APPENDIX C

Legal and Air Quality Issues in Removing Minimum Wintertime Oxygen Requirement

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I. Identifying the Areas in Which the Winter Oxygen Program Should be Retained

The CaRFG regulations currently require at least 1.8 percent oxygen by weight in all gasoline in the state in the winter. This requirement is part of the California State Implementation Plan (SIP), along with the rest of the CaRFG regulations. It was adopted to comply with the 1990 amendments to the federal Clean Air Act (FCAA §211(m)), which require the SIPs for all CO non-attainment areas to include a minimum oxygen requirement in the winter months. When the CaRFG regulations were adopted, California had eight CO non-attainment areas (along with two unclassified areas).

Today, only Lynwood in Los Angeles and Calixico in Imperial county continue to record violations of the federal CO standard. However, Imperial county is not a federally designated area. Recently, the U.S. EPA approved re-designations to attainment for all previous CO non-attainment areas in California, except Los Angeles--South Coast Air Basin (63 F.R. 15305 (March 31, 1998) in Appendix D).

Section 211(m)(6) of the FCAA provides that,

> "Nothing in this subsection [m] shall be interpreted as requiring an oxygenated gasoline program in an area which is in attainment for carbon monoxide, except that in a carbon monoxide non-attainment area which is re-designated as attainment for carbon monoxide, the requirements of this subsection shall remain in effect to the extent such program is necessary to maintain such standard thereafter in the area."

The maintenance plans for all of the re-designated areas are being revised to demonstrate maintenance of the federal CO standard without the need for a mandatory winter oxygenates program. The plans show that ambient CO levels in the areas are expected to continue to decline even without the wintertime oxygenates requirements, due to the motor vehicle fleet turnover. (Supporting data are the next section.) Accordingly, the staff proposes that the area subject to the mandatory winter minimum oxygen content be reduced to the area that remains subject to the FCAA §211(m) requirements.

Federal Clean Air Act section 211(m)(2) requires the SIP to contain wintertime oxygenated gasoline requirements

> "in the larger of — (A) the Consolidated Metropolitan Statistical Area (CMSA) in which the [CO nonattainment] area is located, or (B) if the area is not located in a CMSA, the Metropolitan Statistical Area in which the area is located."

Los Angeles is in the "Los Angeles-Anaheim-Riverside" CMSA, which consists of the entire counties of Los Angeles, Orange, San Bernardino, Riverside and Ventura (http://www.census.gov/population/estimates/metro-city/93mfips.txt). This is significantly larger than the South Coast Air Basin, which does not include Ventura County and excludes the eastern portions of San Bernardino and Riverside counties and the northern portions of Los Angeles and

San Bernardino counties. The westerly portion of the CMSA is identical to that of the RFG covered area. However, the CSMA includes the eastern portion of San Bernardino and Riverside counties and the northern portion of San Bernardino County, which areas are not in the RFG area. Therefore, although the actual area where CO violations have been recently recorded is quite small geographically, the area where the winter oxygen requirement must remain in effect is the Los Angeles-Anaheim-Riverside CMSA.

II. Maintenance of CO Attainment in the Absence of Minimum Wintertime Oxygen Requirements

There are two factors influencing the reduction of CO emissions from the on-road fleet of gasoline-powered motor vehicles ("fleet"): the use of oxygenate and the fleet turnover. Older vehicles without fuel injection and electronic control of the air fuel ratio require oxygenated fuel to reduce CO emissions by leaning the mixture. The number of these vehicles is continuously declining as new vehicles with advanced mixture controls and fuel injection replace them. The more modern vehicles adjust the fuel/air mixture for efficient combustion and a significant reduction in CO. Oxygen in their fuel has little effect on the CO emissions.

Table E-1 contains the CO emission data for the 1995 base year (the demonstration year for CO attainment) for the fleet, by county or portions of counties (Lake Tahoe) for the attainment areas[1]. CO emissions are shown by model-year ranges, 1961 through 1985 and 1986 through 1995. It is necessary to demonstrate that over a reasonable future time period, CO emissions in these areas will remain less than the 1995 emissions, even without oxygen in gasoline.* The staff is providing data here to show that demonstration for the years 1999, 2002 and 2005.

The overall reduction of CO emissions from gasoline-powered vehicles attributed to the CaRFG regulations is 11 percent[2]. The portion of the 11 percent attributable to the presence of oxygen (at 2 weight percent) in the gasoline can been estimated with a draft CO emission model that was developed in parallel with the Predictive Models for THC, NOx, and PWT. The staff has compared gasoline at the refiners' averaging limits** with 2 weight percent oxygen to the baseline for the 11-percent reduction. Also, we have compared gasoline at the refiners' averaging limits and zero oxygen to the same baseline. The quotient of the two results indicates that the 2 weight percent oxygen provides about 70 percent of the CO reduction from "Tech 3" cars (model years 1981 to 1985) and 50 percent of reduction for "Tech 4" (1986 to 1994) cars. Thus, about 60 percent of the 11 percent CaRFG reduction of CO may be due to the oxygen content. The corresponding estimate of the CO increase from withdrawing oxygen from gasoline is about 6.6 percent.

Another estimate can be made by using the CO emission model on oxygen-free alternative limits that have been applied to actual gasoline production under the Predictive Model. When typical values of actual oxygen-free limits (confidential data) are compared to the averaging limits, the modeled emissions increase by 13 percent for Tech 3 and 10 percent

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* The scenario of no oxygen in gasoline gives an extreme "worst-case" analysis of the effect of rescinding the winter oxygen requirement. The federal RFG regulations require oxygen in 70 percent of gasoline in California. Even without that requirement, refiners would continue to use some oxygenates in gasoline for their great utility in meeting the CaRFG standards.

** This is the basis on which the 11-percent inventory reduction was calculated.

Table E-1. CO Emissions in 1995[1] (Attainment Year)

tons/day

County	MYs 1961-1985	MYs 1986-1995	1995 Total	
Alameda	367.83	300.29	668.12	
Butte	66.43	48.76	115.19	
Contra Costa	292.33	233.65	525.98	
Fresno	269.60	206.70	476.30	
Kern	228.72	189.48	418.20	
Lake Tahoe No. Shore (Placer Co.)	13.65	11.49	25.14	
Lake Tahoe So. Shore (El Dorado Co.)	44.13	36.47	80.60	
Sacramento	420.94	310.81	731.75	
San Diego	775.88	640.31	1,416.19	
San Francisco	147.78	114.95	262.73	
San Joaquin	187.19	141.25		328.44
San Mateo	221.41	180.83	402.24	
Santa Clara	433.76	352.86	786.92	
Stanislaus	127.15	99.15	226.30	
		Total	6,463	

for Tech 4, average 12. The staff has taken the mean of 6.6 and 12 percent ,9.3 percent, to estimate the CO emission increase if there were no oxygen in winter gasoline.

The fleet CO emission estimates in the inventories for the selected future years have been increased by the model results and compared to 1995 base year CO emissions to verify maintenance. These comparisons are shown in Tables E-2, E-3, and E-4. In all cases, the on-road emissions of CO are less than the emissions in 1995, to a degree increasing with time.

The following memo gives the analysis that overall CO emissions in the federal attainment areas should be sufficient for CO maintenance with respect to the federal NAAQS. However, continued maintenance of the state CO standard in Fresno and Lake Tahoe is not assured for the short term. More time needs to be provided to allow the fleet turnover to reduce CO emissions in those areas enough to ensure maintenance of the State standard.

References

1. ARB/TSD; “Predicted California Vehicle Emissions, Carbon Monoxide Planning Inventory” (for the counties included in California’s 10 federal planning areas for CO attainment).

2. ARB/SSD; “Phase 2 Reformulated Gasoline Emission Benefits”, memo from Peter Venturing to K.D. Drachand and Terry McGuire, October 17, 1994.