Overview

- Background and Status
- Implementation Activities
- Proposed Amendments
- Next Steps
- Contacts
Background and Status

California’s Ocean-Going Vessel Clean Fuel Regulation

- 8 years in development
- Consultative process
- Adopted by ARB in July 2008
- Implementation began July 2009
- Provides immediate and significant emissions reductions
  - Diesel PM: 83% reduction
  - SOx: 96% reduction
  - NOx: 6% reduction
- Establishes “bridge” to ECA in the 2015 timeframe
Requirements—California’s Ocean-Going Vessel Clean Fuel Regulation

- Requires use of cleaner fuels in main engines, auxiliary engines and auxiliary boilers
- Two-phase implementation
  - July 1, 2009
    - use marine gas oil (averages 0.3% sulfur), or
    - use marine diesel oil with a 0.5% sulfur limit
  - January 1, 2012
    - use marine gas oil with a 0.1% sulfur limit, or
    - use marine diesel oil with a 0.1% sulfur limit

*ARB 2012 fuel sulfur limit is the same as the 2015 North American ECA fuel sulfur limit (0.1%)

Requirements—California’s Ocean-Going Vessel Clean Fuel Regulation

- Applies to US and foreign-flagged ocean-going vessels
- Requires use of cleaner fuels within 24 nautical mile zone of the California coastline
Enforcement and Compliance Status

- ~12,000 vessel calls since regulation began in July 2009
- ARB inspectors board vessels at dockside
  - fuel samples collected for testing and analysis
  - records and fuel switching procedures reviewed
- Nearly 400 inspections since July 1, 2009*
  - 22 notices of violation issued (~94% compliance)
- Most notices of violation involve fuel switching within regulated zone or recordkeeping

*Summary from July 1, 2009 to October 1, 2010

Implementation Activities
Use of Provisions in Regulation Facilitates Implementation

- 30 Safety exemptions used
  - ARB staff work closely with USCG to implement
- 3 Noncompliance fees
- Essential Modifications Exemptions
  - majority of applications are for auxiliary boilers on tankers
  - 436 exemptions provided for vessels that demonstrated the need for essential modifications

*Summary from July 1, 2009 to Sept. 1, 2010*

Outreach Efforts and Investigations to Support Implementation

- Six advisories issued
- Contract with California Maritime Academy to investigate root causes of vessel LOPs
  - final report expected late 2010
- Maritime Working Group Meeting
  - held April 28, 2010 (Oakland)
  - CMA Analysis of LOP – preliminary findings
  - presentations available at www.arb.ca.gov/ports/marinevess/ogv/ogvmeet.htm
- Coordinated with the SNAME Conference on Fuel Switching under the IMO ECA
Vessel Loss of Propulsion (LOP) Incidents Have Declined

- About 12,000 vessel calls since regulation began in July ’09
- Vessel LOP incidents tracked by USCG
  - temporary spike in LOP incidents upon implementation of Rule
  - 30 incidents occurred since July 2009 that may be related to use of cleaner fuel
  - all managed effectively
- Fuel related LOPs have decreased from 6 per month in July ’09 to 1 per month in Sept. ’10

Changes in Vessel Traffic Patterns Impact Expected Emission Reductions

- Many vessel operators choosing to not transit through the established shipping lanes in Santa Barbara Channel
  - results in increased vessel traffic south of the Channel Islands (about 50% of POLA/POLB visits)
- Changes in vessel routing impacting anticipated emissions reductions
- Changes in vessel routing through Mugu Sea Range
Current Rule Status - Vessels are Changing Routes from the Established Santa Barbara Channel Shipping Lanes and Using a Route Outside the Channel Islands

Channel Route
Outer Route
Current 24 nm Regulatory Zone
Pt. Mugu Sea Range

Emissions Reductions are Lost Due to Changes in Vessel Routing (in Southern California Region*)

Estimated Emissions (TPD) in South Coast Ozone Study (SCOS) Domain

*Year 2010, 50% of POLA/POLB vessel visits using outer route
Change in Vessel Routing is Driven by a Fuel Cost Differential

<table>
<thead>
<tr>
<th>Route</th>
<th>Distance (nm)</th>
<th>Cost</th>
<th>Time (hrs)</th>
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<tbody>
<tr>
<td>Channel Route (150 nm)</td>
<td>MGO:150 nm</td>
<td>$13,700</td>
<td>9</td>
</tr>
<tr>
<td>Outer Route (163 nm)</td>
<td>MGO: 31 nm</td>
<td>HFO: 132 nm</td>
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</table>

Estimated Cost differential $3,000

*Assumptions: MGO 700 $/MT, HFO 440 $/MT, average transit speed 17.4 knots, 20 nm Port VSR at 12 knots

Proposed Amendments Necessary to Address Impacts of Route Changes

♦ Recapture lost emission reductions due to vessel route changes
♦ Reduce vessel traffic through the Pt. Mugu Sea Range
U.S. Navy Presentation

Proposed Amendments
Goals for Proposed Amendments

♦ Goals
  – recapture lost emission reductions due to vessel route changes
  – reduce vessel traffic through the Point Mugu Sea Range
♦ Achieve goals by
  – removing economic incentive for vessels to change historic travel patterns

Proposed Amendments

♦ Extend the clean fuel zone in Southern California
  – extended zone is consistent with Contiguous Zone
  – provide a small “window” to reduce the amount of more expensive clean fuel needed for the channel route
♦ Other minor amendments
Contiguous Zone is a recognized nautical zone and is depicted on NOAA maritime charts.

Extended clean fuel zone retains reduction levels anticipated with original vessel routing.

Eliminate economic advantage of transiting through the Point Mugu Sea Range.

Proposed Extended Clean Fuel Zone:

- "Window" for vessels using the Channel Route.
- Channel Route.
- Current 24 nm Regulatory Zone.
- Extended Clean Fuel Zone—Extends out 24 nm from islands (consistent with Contiguous Zone on NOAA charts).
- Outer Route.
Proposed Extended Clean Fuel Zone Recaptures Emissions Reductions

![Graph showing estimated emissions (TPD) in South Coast Ozone Study (SCOS) Domain for PM10 and SOx/10 emissions.]

*Year 2010, 50% of POLA/POLB vessel visits using outer route

Proposed Extended Clean Fuel Zone Equalizes Route Costs

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<td>Outer Route (163 nm)</td>
<td>MGO: 143 nm, HFO: 20 nm</td>
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</table>

*Assumptions: MGO 700 $/MT, HFO 440 $/MT, average transit speed 17.4 knots, 20 nm Port VSR at 12 knots
Air Quality Modeling Will Help to Evaluate Air Quality and Health Impacts

- Air Quality modeling underway
  - evaluate the onshore impacts of changes in vessel routes
  - evaluate the onshore impacts of extending the regulatory zone to ensure that anticipated health benefits are maintained
- Completion – late 2010

Summary

- Regulation results in large emission reductions and significant public health benefits
- Excellent compliance with the regulation
- Changes in vessel traffic patterns are impacting anticipated emission reductions
- More vessels are going through the Sea Range
- Extending the clean fuel zone is necessary
  - to achieve anticipated emissions reductions
  - eliminate the economic incentive for vessels to go through the Sea Range
Next Steps

- Next workshop in early 2011
- Complete air quality modeling to evaluate air quality and public health impacts
- ARB Board Date: March, 2011

Contact Information

Bonnie Soriano  
(Lead Staff)  
(916) 327-6888  
bsoriano@arb.ca.gov  

Peggy Taricco  
(Manager)  
(916) 323-4882  
ptaricco@arb.ca.gov  

Paul Milkey  
(Staff)  
(916) 327-2957  
pmilkey@arb.ca.gov  

Dan Donohoue  
(Branch Chief)  
(916) 322-6023  
ddonohou@arb.ca.gov  

http://www.arb.ca.gov/marine