Compressed Natural Gas Specifications for Motor Vehicles

August 3, 2005

California Environmental Protection Agency

Air Resources Board
Agenda

- Introductions
- Background
- Proposed concept
- Presentations by others on proposed concept
- Research needs
- Presentations by others on research needs
- Open discussion
Background
Compressed Natural Gas
Motor Vehicle Fuel Regulation

• Title 13, CCR, section 2292.5 adopted in 1992

• Compositional specifications

• Based on technology available at that time

• Provides engine manufacturers with a known fuel quality for designing engines

• Addressed fuel related engine performance problems and excess emissions

• More stringent than CPUC specifications for NG

• Pipeline operators have imposed CNG specifications on the pipeline
Current Motor Vehicle CNG Specifications

- Methane (min.) = 88 mol%  
- Ethane (max.) = 6 mol%  
- C3+higher (max.) = 3 mol%  
- Inert Gases = 1.5 - 4.5 mol%  

Other specs. to safeguard quality
88% of CA Current Supply Meets CNG MV Specifications

Interstate 84%

CA Gas
Wells 4%
Associated Gas 12%

Compressed Natural Gas

6
California Associated Gas

- Predominately in the Southern San Joaquin Valley and the South Central Coast
- Exceed ethane, C3+ specifications
- Higher energy content
Potential for Imported LNG

- Potential to displace a significant amount of CA natural gas supply
- Potentially exceeds ethane, and C3+ specifications
- Does not meet inert specifications
- Higher energy content
Modifications of CNG MV Specifications

- CNG specifications could be updated
  - reflect vehicle technology advancements
  - provide flexibility
- Need to balance cost with air quality and vehicle performance issues
- Optional
- Preserve performance and emission benefits
Fuel Quality and Emissions

• Test programs confirm that an increase in energy content will increase NOx emissions
  – Stationary sources
  – Mobile sources
• Current information indicates that NOx emission increases may be significant
• Additional tests need to be conducted to fully quantify the performance and emissions impacts
Fuel Effects on Performance and Durability

- Light duty engines are equipped with advanced feedback control systems and do not experience any significant effects.
- Heavy duty engines without advanced feedback control systems can experience significant performance and durability effects.
- Stationary applications can experience modified flame and combustion characteristics that can affect performance and durability.
Proposed Concept
Proposed Concept Objectives

• Provide compliance flexibility with CNG fuel regulation
• Ensure protection of existing and new technology natural gas engines
• No significant air quality degradation occurs
Proposed Concept

• **Methane Number**
  – 80 statewide
  – 73 regional

• **WOBBE Index**
  – xxxx statewide
  – xxxx regional

• **Inerts 4% max.**

• **C4+ 1.5% max.**

• **Other specifications based on CPUC Rule 30 or Rule 21**
Presentations by Others on Proposed Concept
Research Needs
Presentations by Others on Research Needs
Open Discussion