Commercial Harbor Craft Public Workshop

May 7, 2008

Sacramento, California

California Environmental Protection Agency

Air Resources Board

Overview

- Background
- Crew and Supply Boat Survey
- Emissions Inventory
- Next Steps
- Excursion Vessel Economics Survey
- Contacts

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Background

Why Did We Need to Develop a Commercial Harbor Craft Regulation?

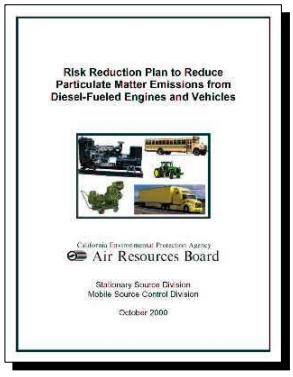
Public Health Is Imperative

- Over 90% of Californians breathe unhealthy air at times
- Diesel PM emissions are estimated to cause 70% of the cancer risk from toxic air contaminants

- Commercial harbor craft generally operate close to shore, causing localized exposure and risk
- Activities to support goods movement are expected to increase

Background

Regulatory Framework

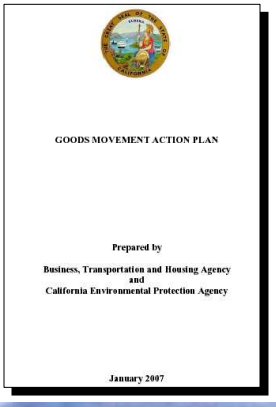

Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles

California Environmental Protection Agency
Air Resources Board

Stationary Source Division
Mobile Source Control Division

October 2000

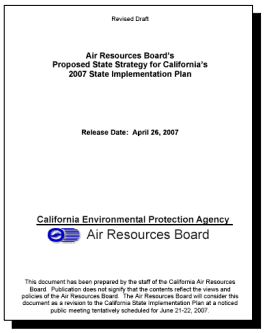
Governor's Action Plan


GOODS MOVEMENT ACTION PLAN

Prepared by

Business, Transportation and Housing Agency
and
California Environmental Protection Agency

January 2007


Revised Draft

Air Resources Board's
Proposed State Strategy for California's
2007 State Implementation Plan

Release Date: April 26, 2007

California Environmental Protection Agency
Air Resources Board

This document has been prepared by the staff of the California Air Resources Board. Publication does not signify that the contents reflect the views and policies of the Air Resources Board. The Air Resources Board will consider this document as a revision to the California State Implementation Plan at a noticed public meeting tentatively scheduled for June 21-22, 2007.

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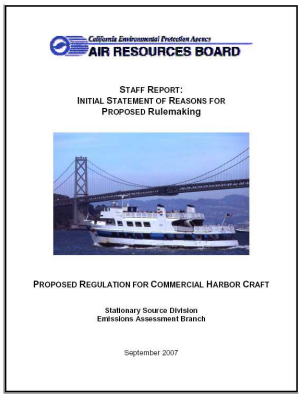
Background

Existing Commercial Harbor Craft Regulation

- Approved by Board in November 2007
- Will release Board-directed changes for a 15-day public comment period in May
- Final OAL approval expected this Fall



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Background

What Does the Current Regulation Require?

- Engines on all new vessels and all engine replacements
  - must be cleanest available marine engines
  - new ferries additionally required to employ best available emission control technology on propulsion engines
- Tier 1 or earlier auxiliary and propulsion engines on in-use ferries, excursion vessels, tug boats, and tow boats
  - must meet U.S. EPA Tier 2 or Tier 3 standards beginning in 2009, based on current engine model year
- Recordkeeping and reporting for all commercial harbor craft
  - install non-resettable hour meters on all engines
  - maintain accurate records
  - initial report due to ARB in February 2009

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Funding Opportunities

- Carl Moyer Program
  - available for surplus emission reductions
    - early or additional reductions for regulated engines
    - opportunities for unregulated engines
- Goods Movement Emissions Reduction Program (Prop 1B Bond)
  - currently available for crew and supply vessels, work boats, pilot vessels, tug and tow boats, and commercial fishing vessels
  - potential payment of the lower of 50% of total cost or $135/horsepower for replacement/repower

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Why Are We Exploring Additional Requirements for Crew and Supply Boats?

- Districts concerned about localized impacts
  - majority of crew and supply boats operate in four districts: South Coast, Ventura County, Santa Barbara County, and Bay Area
  - Crew and supply vessels make up about 10% of the commercial harbor craft emissions in Ventura County; 20% in Santa Barbara County
  - current regulation does not include in-use engine standards for crew or supply vessels

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Crew and Supply Boat Survey

- Survey conducted in February/March 2008
  - provide additional data characterizing population
  - help in assessing potential emission reductions
  - distributed to 14 crew and supply boat companies; emailed to list serve
  - contacts developed from ARB's 2004 CHC Survey, industry publications, and on-line information
- Response
  - 9 crew and supply companies
  - 34 vessels
  - 106 engines

- We gathered information about 13 additional vessels from internet sources

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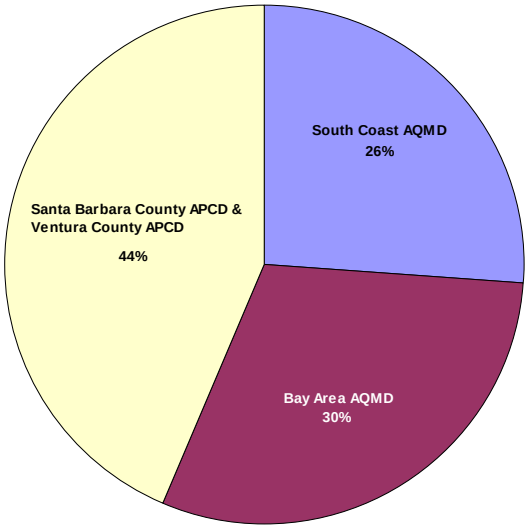
Crew & Supply Boat Survey

Distribution by Air District



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Vessel Operational Data

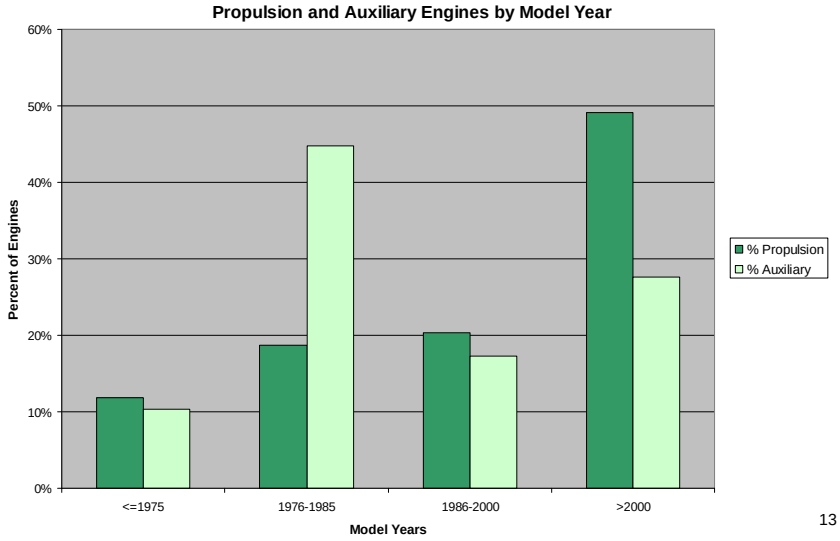
Vessel Type	Avg Engine Horespower		Avg # Engines per Vessel		Avg Annual Engine Hours	
	Main	Aux	Main	Aux	Main	Aux
Crew	523	35	2.4	1.6	2,491	1,909
Supply	596	213	2	3	1,517	3,136

Proximity to Shore

Vessel Type	% Total Annual Hours (Distance from Shore)		
	0-3 nm	3-24 nm	>24 nm
Crew	86%	5%	9%
Supply	33%	65%	2%

Crew & Supply Boat Survey

Vessel Engine Age Distribution



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Updating the Commercial Harbor Craft Emissions Inventory

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Goals

- Update crew & supply vessel emissions with new survey information
- Expand detail in passenger harbor craft categories

Crew & Supply Vessels in Surveys

- 21 vessels in ARB 2004 Survey and 46 vessels in ARB 2008 Survey (some vessels in both data sets)

Propulsion	Avg. # engines	Avg. hp	Avg. Hrs	Load	hp-hr/vessel
2004	2.5	463	788	0.45	409,882
2008	2.3	536	2224	0.23	610,964
Change	-9%	16%	182%	-50%	49%

Auxiliary	Avg. # engines	Avg. hp	Avg. Hrs	Load	hp-hr/vessel
2004	1.1	83	3036	0.43	118,772
2008	1.0	87	2455	0.32	66,584
Change	-12%	5%	-19%	-25%	-44%

Draft Comparison of Crew & Supply Survey Results

- Because the new survey focused on crew & supply vessels, the return rate was higher
- Overall, per vessel activity increased by ~30% between the 2004 and the 2008 survey
  - Primarily due to increase in propulsion engine operating hours
- Data still under review

Crew & Supply: Next Steps

- Continue analysis of survey data
- Update statewide vessel population
  - Possibly follow up with vessel operators
- Finalize assumptions and update inventory

Expanding Passenger Harbor Craft Category

- We believe there is sufficient variation in the ferry/excursion vessel inventory category to warrant splitting the category
- Challenges:
  - What should the split be based on? Vessel use or propulsion hp?
  - Available vessel databases don't identify detailed vessel use
  - Some vessels can be used as both ferries and excursion vessels

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Proposed Methodology (1)

- Identify each passenger boat in the ARB 2004 survey as either a ferry or an excursion vessel
- Reanalyze survey data using the new category
- Identify vessels in BTS ferry database as ferries and generate ferry population (~60)
- Generate excursion vessel population (~350) by subtracting ferry population from passenger boat population
- Rerun the inventory model

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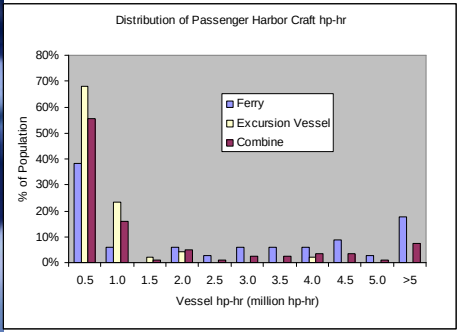
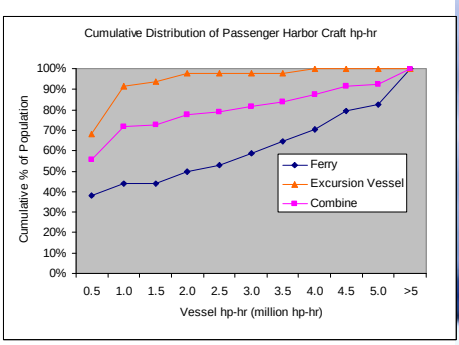
Passenger Harbor Craft Annual hp-hr





- Ferries generally have higher activity
- But there are excursion vessels that also have higher activity
- One million hp-hr can generate around 5 metric tons of NOx assuming 5 g/hp-hr NOx emission factor

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Draft Results (1)

- Overall as expected ferries have larger engines & higher operating hours than excursion vessels
- Ferries appear oversampled relative to excursion vessels in 2004 survey
- Overall emissions decrease if ferries and excursion vessels are separated
- However, results also suggest vessel use is a poor surrogate for size & activity
  - Some ferries are small, low use
  - Some excursion vessels are large, high use
- Population databases provide poor information on differences between ferries and excursion vessels
  - Some vessels are both ferries and excursion vessels

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Proposed Methodology (2)

- New approach under development
  - Categorize ferry/excursion vessel by size rather than vessel use (large high use vs. small low use)
  - Use USCG documentation database as primary vessel information data source (may require looking up every vessel)
  - Develop a database that estimates emissions based on currently available information and default factors and adjusts emissions based on ship operators' inputs for each vessel

Passenger Harbor Craft: Next Steps

- Implement new proposed methodology
  - May require stakeholders input if size/activity cuts are used
- Integrate new results into inventory

Next Steps

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Next Steps for Crew & Supply Emission Reduction Options

- Survey follow-up
- Emissions inventory updates
- Evaluating regulatory requirements versus voluntary programs
- Next workshop mid or late summer
- Possible Board consideration October 2008

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Excursion Vessel Economics Survey

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Excursion Vessel Economics Survey

- Gather economic data on private excursion companies
- Survey conducted in March 2008
  - company size, annual sales, income, net worth
  - vessel use
  - propulsion and auxiliary engine data (make, model, year, power rating, annual hours, annual fuel consumption)

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Survey Response

- Distributed to 163 owners/operators
- Response
  - 17 companies:
    - 11 owned 1 or 2 vessels
    - 6 owned 3 to 6 vessels
  - excursion vessel types:
    - bay and harbor cruises
    - whale watching
    - diving
    - private events
    - multi-use

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Estimated Ticket Price Increase Similar to Earlier Analysis

	Small (1-2 vessels)	Medium (>2 vessels)
2007 Analysis	5%-10%	
2008 Survey Analysis	5%-13%	3%-5%

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Next Steps for Excursion Vessels

- No new conclusions from survey
- Continue emissions inventory analysis
- Investigate if there is a vessel horsepower/operating hours split where economics are significantly different

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