

Public Workshop to Discuss Proposed Amendments to Motor Vehicle LPG Fuel Specifications

February 2002

California Environmental Protection Agency



Air Resources Board

Alternative Fuels Regulations

- ◆ Title 13, CCR, sections 2290-2292 originally adopted in 1992
- ◆ Provides engine manufacturers with a known fuel quality for designing engines
- ◆ Address fuel related engine performance problems and excess emissions

Motor Vehicle LPG Specifications

Propane (min.)	85 vol%
Propene (max.)	10.0 vol%
Pentenes +heavier (max.)	0.5 vol%
Butene (max.)	2.0 max%
Vapor Pressure (max.)	208 psig
Volatility Residue: (max.)	
- Evap. Temp, 95%	-37°F, or
- Butanes	5.0 vol%
Residual Matter:	
- Residue on evap. of 100 ml on oil stain obs.	0.05 ml
Sulfur (max.)	80 ppmw
Water, Corrosion, Odorant	

LPG Issues

- ◆ Limited Northern CA. availability of LPG meeting the MV fuel specifications
- ◆ Most LPG meeting less stringent commercial grade specification
- ◆ Single distribution system to handle both fuels
- ◆ Transport/delivery trucks (bobtails) are fueled on the same LPG they carry as product

Current LPG Fuel Quality

	% Propene (Ave.)	
	Summer	Winter
Imports	< 5%	< 5%
Northern California		
Refinery 1	3%	3%
Refinery 2	25 - 30%	55%
Refinery 3	30%	50%
Refinery 4	12%	12%
Southern California		
All Refineries	3 - 5%	3 - 5%

Objective of Proposal

- ◆ Provide compliance flexibility for LPG distributors to handle motor vehicle grade and commercial grade LPG
- ◆ No significant impact on engine performance or emissions

Proposed Amendments to LPG Specifications

- ◆ Bobtail truck exemption
 - Allows use of both motor vehicle grade and commercial grade LPG
 - Applies to delivery trucks:
 - Fuel off the cargo tank
 - Maximum 3000 gallon capacity

Impact on Engine Performance and Durability

- ◆ Engine durability and performance testing
 - Unaffected by varying fuel blend
 - No abnormal engine wear
- ◆ Survey of Northern California bobtail fleet indicate long term intermittent operation on commercial grade LPG in bobtail trucks
 - LPG fleet owners do not indicate any adverse affects on engine durability and performance

Impact on Emissions

- ◆ Engine tests comparing motor vehicle grade and commercial grade LPG indicate:
 - 14% increase in NO_x
 - 20% decrease in CO
 - 11% decrease in NMHC
- ◆ NO_x increase of 0.02 tons per day in Northern California

Benefits of Proposed Amendments

- ◆ Provides compliance flexibility for LPG distributors to handle two LPG fuels
- ◆ No significant impact on engine performance or emissions

Continued Efforts

- ◆ Improve quality of refinery LPG
- ◆ Develop more compliance flexibility