E85 Demonstration Program

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E85 Demonstration Program – Chevron's Role

- Provide E85 to the Caltrans test fleet of FFV's
- Two locations
- Provide fueling equipment
  - Above ground storage tank
  - Dispenser
  - Hose and nozzle
- No certified E85 EVR vapor recovery systems are available

E85 Demonstration Program – Chevron's Program Goals

- Assess vehicle performance
  - Mileage
  - Emissions
  - Effect of various climatic conditions
  - Maintenance needs
  - Driver feedback
- Investigate commercial feasibility
  - Blending
  - Transportation
  - Storage
  - Dispensing
- Final Report not yet released by CARB

E85 Demonstration Program
E85 Blending

- CARBOB + Ethanol ≠ On-Spec E85
- ASTM D 5798 specifies several properties, including:
  - RVP
  - Minimum ethanol content
- Example: Summer
  - E85 Specification: 5.5 psi minimum RVP
  - CARBOB: 5.5 – 5.7 psi
  - Pure Ethanol: 2.3 psi
  - 15% CARBOB/85% Ethanol: 4.5 – 5.3 psi

E85 Demonstration Program
E85 Blending (continued)

- Options to increase E85 RVP:
  - Increase proportion of hydrocarbon
  - Increase RVP of hydrocarbon using a third component
- Decision: Use isopentane + CARBOB + ethanol
  - Then-current ASTM ethanol content specifications very rigid
  - Isopentane chosen based on availability
- Blending results:
  - Range: 2.5% - 6.8% isopentane
  - Average: 5.2% isopentane

Commercial Implications of Third Component Blending

- Current distribution infrastructure fully and efficiently utilized
  - Storage for CARBOB and ethanol, but not third component
- Third component would require pressurized tanks
  - Effective options all have higher RVP than gasoline
  - Butane has some advantages
- Blending to property specifications not currently done at terminals
  - Variations in ethanol denaturant
  - Variations in CARBOB RVP

Changes to ASTM D 5798

- Since the demonstration program, the minimum ethanol content has been decreased to 68% year-round
  - Reduces the amount required, but does not eliminate the need for third component blending in California
- ASTM considering a shift to a “Flexible-Fuel” specification that would decrease the minimum ethanol content to 51% year-round
  - Could nearly eliminate the need for third component blending
  - No third component blending would result in “E85” containing about 51 – 75% ethanol, depending on the season