

Comment/Response Document  
Harrisburg-Lebanon-Carlisle Ozone Nonattainment Area  
Request for Redesignation, Maintenance Plan and Base Year Inventory

LIST OF COMMENTATORS:

1. Jennifer McKenna  
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**1. COMMENT:** *DEP has installed no monitoring stations for ozone either in Carlisle or Lebanon. The data submitted to support redesignation of the metropolitan area are from monitors located in Harrisburg and Hershey (Dauphin County) and at Little Buffalo State Park (Perry County). These monitoring stations are located at least 20 miles from Carlisle. No monitoring data for ozone has been submitted for Cumberland County or for Lebanon County. Ozone concentrations for Carlisle or Lebanon could be higher or lower than the measurements obtained for the three monitors used by DEP to represent the entire metropolitan planning area. CAB requests that DEP monitor ambient ozone concentrations in Carlisle and Lebanon and believes that the Carlisle area should not be declared attainment until DEP has received or taken measurements of ozone in Carlisle. (1)*

**RESPONSE:** The monitoring network in the nonattainment area meets the requirements of the U.S. Environmental Protection Agency's (EPA) ambient air quality surveillance regulations in 40 CFR Part 58. The Department believes the existing monitors adequately measure ozone concentrations for the Harrisburg-Lebanon-Carlisle nonattainment area.

The Commonwealth's ground-level ozone monitoring consists of National Air Monitoring Stations (NAMS) and State and Local Air Monitoring Stations (SLAMS). For NAMS-designated ozone samplers, the primary objective is to monitor in urbanized areas where the pollutant concentration and population exposure are expected to be the highest consistent with the 8-hour averaging time for current ozone standard. The area to be monitored must be selected based on urbanized population and pollutant concentration levels. An urbanized area has a population of 200,000 or more. Each urban area, in general, would require only two NAMS ozone samplers. Only two NAMS ozone monitors are necessary in most urbanized areas since spatial concentration gradients are not as sharp as for the other criteria gaseous pollutants. Recent revisions to the EPA regulations require only two samplers for even larger urbanized areas, between 350,000 and 4 million.

EPA requires that one sampler be an "urban scale" sampler, representative of maximum ozone concentrations downwind of the area with high precursor emissions. The Hershey ozone monitor was sited for this purpose. EPA requires that the second ozone sampler be placed in an area of high population density, but on the fringes on the central business district. This sampler would measure peak ozone levels during light, variable or stagnant wind conditions. The Harrisburg-Lebanon-Carlisle ozone monitor was sited to meet these requirements.

For SLAMS, which are monitors not identified as NAMS, the number of monitors required is not specified in the regulations but rather is determined by the Regional Office and State agencies on a case-by-case basis. The SLAMS network should be designed to meet various monitoring objectives as specified in Appendix D. In the case of the Department's Perry County ozone sampler, the monitor was sited here to satisfy the SLAMS requirement for the determination of background concentration levels.

The fact that the nonattainment area encompasses Carlisle, Harrisburg and Lebanon does not automatically require the Department to establish monitoring stations in each of these areas. The Commonwealth recommended establishment of 8-hour ozone designations based primarily on the June 6, 2003 issued definitions of Core Based Statistical Area (CBSA) boundaries and Combined Statistical Area boundaries (see descriptions below). The Harrisburg-Carlisle-Lebanon Combined Statistical Area is comprised of two Metropolitan Statistical Areas. Dauphin, Cumberland, and Perry counties comprise the one Metropolitan Statistical Area. All three counties have very strong economic and commuting links with each other so that the area comprises both a core and a CBSA. Lebanon County is also a Metropolitan Statistical Area and has commuting patterns that led the federal government to include the two Metropolitan Statistical Areas into one Combined Statistical Area.

**2. COMMENT:** *DEP's Technical Appendices for the Proposed Redesignation Request rely on the motor vehicle emissions budget prepared by the Harrisburg Area Transportation Study (HATS) and PENNDOT (Technical Appendices at pp. 9, 11-14, 18-19). The Clean Air Board believes that the HATS and PENNDOT motor vehicle emissions budget seriously underestimates the impact from increasing commercial diesel vehicle traffic on air quality in the area. The HATS report demonstrates conformity for ozone and PM<sub>2.5</sub> pollutants based on computer models which project that the mix of vehicles and miles travel will yield a result less than 2002 emissions budget. (Air Quality Conformity Analysis Report for HATS, Vol. 1 - Executive Summary, at p.11) The CAB submitted comments to HATS on November 17, 2006. CAB requested the HATS group to examine the impact of a different number and percentage of diesel vehicles on the projected vehicle emissions. Very shortly after the submission of these comments, the South Central Pennsylvania Regional Goods Movement Study was released, which confirmed CAB's view that the number and percentage of diesel vehicles traveling in the HATS region is increasing and not reflected in the HATS assumptions. On December 8, 2006, CAB submitted additional comments related to the release of the South Central Pennsylvania Regional Goods Movement Study. CAB incorporates by reference the comments contained in the November 17, 2006 and December 8, 2006 letters. Among the significant findings of the Regional Goods Movement Study is that the amount of tons hauled by trucks in Cumberland, Dauphin, and Lebanon counties is projected to grow by over 80 percent between 2003 and 2030. (South Central Pennsylvania Regional Goods Movement Study, Table 4.1) The increase in vehicle miles traveled and the changing mix of commercial diesel vehicles vs. light-duty vehicles becomes significant in determining total highway emissions. CAB believes these numbers are not accurately factored into the HATS report and conclusions. (1)*

**RESPONSE:** The emissions demonstrations for transportation conformity and for redesignation to attainment of the eight-hour ozone national ambient air quality standard (NAAQS) differ. For

transportation conformity, in the absence of an emissions “budget” from an approved SIP, HATS must demonstrate emissions from highway vehicles in the projected year(s) are not greater than those attributable from highway vehicles in 2002. Ozone precursors, directly emitted PM<sub>2.5</sub> and NO<sub>x</sub> as a precursor to PM<sub>2.5</sub> are considered. For redesignation and an approvable ozone maintenance plan, at issue in this SIP revision, the Department is demonstrating that ozone precursor emissions from all sources, including those from highway vehicles, will be less than those occurring in 2004, when it was documented that the area met the ozone standard.

While the commentator incorporates comments to HATS transportation conformity analysis in its comments to the Department, not all of those comments are relevant to the request for redesignation or maintenance plan for the eight-hour ozone standard for the Harrisburg area. The relevant comments would be those under the section “Analysis Modeling Parameters” A-H from the November 17, 2006 letter.

The basic thrust of the comment is that the highway vehicle estimates do not take a number of factors into account that would significantly increase heavy-duty truck travel and/or emissions from heavy-duty trucks in the nonattainment area. The Department recognizes that there are uncertainties and developments in predicting emissions more than 10 years into the future. The Maintenance Plan uses the best available data at this time. The process used by HATS, PennDOT and the Department includes ongoing analysis of new data and assumptions, and incorporation of these into the emissions estimation process as appropriate.

Furthermore, the Department is required to submit a second 10-year Maintenance Plan eight years after redesignation of an area (depending on EPA approval of this Maintenance Plan, in 2015) to ensure the area will still meet air quality standards through 2028. That plan will use actual data and projections from the most recent year (most likely 2014).

For purposes of responding to the commentator, the Department examined what would happen to highway and total nitrogen oxides (NO<sub>x</sub>) and volatile organic compound (VOC) emissions in the four-county area if emissions from all heavy-duty diesel vehicles were twice what the Department has projected for 2018, the maintenance year. (Diesel vehicles inherently produce very little VOC.)

Even under this assumption, the Department can demonstrate that the total emissions of these ozone precursors in the area for 2018, the maintenance year, would still be significantly less than 2004, the attainment year. Even a doubling of emissions therefore would not affect the integrity of the maintenance plan demonstration. The decrease in emissions from diesel vehicles is directly due to the federal and state programs requiring much cleaner new diesel engines, the retirement of older, more polluting vehicles from the truck fleet and the federal program reducing sulfur in diesel fuel. Thus, increases in truck traffic are more than overcome by improved technology.

### NOx Emissions

	Highway emissions	All emissions
2004	76.2	<b>112.5</b>
Diesel emissions included	40.7	
2018 projected including safety margin (Table 2-2 Maintenance Plan)	24.4	63.9
Diesel emissions included	9.8	
2018 if heavy-duty diesel emissions doubled	34.2	<b>73.7</b>

### VOC Emissions

	Highway emissions	All emissions
2004	36.9	<b>87.2</b>
Diesel emissions included	0.04	
2018 projected including safety margin (Table 2-2 Maintenance Plan)	20.6	67.2
Diesel emissions included	0.98	
2018 if heavy-duty diesel emissions doubled	21.04	<b>68.18</b>

Once the Maintenance Plan for the Harrisburg-Lebanon-Carlisle area is approved by EPA, the highway vehicle emissions included in the Plan for 2009 and 2018 establish an emissions budget for the purposes of transportation conformity. This means that future conformity analyses must show that NOx emissions are less than those in the SIP (Table 2-5 of the Maintenance Plan). If the projected emissions are more than the budget, HATS will either have to change its mix and/or timing of transportation projects (for example, include projects that reduce truck miles or emissions) or reduce NOx emissions from other highway sources. HATS could also request a change in the motor vehicle emissions budget included in the SIP. The Department could only make such a change if the total emissions in the maintenance plan would still be less than those in the attainment year.

The commentators' questions from the HATS comments as it relates to the Department's proposed SIP revision are addressed below.

*Q. Do the Vehicle Miles Traveled (VMT) data include the number of diesel truck trips to/from the tens of millions of square feet of distribution centers in the region and the related acceleration, deceleration, and idling that contribute significantly to PM2.5 emissions? If yes, how was this measured? In what year was the actual truck trip data used for this study's baseline? What type of field checking was done or is being done to assess the accuracy of your VMT data? (Questions A, B and D related to estimating vehicle miles traveled.)*

The Department relies upon PennDOT and its Highway Performance Monitoring System (HPMS) and Roadway Management System inputs to supply the appropriate vehicle miles traveled and truck percentage projections used in projecting emissions. PennDOT periodically (every three years) updates their database based on actual traffic count samples. The actual truck

trip data is from 2002, the latest information available from PennDOT. Vehicle activity by roadway link (small segments of road) is analyzed using EPA's required MOBILE6.2 model which accounts for acceleration and deceleration and some percentage of idling. As discussed previously, 2002 HPMS VMT and 2002 PennDOT RMS traffic counts are used to verify base year consistency both for total and truck VMT.

*Q. What factor(s) is (are) being used to project the growth of truck traffic in the region? (Question C)*

PennDOT projects truck traffic to grow at a pace consistent with total VMT.

*Q. In your VMT tables, the assumed average speed for rural interstate travel was about 60 mph. It is our opinion that few trucks travel at this low rate of speed on I-81. We feel confident our assumption would be shared by anyone who travels I-81. Thus, we ask how was this average truck speed calculated? Further, we wonder why emission levels for PM2.5 and ozone were not modeled for speeds of 55 and 65 mph, which are the current limits? (Question E)*

The Department concurs with HATS' response to the commentator because both agencies use the same methods to assess and compile highway vehicles emissions data. The emissions analysis considers the speeds on each roadway segment for each hour of the day, differentiated by day of week and month. The average daily speed includes a compilation of truck speeds calculated from hourly PennDOT traffic volume data, reflecting speeds during congested time periods (typically the commuting hours) and uncongested time periods (typically midday and evening hours). Data is compiled for each of the 24 hours in the day, and a weighted average calculation reflects differing volumes at differing speeds. Modeling is performed with this detailed level of speed and volume data. The federal conformity regulations require use of actual speeds (as calculated by a calibrated and validated transportation demand model or empirical), not posted speed limits. PennDOT uses a complex software package that considers the engineering characteristics of each roadway segment, volumes by vehicle type, roadway classification and other factors which are used to calculate speeds according to federal guidelines.

*Q. What analysis has been used to project the impact of ultra low sulfur diesel (ULSD) fuel and in which year(s) of your data set was it used? (Question F)*

The Department concurs with HATS' response to the commentator. ULSD, containing 15 parts per million (ppm) of sulfur, was phased in beginning in 2006; therefore, diesel sulfur values for previous years (2002 and 2004) do not reflect this program. EPA recommends that past data be taken from an EPA spreadsheet called "Diesel Sulfur Levels by County" (see [www.epa.gov/otaq/m6.htm](http://www.epa.gov/otaq/m6.htm)) which provides data by county and contains diesel sulfur levels for summer and winter, going back to 1999 and forward through May, 2006. Use of this data is the practice in Pennsylvania.

The Department concurs with HATS' response to the commentator. ULSD, containing 15 parts per million (ppm) of sulfur, was phased in beginning 2006; therefore, diesel sulfur values for previous years (2002 and 2004) do not reflect this program. EPA recommends that past data be

taken from an EPA spreadsheet called “Diesel Sulfur Levels by County” which provides the following values. Emission projections for the maintenance years 2009 and 2018 use the recommended EPA sulfur content (43 and 11 ppm respectively) based on national averages. The decreasing default values reflect the fact that 20% of the highway diesel can still be 500 ppm until 2010 nationwide.

*Q. What factors are being used to estimate the effects of new 2007 standard model diesel truck engines in your analysis? What considerations did you give to the reported high sales volume of 2006 model heavy duty diesel trucks and the anticipated low demand for 2007 new standard truck models? (Questions G and H)*

The Department uses the required EPA model which includes assumptions about the phase-in of new heavy-duty engines based on the regulation and historical data about diesel truck turnover. The Department also uses national defaults regarding truck vehicle age rather than PennDOT registration data because of the high percentage of out-of-state trucks traveling in the Commonwealth. While anecdotal evidence indicates the industry has purchased 2006 vehicles in order to delay the purchase of 2007 vehicles, there is no quantification available on emission effects. Model year 2007 vehicles have only become available in January 2007 so no purchase data is available for this year. If EPA subsequently changes its model to account for sales volume changes or includes other valid information and data in its requirements for transportation conformity modeling, HATS will utilize that data in accordance with federal regulations including the requirement to use the “latest planning assumptions”.