ENDANGERED HABITATS LEAGUE
DEDICATED TO ECOSYSTEM PROTECTION AND SUSTAINABLE LAND USE

08-4=8
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COMMENTS OF ENDANGERED HABITATS LEAGUE AND NATURAL RESOURCES DEFENSE COUNCIL ON PROPOSED INTERIM MOTOR VEHICLE EMISSIONS BUDGETS FOR SOUTH COAST AIR DISTRICT
APRIL 24, 2008

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The Endangered Habitats League and the Natural Resources Defense Council submit these comments on the proposal by the California Air Resources Board to adopt revised motor vehicle emissions budgets as part of the Air Quality Management Plans (AQMP) for Ozone and PM2.5 that have been submitted to EPA as part of the State Implementation Plan (SIP) for the South Coast Air District. The proposed budgets are currently under consideration by EPA to determine if they meet the criteria for an adequate budget that can be used for conformity purposes. For the reasons described below, the proposed budgets do not meet the federal requirement for adequacy and should be adopted by the Board until additional measures are adopted as needed to achieve the requirements of the Clean Air Act.

Executive Summary.

Commenters object to adoption of the proposed budgets based on two broad concerns:

I) the failure of the attainment demonstration to --

A) identify the elevated concentrations of PM2.5 in the near-highway environment that have been shown by numerous studies to significantly exceed concentrations recorded at regional monitors, and

B) estimate the emissions reductions and include a control strategy designed to reduce these elevated near-highway concentrations to the level of the NAAQS; and

II) the reliance in the AQMP on measures that are not being implemented, and that may not be implemented, for the purpose of demonstrating reasonable further progress (RFP), including but not limited to—

A) emissions reductions expected from the marine vessel fuel rule recently set aside by the federal courts because of the lack of an EPA fuel waiver;

B) emissions reductions attributed to EPA's locomotive rule which are not adopted in the EPA rule; and

C) emission reductions from non-road engines assumed in the AQMP, but not implemented by rule.

Until the emissions reductions needed to attain the annual and 24-hour NAAQS in the near-highway environment are known, the emissions reductions needed to meet the RFP targets in the milestone years cannot be determined. Unlike ozone, where the RFP targets require a fixed annual reduction in emissions at the rate of 3% of the baseline emissions inventory, the RFP targets for PM2.5 are based on the annual reductions needed to achieve the overall reduction target required for attainment. The adopted AQMP contains emission reductions that will achieve the regional reductions shown by the modeling to be necessary for attainment at monitors that do not reflect the incremental impact of highway emissions in the near-highway environment. The attainment demonstration in the AQMP fails to estimate the reductions in particulate emissions from highways needed to attain in the near-highway environment where 1.5 to 3 million citizens will be exposed daily to continuing NAAQS violations. The RFP targets that will be needed to attain the NAAQS in all communities in the Basin cannot be determined from the adopted AQMP. All that can be said is that the overall reductions in the adopted AQMP are not sufficient to eliminate the NAAQS violations in the near-highway environment, and therefore the RFP targets based on that plan cannot be adequate to achieve the percentage reductions that will be needed for an adequate attainment demonstration. For this reason, the proposed emissions budgets cannot be adequate for conformity purposes, and do not meet EPA's requirements. 40 CFR § 93.118(e)(4).

In addition, EPA requires that emissions budgets be based upon emissions reductions that can be expected from adopted measures. 40 CFR § 93.118(e)(4)(v). The proposed budgets are based, in part, on emission reductions expected from measures identified in the AQMP that are now not being achieved, and will be achieved based on the absence of any current legally enforceable obligation.

Until an attainment demonstration is adopted that provides for attainment in the near-highway environment, and measures are adopted to achieve the reductions required to attain, it is premature to establish emission budgets for motor vehicles. We therefore ask the Board to postpone action on the proposed budgets until these deficiencies in the AQMP are remedied.

I. THE ATTAINMENT DEMONSTRATION DOES NOT PROVIDE FOR ATTAINMENT IN COMMUNITIES ADJACENT TO HEAVILY TRAVELED FREEWAYS.

The attainment demonstration in the adopted AQMP does not estimate the emissions reductions that will be needed to attain either the annual or the 24-hour NAAQS for PM2.5 in the near-highway environment where primary particles emitted from motor vehicles and re-entrained dust cause or contribute to concentrations well-above those used to determine the design value for the region and the regional attainment demonstration. Emissions from heavily traveled freeways have been shown to add from 1 to 14 μg/m3 of elemental carbon, a major component PM2.5, to

concentrations measured at regional monitors more than 300 to 500 meters distant from major highways. In the South Coast Air Basin commenters estimate that 1.5 to 3 million citizens reside, attend school, recreate or visit medical care providers within this near-highway environment where elevated concentrations of PM2.5 are expected.

A. Reliable Scientific Evidence Shows Elevated PM2.5 in the Near-Highway Environment.

The evidence that highway emissions have a significant impact on air quality in the near-highway environment is not new. MATES-II first identified the importance of highway emissions in 2000. Although MATES-II was focused on the significance of diesel particulate as the largest source of cancer risk in the air basin, it also provided important findings that demonstrated that higher levels of diesel pollution occur near highways. The Report found the greatest exposure to diesel PM at locations where "the dominance of mobile sources is even greater than at other sites." It also found that "model results, which are more complete in describing risk levels…than is possible with the monitored data, show that the higher risk levels occur… near freeways." "Results show that the higher pollutant concentrations generally occur near their emission sources." These findings provided evidence that neighborhoods near highways would experience higher concentrations than the regional averages. Based on these observations, MATES-II concluded that "[f]or mobile source compounds such as benzene, 1-3 butadiene, and particulates associated with diesel fuels, higher concentration levels are seen along freeways and freeway junctions." This work identified the near-highway environment as a high risk environment where elevated levels of PM would be expected because of emissions from diesel vehicles.

This triggered further research in the region. A team from USC conducted seminal studies to measure the concentrations of highway pollutants as a function of distance from the I-710 and I-405 freeways. Both studies included measurements of concentrations of CO and black carbon (BC) at increasing distances from the freeway. CO and BC were intentionally selected because their ambient concentrations are strongly related to vehicle emissions. Black carbon, also measured as elemental carbon (EC) in the monitoring reported in MATES-II and MATES-III, is a species of PM2.5 that was used in the MATES-II study as a measure of diesel PM in the Air Basin. The MATES-III study reported more recent investigations showing that elemental carbon is an inadequate measure of diesel PM, and that other methods show that total diesel PM is at least 72% greater than elemental carbon. MATES-III, p. 2-9. The AQMP relies on the MATES-III data to identify elemental carbon as one of the six major species of PM2.5 in the South Coast air shed that contribute significantly to PM2.5 nonattainment.

The freeway studies show the dramatic increase in BC/EC in the near-highway environment. The studies measured concentrations at five distances downwind from the freeway and upwind from the freeways. By comparing the upwind measurements which provide a good estimate of regional carbon loadings in the Air Basin with the downwind measurements, these studies provide a good estimate of the increase in concentrations of primary carbon particles emitted from highways in the vicinity of major highways compared to regional concentrations measured in the urban air shed.

The BC measurements from each of the freeway studies are summarized separately below along with measured upper and lower limits, and the observed difference between the comparable upwind and downwind BC concentrations:

Measured Average (and Upper and Lower Limit) BC Concentrations at Increasing Distances from the 405 Freeway

Downwind Distance (m)	BC (µg/m3)	BC (µg/m3) Downwind-Upwind Ave Concentration
30	5.4 (3.4-10.0)	4.75
60	3.2 (3.0-3.5)	2.55
90	2.5 (2.4-2.6)	1.85
150	1.6 (1.1-2.0)	0.95
300	1.3 (1.1-1.5)	0.65

Measured Average (and Upper and Lower Limit) BC Concentrations at Increasing Distances from the 710 Freeway

Downwind Distance (m)	BC (µg/m3)	BC (µg/m3) Downwind-Upwind Ave Concentration
200 m (upwind)	4.6 (3.1-5.9)	
17 m	21.7 (20.3-24.8)	17.1
20	19.4 (16.5-21.6)	14.8
30	17.1 (12.6-19.3)	12.5
90	7.8 (4.5-9.3)	3.2

150	6.5 (3.9-9.2)	1.9
300	5.5 (3.5-7.7)	0.9

Notice the large increase in the near-highway concentrations of BC downwind of the I-710 compared to the I-405. The Interstate 710 study was conducted in part because the freeway has a much higher percentage of heavy-duty diesel truck travel than the Interstate 405 freeway. Average traffic flow during sampling periods was 12,180 vehicles per hour with more than 25 percent of vehicles being heavy-duty diesel trucks. This is perhaps the highest density of diesel truck traffic anywhere in the U.S. Measurements were taken at 17, 20, 30, 90, 150 and 300 meters downwind and 200 meters upwind from the center of the freeway. As with the 405 freeway study, relative concentrations of CO and BC downwind from the freeway were found to be many micrograms per cubic meter greater than upwind concentrations and tracked each other well as one moves away from the freeway.

These studies show that in the impact zone downwind of a heavily traveled freeway in the Air Basin with average truck traffic (I-405), emissions of BC from the freeway will add 4.75 μg/m3 to PM2.5 30 meters from the freeway dropping off to 0.65 μg/m3 greater than the regional concentration at 300 meters, and that a freeway with heavy truck traffic will add 12.5 μg/m3 at 30 meters dropping off a 1.9 μg/m3 increase above the regional levels at 300 meters.

These results were supported by measurements made in other regions. A study in Seattle, WA (Curtis, Gilroy, and Harper, 2004) measured the relationship between BC levels at an urban near-roadway monitoring site, and a heavily traveled freeway. This study showed that there were frequently peak evening rush hour BC levels of 5 μg/m3 or above near I-5. The BC data was obtained from the Olive Street monitoring site located at the EPA-designated microscale within the I-5 traffic corridor. The traffic volumes and BC readings correlate well, supporting the hypothesis that traffic is a major contributor to $PM_{2.5}$ at the site, given that BC originates from motor vehicle exhausts as ultrafine or fine particles. The Olive Street air monitoring site is about 20 meters west of the southbound lane of I-5 in the CBD. This area of I-5 contains express lanes along with several high use overpasses which all contribute to the area traffic. Daily volumes along this section of I-5 average 284,700 vehicles per day (in 2003). Light-duty traffic has peak weekday flows above 10,000 vehicles per hour, with diesel traffic of about 1,000 vehicles per hour (10%). BC tends to peak during weekdays with high traffic volumes, and is sharply lower on weekends. This reduction parallels the significantly lower weekend diesel traffic volumes. Peak BC measurements occur during the afternoon rush hour (4-6 pm). Correlations between light-duty vehicle volumes and BC peaks (readings above 5 μg/m3) are better than those between diesel truck volumes and BC peaks. This

may occur because light-duty volumes overwhelm diesel truck volumes during this peak period (93 percent of the traffic volume is from light-duty vehicles).

The Seattle study also measured BC at a Beacon Hill site about 600 meters from a major freeway, which is used as the urban background for Seattle. Hourly BC readings during the study period stayed within the range of 0 to 2 μg/m3, with readings mostly below 1.0 μg/m3. Comparing these sites demonstrates results similar to the data obtained from the I-405 study with BC concentrations in the near-highway environment being about 4 μg/m3 greater than the urban regional concentration.

The East Bay (California) Children's Respiratory Health study (Kim et al., 2004), conducted with support from CalEPA OHHEA, obtained measurements of PM2.5 concentrations at monitors located in the schoolyards of 10 middle schools in communities across the East Bay. This study reported the distance of each monitor from major freeways, the traffic density on the nearest freeway, and whether the school was located downwind of the traffic source. The PM2.5 measured at the school closest to (60 meters), and downwind from a major freeway, was 15 μg/m3 which was 3 μg/m3 greater than the PM2.5 concentrations reported at the regional air district network monitor located about 1 mile from major traffic sources.

These and other studies provide credible evidence that PM2.5 concentrations in the near-highway environment are expected to range from 3 μg/m3 to as much as 12 μg/m3 greater than concentrations measured at regional monitors located outside the high impact zone of heavily traveled freeways.

These and other data from highway studies were expressly relied upon by US EPA to decide that it must establish a conformity program to review the localized impacts of PM2.5 emissions from highways. See Transportation "hot spot" rule, 71 Fed.Reg. 12468, 12494 (March 10, 2006). EPA concluded that the evidence of localized impacts from highways was sufficiently compelling to require that "it is essential that a quantitative PM2.5 or PM10 hot-spot analysis be performed for all projects of air quality concern." *Id.* If the evidence of localized impacts was sufficient to justify a national regulatory program to protect against NAAQS violations caused by new highways, it is also compelling enough to require a quantitative analysis to ensure that the SIP will protect against existing localized NAAQS violations caused by highway emissions.

B. Attainment Demonstration Fails to Protect Against Elevated PM2.5 in the Near-Highway Environment.

The PM2.5 concentrations expected in the near-highway environment are not reflected in the adopted attainment demonstration because neither the monitored concentrations of PM2.5 used to

select the design value for the attainment demonstration, nor the modeling analysis used to demonstrate future attainment account for the increased PM2.5 concentrations in the near-roadside environment.

1. Monitors Not Located to Measure PM2.5 In Near-Highway Environment.

The monitors selected to determine the design value for the South Coast air basin are not located in the near-highway environment.

The highest annual and 24-hour design values among the network sites is recorded at Rubidoux in Riverside County. For this reason, the measurements at this site play an important role in the development of the attainment demonstration. But this site is not located in a near-highway environment. The Site Survey Report for the monitor describes the location as residential, with residential traffic of only 10,000 vehicles per day within 25 meters. Based on this description of the site, it is apparent that the design value does not reflect the incremental impact of primary aerosols emitted from a nearby heavily traveled highway.

Another site with a high design value is Fontana/Arrow Highway. The Site Report for this location describes the monitor as being 85 meters from an arterial roadway carrying 28500 vehicles per day. This is not a major highway.

The Wilmington site is in the neighborhood west of the I-710, but it too is more than 300 meters from the freeway and not located in the high impact area where vehicle emissions would be expected to contribute to higher PM2.5 concentrations.

These site locations are not in close proximity to major freeways, and do not detect the incremental impact of highway emissions. A control strategy that is adequate to reduce the concentrations at these sites to attain the NAAQS cannot be shown to reduce the higher concentrations in the near-highway environment to the level of the NAAQS.

2. Modeling Does Not Predict Impact of Reductions in Highway Emissions.

The modeling analysis performed for the attainment demonstration uses the CAMx model, is which the same model as is applied to demonstrate ozone attainment. This is a regional airshed model that aggregates emissions and estimates ambient concentrations for a grid that is made up of cells 5 km on a side. AQMP, Appendix V, p. 2-15. But for the purpose of comparing modeling results with monitoring station measurements, the results are averaged over nine grid squares. "The CAMx modeling results are presented based on a nearest nine-grid-cell

average basis. Performance evaluations at each station are based on this average concentration." *Id.*, p.2-24.

This approach may be suitable for the purpose of estimating concentrations of secondary species that are formed after primary pollutants are cooked in the chemical soup of the Air Basin, but this large scale averaging provides no useful information regarding the dispersion of primary pollutants emitted from large sources such as highways.

Unlike secondary particulate species which become particles downwind from their point of emission as gases, the elemental carbon and aerosol VOCs emitted from tailpipes, road dust, tire and brake pad particles are emitted directly from highways to the atmosphere, and are most highly concentrated at the source. The regional modeling analysis performed by CAMx aggregates these emissions and averages them over large regions, rather than recognizing them as being most highly concentrated at the point of origin. This regional modeling analysis cannot, and does not, predict concentrations of the primary species in the near-highway environment.

CONCLUSION.

For the reasons outlined above, EHL and NRDC ask that the revised mobile source emissions budgets not be formally adopted as adequate until the design values in the attainment demonstration reflect attainment of state and federal PM 2.5 ambient air quality standards for all Californians, including the millions of residents who live and work in near-highway environments.

Respectfully submitted,

ENDANGERED HABITATS LEAGUE
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