Maritime Air Quality Technical Working Group
Long Beach, California

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Region IX

US EPA Updates

Locomotive Tier 3 and Marine Category 1 & 2 Notice of Proposed Rulemaking

MARPOL Annex VI and SOx Emission Control Areas

Collaboration and EPA Leadership
PM$_{2.5}$ from Diesel Engines in 2030

- Highway: 12%
- Locomotives:
  - C1/C2: 15%
  - C3: 45%
- Off-highway equipment: 18%
- Marine:
  - C1/C2: 10%
  - C3: 15%
Mobile Source NOx in 2030

- **Aircraft**: 6%
- **Locomotives**
  - C1/C2: 12%
  - C3: 16%
- **Marine**
  - C1/C2: 12%
- **Highway**: 37%
- **Other nonroad**: 17%
- **Aircraft**: 12%
- **Marine C3**: 16%

Potential reductions on the order of:
- ~900,000 tons/yr of NOx
- ~25,000 tons/yr of PM

Compares to nonroad rule reductions of:
- 738,000 tons/yr of NOx
- 129,000 tons/yr of PM
Locomotive & Marine Diesel Rulemaking

• Patterned after, and coordinated with, highway and nonroad diesel programs
• Covers locomotives and all marine diesel engines <30 liters/cylinder
  – Applies to new locomotives and new engines for tugs, barges, ferries
• Targets NOx and (especially) PM aftertreatment
• Locomotive/marine fuel control already set--
  – 500 ppm sulfur in 2007, 15 ppm in 2012
• NPRM end 2006/early 2007: FRM end of 2007
• Now working with stakeholders on issues raised

Locomotive and Marine Rule

• Early reductions
  – Existing engines: locomotive remanufacture standards, beginning in 2010 or earlier if kits are available
    • Exploring whether this approach can be applied to some marine diesels as well
  – New engines: standards based on engine changes, expected to begin 2012
    – Goals: 50% PM reduction, 10-50% NOx reduction

• Long-term new engine standards
  – Aftertreatment-forcing standards, beginning 2015-2017
    – Goals: 90% PM reduction, 80% NOx reduction

New standards will be enabled by fuel sulfur controls for marine and locomotive diesel fuel
– 500 ppm in 2007 and 15 ppm in 2012
2 Key Issues--
- Residual fuel
  - ~2-3½% sulfur
  - Ships refuel all over the world
- Most ships are foreign-flagged

2030 NOx

12%

2030 diesel PM

C3 marine 45%

C3 Engine Controls

- Two-prong strategy for additional standards--
  - Work through IMO toward a new tier of international engine emission standards
  - ANPRM early 2007

- Next tier of standards is expected to be identified by the end of 2007.
MARPOL Annex VI

MARPOL is the International Convention for the Prevention of Pollution from Ships 1973/78.

- Annex VI establishes global standards applicable to air emissions from ships.
- Current Annex VI standards are NOx only and are based on in-engine controls; expected result – 20% reduction by 2030.
- Addresses NOx, SOx, VOCs, ODS, fuel quality, and shipboard incinerators.
- Entered into force in May 2005.

MARPOL Annex VI Negotiations

- Negotiations are underway to develop more stringent Tier II NOx and SOx standards and to expand coverage to PM and existing engines.
- Specific issues under negotiation:
  - Tier II & III NOx standards for new engines.
  - Standards for existing engines.
  - Lower sulfur limits for marine fuels.
  - VOC standards for tankers.
  - Expansion of the Annex to address PM.
- Negotiations are expected to be completed in 2008 with new standards effective as early as 2010.
- US Ratification
SOx Emission Control Areas

- MARPOL Annex VI provides a mechanism for the creation of SOx Emission Control Areas (SECAs) where ships must use low-sulfur fuel (15,000 ppm) or alternative mechanisms such as scrubbers.

- The U.S. and Canada are currently exploring the feasibility of designating such an area in North America.

SECA Process

- Studies underway will examine feasibility for the West Coast, Gulf Coast, East Coast, and Great Lakes.

- Decision to pursue designation will be a decision of the USCG requiring interagency agreement.

- Important to note that we are strictly exploring feasibility at this stage.
SECA Process

- Once analytical studies are completed, we will need to decide what areas we will pursue, decide on boundaries, and other significant issues.

- Any SECA proposal will be made jointly with Canada and we hope to enlist Mexico’s support for a trilateral proposal.

- Parties to Annex VI must approve any SECA proposal. If approved, the requirements become effective 26 months later.

National Clean Diesel Campaign: Two Components

- Regulations for new engines

- Voluntary measures to address existing diesel fleet
  - Retrofit older vehicles and equipment with emissions reduction technology
  - Replacement of oldest vehicles and equipment
  - Idling reduction, smart operations, etc.
EPA Regional Initiatives

• Many localized, regional approaches have been established:
  – West Coast Diesel Collaborative
  – Northeast Diesel Collaborative
  – Mid-West Clean Diesel Initiative
  – Mid-Atlantic Diesel Collaborative
  – Blue Skies Collaborative
  [www.westcoastcollaborative.org](http://www.westcoastcollaborative.org)

EPA Leadership

• Much can be done by working collaboratively under Federal leadership
  – National Regulations
  – Regional Collaboratives
  – National tools
    • Early fleet modernization
    • SIP guidance and credits
    • Easy to use models and calculators
    • Verification of technologies
    • Packaging technologies to match port operators’ business models
Federal Leadership (cont’d)

• Implementing strategies that have Energy Security (fuel savings) and emissions benefits
  – SmartWay Upgrade kits
  – Efficiency gains and sustainability in new port terminals
  – Work with DOT’s Freight Initiative
  – Clean construction equipment, fleet modernization and retrofit for cargo handling equipment

• Assessing the direct emission reduction potential of port operational strategies
  – on dock rail
  – virtual container yards
  – chassis pools

• Assessing potential NOx reductions resulting from fuel efficiency improvements

Ocean-Going Vessel Conference

• San Diego, CA on Feb 7-8, 2007
• Purpose: Bring together key port officials, shippers, freight owners, ship and engine manufacturers, and finance community to discuss:
  – Technologies/operational strategies - reduce emissions
  – Financing strategies to minimize costs/maximize opportunities
  – Short and Long term business impacts associated with increasing freight emissions:
    • Queues and wait times
    • Diverting OGVs to 2nd and 3rd choice ports
    • Ports inability to expand under current environmental conditions
• Co-sponsors: EPA, Pacific Merchant Shipping Association (PMSA), Ports of LA, Long Beach and San Diego, MARAD, CARB
Conclusions

• EPA is developing a program to achieve large PM and NOx reductions from locomotives and marine diesels that burn distillate fuel.

• We can and will take steps to reduce emissions from ocean-going vessels.

   – Pursuing more stringent air emission standards for ships under MARPOL Annex VI and considering designation of a North American SECA.