

Public Meeting Regulatory and Non-Regulatory Fuels Activities

September 29, 2004

California Environmental Protection Agency



Air Resources Board

Agenda

- ✦ **Introductions**
- ✦ **Implementation Discussions**
 - Phase 3 RFG
 - Permeation Study
 - Diesel Fuel Lubricity
- ✦ **Proposed Changes to the CaRFG regulations**
- ✦ **Proposed CARB Diesel Fuel Regulations for Intrastate Locomotives and Commercial Harbor Craft.**
- ✦ **Presentations by Others**
- ✦ **Open Discussion**
- ✦ **Closing Remarks**

Implementation of Phase 3 RFG Regulation

Oxygen Range and Oxygenates

- ✦ Oxygen Range for 1.8% to 2.2% oxygen content is evaluated at 2.0% and for 2.5% to 2.9% is evaluated at 2.7%.
- ✦ Staff has been asked to investigate the practicality of creating a similar procedure for oxygenate content.
- ✦ To ensure that there is no loss in benefits, it is necessary to validate the CARBOB Model.
- ✦ Several refineries have submitted data for the purpose of validating CARBOB Model

Permeation Study

Test Vehicle

- ✦ Six passengers cars and four trucks selected with different ages and technologies, represent California in-use fleet in 2001.
- ✦ Mileage ranged from 15,000 to 143,000.
- ✦ The oldest model year is 1978 and the newest is 2001.
- ✦ Vehicle were filled up with California Gasoline.

Test Fuels

- ✦ Three California fuels for the test filled at ChevronTexaco stations:
 - Fuel A: MTBE Fuel (10.5 wt.% MTBE or 2 wt.% oxygen)
 - Fuel B: Ethanol Fuel (5.7 vol.% ethanol or 2 wt.% oxygen)
 - Fuel C: Non-oxygenated Fuel

Test Procedures

- ✦ Hot soak test for 3-hour in steady state 85° and 105°F in Sealed Housing for Evaporative Determination (SHED).
- ✦ Variable temperature diurnal test in SHED (65° to 105° then to 65° F) (California 2-day diurnal test)

Test Results

- ✦ Permeation increased from the MTBE fuel to the ethanol fuel on all 10 vehicles.
- ✦ On average, ethanol emission increased permeation emissions compared to:
 - MTBE gasoline: 65%
 - Non-oxygenated gasoline: 45%
- ✦ Permeation increase, on average, by 1.4 g/day from MTBE fuel to ethanol fuel, and decrease, by average, by 1.1 g/day from ethanol to non-oxygenates fuel

Emissions

- ✦ CRC results do not directly provide the emissions impact of permeation
- ✦ To calculate emissions need to consider:
 - Permeation data
 - Diurnal temperature profiles
 - Fleet composition
 - Vehicle activity data
- ✦ Vehicle activity data and equipment temperatures must be integrated to provide an appropriate temporal and spatial distribution of emissions.

Possible Next Steps for CRC Test Program

- ✦ Test newer technology vehicles LEV II and PZEV and the two newest model years from current test group.
- ✦ Fuels: 0%, 2.7%, 10% ethanol and a higher aromatics variant.

Implementation of Diesel Regulation

Implementation of Amendments to the California Diesel Fuel Regulations

- ✦ Approved July 24, 2003
- ✦ Executive Officer signed on May 10, 2004
- ✦ Submitted to OAL on June 1, 2004
- ✦ Final rulemaking package approved by OAL and filed with the Secretary of State on July 15, 2004
- ✦ Regulation became effective on August 14, 2004
- ✦ First round of compliance plans are being submitted in September 2004

Diesel Fuel Lubricity

ARB Diesel Fuel Lubricity Standard Phase I Implementation

- ✦ ASTM standard, identical to ARB Phase I standard, to become effective January 1, 2005
- ✦ ARB lubricity standard will defer to ASTM standard when DMS adopts and enforces
- ✦ Staff will be meeting with refineries and pipeline operators to monitor compliance efforts

Proposed Modifications to the CaRFG Regulations

Proposed Changes to CaRFG Regulations

- ✦ Revise requirements for documentation for transfer of denatured ethanol for use in California gasoline
- ✦ Revise restriction on blending CARBOB with other products
 - Add provision to allow protocols for blending transmix into CARBOB terminal tanks
 - Add provision to allow blending of limited amounts of California gasoline containing ethanol
 - Add provision to allow protocols for other situations

Proposed Changes to CaRFG Regulations (Continued)

- ✦ Revise RVP compliance requirements for CA gasoline transported to South Coast by marine vessel
 - Proposed that the fuel shall be subject to the regulatory control periods for production and import facilities identified in section 2262.4(b)(2)(A)
- ✦ Delete CARBOB importer sampling, testing, and record-keeping requirement

Proposed Changes to CaRFG Regulations (Continued)

- ✦ Miscellaneous improvements and corrections
 - Clarifying that “import facility” means “storage tank”
 - In footnote 2 of section 2266.5(a)(6)(A) table, replace “December 31, 2004” with “December 31, 2005”
 - In section 2266.5(g)(1)(C), replace H&SC reference “section 43021” with “section 43026”
 - “...Procedures for Evaluating Alternative Specifications...” candidate formulation oxygen range of 3.3-3.7% to be treated as 3.5% in CaRFG3 Predictive Model
 - Other minor changes which improve compliance flexibility

Diesel Fuel for Locomotive and Marine Diesel Engines

Extend CARB Diesel Fuel Standards to Harborcraft and Intrastate Locomotives



Why the proposed regulatory amendments?

- ✦ California needs the NO_x and PM emission reductions to attain NAAQS and SAAQS
- ✦ ARB Board direction
- ✦ Diesel Risk Reduction Plan (DRRP)
- ✦ State Implementation Plan (SIP)
- ✦ Governor's Action Plan

What are the proposed regulatory amendments?

- ✦ CARB diesel fuel required for intrastate locomotives and harborcraft
- ✦ January 1, 2006: SCAQMD harborcraft only.
- ✦ January 1, 2007: Statewide harborcraft and intrastate locomotives
- ✦ Alternative Emission Control Plan (AECPP) for intrastate locomotives

What are the proposed definitions?

✦ Harborcraft:

- No foreign trade “registry”
- < 400 feet in length
- < 10,000 gross tons
- < 30 liters per-cylinder displacement

✦ Intrastate Diesel-Electric Locomotives:

- Operate 90% or more within California
- Fuel consumption, Annual Miles, & Annual Hours
- Provides up to 36 days per year for out-of-state activities
- Does not include interstate line-haul locomotives

What are the alternatives to proposed regulatory amendments?

- ✦ No CARB diesel fuel required for intrastate locomotives and harborcraft
- ✦ Class III railroads exempted
- ✦ Certain Class III railroads exempted
- ✦ Requiring both harborcraft and intrastate locomotives in the SCAQMD on Jan. 1, 2006 and the rest of the state on Jan. 1, 2007.
- ✦ Requiring all interstate and intrastate locomotives comply with CARB diesel

Types of Railroads

- ✦ Surface Transportation Board (STB)
 - Defines size of railroads (49 CFR Part 1201) based on three year average of annual operating revenues.
 - STB thresholds adjusted annually based on rate of inflation.
- ✦ Class I Railroads (> \$250 million)
- ✦ Class II Railroad (\$20-\$250 million)
- ✦ Class III Railroads (<\$20 million)

California's Intrastate Railroads

- ✦ Class I Railroads (UP and BNSF)
 - Nearly 400 intrastate locomotives
 - Average 2,400 horsepower (1,500-4000 hp)
 - Average about 15 years old.
 - Average about 60,000 gallons per loco per year.
- ✦ Passenger Trains
 - 111 intrastate locomotives (2 switchers also)
 - Average 3,100 horsepower
 - Average age about 10 years old.
 - Average about 180,000 gallons per loco per year.

California's Intrastate Railroads

- ✦ Class III Railroads (20 with intrastate locos)
 - About 120 intrastate locomotives
 - Average 1,640 horsepower (150-3,000 hp)
 - Average about 40 years old.
 - Average about 28,000 gallons per loco per year.
- ✦ Industrial and Military Locomotives
 - About 120 intrastate locomotives
 - Average 1,000 horsepower
 - Average age about 50 years old.
 - Average about 10-30k gallons per loco per year.

California's Harborcraft

- ✦ ARB Commercial Harborcraft Survey of 2002
- ✦ About an estimated 4,000 CHC statewide.
- ✦ Primary engines range up to 3,600 hp.
- ✦ Auxiliary engines range up to 400 hp.
- ✦ Average about 30 years old.
- ✦ Commercial fishing boats (2,520) 64% of total number of CHC.
- ✦ Ferries consumed largest portion of diesel fuel (36%) and commercial fishing boats (20%)

U.S. EPA Diesel Fuel Standards

Applicability (Year of Implementation)	Maximum Sulfur Level (ppmw)	Maximum Aromatics (% by volume)	Minimum Cetane Index
Onroad (1993)	500	35	40
Onroad (2006)	15	35	40
Nonroad (1993)	5,000	35	40
Nonroad (2007)	500	35	40
Nonroad (2010)	15	35	40
Nonroad (2012) *	15	35	40

* Applicable to locomotives and marine vessels.

Intrastate Locomotives: Statewide Diesel Fuel Consumption (million gallons per year)

RAILROAD	CARB	U.S. EPA	TOTAL
Class I	6.4	16.9	23.3
Passenger	19.9	0.5	20.4
Class III	2.1	1.2 *	3.3
TOTAL	28	19 *	47

* includes 300,000 gallons of nonroad for Class III railroads.

Harborcraft:
Statewide Diesel Fuel Consumption
(million gallons per year)

HARBORCRAFT	CARB	U.S. EPA	TOTAL
Commercial	37.1	45.3	82.4
Recreational	0.1	4.9	5.0
TOTAL	37.2	50.2	87.4

Harborcraft and Intrastate Locomotives: Statewide Diesel Fuel Consumption (million gallons per year)

TYPE	CARB	U.S. EPA	TOTAL
Intrastate Locomotives	28.4	18.6	47.0
Harborcraft	37.2	50.2	87.4
TOTAL	65.6	68.8	134.4

Based on:

- 2004 ARB Intrastate Locomotive Survey (intrastate locomotives)
- 2002 ARB Commercial Harborcraft Survey (commercial harborcraft)
- 2003 ARB Emissions Inventory (recreational harborcraft)

CARB Diesel Anticipated Emission Benefits

- ✦ NO_x - 6%
- ✦ PM - 14%
- ✦ SO_x - 95%
- ✦ Air toxics benefits

Harborcraft and Intrastate Locomotives: 2003 Statewide Emissions (tons per day)

SOURCE	NOX	SOX	PM
Intrastate Locomotives	38.4	0.3	0.9
Harborcraft	19.8	1.9	1.1
TOTAL	58.2	2.2	2.0

Harborcraft and Intrastate Locomotives: **2007 Statewide Emission Reductions** (tons per day)

SOURCE	NOX	SOX	PM *
Intrastate Locomotives	1.0	0.3	0.2 *
Harborcraft	1.0	1.5	0.4 *
TOTAL	2.0	1.8	0.6 *

* includes both directly and indirectly emitted PM emission benefits.

Estimated Costs in 2007

- ✦ Incremental Costs: 3 cents per gallon.
 - Transition from CARB to U.S. EPA diesel fuels.
 - Cost for aromatic hydrocarbon reduction.
- ✦ Statewide Costs: \$2 to \$3 million annually.
- ✦ Lower sulfur will decrease engine wear.
- ✦ Lower sulfur will increase life of lubricating oils.
- ✦ Cost-Effectiveness: \$1.10 to \$1.60.
 - per pound of NO_x and PM reduced.

Economic Impacts

- ✦ Cost-effectiveness within range of ARB control measures.
- ✦ No significant impact expected on California economy.
- ✦ Estimate minor impacts on owners/operators.
- ✦ Expect no significant effects on small businesses due to the cost impacts.

Regulatory Schedule

- ✦ Staff Report OAL Publication Date
 - October 1, 2004
- ✦ Workshop Schedule
 - mid-late October
- ✦ Board Meeting Date
 - November 18, 2004
 - Sacramento, CA

Presentations by Others

Open Discussion

Closing Remarks