

Public Meeting on Regulatory and Non-Regulatory Fuels Activities for 2003

February 20, 2003



Public Meeting on Regulatory and Non-Regulatory Fuels Activities

- Introductions
- Amendments to the California Diesel Fuel Regs.
 - 15-ppm Sulfur Limit
 - Procedures for Certifying Alternative Formulations
 - Flexibility Issues
 - Lubricity
 - Diesel Fuel Deposit Control Additives
- Diesel Engine Lubricating Oils
- Fuel Properties for Diesel Engine Certification
- Further Follow-up Amendments for CaRFG3
- Requirements for Clean Fuels Outlets
- Presentations by Others
- Open Discussion
- Closing Remarks

Introductions

California Diesel Fuel Program

Background

California Diesel Fuel Program

- Adopted in 1988
- Implemented October 1993
- Provides flexibility by allowing certification of equivalent formulations

Comparison of Current Federal and California Diesel Specifications

<i>Property</i>	<i>California</i>	<i>Federal</i>
Sulfur	500 ppm	500 ppm
Aromatic Hydrocarbons*		
Large Refiners	10 Vol. %	---
Small Refiners	20 Vol. %	---

*Alternative formulations may be certified as equivalent through testing

- Applicability
 - California: on- and off-road vehicles
 - Federal: on-road vehicles only

California Diesel Program Benefits^a (tons/day)

Pollutant	Federal	California
SO ₂	60	80 (80%)
PM (Directly Emitted)	4	20 ^b (25%)
NO _x	0	70 (7%)

^a Calculated for 1995 Inventory

^b Includes hazardous pollutant benefits from reduced PM.

Average Specifications of Reformulated Diesel Fuel

Specification	California		U.S. ⁽¹⁾
	Pre-1993	Current	Current
Aromatics, vol%	35	19-22	35
Sulfur, ppmw	440 ⁽²⁾	140 ⁽³⁾	360
Cetane No.	43	50-52	45
PNA	---	3	---
Nitrogen	---	150	110

1. AAMA National Fuel Surveys

2. For Los Angeles area (Greater than 3000 ppm in rest of California)

3. About 10-20 % of total California volume is < 15 ppmw

Low-Sulfur Diesel Fuel Programs

- U.S. EPA adopted 15-ppm sulfur rule in 2001 for on-road diesel motor vehicles, to be implemented in 2006
- U.S. EPA considering low-sulfur regulation for off-road motor vehicles.
- South Coast adopted Rule 431.2 in 2000,
 - 15-ppm sulfur limit for diesel fuel to be used in stationary engines, implementation is 2004
 - 15-ppm sulfur limit for motor vehicle, implementation in 2005 unless the ARB adopts for 2006.

Draft Proposed Amendments Under Development - California Diesel Fuel

15-ppm Sulfur Limit

Draft Proposed Amendments Under Development - California Diesel Fuel

- Lower CARB diesel sulfur limit to 15 ppm
- Applies to
 - On-road and off-road vehicle uses
 - Stationary sources (Air Toxic Control Measure)
- Necessary to implement diesel PM risk reduction plan
- Implementation in 2006

Draft Proposed Amendments Under Development - California Diesel Fuel (Continued)

- Implementation concurrent with EPA's 2006 implementation date
 - No phase-in
 - At this time, no provisions for small refiners

Draft Proposed Amendments
Under Development - California
Diesel Fuel (Continued)

- No changes to aromatic hydrocarbon specifications

Draft Proposed Amendments
Under Development - California
Diesel Fuel (Continued)

- Replace test method for determining sulfur content
 - Current method has detection limit of 10 ppm

Draft Proposed Amendments
Under Development - California
Diesel Fuel (Continued)

- Update certified diesel fuel formulation procedures
 - Update sulfur specification in reference fuel
 - Update equivalency determination procedure

Draft Proposed Amendments
Under Development - California
Diesel Fuel

Procedures for Certifying
Alternative Diesel Fuel
Formulations

Draft Proposed Amendments
Under Development

- Add provisions to ensure candidate fuel and produced commercial fuels are comparable

Draft Proposed Amendments
Under Development - California
Diesel Fuel

Flexibility Issues

Draft Proposed Amendments Under Development - California Diesel Fuel

- Consider alternative set of flat limits, similar to flat limits used in the reformulated gasoline regulations.
 - Consider properties, such as density, cetane, aromatics, sulfur, nitrogen, and other.
 - Allow importation of diesel fuel without having to use one of the existing alternative formulas.

Draft Amendments Being Considered for California Diesel Fuel

- Increase flexibility for certification of alternative formulations
 - Consider the development of a Predictive Model for diesel formulations.
 - A diesel Predictive Model would allow anyone to certify an alternative formulation without testing.
 - Allow importation of diesel fuel without having to use one of the existing alternative formulas.
 - Depending on adequacy of existing data

Draft Proposed Amendments Under Development - California Diesel Fuel

Lubricity

Lubricity Concerns Related to Low Sulfur Diesel Fuel

- Diesel fuel injection systems require adequate fuel lubricity to prevent excessive wear
- Hydrotreating process to lower sulfur can reduce level of trace components, which can reduce lubricity
- Sweden experienced fuel lubricity problems in 1991 with low sulfur diesel fuel

California Experience

- Refineries voluntarily implemented and maintain recommended lubricity level
 - 3,000 gms Scuffing Load BOCLE
- CARB monitored California diesel fuel in 1993 through 1996 and concluded lubricity levels of diesel fuel were consistently at or near the recommended level

Lubricity Concerns Related to Low Sulfur Diesel Fuel

- Current Concerns:
 - Equipment manufacturers believe lubricity standard necessary with 15 ppm diesel sulfur standard
- ASTM has attempted but not been successful to date in passing a lubricity standard

Industry Standards Proposed

- World Wide Fuels Charter lubricity specification
 - HFRR 400 microns maximum wear scar diameter @ 60 deg C
- ASTM ballot being prepared
 - 3,100 grams scuffing load BOCLE for all grades of diesel
 - Planning work to determine if vehicles of 2007 and beyond require higher lubricity level
 - Specify more stringent lubricity requirement for ULSD (15 ppm sulfur) if necessary

ARB Seeking Input on Appropriate Lubricity Standard

- Industry standards being studied:
 - ASTM ballot on lubricity standard
 - World Wide Fuels Charter lubricity specification
- Recommendations from industry welcomed
- Timely ASTM lubricity specification may preclude necessity for regulatory action

Future Amendments Under Development - California Diesel Fuel

Diesel Fuel Deposit Control Additives

Diesel Engine Lubricating Oils

Following Industry Efforts

- Awaiting test results:
 - Advanced Petroleum-Based Fuels - Diesel Emissions Control (APBF-DEC) Lubricants Work Group
 - Southwest Research Institute private consortium:
 - Diesel Aftertreatment Sensitivity to Lubricants (DASL) / Non-Thermal Catalyst Deactivation (N-TCD)
- ASTM Heavy Duty Engine Oil Classification Panel
 - Proposed Category 10 (PC-10)
- Industry efforts may preclude necessity for regulatory action

Draft Proposed Amendments for Fuel Properties for Diesel Engine Certification Testing

Proposed Amendments Under Development for California Certification Diesel Fuel

- Sulfur content of California certification fuel to be consistent with Title 40, Code of Federal Regulations, §86.1313-2007.
- (b)(2)...petroleum fuel for diesel engines...
- Total Sulfur, ppmw 7 - 15

Further Follow-up Amendments to the CaRFG3 Regulations

Requirements for Clean Fuels Outlets

Cleans Fuels Program

- Adopted 1991
- Regulations not reflect market
- Evaluate necessity of regulations
- Consider rescinding regulations
 - scheduled for June Board hearing

Presentations by Others

Open Discussion

Closing Remarks