Comments Related to Ethanol

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Smog Reyes

Four Topics

- Carbon Monoxide Emissions
  - Linearity and Response to Fuel Oxygen
- Carbon Monoxide Reactivity
  - MIR or SIP Conditions
- Nitrogen Oxide Emissions
  - New Vehicle Response and Higher Emitters
- Permeation
  - Remaining uncertainties

Carbon Monoxide Emissions

- ARB claims CO partially reduced in non-oxy fuels
  - Data on fuel properties indicates minimal impact
  - NSTC (1997) recommends linearity with oxygen, but ARB claims very non-linear
  - Predictive Model uses zero Tech 5
    - “Fixing” with Alliance data implies 22 percent CO increase for non-oxy fuels from flatline.
    - ARB claims only 3 percent CO increase.
    - If E10 were the flatline base the non-oxy increase would be 46 percent.

Data on fuel properties indicates minimal impact

- ARB data show non-oxy fuels needed reduced RVP to pass as CaRFG
- ARB data do show more olefins sometimes, but Auto/Oil study shows CO response to olefins not significant.
- ARB data do show somewhat less sulfur, but E5.7 fuels are already low and Auto/Oil study shows less CO response than HC.

ARB claims very non-linear CO

- ARB claim based on two factors
  - Predictions that non-oxy fuels would not use RVP, but recent ARB data show this is false.
  - Lack of aggressive driving data below 2 wt. percent oxygen, but US06 data will soon become available on Tech 5 from Alliance.

Carbon Monoxide Reactivity

- **U.S. EPA Recommends 15/1 VOC to CO**
  - After studying UAM SIP grid-model simulations of Chicago, New York, and South Coast
  - EPA concluded MIR ratio of mobile VOC to CO too high. (66 **FR** 37156, 17 July, 2001)
- Predictive Model uses MIR to gives 48 to 1
  - Newer MIR values imply 59 to 1
  - UAM (with EPA analysis) gives 15 to 1
- MIR's based on high NOx box-model
  - SIP conditions in grid-model show lower ratios.

Nitrogen Oxide Emissions

- Current Predictive Model assumes new Tech 5 (94+) vehicles have same high NOx/oxygen as older Tech 4 (’86-’94).
  - However, new (Alliance) data show little effect of oxygen on NOx.
- New techniques applied to NOx database indicate lower NOx impact from Tech 4 than current Predictive Model treatment.

Permeation

- Remaining uncertainties even with new CRC study.
  - ARB used CRC data to estimate 75-95 tons per day from ethanol.
  - ENVIRON used same data to get 19 tons.
  - AIR, Inc. used same data to get about half of ARB estimate.
    - AIR, Inc. report to be released next week.