Compressed Natural Gas Specifications for Motor Vehicles

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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

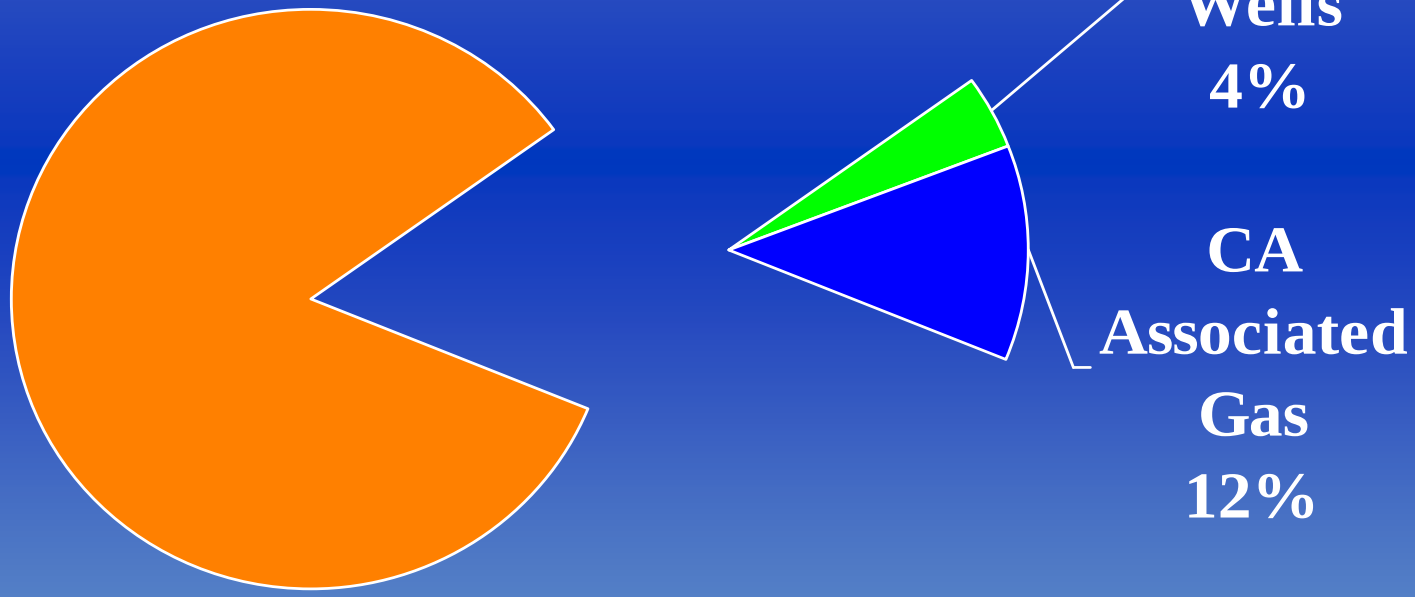
- Title 13, CCR, section 2292.5 adopted in 1992
- Compositional specifications
- Based on technology available at that time
- Provides engine manufacturers with a known fuel quality for designing engines
- Addressed fuel related engine performance problems and excess emissions
- More stringent than CPUC 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



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