Public Hearing to Consider Adoption of a Proposed Regulation for Auxiliary Diesel Engines on Ocean-Going Vessels

December 8, 2005

California Environmental Protection Agency

Air Resources Board

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Background

Ocean-Going Vessels

Vessel Types

- Container Ships
- Tankers
- Bulk Carriers
- Auto Carriers
- General Cargo
- Passenger Cruise Ships

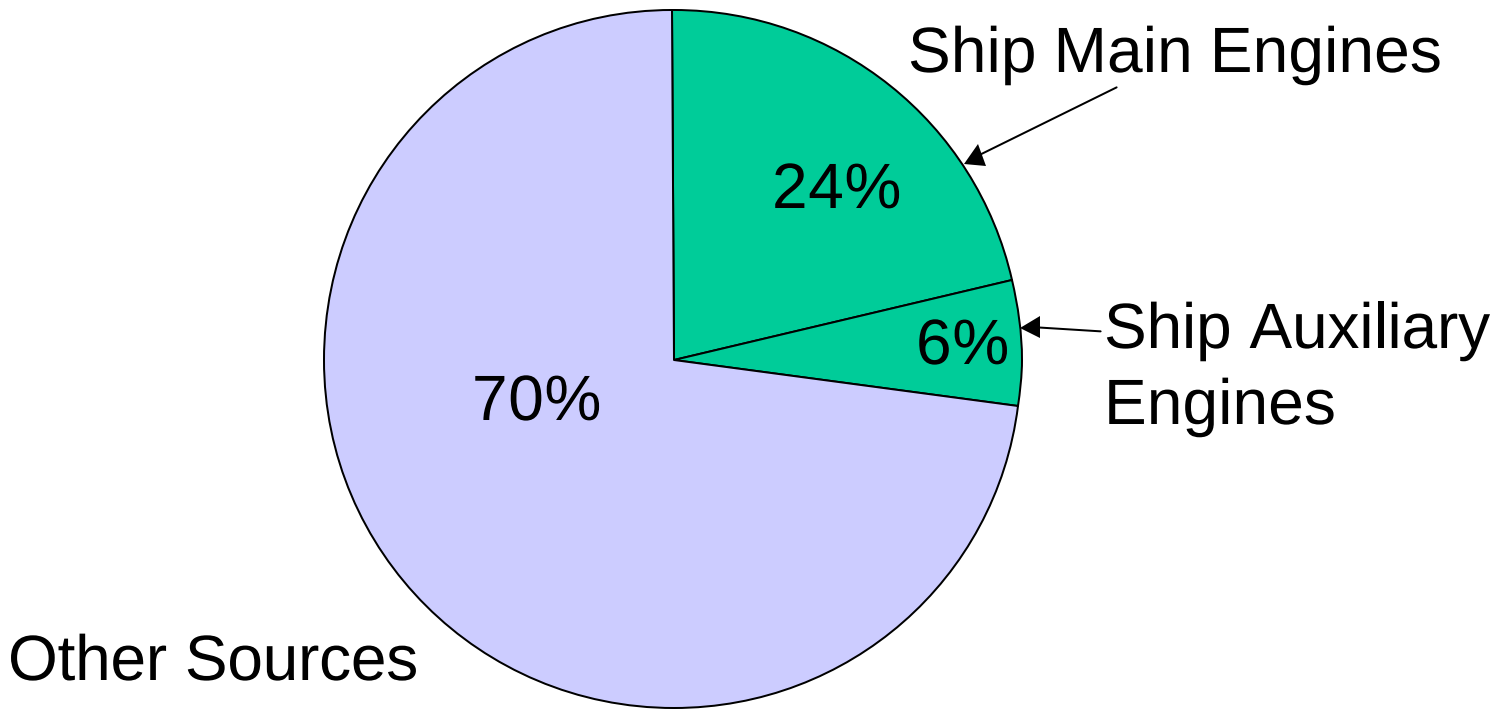
Vessel Statistics

- 10,000 visits annually
- 2,000 unique vessels annually
- Majority visiting the ports of LA, Long Beach, and Oakland

Need for Emission Reductions from Ocean-Going Vessels

- Large and growing source of PM, NOx, and SOx emissions
- Emissions concentrated near population centers
- Significant localized and regional impacts
- Major contributor to PM mortality and cancer risk
- Major contributor to ambient levels of PM and ozone

Ocean-Going Vessels are a Large Source of Statewide Diesel PM Emissions*

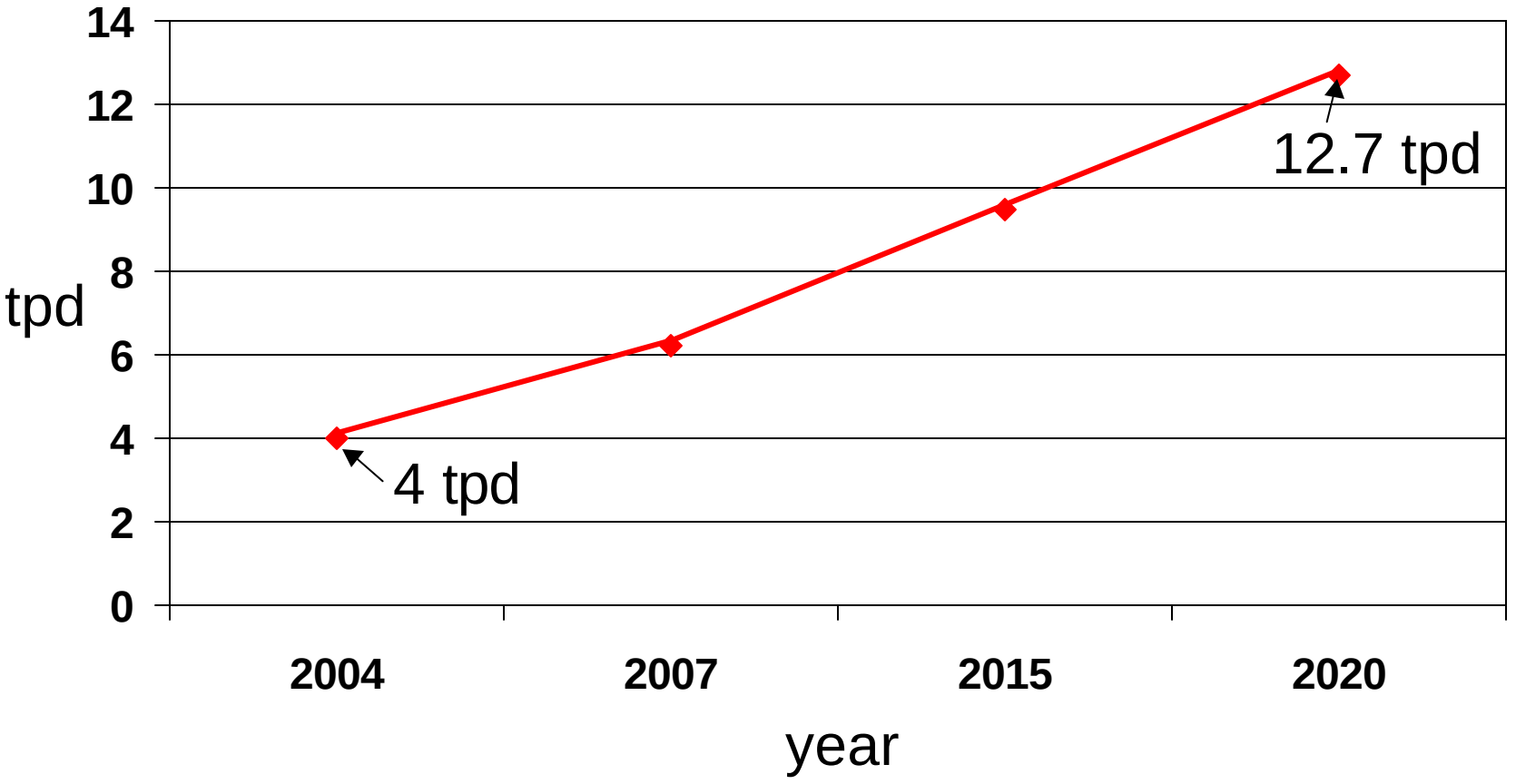


* Sources: 2003 ARB Emissions Inventory and 2005 Ship ISOR

What is an Auxiliary Engine?

- Engine used primarily for activities other than propulsion (i.e. electricity for shipboard lighting, refrigeration, and equipment)
  - Used by vessels at dockside and at sea
- Most vessels have one very large main propulsion engine and several large auxiliary engines
- Diesel-electric vessels are a special case where several large engines provide electrical power for both propulsion and shipboard electricity

Estimated Growth in Diesel PM Emissions from Ship Auxiliary Engines



Significant Contribution to Community Health Risks

- Ports of Los Angeles and Long Beach Exposure Assessment Study found ship auxiliary emissions were most significant contributor to high near source risk levels

Cancer Risk Level (chances/million)	Square Miles Impacted	Population Affected
Risk > 200	3	46,000
Risk > 100	20	220,000
Risk > 10	250	2,000,000

Proposed Regulation

Regulatory Development Process

- Began process in 2001 with the formation of the Maritime Working Group
- Five public workshops and work group meetings
- Input from ship operators, ports, engine manufacturers, government agencies, environmental & community groups
- Ongoing consideration of verbal and written comments

Proposed Regulation Applies to Auxiliary Engines on Ocean-going Vessels

Motor-Ship

Diesel-Electric

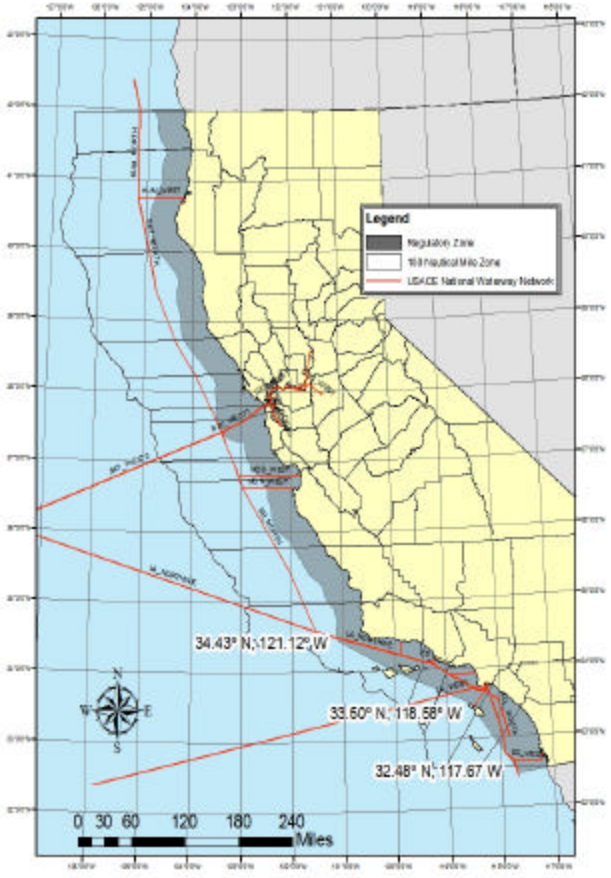
Main Engine for Propulsion (not covered)

Auxiliary Engines for Electricity (covered)

Engines Provide Electricity for both Propulsion & Shipboard Uses (covered)

Proposed Regulation Applies Within 24 Nautical Miles of the California Coastline

- Retains the majority of health benefits
- Reduces the cost
- Utilizes international boundary



Emission Limit Based on Use of Cleaner Distillate Marine Fuels

- January 1, 2007 Emission Limit
  - Use marine gas oil
  - Use marine diesel oil with a 0.5% sulfur limit
  - Use equally effective emission control strategies
- January 1, 2010 Emission Limit
  - Use marine gas oil with a 0.1% sulfur limit
  - Use equally effective emission control strategies
  - Fuel supply review in 2008

Alternative Compliance Plan (ACP)

- Operators may comply using alternative emission control strategies
- Must achieve equivalent or greater reductions
- Applicants may use fleet average emission reductions
- Special provision encourages the use of shore-side power

Noncompliance Fee Provision

- Option to pay a noncompliance fee
  - Unexpected redirection to a California port
  - Inability to purchase complying distillate fuel
  - Fuel found to be noncompliant enroute to CA
  - Extension needed for vessel modifications
  - Vessel modifications needed on infrequent visitor
- Funds to be used for port air quality projects

Noncompliance Fee Schedule

Number of Port Visits	Diesel-Electric Vessels	Other Vessels
1	$32,500	$13,000
2	$65,000	$26,000
3	$97,500	$39,000
4	$130,000	$52,000
5 or More	$162,500	$65,000

Enforcement of the Proposed Regulation

- ARB staff will enforce by inspecting records and sampling fuels
- Fines will be issued for violations

Impacts

Air Quality Benefits

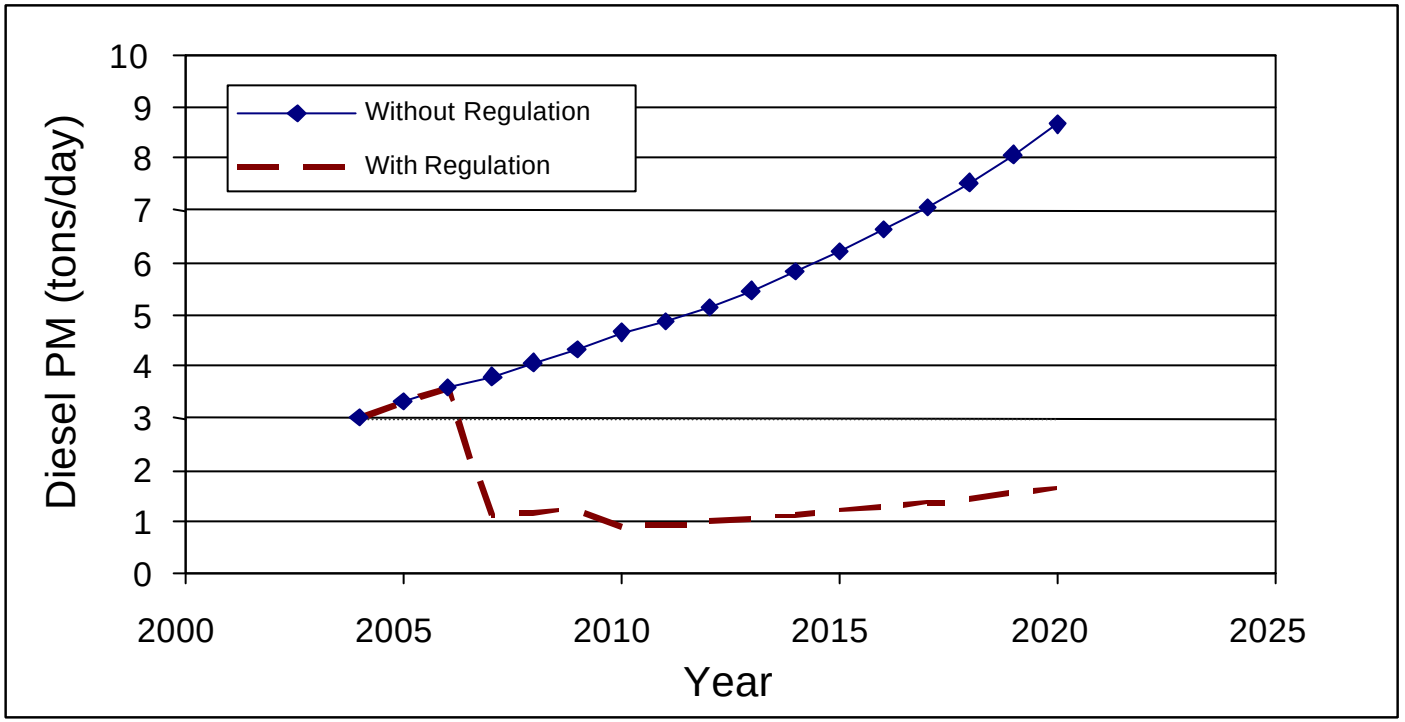
- Large reductions in diesel PM, NOx, & SOx
- Reductions in ozone and “secondarily formed” PM (PM formed in the atmosphere)
- Reduced cancer risk to populations near California ports
- Avoid 520 premature deaths by 2020 due to diesel PM reductions
- Significant additional health benefits from NOx and SOx reductions

Estimated Percent Emission Reductions*

Pollutant	2007	2010
Diesel PM	75%	83%
NOx	6%	6%
SOx	80%	96%

*** Emission reductions estimated from the use of 0.5% sulfur MGO in 2007, and 0.1% sulfur MGO in 2010, relative to the use of heavy fuel oil at 2.5% sulfur**

Estimated Emissions of Diesel PM with and without the Regulation in the 24 nm Zone



Estimated Emission Reductions (TPD)

Estimated Costs and Benefits

- Total Annual Cost to Industry of $40 million
- Added Fuel Costs
  - Typical cargo ship: $3,500 per visit
  - Typical cruise ship: $20,000 per visit
- Capital Costs for Ship Modifications
  - Most vessels (>90%) will not require modifications
  - Cost per vessel: $100,000-$500,000
- Value of Non-Cancer Health Effects
  - $200 to $300 million annually

The Proposal is Cost-Effective Compared to Other Measures

Control Measure	$/pound of diesel PM
Ship Auxiliary Engine Proposal	$27
Solid Waste Collection Vehicle Rule	$28
Stationary Diesel Engine ATCM	$4-$26
Transport Refrigeration Unit ATCM	$10-$20

Economic Impacts of Proposal

- No significant economic impacts anticipated on ship operators or the California economy
  - An increase of $1 per shipping container for a typical trans-Pacific voyage
  - An increase of $8 per passenger for a typical LA to Mexico cruise expected

Issues

ARB Authority

- ARB has the authority to regulate vessel emissions under both state and federal law
- Proposed regulation does not conflict with federal laws and regulations
- Proposed regulation does not violate the “Commerce Clause”

Inclusion of Diesel-Electric Vessels in the Proposal

- Large source of emissions
  - Engines account for about 25% of emissions subject to rule
- Engines are similar to other auxiliary engines
- No additional technical barriers to controlling these engines

Fuel Switching

- Fuel switching is a compliance option, not a mandate
- Many operators currently switch fuels
- Fuel switching can be done safely

Proposed 15-Day Changes

- Add safety exemption
- Modify ACP to ensure that emission reductions occur where ships visit
- Clarify target pollutants for noncompliance fee provision funds
- Define noncompliance
- Miscellaneous clarifications

Summary and Recommendation

- The proposal for auxiliary diesel engines:
  - would quickly and substantially reduce emissions
  - improves regional air quality and reduces cancer and noncancer health impacts
  - is cost-effective
- We recommend that the Board adopt the proposal with the suggested 15-day changes