

**Technical Support for State and Tribal Air Quality
24-Hour Fine Particle (PM_{2.5}) Designations**

December 2008

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Integrated Policy and Strategies Group
Research Triangle Park, NC 27711

For information on this document, please contact Ms. Amy Vasu at (919) 541-0107

TABLE OF CONTENTS

Chapter	Page
List of Tables.....	iv
List of Figures.....	iv
Abbreviations and Acronyms.....	v
1.0 Introduction	1-1
1.1 Background	
1.2 Designations Process	
1.3 Designations Guidance	
1.4 Timeline for 2006 24-hour PM2.5 Designations	
2.0 EPA 2006 24-hour PM2.5 Nonattainment Designations	2-1
2.1 Nonattainment Designations by State	
2.2 Nonattainment Designations by EPA Region	
3.0 Designations Methodology	3-1
3.1 An Overview of EPA’s Technical Analysis	
3.1.1 Factor 1: Emissions Data	
3.1.2 Factor 2: Air Quality Data	
3.1.3 Factor 3: Population Density and Degree of Urbanization	
3.1.4 Factor 4: Traffic and Commuting Patterns	
3.1.5 Factor 5: Expected Growth	
3.1.6 Factor 6: Meteorology	
3.1.7 Factor 7: Geography/Topography	
3.1.8 Factor 8: Jurisdictional Boundaries	
3.1.9 Factor 9: Level of Control of Emission Sources	
3.2 Contributing Emission Score	
4.0 Analyses of Individual Nonattainment Areas	4-1
4.1 Region 1 Nonattainment Areas	
4.1.1 Connecticut	
4.2 Region 2 Nonattainment Areas	
4.2.1 New Jersey	
4.2.2 New York	

4.3	Region 3 Nonattainment Areas	
4.3.1	Delaware	
4.3.2	Maryland	
4.3.3	Pennsylvania	
4.3.4	West Virginia	
4.4	Region 4 Nonattainment Areas	
4.4.1	Alabama	
4.4.2	Kentucky	
4.4.3	Tennessee	
4.5	Region 5 Nonattainment Areas	
4.5.1	Illinois	
4.5.2	Indiana	
4.5.3	Michigan	
4.5.4	Ohio	
4.5.5	Wisconsin	
4.6	Region 6 Nonattainment Areas	
4.7	Region 7 Nonattainment Areas	
4.7.1	Iowa	
4.7.2	Missouri	
4.8	Region 8 Nonattainment Areas	
4.8.1	Montana	
4.8.2	Utah	
4.9	Region 9 Nonattainment Areas	
4.9.1	Arizona	
4.9.2	California	
4.9.3	Pechanga Band of Luiseno Mission Indians Reservation	
4.10	Region 10 Nonattainment Areas	
4.10.1	Alaska	
4.10.2	Idaho	
4.10.3	Oregon	
4.10.4	Washington	
5.0	Other Supporting Maps and Figures	5-1
Appendix A	EPA Guidance Memorandum to Regional Administrators, June 8, 2007	
Appendix B	2005 National Emission Inventory (Version 1) Data	
Appendix C	Summary of PM _{2.5} Air Quality Design Values By Site, 2004-2006 and 2005-2007	
Appendix D	The Chemical Composition of PM _{2.5} to Support PM _{2.5} Implementation	
Appendix E	Major chemical components of PM _{2.5} derived from CSN data, 2005-2007	
Appendix F	Limited 2004-2006 Speciation Data Derived from FRM filters for 20 Areas (Report File)	
Appendix G	Limited 2004-2006 Speciation Data Derived from FRM filters for 20 Areas (Data File)	
Appendix H	Derivation of the Contributing Emissions Score	

Appendix I	Methodology for Preparing VMT Estimates for the National Emission Inventory: 2003, 2004, and 2005.
Appendix J	VMT Data Used for Technical Analyses for Area Designations for the 2006 24-hour PM2.5 NAAQS
Appendix K	Commuting Data: County-to-County Worker Flow Files, 2000 Census
Appendix L	Pollution Roses for 2005-2007
Appendix M	Back Trajectory Information
Appendix N	National Electric Energy Data System (NEEDS) database

Abbreviations and Acronyms

CAA- Clean Air Act
CBSA- Core Based Statistical Area
CES- Contributing Emission Score
CM- Crustal matter
C/MSA- Consolidated Metropolitan Statistical Area
CSA- Combined Statistical Area
CSN- Chemical Speciation Network
EC- Elemental carbon
EGU- Electric Generating Unit
EIP-Emission Impact Potential
EPA- United States Environmental Protection Agency
FHWA- Federal Highway Administration
FIPS- Federal Information Processing Standards
FRM- Federal Reference Method
FTIR – Fourier Transform Infrared
HPMS-Highway Performance Modeling System
IMPROVE- Interagency Monitoring of Protected Visual Environments
MDL- Minimum detection limit
MOBILE6- Mobile Source Emission Factor Model version 6
MPO- Metropolitan Planning Organization
NA- Nonattainment
NAAQS- National Ambient Air Quality Standards
NA-P- Part of the county was designated nonattainment
NEI- National Emissions Inventory
NMIM- National Mobile Inventory Model
NO_x- Nitrogen Oxides
OC- Organic carbon
OMC- Organic mass by carbon
OP- Pyrolyzed organics
PIXE- Particle Included X-Ray Emission
PM – Particulate Matter
PM_{2.5} – Particulate Matter with aerodynamic diameter less than 2.5 microns
SANDWICH-
SASS- Source Assessment Sampling System
SIP- State Implementation Plan
SO₂ – Sulfur Dioxide
STN- Speciation Trends Network
TCM- Total carbon mass
TOR -Thermal Optical Reflectance
TOT- Thermal Optical Transmittance
U- Unclassifiable
VMT- Vehicle Miles Traveled
VOC- Volatile Organic Compound
WES- Weighted Emission Score

1.0 INTRODUCTION

This document contains factual and technical data in support of the U.S. Environmental Protection Agency's (EPA) designations of nonattainment areas for the 24-hour fine particle national ambient air quality standards (NAAQS) established in 2006. Fine particles are those less than 2.5 micrometers in aerodynamic diameter and are also referred to as "PM2.5." Additional supporting information is contained in the EPA August 19 - 20, 2008 response letters to the states and tribes. The August 2008 letters address instances where EPA agreed with states' and tribes' initial recommendations and cases where EPA made modifications to the states' and tribes' recommendations as authorized under section 107(d) of the Clean Air Act (CAA). This chapter presents an overview of the 24-hour PM2.5 designations process. Chapter 2 contains two tables of EPA's nonattainment designations for PM2.5. Section 2.1 contains a table with nonattainment counties arranged alphabetically by state and then by area name. Section 2.2 contains a table with nonattainment counties arranged alphabetically by Region, state, and area name. Chapter 3 discusses factors and analytical tools considered in the designations process. Chapter 4 contains the results of the technical analyses for individual nonattainment areas and these are sorted by EPA Region and state. Chapter 5 contains maps, wind roses, and other documentation to support EPA's designations.

1.1 Background

The CAA establishes a process for air quality management through the NAAQS. The NAAQS are set for six air pollutants that are commonly found in the United States that can injure health, harm the environment and cause property damage. These pollutants are called criteria air pollutants because the agency has developed health-based criteria (science-based guidelines) as the basis for setting permissible levels in the air we breathe. PM2.5 is one of these criteria pollutants. The NAAQS apply to pollutant concentrations in outdoor air. If the air quality in a geographic area is higher than or meets the national standard for a pollutant, it is called an attainment area. An area that does not meet the national standard for a pollutant is called a nonattainment area.

After evaluating thousands of health studies and conducting an extensive peer review process, EPA promulgated a new 24-hour standard for PM2.5 in October 2006. The effective date of the revised 24-hour PM2.5 NAAQS was December 18, 2006. This daily fine particle standard for PM up to a size of 2.5 microns in diameter (24-hour PM2.5) was set at 35 micrograms per cubic meter, measured at the 98th percentile for the year, averaged over three years.

1.2 Designations Process

Section 107(d) of the CAA governs the process that states and EPA must follow in order to recommend and promulgate designations. Pursuant to the provisions in this section, by not later than one year after the promulgation of a new or revised standard, each state is required to recommend air quality designations, including the appropriate boundaries for areas, to EPA. EPA reviews those state recommendations and is authorized to make

any modifications the Administrator deems necessary. By not later than 120 days prior to promulgation of final designations, EPA is required to notify states of any intended modifications to their recommendations that EPA deems necessary. States then have an opportunity to demonstrate why they believe the modification proposed by EPA is inappropriate. Whether or not a state provides a recommendation, EPA must promulgate the designation that the Administrator deems appropriate. EPA must, by statute, designate as nonattainment both those areas that are violating the 24-hour PM_{2.5} NAAQS and those nearby areas that are contributing to the violations. The timeline for the 2006 24-hour PM_{2.5} designations is found in Section 1.4.

1.3 Designations Guidance

In June 2007, EPA issued guidance concerning how to determine the boundaries for nonattainment areas for the 24-hour PM_{2.5} NAAQS.¹ As part of that guidance, EPA recommended that the three most recent calendar years of monitoring data for PM_{2.5} be used to identify a violation of the 24-hour PM_{2.5} NAAQS. This is appropriate because the form of the 24-hour PM_{2.5} NAAQS is calculated over a 3-year period. For the final designations, EPA therefore identified violating monitors based on air quality monitoring data from federal reference method (FRM) monitors for calendar years 2005-2007.

In the guidance, EPA noted that in making boundary recommendations for nonattainment areas, states and tribes should evaluate each area on a case-by-case basis. EPA indicated that it would promulgate nonattainment area boundaries that cover a sufficiently large area to include both the area that violates the standard and the nearby areas that contribute to the violations, as required by section 107, to assure that nonattainment area plans developed for these areas would attain the NAAQS as expeditiously as practicable. In the guidance, EPA also identified nine factors that EPA would take into consideration, in addition to other relevant factors or circumstances specific to a particular area, in determining appropriate nonattainment area boundaries.

For existing PM_{2.5} nonattainment areas, based on early technical analyses of PM_{2.5} composition, combined with an understanding of the existing PM_{2.5} nonattainment areas, EPA noted the expectation that the same boundaries established for implementing the annual PM_{2.5} NAAQS may also be appropriate for implementing the 24-hour PM_{2.5} NAAQS in areas where both standards are violated. Maintaining the same nonattainment area boundaries was also expected to more easily facilitate overall air quality planning for attaining the suite of PM_{2.5} standards.

Section 107(d)(1)(A)(i) of the CAA requires EPA to designate not only violating areas, but also nearby contributing areas. The statute does not, however, define contributing. Therefore, in the designations guidance, EPA recommended that states consider various

¹ See, "Area Designations for the Revised 24-Hour Fine Particle National Ambient Air Quality Standards," memorandum to Regional Administrators, Regions I-X, from Robert J. Meyers, Acting Assistant Administrator, Office of Air and Radiation, dated June 8, 2007.

types of information relevant to evaluating contributing areas, including the 9 factors identified in EPA's designations guidance.

A copy of this guidance memorandum is found in Appendix A.

1.4 Timeline for 2006 24-hour PM2.5 Designations

Under the current 24-hour PM2.5 NAAQS designations process, states and tribes submitted their recommendations to EPA by December 18, 2007 as to whether or not areas were attaining the 24-hour PM2.5 NAAQS. In most cases, the states and tribes based these recommendations on air quality data collected for 2004-2006 from PM2.5 monitors. After working with the states and tribes, performing technical analyses, and after considering new information from air quality monitors, EPA sent letters to the states and tribes with EPA's responses to the recommendations for these areas. EPA sent these letters to the states on August 19, 2008 and to tribes on or around August 20, 2008. EPA posted its responses on its web site for public review. On September 2, EPA published a notice in the Federal Register notifying the public that comments on EPA's responses would be accepted for 30 days (until October 2). EPA has responded to significant responses received on the designations from states and the public in separate documents. These Response to Comments Documents will be placed in the docket along with this Technical Support Document at the time of signature. The designations will be finalized and signed by the EPA Administrator on December 22, 2008.