Overview

♦ Background
♦ Proposed Regulation Amendments
♦ Regulation Timeline
♦ State Repower Capacity
♦ Emission Reductions and Cost
♦ Questions ???
Commercial Harbor Craft Regulation

- Board approved in November 2007
- Became effective November 2008
- Operational and new engine requirements for all commercial harbor craft
- In-use engine requirements for ferries, excursions vessels, tugboats, and towboats

Health Risk Assessment

- Port POLA / POLB Health Risk Assessment
  - Commercial Harbor Craft third largest contributor to risk behind ocean going vessel hotelling and cargo handling equipment

- POLA / POLB CHC Emissions Cancer Risk
  - >200 cases per million risk (5,000 residents)
  - >10 cases per million risk (1.5 million residents)
  - Significant source of PM mortality
Why Were Crew and Supply Vessels Excluded from Original In-Use Engine Requirements?

♦ Crew and supply emissions are a small portion of the overall statewide harbor craft emissions
♦ Low response rate to the original CA harbor craft survey resulted in inaccurate data
  – Crew and supply emissions skewed low

Updated Crew and Supply Vessel Survey Conducted

♦ Higher response rate
♦ More complete data
♦ Updated inventory with new crew and supply vessel population and activity level
Why Add In-Use Engine Requirements for Crew and Supply Vessels?

♦ Significant source of harbor craft emissions in Santa Barbara and Ventura
♦ Size and operational characteristics similar to ferries, excursion vessels, tugboats, and towboats
♦ Vessels work close to shore

New Survey Revealed Higher Engine Hours and Emissions

<table>
<thead>
<tr>
<th></th>
<th>2004 Inventory*</th>
<th>2008 Updated Inventory**</th>
</tr>
</thead>
<tbody>
<tr>
<td># Vessels</td>
<td>64</td>
<td>63</td>
</tr>
<tr>
<td># Propulsion Engines</td>
<td>160</td>
<td>152</td>
</tr>
<tr>
<td>Average Horsepower</td>
<td>439</td>
<td>505</td>
</tr>
<tr>
<td>Average Annual Hours</td>
<td>788</td>
<td>2438</td>
</tr>
<tr>
<td># Auxiliary Engines</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Average Horsepower</td>
<td>83</td>
<td>96</td>
</tr>
<tr>
<td>Average Annual Hours</td>
<td>3036</td>
<td>3524</td>
</tr>
<tr>
<td>PM Emissions (tpd)</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>NOx Emissions (tpd)</td>
<td>1.4</td>
<td>3.9</td>
</tr>
</tbody>
</table>

*based on 2004 survey data – 34% response rate for crew and supply vessels
** based on 2008 survey data – 78% response rate for crew and supply vessels
Crew and Supply Vessels Operate Primarily Near Shore and Within 24 nm

Crew and Supply Main Engine Age Distribution
Statewide, Crew and Supply Vessel Emissions

- Tug: 17%
- Crew and Supply: 7%
- Tow: 3%
- Other: 3%
- Pilot: 0%
- Workboats: 0%
- Commercial Fishing: 24%
- Ferries / Excursion: 27%
- Charter Fishing: 18%

Statewide CHC Emissions

Crew and Supply Largest Single Contributor to Santa Barbara and Ventura Harbor Craft Emissions

- Crew and Supply: 36%
- Commercial Fishing: 22%
- Charter Fishing: 14%
- Work Boats/Tug: 5%
- Ferry and Excursion: 20%
- Other: 1%
- Other Excursion: 1%
Crew and Supply In-Use Engine Requirements

- Similar to those for ferries, excursion vessels, tugboats, and towboats
- Phased compliance schedule brings oldest, highest use engines into compliance first
- Requires unregulated and Tier 1 engines to meet U.S. EPA Tier 2 or Tier 3 standards
- Compliance methods, engine model year determination, extensions, and alternative compliance plan all consistent with original regulation

Draft Regulatory Language Available

- Available on the harbor craft webpage
- Key definitions:
  - “Crew and Supply Vessel” means a self-propelled vessel used for carrying personnel and/or supplies to and from off-shore and in-harbor locations. (including, but not limited to, off-shore work platforms, construction sites, and other vessels).
  - “Off-shore location” means a location isolated from the mainland by a body of water.
Compliance Schedule

♦ Single statewide schedule for crew and supply
♦ First compliance date in 2011 and last in 2022

Proposed Compliance Schedule for Crew and Supply Vessel Engines

<table>
<thead>
<tr>
<th>Engine Age and Hours</th>
<th>Compliance Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985 and earlier (&gt;1500 hours)</td>
<td>2011</td>
</tr>
<tr>
<td>1985 and earlier (&gt;300 - &lt;1500 hours)</td>
<td>2012</td>
</tr>
<tr>
<td>1986-1995 (&gt;1500 hours)</td>
<td>2013</td>
</tr>
<tr>
<td>1986-1995 (&gt;300 - &lt;1500 hours)</td>
<td>2014</td>
</tr>
<tr>
<td>1996-2000 (&gt;1500 hours)</td>
<td>2015</td>
</tr>
<tr>
<td>1996-2000 (&gt;300 - &lt;1500 hours)</td>
<td>2016</td>
</tr>
<tr>
<td>2001-2002 (&gt;300 hrs)</td>
<td>2017</td>
</tr>
<tr>
<td>2003 (&gt;300 hrs)</td>
<td>2018</td>
</tr>
<tr>
<td>2004 (&gt;300 hrs)</td>
<td>2019</td>
</tr>
<tr>
<td>2005 (&gt;300 hrs)</td>
<td>2020</td>
</tr>
<tr>
<td>2006 (&gt;300 hrs)</td>
<td>2021</td>
</tr>
<tr>
<td>2007 (&gt;300 hrs)</td>
<td>2022</td>
</tr>
</tbody>
</table>
Same Compliance Methods as for Ferries, Excursion Vessels, Tugboats, and Towboats

- Replace with engine meeting current standard
- Demonstrate in-use engine meets standard
  - Tier 2 prior to Tier 3 effective date
  - Tier 3 when standard becomes effective
- Demonstrate in-use engine operates less than 300 hours annually

Engine Model Year for Compliance Date Determination

- Engine’s actual model year
- Engine’s actual model year +5
  - If a diesel emission control strategy is employed that reduces the PM or NOx emissions by >25%
- Engine Tier 1 Rebuild Model Year
  - If Tier 0 engine was rebuilt to meet Tier 1 standards prior to January 1, 2009
Alternative Compliance Plan

♦ Operators may comply using alternative emission control plan
♦ Must achieve equivalent or greater reductions
♦ Application process includes public review

Compliance Date Extensions

♦ Change in annual engine hours of operation
♦ No suitable engine replacement
♦ Manufacturer delay or installation difficulties
♦ Multiple engines on multiple vessels within fleet requiring compliance in one year
Exemptions from In-Use Engine Requirements

- Temporary replacement vessels
- Registered historic vessels
- Engines rated at less than 50 horsepower
- Engines operated less than 300 hours per year
- Near-retirement vessels

California Repower Capacity
Estimated Statewide Engine Repower Capacity

<table>
<thead>
<tr>
<th>Region of the State</th>
<th>Numbers of Engines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern California</td>
<td>76 - 101</td>
</tr>
<tr>
<td>Los Angeles Area</td>
<td>93 - 110</td>
</tr>
<tr>
<td>San Diego Area</td>
<td>48 - 60</td>
</tr>
<tr>
<td>Total Capacity Statewide</td>
<td>217 - 271</td>
</tr>
</tbody>
</table>

- Contacted 50+ marine vessel boat yards, vessels builders, or vessel repair facilities statewide

No Significant Impact from Additional Crew and Supply Vessel Engine Replacements
Estimated Emission Benefits and Costs

- Total emissions reductions from crew and supply vessel engines over life of the regulation
  - 223 tons PM
  - 3,500 tons NOx
Baseline and Controlled Statewide Crew and Supply PM Emissions

Baseline and Controlled Statewide Crew and Supply NOx Emissions
Total Cost for Crew and Supply Vessel Engines

- $19 million industry cost for new equipment
- $7.5 million total cost of regulatory compliance
- $13/lb PM (all costs attributed to PM)

Estimated Engine Replacement Costs

<table>
<thead>
<tr>
<th>Engine Category</th>
<th>Average Cost ($/hp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propulsion Engine</td>
<td>$270</td>
</tr>
<tr>
<td>Auxiliary Engine</td>
<td>$233</td>
</tr>
</tbody>
</table>
Crew and Supply Cost Effective Due to Large Percentage of Older Engines

<table>
<thead>
<tr>
<th>Cost Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Costs Attributed to PM ($/lb)</strong></td>
</tr>
<tr>
<td>Ferry, Excursion, Tug, Tow</td>
</tr>
<tr>
<td>Ferry, Excursion, Tug, Tow</td>
</tr>
<tr>
<td>Crew and Supply</td>
</tr>
<tr>
<td><strong>All Costs Attributed to Nox ($/ton)</strong></td>
</tr>
<tr>
<td>Ferry, Excursion, Tug, Tow</td>
</tr>
<tr>
<td>Crew and Supply</td>
</tr>
</tbody>
</table>

**Notes:** Ferry, Excursion, Tug, Tow - 2006 dollars  
Crew and Supply - 2008 dollars

Funding Opportunities for Crew and Supply Vessels

- Require real, surplus, quantifiable, and enforceable reductions
- Carl Moyer Program
- Proposition 1B
  - Funding in specific trade corridors only:
    - Los Angeles/Inland Empire, Central Valley, Bay Area, and San Diego/Border
- Contact your local air pollution control district
Commercial Harbor Craft Team
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Questions