Public Workshops to Discuss
At Berth and At Anchor
Regulatory Concepts

September 6, 2018
Oakland

&

September 17, 2018
San Pedro
Discussion Items

I. New At Berth and At Anchor Regulatory Concepts
II. Preliminary Assessment of Benefits and Costs
III. Overview of Environmental Analysis
IV. Next Steps
I. New At Berth and At Anchor Regulatory Concepts: Goals

- Address implementation issues of existing At-Berth Regulation
- Simplify requirements and increase enforceability
- Increase community health benefits
- Hold terminals and ports accountable for their roles to achieve reductions
- Meet March 2017 Board direction
CARB Regulatory Authority

- HSC 39650 et seq. – directs CARB to regulate toxic air contaminants from non-vehicular sources to reduce public exposure/risk
- HSC 43013, 43018 – directs CARB to control criteria air pollutants from mobile sources to attain air quality standards
- AB/SB 32 - directs CARB to reduce greenhouse gases to specific levels to combat climate change
Need For Additional Reductions

2021 Projected Statewide NOx Emissions At Berth - Existing Rule (Total: 10.5 TPD)

- Aux Engine - Container, Cruise, and Reefer
  - 35%

- Aux Engine - Auto/Roro, Bulk, Gen. Cargo, and Tanker
  - 40%

- Boiler - Tanker
  - 17%

- Boiler - Non Tankers
  - 8%

*3825.1 TPY

NOx = Oxides of Nitrogen, TPD = Tons Per Day, TPY = Tons Per Year
Source: CARB Emissions Inventory, 2018
2021 Projected Statewide PM2.5 Emissions
At Berth - Existing Rule
(Total: 109.5 TPY*)

- Aux Engine - Container, Cruise, and Reefer: 7%
- Aux Engine - Auto/Roro, Bulk, Gen. Cargo, and Tanker: 23%
- Boiler - Non Tankers: 23%
- Boiler - Tanker: 47%

*0.3 TPD
PM = Particulate Matter, Source: CARB Emissions Inventory, 2018
Need For Additional Reductions (cont.)

2021 Projected Statewide CO₂ Emissions At Berth - Existing Rule (Total: 700,000 MT/Year*)

- Aux Engine - Container, Cruise, and Reefer 16%
- Aux Engine - Auto/Roro, Bulk, Gen. Cargo, and Tanker 19%
- Boiler - Tanker 44%
- Boiler - Non Tankers 21%

*1,900 MT/Day

MT/Year = Metric Tons Per Year
Source: CARB Emissions Inventory, 2018
## Overview of Changes

<table>
<thead>
<tr>
<th>Existing Rule</th>
<th>Draft Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel fleets</td>
<td>Vessel visits</td>
</tr>
<tr>
<td>Container, reefer and cruise</td>
<td>Additional vessel types</td>
</tr>
<tr>
<td>Implementation issues</td>
<td>Simplified requirements</td>
</tr>
<tr>
<td>Shore power or CARB approved alternative</td>
<td>Shore power or CARB approved alternative</td>
</tr>
<tr>
<td>Annual compliance reported</td>
<td>Clear, real time enforcement</td>
</tr>
<tr>
<td>Ports and terminals have limited responsibilities</td>
<td>Requirements for ports and terminals</td>
</tr>
<tr>
<td>Covers 6 named ports</td>
<td>Port and terminal thresholds</td>
</tr>
<tr>
<td>Reduces auxiliary engine emissions</td>
<td>Also reduces tanker boiler emissions</td>
</tr>
</tbody>
</table>
Potential Changes to Concepts in Response to Staff Analysis and Public Feedback

- Removal of bulk/general cargo vessel control requirements
- Evaluating changes to tanker phase-in (50%/80% control)
- Removal of low-use berth concept
- Updates to cost assumptions and cost estimates
- Assumptions re: capture & control utilization

Some (not all) of these are reflected in slides
Draft Regulatory Language

• Supersede existing At-Berth Regulation in 2021
• Responsibilities for vessel operators, marine terminals/complexes, and ports to reduce auxiliary engine and auxiliary boiler emissions
• Limited temporary exceptions for complications outside vessel’s or terminal’s direct control
• Requirements for reporting and record-keeping
• Pathway for shore power or alternative
Draft Implementation Timelines

<table>
<thead>
<tr>
<th>Vessel category</th>
<th>Controls for 100% of visits*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2021</td>
</tr>
<tr>
<td>Container, Reefer, Cruise</td>
<td>✔</td>
</tr>
<tr>
<td>Ro-Ro/Auto carrier</td>
<td></td>
</tr>
<tr>
<td>Tanker (plus boilers for steam powered pumps)</td>
<td></td>
</tr>
</tbody>
</table>

* Above port and terminal thresholds

- Does not include control requirements for bulk and general cargo vessels (still subject to opacity and reporting)
Draft Port and Terminal Thresholds

- Ports, marine terminal complexes (MTC), and terminals will have emission reduction obligations if they exceed both the port/MTC and terminal thresholds

<table>
<thead>
<tr>
<th>Vessel Type</th>
<th>Annual Port or MTC Threshold</th>
<th>Annual Terminal Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container &amp; Reefer</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Cruise</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>Liquid Bulk &amp; Tankers</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>Auto Carrier/Ro-Ro</td>
<td>50</td>
<td>25</td>
</tr>
</tbody>
</table>
Draft California Ports and Marine Terminal Complexes Covered

All are in, or adjacent to, disadvantaged communities
Draft Northern California Preliminary Regional Marine Terminal Complexes

*Rodeo Complex

*Carquinez Complex

*Richmond Complex

*Stockton Complex

*Complexes made up of geographically close marine emissions sources that impact surrounding community
Draft Emission Reduction Requirements

- Use a CARB approved control strategy for each visit
- Shore power still the “gold standard”
  - High emissions reduction benefits for auxiliary engine emissions (diesel PM, NOx, GHG)
  - Economical for frequent visitors
- Capture and Control system (80% control)
  - High to moderate emissions reduction benefits for auxiliary engines (diesel PM, NOx), but potentially increases GHGs
  - Feasible option to capture tanker auxiliary boiler exhaust
  - Potentially more economical for infrequent visitors
- Future: onboard controls, cleaner vessels
Draft Vessel Owner/Operator Requirements

- Maintain opacity standards at berth and at anchor in California regulated waters
- Vessel must use a CARB approved emission control strategy
  - Unless exceptional situation occurs
- Vessel must advise terminal at least 72 hours prior to arrival if shore power berth is needed
  - If vessel is not shore power capable, an alternative control strategy must be confirmed with the terminal
- Follow checklist for compliance
- Record-keeping and reporting
Draft Terminal and Marine Terminal Complex Requirements

- Provide a CARB approved emissions control strategy for every regulated vessel visit
- Confirm shore power berth or alternative control system availability at least 48 hours prior to arrival
- Install and maintain any infrastructure or equipment necessary for compliance
  - Terminal lease with port may require port approval or participation in construction of new infrastructure
- Follow checklist for compliance
- Submit terminal plans to CARB
Draft Port Requirements

- Install infrastructure needed for compliance if terminal lease prevents terminal from doing so
- Submit port plans to CARB
- Provide annual Wharfinger data to CARB
## Responsibilities

<table>
<thead>
<tr>
<th>Vessel has....</th>
<th>Terminal has....</th>
<th>Shore Power</th>
<th>No Shore Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shore Power</td>
<td>Shore Power</td>
<td>Terminal plugs vessel into shore power or provides alternative control</td>
<td>Terminal provides alternative control</td>
</tr>
<tr>
<td>No Shore Power</td>
<td>Vessel</td>
<td>Vessel responsible for providing alt. control</td>
<td>Vessel &amp; Terminal both responsible for providing alt. control</td>
</tr>
<tr>
<td>On-Board Controls</td>
<td>Vessel</td>
<td>Vessel</td>
<td>Vessel</td>
</tr>
</tbody>
</table>
Draft Alternative Emission Control Technology Operator Requirements

- Ensure alternative strategy has gone through CARB approval process
- Adhere to strategy specific checklist
- Control emissions for all of vessel’s stay
  - Except for required connect/disconnect times
- Comply with all provisions of CARB Executive Order
- Maintain approved capture/control rates and conduct periodic emissions testing to verify performance
- Ensure appropriate labor and training are available for operation of alternative control technology
Compliance Exceptions

- Exceptions from certain compliance requirements may be granted for vessels and/or terminals for situations outside control of responsible party
- Exceptions may be limited in duration
- These situations may include:
  - Safety
  - Vessel/terminal side equipment failure or manufacturer delay
  - Research for testing of new alternative control technologies
  - Physical constraints (with U.S. Coast Guard confirmation)
Record-Keeping and Reporting Requirements

- Both vessel and terminal operators have record-keeping and reporting requirements
- Some record-keeping and reporting requirements may vary depending on emissions control strategy used
- Reporting includes:
  - General visit information
  - Additional visit information, such as:
    - Type of emissions control used
    - “Ready to Work” and “Pilot On Board” times
    - Connect and disconnect times
  - Documentation for exception utilized (if applicable)
II. Preliminary Assessment of Benefits and Costs of Regulatory Concepts
Emissions Inventory Updates

- Emission factors – Changes made to align with U.S. EPA and IMO emission factors
  - Reductions to boiler PM emission factors
  - No significant change to NOx, GHG emission factors
- Vessel stay time now includes South Coast Marine exchange data
  - Adds more geographic specificity to POLA and POLB
- New tanker size grouping
  - Incorporates Starcrest engine load changes
- Updated growth factors

U.S. EPA – United States Environmental Protection Agency
IMO – International Maritime Organization
Draft Statewide NO\textsubscript{x} Emissions Estimates (TPD)

Draft Statewide CO\textsubscript{2} Emissions Estimates (MT/Year)

- 2031 reductions w/concept: 6.7 TPD NO\textsubscript{x}, 30,000 MT/Year CO\textsubscript{2}
• 2031 reductions w/concept: 54 TPY PM$_{2.5}$, 35 TPY DPM
Health Impacts

Potential excess cancer risk

• Health risk assessments for POLA/POLB and Richmond Port/Complex
  • Maximum Exposed Individual Resident (MEIR) cancer risk (chances per million)
  • Population exposed to cancer risk levels

• Draft report for public comment in advance of formal rule proposal

Non-cancer effects

• Staff will estimate and monetize regional impacts
POLA/POLB At Berth DPM Emissions Estimates (TPY)

- **2023 Existing Rule**
- **2023 W/Concept**
- **2031 Existing Rule**
- **2031 W/Concept**

Richmond Port/Complex At Berth DPM Emissions Estimates (TPY)

- **2023 Existing Rule**
- **2023 W/Concept**
- **2031 Existing Rule**
- **2031 W/Concept**

Legend:
- Container
- Cruise
- Tanker
- RoRo
- Reefer
- General
- Bulk
### Existing Regulation Vs. Draft Concepts - 2031 Emissions by Ports

<table>
<thead>
<tr>
<th>Ports</th>
<th>Carquinez</th>
<th>Hueneme</th>
<th>Oakland</th>
<th>POLA-POLB</th>
<th>Richmond</th>
<th>Rodeo</th>
<th>San Diego</th>
<th>San Francisco</th>
<th>Stockton</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPM Emissions</td>
<td>65%</td>
<td>57%</td>
<td>57%</td>
<td>62%</td>
<td>71%</td>
<td>75%</td>
<td>52%</td>
<td>62%</td>
<td>17%</td>
</tr>
<tr>
<td>PM2.5 Emissions</td>
<td>57%</td>
<td>34%</td>
<td>25%</td>
<td>40%</td>
<td>42%</td>
<td>47%</td>
<td>29%</td>
<td>51%</td>
<td>8%</td>
</tr>
<tr>
<td>NOx Emissions</td>
<td>61%</td>
<td>50%</td>
<td>47%</td>
<td>53%</td>
<td>57%</td>
<td>60%</td>
<td>50%</td>
<td>58%</td>
<td>14%</td>
</tr>
</tbody>
</table>
2031 POLA-POLB: Vessels At Berth Cancer Risk (chances/million)
### 2031 POLA-POLB Vessels At Berth Estimated Population Impacts

#### Population Impacted by Risk Levels (Number of People)

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Total 2031 Existing rule</th>
<th>Total 2031 w/Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk &gt;50</td>
<td>46,100</td>
<td>0</td>
</tr>
<tr>
<td>Risk &gt;30</td>
<td>242,800</td>
<td>0</td>
</tr>
<tr>
<td>Risk &gt;20</td>
<td>464,600</td>
<td>39,500</td>
</tr>
<tr>
<td>Risk &gt;10</td>
<td>1,166,900</td>
<td>327,600</td>
</tr>
<tr>
<td>Risk &gt;5</td>
<td>3,201,800</td>
<td>795,500</td>
</tr>
</tbody>
</table>

- 91% reduction in population exposed to risk above 20 chances/million
2031 Richmond Port/Complex: Vessels At Berth Cancer Risk (chances/million)
### Population Impacted by Risk Levels (Number of People)

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>2031 Existing rule</th>
<th>2031 w/concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk &gt;50</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Risk &gt;30</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Risk &gt;20</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Risk &gt;10</td>
<td>3,100</td>
<td>0</td>
</tr>
<tr>
<td>Risk &gt;5</td>
<td>35,780</td>
<td>750</td>
</tr>
</tbody>
</table>

- 98% reduction in population exposed to risk above 5 chances/million
Preliminary Cost Analysis

- Input from multiple sources
  - Surveys of vessel operators, terminals, ports
  - Utilities
  - Prop 1B grants
  - Equipment manufacturers
- Cost workgroup meetings
- Standardized Regulatory Impact Assessment (SRIA)
  - Required for all major regulations
  - Regulatory alternatives for analysis
Cost Estimate Updates

- Updating costs based on industry feedback and staff evaluation
  - Vessel visits for currently regulated entities in 2021 (80% to 100%)
  - Growth, fuel and electricity increases in cost
- Evaluating increased cost inputs
  - Hourly rates for tanker capture and control
  - Infrastructure estimates
- Cost estimates will increase (up to 100%)
## Annualized Statewide Cost Estimate Summary

<table>
<thead>
<tr>
<th>Vessel Type</th>
<th>Proposed Implementation Date</th>
<th>Annualized Cost at Full Implementation (2031)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Containers and Reefer Vessels</td>
<td>2021</td>
<td>$7,537,200</td>
</tr>
<tr>
<td>Cruise Vessels</td>
<td>2021</td>
<td>$3,737,100</td>
</tr>
<tr>
<td>Bulk and General Cargo Vessels</td>
<td>2025</td>
<td>$29,541,500</td>
</tr>
<tr>
<td>Ro-Ro/Auto Vessels</td>
<td>2025</td>
<td>$20,347,700</td>
</tr>
<tr>
<td>Product Tanker Vessels (80% control)</td>
<td>2031</td>
<td>$32,782,000</td>
</tr>
<tr>
<td>Crude Tanker Vessels (80% control)</td>
<td>2031</td>
<td>$23,639,000</td>
</tr>
<tr>
<td><strong>Total Annualized Cost</strong></td>
<td></td>
<td><strong>$117,584,500</strong></td>
</tr>
</tbody>
</table>
III. Overview of Environmental Analysis

- Environmental Analysis (EA) to analyze potentially significant adverse impacts caused by reasonably foreseeable actions
- Meets requirements of CARB’s certified program under the California Environmental Quality Act
- The CEQA Environmental Checklist (CEQA Guidelines Appendix G) is used to identify and evaluate potential indirect impacts
- The Draft EA will be appended to Staff Report
Environmental Analysis to Include

- Description of reasonably foreseeable actions taken in response to the proposal
- Programmatic level analysis of potential adverse impacts caused by reasonably foreseeable actions
- Beneficial impacts
- Feasible mitigation measures to reduce/avoid significant impacts
- Alternatives analysis

*Input invited now on appropriate scope and content*
IV. Next Steps

- Fall meetings with community groups
- Evaluation of public comments, new data
- Updated regulatory concepts and analyses
- Fall/Winter meetings on revised concepts
- Finance to release SRIA for comment
- Issue formal regulatory proposal with draft environmental analysis for comment 45 days prior to Board Hearing
Contacts

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CARB At-Berth Website:
https://www.arb.ca.gov/ports/shorepower/shorepower.htm