Comments Presented at ARB Workshop on CARFG3
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We believe that the December 9 hearing for the CARFG3 rule is premature and does not provide stakeholders appropriate time to analyze the complete proposal. We are in the process of performing analytical work in many of the areas outlined below and intend to provide ARB staff with detailed written documentation of our findings. We also expect to hold technical meetings with Staff prior to the final hearing in an effort to help Staff propose the best rule for California.

EMFAC2000

- The CARFG3 proposal is incomplete since it does not incorporate all of the details which are embodied in EMFAC 2000.
- The inventory based upon EMFC2000 is not yet approved by the Board. Approving the inventory at the same hearing does not permit time for meaningful comments.
- The documentation for EMFAC2000 has not been released to the public and we believe EMFAC2000 might be flawed. Our initial understanding is that the inventory might change substantially in terms of fleet weightings and the mix of evaporative and exhaust emissions. For example, evaporative emissions might be more important than exhaust emissions in the future even though vehicles with advanced evaporative emissions controls will be sold.

Predictive Model

- We believe that the predictive model might not be representative of the in-use fleet. Environ is currently reviewing the data base to understand whether the database is representative of the various emitter classes and vehicle population distributions. Since the model does not explicitly treat these populations within each tech group, it is very important that the data set be weighted appropriately to reflect fuel impacts.
- In the Staff Paper, a number of issues are raised regarding the robustness of the model. A small numbers of data points appear to change the entire sense of the model. J Cohen of ICF Consulting is analyzing the ARB methodology for rejecting data.
- ARB indicates that new data from Auto/Oil will be incorporated into the model. Thus, the final model coefficients are not publicly available for review.

- Because the PM is very heavily weighted toward clean cars and sulfur effects, if high emitters are not properly weighted, the impact of sulfur reductions on the

environment is overstated, and the cost of reduction of emissions per mile will be understated per mile of driving.

Evaporative Emission Alternative:

- ARB proposes to CAP RVP at 7.2 psi when using the evaporative emission alternative. The CAP should be tied to meeting Federal RFG 2 emissions requirements and not be a fixed value. Thus, the refiner should need only to demonstrate that his gasoline satisfies the federal complex model as well as the PM.
- We have not seen the evaporative emissions data base and have been unable to acquire it from ARB to evaluate the RVP models for low RVP gasoline and the proposed fleet makeup and weightings in the rule.
- ARB proposes to penalize refiners who use the evaporative option 0.1 psi on the basis of compliance margins. We see no valid reason or analysis which shows that the environment will be harmed by maintaining the 7 psi baseline with the evaporative emission option.

Proposed CO Credit:

- The ARB estimated that 0 and 2% oxygen gasoline are likely to produce the same CO emission. We have performed an analysis which we intent to share considering the effects of oxygen, sulfur and aromatics content which suggests that the majority of the on-road CO emissions in fact come from the reduction in oxygen from 2% to 0%.
- In analyzing the relative ozone forming potential of evaporative emissions and CO, ARB assigned fixed reactivites to the various emissions. We have performed an analysis which models how fuel properties impact the various reactivites to permit a complete evaluation of the effects of fuel formulation on ozone forming potential for all fuels. We believe this approach is more consistent for treating all fuels than that proposed by ARB. We will provide documentation.
- The inventory estimate for on-road CO is incorrect. First, high emitter effects were not considered. While these are not properly built into the PM, they are not at all included in the ARB analysis of the effect of oxygen on CO. Second, ARB did not consider all available data in establishing the impact of oxygen on CO for the various tech groups. Third, while ARB assumes that Tech 5 vehicle hydrocarbon emissions will respond to oxygen, it assumes inappropriately that there is no simultaneous CO response.
- The CO inventory for the fuel credit is only based upon on-road vehicle emissions. First, the inventory must include off cycle emissions. Off cycle effects may be important in Tech 5 vehicles which operate completely closed loop during the FTP. While the inventory assumes the existence of high emitters, ARB did not consider their effects in estimating the CO response to oxygenates. The impact of sulfur will be substantially lower for the fleet and the oxygen effect higher when high emitters are included. ARB ruled out any CO benefits from off road engines. Since gasoline off road engines run very fuel rich, their contribution to the NOX inventory is minor, but their contribution to the VOC and CO inventories is large. Importantly, since most off –road engines are non-catalytic and should remain that way through 2005,

the effect of sulfur on VOC emissions reduction is highly overestimated when both off and on road sources are considered. Thus, oxygenates will have an impact on these inventories, and ARB should not dismiss these effects without more quantitative analysis.

Because of the lack of data on these inventory issues, we would be willing to work with ARB to refine the estimates so as to properly characterize the impact of oxygenates on ozone formation through CO reduction after finalization of the rule if ARB is willing to provide such flexibility in the rule making.

Other Issues:

- ARB proposes to raise the T90 and aromatic caps to facilitate the production of non-oxygenated RFG. Yet, ARB believes that refiners will produce gasoline both lower in sulfur and aromatics in the future. Aromatics are important because they tend to be highly reactive in the environment. Raising the T90 cap presents a further problem because it allows more heavy cat cracker aromatics into the pool. Higher aromatics and T-90 increase emissions from high emitters and there is "no sulfur offset". Thus, CARFG3 may not satisfy SB989 in terms of its impact on the environment and ARB needs to do more analysis.
- Aromatics are precursors for PNA emissions and will raise the toxicity of CARFG3 emissions. If refiners will produce lower aromatic gasoline in the future as ARB predicts, the T90 and aromatic caps should not be raised.
- A number of studies are showing that oxygenates reduce both PNA and primary PM2.5 emissions from both low and high emitting vehicles. The effect of allowing more non-oxygenated gasoline in the pool is to backslide on both fine PM and PNA emissions. Approaches to protecting the environment from these emission increases as required by the Governor are not included in this proposal.
- A Drivability Index standard is proposed which penalizes oxygenates. There is no supporting data, and ARB made no arguments, proving that oxygenated gasoline impacts in-use emissions any differently than non-oxygenated gasoline when considering the T10, T50 and T90 distillation temperatures. If future vehicle calibrations need to take oxygenate into account, this should be done through sensing and calibration and not arbitrary fuel caps.