

United States Environmental Protection Agency
National Vehicle and Fuel Emissions Laboratory

June 22, 1999

MEMORANDUM

Subject: Exceedance Method Analysis of Photochemical Modeling in Support of Tier 2/Sulfur.

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To: Air Docket A-97-10

This memorandum explains in detail the "exceedance method" and how it was applied to determine which metropolitan areas were projected to experience exceedences of the 1-hour ozone standard after the emission controls of the Regional Ozone Transport Rule (ROTR, also referred to as the NO_x SIP Call) were in place but before the proposed implementation of Tier 2/Sulfur controls. The exceedance method analysis done for the Tier 2/Sulfur SNPRM is based on that done for the ROTR final rule,¹ for which it is documented in the "Air Quality Modeling Technical Support Document for the NO_x SIP Call" (AQMTSD), September 23, 1998.² This memorandum also explains differences in the way the exceedance method was applied for the ROTR final rule and the way it was applied in the Tier 2/Sulfur SNPRM.

Table 2 in the Tier 2/Sulfur SNPRM shows results of the exceedance method for the 1-hour standard. It lists current nonattainment areas that are projected to experience exceedences of the 1-hour standard in 2007, even after implementation of the ROTR, the National Low Emission Vehicle Program, the 2004 highway diesel engine standards, the Phase II nonroad diesel engine standards, and other federal emission control measures.

For the Los Angeles-Riverside-San Bernardino CMSA, possible 2010 exceedences without Tier 2/Sulfur are inferred from the inclusion of Tier 2/Sulfur reductions in the most recently submitted SIP update³. All other areas in Table 2 were analyzed by the exceedance method, based on the modeling done for the ROTR final rule. This modeling is documented in the AQMTSD.

Nonattainment receptors for the 1-hour analysis include those grid cells that (a) are associated with counties designated as nonattainment for the 1-hour ozone National Ambient Air

¹Federal Register, Volume 63, pages 57356-57538, October 27, 1998.

² The AQMTSD is in Air Docket A 96-56, Category VI-B-11, and is also available on the world wide web at <http://www.epa.gov/ttncaaa1/otag/aqtsd/index.html>.

³California Air Resources Board, Executive Order G-99-037, May 20, 1999, Attachment A, p.6-7, 10.

Quality Standard (NAAQS) and (b) have 1-hour ozone model predictions ≥ 125 ppb. These grid cells are referred to as "designated plus modeled" nonattainment receptors. Grid cells were linked to a specific nonattainment area if any part of the grid cell covered any portion of a county in a nonattainment area. In cases where a grid cell covered two or more nonattainment areas, the grid cell was tied to the nonattainment area that contained the largest portion of the area of the grid cell.

In summary, the exceedence method projects an area to experience exceedences of the 1-hour ozone standard in the future if the area is currently a designated non-attainment area and the modeled case also shows exceedences.

The difference between the way the exceedence method was applied for the ROTR final rule and the way it was applied for the Tier 2/Sulfur SNPRM is the choice of areas to examine for modeled exceedences. Table A indicates areas that were projected to experience exceedences by the ROTR analysis that were not included in the Table 2 of the Tier 2/Sulfur SNPRM.

Table A. Areas in the ROTR analysis (Table IV.B-1 AQMTSD) that were not included in the Tier 2/Sulfur SNPRM (Table 2)

<i>Area</i>	<i>Reason for Exclusion</i>
Boston	1995-1997 design values below the standard
Lake Michigan	This refers to the actual lake, which was used in the ROTR analysis as an indicator for exceedences affecting shoreline communities.
Memphis	1995-1997 design values below the standard
Portland, ME	1995-1997 design values below the standard
Rhode Island	1995-1997 design values below the standard
Southwest Michigan	1995-1997 design values below the standard

Some areas were not included in the ROTR analysis because they were not considered downwind receptors for ozone transport. We included them in the Tier 2/Sulfur SNPRM, however, because they are currently designated nonattainment areas that were modeled to show exceedences in 2007 after ROTR controls. These areas are listed in Table B.

Table B. Areas included in the Tier 2/Sulfur SNPRM (Table 2) that were not considered downwind receptors in the ROTR analysis (Table IV.B-1 AQMTSD).

<i>Area</i>
Baton Rouge, LA MSA
Beaumont-Port Arthur, TX MSA
Dallas-Fort Worth, TX CMSA
Houston-Galveston-Brazoria, TX CMSA

Finally, the ROTR analysis used both nonattainment areas and combinations of nonattainment areas and additional counties for downwind receptor areas. For Tier 2/Sulfur, we used metropolitan areas. Metropolitan areas generally correspond quite closely to nonattainment areas and are convenient for population assessment. Table C indicates the areas analyzed for projected exceedences and the associated metropolitan areas with which we have associated them for the Tier 2/Sulfur analysis.

Table C. Nonattainment area names used by OAQPS in the exceedance method (Table IV.B-1, AQMTSD) and the associated metropolitan areas used in the Tier 2/Sulfur SNPRM.

<i>Nonattainment name or reference used by OAQPS</i>	<i>Metropolitan area names used in above tables</i>
Atlanta	Atlanta, GA MSA
Baltimore	Washington-Baltimore, DC-MD-VA-WV CMSA
Birmingham	Birmingham, AL MSA
Chicago/Milwaukee	Chicago-Gary-Kenosha, IL-IN-WI CMSA
Chicago/Milwaukee	Milwaukee-Racine, WI CMSA
Cincinnati	Cincinnati-Hamilton, OH-KY-IN CMSA
Connecticut	Hartford, CT MSA
Louisville	Louisville, KY-IN MSA
Memphis	Memphis, TN-AR-MS MSA
New York City	New York-Northern New Jersey-Long Island, NY-NJ-CT-PA CMSA
Philadelphia	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD CMSA
St. Louis	St. Louis, MO-IL MSA
W. Massachusetts	Springfield, MA MSA
Metro D.C.	Washington-Baltimore, DC-MD-VA-WV CMSA