



South Coast Air Quality Management District

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March 21, 2008

Mr. James Goldstone, Executive Officer
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Dear Mr. Goldstone:

South Coast AQMD Staff Comments on the Modified Text Regarding the
2007 Amendments to the Phase 3 California Reformulated Gasoline Regulations

The South Coast Air Quality Management District (AQMD) staff appreciates this opportunity to provide comment on the proposed regulatory modifications issued by the California Air Resources Board (CARB) staff on March 7, 2008 to the Phase 3 RFG regulations considered by the Board at its June 14, 2007 hearing. The AQMD staff appreciates that these proposed changes provide flexibility to refiners as they seek to meet the requirements of CARB regulations in the context of recent federal legislation mandating a Renewable Fuel Standard. It is essential, at the same time, that these amendments meet the full obligations set out under SB 989 (Sher), which require the full maintenance of air quality benefits originally achieved and benchmarked as Phase 2 gasoline, which contained no ethanol blend components.

In seeking to balance the needs of refiners as well as federal mandates for national average ethanol content, it is also essential that the maximum emission reduction be achieved from California gasoline. For this reason, the AQMD has historically advocated that the cleanest gasoline specification form the basic foundation for vehicle emissions optimization. This principle was first enacted in the original Low Emission Vehicle / Clean Fuels program adopted by CARB in 1990.

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Our comments are focused on the following concerns:

- 1) The need for an offset ratio higher than one to one;
- 2) The need to set a tighter sulfur limit and expedite the timetable for sulfur removal from gasoline;
- 3) The need to reconsider the potential greenhouse gas (GHG) emission implications of low level blends in light of recent studies; and
- 4) The need to reconsider the assumption that no additional permeation emissions occur with increased ethanol concentration in gasoline from E5.7 to E10.

Need for Higher Offset Ratio

CARB staff is proposing in Section 2265.5 that the Alternative Emission Reduction Plan (AERP) require equivalent or better emission reduction benefits for NOx, total ozone forming potential, and potency-weighted toxics. Given that there are inherent uncertainties in the modeling and inventory associated with these emissions; in addition, the impact of higher ethanol blend use in off-road sources is not reflected in the current version of the Predictive Model, the AQMD staff recommends that an offset ratio of 1.5:1 for each of these emission categories be required to ensure that the emission impacts of added ethanol blending are mitigated to the fullest extent possible. We recognize that staff are attempting to gain additional information in these areas. However, given the timelines incorporated in the current proposal and the urgent need to expedite emission reductions in the South Coast Air Basin, we consider an offset ratio of 1.5:1 to be the most direct, effective and fair reconciliation of these concerns at this time. These reductions should also be achieved on a contemporaneous basis.

Tighter and More Expedited Sulfur Limit

It was noted at the June 2007 Hearing that 5 ppm sulfur levels are needed to achieve full flexibility and emission benefits associated with the revised Phase 3 gasoline requirements. **In order to ensure that the 5 ppm level is attained in use, the AQMD staff urge CARB to set a sulfur cap limit at a level no higher than 10 ppm.** Such a lower limit is necessary to enable advanced fuel efficiency technologies such as lean NOx catalyst technology. In addition, such a standard would align California gasoline sulfur requirements with Japan and the European Union, and ensure that the maximum potential emission reductions are achieved from gasoline. It should also be noted that under the CARB proposed sulfur cap California's gasoline sulfur limits would still be less stringent than the 15 ppm sulfur limit imposed on diesel fuel.

With respect to the timeframe, CARB staff is proposing that the sulfur cap limit of 20 ppm be phased in by December 31, 2011 rather than February 14, 2009 as originally pro-

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vided in the June 2007 staff recommendation.¹ This delay of over 2½ years is unnecessary, given the readily available excess gasoline desulphurization capacity already in place in California refineries. While this relaxation provides additional flexibility to refiners, it is unwarranted in the face of the critical need to supply the cleanest gasoline possible as soon as possible. **Given the clear benefits associated with lower sulfur levels, we urge CARB to retain the original proposed deadline of February 14, 2009 for its most stringent sulfur limit. We also believe that a 10 ppm sulfur limit is achievable in that time frame, and further recommend that the expedited schedule reflect such a limit.**

Greenhouse Gas Impacts

The evolution to E10 in California – the largest gasoline market in the U.S. – will accelerate the pressure for increased corn-based ethanol production. The national acreage devoted to corn production increased from 80 million acres to 93 million from just 2006 to 2007. Additional corn ethanol demand pressures may in fact result in INCREASED greenhouse gas emissions, according to some researchers.² Certain key assumptions made by CARB staff regarding the GHG efficacy of corn-based ethanol are coming under tighter scrutiny from a number of researchers. Nobel Prize winning chemist Dr. Paul Crutzen, for example, has published an important paper which challenges the key GHG parametric assumption which drives the current belief that there is a slight GHG benefit association with corn-based ethanol.³ Dr. Crutzen's analysis, which became available in August after the June hearing, indicates that four percent – rather than two percent – of nitrogen applied as fertilizer converts to nitrous oxide (N₂O) in the atmosphere. As a result of this updated "land use" effect on a potent GHG emission source, the assumed net benefit associated with corn-based ethanol blends becomes a net increase in GHGs once this impact on nitrous oxide emissions is better estimated. **We therefore recommend that proposed Section 2261(b)(5)(C) include a provision that the GHG assessment underlying the program is to be annually updated to ensure that the incremental impacts of the Ethanol Emission Reduction Plan (EERP) and the Alternative Emissions Reduction Plan (AERP) do not exacerbate GHGs on a full life cycle basis.**

Hydrocarbon Permeation Emissions

CARB is assuming that permeation emissions do not increase as a result of increasing ethanol content from 5.7% to 10% in gasoline. There is very little data available on this key assumption. The changes being proposed allow for a 75% increase in ethanol blend levels in gasoline. Rather than assume the best possible outcome, it would be far more prudent to assume that there may be some increase. Even if the increase is relatively

¹ Staff Report, Initial Statement of Reasons (ISOR), Appendix A, Proposed CARFG3 Regulations Including Predictive Model Procedures, April 27, 2007, pg A-7.

² Timothy Searchinger, "Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change", Science Magazine, February 29, 2008.

³ Dr. Paul Crutzen, Mosler, Smith and Winiwarter, "N₂O Release from Agro Biofuel Production Negates Global Warming Reduction by Replacing Fossil Fuels", Atmospheric Chemistry and Physics Discussions, 7, 11911 – 11205, August, 2007.

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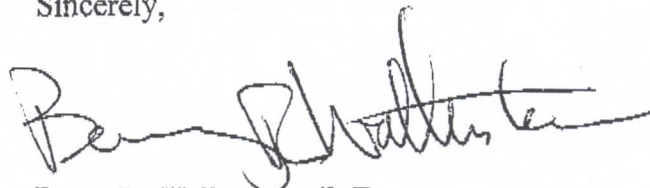
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small in percentage terms, given the 16⁺ billion gallons of annual gasoline consumption statewide, it is very possible that permeation emissions impact of these upcoming modifications could be meaningful. CARB staff acknowledged that the fundamental chemical/materials mechanisms governing permeation are still not well understood. A categorical assumption of no additional impact on permeation HCs from an increase from 5.7 to 10 percent ethanol blend level is directly analogous to the erroneous assumption on permeation emissions back in 2003.

The Coordinating Research Council (CRC) study E65-3, which was primarily intended to assess permeation emissions from PZEVs and E85 indicated that for two of the vehicles tested in the study, total permeation emissions increased by 4% and 38% respectively as the ethanol portion increased from E6 to E10.⁴ Figure 34 of this study indicates that there is in fact a non-linear positive relationship between ethanol content and permeation rates. AQMD staff strongly recommends that CARB obtain additional permeation emissions data from both older and newer car segments to further understand the impacts of permeation emissions. **We further recommend that in the interim, CARB reevaluate its assumption of no increase in permeation emissions above 6% ethanol and, at a minimum, the Predictive Model should reflect some small increase in permeation HC between E6 and E10 rather than zero percent increase.**

The AQMD staff appreciates the efforts of the staff to address a wide range of complex issues as part of this final rulemaking. If there are any questions regarding these comments, please feel free to contact me or Mr. Paul Wuebben – Clean Fuels Officer, Mobile Source Division, at 909-396-3247.

Sincerely,



Barry R. Wallerstein, D.Env.
Executive Officer

CSL:HH:PW

⁴ Coordinating Research Council, E65-3, Figures 26 and 27, <http://www.crcao.com/reports/recentstudies2006/E-65-3/CRC%20E-65-3%20Final%20Report.pdf>