

Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations

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Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations

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Emissions Inventory Group
Emissions, Monitoring and Analysis Division
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ACRONYMS AND ABBREVIATIONS

ALAPCO	Association of Local Air Pollution Control Officials
ASD	Assessment and Standard Division
ATREF	Area (nonpoint) source temporal cross-reference file
BC	Black carbon
BEIGIS	Biogenic Emissions Inventory Geographical Information System
BEIS	Biogenic Emissions Inventory System
BELD	Biogenic Emissions Landcover Databases
BIOME	Biogenic Model for Emissions
CAA	Clean Air Act
CAMx	Comprehensive Air Quality Model with extensions
CARB	California Air Resources Board
CB-IV	Carbon Bond IV
CDX	Central Data Exchange
CEMS	Continuous emission monitoring system
CERR	Consolidated Emissions Reporting Rule
CFR	Code of Federal Regulations
CHIEF	Clearing House for Inventories and Emission Factors
CMAQ	Community Multiscale Air Quality model
CNG	Compressed natural gas
CO	Carbon monoxide
CO_2	Carbon dioxide
DARS	Data Attribute Rating System
DQO	Data quality objective
EC	Elemental carbon
EDMS	Emission Dispersion Modeling System
EDR	Electronic data reporting
EIG	Emissions Inventory Group
EIIP	Emissions Inventory Improvement Program
EMCH	Emissions Modeling Clearinghouse
EMS	Emission Modeling System
EPA	Environmental Protection Agency
EPS	Emission Processing System
ETS/CEM	Emissions Tracking System/Continuous Emissions Monitoring
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
GCVTC	Grand Canyon Visibility Transport Commission
GIS	Geographical Information System
GLOBEIS	Global Biosphere Emissions and Interactions System
GUI	Graphical user interface
HAP	Hazardous air pollutant
HCs	Hydrocarbons
HDDV	Heavy-duty diesel vehicle
HDGV	Heavy-duty gasoline vehicle
HONO	Gaseous nitrous acid
HPMS	Highway Performance Monitoring System
I/M	Inspection and maintenance
IPP	Inventory preparation plan

ACRONYMS AND ABBREVIATIONS (continued)

LADCO	Lake Michigan Air Directors Consortium
LDDT	Light-duty diesel truck
LDDV	Light-duty diesel vehicle
LDGT	Light-duty gasoline truck
LDGV	Light-duty gasoline vehicle
LPG	Liquid petroleum gas
LTOs	Landing and takeoffs
LULC	Landuse/landcover
MC	Motorcycle
MOVES	Multi-Scale Motor Vehicle and Equipment Emission System
MTREF	Mobile source temporal cross-reference file
NAAQS	National ambient air quality standard
NAICS	North American Industry Classification System
NCAR	National Center for Atmospheric Research
NEI	National Emission Inventory
NEIEN	National Environmental Information Exchange Network
NH_3	Ammonia
NIF	NEI Input Format
NLCD	National Land Cover Database
NMHC	Nonmethane hydrocarbons
NMIM	National Inventory Emissions Model
NMOG	Nonmethane organic gases
NO	Nitric oxide
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NONROAD	EPA's emissions model for estimating nonroad emissions
OC	Organic carbon
OEI	Office of Environmental Information
OTAG	Ozone Transport Assessment Group
OTAQ	Office of Transportation and Air Quality
OTC	Ozone Transport Commission
PAR	Paraffin
Pb	Lead
PC	Personal computer
PM	Particulate matter
PM_{10}	Particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	Particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PTREF	Point source temporal cross-reference file
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
RADM	Regional Acid Deposition Model
RE	Rule effectiveness
RFP	Reasonable further progress
RFG	Reformulated gasoline
ROG	Reactive organic gases
ROP	Rate of progress

ACRONYMS AND ABBREVIATIONS (continued)

RPO	Regional planning organization
RVP	Reid vapor pressure
SAEWG	Standing Air Emissions Work Group
SAPRC	California Statewide Air Pollution Research Center
SAQM	SARMAP Air Quality Model
SARMAP	San Joaquin Valley Air Quality Study/Atmospheric Utilities Signatures, Predictions and Experiments Regional Modeling Adaption Project
SCC	Source classification code
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SMOKE	Sparse Matrix Operator Kernel Emissions Modeling System
SO_2	Sulfur dioxide
SO_4	Sulfate
SO_x	Oxides of sulfur
STAPPA	State and Territorial Air Pollution Program Administrators
TCA	1,1,1-trichloroethane
TCEQ	Texas Commission on Environmental Quality
TDM	Travel demand model
THC	Total hydrocarbons
TIP	Tribal Implementation Plan
TOG	Total organic gases
UAM	Urban Airshed Model
U.S.	United States
UTM	Universal transverse mercator
VMT	Vehicle miles traveled
VOC	Volatile organic compound(s)
XML	Extensible mark-up language

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SECTION 1.0
OVERVIEW

1.1 PURPOSE

This document provides guidance on how to develop emission inventories to meet State Implementation Plan (SIP) requirements for complying with the 8-hour ozone national ambient air quality standard (NAAQS), the revised particulate matter (PM) NAAQS, and the regional haze regulations. It is intended for use by: the United States (U.S.) Environmental Protection Agency (EPA) Regional Offices; State, local and Tribal air quality management authorities; and the general public. The guidance is designed to implement national policy on these issues as embodied in: Sections 110(a)(2)(F), 110(a)(2)(K), 110(a)(2)(J), 110(p), 169(A), 172(c)(3), 182(a)(3), 187(a)(5), 301(a) of the CAA (42 U.S.C. § 7410, 7491, 7502, 7511a, 7512a, 7601) and implementing regulations at 40 Code of Federal Regulations (CFR) part 51, subparts A and Q contain legally binding requirements.

This document does not substitute for provisions or regulations of the Clean Air Act enumerated above, nor is it a regulation itself. Thus, it does not impose binding, enforceable requirements on any party, nor does it assure that EPA will approve all instances of its application, and thus the guidance may not apply to a particular situation based upon the circumstances. EPA and State decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. Any decisions by EPA regarding a particular State implementation plan (SIP) demonstration will only be made based on the statute and regulations, and will only be made following notice and opportunity for public review and comment. Therefore, interested parties are free to raise questions and objections about the appropriateness of the application of this guidance to a particular situation; EPA will, and State/Local/Tribal agencies should, consider whether or not the recommendations in this guidance are appropriate in that situation. This guidance is a living document and may be revised periodically without public notice. EPA welcomes comments from the public on this document at any time and will consider those comments in any future revision of this guidance document.

Readers of this document are cautioned not to regard statements recommending the use of certain procedures as either precluding other procedures or providing guarantees that using these procedures will result in actions that are fully approvable. As noted above, EPA cannot assure that actions based upon this guidance will be fully approvable in all instances, and all final actions may only be taken following notice and opportunity for public comment.

The purpose of this guidance document is to define elements of emission inventories to meet SIP requirements for complying with the 8-hour ozone NAAQS, the revised PM NAAQS (24-hour and annual), and the regional haze regulations. For the PM NAAQS, the emphasis in this guidance is on PM with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$). However, State/Local/Tribal agencies should continue to inventory PM with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}) as well because the emission factors for $PM_{2.5}$ are limited and PM_{10} emissions may be needed to calculate $PM_{2.5}$. The priority elements of emission inventories emphasize those necessary for compiling and reporting air pollutant emissions to EPA.

This guidance applies to all State air pollution control agencies. In the special case where a SIP provides for independent jurisdiction for local air pollution control agencies, the guidance also applies to these local agencies. Through the provisions of the Tribal Authority Rule, Tribes are not required to develop emission inventories. However, if Tribes choose to develop an emissions inventory that may

become part of a SIP or Tribal Implementation Plan (TIP) inventory covered by this guidance, the Tribes are encouraged to follow the provisions of this guidance.

Ozone, regional haze, and a significant portion of $PM_{2.5}$ are produced in the air by the combination of pollutants [oxides of sulfur (SO_x), oxides of nitrogen (NO_x), volatile organic compounds (VOCs), ammonia (NH_3), and carbon monoxide (CO)] from many of the same local emission sources. In addition, studies such as the Grand Canyon Visibility Transport Commission (GCVTC) report available at http://www.westgov.org/wga/publicat/epafin.htm have identified the long-range transport of pollutants as contributing to ambient air violations and visibility impairment.[1] Therefore, this guidance document and the Consolidated Emission Reporting Rule (CERR), which is included in this document as Appendix A, emphasize the importance of preparing a single, statewide inventory for all pollutant emissions that contribute to the formation of ozone, $PM_{2.5}$, and regional haze.

1.2 RELATIONSHIP TO OTHER EPA EMISSION INVENTORY GUIDANCE

This document is a guide for State, local and Tribal agencies for submitting their emission inventories for the 8-hour ozone and $PM_{2.5}$ NAAQS, and for the regional haze program. It is not a procedures document covering the methods for compiling and documenting emissions inventories. Thus, other existing EPA guidance, such as the documents prepared by the Emission Inventory Improvement Program (EIIP)[2], complements this document.

The EIIP has developed procedures for compiling and documenting emission inventories for point, nonpoint, nonroad mobile, onroad mobile, biogenic, and geogenic source categories. The goal of EIIP is to provide cost-effective, reliable inventories by (1) improving the quality of emissions information; and (2) developing systems for collecting, calculating, and reporting emissions data. The goal is achieved by developing a set of "preferred and alternative methods" for all inventory associated tasks. This standardization improves the consistency of collected data and results in increased usefulness of emissions information. The EIIP will reach its goal through development of:

- Preferred and alternative methods for collecting data and calculating emissions;
- Improved reporting systems;
- Procedures for quality assurance (QA) and quality control (QC); and
- More consistent guidance.

The EIIP is a jointly sponsored effort of the State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) and EPA, and is an outgrowth of the Standing Air Emissions Work Group (SAEWG). Funding is provided by State, local and Tribal agencies through the federal 105 grant programs. The EIIP Steering Committee and technical committees are composed of State, local, industry, and EPA representatives. The EPA maintains a web site which provides the documents prepared by EIIP as well as periodic updates on EIIP activities and products. The web site address is: http://www.epa.gov/ttn/chief/eiip/.

It should be noted that additions and revisions to the EIIP guidance documents are ongoing, and the EIIP guidance currently does not address all emissions categories within all sectors. Additional specific guidance for preparing emission inventories, where different from the EIIP, is referred to in Section 5, "Emission Inventory Development" (e.g., for some nonroad categories). The EPA's Emissions Inventory Group (EIG) also periodically sponsors emission inventory training for State, local and Tribal agency staff to prepare ozone inventories, and more recently, $PM_{2.5}$ and regional haze inventories.

See the following web site address for copies of training presentations used for prior EPA workshops: http://www.epa.gov/ttnchie1/eidocs/training.html.

1.3 RELATIONSHIP TO THE CONSOLIDATED EMISSIONS REPORTING RULE (CERR)

The EPA finalized the CERR on June 10, 2002 (FR 67 39602). The CERR, which improves and simplifies the reporting of emission inventory information, is provided in Appendix A of this document. The CERR is also available at www.epa.gov/ttn/chief/cerr/index.html. The EPA developed this guidance document to complement the CERR and to provide specific guidance to State, local and Tribal agencies on how to develop emission inventories for 8-hour ozone, $PM_{2.5}$, and regional haze SIPs.

The first triennial emission inventory required by the CERR is for calendar year 2002 and was due June 1, 2004. The year 2002 has also been designated as the new base year for 8-hour ozone, $PM_{2.5}$, and regional haze SIPs (see Section 2.3, "Specification of Base Year"). The 2002 emission inventory submitted by the State, local and Tribal agencies to satisfy CERR requirements on June 1, 2004, is not necessarily the same as the 2002 base year inventory for SIP planning (see Section 2.3). It is anticipated that State, local and Tribal agencies will use their 2002 CERR inventory as an important resource in preparing their 2002 SIP base year inventory, but because of the different due dates, in many cases there are likely to be differences in the two 2002 inventories due to corrections and updates. Also, the SIP inventories are subject to approval requirements by EPA because the inventories can be considered SIP elements.

1.4 RELATIONSHIP TO OZONE, $PM_{2.5}$, AND REGIONAL HAZE IMPLEMENTATION RULES

Section 2.3 of this document provides details of SIP inventory implementation schedules. Due to litigation, the implementation of the 8-hour ozone and $PM_{2.5}$ NAAQS was delayed from the original schedule. The implementation of the 8-hour ozone and $PM_{2.5}$ NAAQS will begin in 2005. Implementation of the regional haze regulations began after they were finalized in the spring of 1999.

Because many of the same sources produce emissions that contribute to ozone and $PM_{2.5}$ formation and visibility impairment, EPA encourages State, local and Tribal agencies to coordinate emission inventory planning and development efforts for ozone, regional haze, and $PM_{2.5}$ as they develop their required inventories. Coordination of emission inventory planning and development efforts will help to reduce the burden associated with preparing separate inventories, improve the accuracy of emission inventories through the application of consistent methods, improve regional modeling studies, and improve coordination of control strategy development.

1.5 SUMMARY OF DOCUMENT CONTENTS

Section 2 of this document summarizes the regulatory requirements for emission inventories for the 8-hour ozone and $PM_{2.5}$ NAAQS, and the regional haze regulations. This section also provides a brief overview of the types of inventories that State, local and Tribal agencies will need to prepare for their SIPs, specifies the year for which the base year inventories are to be prepared, and provides a time line illustrating the relationship between the schedules for submittal of emission inventories and other SIP milestones. Section 2.0 also discusses the emission inventory planning and approval process.

Section 3 identifies and explains the key elements needed for ozone, $PM_{2.5}$, and regional haze SIP

emission inventories. The topics covered include components of the base year and periodic inventories; uses of the inventories; defining the pollutants and pollutant precursors, and sources and source

categories, to be inventoried; geographic coverage of inventories; temporal basis of emissions; application of rule effectiveness and rule penetration; and modeling inventories. For modeling inventories, this section explains the procedures by which emissions in a completed base year or projection year inventory are temporally allocated, spatially allocated, and speciated for use in a photochemical grid model.

Section 4 provides brief definitions and data element reporting requirements for stationary point and nonpoint, nonroad mobile, onroad mobile, biogenic, and geogenic emission sources, as defined by the CERR. This section also specifies data reporting and electronic data transfer requirements, and discusses how the emission inventories submitted by State, local and Tribal agencies are compiled into a comprehensive emission database at EPA.

Section 5 addresses emission inventory development procedures for the base year and periodic emission inventories. This section provides an overview of the types of emission sources and pollutants expected to be considered for inclusion in an inventory, and cross-references existing emission inventory development procedures by source category and pollutant where available. Section 5 also emphasizes the importance for State, local and Tribal agencies to collect the best activity data available for their inventories. The EPA recognizes that emission factors are either currently not available or have higher uncertainty for some pollutants (e.g., $PM_{2.5}$ and NH_3), and is conducting ongoing research to develop new and improved emission factors. Therefore, emphasis should be placed on collecting good activity data for the base year inventory. As emission factors are developed or improved, the factors can be applied to the activity data to improve emission estimates.

The final section of this document, Section 6, discusses the importance of including QA/QC procedures in the inventory planning and development process, and the importance of preparing sound documentation for the inventories.

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SECTION 2.0
REGULATORY REQUIREMENTS, DEFINITIONS, AND SUBMITTAL DATES

This section reviews the CAA provisions and associated regulations that require State, local and Tribal agencies to compile and submit air pollution emission estimates to EPA. It also reviews inventory types, emission inventory base year, Inventory Preparation Plans (IPPs), and the EPA approval process.

2.1 STATUTORY AND REGULATORY REQUIREMENTS

The EPA interprets Section 110(a)(2)(F) of the CAA (codified in 40 CFR 51 Subparts A and Q) as requiring SIPs to provide for the reporting of criteria air pollutants for all areas under the general SIP requirements of section 110. In addition, EPA interprets section 172(c)(3) as providing the Administrator with discretionary authority to require other emissions data as deemed necessary for SIP development in nonattainment areas to attain the NAAQS. This statutory authority provides a basis for requiring SIPs to provide for a periodic inventory of PM emissions for PM nonattainment areas. Section 169(A) provides authority for emission inventories to be required in SIPs developed to protect visibility in Federal Class I areas.

2.2 TYPES OF INVENTORIES

For the purpose of developing SIPs to demonstrate compliance with the 8-hour ozone NAAQS, $PM_{2.5}$ NAAQS, and regional haze rule, there are four basic kinds of inventories that are necessary. These four are the base year, 3-year cycle, rate of progress, and modeling inventories. Because of the increasingly regional nature of air quality analysis and planning, three of the four types of inventories should be prepared on a statewide basis. $PM_{2.5}$ nonattainment areas would develop inventories for the annual and 24-hour $PM_{2.5}$ NAAQS, as necessary, to reach attainment and meet Clean Air Act requirements.

The **base year inventory** is the primary inventory from which the other three inventories are derived. Thus, all inventories should be consistent with data provided in the base year inventory. The CAA calls for State, local and Tribal agencies to ensure that the base year inventory is comprehensive, accurate, and current for all actual emissions. The inventory should include emissions estimates from stationary point and nonpoint sources, onroad mobile sources, and nonroad mobile sources.

Every 3 years State and local agencies are required to develop periodic inventories called the **3-year cycle inventories** based on actual emissions. State and local agencies have the option to report smaller point sources every three years or one-third of the sources each year. This option is not available for reporting emissions for a designated base year inventory. The 3-year cycle inventories are used to measure overall emission reduction trends and meet information requests from the general public. These inventories will be important to future modeling studies and emissions trading programs.

The SIP planning process requires State and local agencies to demonstrate reasonable further progress (RFP) toward attainment with the NAAQS and regional haze rule. To meet this requirement, the SIP must demonstrate how annual incremental reductions in emissions of the relevant air pollutants will be achieved to provide steady progress toward attainment of the relevant air quality standards. In this guidance, EPA uses the term "RFP" as the more generic progress requirement, applying to both ozone

and $PM_{2.5}$ nonattainment areas, and "rate of progress" (ROP) to denote the specific requirements for ozone nonattainment areas subject to subpart 2 of part D of Title I of the Clean Air Act. The **RFP/ROP inventory** is developed from the base year inventory to (1) calculate the emission reduction target(s) for the planning area, (2) develop control strategies, and (3) provide the baseline for calculating emission reductions associated with the implementation of control measures adopted in the SIP. This inventory accounts for economic growth and emission source controls anticipated to occur from the base year to the year for which emission reduction targets must be met. This inventory is limited in geographic scope to the designated nonattainment area and related adjacent areas that may be included in the domain for emission reduction credits. It is not statewide.

Modeling inventories are required for developing the attainment demonstration. A modeling inventory, defined as an inventory that will be processed through an "emissions preprocessor," is only prepared for a specific modeling application. The inventory components specified in this guidance will support modeling, but do not require a modeling inventory *per se*. More details on air quality modeling for SIP applications is available in separate modeling guidance documents. The modeling guidance will be available on the EPA's SCRAM website (http://www.epa.gov/ttn/scram/) when complete [3].

Previously, modeling inventories were only specifically required for areas performing photochemical grid-based modeling to demonstrate attainment of the 1-hour ozone NAAQS; however, recent events have shown that most State, local and Tribal agencies also need access to emissions data outside their borders. Regional approaches such as the Ozone Transport Assessment Group (OTAG), the Ozone Transport Commission's (OTC) NO_x baseline study, and the GCVTC study have emphasized the need for regional (multi-State) emission inventories. Regional modeling is expected to become even more prevalent as areas develop attainment plans for the 8-hour average ozone and the $PM_{2.5}$ NAAQS, and to develop plans and demonstrate progress toward meeting regional haze visibility goals. Thus, needs for multi-State inventories to support grid-based modeling are increasing.

Countywide emission estimates are needed for all counties. Where a State, local or Tribal agency is unable to provide this information, EPA's National Emission Inventory (NEI) can be used for regional analyses. State, local and Tribal agencies that are performing modeling analyses generally have to make emission estimates for more than just a nonattainment area. In the absence of State-prepared emissions data, the NEI may be used. Without additional State, local and Tribal agency scrutiny, however, the risk of incorrect air quality estimates is increased.

2.3 SPECIFICATION OF BASE YEAR

The November 18, 2002 EPA memorandum "2002 Base Year Emission Inventory SIP Planning: 8-Hour Ozone, $PM_{2.5}$ and Regional Haze Programs" identifies 2002 as the emission inventory base year for the SIP planning process [4]. This section reviews the guidance presented in EPA's memorandum available at http://www.epa.gov/ttn/chief/eidocs/2002baseinven_102502new.pdf.

Updated emission inventories are a key element in the overall SIP planning process for the three programs. The EPA has designated nonattainment areas for the 8-hour ozone NAAQS with an effective date of June 15, 2004. Nonattainment area designations for the $PM_{2.5}$ NAAQS were published in the Federal Register on January 5, 2005, with an effective date of April 5, 2005. Within 3 years after designations are promulgated, States will need to submit new attainment demonstration SIPs for the new NAAQS. For regional haze, most State, local and Tribal agencies (i.e., those participating in regional planning organizations [RPOs]) will have SIPs due at the same time as the $PM_{2.5}$ SIPs. Table 2.3-1 is a summary of the dates for various elements in the SIP process.

Table 2.3-1. SIP Related Dates

Program	Designation of Initial Nonattainment Areas	Emission Inventory Due Date as SIP Element
Ozone		
Subpart 1 Nonattainment Areas *	June 15, 2004	June 15, 2007
Subpart 2 Nonattainment Areas **	June 15, 2004	June 15, 2006
$PM_{2.5}$	April 5, 2005	April 5, 2008
Regional Haze	December 17, 2004	December 17, 2007

* Subpart 1 nonattainment areas are those whose 1-hour ozone design value at designation is less than 0.121 parts per million; subpart 1 of the CAA contains the more general planning and control requirements with attainment deadlines 5-10 years after designation.
** Subpart 2 nonattainment areas are those whose 1-hour design value at designation is greater than or equal to 0.121 ppm; subpart 2 CAA contains more specific control and planning requirements and attainment dates between 2007 – 2024 depending on classification. These areas would be classified as marginal, moderate, serious, severe, or extreme based on their 8-hour ozone design value.

Note that for the Ozone Subpart 2 nonattainment areas that the required emission inventory submittal is due on June 15, 2006, one year earlier than the SIP for these same areas. This is because the 1990 CAAA required that the initial base year 1990 emission inventory was due two years after enactment and one year prior to the SIP due date. The logic was that the emission inventories were needed a year before the SIPs were due so that the emission inventory data would be available to develop the SIP. EPA has determined that the two year due date for the emission inventory in the 1990 CAAA applies to all subsequent Subpart 2 designations.

The EPA selected 2002 as the base year for a number of reasons. The 2002 base year harmonizes dates for other reporting requirements such as the CERR that requires State, local and Tribal agencies to submit emission inventories for all criteria pollutants and their precursors every 3 years, on a schedule that includes the emission year 2002. The EPA concluded that 2002 is the appropriate base year for requirements related to RFP, after considering the statutory and regulatory provisions applicable to each program. Using the 2002 inventory as the base year will also ensure that the inventory reflects one of the years used for calculating the air quality design values on which ozone and $PM_{2.5}$ designation decisions are based, as well as one of the years in the 2000 to 2004 period used to establish baseline visibility levels for the regional haze program. This discussion on 2002 as the base year only applies to areas designated as nonattainment in the initial ozone (June 15, 2004) and $PM_{2.5}$ (January 5, 2005) designations. For areas with an effective nonattainment designation in the future, the base year inventory will be for the calendar year of the most recent triennial inventory as of the date of designation.

Another practical reason for choosing 2002 as the base year has to do with the schedule of EPA's own work on the NEI. The EPA made its initial version of the 2002 NEI available to the States in March 2004. This preliminary 2002 NEI can be used in 2004 by each State needing emission estimates for upwind States. The EPA's final 2002 NEI, which will merge and augment the State-by-State inventories received in 2004, will be ready by the fall of 2005. Depending on where they are in the process, State, local and Tribal agencies may wish to rely on the newer estimates of upwind-States' emission, and certainly should at least consider how the emission estimates for upwind States have changed.

Alternatively, some regional groupings of States may exchange and merge their 2002 inventories directly, prior to completion of EPA's final 2002 NEI. The EPA will consult with multistate organizations about the 2002 inventory process so that work is not duplicated unnecessarily.

In most instances, the States will need to include the 2002 base year SIP inventory in the public hearing process because it has "regulatory significance" as an intergal part of RFP/ROP plans or attainment demonstration plans. The States may choose to defer the public hearing on the 2002 base year SIP inventory until such time as public hearings are held for other SIP elements. The States are encouraged to include their specific Regional Office in the review of the SIP inventories as early in the process as possible. This should be done to insure that all major issues regarding the inventory are resolved before holding a public hearing and before an official SIP submittal.

2.4 INVENTORY PREPARATION PLAN

Inventory Preparation Plans are used as a planning tool to guide inventory preparation and ensure that emission estimates are of high quality and are consistent with CAA requirements. The IPPs provide State and local agencies with the opportunity to tell their EPA Regional Office how they plan to compile their emissions inventories and allow EPA to provide feedback to avoid having State and local agencies use approaches that are inconsistent. Because EPA has attempted to be as flexible as possible on how it allows State, local and Tribal agencies to meet the CAA inventory requirements, EPA recommends that State and local agencies submit detailed IPPs which describe how the inventory is developed, what it includes, and what assumptions are being made. State and local agencies should prepare and submit these IPPs for annual and 3-year cycle emission inventories. State and local agencies that prepared earlier IPPs for the 1-hour ozone or the PM_{10} NAAQS can use these IPPs as the starting point for the 8-hour ozone, $PM_{2.5}$, and regional haze IPPs. The IPPs can also serve as standard operating procedures for the State and local agencies for future inventory preparation and as documentation of inventory procedures to other neighboring States in regional planning efforts. In addition, the IPPs can be used as the basis for the emission inventory documentation discussed in Section 4.2.

The IPPs should include descriptions of inventory objectives and general procedures. One of the first steps in developing the IPP is to define the purpose and scope of the inventory. This includes identifying items such as the base year for the inventory, the pollutants to be inventoried, the emissions sources and source categories, the geographical boundaries of the inventory, the spatial and temporal scales of the emissions, and the application of controls and regulations including rule effectiveness and rule penetration. The IPPs for inventories that report VOC emissions should include the State's definition of VOC and what species are included. The IPPs should also contain a schedule or time line for when the State and local agencies plan to submit their inventories or inventory components to EPA. This schedule/time line should also show how the inventory preparation or review process will mesh with the application of these inventories in atmospheric modeling. If the State or local agency plans to submit an inventory in components (e.g., point sources, nonpoint sources, etc.), the IPP should so indicate, along with their submittal dates by component. Final submittal dates should be consistent with the ultimate inventory dates specified by EPA (see section 2.3).

The IPP should contain the following sections, including separate sections to address the point, nonpoint, nonroad mobile, onroad mobile, biogenic, and geogenic portions of the inventory:

- **Introduction**

This section includes items such as: a description of the inventory objectives, including how the IPP is structured, what it contains, who is responsible for the inventory, and who is compiling it; the

geographic area covered by the inventory (see section 3.2.3); the base year of the inventory (see section 2.3); the pollutants included in the inventory (see section 3.2.1); and the temporal resolution of the inventory (see section 3.2.4). In addition, a State should identify counties it excludes from its inventory because a local authority is responsible for preparing the inventory for the counties or Tribal area.

- **Point Source Inventory**

Topics to be discussed in this section include: how point sources are identified and located (see section 3.2.2); what data collection methods are used; the basis for activity data and emissions estimates; how control efficiencies are identified and applied; whether rule effectiveness and rule penetration are applied and their values (see section 3.2.5); and how temporally resolved emissions are prepared and supplied (see section 3.2.4). A State or local agency should identify any point sources it excludes from its inventory because the point sources report directly to EPA.

- **Nonpoint Source Inventory**

This section identifies what nonpoint source categories are included in the inventory (see section 3.2.2), how emissions are estimated, how data are identified and collected, whether rule effectiveness and rule penetration are applied and their values (see section 3.2.5), how emissions are temporally and spatially resolved and supplied (see sections 3.2.4 and 3.3), and how double-counting of emissions is avoided.

- **Nonroad Mobile Source Inventory**

This section includes details on what nonroad mobile source categories are included in the inventory (see section 3.2.2), how emissions are estimated, specification of key inputs for the nonroad emission model used, including parameters such as temperature and fuel characteristics, description of activity data to replace model defaults such as equipment population and hours of use, how emissions are temporally and spatially resolved (see sections 3.2.4 and 3.3), and how double counting of emissions is avoided. If the State or local agency plans to use EPA's NEI estimates for any nonpoint source categories, these should be specified.

- **Onroad Mobile Source Inventory**

This section includes the State or local agency's approach for determining vehicle miles traveled (VMT) (see section 5.5.1), specification of the mobile source emissions model used, specification of key assumptions for the model, including parameters such as temperature, speeds, existing inspection and maintenance (I/M) programs, etc., and how emissions are temporally and spatially resolved (see sections 3.2.4 and 3.3).

- **Biogenic and Geogenic Source Inventory**

This section identifies what biogenic and geogenic source categories are included in the inventory (see section 3.2.2), how emissions are estimated, how data are identified and collected, and how emissions are temporally and spatially resolved and supplied. If the State or local agency plans to accept EPA's biogenic inventory, which EPA recommends, this should be stated.

- **Documentation Approach**

  This section describes how the inventory and its procedures are documented and how the data are stored and managed (see section 4.2). In addition, this section includes information on how the data are transmitted to EPA (see section 4.1.6).

- **QA Plan**

  This section includes a description of the inventory QA program and QA/QC procedures. See Section 6, Quality Assurance, for more details on QA for the SIP inventories.

  A QA Plan should always be included as part of the IPP. In circumstances where the more formal Quality Assurance Project Plan (QAPP) is developed, the QAPP will satisfy the need for the IPP QA Plan. See Section 6 for specific information on QAPPs. The EIIP document, "Volume 6 Quality Assurance Procedures and DARS Software"[5], has a chapter on a model QA plan for SIP inventories which should be useful in the preparation of the QA Plan portion of the IPP. See http://www.epa.gov/ttn/chief/eiip/techreport/volume06/index.html

Each State or local agency should negotiate its IPP submittal schedules with its EPA Regional Office. The State or local agency and its Regional Office should agree in advance on the time table for submitting the IPP and the approval process that will be used by the EPA Regional Office. EPA Headquarters and Regional Offices will work together to promote consistency of IPP review and approval, while allowing maximum flexibility to the State and local agencies in their inventory preparation process.

During the preparation of their IPPs, State and local agencies are referred to Volume I of the EIIP guidance available at http://www.epa.gov/ttn/chief/eiip/techreport/volume01/index.html which discusses emission inventory planning and development.[2] Chapter 2 of Volume VI, *Quality Assurance Procedures and DARS software*, of the EIIP guidance available at http://www.epa.gov/ttn/chief/eiip/techreport/volume06/index.html.[5], provides additional information on planning and documentation of inventory development and QA activities EPA developed QC software is available at www.epa.gov/ttn/chief/nif/. An example of an IPP developed by EPA for the National Emission Inventory is available at http://www.epa.gov/ttnchie1/net/nei_plan_feb2001.pdf .

2.5 INVENTORY APPROVAL

State and local agencies should negotiate the emission inventory approval process with their respective EPA Regional Office. Included in these negotiations should be a discussion on the emission inventory documentation that will be necessary to support approval. Of the emission inventories that State and local agencies submit to EPA, those that are deemed to be of "regulatory significance" will require EPA approval. In general, this means that the approval process will include the emission inventory as a component of a SIP submittal, or other significant action by the State, that requires EPA review and approval. In the guidance memo titled "Public Hearing Requirements for 1990 Base-Year Emission Inventories for Ozone and Carbon Monoxide Nonattainment Areas", September 29, 1992 (http://www.epa.gov/ttn/chief/old/memos/ei/phr_sep1992.pdf), EPA established the policy for deffering the public hearing on the SIP emission inventories and the approval of these inventories until the time the areas adopt and submit their attainment demonstration and/or RFP plans.

SECTION 3.0
EMISSION INVENTORY ELEMENTS

The purpose of this section is to identify and explain the key elements to be included in SIP emission inventories that should be prepared by State and local agencies to comply with the 8-hour ozone NAAQS, $PM_{2.5}$ NAAQS, and regional haze rule. If a State or local agency is unclear on how this guidance applies to its specific situation, it should consult with its EPA Regional Office for clarification. This section identifies the uses and components of the base year, 3-year cycle, RFP and modeling inventories discussed in this guidance document. This section also discusses the temporal allocation, spatial allocation, and speciation methodologies used to process the inventories for input to photochemical air quality models to enable State and local agencies the opportunity for supplying data to improve the methodologies.

3.1 IDENTIFICATION OF INVENTORY USES

The uses of inventories determine the information that should be included in the inventories. The emission inventories covered by this guidance document will be used by State and local agencies to develop their SIPs to demonstrate attainment of the 8-hour ozone NAAQS, annual and 24-hour $PM_{2.5}$ NAAQS, and regional haze rule. As discussed in section 2.2, these inventories include the base year, 3-year cycle, RFP and modeling inventories. In the case of $PM_{2.5}$ nonattainment areas, States would determine whether inventories are needed for both the annual and 24-hour $PM_{2.5}$ NAAQS or only the annual standard, in order to reach attainment for both $PM_{2.5}$ NAAQS. These inventories will also be used by regional planning organizations and EPA to support regional and national analyses, which in turn will be given to State and local agencies to support development of their SIPs.

The base year inventory is the starting point from which the other SIP inventories are derived. One of its key purposes is to support air quality modeling and control measure analyses to determine the types and amounts of emission reductions needed to meet RFP/ROP emission reduction targets and demonstrate attainment. Emissions trading programs could also be based on the inventory if emissions trading programs are adopted as a result of implementing controls. The results of these studies are then used by State and local agencies to identify the emission sources for control, and to develop and adopt the control measures that should be included in the overall control strategy for a SIP. The CERR presented in Appendix A specifies the data elements that State and local agencies should include in their inventories.

Studies have indicated that the long-range transport of precursor emissions contribute to elevated ozone and $PM_{2.5}$ levels and visibility impacts in down-wind areas.[1] Thus, EPA will support State and local agencies in conducting regional-scale photochemical modeling for all three of these programs to provide State and local agencies with a number of critical databases for use in developing their attainment demonstration and maintenance SIPs. To support this effort, EPA will compile inventories that will include a blend of inventory data submitted by State and local agencies with inventory data developed by EPA. The EPA-developed data will be used to fill gaps in State data and for certain source types where EPA has developed accurate and comprehensive emission estimates (e.g., electric utility sources). The EPA has developed a NEI Preparation Plan available at http://www.epa.gov/ttn/chief/net/2002neiplan_081004final.pdf which documents in detail how EPA plans to use State and EPA-developed data.[6] These inventories will be stored in a central repository termed the NEI database. The EPA will also improve the NEI database for other regional studies as the needs arise. The NEI database will be updated triennially with the emphasis on incorporating State, local and Tribal data using the 3-year cycle inventories submitted by State, local and Tribal agencies.

3.2 COMPONENTS OF THE BASE YEAR AND 3-YEAR CYCLE INVENTORIES

3.2.1 Pollutants and Pollutant Precursors to Be Inventoried

This section identifies the pollutants that should be included in the base year and a 3-year cycle inventory for the 8-hour ozone NAAQS, $PM_{2.5}$ NAAQS, and regional haze rule. Because many sources emit more than one of the precursor pollutants, and because the precursor pollutants have the potential to be transported across State boundaries, it is important that State, local and Tribal agencies develop a single statewide inventory of pollutants to support integrated, regional-scale modeling, and control strategy development for ozone, $PM_{2.5}$, and regional haze.

For all three applications, the 8-hour ozone NAAQS, $PM_{2.5}$ NAAQS, and regional haze rule, the emission inventory should be based on actual emissions.

For the 8-hour ozone NAAQS, the pollutants to be inventoried are VOC, NO_x, and CO.

For the $PM_{2.5}$ NAAQS, the pollutants to be inventoried are primary emissions (including condensibles) of PM_{10} and $PM_{2.5}$, and emissions of SO_2, NH_3, VOC, and NO_x. The EPA is specifying PM_{10} emissions to be reported because PM_{10} emissions are often used as the basis for calculating $PM_{2.5}$ emissions. While elemental or black carbon (EC/BC) and organic carbon (OC) will be identified in default speciation profiles, more locally-specific data should be collected where available as an input to model preprocessing. Where such data are available, they should be provided to EPA to help in improving EPA's speciation profiles. Certain organic gases have been identified as precursors to secondary organic aerosols (SOA). Toluene, xylene and ethyl benzene are known to be important SOA precursors. Additional organic gases may be identified by ongoing research. While these gases will be identified in default speciation profiles, more locally-specific data should be collected, where available, as an input to model preprocessing. State, local and Tribal agencies can contact EPA's EIG for more information.

For regional haze, the pollutants to be inventoried include all of the pollutants and precursor pollutants identified for ozone and $PM_{2.5}$, except for CO.

The EPA's current regulatory definition of VOC (40 CFR §51.100) excludes constituents considered to be negligibly photochemically reactive. These include methane, ethane, methylene chloride, 1,1,1-trichloroethane (TCA), several Freon compounds, acetone, perchloroethylene, and others. It is anticipated that additional compounds may be exempted from this VOC definition. The exempt compounds are considered negligibly reactive, although some can influence the formation of ozone when present in sufficient amounts. The emission factors used to estimate organic emissions represent nonmethane hydrocarbons (NMHCs). Because of this it is assumed that inventories do not have methane, and part of the air quality modeling procedure "automatically" adds back that missing VOC component. Therefore, inventory preparers should not have to do anything further specific to methane. For SIP purposes, State, local and Tribal agencies should report VOC as defined by EPA (40 CFR §51.100).

For the purpose of this guidance document, the following definitions for PM apply:

- **PRIMARY PM:** Particles that enter the atmosphere as a direct emission from a stack or an open source. It is comprised of two components: Filterable PM and Condensible PM.

- **FILTERABLE PM:** Particles that are directly emitted by a source as a solid or liquid at stack or release conditions and captured on the filter of a stack test train.

- **CONDENSIBLE PM:** Material that is vapor phase at stack conditions, but which condenses

and/or reacts upon cooling and dilution in the ambient air to form solid or liquid PM immediately after discharge from the stack. For example, some high molecular weight organic gases rapidly condense and should be reported as condensible PM.

- **SECONDARY PM:** Particles that form through chemical reactions in the ambient air well after dilution and condensation have occurred. Secondary PM is usually formed at some distance downwind from the source. Secondary PM is **NOT** reported in the emission inventory. Rather, secondary PM is calculated by air quality models.

In preparing their $PM_{2.5}$ SIPs, State and local agencies should report the following:

- Primary $PM_{2.5}$ (or Filterable $PM_{2.5}$ and Condensible PM individually. Note that all Condensible PM is assumed to be in the $PM_{2.5}$ size fraction)
- Primary PM_{10} (or Filterable PM_{10} and Condensible PM individually)

It is preferred that the State and local agencies report the two separate components rather than the single combined Primary PM values, if known. This information is important to assist in the development of new emission factors for condensible PM. If only the filterable component is known, report it as "filterable."

In addition, State, local and Tribal agencies may also choose to report the following:

- Total Primary PM (or Filterable Total Primary PM and Condensible PM individually)

For stationary point and nonpoint sources, the EPA recognizes that emission factors for condensible emissions and speciated PM are limited, as well as emission factors for many industrial sources of filterable $PM_{2.5}$. The EPA is working to improve the quality of existing factors and to develop new factors as emissions source test data becomes available. The EPA invites State, local and Tribal agencies to provide EPA with source test data they may collect during the preparation of PM inventories to support the development of emission factors.

The EPA Reference Methods for filterable $PM_{2.5}$ and PM_{10}, condensible PM, and speciated PM are currently available from EPA's Emissions Measurement Center (http://www.epa.gov/ttn/emc/). The existing test methods for PM include Methods 5, 17, 201 and 201A, and 202. Methods 5 and 17 measure only total filterable PM and do not distinguish between different size particles or measure condensibles or speciated compounds. Methods 201 and 201A are similar to Method 17 in that they measure total filterable mass in the stack, but have a cyclone that measures the filterable PM_{10} fraction. The EPA has posted Preliminary Method 4 (http://www.epa.gov/ttn/emc/prelim.html) which is a draft method that is similar to Method 201A but provides for particle sizing at 2.5 micrometers in addition to sizing at 10 micrometers. However, Methods 201, 201A and Preliminary Method 4 do not measure condensibles or speciated compounds. Method 202 was developed to measure condensible PM and provides limited speciation data. This method is used with a filterable PM method to determine the total mass of fine PM.

The EPA is developing a new method for characterizing the total PM_{10} and $PM_{2.5}$ mass and allows for the chemical speciation of the $PM_{2.5}$ component of emissions. This new method will use air dilution to cool the sample gas which will allow the same chemical reactions and condensation that occur upon release from the stack to occur in the sampling system. Because the in-stack filter of Preliminary Method 4 has been removed, separate filterable and condensible masses (total, PM_{10} and $PM_{2.5}$) are not measured. The method allows for the extraction of aliquots of diluted sample gas using the same filter media and analytical methods used for the ambient air speciation monitoring network. This method is available on the Emissions Measurement Center web site as a Conditional Method (http://www.epa.gov/ttnemc01/news/emchighlights2003.pdf). The method will provide for the development of emission factors that are more reliable and consistent with ambient measurement methods

than are available with the existing mix of methods for estimating total fine PM mass emissions and chemical species released to the ambient air. In addition, EPA is continuing to improve methods for measuring air emission fluxes from fugitive or nonpoint sources and motor vehicles. Interested parties should periodically check the Emissions Measurement Center's web site to keep current with EPA's research on improving source test methods for fine PM.

3.2.2 Identification of Sources and Source Categories to Be Inventoried

The CERR requires that States prepare inventories that include all stationary point and nonpoint, nonroad mobile, onroad mobile, biogenic, and geogenic emission sources present within each county within a State. The EPA will be furnishing each State the NEI which should be a good starting point for estimating nonpoint source emissions. Mobile source emissions should be estimated by using the latest emissions models and planning assumptions available. The NONROAD model can be used for off-road mobile sources as appropriate. Even if there are areas within a State that do not have significant emissions, the State should still prepare a statewide inventory (the State may, however, elect to use the NEI data for nonpoint sources for those areas).

The EPA anticipates that each State, local and Tribal agency will use data obtained through their current annual emission source reporting requirements, Emission Statement program, and/or operating permits program to compile emissions data for its point source inventory. As appropriate, a State, local or Tribal agency may use these data to meet its reporting requirements for point sources. If emissions data reported under an operating permits program are used, the State or local agency should ensure that the emissions represent actual rather than allowable or potential emissions for the base year inventory.

The EPA's EIG maintains the Clearing House for Inventories and Emission Factors (CHIEF) web site (http://www.epa.gov/ttn/chief/) to provide access to the latest information and tools for identifying emission sources and estimating emissions of air pollutants and preparing air emission inventories. The CHIEF web site provides access to the list of point, nonpoint, onroad, nonroad, biogenic, and geogenic source classification codes (SCCs).

For point source reporting under the CERR, a State is required to specify the Standard Industrial Classification (SIC) code or the North American Industry Classification System (NAICS) code. The U.S. Department of Commerce, Bureau of the Census has developed the NAICS to replace the SIC system. The NAICS was developed jointly by the United States, Canada, and Mexico to provide new comparability in statistics about business activity across North America. Correspondence tables to map NAICS codes to SIC codes (or SIC codes to NAICS codes) have also been developed by the Bureau of the Census (http://www.census.gov/epcd/www/naics.html).

Section 5.0 of this document provides tables which list in detail the source categories that EPA believes are significant sources for the pollutants in the tables. This section also lists the source categories for which EIIP procedures guidance has been developed.

3.2.3 Geographic Coverage

The CERR requires that States prepare inventories for all sources for the entire State regardless of the attainment status of counties within the State. Even if there are areas within a State that do not have significant emissions, the State must still prepare a statewide inventory. The State may elect to use the EPA-supplied NEI for nonpoint sources for those areas. Emissions for nonpoint, nonroad mobile, onroad mobile, biogenic, and geogenic emissions should be provided at the county level. The geographic location of emissions for point sources should be defined by their coordinates [i.e., latitude and longitude (decimal degrees)] .

Because of the regional nature of the pollutants, statewide inventories are necessary to support air quality modeling to identify the scale of the pollutant problem (i.e., local versus regional), which in turn will support evaluation and development of cost-effective control strategies. The CERR in Appendix A specifies the criteria for defining point sources in attainment and nonattainment areas and the frequency for reporting point source data. The CERR also specifies the criteria for defining nonpoint, nonroad mobile, onroad mobile, biogenic, and geogenic sources, and the reporting frequencies for these sources. The CERR includes reporting requirements for all NAAQS criteria pollutants and precursors, and references the reporting provisions of the Section 110 NO_x SIP Call.

3.2.4 Temporal Basis of Emissions

This section addresses the temporal resolution of the emissions data that should be provided in the base year and 3-year cycle inventories. Discussion of how emissions are temporally allocated for air quality modeling purposes is provided in section 3.3.1. Temporal adjustments to annual emissions included in the inventory are made because of seasonal differences in the rate of emissions or activity, or to apportion emissions to a particular season or day. State, local and Tribal agencies should consult EIIP guidance for temporal adjustment procedures. It is important that State, local and Tribal agencies develop a single integrated annual statewide inventory.

For the 8-hour ozone NAAQS emission inventory, VOC, NO_x, and CO emissions should be reported as actual annual and actual summer weekday. Summer weekday emissions are defined as an average day's emissions for a typical summer day during the ozone season. Temperature data are provided to the air quality model by meteorological inputs developed for the specific days which are modeled. This information, in turn, is used by emissions models to "adjust" initial information provided by the State. It is only necessary to choose a summer weekday and make note of the diurnal temperature pattern used on a selected day. The emissions model will make adjustments for temperatures observed on the actual days which are modeled. For modeling purposes, EPA also urges providing estimates for a weekend day, which may reflect different activity levels and patterns. Note that in certain situations, weekend emissions may dominate some episodes, and, therefore, the inventory will be needed to support those analyses.

For the $PM_{2.5}$ NAAQS and regional haze rule emission inventories, direct emissions (including condensibles) of PM_{10} and $PM_{2.5}$, and the precursor emissions VOC, NO_x, SO_x, and NH_3 should be reported as actual annual. Temporal allocation of the inventories to other time scales (e.g., daily) will be made during preprocessing of the inventories for modeling, based on temporal allocation profiles. Alternatively, the State, local or Tribal agency may choose to include actual temporally resolved emissions data in its inventory (see section 3.3).

The State, local or Tribal agency should discuss in its IPP its approach for preparing and supplying temporally resolved emissions.

3.2.5 Actual Emissions, Rule Effectiveness and Rule Penetration

For most SIP purposes, emission inventories should contain estimates of actual emissions to the air during the relevant time period. Activity throughput, uncontrolled emission factor, and control device efficiency (if used) obviously are factors that affect actual emissions. Other factors that can cause higher actual emissions are control equipment efficiency that does not meet specification; process excursions that bypass controls, exceed control equipment capacity, or reduce control efficiency; operator failure to properly install and run control equipment; bypassing control equipment during maintenance; and equipment malfunctions. Reasonable efforts should be made to collect information on these factors and to

incorporate their effects into the estimates of actual emissions.

The concepts of control efficiency, rule effectiveness, and rule penetration are conventionally used in formally accounting for such real world factors, as described below.

Control efficiency refers to the percentage reduction in emissions achieved by a control device(s) or a control practice relative to the no control state. For the purposes of emission inventory preparation, control efficiency is an overarching term that includes the overall efficiency of multiple control devices. The term control efficiency also includes capture efficiency for point sources which defines the percentage of emissions from a source that is treated by a control device(s).

Rule effectiveness reflects the actual ability of a regulatory program to achieve the emission reductions required by regulation (or perhaps voluntarily adopted). The concept of applying rule effectiveness in a SIP emission inventory has evolved from the observation that regulatory programs may be less than 100 percent effective for some source categories. EPA's initial rule effectiveness policy was limited to the ozone related pollutants and included an 80 percent default rule effectiveness factor. This current rule effectiveness policy revises the earlier policy; specifically, the 80 percent default is eleminated and particulate matter related pollutants are now included. Rule effectiveness only applies to controlled emission sources (point) or source categories (non-point sources). No rule effectiveness adjustment is needed in cases where controls are not applied or a regulation does not exist. In the specific case of the 2002 ozone SIP emission inventories, States have the option of choosing to use the orginal rule effectiveness policy or the new policy. When applied to the 2002 $PM_{2.5}$ SIP emission inventories, States have the option of not applying rule effectiveness (the old policy) or, if rule effectiveness is applied, using the new policy.

Rule penetration is an estimate of the percentage of emissions in a source category that are emitted at facilities subject to the requirements of a rule. For example, a State may adopt a regulation applicable to sources that emit more than 1 ton per year of VOC. Within the State, some sources will be below the 1 tpy threshold, and will therefore not be subject to the rule's requirements. Rule penetration is an estimate of the percentage of emissions emitted by facilities covered by a regulation.

In the Spring of 2004, a workgroup consisting of emissions inventory staff from State, local and EPA offices convened to review existing rule effectiveness (RE) guidance. Through a series of conference calls, the workgroup developed recommendations to revise EPA's existing rule effectiveness guidance. The revised guidance is included as Appendix B to this document.

In summary, the revised guidance continues to recommend that a State or local agency attempt to gather enough local data to make a refined estimate of rule effectiveness. However, such refined estimates typically involve the expenditure of a significant amount of resources, for example, to perform numerous inspections, and therefore are not always feasible. As an alternative, the new guidance provides inventory preparers with a listing of the factors that are most likely to affect RE, and ranks these factors in a priority order. Inventory preparers then select a rule effectiveness value from within one of 5 ranges for point sources, or from one of 3 ranges for nonpoint sources. In using this last methodology, the RE workgroup recognized that a fair amount of subjectivity will remain in the selection of appropriate RE adjustments. However, the group believes that selecting a RE value from within the ranges provided will help minimize this subjectivity, and offers a better means of estimating RE than the prior recommendation of a blanket use of an 80% default value. The guidance also recommends that inventory preparers review prior rule effectiveness studies performed by other agencies. EPA plans to compile as many of these studies as possible and to post them on a on a rule effectiveness page of the CHIEF website. Doing so may reveal a RE study of a similar source category performed by another State that could help inform the

selection of an appropriate RE value.

Organizations coordinating the preparation of SIP emission inventories are encouraged to coordinate the application of rule effectiveness/rule penetration with the responsible EPA Regional Office(s).

3.3 INVENTORIES USED FOR TRACKING PROGRESS

This section of the guidance was written before EPA finalized the requirements for the 8-hour ozone NAAQS. This section of the guidance is based on EPA's views at the time of publication of this guidance. This guidance may need to be modified after this rule is promulgated. Prior to any such modification, however, we strongly recommend that the user of this guidance consult the final 8-hour ozone rule to determine the effect of this rule on this guidance. The purpose of the progress inventories is to demonstrate a reduction in emissions from regulated sources from the Base Year to a current year. Specific progress inventory requirements will be determined on a case-by-case basis and will be dependant on specific elements in each individual progress plan which is part of a SIP. In general, the progress inventories will be based on the base year inventory with modifications to accomodiate the following:

- Geographic Coverage: The geographic coverage would be limited to the nonattainment counties plus any sources in attainment counties that are covered by the modeling domain used to demonstrate progress compliance as specified in the progress plan.

- Sources and Source Categories Covered: The sources covered are limited to anthropogenic sources, both stationary and mobile. Biogenic and geogenic sources should not be included.

- Base Year from which Applicable Emission Reductions are Determined: The progress inventory should specify the Base Year. In most cases, this will be 2002.

- Milestone Dates for Demonstrating progress: These dates need to be specified in the progress inventory and will be specific to each progress plan.

- Type of Emissions to be Included in the progress inventory: For past and current years, the progress inventory should be based on actual emissions. Where projected emissions are used for future years, State, local and Tribal agencies should use the same type of emissions (actual or allowable or a combination of actual and allowable) that were used in the modeled attainment demonstration.

3.3.1 Specific Provisions for Ozone Reasonable Further Progress Inventories

Pollutants for which emissions must be reduced

Section 182(b)(1)(A) of the 1990 Clean Air Act Amendments mandates a 15 percent VOC emission reduction, accounting for growth, between 1990 and 1996 for moderate and above ozone nonattainment areas. Furthermore, section 182(c)(2)(B) of the CAA requires each serious and above ozone nonattainment area to submit a SIP revision providing for VOC emission reductions of at least 3 percent per year averaged over each consecutive 3-year period beginning in 1996 until the area's attainment date (the post-1996 ROP plan). Section 182(c)(2)(C) of the CAA allows for substitution of NO_x for VOC emissions reductions in the post-1996 ROP plan. Generally, with some exceptions according to transitional variences between the 1-hour and the 8-hour standards, the 8-hour implementation scheme for

ROP follows similar timing and requirements beginning with 2002 as the baseyear through consecutive classification areas to the 2024 attainment year for extreme areas.

Temporal basis of emissions reductions

For moderate and higher classified areas, the first RFP SIP must be submitted within 3 years after the area's nonattainment designation. For areas with a June 15, 2004 effective date, for the 8-hour designations, the SIP would be due by June 15, 2007. This would provide up to 3 years for States to develop and submit RFP plans, and 1 additional year (until the end of 2008) for control measures to be implemented. The RFP SIP for any remaining 3-year periods out to the attainment date beyond the first 6 years would be submitted with the attainment demonstration, i.e., within 3 years after designation. However, since States maintain the flexibility to submit plans early to provide more time for implementation of their SIP control measures, we recommend that States complete their RFP plans as expeditiously as practicable after designation to provide as much time as possible for sources to implement the emission reductions.

Methods for calculating emission reductions

We proposed a methodology for the calculation of RFP target levels of emissions that is based on the method we developed for the 1-hour standard, while taking into account our interpretation of CAA restrictions on creditable emissions and our proposal to use the 2002 inventory as the baseline inventory for the RFP requirement. The CAA specifies four types of measures that were not creditable toward the 15 percent RFP requirement. These were:

(1) Any measure relating to motor vehicle exhaust or evaporative emissions promulgated by the Administrator by January 1, 1990;

(2) Regulations concerning Reid Vapor Pressure that would go into effect in 1992;

(3) State regulations submitted to correct deficiencies in existing VOC RACT regulations or previously required RACT rules;

(4) State regulations submitted to correct deficiencies in I/M programs.

These four types of measures were all expected to result in a decrease in emissions between 1990 and 1996. Of these four types of measures, RACT and I/M program corrections and the 1992 RVP requirements were completely in place by 1996 and therefore are already accounted for in the 2002 baseline. As a result, they would produce no additional reductions between 2002 and 2008 or later milestone years.

However, the pre-1990 Federal Motor Vehicle Control Program (FMVCP) will continue to provide additional benefits during the first two decades of the 21st century as remaining vehicles meeting pre-1990 standards are removed from the vehicle fleet. Because these benefits are not creditable for RFP purposes, in order to calculate the target level of emissions for future RFP milestone years (i.e., 2008, 2011, etc.), States must first calculate the reductions that would occur over these future years as a result of the pre-1990 FMVCP. We proposed three methods to properly account for the non-creditable reductions when calculating RFP targets for the 2008 and later RFP milestone years.

The calculation methods have been revised to account for NO_x and for other emissions models. These methods are consistent with the requirements of sections 182(b)(1)(C) and (D) and 182(c)(2)(B) of

the Act.

States must use the following methods to properly account for the non-creditable emission reductions when calculating ROP targets for the 2008 and later ROP milestone years.[AB]

(1) Method 1: For areas that must meet a 15 percent VOC reduction requirement by 2008:

(A) Estimate the actual anthropogenic base year VOC inventory in 2002 with all 2002 control programs in place for all sources.

(B) Using the same highway vehicle activity inputs used to calculate the actual 2002 inventory, run the appropriate motor vehicle emissions model for 2002 and for 2008 with all post-1990 CAA measures turned off. Any other local inputs for vehicle inspection and maintenance (I/M) programs should be set according to the program that was required to be in place in 1990. Fuel Reid Vapor Pressure (RVP) should be set at 9.0 or 7.8 depending on the RVP required in the local area as a result of fuel RVP regulations promulgated in June, 1990.

(C) Calculate the difference between the 2002 and 2008 VOC emission factors calculated in Step B and multiply by 2002 vehicle miles traveled (VMT). The result is the VOC emissions reductions that will occur between 2002 and 2008 without the benefits of any post-1990 CAA measures. These are the non-creditable reductions that occur over this period.

(D) Subtract the non-creditable reductions calculated in Step C from the actual anthropogenic 2002 inventory estimated in step A. This adjusted VOC inventory is the basis for calculating the target level of emissions in 2008.

(E) Reduce the adjusted VOC inventory calculated in step D by 15 percent. The result is the target level of VOC emissions in 2008 in order to meet the 2008 ROP requirement. The actual projected 2008 inventory for all sources with all control measures in place and including projected 2008 growth in activity must be at or lower than this target level of emissions.

(2) Method 2: For areas that qualify and must meet an 18 percent VOC emission reduction requirement by 2008 with NOx substitution allowed, following EPA's NOx Substitution Guidance:

(A) Estimate the actual anthropogenic base year inventory for both VOC and NOx in 2002 with all 2002 control programs in place.

[A]These method assume the use of EPA's on-road motor vehicle emissions model in all States other than California. All of the methods given here required the user to turn off all post-1990 Clean Air Act measures as part of the calculation. In EPA's current motorvehicle emmisions model, MOBILE62, this is accomplished using the NO CLEAN AIR ACT commands as described in the MOBILE6.2 User's Guide (found at http://www.epa.gov/otaq/m6.htm). Users of future versions of EPA's motor vehicle emissions model should consult the appropriate User's Guide for the version of the model they are using for instructions on what model command to use. For California nonattainment areas, the current motor vehicle emissions model is EMFAC2002. Users modeling Californa nonattainment areas should consult with the EPA Regional Office for information on doind equivalent calculations in the model and in future versions.

(B) Using the same highway vehicle activity inputs used to calculate the actual 2002 inventory, run the appropriate motor vehicle emissions model for 2002 and for 2008 with all post-1990 CAA measures turned off. Any other local inputs for I/M programs should be set according to the program that was required to be in place in 1990. Fuel RVP should be set at 9.0 or 7.8 depending on the RVP required in the local area as a result of fuel RVP regulations promulgated in June, 1990.

(C) Calculate the difference between 2002 and 2008 VOC emissions factors calculated in Step B and multiply by 2002 VMT. The result is the VOC emissions reductions that will occur between 2002 and 2008 without the benefits of any post-1990 CAA measures. These are the non-creditable VOC reductions that occur over this period. Calculate the difference between 2002 and 2008 NOx emissions factors calculated in Step B and multiply by 2002 VMT. This result is the NOx emissions reductions that will occur between 2002 and 2008 without the benefits of any post-1990 CAA measures. These are the non-creditable NOx reductions that occur over this period.

(D) Subtract the non-creditable VOC reductions calculated in Step C from the actual anthropogenic 2002 VOC inventory estimated in Step A. Subtract the non-creditable NOx reductions calculated in Step C from the actual anthropogenic 2002 NOx inventory estimated in Step A. These adjusted VOC and NOx inventories are the basis for calculating the target level of emissions in 2008.

(E) The target level of VOC and NOx emissions in 2008 needed to meet the 2008 ROP requirement is any combination of VOC and NOx reductions from the adjusted inventories calculated in Step D that total 18 percent. For example, the target level of VOC emissions in 2008 could be a 10 percent reduction from the adjusted VOC inventory in Step D and an 8 percent reduction from the adjusted NOx inventory in Step D. The actual projected 2008 VOC and NOx inventories for all sources with all control measures in place and including projected 2008 growth in activity must be at or lower than the target levels of VOC and NOx emissions.

(3) Method 3: For all areas that have used Method 1 above (and therefore do not have a NOx target level of emissions for 2008) and must meet an additional reduction VOC requirement of 9 percent every 3 years after 2008 with NOx substitution allowed, follow EPA's NOx Substitution Guidance. Each subsequent target level of emissions should be calculated as an emissions reduction from the previous target.

(A) Estimate the actual anthropogenic base year NOx inventory in 2002 with all 2002 control programs in place for all sources.

(B) Using the same highway vehicle activity inputs used to calculate the actual 2002 inventory, run the appropriate emissions model for VOC and NOx in 2002 and 2008 (previously done in Step B in Method 1 for VOC but not necessarily for NOx) and 2011 with all post-1990 CAA measures turned off. Any other local inputs for I/M programs should be set according to the program that was required to be in place in 1990. Fuel RVP should be set at 9.0 or 7.8 depending on the RVP required in the local area as a result of fuel RVP regulations promulgated in June, 1990.

(C) Calculate the difference between 2008 and 2011 VOC emission factors calculated in Step B and multiply by 2002 VMT. The result is the VOC emissions reductions that will occur between 2008 and 2011 without the benefits of any post-1990 CAA measures. These are the

non-creditable VOC reductions that occur over this period. Calculate the difference between 2002 and 2011 NOx emission factors calculated in Step B and multiply by 2002 VMT. The result is the NOx emissions reductions that will occur between 2002 and 2011 without the benefits of any post-1990 CAA measures. These are the non-creditable NOx reductions that occur over this period.

(D) Subtract the non-creditable VOC reductions calculated in Step C from the 2008 VOC target level of emissions calculated previously. Subtract the non-creditable NOx reductions calculated in Step C from the actual 2002 NOx inventory of emissions calculated in Step A. These adjusted VOC and NOx inventories are the basis for calculating the target level of emissions in 2011.

(E) The target level of VOC and NOx emissions in 2011 needed to meet the 2011 ROP requirement is any combination of VOC and NOx reductions from the adjusted inventories calculated in Step E that total 9 percent. For example, the target level of VOC emissions in 2011 could be a 4 percent reduction from the adjusted VOC inventory in Step C and an 5 percent reduction from the adjusted NOx inventory in Step C. The actual projected 2011 VOC and NOx inventories for all sources with all control measures in place and including projected 2011 growth in activity must be at or lower than the target levels of VOC and NOx emissions.

(F) For subsequent 3-year periods until the attainment date, repeat the process for VOC. For subsequent 3-year periods, the adjusted NOx inventory should be based on the difference in NOx emissions during that 3-year period when all post-1990 CAA measures are turned off, subtracted from the previous NOx target level of emissions. For example, for 2014, take the difference in NOx emissions reductions that will occur between 2011 and 2014 without the benefits of any post-1990 CAA measures. This value is subtracted from the 2011 target level of NOx emissions calculated in Step D to get the adjusted NOx inventory to be used as the basis for calculating the target level of NOx emissions in 2014.

(4) Method 4: For all areas that have used Method 2 above (and therefore do have a NOx target level of emissions for 2008) and must meet an additional reduction VOC requirement of 9 percent every 3 years after 2008 with NOx substitution allowed, following EPA's NOx Substitution Guidance. Each subsequent target level of emissions should be calculated as an emissions reduction from the previous target.

(A) Using the same highway vehicle activity inputs used to calculate the actual 2002 inventory, run the appropriate emissions model for VOC and NOx in 2008 (previously done in Step B in Method 2) and 2011 with all post-1990 CAA measures turned off. Any other local inputs for I/M programs should be set according to the program that was required to be in place in 1990. Fuel RVP should be set at 9.0 or 7.8 depending on the RVP required in the local area as a result of fuel RVP regulations promulgated in June, 1990.

(B) Calculate the difference between 2008 and 2011 VOC emission factors calculated in Step A and multiply by 2002 VMT. The result is the VOC emissions reductions that will occur between 2008 and 2011 without the benefits of any post-1990 CAA measures. These are the non-creditable VOC reductions that occur over this period. Calculate the difference between 2008 and 2011 NOx emission factors calculated in Step A and multiply by 2002 VMT. The result is the NOx emissions reductions that will occur between 2008 and 2011 without the benefits of any post-1990 CAA measures. These are the non-creditable NOx reductions that

occur over this period.

(C) Subtract the non-creditable VOC reductions calculated in Step B from the 2008 VOC target level of emissions calculated previously. Subtract the non-creditable Nox reductions calculated in Step B from the 2008 NOx target level of emissions calculated previously. These adjusted VOC and NOx inventories are the basis for calculating the target level of emissions in 2011.

(D) The target level of VOC and NOx emissions in 2011 needed to meet the 2011 ROP requirement is any combination of VOC and NOx reductions from the adjusted inventories calculated in Step E that total 9 percent. For example, the target level of VOC emissions in 2011 could be a 4 percent reduction from the adjusted VOC inventory in Step C and an 5 percent reduction from the adjusted NOx inventory in Step C. The actual projected 2011 VOC and NOx inventories for all sources with all control measures in place and including projected 2011 growth in activity must be at or lower than the target levels of VOC and NOx emissions.

(E) Repeat entire process for subsequent 3-year periods until the attainment date.

Creditable emission reductions

Section 182(b)(1) contains provisions that limit creditability toward meeting RFP for certain limited emission reduction measures required prior to the enactment of the CAA Amendments of 1990. The final rule for implementation of the ozone NAAQS states that all emissions reductions that occur from all Federal and any other measures (not otherwise identified in section 182(b)(1)(D)) implemented after the 2002 baseline emission inventory year would be creditable to the RFP requirement. Obviously, reductions that occur prior to the baseline year would be incorporated into the baseline and could not be credited.

3.3.2 Specific Provisions for PM Reasonable Further Progress Inventories

Overview

As discussed in Section 2.3, under the $PM_{2.5}$ implementation program, $PM_{2.5}$ SIPs are due three years from designation (April 2008 for the initially designated nonattainment areas). The basic requirements of section 172, subpart 1 of the CAA, state that an area must attain as expeditiously as practicable, but no later than 5 years after designation. It also states that under certain circumstances, EPA may approve a request for an attainment date extension of an additional five years. EPA does not intend to impose additional RFP-related requirements for an area that can attain within 5 years of designation (i.e., two years after submittal of the attainment demonstration). However, an area that requests an attainment date extension will need to establish emission reduction milestones for January 1, 2010 and, if applicable, January 1, 2013, for those pollutants with emission reduction measures in the attainment demonstration. The January 2010 milestones should reflect progress in emission reductions from the 2002 base year through the 2009 emissions year. Likewise, the January 2013 milestones should reflect progress in emission reductions from the 2002 base year through the 2012 emissions year. These milestones should reflect reasonable progress in reaching levels to attain the standards. They should not reflect that a majority of the emission reductions will occur in the last two years prior to the attainment date.

Pollutants for which emissions must be reduced

The pollutants that may be addressed in the emission inventory for RFP purposes are primary $PM_{2.5}$, SO_2, NO_X, VOC, and ammonia. However, a state's attainment demonstration may not include control measures addressing all of these pollutants. Thus, for RFP purposes, the state should track changes in

those emissions addressed in the attainment demonstration. All emissions reductions that occur from all Federal and any other measures implemented after the baseline emission inventory year would be creditable to the RFP requirement. Obviously, reductions that occur prior to the baseline year would be incorporated into the baseline and could not be credited.

Spatial basis of emissions reductions

The tracking of emission reductions through the RFP inventory will vary geographically depending on the pollutant or precursor. For direct $PM_{2.5}$ emissions, including emissions of elemental carbon, organic particles and inorganic particles such as metals and crustal material, RFP should be assessed based on emissions within the nonattainment area. Direct $PM_{2.5}$ emissions from sources outside the nonattainment area should not be considered. Because NO_X and SO_2 emissions are pollutants that can lead to regional formation of particle sulfate and nitrate many miles from the source, States may include sources up to 200 kilometers outside the nonattainment area in tracking RFP and associated emissions reduction milestones. This policy is consistent with previous guidance issued for the 1-hour ozone program[B]. The ozone guidance provides that in their RFP baseline inventories, States at a minimum are required to include all sources of NO_X and VOC emissions from within the nonattainment area. EPA believes that for $PM_{2.5}$, it is appropriate to allow for the possibility of crediting SO_2 and NO_X reductions outside the nonattainment area because numerous technical studies have generally demonstrated the long-range transport of sulfates and nitrates.

Any State proposing to take credit for reductions by any NO_X or SO_2 source located within 200 kilometers of the nonattainment area will need to include with its SIP submittal appropriate documentation demonstrating that emissions from the sources outside the nonattainment area contribute to fine particle concentrations within the nonattainment area. Because of the uncertainty associated with VOC contributions to $PM_{2.5}$ concentrations, we do not believe it would be appropriate to extend the policy to VOC sources located 100 kilometers outside of a $PM_{2.5}$ nonattainment area.

The EPA expects that analyses conducted as part of the attainment demonstration will help identify the most appropriate geographic range of interest for each pollutant. EPA believes that if an area concludes that controls for a specific pollutant on an alternate geographic scale are more appropriate for reaching attainment, the area should use that same alternate geographic scale in assessing RFP. In particular, for each pollutant addressed, the same geographic scale must be used in analyzing the 2002 inventory, the attainment year inventory, and any RFP milestone year inventories, in order to assure that the milestones in fact represent RFP on a path to timely attainment.

3.4 GUIDANCE FOR CREATING ANNUAL ON-ROAD MOBILE SOURCE EMISSION INVENTORIES FOR PM2.5 NONATTAINMENT AREAS FOR USE IN SIPS AND CONFORMITY

This guidance was developed by EPA's Office of Transportation and Air Quality (OTAQ) for

[B]Memorandum of December 29, 1997 from Richard D. Wilson to Regional Administrators, Regions I-X re "Guidance for Implementing the 1-Hour Ozone and Pre-Existing PM_{10} NAAQS." Located at URL: http://www.epa.gov/ttn/oarpg/t1/memoranda/iig.pdf. This policy recognized that VOC emissions up to 100 km and NO_x emissions up to 200 km from the nonattainment area could be relied on for RFP. The specified distances resulted from discussions of the FACA Subcommittee on Ozone, PM, and Regional Haze Implementation Programs. Because some stakeholders have expressed concerns about this policy, EPA is in the process of subjecting this policy to a technical review and may revise it in light of that review.

estimating on-road motor vehicle emissions to meet state air quality implementation plan (SIP) and transportation conformity requirements. The guidance has been issued separately by OTAQ and is available at: http://www.epa.gov/otaq/transp/conform/policy.htm#sips. This guidance is repeated for the convenience of the emission inventory community in Appendix C.

3.5 MODELING INVENTORIES

This section explains the procedures by which emissions in a completed base year or projection year inventory are temporally allocated, spatially allocated, and speciated for use in a photochemical grid model. By explaining these procedures, it is anticipated that State, local and Tribal agencies will be able to provide more complete and accurate data to increase the accuracy of the procedures. Note, however, that the information on preparing gridded inventories is presented for informational purposes. The procedures described are generally applicable to those applied in common emissions models, including the Sparse Matrix Operator Kernel Emissions Modeling System (SMOKE), the Emissions Modeling System (EMS-95 and EMS-2001), and the Emissions Processing System 2.0 (EPS 2.0). In this guidance, specific examples are provided that are consistent with the methods employed by SMOKE.

Specific air quality modeling guidance has been completed. It is titled "Guidance on the Use of Models and Other Analysis in Attainment Demonstrations for the 8 Hour Ozone NAAQS" and is available on the EPA's SCRAM website (http://www.epa.gov/ttn/scram/guidance_sip.htm#8ozone). This guidance should be consulted for more specific information in the preparation of modeling inventories.

State, local and Tribal agencies should consult with their modeling staff and EPA Regional Office to verify the procedures that will be used to process their inventory data for modeling and make adjustments as needed. Once these decisions have been made, State, local and Tribal agencies should document their approach in the IPP.

It is possible that State, local and Tribal agencies will need to develop microscale, day-specific inventories to support air quality modeling efforts. These detailed emission inventories may be developed for any number of State-specific purposes, including model performance evaluation. The EPA encourages State, local and Tribal agencies to report emissions data at the highest level of detail available. However, State, local and Tribal agencies are not required to develop these data for the sole purpose of reporting them to EPA.

In order to develop high quality modeling inventories, sufficient detail in the specification of source categories is necessary. For example, in the aircraft sector, if emissions data are available for military aircraft, commercial aircraft, and general aviation (e.g., civil aircraft), these data should be maintained at this level of resolution in order to allow for appropriate temporal and spatial allocation of emissions. Similarly, emissions for other nonroad and nonpoint sources should be reported at the highest level of resolution available. For the onroad sector, the use of EPA's latest SCC codes allow evaporative and exhaust emissions to be reported separately. These distinctions should be maintained so that appropriate speciation profiles can be applied, because the composition of exhaust and evaporative VOC from onroad vehicles is different.

3.5.1 Temporal Allocation Procedures

Emissions models temporalize annual emissions monthly and/or seasonally, weekly (day of the week), and diurnally in order to allocate emissions to a given hour. Diurnal (hour of day) allocation is performed separately for weekdays and weekend days. Alternatively, emissions can be input to emissions models as daily totals. The following discussion describes the methods used to temporally allocate annual emissions

to hourly emissions. SMOKE uses the same temporal profile file format for point, nonpoint, and mobile sources. This file contains all of the monthly, weekly, and diurnal profiles and profile codes used to temporally allocate emissions.

SMOKE uses two sets of diurnal profiles: one for weekdays and another for weekend days. In addition to the temporal profile files used by SMOKE, a temporal cross-reference file is also used. SMOKE uses 3 different cross-reference files for point, nonpoint/nonroad, and onroad sources. The information in this file is used to assign source categories to the temporal profiles described above. In addition to specifying the temporal profiles to assign to a given SCC, the cross-reference files allow for specification of temporal allocation based on pollutant type. For example, if a source category has different temporal patterns of NO_x and VOC emissions, separate temporal profiles can be assigned to these pollutants. Also, if emissions vary by State or county within the modeling domain, different temporal profiles can be assigned at the State or county level.

3.5.2 Spatial Allocation Procedures

To prepare emissions for photochemical modeling, these emissions should be spatially allocated both horizontally and vertically. Horizontal spatial allocation refers to placing the emissions in the proper grid cell on the emissions modeling grid to be used in the modeling exercise. Vertical spatial allocation refers to placing the emissions in the proper layer, that is, the distance into the atmosphere, in which emissions are deposited. Spatial allocation procedures used for point sources are different than those used for nonpoint and mobile sources. Procedures used for spatial allocation of point source and nonpoint/mobile source emissions are described below.

3.5.2.1 Point Sources

Point sources are spatially allocated to an emissions modeling grid by the geographic coordinates of a stack or facility. Geographic coordinates should be supplied as part of the point source inventory. Some emissions models can handle either latitude/longitude coordinates or Universal Transverse Mercator (UTM) coordinates (e.g., SMOKE). For EMS-95, latitude/longitude coordinates must be converted to UTM prior to input to EMS-95. Emissions models use the geographic coordinates to place the associated emissions in the appropriate grid cell.

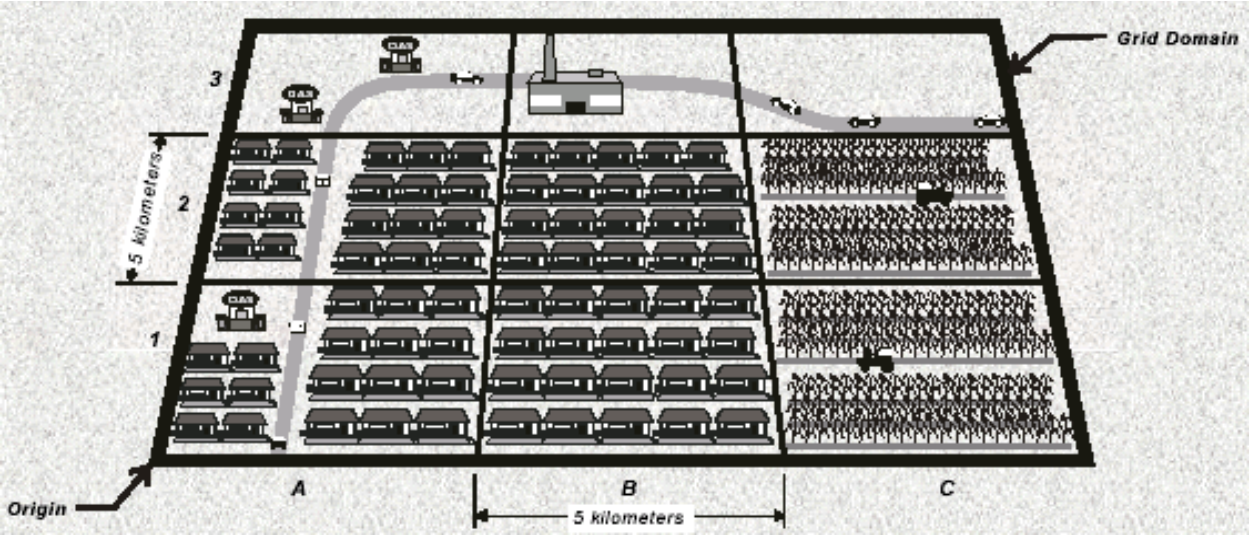
The vertical layer that point source emissions are deposited in is based on the plume rise of the emissions. The plume rise of emissions is calculated based on the stack parameters supplied in the point source inventory. Therefore, it is important that State, local and Tribal agencies provide accurate stack parameters (height, diameter, gas exit temperature, velocity, and flow rate) as part of their point source inventory submissions.

3.5.2.2 Nonpoint and Mobile Sources

Most nonpoint and mobile source inventories contain countywide emissions. Emissions modeling grids are not based on political boundaries and in almost all cases they represent smaller areas than counties. Therefore, countywide nonpoint and mobile source emissions must be allocated to grid cells prior to photochemical modeling. Figure 3.5-1 shows a simplified modeling grid with the locations of several emissions sources. This grid has 9 grid cells which are identified by row and column (e.g., grid cell A,1 is in the lower left-hand corner).

Emission models use spatial surrogates to allocate county-level emissions to modeling grid cells. Ideally, these spatial surrogates closely approximate both the location and magnitude of the emissions for the nonpoint or mobile source. For each spatial surrogate, the emissions modeler must specify which surrogate data best approximate the location of the actual source (e.g., area of specified land use/land cover, length of roadway, population counts, housing counts). The modeler assigns each nonpoint or mobile source category to a unique spatial surrogate in a cross-reference file (e.g., residential natural gas combustion emissions assigned to housing, dry cleaning emissions assigned to population).

Figure 3.5-1. Simplified Graphic of a Modeling Domain (Radian, 2000) [8]



For example, single-family housing is often used as a surrogate for residential natural gas combustion. This surrogate closely approximates the location and magnitude of emissions in residential areas with natural gas service. On the other hand, emissions are allocated incorrectly to areas that do not have natural gas service. Often, in the selection of spatial surrogates, there is a trade-off in the quality of the surrogate based on data availability and the cost of new surrogate data development.

Population has often been used in the past as a surrogate for many source categories, including emissions from gasoline service stations. In this case, the surrogate is probably adequate for allocating emissions to a coarse grid (e.g., national or regional 36-square kilometers). However, for fine grids (e.g., 1- or 4-square kilometers for smaller spatial domains), emissions will be allocated poorly since gasoline service stations tend to be located in commercial areas as opposed to residential areas. Hence, the parameters and objectives of the modeling exercise should be considered during the selection or development of spatial surrogates.

In some cases a surrogate (e.g., agricultural cropland) will not exist in a county although an emissions estimate for a nonpoint source category (e.g., farm harvesting equipment) may be assigned to the surrogate. In such a case, the emissions model (e.g., EMS-95) may have the capability to assign a secondary surrogate (e.g., rural land use). If the secondary surrogate also does not exist in the county, the population surrogate acts as the default since population covers the entire domain. Figure 3.5-2 shows some example spatial surrogate fractions calculated for the simplified domain in Figure 3.5-1.

The EPA encourages the use and further development of the most representative data for use as spatial surrogates. Table 3.5-1 provides 2002 U.S. spatial surrogate information from EPA's Emissions Modeling Clearinghouse (EMCH). These data include ArcView® Geographic Information System (GIS) shape files and the associated databases. These data are continually being updated and can be downloaded from EPA's EMCH web site at http://www.epa.gov/ttn/chief/emch/index.html. The EPA is currently developing databases of spatial surrogate fractions for the U.S. 4-square kilometer unified grid. See the EMCH website for more information on these databases and the unified grid.

Figure 3.5-2. Example Spatial Surrogate Fractions Corresponding to Figure 3.5-1

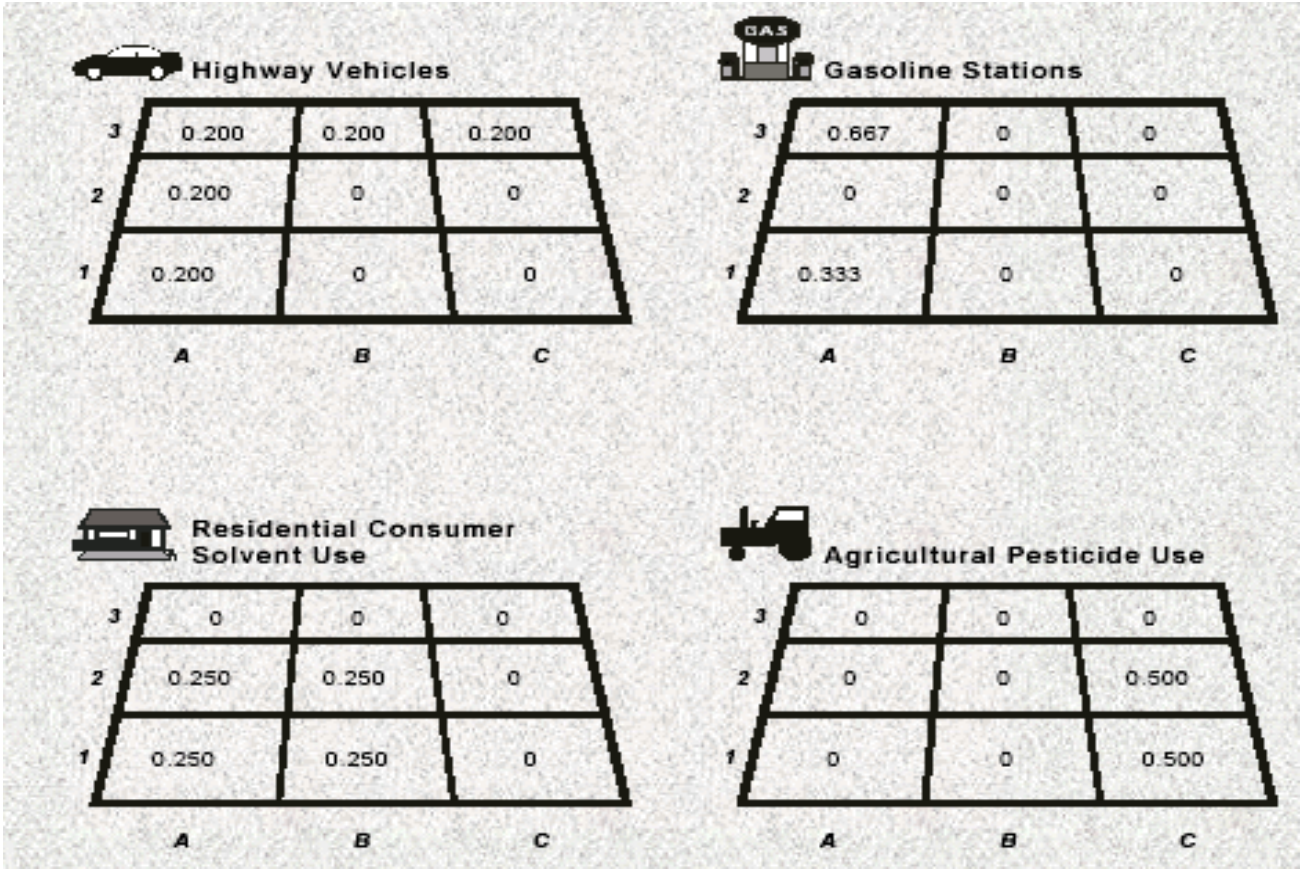


Table 3.5-1. 2002 EMCH Nonpoint Source Spatial Surrogate Data for the United States

Surrogate (data form)	Description
Agriculture (polygon)	Data source: National Land Cover Database (NLCD) from the U.S. Geological Service. Data attributes include: non-agricultural, orchards/vineyards, pasture/hay, row crops, small grains, and fallow land.
Airports (point)	Data source: U.S. Bureau of Transportation Statistics and the Federal Aviation Administration. Data attributes include facility use (public or private), owner (Air Force, Navy, Army, Private, Public), commercial enplanements, commuter enplanements, air taxi enplanements, foreign flight enplanements, total enplanements, and % of total U.S. enplanements.
Dry Cleaners (polygon)	Data source: U.S. Census Bureau Zip Code Statistics. Data attributes include total number of dry cleaners in each zip code, number of dry cleaners by employee size range in each zip code, and number of facilities per polygon.
Forest (polygon)	Data source: NLCD. Data attributes include: non-forest, deciduous forest, evergreen forest, mixed forest, and woody wetlands.
Four Mile Urban Buffer (polygon)	Data source: U.S. Bureau of Census. Four mile urban buffer built around each designated urban area. Data attributes include a buffer code (urban area, urban buffer, non-urban area) and urban area type).
Gas Stations (polygon)	Data source: U.S. Bureau of Census. Number of gas stations in each Census Block Group.
Golf Courses (point)	Data source: U.S. Geological Survey - Geographic Name Inventory System. Data attributes include golf course name.
Home Heating Fuel (polygon)	Data source: U.S. Bureau of Census - 2000 Census. Data attributes include total housing units in each Census Block Group, number of housing units in each Census Block Group using the following fuels as the primary source of heat: utility (natural) gas, propane, electricity, fuel oil, coal, solar, other fuel, or no fuel.
Landuse (polygon)	Data source: Federal Emergency Management Association. Resolution is 1990 census tract level. Data attributes include: Square footage of various building types including various residential, commercial, industrial, government, and educational categories.
Land/Water (polygon)	Data source: NLCD. Data attributes include land, inland water, and coastal water.
Low Intensity Residential (polygon)	Data source: NLCD. Identifies areas with low intensity residential land use.
Mines (point)	Data source: U.S. Geological Service. Data attributes include type of operation and type of commodity.
Mines (polygon)	Data source: NLCD. Data attributes are either mine area or non-mine area.
National Forest Areas (polygon)	Data source: U.S. Forest Service. Data attributes include national forest name.

Table 3.5-1 (continued)

Surrogate (data form)	Description
Native American Reservations (polygon)	Data source: U.S. Bureau of Census. Data attributes include reservation name.
Natural Gas Facilities (point)	Data source: Federal Emergency Management Association. Data attributes include the main function of the facility.
Navigable Waterways (line)	Data source: U.S. Army Corps of Engineers. Data attributes include geographic class (Great Lakes, Ocean, Inland Waterway), functional class (no traffic, shallow draft, deep draft, both), waterway type (harbor, intracoastal waterway, sealane, etc.).
Oil Facilities (point)	Data source: Federal Emergency Management Association. Data attributes include facility function (tank farm or production plant).
Population (polygon)	Data source: U.S. Bureau of Census - 2000 Census. Resolution of data is 2000 census tract level. Data attributes include population, housing units, housing density, and demographic data.
Population Change (polygon)	Data source: U.S. Bureau of Census - 2000 Census. Change in U.S. population between 1990 and 2000. Data attributes include 1990 population based on Census 2000 block groups, 2000 population, and calculated change in population.
Ports (point)	Data source: U.S. Army Corps of Engineers. Comprised of major national commercial shipping ports. Data attributes include number of berths and main function (type of goods).
Railroads (line)	Data source: U.S. Bureau of Transportation Statistics - Federal Railroad Administration. Data attributes include abandoned rail lines, passenger service, military service, and railroad class type (Class 1, 2, 3, A, O/U).
Roads (line)	Data source: U.S. Census Bureau TIGER Data. Data attributes include road classes - urban primary, rural primary, urban secondary, and rural secondary.
Timber Harvesting (point)	Data source: U.S. Forest Service, Forest Inventory and Analysis Survey. Data attributes include timber site size, forest type (many species), owner type (various public and private owners).
Urban (polygon)	Data source: U.S. Bureau of Census. Data attributes include urban area type (urban area, urban cluster).
Waste-Water Treatment Plants (point)	Data source: Federal Emergency Management Association. Point locations of waste-water treatment plants.

A source category code (SCC) to spatial surrogate cross-reference file can also be downloaded from the EMCH. Because there are over 340,000 State/county/nonpoint source category combinations, it is not possible to list all spatial surrogate assignments here. However, Table 3.5-2 provides an overview of assignments contained in the EMCH cross-reference file available in January of 2003. The table identifies the 4-digit nonpoint source category code (note that nonpoint source category codes are 10 digits long), a brief description of the nonpoint source category, and the predominant nonpoint source spatial surrogate to which most of the nonpoint source categories have been assigned. This table is strictly an overview and does not show many other surrogate assignments that differ at the 10-digit SCC level. See the cross-reference file located at the EMCH web-site for more detailed assignments. As spatial surrogate data

improves, changes will continue to be made to the assignments shown in the cross-reference file. For example, many of the new sources of spatial surrogate data shown in Table 3.5-2 will supplant the current assignments (e.g., the dry cleaning spatial surrogate data will be used instead of population).

It should be noted that some areas may have link-based VMT data that can be used to develop much more refined spatial surrogates for onroad mobile sources. The use of link-based VMT spatial surrogates allocates emissions to specific road segments based on the number of miles traveled on that segment. Hence, the accuracy of spatial allocation is improved dramatically over allocating emissions to a gridded roadway length.

Both nonpoint and mobile source emissions are assumed to be ground-level sources, that is, deposited into the surface layer. Therefore, no vertical spatial allocation is needed for these sources.

Table 3.5-2. Four-digit Nonpoint Source Category Codes and the Predominant Nonpoint Source Spatial Surrogate

4-digit Nonpoint Source Category Code	Major Category Description (2-digit Nonpoint Source Category)	Minor Category Description (4-digit Nonpoint Source Category)	Predominant 4-Digit Nonpoint Source Spatial Surrogate
Default	Default	Default	Population
2101	Stationary Source Fuel Combustion	Electric Utility	Population
2102	Stationary Source Fuel Combustion	Industrial	Population
2103	Stationary Source Fuel Combustion	Commercial/Institutional	Population
2104	Stationary Source Fuel Combustion	Residential	Housing
2199	Stationary Source Fuel Combustion	Total Nonpoint Source Fuel Combustion	Land Area
2260	Mobile Sources	Off-highway Vehicle Gasoline 2-Stroke	Population
2265	Mobile Sources	Off-highway Vehicle Gasoline 4-Stroke	Population
2270	Mobile Sources	Off-highway Vehicle Diesel	Population
2275	Mobile Sources	Aircraft	Airports
2280	Mobile Sources	Marine Vessels Commercial	Ports
2282	Mobile Sources	Marine Vessels Recreational	Water Area
2283	Mobile Sources	Military Marine Vessels	Ports
2285	Mobile Sources	Railroads	Railroads
2294	Mobile Sources	Paved Roads	Population, Urban
2296	Mobile Sources	Unpaved Roads	Population, Rural
2301	Industrial Processes	Chemical Manufacturing: SIC 28	Population
2302	Industrial Processes	Food and Kindred Products: SIC 20	Population
2303	Industrial Processes	Primary Metal Production: SIC 33	Population
2304	Industrial Processes	Secondary Metal Production: SIC 33	Population
2305	Industrial Processes	Mineral Processes: SIC 32	Population
2306	Industrial Processes	Petroleum Refining: SIC 29	Population
2307	Industrial Processes	Wood Products: SIC 24	Population
2308	Industrial Processes	Rubber/Plastics: SIC 30	Population
2309	Industrial Processes	Fabricated Metals: SIC 34	Population
2310	Industrial Processes	Oil and Gas Production: SIC 13	Population, Rural
2311	Industrial Processes	Construction: SIC 15 - 17	Housing
2312	Industrial Processes	Machinery: SIC 35	Population
2325	Industrial Processes	Mining and Quarrying: SIC 14	Population, Rural
2390	Industrial Processes	In-process Fuel Use	Population
2399	Industrial Processes	Industrial Processes: NEC	Population
2401	Solvent Utilization	Surface Coating	Population
2415	Solvent Utilization	Degreasing	Population
2420	Solvent Utilization	Dry Cleaning	Population
2425	Solvent Utilization	Graphic Arts	Population
2430	Solvent Utilization	Rubber/Plastics	Population

4-digit Nonpoint Source Category Code	Major Category Description (2-digit Nonpoint Source Category)	Minor Category Description (4-digit Nonpoint Source Category)	Predominant 4-Digit Nonpoint Source Spatial Surrogate
2440	Solvent Utilization	Miscellaneous Industrial	Population
2460	Solvent Utilization	Miscellaneous Nonindustrial: All Classes	Population
2461	Solvent Utilization	Miscellaneous Nonindustrial: Commercial	Population
2465	Solvent Utilization	Miscellaneous Nonindustrial: Consumer	Population
2500	Storage and Transport	***UNKNOWN***	Population, Rural
2501	Storage and Transport	Petroleum and Petroleum Product Storage	Population, Rural
2505	Storage and Transport	Petroleum and Petroleum Product Transport	Population
2510	Storage and Transport	Organic Chemical Storage	Population, Rural
2601	Waste Disposal, Treatment, and Recovery	On-site Incineration	Population
2610	Waste Disposal, Treatment, and Recovery	Open Burning	Population, Rural
2620	Waste Disposal, Treatment, and Recovery	Landfills	Population, Rural
2630	Waste Disposal, Treatment, and Recovery	Wastewater Treatment	Population, Rural
2640	Waste Disposal, Treatment, and Recovery	TSDFs	Population, Rural
2660	Waste Disposal, Treatment, and Recovery	Leaking Underground Storage Tanks	Population
2701	Natural Sources	Biogenic	Agriculture
2730	Natural Sources	Geogenic	Population, Rural
2740	Natural Sources	Miscellaneous	Water Area
2801	Miscellaneous Nonpoint Sources	Agriculture Production - Crops	Agriculture
2805	Miscellaneous Nonpoint Sources	Agriculture Production - Livestock	Agriculture
2810	Miscellaneous Nonpoint Sources	Other Combustion	Housing
2830	Miscellaneous Nonpoint Sources	Catastrophic/Accidental Releases	Population, Rural
2850	Miscellaneous Nonpoint Sources	Health Services	Population

3.5.3 Speciation Procedures

Another task performed by emissions models is VOC, NO_x, sulfur dioxide (SO_2), and PM speciation. Speciation is necessary in order to disaggregate these inventory pollutant species into air quality model species. VOC speciation is a 2-step process. First, the models calculate the amount of discrete VOC species emitted per unit mass of VOC. Second, the models "lump" these discrete species together into groups of lumped-model species. Additional details of these two steps follow:[9]

- ***discrete speciation*** - refers to splitting emissions for a pollutant into individual chemical compounds. For example, total organic gas (TOG) emissions from automobile exhaust may consist of 50 or more identified organic compounds (e.g., benzene, hexane, formaldehyde, etc.). Discrete speciation is performed using speciation profiles containing weight fractions for each chemical compound (e.g., profiles found in EPA's SPECIATE database);

- ***lumped-model speciation*** - refers to splitting emissions for a pollutant into groups of components that represent numerous discrete compounds. The groups of components are referred to as lumped-model species. The lumped-model species for TOG are developed using split factors that are specific to the type of chemical mechanism employed by the photochemical model to be used.

  For example, the Urban Airshed Model (UAM) uses the Carbon Bond IV (CB-IV) mechanism, therefore discrete compounds are lumped together based on the compounds' carbon bond structure. The single carbon-carbon bond HC compounds, for instance, are lumped into the paraffin (PAR) lumped-model species. For the California Statewide Air Pollution Research Center (SAPRC) mechanism employed by the Regional Acid Deposition Model (RADM) and the San Joaquin Valley Air Quality Study/Atmospheric Utilities Signatures, Predictions and Experiments Regional Modeling Adaption Project (SARMAP) Air Quality Model (SAQM), discrete compounds are lumped together based on their relative reactivity with the hydroxyl radical.

For NO_x emissions, these are discretely speciated into nitric oxide (NO) and nitrogen dioxide (NO_2) [and sometimes gaseous nitrous acid (HONO)]. The NO and NO_2 split factors for NO_x are typically based on an assumed composition of NO (as NO_2) and NO_2 (e.g., 90 percent NO as NO_2 and 10 percent NO_2). However, the NO mass can vary between 89 and 95 percent by weight. Sometimes, HONO mass is also included in the speciation (usually less than 2 percent of NO_x mass). SO_2 is discretely speciated into SO_2 and sulfate (SO_4). Important $PM_{2.5}$ species include EC, OC, SO_4, nitrates, NH_3 and organic gases that contribute to the formation of secondary organic aerosols (SOA). For most sources of $PM_{2.5}$, sulfates, nitrates and ammonia make up only a small portion of the total mass. However, EC and OC can make up a substantial fraction of $PM_{2.5}$ mass and are important contributors to visibility impairment and fine PM pollution.

Prior to discrete speciation, a pollutant conversion step is often necessary. The most common example of this is for VOC emissions. Most speciation profiles have been developed based on TOG instead of VOC or reactive organic gas (ROG). Therefore, the emissions model will apply a conversion factor to adjust the VOC (or ROG) emissions to approximate TOG emissions.

During the VOC speciation process, mass-based emissions from the emissions inventory (e.g., grams/hour) are converted into the mole-based emissions needed by the air quality model (e.g., moles/hour). While VOC speciation can be thought of as three separate steps in some cases (pollutant conversion, discrete speciation, lumped-model speciation), emissions models often perform these steps in one calculation by combining discrete and lumped-model speciation.

Other pollutants such as $PM_{2.5}$ do not require a step similar to the conversion of VOC to TOG. In addition, unlike the speciation of VOC, PM is not converted to molar values, as the chemistry applied in air quality models does not currently require it as direct input. For further details on speciation, see EPA's web site http://www.epa.gov/ttn/chief/emch/speciation/index.html.

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SECTION 4.0
DATA REPORTING AND DOCUMENTATION

As discussed in Section 2.5 of this document, inventories developed by States will be integral parts of other SIP planning tools, such as RFP emission reduction plans. Such inventories are referred to as "SIP inventories", and will need to be subject to a public hearing and approved into the State's SIP in conjunction with the associated regulatory planning SIP. To reduce the administrative burden, EPA recommends that the hearing on the SIP inventory be held in conjunction with the hearing on the associated regulatory plan.

Since the inventories described above will need to be approved into the State's SIP, the methods used to develop the emission estimates need to be clearly documented in a written report submitted to the appropriate EPA Regional office. The report should include descriptions and identification of the activity data and emission factors used, as well as any adjustments made to derive the required temporal basis for the estimates. States should discuss the timeframe and specific contents of these reports with their EPA Regional office. During these discussions, the already existing inventory data requirements brought about by EPA's Consolidated Emissions Reporting Rule (CERR) should be acknowledged to avoid duplication of effort. Section 4.1 provides an overview of the electronic emission data reporting requirements of the CERR which covers the data elements that will be necessary for the SIP inventories. Section 4.2 is a discussion of the written documentation that is needed to support the electronic data discussed in Section 4.1.

4.1 DATA REPORTING

The CERR requires specific data elements to be reported by State and local agencies to EPA for point, nonpoint, nonroad mobile, and onroad mobile source categories. The following sections summarize reporting for each of these four major source sectors, as well as biogenic and geogenic emission source categories. Electronic data transfer options are also discussed. The CERR, including the preamble, is included as Appendix A to this guidance document and is referenced where appropriate.

4.1.1 Point Sources

Point sources are large, stationary, identifiable emissions sources that release pollutants into the atmosphere. Sources are generally defined by State or local agencies as point sources if they annually exceed a specified pollutant emissions threshold. These thresholds may vary by State, but EPA has established certain minimum point source thresholds for both pollutant nonattainment areas and attainment areas.

According to the CERR, States are required to report data for larger point sources, or Type A point sources, on an annual basis, starting with the 2001 inventory. Type B sources refer to all point sources, including Type A sources. The reporting frequency for Type B sources has been established as once every 3 years, starting with the 2002 inventory.

The pollutant emission thresholds that define Type A and Type B sources are presented in Appendix A, Table 1. The data elements required to be reported are listed in Appendix A, Table 2a. The emissions thresholds also vary depending on whether a point source is located in a pollutant nonattainment area or attainment area (but the data elements are the same regardless of attainment status). It should also be noted that additional stack data elements, while not required for annual Type A point source reporting, should be

reported every 3 years.

4.1.2 Nonpoint Sources

Nonpoint sources are sources that do not qualify as point sources under the relevant emissions cutoffs. Nonpoint sources encompass more widespread sources that may be abundant, but that, individually, release small amounts of a given pollutant. Examples of nonpoint sources include dry cleaners, residential wood heating, autobody painting, fires, and consumer solvent use.

Every 3 years, beginning with the 2002 inventory, State, local and Tribal agencies should submit to EPA nonpoint source emissions data representing all relevant nonpoint source categories for the entire State. The data elements required for nonpoint source reporting are listed in Table 2b of Appendix A.

4.1.3 Nonroad Mobile Sources

Nonroad mobile sources can be defined as mobile and portable internal combustion powered equipment not generally licensed or certified for highway use. Nonroad engines can be classified according to distinct nonroad equipment categories, ranging from small lawn and garden equipment to heavy-duty construction equipment, large aircraft, and diesel locomotives. These general categories comprise specific types of applications (e.g., chainsaws, front mowers, and leaf blowers/vacuums are examples of lawn and garden applications).

Every 3 years, State, local and Tribal agencies should submit to EPA a statewide nonroad mobile source emissions inventory, starting with the 2002 inventory. Table 2b of Appendix A presents the data elements required to be reported for nonroad sources (which are identical to those elements required for nonpoint sources). If State, local and Tribal agencies make changes to the default NONROAD model inputs, discussed in more detail in Section 5.5.2, these input files should be submitted to EPA along with the nonroad data elements.

4.1.4 Onroad Mobile Sources

Onroad mobile sources are defined as those vehicles registered for use on public roadways, and include automobiles, light-duty and heavy-duty trucks, buses, and motorcycles. Onroad emissions are comprised of both exhaust (i.e., tailpipe) and non-exhaust (e.g., refueling, tire and brake wear) components.

States are required to submit a statewide onroad mobile source emissions inventory on a 3-year basis, starting with the year 2002. Table 2c of Appendix A presents the data elements required to be reported by State agencies for onroad mobile sources. The MOBILE model input files should also accompany the onroad mobile source data, so that these inputs are available for national and regional air quality modeling studies.

4.1.5 Biogenic and Geogenic Sources

Biogenic and geogenic sources are natural (i.e., nonanthropogenic) emissions sources. Biogenic sources are biological sources of ozone precursor emissions such as trees, agricultural crops, or microbial activity in soils or water. VOC and NO_x emissions can also result from geological activity, most notably from seeps of oil or natural gas, volcanoes, and fumaroles (i.e., vapor or gas vents in a volcanic region). Soil wind erosion is a geogenic source of PM_{10} and $PM_{2.5}$ emissions (although in the past this process has also been considered to be an anthropogenic fugitive dust component of PM emissions inventories). At this time, the emission estimation methodology for wind erosion is being refined by EPA. In addition, lightning

may also be a significant contributor to natural NO_x emissions in an inventory area. Table 2d of the CERR specifies the data elements for biogenic source reporting.

According to the CERR, a baseline biogenic emissions inventory is required to be established for each State. Triennial updates to this baseline inventory are only required if land use characteristics used in determining biogenic emissions have changed, or if a new method is used to determine emissions. To the extent that the EPA develops a biogenic baseline for the specified base year inventory [e.g., using Biogenic Emissions Inventory System-3 (BEIS-3)], it would be acceptable and practical for a State to use these EPA-generated emission estimates as the basis for their SIP planning and modeling inventories. EPA issued a NEI Listserve message on November 14, 2003 that details how State, local and Tribal agencies may use the EPA prepared 2002 biogenics inventory for CERR purposes. Contact INFO CHIEF (919-541-1000) for a copy of this listserve message. For attainment demonstration purposes, biogenic emissions are calculated "on the fly" within the air quality model and the use of prior biogenic inventories would not be necessary. State, local and Tribal agencies may use non-BEIS-3 estimates if they believe they have more representative data for estimating biogenic emissions and can demonstrate better quality emissions data.

The EPA also encourages State, local and Tribal agencies to prepare an inventory of all significant geogenic sources in the inventory area, including wind erosion.

4.1.6 Electronic Data Transfer

4.1.6.1 Protocol for Transferring Data Electronically to the EPA National Emission Inventory (NEI)

Because the submittal of emissions data from State, local and tribal agencies represent a very large amount of data to consider for inclusion in the NEI, the data must be provided in one of the acceptable formats that EPA is readily able to read and process.

At present there are two acceptable formats for the State, local, and tribal agencies to use for incorporation into the NEI - the NEI Input Format (NIF) and NEI xml schema - extensible markup language (XML) format.

Both formats are described and located on http://www.epa.gov/ttn/chief/nif/. The format specifications and user materials are available on this site for prosepective users to download or may be in the case of xml, linked to and located on the National Environmental Information Exchange Network site. Information on these sites will provide users with the format specification, its prescribed conventions of use, the file types that may be used to prepare the formatted file, available tools for checking format errors, and electronic protocols and instructions for transferring the data electronically to EPA.

The NIF and XML formats contain the same data element content, though packaged differently. Either file format may be used to move the data of interest to the NEI including the data reporting required by the CERR.

Whether a State, local, or tribal agency uses the NIF or XML format noted above, they will all move their files to the NEI through the EPA's Central Data Exchange node on the National Environmental Information Exchange Network (NEIEN). The NEIEN is administered in partnership with the Environmental Council of States (ECOS) and is maintained by the EPA's Office of Environmental Information (OEI) for all data flows in the Agency. Some State, local and Tribal agencies also operate a node on the NEIEN, and more are expecting to do so in the future. Node-to-node, or automated machine-to-machine transmissions over the NEIEN are planned in the future for the NEI data transfers. Node-to-node

exchanges over the NEIEN will use XML .

CDX registration and submission procedures for State, local, and tribal agencies are located at http://www.epa.gov/ttn/chief/nif/cdx.html. The sequence of events minimally involved in the electronic transfer of files through CDX are summarized below.

- Data submitter registers on-line at CDX.
- CDX on-line - the data submitter completes NEI submittal form to generally describe the data, zips and names file as prompted by CDX instruction, and sends the file.
- Submitters receive an automated message from CDX upon receipt of files at CDX and a second automated message from CDX upon download by EIG.
- EPA downloads the files received at CDX from a secure password-protected CDX website to a secure local network drive accessible by NEI program staff.

4.1.6.2 Direct Source Reporting

Certain point sources may already be reporting electronic emissions data directly to EPA. For example, electricity-generating units subject to Title IV Acid Rain monitoring and reporting provisions must report continuous emission monitoring system (CEMS) data in a specified electronic data reporting (EDR) format to EPA. In addition, large industrial combustion sources participating in regional NO_x mass emissions trading programs (e.g., under 40 CFR Part 96) are allowed to submit data using this method. This CEMS data may not directly fulfill reporting requirements for all pollutants that would constitute a State's ozone, fine PM, or regional haze SIP submittal. However, EPA acknowledges this to be a viable data option where reporting requirements overlap, and would like to encourage and facilitate the use of CEMS data by State, local and Tribal agencies and EPA. One possible option may involve the calculation of emissions for pollutants not reported under Part 75 or Part 96 (e.g., PM_{10}, $PM_{2.5}$) by applying emission factor ratios to the highly temporally-allocated emission estimates available for other pollutants such as NO_x and SO_2.

To avoid duplication of effort, the EPA envisions that these emissions data will either be: (1) transferred into EPA's central emissions database after submittal by the source; or (2) if a State prefers, the data can be made available to State, local and Tribal agencies for incorporation into their emissions inventory.

4.2 DOCUMENTATION OF THE INVENTORY

The written presentation to support an emissions inventory submittal for the ozone and $PM_{2.5}$ NAAQS, as well as the regional haze rule, should contain documentation that is sufficiently detailed for EPA to evaluate how the emission inventory was prepared. The EPA recommends that State, local and Tribal agencies prepare adequate documentation; the level of detail included in the documentation should be agreed upon with the Regional Office and specified in a State's IPP. This section refers to prior guidance issued by EPA to assist in developing appropriate documentation for emission inventories.

Written documentation of calculations, assumptions, and all other activities associated with developing the emission estimates is a key element of the QA program. Documentation of the work that is actually performed during inventory development includes documentation of calculations (hand calculations, spreadsheets, and databases), documentation of the QA program implementation, and documentation of the results (the inventory report). Examples of topics requiring good documentation in the inventory

development process include:

- point/nonpoint source cutoffs to demonstrate that double-counting of emissions does not occur
- point source information on survey mail-out procedures, tracking and logging of returned surveys, and verification procedures for source test data
- adjustments made to source test data to represent longer periods of time, seasonal influences, etc.
- data obtained from permit and compliance files
- adjustments made for applicable rules, including control efficiency, rule penetration, and rule effectiveness
- information obtained on emission factors and activity data (primarily for nonpoint sources)
- data references
- adjustments made for local conditions and assumptions made to adjust for scaling up emissions to account for nonreported sources
- VMT, traffic speeds, miles of roadway for each roadway class, hot- and cold-start percentages, vehicle age distribution, etc., for the mobile source documentation

Chapter 2 of the EIIP's *Volume VI,* titled *Planning and Documentation*, provides valuable, detailed guidance on documenting inventory components.

For a complete example of how an inventory should be compiled and documented, State, local and Tribal agencies are referred to the document, *Example Documentation Report for 1990 Base Year Ozone and Carbon Monoxide State Implementation Plan Emission Inventories*[23] available at http://www.epa.gov/ttn/chief/eidocs/exdocument.pdf. This document provides State, local and Tribal agencies with a list of elements deemed to be essential for documenting an emissions inventory in written form. An outline for the organization and content of a State's inventory report is presented in Table 6.2-1. This table references another document entitled *Example Emissions Inventory Documentation for Post-1987 Ozone State Implementation Plans*.[24] This document also addresses inventory documentation requirements but was not explicitly designed to address 1990 inventories. However, much of the guidance provided for post-1987 inventories would still be applicable for inventories developed for the new ozone and $PM_{2.5}$ NAAQS, and regional haze rule. In addition, although these documents focus on ozone precursor and CO emission inventories, the principles defined in these reports also apply to $PM_{2.5}$ and regional haze inventories.

Table 4.2-1. Outline for Format/Contents for SIP Emission Inventory Reports

I. Cover and Title Page
   - A. Title (geographic area, type of inventories, pollutants, base year)
   - B. Responsible agency
   - C. Report date (date completed/distributed)
   - D. Preparer (if different from responsible agency - e.g., contractor)

II. Table of Contents

A. Contents

B. Tables

C. Figures

III. Introduction

A. Reason for report being prepared, purpose

B. Geographic area covered, base year, type of inventory (CRIT, HAP, CRITHAP), pollutants included (VOC, NOX, CO, SO2, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, PM-CON, NH3)

C. Brief discussion of contents of report

D. Discussion of automated data systems used

E. Major problems, deficiencies, portions of inventory not included

F. List of primary guidance documents and references used (EPA guidance documents, EIIP documents, AP-42, etc.)

G. List of contacts for each distinct portion of the inventory

IV. Summary

A. Emissions (annual and seasonal) of each pollutant by major category

B. See example tables and graphics given in *Example Emissions Inventory Documentation for Post-1987 Ozone State Implementation Plans* (EPA-450/4-89-018)

V. Documentation of Emissions Methods/Data Estimates

A. Stationary Point Source Emissions

1. discussions of procedures and methodologies
2. example surveys/questionnaires
3. list of plants by primary product and total emissions
4. point source emissions summary

B. Stationary Nonpoint Source Emissions

1. discussion of procedures and methodologies
2. list of source categories and emissions
3. calculations and discussion for each source category
4. nonpoint source emissions summary

C. Mobile Source Emissions

1. Nonroad Mobile Sources
    a. same information as for stationary nonpoint sources
2. Onroad Vehicles
    a. mobile model inputs and outputs
    b. VMT estimates

c. documentation (can put all or part in Appendices)

d. mobile source emissions summary

e. discussion of procedures and methodologies

VI. Quality Assurance/Quality Control (QA/QC)

A. QA/QC plan - discussion of QA/QC methodologies used

B. Results

C. QA procedures can also be discussed in individual source category sections

In addition to the detailed emissions data submitted in electronic form, the EPA recommends that general summaries of the emissions inventory data be compiled and submitted by State, local and Tribal agencies. EPA Headquarters and EPA Regional Offices will use these summaries for easy and efficient comparison with other State, local and Tribal agencies' inventories and as a check for approximate and valid ranges of emissions. Examples of statewide emissions summaries are presented in Tables 4.8-1 and 4.8-2. State, local and Tribal agencies may also want to consider summarizing pollutant emissions by county.

Table 4.2-2. Statewide Ozone Precursor Emissions by Source Sector

Source Type	VOC Emissions		CO Emissions		NO_x Emissions	
	tons/yr	lbs/day	tons/yr	lbs/day	tons/yr	lbs/day
Point Sources						
Nonpoint Sources						
Onroad Mobile Sources						
Nonroad Mobile Sources						
Biogenic Sources						
Geogenic Sources						
TOTAL EMISSIONS						

Table 4.2-3. Statewide PM_{10}, $PM_{2.5}$, and Precursor Emissions by Source Sector

Source Type	PM10-PRI Emissions tons/yr	PM2.5-PRI Emissions tons/yr	VOC Emissions tons/yr	NO_x Emissions tons/yr	SO_2 Emissions tons/yr	NH_3 Emissions tons/yr
Point Sources						
Nonpoint Sources						
Onroad Mobile Sources						
Nonroad Mobile Sources						
Biogenic Sources						
Geogenic Sources						
TOTAL EMISSIONS						

See section 3.2.1 for reporting of primary versus filterable and condensible emissions.

SECTION 5
EMISSION INVENTORY DEVELOPMENT

5.1 AVAILABLE GUIDANCE

The EPA has developed numerous guidance documents to assist State, local and Tribal agencies in developing emissions inventories for various pollutants. These include the EIIP guidance documents, AP-42, [10] available at http://www.epa.gov/ttn/chief/publications.html#factor, and older documents such as *Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I.*[11] Other guidance documents can be accessed using EPA's CHIEF web site at http://www.epa.gov/ttn/chief/. The EIIP guidance documents are EPA's most recent emission inventory development guidance and should be the primary source of guidance for State, local and Tribal agencies.

For $PM_{2.5}$, EIG has developed a "getting started" web site. This web site, titled "$PM_{2.5}$ Emission Inventory Resource Center," is available at http://www.epa.gov/ttn/chief/eiip/pm25inventory/. State, local and Tribal agencies should refer to the "$PM_{2.5}$ Emission Inventory Resource Center" for information on the latest guidance and tools for preparing $PM_{2.5}$ emission inventories.

The EPA is also evaluating its current projections guidance, *Procedures for Preparing Emissions Projections*, [12] available at www.epa.gov/ttn/chief/publications.html, to determine how it should be updated/revised to reflect the provisions of the new NAAQS, regional haze, and other programs. State, local and Tribal agencies should refer to the existing projections guidance until new guidance is issued by EPA.

5.2 NEI

The EPA develops the NEI and provides it to State, local and Tribal agencies as well as to the public. The NEI contains statewide emission estimates for all of the pollutants and pollutant precursors required by this guidance. The NEI is comprehensive and includes emission estimates for point sources, nonpoint sources, and mobile sources. The EPA believes that most State, local and Tribal agencies will find the NEI to be a useful tool in preparing their SIP emission inventories specified by this guidance. If State, local and Tribal agencies choose to use the NEI in their SIP inventory preparation, EPA would suggest the following as a means of prioritizing their inventory efforts and resources:

- Point Sources - this should be the State, local and Tribal agencies' main point of emphasis for all pollutants except $PM_{2.5}$, since the CERR requires State-submitted data for point sources. Unlike nonpoint and biogenic/geogenic sources, a State, local and Tribal agency may not rely on the EPA-supplied NEI for point sources.

- Nonpoint and Nonroad Mobile Sources - State, local and Tribal agencies should review their nonpoint and nonroad source emission estimates in the NEI. The State, local and Tribal agencies may want to concentrate their efforts on the most significant source categories. In general, the greatest opportunity for improving the NEI nonpoint and nonroad source estimates is for the State, local and Tribal agency to develop locally-specific activity data. The development of these activity data should be a main point of emphasis for $PM_{2.5}$.

- Onroad Mobile Sources - if State, local and Tribal agencies choose to use the NEI onroad emission estimates as a starting point, improvements in the estimates can be made by providing locally-specific inputs to the MOBILE model and more precise estimates of VMT.

- Biogenic Sources - The NEI biogenic estimates are believed to be reliable. EPA encourages State, local and Tribal agencies to use the EPA supplied biogenic estimates. However, if State, local and Tribal agencies want to improve these estimates, locally-specific land use/land cover data can be obtained.

- Geogenic Sources - The EPA has not yet included geogenic source emissions in the NEI due to the lack of reliable data. The EPA is working on refining the emission estimation methodology to produce more representative PM estimates for wind erosion sources. State, local and Tribal agencies should prepare an inventory of all other significant geogenic sources in the inventory area.

5.3 POINT SOURCES

Volume II of the EIIP guidance documents includes major chapters that address various combustion, manufacturing, and production activities that are point sources.[13] Volume II is available at http://www.epa.gov/ttn/chief/eiip/techreport/volume02/index.html. Information in these chapters should be used to estimate ozone and $PM_{2.5}$ precursor emissions where they address the source categories of interest. The EIIP point source chapters within Volume II are as follows:

- Chapter 2: *Preferred and Alternative Methods for Estimating Air Emissions from Boilers*

- Chapter 3: *Preferred and Alternative Methods for Estimating Air Emissions from Hot-Mix Asphalt Plants*

- Chapter 4: *Preferred and Alternative Methods for Estimating Fugitive Air Emissions from Equipment Leaks*

- Chapter 5: *Preferred and Alternative Methods for Estimating Air Emissions from Wastewater Collection and Treatment*

- Chapter 6: *Preferred and Alternative Methods for Estimating Air Emissions from Semiconductor Manufacturing Facilities*

- Chapter 7: *Preferred and Alternative Methods for Estimating Air Emissions from Surface Coating Operations*

- Chapter 8: *Preferred and Alternative Methods for Estimating Air Emissions from Paint and Ink Manufacturing Facilities*

- Chapter 9: *Preferred and Alternative Methods for Estimating Air Emissions from Secondary Metal Production Facilities*

- Chapter 10: *Preferred and Alternative Methods for Estimating Air Emissions from Oil and Gas Field Production and Processes*

- Chapter 11: *Preferred and Alternative Methods for Estimating Air Emissions from Plastic Products Manufacturing*

- Chapter 12: *How to Incorporate Effects of Air Pollution Control Device Efficiencies and Malfunctions into Emission Inventory Estimates.*

- Chapter 13: *Preferred and Alternative Methods for Estimating Air Emissions from Stone Mining and Quarrying Operations*.

- Chapter 14: *Uncontrolled Emission Factor Listing for Criteria Air Pollutants*.

- Chapter 15: *Preferred and Alternative Methods for Estimating Air Emissions from the Printing, Packaging and Graphic Arts Industry*.

- Chapter 16: *Methods for Estimating Air Emissions from Chemical Manufacturing.*

Each industry- or source-specific document contains a brief description; identification of emission points; an overview of methods available for estimating emissions; example calculations for each technique presented; a brief discussion on QA and QC; and the SCCs needed for entry of the data into a database management system. The SCCs included in each volume apply to the process emission points, in-process fuel use, storage tank emissions, fugitive emissions, and control device fuel (if applicable). More details on $PM_{2.5}$ emission inventories are available at the "$PM_{2.5}$ Emission Inventory Resource Center."

Table 5.3-1 lists potential point source categories. This table is presented as a guide to aid State, local and Tribal agencies in focusing their point source emission inventory efforts, and is based on an analysis of EPA's NEI database. The table shows where in EPA's database significant point source emissions occur. The H (high), M (medium), and L (low) designations indicate the level of significance of a source category's emissions to the overall emissions of that pollutant. A ✓ indicates that emissions of the pollutant may occur from that category but are not considered significant. A blank cell indicates that no emissions of the pollutant were recorded in EPA's NEI database for that source category. Note that local priorities for inventory development may vary depending on the nature of sources in the area. State, local and Tribal agencies should also be aware that some of these source categories may have both point and nonpoint source components, and that they should be careful to avoid double-counting of emissions.

5.4 NONPOINT SOURCES

Nonpoint sources are generally described as those sources that are too small, numerous, or difficult to be inventoried individually. Potential nonpoint sources of emissions are given in Table 5.4-1 and potential crustal (dust) sources of PM emissions are given in Table 5.4-2. These tables are presented as guides to assist State, local and Tribal agencies in focusing their nonpoint source emission inventory efforts. The tables are based on an analysis of EPA's NEI database and show where in the database significant nonpoint source emissions occur. As with Table 5.3-1, the H (high), M (medium), and L (low) designations indicate the level of significance of a source category's emissions to the overall emissions of that pollutant. A ✓ indicates that emissions of the pollutant may occur from that category but are not considered significant. A blank cell indicates that no emissions of the pollutant were recorded in EPA's NEI database for that source category. Note that local priorities for inventory development may vary depending on the nature of sources in the area. State, local and Tribal agencies should also be aware that some of these source categories may have both point and nonpoint source components, and that they should be careful to avoid double-counting of emissions.

Table 5.4-1. Point Sources of Emissions

CATEGORY	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	NH_3 *
FUEL COMBUSTION - ELECTRIC UTILITY							
Coal	H	L	L	H	H	H	L
Gas	M	L	L	M	L	M	L
Internal Combustion	M	L	L	L	L	M	L
Oil	M	L	L	H	M	M	L
Other	L	L	✓	L	L	L	✓
FUEL COMBUSTION - INDUSTRIAL							
Coal	M	L	L	H	M	M	L
Gas	H	L	M	H	M	H	L
Internal Combustion	H	L	M	L	L	M	L
Oil	M	L	L	M	M	M	L
Other	M	L	L	L	M	M	✓
FUEL COMBUSTION - OTHER							
Commercial/Institutional Coal	L	✓	✓	L	L	L	✓
Commercial/Institutional Gas	L	L	L	L	L	L	L
Commercial/Institutional Oil	L	✓	✓	L	L	L	✓
Miscellaneous Fuel Combustion (Except Residential)	L	L	L	L	L	L	✓
CHEMICAL & ALLIED PRODUCT MANUFACTURING							
Agricultural Chemical Manufacturing	L	✓	L	L	L	L	M
Inorganic Chemical Manufacturing	L	L	✓	M	L	L	L
Organic Chemical Manufacturing	L	L	M	L	L	L	✓
Paint, Varnish, Lacquer, Enamel Manufacturing	✓	✓	L	✓	✓	✓	✓
Pharmaceutical Manufacturing	✓	✓	L	✓	✓	L	✓
Polymer and Resin Manufacturing	✓	✓	M	✓	L	L	✓
Other Chemical Manufacturing	L	L	M	M	L	M	✓
METALS PROCESSING							
Ferrous Metals Processing	L	M	L	L	M	M	L
Metals Processing NEC	L	L	L	L	L	L	✓
Non-Ferrous Metals Processing	L	L	L	M	M	M	✓
PETROLEUM AND RELATED INDUSTRIES							
Asphalt Manufacturing	L	✓	L	L	L	L	✓
Oil & Gas Production	L	L	M	L	✓	✓	L
Petroleum Refineries and Related Industries	L	L	M	M	L	L	L
OTHER INDUSTRIAL PROCESSES							
Agriculture, Food, and Kindred Products	✓	✓	M	L	M	M	L
Construction			✓		✓	✓	
Electronic Equipment	✓	✓	L	✓	L	L	✓
Machinery Products	✓	✓	L	✓	L	L	✓
Mineral Products	M	L	L	M	M	H	✓
Miscellaneous Industrial Processes	L	L	M	L	L	✓	✓

CATEGORY	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	NH_3 *
Rubber and Miscellaneous Plastic Products	✓	✓	M	✓	L	L	✓
Textiles, Leather, and Apparel Products	✓	✓	L	✓	L	L	✓
Transportation Equipment	✓	✓	L		✓	✓	✓
Wood, Pulp and Paper, and Publishing Products	L	L	M	M	M	H	L
SOLVENT UTILIZATION							
Degreasing	✓	✓	L	✓	✓	✓	✓
Dry Cleaning	✓	✓	L	✓	✓		✓
Graphic Arts	✓	✓	M	✓	✓	✓	✓
Nonindustrial			✓		✓		
Solvent Utilization NEC			✓				
Surface Coating	✓	L	H	✓	L	✓	✓
Other Industrial	✓	✓	L	✓	✓		✓
STORAGE AND TRANSPORT							
Bulk Materials Storage	L	L	✓	✓	M	M	L
Bulk Materials Transport	✓	✓	✓		L	✓	✓
Bulk Terminals and Plants	✓	✓	L	✓	✓	✓	✓
Inorganic Chemical Storage	✓	L	✓	✓	✓	✓	✓
Inorganic Chemical Transport			✓	✓	✓	✓	
Organic Chemical Storage	✓	L	L	✓	L	L	✓
Organic Chemical Transport	✓	✓	L	✓	✓	✓	✓
Petroleum & Petroleum Product Storage	✓	✓	M	✓	L	L	L
Petroleum & Petroleum Product Transport	✓	✓	L	✓	✓	✓	✓
Service Stations: Breathing & Emptying			✓				
Service Stations: Stage I	✓	✓	L	✓			✓
Service Stations: Stage II	✓	✓	L	✓			✓
WASTE DISPOSAL AND RECYCLING							
Incineration	L	L	L	L	L	L	✓
Industrial Waste Water	✓	✓	L	✓	✓	✓	✓
Landfills	L	✓	L	✓	L	L	✓
Open Burning	✓	✓	✓	✓	✓	✓	✓
POTW	✓	✓	L	✓	✓	✓	✓
TSDF	✓	✓	✓	✓	✓	✓	✓
Other	✓	✓	L	✓	✓	✓	✓
MISCELLANEOUS							
Cooling Towers			✓		L	L	✓
Health Services	✓		✓		✓	✓	
Other Combustion	✓	✓	✓		✓	✓	✓
Other	L	✓	✓	✓	✓	L	✓

CATEGORY	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	NH_3 *

* The emissions from all NH_3 source categories need to be better characterized because of their role in the formation of secondary particles.

Note: The H (high), M (medium), and L (low) designations indicate the level of significance of a source category's annual emissions to the overall annual emissions of that pollutant (i.e., emissions from all sectors).

A ✓ indicates that emissions of that pollutant may occur from that source category, but they are not considered significant.

A blank cell indicates that no emissions of that pollutant are emitted from that source category based on the data in EPA's 1999 NEI Version 2.0.

Table 5.4-2. Nonpoint Sources of Emissions

CATEGORY	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	NH_3 *
FUEL COMBUSTION - ELECTRIC UTILITY							
Gas	✓	✓	✓	✓	✓	✓	
FUEL COMBUSTION - INDUSTRIAL							
Coal	M	L	L	M	M	L	✓
Gas	M	L	L	L	L	M	L
Internal Combustion	L	✓	✓	✓	✓	✓	
Oil	L	L	L	H	L	L	L
Other	L	L	L	L	L	L	
FUEL COMBUSTION - OTHER							
Commercial/Institutional Coal	L	✓	✓	L	L	L	✓
Commercial/Institutional Gas	M	L	L	L	L	M	✓
Commercial/Institutional Oil	L	✓	L	M	L	L	L
Miscellaneous Fuel Combustion (Except Residential)	L	✓	✓	✓	L	L	
Residential Wood	L	M	H	L	H	H	
Residential Other	H	L	L	M	M	M	L
CHEMICAL AND ALLIED PRODUCT MANUFACTURING							
Inorganic Chemical Manufacturing			✓		✓	✓	
Organic Chemical Manufacturing	✓		L				
Pharmaceutical Manufacturing			L				
Polymer & Resin Manufacturing			M				
METALS PROCESSING							
Ferrous Metals Processing	✓	✓	✓				
Metals Processing NEC	✓	✓	✓	✓	✓	✓	
Non-Ferrous Metals Processing	✓		✓				
PETROLEUM & RELATED INDUSTRIES							
Asphalt Manufacturing	✓	✓	L	✓	✓	✓	
Oil and Gas Production	L	✓	M	✓	L	L	

Table 5.4-2 (continued)

CATEGORY	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	NH_3 *
Petroleum Refineries and Related Industries			M				
OTHER INDUSTRIAL PROCESSES							
Agriculture, Food, and Kindred Products	L	✓	M	✓	M	L	
Machinery Products	✓		✓				
Mineral Products	✓	✓	✓	✓	L	L	
Miscellaneous Industrial Processes	✓	✓	L	✓	L	L	L
Rubber and Miscellaneous Plastic Products	✓	✓	L		✓	✓	
Wood, Pulp and Paper, and Publishing Products	✓	✓	✓	✓	L	L	
SOLVENT UTILIZATION							
Degreasing			H				✓
Dry Cleaning	✓	✓	M	✓			
Graphic Arts	✓	✓	M	✓			
Nonindustrial	✓	✓	H				
Other Industrial	✓	✓	M				
Solvent Utilization NEC	✓	✓	L	✓			
Surface Coating	✓	✓	H	✓			
STORAGE AND TRANSPORT							
Bulk Materials Storage			✓	✓	✓	✓	
Bulk Terminals & Plants			M				
Organic Chemical Storage			L				
Organic Chemical Transport			L				
Petroleum and Petroleum Product Storage	✓		L				
Petroleum and Petroleum Product Transport			M				
Service Stations: Breathing & Emptying			L				
Service Stations: Stage I			M				
Service Stations: Stage II			H				
WASTE DISPOSAL AND RECYCLING							
Incineration	L	L	L	L	L	L	
Industrial Waste Water			L				
Landfills	✓	✓	L	✓	✓	✓	✓
Open Burning	L	M	H	L	H	H	
POTW	✓	✓	M	✓	✓	✓	M
TSDF	✓	✓	L				
Other			L				
MISCELLANEOUS							
Agriculture and Forestry			L		H	H	H
Catastrophic/Accidental Releases			L				
Health Services			✓				
Other Combustion	M	H	H	L	H	H	L
Other	✓	✓	L				

CATEGORY	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	NH_3 *

* The emissions from all NH_3 source categories need to be better characterized because of their role in the formation of secondary particles.

Note: The H (high), M (medium), and L (low) designations indicate the level of significance of a source category's annual emissions to the overall annual emissions of that pollutant (i.e., emissions from all sectors).

A ✓ indicates that emissions of that pollutant may occur from that source category, but they are not considered significant.

A blank cell indicates that no emissions of that pollutant are emitted from that source category based on the data in EPA's 1999 NEI Version 2.0.

Table 5.4-3. Crustal Sources of Emissions

CATEGORY	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	NH_3
MISCELLANEOUS							
Agricultural Crops (Tillage)					M	M	
Construction					H	H	
Paved Roads					H	H	
Unpaved Roads					H	H	
Other Fugitive Dust (e.g., Mining and Quarrying)					M	M	
NATURAL SOURCES							
Geogenic, Wind Erosion					NA	NA	

Note: The impact of crustal sources on $PM_{2.5}$ ambient concentrations is much lower than would be suggested by their estimated emissions (relative to other directly emitted $PM_{2.5}$).

The H (high) and M (medium) designations indicate the level of significance of a source category's emissions to the overall emissions of that pollutant.

Geogenic wind erosion estimates, although expected to be significant in certain areas, are not currently reported in EPA's NEI Version 2.0 due to the uncertainty associated with emission estimation methods for this category.

The EIIP Area Source Committee has issued preferred and alternate emission estimation methods documents under EIIP Volume III (available at http://www.epa.gov/ttn/chief/eiip/techreport/volume03/index.html) for the following categories: [14]

- Chapter 2: *Residential Wood Combustion*
- Chapter 3 *Architectural Surface Coating*
- Chapter 4: *Dry Cleaning*
- Chapter 5: *Consumer and Commercial Solvent Use*

- Chapter 6: *Solvent Cleaning*
- Chapter 7: *Graphic Arts*
- Chapter 8: *Industrial Surface Coating*
- Chapter 9: *Pesticides - Agricultural and Nonagricultural*
- Chapter 11: *Gasoline Marketing*
- Chapter 12: *Marine Vessel Loading, Ballasting, and Transfer*
- Chapter 13: *Autobody Refinishing*
- Chapter 14: *Traffic Paints*
- Chapter 15: *Municipal Landfills*
- Chapter 16: *Open Burning*
- Chapter 17: *Asphalt Paving*
- Chapter 18: *Structure Fires*
- Chapter 24: *Conducting Surveys for Area Source Inventories*

The EIIP Volume III, Chapter 1 document lists potential activity data sources by category. *Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I* also gives detailed guidance for estimating ozone precursor emissions from nonpoint sources.[11] Agencies should review the EIIP documents carefully for information on the types and sources of data needed to develop emissions estimates for each source category.

5.5 MOBILE SOURCES

Mobile sources consist of both highway vehicles (cars and trucks) and nonroad mobile sources (e.g., airplanes, motorboats, farm equipment, etc.). Table 5.5-1 lists mobile source categories that EPA believes are significant sources of emissions. This table can be used as a guide to assist State, local and Tribal agencies in focusing their mobile source emission inventory efforts, and is based on an analysis of EPA's NEI database. The H (high), M (medium), and L (low) designations indicate the level of significance of a source category's annual emissions to the overall annual emissions of that pollutant. A ✓ indicates that emissions of the pollutant may occur from that category but are not considered significant. A blank cell indicates that no emissions of the pollutant were recorded in EPA's NEI database for that source category. Note that local priorities for inventory development may vary depending on the nature of sources in the area.

Table 5.5-1. Mobile Sources of Emissions

CATEGORY	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	NH_3 *
HIGHWAY VEHICLES							
Diesels	H	M	M	M	M	H	L
Heavy-Duty Gas Vehicles	H	M	H	L	L	L	L
Light-Duty Gas Trucks	H	H	H	L	M	M	M
Light-Duty Gas Vehicles & Motorcycles	H	H	H	M	M	M	M
NONROAD VEHICLES AND ENGINES							
Aircraft	L	L	L	L	L	L	
Marine Vessels	H	L	L	M	M	M	
Nonroad Diesel	H	M	M	M	H	H	L
Nonroad Gasoline	M	H	H	L	M	M	✓
Railroads	H	L	L	L	L	M	
Other	M	M	✓	✓	L	L	L

CATEGORY	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	NH_3 *

* The emissions from all NH_3 source categories need to be better characterized because of their role in the formation of secondary particles.

Note: The H (high), M (medium), and L (low) designations indicate the level of significance of a source category's emissions to the overall annual emissions of that pollutant (i.e., emissions from all sectors).

A ✓ indicates that emissions of that pollutant may occur from that source category, but they are not considered significant.

A blank cell indicates that no emissions of that pollutant are emitted from that source category based on the data in EPA's 1999 NEI Version 2.0.

The following sections discuss the models and data sources for onroad mobile sources and nonroad mobile sources, respectively.

5.5.1 Onroad Mobile Sources

Ozone precursor emissions for onroad sources are estimated using emission factors generated by emission factor models combined with estimates of activity, generally in terms of VMT. The currently accepted onroad emission factor model is the MOBILE6.2 model developed by EPA's Office of Transportation and Air Quality (OTAQ). MOBILE6.2 was released in February 2004 and can generate onroad emission factors of VOC, NO_x, CO, primary PM_{10} and $PM_{2.5}$, SO_2, and NH_3 for each of the vehicle categories shown in Table 5.5-2. Emissions may be aggregated to or calculated at the SCC level of detail shown in Table 5.5-2. The use of VMT activity data and these onroad mobile emission factor models are discussed further below.

VMT Activity Data

Each State's highway or transportation agency provides annual data to the Federal Highway Administration's (FHWA) Highway Performance Monitoring System (HPMS). The FHWA uses the data provided by the States to report the condition of the nations' highways to Congress. The HPMS compiles VMT at the State level for rural, urban, and individual urbanized areas by 12 different road types, and six distinct vehicle types. These six HPMS vehicle types are shown in the column to the far right in Table 5.5-2, mapped to the appropriate MOBILE6.2 vehicle type. By normalizing the VMT fractions for each MOBILE6.2 vehicle type within a specific HPMS vehicle type, VMT data at the HPMS vehicle type level can be converted to VMT data for each of the MOBILE6 vehicle types. The report, *Use of Locality Specific Transportation Data for the Development of Mobile Source Emission Inventories*[15] available at http://www.epa.gov/ttn/chief/eiip/techreport/volume04/index.html contains sections addressing improvements to travel demand model (TDM) outputs. In 1993, FHWA issued a letter indicating that all urban areas greater than 50,000 population should have individual HPMS sample panels representative of travel within those areas.

The EPA guidance, *Procedures for Emission Inventory Preparation - Volume IV: Mobile Sources*,[16] available at http://www.epa.gov/otaq/invntory/r92009.pdf provides a very detailed discussion of HPMS and TDMs. Pages 62 to 94 of this document discuss how to use HPMS data and the more limited cases when TDMs may be used. In general, HPMS is the preferred method for estimating historical VMT and TDMs are the preferred method for allocating VMT to the county level and road classes and for calculating growth

factors for future years. The guiding principal of this policy is that the State should provide the same estimate of travel to the EPA as it uses internally and provides to the FHWA.

The approval of the use of any alternative to HPMS will be made by the EPA Regional Office. State, local and Tribal agencies are encouraged to identify in their IPP their proposed method for determining historical VMT, for allocating VMT to the county level and road classes, and for calculating growth factors for future years.

Table 5.5-2. MOBILE6.2 Vehicle Classes

MOBILE6.2 Vehicle Class and Description		7-Digit Source Classification Code (SCC)	Gross Vehicle Weight Rating (lbs)	HPMS Vehicle Category
LDGV	Light-duty gasoline vehicles (passenger cars)	2201001		cars
LDGT1	Light-duty gasoline trucks 1	2201020	< 6,000, < 3,750 lb LVW	O2X4T
LDGT2	Light-duty gasoline trucks 2	2201020	< 6,000, 3,751 - 5,750 lb ALVW	O2X4T
LDGT3	Light-duty gasoline trucks 3	2201040	6,001 - 8,500, < 5,750 lb ALVW	O2X4T
LDGT4	Light-duty gasoline trucks 4	2201040	6,001-8,500 > 5,750 lb ALVW	O2X4T
HDGV2b	Class 2b heavy-duty gasoline vehicles	2201070	8,501 - 10,000	O2X4T
HDGV3	Class 3 heavy-duty gasoline vehicles	2201070	10,001 - 14,000	SU2X6T
HDGV4	Class 4 heavy-duty gasoline vehicles	2201070	14,001 - 16, 000	SU2X6T
HDGV5	Class 5 heavy-duty gasoline vehicles	2201070	16, 001 - 19,500	SU2X6T
HDGV6	Class 6 heavy-duty gasoline vehicles	2201070	19,501 - 26, 000	SU2X6T
HDGV7	Class 7 heavy-duty gasoline vehicles	2201070	26,001 - 33,000	SU2X6T
HDGV8a	Class 8a heavy-duty gasoline vehicles	2201070	33,001 - 60,000	COMB
HDGV8b	Class 8b heavy-duty gasoline vehicles	2201070	> 60,000	COMB
HDGB	Gasoline buses (school, transit, and urban)	2201070		buses
MC	Motorcycles	2201080		MC
LDDV	Light-duty diesel vehicles (passenger cars)	2230001		cars
LDDT12	Light-duty diesel trucks 1 and 2	2230060	< 6,000	O2X4T
LDDT34	Light-duty diesel trucks 3 and 4	2230060	6,001 - 8,500	O2X4T
HDDV2b	Class 2B heavy-duty diesel vehicles	2230071	8,501-10,000	O2X4T
HDDV3	Class 3 heavy-duty diesel vehicles	2230072	10,001 - 14,000	SU2X6T
HDDV4	Class 4 heavy-duty diesel vehicles	2230072	14,001 - 16, 000	SU2X6T
HDDV5	Class 5 heavy-duty diesel vehicles (single-unit, 2-axle, 6-tire trucks)	2230072	16, 001 - 19,500	SU2X6T
HDDV6	Class 6 heavy-duty diesel vehicles	2230073	19,501 - 26,	SU2X6T

HDDV7	Class 7 heavy-duty diesel vehicles	2230073	26,001 - 33,000	SU2X6T
HDDV8a	Class 8a heavy-duty diesel vehicles	2230074	33,001 - 60,000	COMB
HDDV8b	Class 8b heavy-duty diesel vehicles	2230074	> 60,000	COMB
HDDBT	Diesel transit and urban buses	2230075		buses
HDDBS	Diesel school buses	2230075		buses

LVW = loaded vehicle weight, ALVW = average loaded vehicle weight
O2X4T = other 2-axle, 4-tire vehicles, SU2X6T = single-unit, 2 axle, 6-tire trucks
COMB = combination trucks, MC = motorcycles

Onroad Mobile Models

Onroad mobile source VOC, NO_x, CO, SO_2, primary PM_{10} and $PM_{2.5}$, and NH_3 emission factors are calculated using an emission factor model. MOBILE6.2 is EPA's current onroad emission factor model. MOBILE6.2 generates exhaust and evaporative emission factors in grams per mile. Emission factors for brake wear and tire wear are also generated for PM. These factors must then be multiplied by the VMT activity estimates, discussed above, to estimate emissions. The MOBILE6.2 model replaces the MOBILE5 model for VOC, CO, and NO_x and PART5 for PM and SO_2. Although PART5 also included the ability to estimate emission factors from fugitive dust from paved and unpaved roads, MOBILE6.2 does not include the estimation of these emission factors. EIG has revised the AP-42 paved road and unpaved road emission factors to enable users to estimate emission factors for fugitive dust from paved and unpaved roads. The EPA has developed a new mobile modeling tool. The National Inventory Emissions Model (NMIM) is essentially a graphical user interface that uses MOBILE6.2, NONROAD2002, and a database which contains modeling information for each county in the US to generate these inventories. NMIM will be released in late summer or fall of 2005. In addition, EPA is developing a new emissions model. The Multi-Scale Motor Vehicle and Equipment Emission System (MOVES) is under development and is intended to include and improve upon the capability of MOBILE6.2 and will eventually replace the MOBILE6.2 model, as well as EPA's current NONROAD emission model, with a single comprehensive mobile source modeling system. The onroad portion of this model is expected to be functional for criteria pollutants by 2007. The latest information on the development of this model can be found at http://www.epa.gov/otaq/ngm.htm. California has developed its own onroad emission factor model known as EMFAC. This model accounts for the California-specific emission standards.

The MOBILE6.2 model, user's guides, and associated documentation are all available at EPA's OTAQ web page at: http://www.epa.gov/otaq/m6.htm. A technical guidance document concerning the use of MOBILE6 for preparing emission inventories for SIPs and transportation conformity determinations is also available at that web site. In addition, this site contains a policy guidance document that details the schedule for using MOBILE6.2 in SIPs and transportation conformity determinations as well as the required inputs.

State, local and Tribal agencies should plan for compiling an onroad inventory using MOBILE6.2 by developing the best possible set of local inputs for variables such as registration distribution, I/M program inputs, defining the geographic and temporal applicability of other control programs (e.g., in which counties and what months is oxygenated fuel used), mileage accumulation rates, and determining what temperature data will be used for each of the different types of inventories. State, local and Tribal agencies should also have methods in place for determining fuel characteristics throughout the State and according to season, including fuel Reid vapor pressure (RVP), sulfur level, oxygen content, and the makeup of reformulated gasoline. For all types of onroad vehicle emission modeling (e.g., ozone modeling, 3-year cycle inventories, transportation conformity), having an accurate, local registration distribution is important to determining

accurate emission inventories. Because wide differences between actual model year fleet distributions and default distributions in the MOBILE6.2 model have been observed, State, local and Tribal agencies are encouraged to use county-specific motor vehicle model year distributions obtained from their State motor vehicles office. For the 3-year cycle and modeling inventories, having accurate representations of control programs in place during the modeled time periods is crucial, particularly for I/M program modeling. For example, if a set of phase-in cutpoints are being used in an I/M program in 2002, it is important to model that set of cutpoints rather than the final set of emission cutpoints. On the other hand, for attainment demonstration or projection inventories, where allowable emissions are calculated, the final planned I/M program may be modeled. Modeling accurate speeds by roadway type, while important for all inventory types, is particularly important in transportation conformity modeling. In this case, it is necessary to capture the changes in average speeds by roadway type or roadway link due to the presence or absence of particular transportation-related programs.

The temperature inputs used in the MOBILE6.2 model will depend upon the purpose of the inventory as well as the time period covered by the inventory. For annual inventories, EPA's general practice has been to develop monthly emissions based on average monthly maximum and minimum daily temperatures. The monthly emissions are then summed to obtain annual emissions. In the other extreme, when developing onroad inputs for emission modeling, actual hourly temperatures are generally used to model the particular days of interest. In past practice, ozone SIPs have typically required the use of ozone season day temperatures, based on the temperatures that occurred during an area's highest ozone recordings over a specified 3-year period. This method can be difficult and with new designations, monitored data might be scarce. EPA will accept the use of actual average day temperature for the month of July. If NMIM is employed, it requires hourly average temperatures. Temperature and humidity data can be obtained from the National Climatic Data Center. Temperature inputs used in developing conformity budgets should be consistent with the temperature inputs used in an area's SIP modeling.

The MOBILE6.2 technical guidance document provides recommendations for determining appropriate values for MOBILE6.2 model inputs and the conversion of MOBILE5 inputs to MOBILE6 inputs. For many of the input options in MOBILE6.2, the EPA encourages the use of non-default inputs by users of the model, but requests that State, local and Tribal agencies discuss the selection of any non-default values in documentation submitted with the onroad mobile source emission inventory.

Reporting of Emissions

The CERR requires States to report onroad emissions by SCC. Valid SCC codes can be found at http://www.epa.gov/ttn/chief/codes/index.html#scc. This listing provides a variety of reporting levels for the onroad sector. EPA has not developed SCC codes for all of the 28 vehicle types included in MOBILE6 because of data storage limitations. While emissions may be calculated at that level, when emissions are reported to EPA for inclusion in the NEI, emission modeling, or other purposes, the preferred level of detail is at either the 8-vehicle type (LDGV, LDGT1, LDGT2, HDGV, LDDV, LDDT, HDDV, and MC) or 12-vehicle type level of detail. The 12-vehicle type level of detail is the 8-vehicle type level of detail, with the HDDV category subdivided into 5 weight categories (Class 2B HDDVs; Class 3, 4, and 5 HDDVs; Class 6 and 7 HDDVs; Class 8A and 8B HDDVs; and diesel buses). These SCC codes are shown in Table 5.5-2, with the corresponding MOBILE6 vehicle types included in each of the 12 vehicle categories. Following the first 7 digits of the vehicle type portion of the SCC code are three additional digits. The digits in the eighth and ninth positions of the SCC codes represent the 12 HPMS facility types. These codes are shown in Table 5.5-3, along with the EPA-recommended MOBILE6.2 facility type corresponding to each of the HPMS facility types. The code in the tenth digit of the SCC can be used to indicate whether the emissions represent exhaust emissions (X), evaporative emissions (V), brake wear emissions (B), or tire wear emissions (T). A "0" is used in the tenth digit of the SCC if this breakdown of the emissions is not

available.

Table 5.5-3. HPMS Facility Types

HPMS Facility Type	Facility Type Source Classification Code (SCC)	Recommended MOBILE6.2 Facility Type
Rural Interstate	11	Freeway
Rural Other Principal Arterial	13	Arterial
Rural Minor Arterial	15	Arterial
Rural Major Collector	17	Arterial
Rural Minor Collector	19	Arterial
Rural Local	21	Arterial
Urban Interstate	23	Freeway
Urban Other Freeways and Expressways	25	Freeway
Urban Other Principal Arterial	27	Arterial
Urban Minor Arterial	29	Arterial
Urban Collector	31	Arterial
Urban Local	33	Local

5.5.2 Nonroad Mobile Sources

The EPA's OTAQ is developing a computer model, NONROAD, to directly estimate pollutant emissions for the following nonroad equipment categories:

- Lawn and Garden
  – residential
  – commercial
- Construction and Mining
- Agricultural
- Industrial
- Airport Service
- Recreational Vehicles
- Logging
- Recreational Marine
- Light Commercial
- Railway Maintenance

Within these general categories are more specific types of equipment (e.g., 2-wheel tractors, balers, and combines are examples of 10-digit SCCs within the broader 7-digit SCC defining agricultural equipment). Because of the variations in hours of use, horsepower, and load factors corresponding to engines in various applications, these distinctions are necessary. These applications can be further classified according to fuel and engine type [diesel, gasoline 2-stroke, gasoline 4-stroke, compressed natural gas (CNG), and liquid petroleum gas (LPG)].

The NONROAD model estimates emissions for six exhaust pollutants: HC, NO_x, CO, PM, SO_2, and

carbon dioxide (CO_2). Hydrocarbons (HC) can be reported as total hydrocarbons (THC), TOG, nonmethane organic gases (NMOG), NMHC, or VOC. Particulate matter can be reported as primary emissions of total PM, PM_{10} (which is equivalent to total PM), or $PM_{2.5}$. The model also estimates non-exhaust HC emissions, including crankcase, diurnal, and refueling emissions. The model allows the user to report total HC emissions, which account for both exhaust and relevant non-exhaust components (depending on the engine type and pollutant). At the present time, the NONROAD model does not generate NH_3 emissions. Although nonroad engines are not a significant source of NH_3, emissions for NH_3 can be estimated by multiplying SCC-level fuel consumption, in gallons (available from the NONROAD model), by gram/gallon NH_3 emission factors developed by OTAQ.

NONROAD allows the calculation of pollutant emissions at the national, State, and county level. The model can also estimate sub-county (i.e., nonattainment area) emissions if the necessary inputs to perform this calculation are supplied by the user. By using estimates of annual activity for each equipment type, annual emissions inventories can be calculated. Additional inventories can be calculated on a seasonal (i.e., summer, fall, winter, spring), monthly, or daily (i.e., week or weekend day) basis by allocating annual activity to these smaller time periods. Past year, present year, and future year inventories (up to the year 2050) can be generated with this model.

The NONROAD model estimates emissions for each specific type of nonroad equipment by multiplying the following input variables:

- Equipment population for a specified year, distributed by age, horsepower, fuel type, and application;
- Average load factor expressed as average fraction of available power;
- Activity in hours of use per year; and
- Emission factor, accounting for engine deterioration and any applicable new standards.

The emissions are then temporally and geographically distributed using appropriate allocation factors.

State, local and Tribal agencies have the option of replacing default model values with more representative data if available. If a State, local and Tribal agency makes changes to default model values such as local equipment populations, geographic allocations, and local growth rates, the agency should submit the input files to EPA, as well as a description of why the defaults were changed. The EIIP has published a report entitled, *Guidance for Estimating Lawn and Garden Equipment Activity Levels*[17] available at http://www.epa.gov/ttn/chief/eiip/techreport/volume04/index.html, that discusses methods for improving estimates of local lawn and garden equipment populations according to commercial and residential use.

If NMIM is used, it will use the same temperature and fuel information for onroad MOBILE and nonroad NONROAD calculations. NMIM runs the NONROAD model on a monthly basis.

OTAQ has posted technical reports on their web site that describe the various default input variables. Copies of these reports, as well as the most recent version of the NONROAD model

(including user's guide) can be downloaded from the web site: http://www.epa.gov/otaq/nonrdmdl.htm#model. In addition, a CD-ROM copy of the model can be obtained from OTAQ by request.

Commercial Marine Vessels, Aircraft, and Locomotives

The NONROAD model does not provide State, local and Tribal agencies with a tool for estimating emissions for commercial marine vessels, aircraft, and locomotives. Guidance on emission estimation methodologies for these categories was originally published by EPA in the report, *Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources*.[18] Following is a discussion on the status of updated guidance for commercial marine vessels, aircraft, and locomotive categories.

OTAQ originally intended to incorporate a commercial marine module into the NONROAD model. However, due to unexpected complications in developing input data and the requisite computer code, OTAQ discontinued work on the electronic commercial marine module for the NONROAD model, and focused instead on written guidance. In 1999, EPA sponsored two studies entitled, "Commercial Marine Activity for Great Lake and Inland River Ports in the United States,"[19] and "Commercial Marine Activity for Deep Sea Ports in the United States."[20] These studies provide activity profiles for approximately 150 ocean, lake, and river ports, and present a method for an inventory preparer to allocate time-in-mode activity data from one of four typical ports to another port that has similar characteristics. Activity profiles for a typical port include: 1) number of vessels in each category; 2) vessel characterization, including propulsion size (horsepower), capacity tonnage, and engine age; 3) number of hours at each time-in-mode associated with cruising, reduced speed, maneuvering, and hotelling. It should be noted that this guidance only addresses methods to estimate commercial marine activity. EPA's current marine inventory guidance document[18] uses modeling techniques based on fuel consumption that were common at that time. Since then, new marine inventory techniques have been developed as part of the rulemaking process for emission standards for commercial marine diesel engines. These techniques are more similar to the techniques used for mobile sources generally, and rely on emission factors, population estimates, and usage characteristics. These techniques are currently being used to update the marine inventories and to develop marine components for the MOVES model. This new work will provide the foundation for a new marine inventory guidance document, including more research into emission factors, populations, and operating characteristics. Until that time, States and other stakeholders are encouraged to refer to the inventories prepared for the commercial marine diesel engine standards for use in developing their own inventories. The Regulatory Support Documents for those rules contain the inventory estimates and a description of how those estimates were produced.

Emissions for commercial aircraft engines can be estimated using the Federal Aviation Administration's (FAA) Emission Dispersion Modeling System (EDMS). The EDMS model requires detailed inputs on aircraft operation by aircraft and engine type. Aircraft activity data in the form of landing and take-offs (LTOs) can also be obtained from the FAA, if not available directly from airports (e.g., through surveys). Users should be aware that emission factor data for all aircraft types/engine models may not be available in EDMS, so default engine assignments may need to be made. In addition, the current version of EDMS does not contain PM emission factors. EPA OTAQ is working with the FAA to add this capability. The EDMS is available at the following web site: http://www.aee.faa.gov/emissions/EDMS/edmshome.htm. For air taxi, general aviation, and military aircraft, emission factors are available from EPA's 1989 mobile source emissions preparation guidance. These represent fleet-average emission factors and should be applied to activity data, or LTOs, for these aircraft types.

For the locomotive category, inventory preparers should account for Class I and Class II/III rail operations, as well as passenger and commuter line activity in their area. The activity data (i.e., fuel consumption) may be obtained by directly contacting individual railroads in the inventory area. Switch yard operations should also be identified. Both line haul and yard emissions can be estimated using EPA recommended emission factors, available at http://www.epa.gov/otaq/locomotv.htm. The EIIP also has

plans to issue further guidance for preparing locomotive emission estimates, expected in fall 2004.

Those seeking additional information related to emission estimation methods and emission factors for these nonroad categories should direct inquiries to OTAQ's Assessment and Standard Division Information Line at (734) 214-4636; e-mail: asdinfo@epa.gov.

5.6 BIOGENIC AND GEOGENIC SOURCES

Biogenic and geogenic sources contribute to pollutant emissions as indicated in Table 5.6-1.

Table 5.6-1. Natural Source Categories and Pollutants Emitted

Source	Pollutant			
	VOC	NO_x	PM_{10}	$PM_{2.5}$
Biogenic				
– Vegetation	✓			
– Soil Microbial Activity		✓		
Geogenic				
– Oil and Gas Seeps	✓			
– Wind Erosion			✓	✓
Other Natural				
– Lightning		✓		
– Stratospheric Injection*		✓		
– Oceans*		✓		

* NO_x emissions from each of these sources contribute 2 percent or less of the total global NO_x budget, and will not be discussed further.

5.6.1 Biogenic Sources

Biogenic sources are a subset of natural emissions sources that may contribute significantly to an emissions inventory. Vegetation (i.e., forests and agriculture) is the predominant biogenic source of VOC and is typically the only source that is included in a biogenic VOC emissions inventory. Microbial activity in the soil contributes to natural biogenic NO_x emissions.

State, local and Tribal agencies are referred to the EIIP document, *Volume V, Biogenic Sources Preferred Methods*,[21] for a detailed description of some of the biogenic source emissions that should be considered when preparing an emissions inventory. One of the major constituents of biogenic emissions, isoprene, is highly photoreactive. Because of this characteristic, inclusion of biogenic emissions is deemed essential for photochemical air quality modeling for ozone. In addition, some biogenic VOC may ultimately contribute to secondary particle formation, and would therefore be important with respect to a fine PM or regional haze inventory. Computer models available for State, local and Tribal agencies to estimate speciated biogenic emissions include the following:

- BEIS2.3 [A Personal Computer (PC) version of BEIS];
- BEIS3.12
- Global Biosphere Emissions and Interactions System (GLOBEIS3.1); and
- Biogenic Model for Emissions 3 (BIOME3).

Other alternative (but less preferable) methods for estimating biogenic emissions are also discussed in

Volume V of the EIIP document. In addition, the California Air Resources Board (CARB) has developed the Biogenic Emissions Inventory Geographical Information System (BEIGIS), a biogenic emissions model tailored to conditions and available data for California.

The BEIS2.3 model was developed by scientists at EPA and the National Center for Atmospheric Research (NCAR) with NCAR contributing emission factor algorithms and EPA developing national landuse/landcover (LULC) data (Biogenic Emissions Landcover Databases [BELD]). BEIS2.3 is a stand-alone processor that produces biogenic estimates for use with several existing air quality models. The BEIS2.3 model also estimates biogenic emissions from soil, which may be a significant source of NO_x emissions in rural areas. BEIS2.3 output is typically used only for inventory reporting purposes.

BEIS3.12 is designed to create a SMOKE emissions output file, suitable for input to models such as Models-3/Community Multiscale Air Quality (CMAQ); it is not a PC version.

GLOBEIS and BIOME are biogenic emission models developed by the Texas Commission on Environmental Quality (TCEQ)/NCAR and the Lake Michigan Air Directors Consortium (LADCO), respectively, for use in combination with photochemical modeling systems such as Comprehensive Air Quality Model with extensions (CAMx) and CMAQ. Both GLOBEIS3.1 and BIOME3 algorithms reflect improvements to the biogenic emission algorithms incorporated into BEIS2. The GLOBEIS model is a desk-top tool that is coded in MS Access, has a Graphical User Interface (GUI), and has extensive built-in QA and reporting functions. The GLOBEIS model is publicly available from: www.globeis.com. BIOME is coded in SAS, and allows the user to display maps of gridded emissions by pollutant. Additional information on BIOME can be found at: http://64.27.125.175/tech/emis/biogenics/biome3/biome3.htm.

State, local and Tribal agencies are encouraged to use EPA-generated BEIS emission estimates as the basis for their SIP planning inventories. State, local and Tribal agencies should note that biogenic emissions are required in a projected year inventory. However, unless there are anticipated changes in land use or vegetation patterns for the modeling area, it is appropriate to assume that biogenic emissions will remain the same between the base year and projected year. Readers can track the status of EPA's biogenic emissions modeling efforts at: http://www.epa.gov/asmdnerl/biogen.html.

5.6.2 Geogenic and Other Natural Sources

Geogenic emissions are primarily the result of oil or natural gas seeps and soil wind erosion. In addition, lightning may also be a significant contributor to natural NO_x emissions in an inventory area. Volcanoes and fumaroles (i.e., vapor or gas vents in a volcanic region) can be additional sources of geogenic emissions.

As a source of ozone precursor emissions, geogenic sources are less significant than biogenic sources. However, geogenic wind erosion may contribute substantially to PM emissions in an area. At this time, the emission estimation methodology for wind erosion is being refined by EPA to produce more representative PM estimates for this category.

State, local and Tribal agencies should also prepare an inventory of all other significant geogenic sources in the inventory area. Methods for estimating VOC emissions from oil and gas seeps, as well as NO_x emissions from lightning, are described in the EIIP document, *Volume V, Biogenic Sources Preferred Methods* available at http://www.epa.gov/ttn/chief/eiip/techreport/volume05/index.html. For oil and gas seeps, the preferred method is to develop a local emission factor based on the study of oil or gas seeps in the inventory area. The document also describes an alternative method developed by CARB [22] (available at http://www.arb.ca.gov/emisinv/areasrc/fullpdf/full9-2.pdf) that includes simplifying assumptions for oil or

gas seeps whose specific flow rates and volatile fractions have not been studied and are not known.

Lightning produces NO, which is oxidized to NO_2 in the presence of ozone or in a photochemically reactive atmosphere. Because lightning is not a direct source of NO_2, accounting for this source category is more important for air quality modeling purposes than for SIP inventory purposes. NO emissions from lightning can be estimated by collecting activity data on the cloud-to-ground lightning flashes, assuming a frequency of intra-cloud flashes based on the value for CG lightning flashes, and applying appropriate emission factors (in molecules NO per flash) to these activity levels.

SECTION 6.0
QUALITY ASSURANCE

As part of the 8-hour ozone NAAQS, $PM_{2.5}$ NAAQS, and regional haze rule, State, local and Tribal agencies are encouraged to perform QA checks and procedures on their inventories. State, local and Tribal agencies can develop and select the QA procedures they will perform, and should include the details of their QA program (including specific procedures) in their IPPs.

The purpose of QA is to ensure the development of a complete, accurate, and consistent emission inventory. A well-developed and well-implemented QA program fosters confidence in the inventory and in any resulting regulatory and/or control program.

The overall QA program consists of two components: QC and external QA activities. Quality control is a system of routine technical activities designed to measure and control the quality of the inventory as it is being developed. The QC system provides routine and consistent checks and documentation points in the inventory development process to verify data integrity, correctness, and completeness; identifies and reduces errors and omissions; maximizes consistency within the inventory preparation and documentation process; and facilitates internal and external inventory review processes. Quality control activities include technical reviews, accuracy checks, and the use of approved, standardized procedures for emission calculations, and should be included in inventory development planning, data collection and analysis, emission calculations, and reporting.

An effective QA program includes planning, numerous QC checks during the inventory development process, and QA audits at strategic points in the process. The EPA has developed several guidance documents designed to assist State, local and Tribal agencies in designing and implementing their QA programs. The EIIP Volume VI, available at http://www.epa.gov/ttn/chief/eiip/techreport/volume06/index.html, addresses QA issues, including the following: [5]

- Chapter 1: *Introduction - The Value of QA/QC*
- Chapter 2: *Planning and Documentation*
- Chapter 3: *General QA/QC Methods*
- Chapter 4: *Evaluating the Uncertainty of Emission Estimates*
- Chapter 5: *Model QA Plan*
- Appendix A: *Example Audit Report*
- Appendix B: *Technical Systems Audit Checklist Example*
- Appendix C: *Example 1 of Data Quality Audit Checklist*
- Appendix D: *Example 2 of data Quality Audit Checklist*
- Appendix E: *Performance Evaluation Checklist Example*
- Appendix F: *EIIP Recommended Approach to Using the Data Attribute Rating System (DARS)*

These documents can be downloaded from EIIP's web site at: http://www.epa.gov/ttn/chief/eiip/.

To assist State and local agencies in the QA process, EPA will make available to these agencies the

QA checks that EPA may run on their submitted data. State, local and Tribal agencies may decide to pre-screen their data using these QA checks prior to submitting their data to EPA. For example, EPA has prepared QA/QC software for the criteria and toxics NEI. This software is located on EPA's Chief web site at: http://www.epa.gov/ttn/chief/nif/index.html#qa. State, local and Tribal agencies are encouraged to run this software on their inventories prior to submitting the inventories to EPA to identify and correct QA issues.

On May 5, 2000, EPA issued Order 5360.1 A2 which revised EPA's quality assurance policy. This policy revision established amoung other things, the requirement for Quality Assurance Project Plans (QAPPs) for all EPA supported programs that generate environmental data. The EPA Office of the Inspector General has determined that emission inventories should be included under the provisions of 5360.1 A2 (see http://www.epa.gov/quality/qa_docs.html#EPArqts for a link to 5360.1 A2). Specific information and guidance on the preparation of QAPPs can be found at the following URL: http://www.epa.gov/quality/. The document "Guidance for Quality Assurance Project Plans (QA/G-5)" gives very detailed information on how to prepare QAPPs (see http://www.epa.gov/quality/qapps.html).

States should consult with their specific Regional Office to determine how to meet the QAPP obligation for the SIP inventory development.

SECTION 7
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22. *Emission Methodology for Oil and Gas Seeps*, California Air Resources Board, Sacramento, CA, 1993. (Web address: http://www.arb.ca.gov/emisinv/areasrc/fullpdf/full9-2.pdf)

23. *Example Documentation Report for 1990 Base Year Ozone and Carbon Monoxide State Implementation Plan Emission Inventories*, EPA-450/4-92-007, U.S. Environmental ProtectionAgency, Research Triangle Park, NC, March 1992. (Web address: http://www.epa.gov/ttn/chief/eidocs/exdocument.pdf)

24. *Example Emissions Inventory Documentation for Post-1987 Ozone State Implementation Plans*, EPA-450/4-89-018, U.S. Environmental Protection Agency, Research Triangle Park, NC, October 1989.

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APPENDIX A
CONSOLIDATED EMISSIONS REPORTING RULE (CERR)

The Consolidated Emissions Reporting Rule (CERR) was published as a final rule in the Federal Register on June 10, 2002 (FR June 10, 2002, 39602-39616). It has been subsequently codified in the Code of Federal Regulations as 40 CFR Part 51 Subparts A and Q.

ENVIRONMENTAL PROTECTION AGENCY
40 CFR Part 51
[AD-FRL-7223-8]
RIN 2060-AH25
Consolidated Emissions Reporting

AGENCY: Environmental Protection Agency (EPA)

ACTION: Final rule

SUMMARY: This action simplifies and consolidates emission inventory reporting requirements to a single location within the Code of Federal Regulations (CFR), establishes new reporting requirements related to $PM_{2.5}$ and regional haze, and establishes new requirements for the statewide reporting of area source and mobile source emissions. Many State and local agencies asked EPA to take this action to: consolidate reporting requirements; improve reporting efficiency; provide flexibility for data gathering and reporting; and better explain to program managers and the public the need for a consistent inventory program. Consolidated reporting should increase the efficiency of the emission inventory program and provide more consistent and uniform data.

DATES: The regulatory amendments announced in this rule take effect on August 9, 2002.

ADDRESSES: Docket. Supporting material used in developing the proposal and final regulatory revisions is contained in Docket Number A-98-40. This docket is available for public inspection and copying between 8:30 a.m. and 5:30 p.m., Monday through Friday. The address of the EPA air docket is: Air and Radiation Docket and Information Center (6102), Attention Docket Number A-98-40, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460. The Docket is located in Room M-1500, Waterside Mall (ground floor). The telephone number for the EPA air docket is (202) 260-7548. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: William B. Kuykendal, Emissions, Monitoring, and Analysis Division (MD-D205-01), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, 27711, Telephone: (919) 541-5372, email: kuykendal.bill@epa.gov.

SUPPLEMENTARY INFORMATION:

I. AUTHORITY

Sections 110(a)(2)(F), 110(a)(2)(K), 110(a)(2)(J), 110(p), 172(c)(3), 182(a)(3), 187(a)(5), 301(a) of the Clean Air Act.

II. BACKGROUND

Emission inventories are critical for the efforts of State, local, and federal agencies to attain and maintain the National Ambient Air Quality Standards (NAAQS) that EPA has established for criteria pollutants such as ozone, particulate matter, and carbon monoxide. Pursuant to its authority under section 110 of Title I of the Clean Air Act (CAA), EPA has long required State Implementation Plans (SIPs) to provide for the submission by States to EPA of emission inventories containing information regarding the emissions of criteria pollutants and their precursors (e.g., volatile organic compounds (VOC)). The EPA codified these requirements in 40 CFR part 51, subpart Q in 1979 and amended them in 1987.

The 1990 Amendments to the CAA revised many of the provisions of the CAA related to the attainment of the NAAQS and the protection of visibility in mandatory Class I Federal areas (certain national parks and wilderness areas). These revisions established new periodic emission inventory requirements applicable to certain areas that were designated nonattainment for certain pollutants. For example, section 182(a)(3)(A) required States to submit an emission inventory every three years for ozone nonattainment areas beginning in 1993. Emissions reported must include VOC, nitrogen oxides (NO_x), and carbon monoxide (CO) for point, area, mobile (onroad and nonroad), and biogenic sources. Similarly, section 187(a)(5) required States to submit an inventory every three years for CO nonattainment areas for the same source classes, except biogenic sources. The EPA, however, did not codify these statutory requirements in the Code of Federal Regulations (CFR), but simply relied on the statutory language to implement them.

The EPA has promulgated the NO_x SIP Call (§51.121) which calls on the affected States and the District of Columbia to submit SIP revisions providing for NO_x reductions in order to reduce the amount of ozone and ozone precursors transported among States. As part of that rule, EPA established emissions reporting requirements to be included in the SIP revisions to be submitted by States in accordance with that action.[A]

This rule consolidates the various emissions reporting requirements that already exist into one place in the CFR, establishes new reporting requirements related to $PM_{2.5}$ and

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[1]EPA recognizes that the United States Court of Appeals has remanded certain issues regarding the NO_x SIP call to the Agency. See *Michigan v. EPA*, 213 F. 3d 663 (D.C. Cir. 2000), and *Appalachian Power Co. v. EPA*, No. 99-1268, United States Court of Appeals for the District of Columbia Circuit, slip op. Issued June 8, 2001. Those issues, however, do not include the reporting requirements and the consolidation of those requirements does not represent any prejudgment of the issues on remand to the Agency.

regional haze, and establishes new requirements for the statewide reporting of area source and mobile source emissions. This rule also includes the reporting provisions for the NO_X SIP call. The NO_X SIP call reporting requirements are very detailed and are specified in 40 CFR 51.122; this rule references these requirements.

In this action, we refer to the required types of inventories as the following:

- Annual inventories
- 3-year cycle inventories

The EPA anticipates that States will use data obtained through their current annual source reporting requirements (annual inventories) to report emissions from larger point sources annually. States will need to get data from smaller point sources only every third year. States may also take advantage of data from Emission Statements that are available to States but not reported to EPA. As appropriate, States may use these data to meet their reporting requirements for point sources. States will also be required to inventory area and mobile source emissions on a Statewide basis for the 3-year cycle inventory. We will be furnishing each State the National Emission Inventory (NEI) which should be a good starting point for estimating area source emissions. Mobile source emissions should be estimated by using the latest emissions models and planning assumptions available. The MOBILE emissions factor model should be used to estimate emissions from on-road transportation sources, in combination with the latest available estimates of vehicle miles traveled (VMT). The NONROAD model can be used for off-road mobile sources as appropriate. By merging this information into a comprehensive emission inventory, State and local agencies may do the following:

- measure their progress in reducing emissions.
- have a tool they can use to support future trading programs.
- set a baseline from which to do future planning.
- answer the public's request for information.

We intend these inventories to help nonattainment areas develop and meet SIP requirements to reach the NAAQS and comply with the regional haze regulation.

For the first time, all States will need to inventory direct emissions of $PM_{2.5}$ and ammonia (NH_3). Since $PM_{2.5}$ is both a NAAQS pollutant and a major contributor to visibility impairment, we feel it is appropriate to begin collecting this emissions data. These $PM_{2.5}$ related data elements are needed as input to emission models. Emissions data will also be a factor in the development of $PM_{2.5}$ nonattainment area boundaries.

The Administrator has determined that States should submit statewide annual and 3-year cycle inventories for PM_{10}, $PM_{2.5}$, and regional haze, consistent with the data requirements for O_3 and CO. Sections 110(a)(2)(F) and 172(c)(3) provide ample statutory authority for this rule. Section 110(a)(2)(F) provides that SIPs are to require "as may be prescribed by the Administrator...

(ii)periodic reports on the nature and amounts of emissions and emissions-related data from such sources." Section 172(c)(3) provides that SIPs for nonattainment areas are to "include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants in such area, including such periodic revisions as the Administrator may determine necessary to assure that the requirements of this part are met." Additional statutory authority for emissions inventories from 1-hour ozone nonattainment areas is provided by section 182(a)(3)(A) and for emissions inventories from CO nonattainment areas is provided by section 187(a)(5). Section 301(a) provides authority for EPA to promulgate regulations embodying these provisions.

What is the purpose of the Consolidated Emissions Reporting Rule (CERR)?

The purpose of this rule is fivefold:

- simplify emissions reporting,
- offer options for data submittal,
- unify reporting dates for various categories of inventories,
- include reporting fine particulate matter and NH_3 (Note: Initially $PM_{2.5}$ and NH_3 reporting will only be required for area and mobile sources. States will be required to commence point source reporting of $PM_{2.5}$ and NH_3 at a later date as detailed in §51.30.) and,
- include Statewide reporting for area and mobile sources.

Previous requirements may have, at times, led to inefficient reporting. This rule provides for options for reporting that allow States to match their ongoing activities with federal requirements. This action also consolidates existing and new requirements of emission inventory programs for annual and 3-year cycle inventories.

Who will have to comply with the CERR requirements?

This rule will apply to State air pollution control agencies. In the special case where a State Implementation Plan provides for independent jurisdiction for local air pollution control agencies, these local agencies will also have to comply with the CERR requirements. In the rule, we have adopted "plain English language". When "you" is used we mean the State or local agency. When "we" is used, EPA is meant.

How will this rule affect Tribes?

One of the principal goals of the Tribal Authority Rule (TAR) is to allow tribes the flexibility to develop and administer their own CAA programs to as full an extent as they elect to do, while at the same time ensuring that the health and safety of the public are protected. In seeking to achieve this principal goal, the TAR adopts a modular approach, that is, it authorizes tribes to develop and implement only discrete portions of CAA programs, instead of entire complex programs. Neither the CAA nor the TAR

require tribes to adopt and manage CAA programs. Accordingly, the tribes are not required to develop an emissions inventory for sources within their jurisdiction. However, the emissions inventory is an important part of understanding the air quality status on the reservations and would be helpful in determining the best approach for addressing any air quality issues identified. Therefore, EPA expects that many of the tribes will wish to develop emissions inventories. This rule can provide valuable guidance to the tribes on how to develop these inventories, for example, by pointing out that any inventory data that are collected should be quality assured, and explaining how to do so. In addition, it would be very helpful if this information were recorded in EPA's National Emission Inventory (NEI) data format. This would make it possible to include the tribal data in the NEI which should facilitate future efforts by EPA when working with the tribes to develop air quality plans for reservations.

How are the CERR's requirements different from existing requirements?

(a) additional pollutants

Your State's inventory will add $PM_{2.5}$ and the precursor NH_3 to the criteria pollutants. (Note: Initially $PM_{2.5}$ and NH_3 reporting will only be required for area and mobile sources. States will be required to commence point source reporting of $PM_{2.5}$ and NH_3 at a later date as detailed in §51.30.)

(b) geographic coverage of inventory

Your State now reports point source emissions statewide and emissions from area and mobile sources by nonattainment area. Your State's new inventory will be statewide by county for all source types, regardless of the attainment status.

(c) frequency of reporting

Your State will continue to report emissions from larger point sources (See Table 1 of Appendix A) annually. Your State has a choice to report smaller point sources every three years or one-third of the sources each year. Your State will continue to report emissions from nonattainment areas for area and mobile sources every three years. Area and mobile source emissions in all other areas will be required to be reported for the first time, also every three years.

How will EPA use the data collected under this reporting requirement?

The EPA uses emission inventories for the following purposes:

- modeling analyses,
- projecting future control strategies,
- tracking progress to meet requirements of the CAA,
- calculating risk and
- responding to public inquiries.

How will others use my data collected under this requirement?

Some States need emissions data for areas outside their borders. Programs such as the Ozone Transport Assessment Group, the Ozone Transport Commission NO_x Baseline Study, and the Grand

Canyon Visibility Transport Commission demonstrated this need. As we recognize pollution as a regional problem, agencies will need multistate inventories more often to do such things as regional modeling. The EPA has established five Regional Planning Organizations (RPOs) that cover the nation. The RPOs are initially charged with developing regional strategies to address visibility concerns. Each RPO will be developing a regional emission inventory that will be used in regional scale modeling.

We can meet our common needs by creating a central repository of data from State and local agencies, or a group of regional emissions databases. Such repositories offer the advantage of ready access and availability, common procedures for ensuring the quality of data, and an ability to meet the general needs of many potential users.

What happens if EPA doesn't get my agency's emissions data?

We have structured this rule and our own emission inventory development plans so that the chance of this happening is minimized. We will develop our own preliminary National Emission Inventory (NEI) and furnish it to each State. You may choose to use the NEI as a starting point for development of your Statewide emission inventory. We strongly urge you to develop your own emission inventory. However, you may choose to accept all or part of the area source, mobile source and biogenic portions of the NEI as estimated by EPA without change and use these as your submittal to EPA. To do this, you can certify that you accept the EPA developed portions as your own estimates. Since you have been required to submit point source inventories to us since 1979 and since today's action reduces your point source reporting burden, you cannot use the NEI to satisfy your obligation to submit point source data.

If we don't receive your emissions information at the time this rule specifies, we'll use our preliminary NEI to produce final emissions estimates for your geographical area.

The CAA provides for certain actions if we do not receive your data, depending on the type of area, the pollutants involved, and the type of inventory submittal in question. All of the emissions information submissions specified by this rule are required submissions under section 110(p) of the CAA. There are also required submissions under the provisions of each existing approved State Implementation Plan, by virtue of section 110(a)(2)(F)(ii). If States do not make the required data submissions, we may make a finding of failure to implement the SIP even though we have substituted our preliminary estimates for the data you were required to submit but did not. In some cases, for example the three-year periodic emission inventories in ozone nonattainment areas, the submissions are statutorily required SIP revisions. Accordingly, we may also or instead make a finding of failure to submit.

III. COMMENTS RECEIVED ON THE PROPOSAL

The forty-five day comment period for the May 23, 2000 (at 65 33268) proposal expired on July 7, 2000. We received comments

from forty-one respondents. These comments were submitted by twenty-eight State and local agency representatives, eleven industrial organizations and two environmental organizations. We have addressed all comments in detail and placed them in the docket. The major comments and their resolution are discussed below. As an aid to the reader, we have grouped related comments under broad topical headings.

A. Hazardous Air Pollutant Reporting

A number of commenters responded to the section in the preamble of the proposed rule, "What Additional Reporting Requirements Is EPA Considering?". This section discussed how EPA might require the reporting of hazardous air pollutants (HAPs) in the final rule. The predominant comment was that EPA should not include HAP reporting requirements in the final rule until the specific HAP reporting requirements were proposed. We have carefully considered this comment and agree. We have limited this rulemaking to the criteria pollutants including $PM_{2.5}$ and NH_3. We plan to develop HAP reporting measures at a future date. At that time, we will address all other HAP related comments.

B. Criteria Point Source Reporting

We received several comments addressing the proposed applicability threshold (the emission limit at which a State is required to report a facility as a point source), the associated basis for determining applicability (applicability based on either "actual" or "Title V permitted" criteria pollutant emissions), and reporting frequency.

Existing rules require State agencies to annually report criteria pollutant emission inventory information for all qualifying point sources statewide. The reporting thresholds in place prior to this rule were for any point source with actual emissions greater than or equal to any one of the following levels: 100 tons per year for SO_x, NO_x, VOC, and PM_{10}; 1000 tons per year for CO and 5 tons per year for lead. This rule revises the applicability threshold by assigning the point sources into two categories termed Type A (large point sources) and Type B (all point sources), and reduces the reporting frequency for the smaller sources. Qualification as either a Type A or B source is still based upon a point source's actual emissions of the same criteria pollutants. Under our new terminology, all of the sources that were defined as a point source under the old thresholds are defined as Type B sources. Type A sources are the larger emitting sources and are a subset of the Type B sources. The reporting thresholds for Type A and Type B sources are presented in Table 1 of Appendix A.

Several State and local agencies indicated that the proposed Type A and B categories and associated emission thresholds were confusing and increased their reporting burden. These commenters recommended that we use the CAA's Title V definition of major source instead of the two subsets for determining point source applicability for this rule. (Note: for criteria pollutants, a major source under Title V is any stationary source or any group

of stationary sources located within a contiguous area and under common control that has the potential to emit 100 tons per year. However, sources located in nonattainment areas can have lower emission thresholds that would define them as major sources.) In addition to lowering the applicability threshold, use of the Title V definition would shift the basis for determining the applicability of the rule from "actual" to "potential" emissions. Commenters advocating the use of the Title V major source definition indicated that they maintain emission inventory data on all of their Title V sources and their reporting burden would increase if we required them to designate sources in their database as Type A (large point sources) vs Type B (all point sources).

We also received comments opposing the use of the Title V major source definition for determining applicability. These commenters indicated that such a requirement would increase their reporting burden since they currently do not gather the required emission inventory information for all of the Title V sources located in their jurisdiction.

In addition to the Title V applicability issue, we received comments, both advocating and opposing, the proposed 10 tpy VOC applicability threshold for sources located in all ozone nonattainment areas. Commenters opposed to the proposed VOC applicability threshold recommended that the existing 10 tpy level be raised to the major source threshold. (The major source threshold for VOC varies between 10 and 100 tons per year of potential emissions depending on the ozone nonattainment classification.) Other commenters advocated finalizing the proposed 10 tpy VOC applicability threshold.

Existing emission inventory reporting rules require State and local agencies to report emission inventory information for all qualifying point sources on an annual basis. The frequency for reporting emission inventory information was revised in the proposal. As proposed, States would be required to report emission inventory data for Type A (large point sources) on an annual basis and Type B (all point sources) on a 3-year cycle. In response to this revision, we received comments both opposing the reduction and comments advocating further reductions in the reporting frequency. Commenters opposing the reduction recommended that we maintain the existing annual reporting frequency for both Type A and Type B sources. Commenters advocating further reporting reductions wanted to increase the time for reporting Type B sources from 3 to 5 years.

After careful consideration of the comments on the point source applicability and reporting, we have decided to promulgate the proposed Type A (large point sources) and Type B (all point sources) categories and the associated criteria pollutant emission thresholds, except for VOC, and the reporting frequency. Regarding the VOC applicability threshold for sources located in ozone nonattainment areas, we have decided to revise this threshold, proposed as 10 tpy for all ozone nonattainment areas,

to be consistent with the CAA definition of major source in the respective ozone nonattainment areas except that it will apply to actual rather than to potential emissions.

When assessing comments on applicability and reporting issues, we considered the fact that this proposal was developed with input from a work group that included representatives from three states (California, New Jersey and Texas) and EPA. In addition to this workgroup, we maintained an active dialog about this proposal with a larger number of States through the State and Territorial Air Pollution Program Administrators (STAPPA) and the Association of Local Air Pollution Control Officials (ALAPCO). The fact that this proposal received strong support from the same State and local agencies that are responsible for complying with this rule was a factor in our decision to promulgate these revisions. Another factor that impacted our decision is that the revisions to both the point source category and reporting frequency were proposed to reduce the reporting burden on State agencies. Because of their large size, the annual requirement for Type A sources will affect relatively few sources, yet capture a large percentage of the emissions that would be reported if all Type B sources reported annually. Thus, we believe that the promulgated revisions to applicability threshold and reporting frequency will not adversely impact our effort to implement the CAA nor diminish the usefulness of emission inventory data accessible to the public.

We are sympathetic with the additional reporting burden that this rule would place on those agencies that currently collect the required items of emission inventory information on all Title V sources, if they were required to remove all data for smaller point sources when preparing their annual report on Type A (large point sources) or their triennial report on Type B (all point sources). Recognizing the need to provide State agencies with additional reporting flexibility and to reduce reporting burden, the final rule is explicit that we will accept emission inventory information submitted by the States that was collected and stored using any more stringent definition of point source and basis for determining source applicability within the Title V definition. Thus, an annual submission of a point source emission inventory that uses the Title V major source definition and potential emissions as qualification factors for inclusion in a State's emission inventory will be accepted.

We believe that the promulgated rule establishes the baseline or minimal data requirements needed to implement the CAA. We believe that requiring State and local agencies to report sources below the baseline established by this rule would increase the reporting burden with only a minimal increase in the usefulness of the inventory. However, this rule is not intended to relax existing reporting thresholds and frequencies established by State and local agencies. We recognize that State and local agencies may need emission information on sources more frequently and below the baseline established by this rule in order to manage their air

quality. Thus States and local agencies will have the flexibility to establish lower reporting thresholds and more frequent reporting requirements than those promulgated in this rule.

Several commenters noted that the applicability limits for sources subject to annual reporting specified in §51.1 were incorrect. We agree with these comments and have appropriately modified the regulatory language.

One commenter noted that many of the data elements required by this rule for a point source are more appropriate for an "emission unit". The commenter recommended that the final rule include thresholds for reporting emission unit or stack data within a point source. After reviewing this comment, we believe that it would be confusing and would add additional reporting burden to require reporting thresholds below the facility level. Therefore, we have decided not to expand the reporting threshold requirements below the facility level. However, if States choose to report at the sub-facility level, Table 2a in Appendix A includes provisions for reporting at the point, process and stack levels.

C. Criteria Area/Mobile/Biogenics Reporting

One commenter noted that we are requiring States to submit criteria pollutant emission estimates for all counties regardless of an area's classification (attainment or nonattainment) and that States, having historically done a good job when concentrating on problem areas, generally do not have the resources to perform a good job on every county especially when estimating area, nonroad, and mobile sources in small metropolitan areas. The commenter recommended that we develop these estimates and not burden the States.

For the 1996 emission inventory, we prepared an estimate of the criteria pollutants from point, area, mobile, nonroad and biogenic sources and provided these data to the States for their review prior to them initiating their emission inventory reporting effort. The States were able to use the EPA estimates as they prepared their 1996 emission inventory. For area sources, mobile sources and biogenic sources, we offered States the option of either notifying us that they agreed with our estimate or revising the estimate and providing us with updated information. The States were still required to provide State developed estimates for point sources. Recognizing the burden to States, we plan to continue to provide States with our emissions estimate for their review and use in future emission inventory preparation.

Another commenter noted that in the proposed preamble section "What happens if EPA doesn't get my agency's emissions Data?" that we state that we will generate the non-supplied data using our own techniques. The commenter wondered if the State could simply accept the data we developed. The commenter also stated that if we developed data not supplied by the State, that we should label the data as our estimates. The commenter stated that our estimates made without State agreement could be challenged with due cause. We have rewritten this section of the preamble to explicitly state that we will furnish each State with an inventory

that we prepared for that State (the National Emission Inventory (NEI)). The States may use the NEI as they prepare their State inventories. The States are strongly encouraged to improve upon our NEI estimates. However, they may choose to resubmit all or part of the NEI to us as their State's inventory. If they do this, then they are certifying that the adopted NEI portions are their estimates. If States ignore the requirements of this rule and do not make a timely inventory submittal to us, we will use our NEI to fill data gaps that will allow us to proceed with our various analyses.

D. $PM_{2.5}$ and Precursors

One commenter stated that we should revise our list of reported pollutants under § 51.20 to include only specific compounds or groups of compounds. This commenter wanted us to remove "$PM_{2.5}$ precursors" from our list of pollutants. We have carefully evaluated this comment and agree that the term "$PM_{2.5}$ precursor" is not precise. There is not an acceptable enforceable definition of this term. When "$PM_{2.5}$ precursor" was used in the proposed rule, the compounds or groups of compounds SO_X, VOC, NO_X and NH_3 were meant. Since the CERR specifically requires the reporting of SO_X, VOC and NO_X, we have dropped the term "$PM_{2.5}$ precursors" and substituted NH_3 in the list of required pollutants. The proposed rule specifically stated that NH_3 was a "$PM_{2.5}$ precursor", so this modification merely simplifies the list of required pollutants; it does not add a new pollutant to the list.

E. Tools

Several commenters stated that the emissions estimation tools were inadequate to produce acceptable emission inventories. These commenters pointed out specific types of estimation tools that they believed were either not available at all or were not adequate. These included EPA-developed models including the MOBILE model, the NONROAD model, and the PART model and emission factors, especially ones for $PM_{2.5}$ and NH_3. We agree that improvements in many of the emission estimation techniques are highly desirable, particularly in some of the areas identified by the commenters. However, we know that there will always be the opportunity to improve emission estimation techniques and that this is an evolutionary process. The CERR does not require the use of any specific emission estimation technique. There are emission estimation techniques available for all of the required pollutants and their major sources. Therefore, we believe that State or local agencies should be able to make emission inventory submittals that will be acceptable to EPA using current state-of-the-art techniques.

F. Reporting Deadlines/schedules

As proposed, this rule would have been applicable for the 1999 reporting year. Commenters noted that States had already begun compiling their 1999 point source inventories. These commenters would like for us to incorporate a phase-in or implementation schedule into the rule that would allow sufficient time for some agencies to go through a rulemaking process to align their

requirements with the new requirements specified by this rule. In addition, lead time is required for some agencies to conform to the standard data format for the first time. After careful consideration of these comments, we have decided to change the first year that States will be required to report under this rule. The first "Annual Cycle Inventory" will be for the year 2001. The first "Three-year Cycle Inventory" will be for the year 2002. Thus when States begin to develop their 2001 annual cycle emission inventory, they will only be required to submit the plant information and emission data for Type A (large point sources) as outlined by this rule. Since the basic requirement for point source reporting is not new, the States should be able to comply.

Another reporting related issue identified by the commenters was the difference in the reporting schedule between the proposed rule which requires all States to report annual emissions for certain sources and the NO_x SIP call rule which requires only affected States to report ozone season emissions. Some commenters recommended that the reporting schedule for these two inventories should be the same. Specifically, the NO_x SIP call specifies that States must report their ozone season emissions inventory for subject facilities within 12 months after the end of the reporting year. The proposed rule would require States to report both annual and the 3-year cycle inventories for subject facilities within 17 months after the end of the reporting year. The commenters recommended that the reporting schedule for the NO_x SIP call inventory be revised and made consistent with the annual and three-year cycle inventories.

After considering the comment, we have decided to maintain the NO_x SIP call reporting schedule on its 12-month cycle. Maintaining the 12-month reporting requirement for the NO_x SIP call inventory allows both the States and us to take note of higher than planned emissions early enough to give an opportunity for action before the next ozone season. Furthermore, for many large NO_x sources (e.g., utilities) that must report directly to us, the NO_x SIP call rule does not require any State reporting. Thus, the 12-month reporting requirement is not a burden on the States for these sources. We will continue to consider the points made by the commenters in light of the experience that both of us have with the 12 month preparation and submission of annual inventories. We may re-open this requirement for comment at a later date.

One commenter noted that we did not revise 40 CFR § 51.321 to agree with the proposed § 51.35. Each of these sections contains due dates which did not agree. We agree with this comment and have rewritten both sections to ensure consistency of the reporting dates.

G. Reporting Stack Data

One commenter noted that while the proposed rule text required the reporting of stack data every three years, the blocks for stack data were not checked in Table 2a for the column "Entire US". We acknowledge that the omission of the checks was a

mistake in Table 2a for the data elements: 40. Stack Height, 41. Stack Diameter, 42. Exit Gas Temperature, 43. Exit Gas Velocity and 44. Exit Gas Flow rate for the columns "Entire US". We have corrected this; the column "Entire US" has been relabeled "Every 3 Years".

H. Funding Issues

A number of commenters raised the issue of sufficient funding being available to pay for these new emission inventory requirements. These commenters questioned whether we would make additional monies available to the States specifically to comply with the provisions of the CERR. We are aware that the CERR does apply additional reporting burden on the States. In this preamble, under "IV. Administrative Requirements, C. Paperwork Reduction Act," we have estimated the incremental burden of the new requirements to be about $2,133,000 per year nationally. This estimate is based on information supplied by the States to us during the comment period and assumes that the States will be doing new work. However, in this preamble, under "II. Background, What happens if EPA doesn't get my agency's data?" we discuss how you may use the EPA-supplied NEI in the preparation of your emission inventory. If you choose to use the NEI estimates for area, mobile and biogenic sources as your State's estimates, your cost would be limited to the preparation of your point source inventory. We acknowledge that quality of this NEI-based inventory would be lower, but it would satisfy the specific reporting requirements of the CERR. We hope that future budgets at both the Federal and State levels will improve emission inventory funding. For FY 2001, the Congress authorized an increase in the total air grant funds to the States and the multi-State Regional Planning Organizations. Some of these funds were used for emission inventory improvement. However, no new monies are being made available through this rulemaking.

I. General

Several commenters stated that they support EPA's efforts to consolidate and improve emission inventory reporting on a national level. The respondents benefit from the data collected under the CERR since consistently developed statewide emission inventories assist in regional planning processes, especially for those downwind States whose nonattainment status is caused in part by pollution transported across State boundaries. In addition, the collection of $PM_{2.5}$ and NH_3 data will support future State efforts to reach the visibility improvement goals in Class I areas and to attain the revised PM NAAQS.

We received several comments on our estimate of reporting burden contained in the proposed rule. These comments are addressed in this preamble under "IV. Administrative Requirements, B. Paperwork Reduction Act".

J. EPA Initiated Changes

In addition to the above changes in response to specific comments, we have made other changes. Most of these changes were editorial to improve clarity or to correct grammatical mistakes.

The references to sections 182(a)(3)(A) and 182(a)(3)(B) under "Authority" have been combined to refer to section 182(a)(3) as a simplification. An additional reference under "Authority" has been added for section 110(p). The preamble, Section G. "Executive Order 13132: Federalism", has been revised as discussed in that section. In the "Background" section of the preamble, we have added the new subsection "How will this rule affect Tribes?". This subsection immediately follows "Who will have to comply with the CERR requirements?" and clarifies how Tribes will be impacted by this rule. We changed the name of four data elements in Table 2a of Appendix A and relocated one of them in the table. In the proposed rule the data elements were: 7. Federal ID code (plant), 8. Federal ID code (point), 9. Federal ID code (process) and 37. Federal ID code (stack number). There is no "Federal ID code". These data elements were renamed and numbered as follows: 7. Facility ID code, 8. Point ID code, 9. Process ID code and 10. Stack ID code. In addition, a check mark was inadvertently omitted in the proposed rule for data element "10. Stack ID code" for the column "Annual (Type A Sources)". We have added this check mark in the final rule. The Glossary in Appendix A was also revised to include these new names.

In the proposed rule under "§51.40 In what form should my State report the data to EPA?" and "§51.45 Where should my State report the data?", we proposed two specific electronic format options and identified means of reporting these data to us. Because electronic reporting technology changes frequently and is expected to become even more efficient in the future, we believe that structuring the final rule to limit reporting to these formats in the final rule unnecessarily restricts the flexibility for both the States and EPA. For this reason, we have revised both of these sections to allow for the use of new reporting formats in the future. These changes do not substantively alter this rule since, at this time, we will support both of the formats identified in the proposal; the National Emission Trends (NET) format (renamed as the National Emission Inventory (NEI) format) and Electronic Data Interchange (EDI) format, based on user needs.

We have also made changes to the portions of the rule that were concerned with the NO_X SIP Call reporting requirements. In the proposed rule, the NO_X SIP Call reporting requirements were detailed in the regulatory text and in the tables in Appendix A. However, these requirements are actually established in §51.122 and are presented in detail. In order to avoid confusion and possible inconsistencies, we have removed the NO_X SIP Call requirements and instead reference them in this rule. Because §51.122 establishes the reporting requirements, the changes that we have made to the CERR do not represent new requirements for the States.

K. Changes Resulting from OMB Review

In their review of the Paperwork Reduction Act portion of this rule, the Office of Management and Budget (OMB) has raised concerns about that portion of the Information Collection Request

that addresses the reporting of point source $PM_{2.5}$ and NH_3 emissions. Rather than delay the compliance date of the rule, EPA has elected to delay compliance with that portion which concerns the collection of information on point source $PM_{2.5}$ and NH_3 emissions. As modified, the rule now provides that States must commence reporting point source emissions of $PM_{2.5}$ and NH_3 on June 1, 2004 provided that, at least 60 days prior, we have published an approved revised ICR which addresses this subsection of the rule. If we fail to meet the deadline for June 1, 2004 reporting, States must commence reporting point source emissions of $PM_{2.5}$ and NH_3 on the next applicable reporting date that is at least 60 days after we publish an approved ICR addressing this subsection of the rule.

IV. ADMINISTRATIVE REQUIREMENTS

A. Docket

The docket for this regulatory action is A-98-40. The docket is an organized and complete file of all the information submitted to, or otherwise considered by, EPA in the development of this rulemaking. The principal purposes of the docket are: (1) To allow interested parties a means to identify and locate documents so that the parties can effectively participate in the rulemaking process and (2) to serve as the record in case of judicial review (except for interagency review materials). The docket is available for public inspection at EPA's Air Docket, which is listed under the ADDRESSES section of this document.

B. Executive Order 12866, Regulatory Planning and Review

Under Executive Order 12866 (58 FR 51735, October 4, 1993), EPA must determine whether the regulatory action is "significant" and therefore subject to review by the Office of Management and Budget (OMB) and the requirements of the Executive Order. The Executive Order defines "significant regulatory action" as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligation of recipients thereof; or

(4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of Executive Order 12866, OMB has notified EPA that it considers this a "significant regulatory action" within the meaning of the Executive Order. The EPA has submitted this action to OMB for review. Changes made in response to OMB suggestions or recommendations have been documented in the public record.

C. Paperwork Reduction Act

The information collection requirements in this rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. Earlier the Office of Management and Budget approved the current information collection requirements in part 51 under the Paperwork Reduction Act and has assigned OMB control number 2060-0088 (EPA ICR No. 0916.09). The Information Collection Request (ICR) document for the new information collection requirements has been prepared by EPA (ICR No. 0916.10) and a copy may be obtained from Sandy Farmer by mail at Collection Strategies Division; U.S. Environmental Protection Agency (2822); 1200 Pennsylvania Ave., NW, Washington, D.C. 20460, by email at farmer.sandy@epa.gov, or by calling (202) 260-2740. A copy may also be downloaded from the internet at http://www.epa.gov/icr. The information requirements are not enforceable until OMB approves them.

Today's action revises part 51 to consolidate old reporting requirements, adds new requirements for $PM_{2.5}$ and NH_3 (Note: Initially $PM_{2.5}$ and NH_3 reporting will only be required for area and mobile sources. States will be required to commence point source reporting of $PM_{2.5}$ and NH_3 at a later date as detailed in §51.30.) and adds new Statewide reporting requirements for area and mobile sources. Data from new reporting will be used to:

- support modeling analyses,
- project future control strategies,
- track progress to meet requirements of the CAA, and,
- respond to public inquiries.

The rule contains mandatory information reporting requirements; EPA considers all information reported under this rule to be in the public domain and therefore cannot be treated as confidential.

The information in the following table was summarized from ICR 0916.10 and presents the reporting burden estimates.

Reporting Requirement	BURDEN ESTIMATE SUMMARY					
	Number of Respondents	Hours per Respondent	Total hours per year	Total Labor Costs Per Year	Total Annual Capital Costs	Total Annual O&M Costs
Current	104	118	12,271	$365,756	$218,400	$12,480
Statewide Reporting State agencies	Varies	1,120	42,630	$1,267,126		
Statewide Reporting Local agencies	Varies	574	15,022	$446,511		
$PM_{2.5}$ and NH_3 Reporting	104	84	8,736	$259,667		
CERR-Compatible Reporting	Varies	84	5,376	$159,795		

TOTAL	**Varies**	**1,980**	**84,035**	**$2,498,855**	**$218,400**	**$12,480**

The reporting burden is broken down into "current requirements", "statewide area and mobile source reporting requirements", "$PM_{2.5}$ and NH_3 reporting requirements", and "CERR-compatible reporting". This has been done to highlight the major areas changed by the CERR and to show the impact of these changes on the estimated burden. Significant public comments received concerning each of these components are discussed, as well as any resulting changes made to the burden estimates.

The burden hours estimated for all of the emission inventory reporting requirements in place prior to this rule are labeled "current" and equal 118 hours per respondent per year. Because of the streamlining and flexibility offered by the CERR, these "current" requirements are reduced from the original burden estimate of 212 hours per respondent; a savings of 94 hours per respondent per year. Several commenters had stated that the number of respondents used to estimate burden in the proposed ICR (i.e., 55) underestimates the total number of respondents, and does not include local air pollution agencies. The EPA agrees that the estimated total number of State, Territorial and local agencies reporting emissions inventory data directly to EPA should be accounted for. This number was estimated to be 104 respondents (i.e., 55 State and Territorial agencies, plus 49 local agencies). As a result, the total burden hours per year for "current" requirements has increased, but the corresponding hours per respondent has actually decreased.

The reporting requirements for statewide area and mobile source reporting add 57,652 hours per year. Several commenters indicated that they believed the burden estimate in the proposed ICR to underestimate the actual reporting burden to States. One commenter stated that "while consolidation may ease the current burden on some state and local agencies, it will have little effect on others." The EPA acknowledges that certain State or local agencies are farther along than others in developing statewide emission estimation procedures. For States without nonattainment areas, this would be a new requirement, and the burden to comply with this requirement may be significant. Several commenters indicated that the burden to perform this activity will be zero since they are already performing statewide inventories. To respond to these comments, the final ICR presents increased burden estimates for a percentage of State agencies to comply with this provision of the rule, and the remaining state respondents were assumed not to incur additional burden for this activity. Since local agencies are presumed to have jurisdiction over fewer counties than a State agency, the statewide inventory burden for local agencies was estimated to be one-half the time for the State agencies. In addition, area and mobile source reporting responsibility was only attributed to one-half of the local agency respondents.

The $PM_{2.5}$ and NH_3 reporting requirements add 8,736 hours per

year. Several commenters stated that the burden estimate for $PM_{2.5}$ reporting was low and did not take into account the amount of time needed to develop emission factors since very little dependable $PM_{2.5}$ emissions factor information exists. Several commenters, however, indicated that the burden to perform this activity will be zero since they are already compiling $PM_{2.5}$ inventories for their own emissions inventory or modeling purposes. The EPA agrees that burden hours associated with $PM_{2.5}$ reporting were underestimated in the proposed ICR. EPA updated the one-time burden estimate for the final CERR to reflect the time it will take an average State or local agency to generate a more representative $PM_{2.5}$ and NH_3 emissions inventory, and if necessary, to update agency reporting systems to include $PM_{2.5}$ and NH_3. The revised estimate of 8736 hours includes the effort for a State or local agency to update their emissions reporting system to include $PM_{2.5}$ and NH_3. Although States are not required to commence reporting of $PM_{2.5}$ and NH_3 point source emissions until June 1, 2004, this burden estimate includes the effort for a State to update their point source data base in anticipation of this requirement.

Commenters questioned why EPA did not include an estimate for industry respondents for $PM_{2.5}$ reporting, since States may look to industry to provide $PM_{2.5}$ information. Another commenter maintained that it seems inappropriate to include industry respondents when developing the burden estimates. The EPA will include an estimate of the burden hours required by industry, as well as by State and local agencies, to report $PM_{2.5}$ and NH_3 from point sources in a subsequent revised ICR. States will be required to commence point source reporting of $PM_{2.5}$ and NH_3 at a later date as detailed in §51.30.

Finally, several commenters believed that the capital and operations and maintenance costs were not representative of actual costs that would be incurred by respondents. The EPA agrees and we have increased the costs to reflect a higher number of work stations, and multiplied costs per respondent by an increased number of respondents. In addition, although not included as a capital cost, EPA accounted for the labor hours and associated costs of respondents to convert their reporting systems to CERR-compatible format, since all agencies' reporting systems are not presently compatible with EPA's NEI Input format.

The total burden impact of the CERR is estimated to be 84,035 hours per year for State, Territorial and local respondents. It should be noted that, of this total of 84,035 hours per year, approximately 34,000 hours per year are associated with start-up costs that will no longer be incurred after the first three years. Thus, after three years, the estimated burden becomes about 50,000 hours per year.

We did not include Tribes in our estimate of burden. While Tribes may report their emissions to us, under the Tribal Authority Rule they are not required to do so. If the Tribes do not provide emissions estimates to us, we will estimate their

emissions for them. Generally, the emissions from tribal lands are not major and therefore the burden associated with estimating these emissions is not large.

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An Agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR Part 9 and 48 CFR Chapter 15. The OMB control number for the information collection requirements in this rule will be listed in an amendment to [40 CFR part 9 or 48 CFR Chapter 15] in a subsequent Federal Register document after OMB approves the ICR.

D. Regulatory Flexibility Act (RFA), as Amended by the Small Business Regulatory Enforcement Fairness Act of 1966 (SBREFA), 5 U.S.C. 601 et seq.

The Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 USC 601 et. seq., generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of today's rule on small entities, small entity is defined as: (1) a small business is defined in the Small Business Administration's (SBA) regulations at 13 CFR 121.201. SBA defines small business by category of business using North American Industry Classification System (NAICS) codes; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

The EPA has determined that this final rule will not have a significant economic impact on a substantial number of small entities. As stated in the preamble under "Who will have to comply with the CERR requirements?" and in the rule under §51.1, the rule applies only to State agencies, which do not constitute

small entities within the meaning of the RFA.

E. E.O. 13045: Children's Health Protection

Executive Order 13045: "Protection of Children from Environmental Health Risks and Safety Risks" (62FR19885, April 23, 1997) applies to any rule that: (1) is determined to be "economically significant" as defined under E.O. 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

The EPA interprets E.O. 13045 as applying only to those regulatory actions that are based on health or safety risks, such that the analysis required under section 5-501 of the Order has the potential to influence the regulation. This rule is not subject to E.O. 13045 because it is based on the need for information to characterize health and safety risks themselves.

F. The National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (NTTAA), Pub L. No. 104-113, § 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This rule does not involve technical standards. Therefore, EPA is not considering the use of any voluntary consensus standards.

G. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), P.L. 104-4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "Federal mandates" that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an

alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

The EPA has determined that this rule does not contain a Federal mandate that may result in expenditures of $100 million or more for State, local, and tribal governments, in the aggregate, or the private sector in any one year. The additional work required by this rule takes advantage of information already in the possession of reporting groups. Using existing data leverages past work and reduces the burden of this rule. This conclusion is supported by the analysis done in support of EPA ICR No. 0916.10, which shows that total costs will be about $2,730,000. The EPA has also determined that this rule does not apply to small government entities. As discussed in this preamble under section "D. Impact on Small Entities", this rule applies only to State governments. Thus, today's rule is not subject to the requirements of sections 202, 203 and 205 of the UMRA.

H. Executive Order 13132: Federalism

Executive Order 13132, entitled "Federalism" (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure "meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications." "Policies that have federalism implications" is defined in the Executive Order to include regulations that have "substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government."

Under section 6 of Executive Order 13132, EPA may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, or EPA consults with State and local officials early in the process of developing the proposed regulation. The EPA also may not issue a regulation that has federalism implications and that preempts State law, unless the Agency consults with State and local officials early in the process of developing the proposed regulation.

If EPA complies by consulting, Executive Order 13132 requires EPA to provide to the Office of Management and Budget (OMB), in a

separately identified section of the preamble to the rule, a federalism summary impact statement (FSIS). The FSIS must include a description of the extent of EPA's prior consultation with State and local officials, a summary of the nature of their concerns and the agency's position supporting the need to issue the regulation, and a statement of the extent to which the concerns of State and local officials have been met. Also, when EPA transmits a draft final rule with federalism implications to OMB for review pursuant to Executive Order 12866, EPA must include a certification from the agency's Federalism Official stating that EPA has met the requirements of Executive Order 13132 in a meaningful and timely manner.

In the proposed rule (65 FR 33273), EPA proposed to conclude that this rule did have federalism implications. This was based on the fact the proposed rule would require States to report their emissions Statewide and to report $PM_{2.5}$ and NH_3 emissions. It was also assumed that since such reporting may impose direct costs on State or local governments, and since the Federal government will not provide the funds necessary to pay those costs, that the federalism provisions would apply. The EPA has reconsidered this position. The federalism provisions are intended to apply to rules that substantially alter the relationship between the Federal Government and State governments. This rule in large measure consolidates pre-existing reporting requirements and the incremental burden of the new requirements is about $2,133,000 annually. While this rule will impact State governments by imposing new emission inventory reporting requirements, EPA does not believe that this causes a substantial change in the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. Thus, the requirements of section 6 of the Executive Order do not apply to this rule.

I. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

Executive Order 13175, entitled "Consultation and Coordination with Indian Tribal Governments" (65 FR 67249, November 6, 2000), requires EPA to develop an accountable process to ensure "meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications." "Policies that have tribal implications" is defined in the Executive Order to include regulations that have "substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and the Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes."

This final rule does not have tribal implications. It will not have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes, as specified in Executive

Order 13175. The Tribal Authority Rule means that Tribes cannot be required to report their emissions to us. Thus, Executive Order 13175 does not apply to this rule.

J. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This rule is not a "significant energy action" as defined in Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use" (66 FR 28355 (May 22, 2001)) because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. This rule defines the requirements for the reporting of emission inventories by State and local agencies to EPA. We do not believe that this rule will effect the supply, production, availability, cost or use on energy in the United States. Further, we have concluded that this rule is not likely to have any adverse energy effects.

K. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 et seq., as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the Federal Register. A Major rule cannot take effect until 60 days after it is published in the Federal Register. This action is not a "major rule" as defined by 5 U.S.C. 804(2). This rule will become effective 60 days after it is published in the Federal Register.

List of Subjects in 40 CFR Part 51

Environmental protection, Administrative practice and procedure, Air pollution control, Intergovernmental relations, Reporting and recordkeeping requirements.

Dated: May 23, 2002. Christine Todd Whitman, Administrator.

For the reasons stated in the preamble, title 40, chapter I, of

the Code of Federal Regulations is amended as follows:

PART 51 -- [AMENDED]

1. The authority citation for part 51 continues to read as follows:

Authority: 23 U.S.C. 101; 42 U.S.C. 7401 - 7671q.

2. Part 51 is amended by adding subpart A to read as follows:

Subpart A - Emission Inventory Reporting Requirements

GENERAL INFORMATION FOR INVENTORY PREPARERS

Sec.

51.1 Who is responsible for actions described in this subpart?

51.5 What tools are available to help prepare and report emissions data?

51.10 How does my State report emissions that are required by the NO_X SIP Call?

SPECIFIC REPORTING REQUIREMENTS

51.15 What data does my State need to report to EPA?

51.20 What are the emission thresholds that separate point and area sources?

51.25 What geographic area must my State's inventory cover?

51.30 When does my State report the data to EPA?

51.35 How can my State equalize the effort for annual reporting?

51.40 In what form should my State report the data to EPA?

51.45 Where should my State report the data?

Appendix A to Subpart A of Part 51 - Tables and Glossary

Appendix B to Subpart A of Part 51 - [Reserved]

Subpart A - Emission Inventory Reporting Requirements

GENERAL INFORMATION FOR INVENTORY PREPARERS

§51.1 Who is responsible for actions described in this subpart?

State agencies whose geographic coverage include any point, area, mobile, or biogenic sources must inventory these sources and report this information to EPA.

§51.5 What tools are available to help prepare and report emissions data?

We urge your State to use estimation procedures described in documents from the Emission Inventory Improvement Program (EIIP). These procedures are standardized and ranked according to relative uncertainty for each emission estimating technique. Using this guidance will enable others to use your State's data and evaluate its quality and consistency with other data.

§51.10 How does my State report emissions that are required by the NO_x SIP Call?

The States and the District of Columbia that are subject to the NO_X SIP Call (§51.121) should report their emissions under the provisions of §51.122. To avoid confusion, these requirements are not repeated here.

SPECIFIC REPORTING REQUIREMENTS

§51.15 What data does my State need to report to EPA?

(a) Pollutants. Report actual emissions of the following (see Glossary to Appendix A to this subpart for precise definitions as required):

(1) Required Pollutants:

(i) Sulfur oxides.

(ii) VOC.

(iii) Nitrogen oxides.

(iv) Carbon monoxide.

(v) Lead and lead compounds.

(vi) Primary $PM_{2.5}$.

(vii) Primary PM_{10}.

(viii) NH_3.

(2) Optional Pollutant:

(i) Primary PM.

(b) Sources. Emissions should be reported from the following sources:

(1) Point.

(2) Area.

(3) Onroad mobile.

(4) Nonroad mobile.

(5) Biogenic.

(c) Supporting information. Report the data elements in Tables 2a through 2d of Appendix A to this subpart. Depending on the format you choose to report your State data, additional information not listed in Tables 2a through 2d will be required. We may ask you for other data on a voluntary basis to meet special purposes.

(d) Confidential data. We don't consider the data in Tables 2a through 2d of Appendix A to this subpart confidential, but some States limit release of this type of data. Any data that you submit to EPA under this rule will be considered in the public domain and cannot be treated as confidential. If Federal and State requirements are inconsistent, consult your EPA Regional Office for a final reconciliation.

§51.20 What are the emission thresholds that separate point and area sources?

(a) All anthropogenic stationary sources must be included in your inventory as either point or area sources.

(b) See Table 1 of Appendix A to this subpart for minimum reporting thresholds on point sources.

(c) Your State has two alternatives to the point source reporting thresholds in paragraph (b) of this section:

(1) You may choose to define point sources by the definition of a major source used under CAA Title V, see 40 CFR 70.2.

(2) If your State has lower emission reporting thresholds for point sources than paragraph (b) of this section, then you may use these in reporting your emissions to EPA.

(d) All stationary sources that have actual emissions lower than the thresholds specified in paragraphs (b) and (c) of this

section, should be reported as area sources.

§51.25 What geographic area must my State's inventory cover?

Because of the regional nature of these pollutants, your State's inventory must be statewide, regardless of an area's attainment status.

§51.30 When does my State report the data to EPA?

Your State is required to report two basic types of emission inventories to us: Annual Cycle Inventory; and Three-year Cycle Inventory.

(a) Annual cycle. You are required to report annually data from Type A (large) point sources. Except as provided in paragraph (e) of this section, the first annual cycle inventory will be for the year 2001 and must be submitted to us within 17 months, i.e., by June 1, 2003. Subsequent annual cycle inventories will be due 17 months following the end of the reporting year. See Table 2a of Appendix A to this subpart for the specific data elements to report annually.

(b) Three-year cycle. You are required to report triennially, data for Type B (all) point sources, area sources and mobile sources. Except as provided in paragraph (e) of this section, the first three-year cycle inventory will be for the year 2002 and must be submitted to us within 17 months, i.e., by June 1, 2004. Subsequent three-year cycle inventories will be due 17 months following the end of the reporting year. See Tables 2a, 2b and 2c of Appendix A to this subpart for the specific data elements that must be reported triennially.

(c) NO_x SIP call. There are specific annual and three-year reporting requirements for States subject to the NO_X SIP call. See §51.122 for these requirements.

(d) Biogenic emissions. Biogenic emissions are part of your 3-year cycle inventory. Your State must establish an initial baseline for biogenic emissions that is due as specified under paragraph (b) of this section. Your State need not submit more biogenic data unless land use characteristics or the methods for estimating emissions change substantially. If either of these changes, your State must report the biogenic emission data elements shown in Table 2d of Appendix A to this subpart. Report these data elements 17 months after the end of the reporting year.

(e) Point Sources. States must commence reporting point source emissions of $PM_{2.5}$ and NH_3 on June 1, 2004 unless that date is less than 60 days after EPA publishes an approved Information Collection Request (ICR) addressing this section. If EPA fails to publish an approved ICR 60 days in advance of June 1, 2004, States must commence reporting point source emissions of $PM_{2.5}$ and NH_3 on the next annual or triennial reporting date (as appropriate) that is at least 60 days after EPA publishes an approved ICR addressing this subsection of the rule.

§51.35 How can my State equalize the effort for annual reporting?

(a) Compiling a 3-year cycle inventory means much more effort

every three years. As an option, your State may ease this workload spike by using the following approach:
(1) Annually collect and report data for all Type A (large) point sources (This is required for all Type A point sources).
(2) Annually collect data for one-third of your smaller point sources (Type B point sources minus Type A (large) point sources). Collect data for a different third of these sources each year so that data has been collected for all of the smaller point sources by the end of each three-year cycle. You may report these data to EPA annually, or as an option you may save three years of data and then report all of the smaller point sources on the three-year cycle due date.
(3) Annually collect data for one-third of the area, nonroad mobile, onroad mobile and, if required, biogenic sources. You may report these data to EPA annually, or as an option you may save three years of data and then report all of these data on the three-year cycle due date.

(b) For the sources described in paragraph (a) of this section, your State will therefore have data from three successive years at any given time, rather than from the single year in which it is compiled.

(c) If your State chooses the method of inventorying one-third of your smaller point sources and 3-year cycle area, nonroad mobile, onroad mobile sources each year, your State must compile each year of the three-year period identically. For example, if a process hasn't changed for a source category or individual plant, your State must use the same emission factors to calculate emissions for each year of the three-year period. If your State has revised emission factors during the three years for a process that hasn't changed, resubmit previous year's data using the revised factor. If your State uses models to estimate emissions, you must make sure that the model is the same for all three years.

(d) If your State chooses the method of inventorying one-third of your smaller point sources and 3-year cycle area, nonroad mobile, onroad mobile sources each year and reporting them on the 3-year cycle due date, the first required date for you to report on all such sources will be June 1, 2004 as specified in §51.30. You can satisfy the 2004 reporting requirement by either: start inventorying one third of your sources in 2000; or doing a one-time complete 3-year cycle inventory for 2002, then changing to the option of inventorying one third of your sources for subsequent years.

(e) If your State needs a new reference year emission inventory for a selected pollutant, your State can't use these optional reporting frequencies for the new reference year.

(f) If your State is a NO_x SIP call State, you can't use these optional reporting frequencies for NO_x SIP call reporting.

§51.40 In what form should my State report the data to EPA?

You must report your emission inventory data to us in electronic form. We support specific electronic data reporting formats and you are required to report your data in a format

consistent with these. Because electronic reporting technology continually changes, contact the Emission Factor and Inventory Group (EFIG) for the latest specific formats. You can find information on the current formats at the following Internet address: *http://www.epa.gov/ttn/chief* You may also call our Info CHIEF help desk at (919)541-1000 or email to info.chief@epa.gov.

§51.45 Where should my State report the data?

(a) Your State submits or reports data by providing it directly to EPA.

(b) The latest information on data reporting procedures is available at the following Internet address: *http://www.epa.gov/ttn/chief* You may also call our Info CHIEF help desk at (919)541-1000 or email to info.chief@epa.gov.

Appendix A to Subpart A of Part 51 - Tables and Glossary

Table 1. Minimum Point Source Reporting Thresholds by Pollutant(tpy[1])

Pollutant	Annual Cycle (Type A Sources)	Three-year Cycle	
		Type B Sources[2]	NAA[3]
1.SO_x	≥2500	≥100	≥100
2.VOC	≥250	≥100	O_3 (moderate)≥100
3.VOC			O_3 (serious)≥ 50
4.VOC			O_3 (severe)≥ 25
5.VOC			O_3 (extreme)≥ 10
6.NO_x	≥2500	≥100	≥100
7.CO	≥2500	≥1000	O_3 (all areas)≥100
8.CO			CO (all areas)≥100
9.Pb		≥5	≥5
10.PM_{10}	≥250	≥100	PM_{10} (moderate)≥100
11.PM_{10}			PM_{10} (serious)≥70
12.$PM_{2.5}$	≥250	≥100	≥100
13.NH_3	≥250	≥100	≥100

[1]tpy = tons per year of actual emissions.
[2]Type A sources are a subset of the Type B sources and are the larger emitting sources by pollutant.
[3]NAA = Nonattainment Area. Special point source reporting thresholds apply for certain pollutants by type of nonattainment area. The pollutants by nonattainment area are: Ozone: VOC, NO_x, CO; CO: CO; PM_{10}: PM_{10}

Table 2a. Data Elements that States Must Report for Point Sources

Data Elements	Annual (Type A Sources)	Every 3 Years (Type B Sources and NAAs)
1.Inventory year	✔	✔
2.Inventory start date	✔	✔
3.Inventory end date	✔	✔
4.Inventory type	✔	✔

5.State FIPS code	✔	✔
6.County FIPS code	✔	✔
7.Facility ID code	✔	✔
8.Point ID code	✔	✔
9.Process ID code	✔	✔
10.Stack ID code	✔	✔
11.Site name	✔	✔
12.Physical address	✔	✔
13.SCC or PCC	✔	✔
14.Heat content(fuel) (annual average)	✔	✔
15.Ash content (fuel)(annual average)	✔	✔
16.Sulfur content (fuel)(annual average)	✔	✔
17.Pollutant code	✔	✔
18.Activity/throughput (annual)	✔	✔
19.Activity/throughput (daily)	✔	✔
20.Work weekday emissions	✔	✔
21.Annual emissions	✔	✔
22.Emission factor	✔	✔
23.Winter throughput(%)	✔	✔
24.Spring throughput(%)	✔	✔
25.Summer throughput(%)	✔	✔
26.Fall throughput(%)	✔	✔
27.Hr/day in operation	✔	✔
28.Start time (hour)	✔	✔
29.Day/wk in operation	✔	✔
30.Wk/yr in operation	✔	✔
31.X stack coordinate (latitude)		✔

32.Y stack coordinate (longitude)		✔
33.Stack Height		✔
34.Stack diameter		✔
35.Exit gas temperature		✔
36.Exit gas velocity		✔
37.Exit gas flow rate		✔
38.SIC/NAICS		✔
39.Design capacity		✔
40.Maximum namemplate capacity		✔
41.Primary control eff(%)		✔
42.Secondary control eff (%)		✔
43.Control device type		✔
44.Rule effectiveness (%)		✔

Table 2b. Data Elements that States Must Report for Area and Nonroad Mobile Sources

Data Elements	Every 3 Years
1.Inventory year	✔
2.Inventory start date	✔
3.Inventory end date	✔
4.Inventory type	✔
5.State FIPS code	✔
6.County FIPS code	✔
7.SCC or PCC	✔
8.Emission factor	✔
9.Activity/throughput level (annual)	✔
10.Total capture/control efficiency (%)	✔
11.Rule effectiveness (%)	✔
12.Rule penetration (%)	✔

13.Pollutant code	✔
14.Summer/winter work weekday emissions	✔
15.Annual emissions	✔
16.Winter throughput (%)	✔
17.Spring throughput (%)	✔
18.Summer throughput (%)	✔
19.Fall throughput (%)	✔
20.Hrs/day in operation	✔
21.Days/wk in operation	✔
22.Wks/yr in operation	✔

Table 2c. Data Elements that States Must Report for Onroad Mobile Sources

Data Elements	Every 3 Years
1.Inventory year	✔
2.Inventory start date	✔
3.Inventory end date	✔
4.Inventory type	✔
5.State FIPS code	✔
6.County FIPS code	✔
7.SCC or PCC	✔
8.Emission factor	✔
9.Activity (VMT by Roadway Class)	✔
10.Pollutant code	✔
11.Summer/winter work weekday emissions	✔
12.Annual emissions	✔

Table 2d. Data Elements that States Must Report for Biogenic Sources

Data Elements	Every 3 Years

1.Inventory year	✔
2.Inventory start date	✔
3.Inventory end date	✔
4.Inventory type	✔
5.State FIPS code	✔
6.County FIPS code	✔
7.SCC or PCC	✔
8. Pollutant code	✔
9.Summer/winter work weekday emissions	✔
10.Annual emissions	✔

GLOSSARY

Activity rate/throughput (annual) - A measurable factor or parameter that relates directly or indirectly to the emissions of an air pollution source. Depending on the type of source category, activity information may refer to the amount of fuel combusted, raw material processed, product manufactured, or material handled or processed. It may also refer to population, employment, number of units, or miles traveled. Activity information is typically the value that is multiplied against an emission factor to generate an emissions estimate.
Activity rate/throughput (daily) - The beginning and ending dates and times that define the emissions period used to estimate the daily activity rate/throughput.

Annual emissions - Actual emissions for a plant, point, or process - measured or calculated that represent a calendar year.

Area sources - Area sources collectively represent individual sources that have not been inventoried as specific point, mobile, or biogenic sources. These individual sources treated collectively as area sources are typically too small, numerous, or difficult to inventory using the methods for the other classes of sources.

Ash content - Inert residual portion of a fuel.

Biogenic sources - Biogenic emissions are all pollutants emitted from non-anthropogenic sources. Example sources include trees and vegetation, oil and gas seeps, and microbial activity.

Control device type - The name of the type of control device (e.g., wet scrubber, flaring, or process change).

County FIPS Code - Federal Information Placement System (FIPS)is the

system of unique numeric codes the government developed to identify States, counties and parishes for the entire United States, Puerto Rico, and Guam.

Day/wk in operations - Days per week that the emitting process operates - average over the inventory period.

Design capacity - A measure of the size of a point source, based on the reported maximum continuous capacity of the unit.

Emission factor - Ratio relating emissions of a specific pollutant to an activity or material throughput level.

Exit gas flow rate - Numeric value of stack gas's flow rate.

Exit gas temperature - Numeric value of an exit gas stream's temperature.

Exit gas velocity - Numeric value of an exit gas stream's velocity.

Facility ID code - Unique code for a plant or facility, containing one or more pollutant-emitting sources. This is the data element in Appendix A, Table 2a, that is defined elsewhere in this glossary as a "point source".

Fall throughput(%) - Part of the throughput for the three Fall months (September, October, November). This expresses part of the annual activity information based on four seasons - typically spring, summer, fall, and winter. It can be a percentage of the annual activity (e.g., production in summer is 40% of the year's production) or units of the activity (e.g., out of 600 units produced, spring = 150 units, summer = 250 units, fall = 150 units, and winter = 50 units).

Heat content - The amount of thermal heat energy in a solid, liquid, or gaseous fuel. Fuel heat content is typically expressed in units of Btu/lb of fuel, Btu/gal of fuel, joules/kg of fuel, etc.

Hr/day in operations - Hours per day that the emitting process operates - average over the inventory period.

Inventory end date - Last day of the inventory period.

Inventory start date - First day of the inventory period.

Inventory type - Type of inventory represented by data (e.g., point, 3-year cycle, daily).

Inventory year - The calendar year for which you calculated emissions estimates.

Lead (Pb)- As defined in 40 CFR 50.12, lead should be reported as elemental lead and its compounds.

Maximum nameplate capacity - A measure of a unit's size that the manufacturer puts on the unit's nameplate.

Mobile source - A motor vehicle, nonroad engine or nonroad vehicle.

- A "motor vehicle" is any self-propelled vehicle used to carry people or property on a street or highway.

- A "nonroad engine" is an internal combustion engine (including fuel system) that is not used in a motor vehicle or vehicle only used for competition, or that is not affected by sections 111 or 202 of the CAA.

- A "nonroad vehicle" is a vehicle that is run by a nonroad engine and that is not a motor vehicle or a vehicle only used for competition.

PM (Particulate Matter) - Particulate matter is a criteria air pollutant. For the purpose of this subpart, the following definitions apply:

(1) Primary PM: Particles that enter the atmosphere as a direct emission from a stack or an open source. It is comprised of two components: Filterable PM and Condensible PM. (As specified in §51.15 (a)(2), these two PM components are the components measured by a stack sampling train such as EPA Method 5 and have no upper particle size limit.)

(2) Filterable PM: Particles that are directly emitted by a source as a solid or liquid at stack or release conditions and captured on the filter of a stack test train.

(3) Condensible PM: Material that is vapor phase at stack conditions, but which condenses and/or reacts upon cooling and dilution in the ambient air to form solid or liquid PM immediately after discharge from the stack.

(4) Secondary PM: Particles that form through chemical reactions in the ambient air well after dilution and condensation have occurred. Secondary PM is usually formed at some distance downwind from the source. Secondary PM should **NOT** be reported in the emission inventory and is **NOT** covered by this subpart.

(5) Primary $PM_{2.5}$: Also $PM_{2.5}$ (or Filterable $PM_{2.5}$ and Condensible PM individually. Note that all Condensible PM is assumed to be in the $PM_{2.5}$ size fraction) - Particulate matter with an aerodynamic diameter equal to or less than 2.5 micrometers.

(6) Primary PM_{10}: Also PM_{10} (or Filterable PM_{10} and Condensible PM individually) - Particulate matter with an aerodynamic diameter equal to or less than 10 micrometers.

PCC - Process classification code. A process-level code that describes the equipment or operation which is emitting pollutants. This code is being considered as a replacement for the SCC.

Physical address - Street address of a facility. This is the address of the location where the emissions occur; not, for example, the corporate headquarters.

Point ID code - Unique code for the point of generation of emissions, typically a physical piece of equipment.

Point source - Point sources are large, stationary (non-mobile), identifiable sources of emissions that release pollutants into the atmosphere. As used in this rule, a point source is defined as a facility that annually emits more than a "threshold" value as defined under §51.20.

Pollutant code - A unique code for each reported pollutant assigned in the Emission Inventory Improvement Program (EIIP) Data Model. The EIIP model was developed to promote consistency in organizations sharing emissions data. The model uses character names for criteria pollutants and Chemical Abstracts Service (CAS) numbers for all other pollutants. You may be using SAROAD codes for pollutants, but you should be able to map them to the pollutant codes in the EIIP Data Model.

Process ID code - Unique code for the process generating the emissions, typically a description of a process.

Roadway class - A classification system developed by the Federal Highway Administration that defines all public roadways as to type. Currently there are four roadway types: 1) freeway, 2) freeway ramp, 3) arterial/collector and 4) local.

Rule effectiveness (RE) - How well a regulatory program achieves all possible emission reductions. This rating reflects the assumption that controls typically aren't 100 percent effective because of equipment downtime, upsets, decreases in control efficiencies, and other deficiencies in emission estimates. RE adjusts the control efficiency.

Rule penetration - The percentage of an area source category covered by an applicable regulation.

SCC - Source classification code. A process-level code that describes the equipment and/or operation which is emitting pollutants.

Seasonal activity rate/throughput - A measurable factor or parameter that relates directly or indirectly to the pollutant season emissions of an air pollution source. Depending on the type of source category, activity information may refer to the amount of fuel combusted, raw material processed, product manufactured, or material handled or processed. It may also refer to population, employment, number of units, or miles traveled. Activity information is typically the value that is multiplied against an

emission factor to generate an emissions estimate.

Seasonal fuel heat content - The amount of thermal heat energy in a solid, liquid, or gaseous fuel used during the pollutant season. Fuel heat content is typically expressed in units of Btu/lb of fuel, Btu/gal of fuel, joules/kg of fuel, etc.

Secondary control eff (%) - The emission reduction efficiency of a secondary control device. Control efficiency is usually expressed as a percentage or in tenths.

SIC/NAICS - Standard Industrial Classification code. NAICS (North American Industry Classification System) codes will replace SIC codes. U.S. Department of Commerce's code for businesses by products or services.

Site name - The name of the facility.

Spring throughput(%) - Part of throughput or activity for the three spring months (March, April, May). See the definition of Fall Throughput.

Stack diameter - A stack's inner physical diameter.

Stack height - A stack's physical height above the surrounding terrain.

Stack ID code - Unique code for the point where emissions from one or more processes release into the atmosphere.

Start time (hour) - Start time (if available) that you used to calculate the emissions estimates.

State FIPS Code - Federal Information Placement System (FIPS)is the system of unique numeric codes the government developed to identify States, counties and parishes for the entire United States, Puerto Rico, and Guam.

Sulfur content - Sulfur content of a fuel, usually expressed as percent by weight.

Summer throughput(%) - Part of throughput or activity for the three summer months (June, July, August). See the definition of Fall Throughput.

Summer/winter work weekday emissions - Average day's emissions for a typical day. Ozone daily emissions = summer work weekday; CO and PM daily emissions = winter work weekday.

Total capture/control efficiency - The emission reduction efficiency of a primary control device, which shows the amount controls or material changes reduce a particular pollutant from a process' emissions. Control efficiency is usually expressed as a percentage or in tenths.

Type A source - Large point sources with actual annual emissions greater than or equal to any of the emission thresholds listed in Table 1 for Type A sources.

Type B source - Point sources with actual annual emissions during any year of the three year cycle greater than or equal to any of the emission thresholds listed in Table 1 for Type B sources. Type B sources include all Type A sources.

VMT by Roadway Class - Vehicle miles traveled (VMT) expresses vehicle activity and is used with emission factors. The emission factors are usually expressed in terms of grams per mile of travel. Because VMT doesn't correlate directly to emissions that occur while the vehicle isn't moving, these nonmoving emissions are incorporated into the emission factors in EPA's MOBILE Model.

VOC - Volatile Organic Compounds. The EPA's regulatory definition of VOC is in 40 CFR § 51.100.

Winter throughput (%) - Part of throughput or activity for the three winter months (December, January, February, all from the same year, e.g., Winter 2000 = January 2000 + February, 2000 + December 2000). See the definition of Fall Throughput.

Wk/yr in operation - Weeks per year that the emitting process operates.

Work Weekday - Any day of the week except Saturday or Sunday.

X stack coordinate (latitude) - An object's north-south geographical coordinate.

Y stack coordinate (longitude) - An object's east-west geographical coordinate.

Appendix B to Subpart A of Part 51 - [Reserved]

Subpart Q - [Amended]

3. Section 51.321 is revised to read as follows:

§51.321 Annual source emissions and State action report.

The State agency shall report to the Administrator (through the appropriate Regional Office) information as specified in §§51.322 through 51.326.

4. Section 51.322 is revised to read as follows:

§51.322 Sources subject to emissions reporting.

The requirements for reporting emissions data under the plan are in subpart A of this part 51.

5. Section 51.323 is revised to read as follows:

§51.323 Reportable emissions data and information.

The requirements for reportable emissions data and information under

the plan are in subpart A of this part 51.

APPENDIX B
REVISED RULE EFFECTIVENESS GUIDANCE

Introduction

In the Spring of 2004, a workgroup consisting of emissions inventory staff from state, local and EPA offices convened to review existing rule effectiveness (RE) guidance, and if possible develop a consensus recommendation for improvements to this guidance. Initial discussions among workgroup members revealed agreement that making adjustments to inventory estimates to account for rule effectiveness was appropriate, but that the existing guidance was not meeting the inventory community's needs. There was general agreement that adjustments to inventory estimates to account for RE were not occurring in a consistent manner across states and EPA regions.

Through a series of conference calls, the workgroup developed recommendations to revise EPA's existing rule effectiveness guidance. This document presents the revised guidance, and it consists of this introductory text and accompanying frequently asked questions (FAQ) section, attachment 1 containing a questionnaire for point sources, and attachment 2 which contains a shorter questionnaire for non-point (formerly called area) sources. Perhaps of most significance, the revised guidance removes the previous recommendation for use of an across the board 80% default value for RE. In its place, this new guidance provides inventory preparers with a listing of the factors that are most likely to affect RE, and ranks these factors in a priority order. Likely responses to evaluation of these factors were then grouped into RE ranges, such that more positive responses to a number of the factors will lead towards selection of a higher RE value, whereas more negative responses will direct one to select an RE value from a lower range.

For example, if a state has a regulation covering autobody shops, and inspected more than 25% of the sources in a given year and found that 90% or more were in compliance, and took enforcement action against non-compliant sources, the area source questionnaire would direct the state to select an RE value from the highest range, which is from 86 to 100%. It would be up to the state agency to select the exact value to use. Conversely, if fewer than 15% of the sources had been inspected, and violations were found about half the time, and the state was having difficulty processing enforcement actions against violators, an RE value from the lowest area source range, which is 70% or less, should be chosen.

Please note that this rule effectiveness guidance only applies to stationary point and non-point sources; it does not apply to mobile sources. EPA policy remains that in the development of emission inventories, RE must be considered as part of the emission estimation calculation for controlled sources, although there are some exceptions to this as noted in the FAQ part of this document. **Importantly, a state or local agency's rationale for the RE value chosen must be documented within the emissions inventory.**

Use of Facility Specific Information

First and foremost, an agency responsible for emissions inventory preparation should attempt to obtain facility specific data from as many sources as possible, and use the collected information to make a refined source or source category RE determination. A review of the factors that influence RE as outlined in the two attachments should provide a state or local agency with the necessary information on the types of data to collect. States are free to select their own set of data to collect from their sources in order to make source or source category specific RE adjustments. However, if such data deviates substantially from the RE factors identified in the two attachments to this document, the agency should discuss its proposed method with the appropriate EPA regional office. EPA's December 21, 1992 document, "Revised Rule Effective National "Protocol" contains useful information on crafting a refined estimate of RE via conduct of a local evaluation. The document is available on EPA's CHIEF website: http://www.epa.gov/ttn/chief/.

Use of RE Analysis Performed by Others

If facility specific information can't be obtained, it is possible that information collected by other state or local agencies for similar sources in their states may be of use. We are in the process of collecting information from rule effectiveness evaluation studies conducted in the past and assembling this information and all of the other documents either produced or relied upon by the RE workgroup. When this information is assembled, it will be posted on the CHIEF website mentioned above. Studies done by other agencies on the same or similar source categories may shed light on what type of RE adjustment to use if both agency's regulations and general approach to enforcement are reasonably comparable.

Selection Based on Factors that Influence RE

It is unlikely that all state and local agencies will be able to collect sufficient information from all of their stationary sources from which refined RE adjustments can be made. Additionally, no suitable matching studies may exist from which a rule effectiveness value can be obtained. In such situations, the selection of an RE value becomes subjective. In an effort to minimize this subjectivity, EPA recommends that state and local agencies choose a RE level from within the 5 point source ranges shown in attachment 1, or from within the 3 non-point source ranges shown in attachment 2. The point source ranges are narrower and the factors are described in more detail than the non-point source ranges and factors because the RE workgroup felt that state and local agencies generally have more information, and conduct more inspections on facilities within the point source sector.

It is important to note that it is unlikely the source or source category you are evaluating will meet all of the criteria within any one range. Therefore, select the range which best describes the source or source category being considered; choose the range that provides the best fit.

The five point source RE ranges are:
94 to 100%;
87 to 93%;
81 to 86%;
70 to 80%;
less than 70%.

The three non-point source RE ranges are:
86 to 100%;
71 to 85%;
less than 70%.

State and local agencies should select an RE value by reviewing the factors for each range as listed in attachment 1 and 2, and selecting a RE value from within the range that represents the best fit. Within each range, the factors are listed by order of importance as determined by the workgroup that developed this guidance. Three tiers are shown within each range; the most important factors that influence rule effectiveness, other important factors, and other factors which deserve consideration but which weren't regarded as highly as those within the first two tiers. The factors are listed by order of importance within each tier as determined by the workgroup.

Although use of these ranges offers much more flexibility to states and local agencies in determining rule effectiveness adjustments compared to the previous guidance, which in essence recommended an across the board use of an 80% adjustment, variability across states and EPA regions will still exist. It is hoped that creation of these ranges will reduce that variability. EPA encourages states to try to use source specific data to develop refined RE estimates to the maximum extent possible rather than rely on these ranges.

Frequently Asked Questions

1. What does the term "rule effectiveness" mean?

Rule effectiveness (RE) is a term that describes a method to account for the reality that not all facilities covered by a rule are in compliance with the rule 100% of the time. Additionally, RE accounts for the fact that control equipment does not always operate at it's assumed control efficiency.

2. How do I make an adjustment for RE when making an emissions estimate?

To adjust an emission unit's emissions for RE, add a percentage RE term to the normal equation used to estimate the controlled source's emissions. The RE term is used to adjust, in effect lower, the control efficiency. For example, consider an emission unit with uncontrolled emissions of 150 tpy that operates a piece of control equipment with a stated control efficiency of 80%. This unit would have it's emissions calculated as follows if the control equipment is always assumed to be fully operational, and it is assumed the source always operates it:

Uncontrolled Emissions * (1 - Control Efficiency) = Controlled Emissions
150 * (1 - 0.8) = 30 tpy

However, if the agency feels that a review of the factors that influence rule effectiveness indicates that an RE adjustment of 90% should be made, the equation and resulting emissions are changed as follows:

Uncontrolled Emissions * (1 – (Control Efficiency)*(RE)) = Controlled Emissions
150 * (1 – (0.8*0.9)) = 42 tpy

3. Does this guidance apply to all inventories a state or local agency prepares?

This guidance was developed specifically for use by states required to prepare emission inventories in support of development of SIPs for the 8-hour ozone and PM2.5 standards. However, the principles put forth here have relevance to most, if not all types of inventories, and EPA recommends that agencies consider applying it in development of inventories for other criteria or hazardous air pollutants.

4. Do all emission inventory estimates have to be adjusted to account for RE?

Not all inventory estimates need to be adjusted for RE, only those where a control device or control technique is used. Furthermore, not all emission estimates involving use of a control device or technique need to be adjusted to account for RE. In some instances, a state or local agency may feel that the control device or technique has sufficient safeguards and/or monitoring requirements to account for any control device equipment failure. For example, a state or local agency may conclude that a control device that operates in conjunction with a continuous emissions monitor, or is equipped with an automatic shutdown device, may provide a sufficient level of assurance that intended emission reductions will be achieved, and therefore an adjustment for rule effectiveness is not necessary. Another example would be in instances where a direct determination of emissions, such as via a mass balance calculation, can be made.

5. Does the term "actual emissions" mean an emission estimate that has been adjusted for RE, or an emission estimate as reported by a source?

Ideally, state and local agencies will work with each source to determine what the best estimate of the source's emissions are, and that estimate will include any adjustments made to account for rule effectiveness. Thus, the term "actual emissions" should include an adjustment for rule effectiveness. Some agencies prefer to adjust a

source's reported emissions for rule effectiveness themselves, and use the "adjusted" emission estimate within their inventory. In most such cases, the agency would maintain two emission estimates for the same source; one as reported by the source and another as adjusted by the agency to account for rule effectiveness. The latter estimate would be the source's actual emissions. Note that this guidance is intended for use in the development of emission inventories; it is up to each agency to decide if RE adjustment are appropriate for use in other air programs, such as in permitting programs.

6. Should capture efficiency be considered when determining RE adjustments?

Capture efficiency should be considered when making RE determinations, as defects in the operation of equipment designed to capture emissions and route them through a control device can result in a substantial increase in emissions. Emission units that are dependent upon the operation of both capture and control device equipment should generally receive lower RE adjustments than units equipped with only control devices.

7. Using RE to adjust emissions for highly controlled sources can greatly increase a source's emissions. Should RE be used in such circumstances?

Malfunction of control equipment that is expected to operate at very high control efficiencies will substantially increase emissions. An emitting unit whose uncontrolled daily emissions are 10 tons per day equipped with a control device expected to achieve a 99% control efficiency should only emit 200 lbs per day. Clearly, malfunction of the control device can lead to a tremendous increase in emissions. Similarly, application of a rule effectiveness adjustment will also have a large impact on emissions. States should carefully review the reliability and past performance history of emission units equipped with control devices expected to achieve very high control efficiencies to determine an appropriate RE level. Chapter 12 of the Emission Inventory Improvement Program's point source guidance contains a good description of this phenomenon. That document is available on the internet at: http://www.epa.gov/ttn/chief/eiip/.

8. Should emissions that occur during start-up, shut-down, upsets, and malfunctions be included in a facilities emission estimate?

Emissions that occur under all modes of operation need to be included in a facilities emission estimate. State and local agencies can attempt to estimate emissions from start-up, shut-down, upsets and malfunctions using whatever techniques they believe will produce the most accurate result. Ideally, emission estimates for these types of non-normal operating conditions will be obtained using facility specific information. Alternatively, and less preferably, they can be accounted for using the rule effectiveness adjustment procedures outlined in this guidance.

Some states, for example the South Carolina Bureau of Air Quality, currently collect such information as part of their annual emissions reporting process. A copy of South Carolina's data collection form is available on the RE website previously mentioned in this document.

9. What about EPA's existing guidance for the vapor recovery (stage 2) systems; does this guidance replace that?

Since EPA has collected a considerable amount of data on this source category pertaining to the relationship between inspection frequency and exemption criteria, and related that to the anticipated level of control, the existing guidance for vapor recovery systems remains in place. The document containing this guidance is: "Technical Guidance – Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities" EPA-450/3-91-022a. It can be found on the internet at: http://www.epa.gov/ttn/atw/gasdist/gasdispg.html

10. How can I calculate SIP credit for emission reductions achieved via improvements to rule effectiveness?

Such credit will need to be determined on a case by case basis. EPA's older guidance material may be used as a point of reference, but pursuant to the EPA guidance, "Ozone Nonattainment Planning: Decentralization of Rule Effectiveness Policy; April 27, 1995", other approaches can also be used. EPA's older guidance is available at the RE web-site mentioned above, in the documents entitled, "Rule Effectiveness Guidance: Integration of Inventory, Compliance, and Assessment Applications; EPA-452/4/94-001, January, 1994, " "Transmittal of Rule Effectiveness Protocol for 1996 Demonstration; December 22, 1994", and "Stationary Source Compliance Division Rule Effectiveness National Protocol; December 21, 1992".

11. Is this guidance applicable to emission inventories developed in support of the 8-hour ozone or PM 2.5 NAAQS?

Given the large number of stationary point and area source categories contained within an emission inventory, it is not EPA's expectation that state and local agencies will immediately implement this revised rule effectiveness guidance for all sources and source categories. However, we have had a longstanding requirement that inventories developed to support ozone SIPs consider and account for rule effectiveness. Accordingly, inventories submitted to meet requirements of the 8-hour ozone standard should at a minimum comply with EPA's prior rule effectiveness guidance. Additionally, EPA encourages all state and local agencies to begin using the guidance within this policy as soon as possible, as we believe it will lead to higher quality emission estimates for controlled sources.

12. Is there a quick way to research the compliance history of a source?

The best way to obtain information on the compliance history of a source is to speak with the compliance & enforcement staff at your agency that are most familiar with the site. Alternatively, you could use EPA databases that store compliance information. For example, EPA's OTIS database could be used to obtain a quick overview of a source's compliance history. The following is a description of the OTIS database from EPA's website:

"*The OnlineTracking Information System (OTIS) is a collection of search engines enables EPA staff, state/local/tribal governments, and federal agencies to access a wide range of data relating to enforcement and compliance. OTIS is a web application that sends queries to the Integrated Data for Enforcement Analysis (IDEA) system. Only State and Federal agencies have access to the OTIS data system. IDEA copies many EPA and non-EPA databases monthly, and organizes the information to facilitate cross-database analysis. OTIS can be used for many functions, including planning, targeting, analysis, data quality review, and pre-inspection review. OTIS was launched for internal Agency use in November 1999. In addition to performing data base analysis, OTIS has three other additional benefits:*

- *helps the Regions and States to identify and clean up data errors;*
- *provides report information on a cross media basis, leading to improved integration and targeting;*
- *provides the basis for proposed public access site for enforcement and compliance data.*
  For additional information please contact Rebecca Kane at kane.rebecca@epa.govwhich"

The ECHO database can be accessed at: http://www.epa.gov/echo/index.html.

Attachment 1: Point Source Rule Effectiveness Ranges

Range 1: 94 to 100%

Most important factors:

- Monitoring: Source specific monitoring used for compliance purposes, and monitoring records filed with regulatory agency at least every 4 months;

- Compliance history: the facility has been in compliance for the past eight quarters.

Other important factors:

- Type of inspection: Inspections involve compliance test methods with a high degree of accuracy, such as stack testing or other types of precise emissions measurement;

- Operation & Maintenance: Control equipment operators follow and sign daily O&M instructions;
- Unannounced inspections routinely conducted;
- Agency has the authority to impose punitive measures, including monetary fines, towards violators such as in delegated Title V Operating Permit programs.

Other factors:

- Source subject to Title V or other type of compliance certification;
- Source(s) are inspected once every 2 years or more frequently;
- Agency has sufficient resources to implement EPA's 12/22/98 HPV policy;
- Control equipment operators complete a formal training program on use of the equipment, and such program is kept up to date and has been reviewed by the regulatory agency;
- Media publicity of enforcement actions;
- Regulatory workshops are available annually, and/or the implementing agency mails regulatory information packages each year;
- Inspectors must undergo 2 weeks of comprehensive basic training, and 1 to 2 weeks of source specific training, and such training is updated each year;
- Specific guidelines and schedule for testing and test methods exist;
- Follow-up inspections always or almost always done (90 % of the time or more).

Range 2: 87 to 93%

Most important factors:

- Monitoring: Source specific monitoring used as an indicator of compliance, and monitoring records filed with regulatory agency every 6 to 9 months;

- Compliance history: the facility is believed to have been in compliance for the past eight quarters, although inspection frequency is such that this can't be positively confirmed.

Other important factors:

- Type of inspection: Inspections involve detailed review of process parameters & inspection of control

equipment;
- Operation & Maintenance: Control equipment operators follow daily O&M instructions;
- Unannounced inspections sometimes done;
- Agency has the authority to impose punitive measures, including monetary fines, towards violators such as in delegated Title V Operating Permit programs;

Other factors:

- Source subject to Title V or other type of compliance certification;
- Source(s) inspected every 3 years or more frequently;
- Agency's resources allow it to implement EPA's 12/22/98 HPV policy in most instances;
- Control equipment operators complete formal training program, and such program is kept up to date and available for review by the regulatory agency upon request;
- Media publicity of enforcement actions;
- Regulatory workshop are available every 1-2 years, and/or the implementing agency mails regulatory information packages every 1-2 years;
- Inspectors must undergo 1 to 2 weeks of basic training and 1 week of source specific training, and such training is updated every 1-2 years;
- Specific guidelines on testing and test methods exist, but no schedule for testing.
- Follow-up inspections usually done (approximately 75% of the time).

Range 3: 81 to 86%

Most important factors:

- Monitoring: Source specific monitoring used as an indicator of compliance, and monitoring records filed with regulatory agency each year;
- Compliance history: On schedule; the facility is meeting its compliance schedule.

Other important factors:

- Type of inspection: Inspections involve review of process and inspection of control equipment;
- Operation & Maintenance: Control equipment operators follow daily or weekly O&M instructions;
- Unannounced inspections done, but infrequently;
- Agency has the authority to impose punitive measures, including monetary fines, towards violators such as in delegated Title V Operating Permit programs.

Other factors

- Source not subject to any type of compliance certification;
- Source(s) inspected every 5 years or more frequently;
- Agency's resources allow it to implement EPA's 12/22/98 HPV policy in most instances;
- Control equipment operators complete some amount of formal training;
- Media publicity of enforcement actions;
- Regulatory workshop are available every 2-3 years, and/or the implementing agency mails regulatory information packages once every 2-3 years;
- Inspectors must undergo 1 to 2 weeks of basic training and 3 to 5 days of source specific training, and such training is updated every 1-2 years;
- Specific guidelines on testing and test methods exist, but no schedule for testing.
- Follow-up inspections sometimes done (approximately 50% of the time).

Range 4: 70% to 80%

Most important factors:

- Monitoring: General guidance exists for source specific enhanced monitoring, and monitoring records required but aren't submitted to regulatory agency;
- Compliance history: In Violation; facility is in violation of emissions and/or procedural requirements.

Other important factors:

- Type of inspection: Inspections generally consist of only a records review;
- Operation & Maintenance: O&M requirements exist, but on no specific schedule;
- Unannounced inspections rarely done;
- Agency has the authority to impose punitive measures, including monetary fines, towards violators such as in delegated Title V Operating Permit programs.

Other factors:

- Source not subject to any type of compliance certification;
- Inspection of source(s) infrequent; > every 5 years;
- Agency's resources allow it to implement EPA's 12/22/98 HPV policy more often than not;
- Media publicity of enforcement actions;
- Regulatory workshop not routinely available, but implementing agency mails regulatory information packages out about once every 2-3 years;
- Inspectors must undergo 1 to 2 weeks of basic training and 1 to 3 days of source specific training, and such training is updated every 1-2 years; Control equipment operators receive only on the job training ;
- Specific guidelines on testing and test methods, but no schedule for testing;
- Follow-up inspections infrequently done (approximately 25% of the time).

Range 5: Less than 70%

Most important factors:

- Monitoring: No requirements for any type of monitoring;
- Compliance history: High Priority Violator (HPV): the facility is in significant violation of one or more applicable requirement of the CAA.

Other important factors:

- Type of inspection: Inspections most likely consist of visual inspection (e.g., opacity), or drive by;
- Operation & Maintenance: No specific O&M requirements;
- Unannounced inspections never done;
- Agency does not have sufficient authority to impose punitive measures towards violators;

Other factors:

- Source not subject to any type of compliance certification;
- Inspections rarely, if ever, performed;
- Resource constraints prohibit agency from implementing EPA's 12/22/98 HPV policy in most instances.

- Control equipment operators receive no specific training;
- No media publicity of enforcement actions.
- Regulatory workshops not routinely available; implementing agency mails regulatory information packages infrequently, if ever;
- Inspectors must undergo less than 5 days of basic training less than 3 days of source specific training, and such training is updated only every 2 years or less frequently;
- Only general guidance on testing, or no mention of testing requirements.
- Follow-up inspections rarely or never done (10% of the time or less).

Attachment 2: Non-point source Rule Effectiveness Ranges

Range 1: 86 to 100%

Most important factor:

- Over 90% of facilities inspected in the source category are in compliance

Other important factors:

- Source is subject to some type of compliance certification;
- Inspections are thorough and detailed, and include close examination of control equipment, and a detailed records review;
- Unannounced inspections are sometimes done;
- Percent of facilities inspected in the sector in a given year is 25% or greater;
- Agency takes prompt enforcement action, including monetary fines, against violators;
- A compliance assistance program exists and is adequately staffed, and includes such things as workshops, mailings, web-based tutorials, etc.

Other factors:

- Monitoring requirements exist and must be reported to regulatory agency at least once a year;
- Follow-up inspections are done when violations are noted most (>75%) of the time;
- Media publicity of enforcement actions is routinely conducted.

Range 2: 70 to 85%

Most important factor:

- Over 75% of facilities inspected in the source category are in compliance

Other important factors:

- Source is subject to some type of compliance certification;
- Inspections consist of a records review, and sometimes inspection of control equipment;
- Unannounced inspections are done, but infrequently;
- Percent of facilities inspected in the sector in a given year is 15% or greater;
- Agency usually takes enforcement action, including monetary fines, against violators;
- A compliance assistance program exists, but is minimally staffed. The program occasionally makes workshops, mailings, web-based tutorials, etc., available.

Other factors:

- Monitoring requirements exist but records don't have to be filed with regulatory agency;
- Follow-up inspections are done when violations are noted most (>75%) of the time;
- Media publicity of enforcement actions is sometimes done.

Range 3: < 70%

Most important factor:

- Over 60% of facilities inspected in the source category are in compliance

Other important factors:

- Source is not subject to any type of compliance certification;
- Inspections generally consist of a records review only;
- Unannounced inspections are never done;
- Percent of facilities inspected in the sector in a given year is less than 15% ;
- Agency usually does not take enforcement action against violators;
- A compliance assistance program does not exist.

Other factors:

- Monitoring requirements do not exist;
- Follow-up inspections are not routinely done;
- Media publicity of enforcement actions is rarely if ever done.

APPENDIX C



EPA420-B-05-008
August 2005

Guidance for Creating Annual On-Road Mobile Source Emission Inventories for PM2.5 Nonattainment Areas for Use in SIPs and Conformity

Transportation and Regional Programs Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

Background Information

The purpose of this document is to provide areas that are nonattainment or maintenance for the annual $PM_{2.5}$ national ambient air quality standard ("standard") with guidance on developing annual $PM_{2.5}$ on-road motor vehicle emissions estimates to meet state air quality implementation plan (SIP) and transportation conformity requirements.

For previous and existing air quality standards (e.g., 1-hour ozone, 8-hour ozone, PM10 and carbon monoxide (CO)), areas typically have been required to examine a typical summer or winter day because areas were violating a standard established for a time period of 24 hours or less. As a result, these areas have developed on-road motor vehicle SIP inventories, motor vehicle emissions budgets ("budgets"), and regional emissions analyses[C] for transportation conformity determinations using modeling inputs and parameters that were specific to a typical day within a particular season. However, all areas currently designated nonattainment for $PM_{2.5}$ are violating the annual standard for this pollutant. In order to be consistent with this standard, these areas must develop annual emission inventories for the purpose of developing SIP budgets and demonstrating transportation conformity. This guidance provides information on how areas should fulfill these requirements.

[C]The process for generating on-road motor vehicle emissions estimates for conformity purposes is commonly referred to as a "regional emissions anaylsis" in conformity documents. However this term could be confused with the process of creating an inventory for a SIP. To avoid that confusion, we will refer to a "refional emissions analysis" for transportation conformity as a "regional conformity analysis" in this document.

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1. Q. What effect does this guidance have on ozone, CO, and PM10 SIPs and regional conformity analyses?

A. This guidance applies to SIPs and regional conformity analyses for $PM_{2.5}$ nonattainment and maintenance areas that need to develop annual $PM_{2.5}$ inventories, such as areas that are violating the annual $PM_{2.5}$ standard. Ozone, CO, and PM10 SIPs and regional conformity analyses should continue to be based on inventories for a typical summer day or winter day, as applicable, using appropriate MOBILE6.2 input conditions and vehicle miles traveled (VMT). Areas that need to develop inventories for the 24-hour $PM_{2.5}$ standard should follow existing guidance for creating daily emission inventories.

2. Q. What are on-road motor vehicle emission inventories, budgets and regional conformity analyses?

A. An on-road motor vehicle emission inventory represents the total amount of emissions of a particular pollutant or precursor that is emitted by cars, trucks, buses, and motorcycles in a given area for a given point in time. The emissions reductions from on-road motor vehicle control measures are also accounted for in the SIP inventory. When developing an attainment demonstration, reasonable further progress (RFP) plan, or maintenance plan, areas are required to develop emission inventories for all source categories (e.g., point, area, on-road motor vehicle and off-road sources) for specific years. For some of these years, the on-road motor vehicle emission inventory may also serve as the SIP budget that is used to demonstrate transportation conformity. A budget provides a limit or ceiling on the amount of emissions transportation sources can produce in a given area that is consistent with attainment, RFP or maintenance.

The transportation conformity rule (40 CFR parts 51 and 93), requires areas to demonstrate that projected emissions from the planned transportation system do not exceed the budgets established in the applicable SIP. Prior to an adequate or approved SIP budget, 40 CFR 93.109(i)(2) and 93.119(e) provide interim emissions tests that also require a regional conformity analysis. For $PM_{2.5}$ areas that need to do conformity for the annual $PM_{2.5}$ standard, regional conformity analyses should also represent total annual emissions for given years as required by 40 CFR 93.118 and 93.119.

In simplest terms, emissions estimates are created by multiplying emissions factors for a given pollutant or precursor by the total number of vehicle miles traveled (VMT) in a given area for a given year. This document provides guidance on how annual emissions estimates should be developed for inventories, budgets, and regional conformity analyses for SIPs and conformity purposes.

3. Q. What pollutants and precursors are covered by this guidance?

A. This guidance is applicable to the estimation of annual SIP and conformity inventories of direct $PM_{2.5}$ from motor vehicle tailpipe emissions, emissions from motor vehicle brake and tire wear, and re-entrained road dust and construction dust from highway or transit projects. This guidance would also apply, as applicable, to the estimation of annual inventories of applicable $PM_{2.5}$

precursors, i.e., volatile organic compounds (VOCs), nitrogen oxides (NOx), sulfur oxides (SOx), and ammonia. EPA's future $PM_{2.5}$ implementation rule will address when SIP inventories and budgets are established for $PM_{2.5}$ precursors. Requirements for inclusion of precursors in transportation conformity analyses are addressed in a May 6, 2005, final rule (70 FR 24280) and are specified at 40 CFR 93.102(b)(iv)-(v) and 93.119 (f)(9)-(10).

Consistent with the May 6, 2005, final rule, if on-road motor vehicle emissions of one or more $PM_{2.5}$ precursors are determined through the SIP development process to be significant contributors to an area's $PM_{2.5}$ nonattainment problem, an emissions budget for each significant precursor must be established in the SIP. Alternatively, a $PM_{2.5}$ SIP would not establish a motor vehicle emissions budget for precursors that are determined to be insignificant through the SIP development process, and regional emissions analyses for insignificant precursors would not be required for subsequent conformity determinations. See the May 6, 2005, final rule for more information on the requirements for addressing $PM_{2.5}$ precursors in transportation conformity.

$PM_{2.5}$ areas must also address re-entrained road dust in their conformity analyses, if a SIP establishes an adequate or approved $PM_{2.5}$ budget that includes re-entrained road dust. Prior to adequate or approved budgets, areas must include road dust in conformity analyses only if EPA or the State air agency finds road dust to be significant. Requirements for inclusion of road dust in transportation conformity analyses can be found at 40 CFR 93.102(b)(3) and 93.119(f)(8).

Construction-related fugitive dust is not required to be included in any $PM_{2.5}$ conformity determinations before a SIP is submitted. As described in the conformity rule (40 CFR 93.122(f)), construction dust is not required to be considered in the conformity process unless the $PM_{2.5}$ SIP identifies it as a significant contributor to the nonattainment area's $PM_{2.5}$ problem. Areas that are contemplating making this type of determination need to include specific information in their SIPs in order to facilitate future conformity determinations. The inventories should clearly identify how much of the regional construction dust is attributable to highway and transit construction, as opposed to other construction activities. If the SIP is to identify construction dust emissions as a significant contributor, the highway and transit construction dust emissions need to be included and identified as such in the direct $PM_{2.5}$ on-road motor vehicle emissions budget. In addition, the regional conformity analysis would account for the level of construction activity, the fugitive $PM_{2.5}$ control measures in the SIP (if there are any), and the dust producing capacity of the proposed construction activities (November 5, 2003, 68 FR 62711).

4. Q. Does this guidance create new requirements?

A. No, this guidance is based on the existing Clean Air Act (CAA) and associated regulations and does not create any new requirements. It merely explains how to fulfill current SIP and conformity requirements for developing $PM_{2.5}$ emission inventories and budgets.

The statutory provisions and EPA regulations described in this document contain legally binding requirements. This document is not a substitute for those provisions or regulations, nor is it a regulation itself. Thus, it does not impose legally binding requirements on EPA, states, or the regulated community, and may not apply to a particular situation based upon the circumstances.

EPA retains the discretion to adopt approaches on a case-by-case basis that may differ from this guidance, but still comply with the statute and SIP and conformity regulations. Any decisions regarding a particular SIP and conformity determination will be made based on the statute and regulations. This guidance may be revised periodically without public notice.

5. Q. What emissions models should be used to develop SIP inventories and regional conformity analyses for direct $PM_{2.5}$ and $PM_{2.5}$ precursors?

A. For states other than California[D], MOBILE6.2 is currently EPA's approved emission factor model for estimating direct $PM_{2.5}$ emissions from on-road vehicle exhaust and brake and tire wear, and for $PM_{2.5}$ precursor emissions from vehicle exhaust and evaporative emissions. For all states, including California, the methods for estimating re-entrained road dust emissions from cars, trucks, buses, and motorcycles on paved and unpaved roads are incorporated in Chapter 13 of AP-42. These are EPA's approved methods for estimating road dust emissions. However, alternative methods may be used if such methods are approved by EPA and announced in the Federal Register. The use of MOBILE6.2 and AP-42, including discussion of alternatives to AP-42, in SIPs and transportation conformity analyses is described in detail in a separate guidance document.[E] Chapter 13 of AP-42 includes information on the variability of re-entrained road dust emissions based on environmental conditions, including factors that vary based on time of year. The AP-42 method can be used as described in Chapter 13 to develop annual re-entrained road dust inventories. EPA plans on issuing separate guidance on how to apply adjustments to estimated road dust emissions to reflect the true impact of re-entrained road dust on regional air quality in SIPs and regional conformity analyses. The remainder of this document addresses the use of MOBILE6.2 to calculate annual inventories for direct $PM_{2.5}$ emissions from vehicle exhaust and brake and tire wear, and for applicable $PM_{2.5}$ precursor emissions from vehicle exhaust and evaporative emissions.

EPA has made available the National Mobile Inventory Model (NMIM), which incorporates MOBILE6.2 as well as a database of local activity information and a post-processing system that can produce annual emission inventories. NMIM is an additional tool that can be used for inventory development, although its use is not required. Question 13 of this document discusses the option to use NMIM in SIP development and regional conformity analyses.

[D] State and local agencies developing SIPs and conformity analyses for California should consult with EPA Region 9 for information on the current version of EMFAC approved for use in California and for information of how to create annual inventories using EMFAC. However, the general concepts in this document for accounting for variation during the year should be followed when creating annual inventories with EMFAC for the $PM_{2.5}$ annual standard.

[E] "Policy Guidance on the Use of MOBILE6.2 and the December 2003 AP-42 Method for Re-Entrained Road Dust for SIP Development and Transportation Conformity", memorandum from Margo Oge and Steve Page to EPA Regional Air Division Directors, February 24, 2004, which can be found at: www.epa.gov/otaq/models/mobile6/mobil6.2_letter.pdf .

6. Q. What issues should state and local air quality agencies and transportation agencies consider when creating annual emissions inventories with MOBILE6.2 for SIPs and regional conformity analyses?

A. State and local agencies need to consider whether MOBILE6.2 inputs or VMT vary during the year enough to affect $PM_{2.5}$ annual emissions estimates. MOBILE6.2 is designed to allow users to estimate motor vehicle emissions based on specific input conditions that include month of evaluation (i.e., January or July), environmental factors (e.g., temperature, humidity), fleet characteristics (e.g., age distribution of fleet, distribution of VMT by vehicle class), activity measures (e.g., speed distributions, distribution of VMT by roadway type), and fuel characteristics (e.g., gasoline RVP, sulfur content). Some of these input conditions will vary based on time of year. For some pollutants, these seasonal variations for certain input conditions will result in different emissions estimates (these variations are discussed in more detail in Question 8). In addition to the input conditions that affect MOBILE6.2 emission factors, VMT may also vary by time of year. These differences in emission factors and VMT by time of year need to be considered in the development of annual inventories.

The key question in the development of annual $PM_{2.5}$ emissions estimates for SIPs and conformity is how much temporal disaggregation of input data is needed to produce annual emissions inventories that properly reflect local conditions. If, as a result of local conditions, MOBILE6.2 emissions factors vary significantly over the course of the year, state air quality agencies and transportation agencies may need to do multiple MOBILE6.2 runs with different input conditions to properly develop SIP inventories and regional conformity analyses. State and local air quality and transportation agencies should work together with EPA and the U.S. Department of Transportation, via the interagency consultation process, to determine the appropriate inputs and number of MOBILE6.2 runs needed to produce accurate annual inventories in a given nonattainment or maintenance area. During the interagency consultation process, air quality and transportation agencies should take into account the needs and capabilities of the air quality modeling tools that will be used to develop the SIP, the availability of seasonal or monthly VMT and MOBILE6.2 input data, and the seasonal or monthly variability of that data. Depending on the variability of input conditions and the effect that variability has on emissions, state and local air quality and transportation agencies in consultation with EPA and DOT may determine for some areas that a single set of MOBILE6.2 runs is appropriate, or alternatively, that multiple sets of runs using seasonal or monthly conditions are necessary.

7. Q. What options do areas have to develop annual $PM_{2.5}$ and $PM_{2.5}$ precursor SIP inventories and regional conformity analyses with MOBILE6.2?

A. Depending on variability in local input conditions and on the impact of that variability on the overall inventory, states may choose from a range of options for the degree of temporal disaggregation used when creating annual inventories for SIPs and regional conformity analyses. To determine how much temporal disaggregation is appropriate in a given area, states may choose to calculate simplified annual emission inventories using the different approaches (i.e., run MOBILE6.2 using representative annual and seasonal inputs) and compare the results. Through this exercise, states may find that the differences between these methodologies are insignificant

and further emissions analyses can be performed using a less detailed process. The interagency consultation process should be used to determine which approach is most appropriate for a given $PM_{2.5}$ nonattainment or maintenance area. This process should include consultation among state and local transportation and air quality agencies, as well as EPA and the U.S. Department of Transportation. Whichever approach is chosen, that approach should be used consistently throughout the analysis for a given pollutant or precursor. For example, if the 2002 base year annual inventory used in the attainment SIP is based on an analysis using input assumptions broken down for four seasons, the attainment year inventory used in that SIP should also be based on input assumptions for four seasons.

The following are some examples of methodologies that could be used. Other approaches may also be appropriate as determined through the interagency consultation process.

Developing Annual Inventories and Regional Conformity Analyses Using Annual Average MOBILE6.2 Inputs and a Single Set of MOBILE6.2 Runs

Single-Run Approach: This methodology would involve a single set of modeling runs with MOBILE6.2 for each year or scenario using only annual average inputs for all MOBILE6.2 input parameters and for VMT. EPA believes that in some areas this methodology may be appropriate because some input conditions may not vary significantly by time of year in a particular area. For example, distribution of VMT by vehicle class may be fairly constant in most areas. In addition, some input conditions may vary without affecting the emissions estimates for some pollutants generated by MOBILE6.2. For example, direct $PM_{2.5}$ emissions in MOBILE6.2 are insensitive to differences in ambient temperature and humidity (these cases are described in more detail in Question 10).

States should determine which input conditions do not vary significantly during the year. For these conditions, annual average input values may suffice. If local conditions are such that there is no significant variation in emissions derived from MOBILE6.2 based on time of year, state and local air quality and transportation agencies, in consultation with EPA and DOT, may choose to base annual SIP inventories and regional conformity analyses on MOBILE6.2 runs based on a single set of inputs and using total annual VMT. For this approach, the evaluation month in MOBILE6.2 should be July of the calendar year being evaluated.

Developing Annual Inventories and Regional Analyses Using Seasonal or Monthly Average MOBILE6.2 Inputs and Two or More Sets of MOBILE6.2 Runs

In some cases, variations in input conditions at different times of the year may result in significant differences in MOBILE6.2 emission factors. In some areas, there may also be significant differences in VMT at different times of the year. In these areas, developing inventories based on seasonal average input conditions may be necessary. Depending on the temporal variability of input data for a given area, from two to twelve sets of modeling runs with MOBILE6.2 may be used for each year or scenario. Some possible approaches are included below, but this does not include a comprehensive list of options. State and local air quality and transportation agencies, in consultation with EPA and DOT, should choose the approach that best suits local conditions.

Two-Season Approach: This approach uses winter and summer input conditions to develop inventories based on two sets of MOBILE6.2 runs. This approach assumes that each set of input conditions can be used to model six months of the year. The "winter" inventory would be based on average input conditions for the coldest months of the year and the "summer" inventory would be based on average input conditions for the hottest months of the year. Annual VMT would be apportioned as appropriate to the winter or summer runs. If VMT does not vary significantly by season, half of the annual VMT could be apportioned to each of the two sets of MOBILE6.2 runs to create winter and summer inventories. If VMT is significantly different between the "winter" and "summer" seasons, then the VMT should be apportioned based on those differences.

Under this approach, the total annual inventory for an area would be the sum of the "winter" and "summer" inventories. For this approach, January should be used as the input for evaluation month in MOBILE6.2 for the "winter" inventory and July should be used for the "summer" inventory. Because the evaluation month input in MOBILE6.2 can also affect fuel parameters, MOBILE6.2 users should take care to ensure that model inputs for fuel parameters are set to properly represent the season modeled.

Four-Season Approach: This approach bases the total annual inventory on four sets of seasonal input conditions and four sets of MOBILE6.2 runs: winter, spring, summer, and fall. This approach assumes that four sets of inputs are used, one for each of the four seasons. VMT would be apportioned appropriately for each of these seasonal periods. If VMT does not vary significantly by season, one quarter of the annual VMT would be apportioned to each of the seasonal inventories. If VMT is significantly different between the seasons, then the VMT should be apportioned based on those differences.

The total annual inventory for an area would be the sum of the four seasonal inventories. MOBILE6.2 only has two input options for evaluation month (January and July). January should be used as the input for evaluation month in MOBILE6.2 for the winter inventory and July should be used for the summer inventory. For the spring inventory, July should be used as the input for evaluation month in MOBILE6.2, while January of the following year should be used as the input for the fall inventory. Because the evaluation month input in MOBILE6.2 can also affect fuel parameters, MOBILE6.2 users should take care to ensure that model inputs for fuel parameters are set to properly represent the season modeled.

Monthly Approach: Another available approach for developing annual inventories and regional conformity analyses would involve twelve sets of MOBILE6.2 modeling runs using monthly average input conditions and VMT. As a result, this methodology is more resource intensive than the previous approaches. States should note that this is the approach that is used to create the 2002 National Emission Inventory (NEI) that some areas may use as their 2002 base year inventory for SIP purposes. For detailed guidance on how to set the evaluation month in MOBILE6.2 to prepare

monthly inventories for calculation of annual inventories, see Section 2.2 of EPA's "Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation"[F].

States that wish to use this approach may also want to consider using the NMIM model to reduce the amount of data processing needed. See Question 13 below for more information on the use of NMIM in developing annual inventories and regional emissions analyses.

8. Q. How do emission factors for direct $PM_{2.5}$ and for $PM_{2.5}$ precursors vary with changes in external commands?

A. MOBILE6.2 uses different algorithms to estimate emissions from different pollutants. Inputs that contribute to seasonal variability in emissions for some pollutants may not result in variability for others. As a result, state and local agencies may be able to use simpler approaches for some pollutants than for others.

Direct $PM_{2.5}$, SOx, and Ammonia

MOBILE6.2 uses simple algorithms to estimate direct $PM_{2.5}$ emissions and SOx, and ammonia precursor emissions. In general, emissions of these pollutants and precursors do not vary, or vary only by small amounts, for most of the input conditions in MOBILE6.2, including key commands such as temperature, humidity, vehicle speed, and roadway type.

However, emission factors for direct $PM_{2.5}$ emissions and SOx and ammonia precursor emissions are affected by the following MOBILE6.2 input options:

- Registration (age) distribution
- Diesel sales fractions
- Annual mileage accumulation rates
- Distribution of VMT by vehicle class
- Input options that affect gasoline and diesel fuel sulfur content

Of these input options, registration distribution, diesel sales fractions, and annual mileage accumulation rates should not change based on time of year. If the remaining parameters do not vary significantly by time of year, a single set of MOBILE6.2 runs, using July as the evaluation month, may be sufficient to develop annual inventories for SIPs and regional conformity analyses for direct $PM_{2.5}$, SOx, and ammonia.

NOx and VOC

[F] "Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation", Office of Transportation and Air Quality, US EPA, August 2004, EPA420-R-04-013, which can be found at www.epa.gov/otaq/m6.htm.

MOBILE6.2 emissions estimates of NOx and VOC precursor emissions are affected by temperature and humidity, fleet characteristics (e.g., age distribution of fleet, distribution of VMT by vehicle class), activity measures (e.g., speed distributions, distribution of VMT by roadway type), and fuel characteristics (e.g., gasoline RVP, sulfur content). When evaluating which approach to use for generating annual inventories for NOx and VOC, states should first consider which of the input conditions actually vary significantly based on time of year. States can then test whether those variations are likely to result in significant differences in emissions throughout different times of the year, as appropriate.

Based on an analysis of various parameters, states may conclude that simpler methods (i.e., the annual or seasonal methods) can be used to develop direct $PM_{2.5}$ inventories than are needed for $PM_{2.5}$ precursors such as NOx and VOC. The interagency consultation process should be used to determine if the use of different approaches for direct $PM_{2.5}$ and for $PM_{2.5}$ precursors would ease the resource burden of developing SIPs and conformity analyses while maintaining credible results.

9. Q. What other requirements apply when calculating regional emissions for transportation conformity?

A. Section 93.122 of the transportation conformity rule contains requirements for estimating VMT and inclusion of control measures in regional conformity analyses. Section 93.122(b) of the transportation conformity rule requires that serious, severe and extreme ozone nonattainment areas and serious CO nonattainment areas use network based travel models to perform regional conformity analyses. There is no similar requirement to use network based travel models for $PM_{2.5}$ nonattainment areas. However, $PM_{2.5}$ areas that are currently using network based travel models must continue to use them when calculating annual emission inventories, per Section 93.122(d). Areas without a network based travel model may use other appropriate methods for estimating VMT consistent with best professional practice and Section 93.122(d) of the conformity regulation. In addition, sections 93.110 and 93.111 require the latest planning assumptions and emission models to be used in all conformity analyses.

10. Q. For areas currently using network based travel models, does travel demand modeling need to be done for each season or month?

A. In some areas, variations in VMT or other vehicle activity inputs over the course of the year may not have a significant effect on MOBILE6.2 emissions estimates for direct $PM_{2.5}$ or $PM_{2.5}$ precursors. In such cases, a single travel demand modeling run would be sufficient to generate an annual VMT estimate or any other activity inputs derived from the travel model. Annual VMT estimates would then be divided appropriately according to the level of temporal disaggregation used for the emissions estimation as described in Question 7.

State and local air quality and transportation agencies, in consultation with EPA and DOT, should determine whether significant seasonal variations in the output of network based travel models is

expected and whether these variations would have a significant impact on $PM_{2.5}$ emissions estimates. The interagency consultation process should be used to determine the most appropriate method for estimating VMT and identifying the appropriate source for existing VMT data.

11. Q. Prior to the development of the $PM_{2.5}$ SIP, can simpler methods be used for regional conformity analyses?

A. Yes. EPA expects that the most thorough analysis to determine the appropriate methods to be used for developing annual inventories will occur during the development of the SIP, taking into account the needs and capabilities of air quality modeling tools and the limitations of available data. Prior to the development of the SIP, state and local air quality and transportation agencies may not have all of the information they need to determine how much temporal disaggregation is necessary to adequately account for variation in emissions during the year. State and local agencies may also need additional time to collect data on a seasonal or monthly basis if that data is needed. For these reasons, state and local air quality and transportation agencies may, through the interagency consultation process, decide to use simplified methods for regional conformity analyses done prior to an adequate or approved SIP budget. For example, through the interagency consultation process, state and local agencies may choose to base regional conformity analyses used in interim conformity tests (build-no-greater-than-no-build or no-greater-than-2002 tests) on average annual inputs and a single set of MOBILE6.2 runs even while they are working on developing an RFP, attainment, or maintenance SIP using a more complicated approach.

Whatever approach is selected, the latest planning assumptions, latest emissions model, and appropriate methods for estimating travel and speeds must be used as required by Sections 93.110, 93.111, and 93.122 of the conformity rule. Also, the approach that is selected for the interim emissions tests should be used consistently when completing a conformity test. Whether a submitted or draft 2002 SIP inventory or some other inventory determined through the interagency consultation process is used, the regional conformity analysis for the baseline year test should be based on the same approach that was used to develop the baseline inventory for conformity purposes. For example, if the two-season approach is used to develop the 2002 baseline year for conformity purposes, the same two-season approach should be used for the regional conformity analysis. See the preamble of the July 1, 2004 conformity rule (FR 40015 left column) for more information on considerations for the 2002 baseline test. Similarly, the same approach should be used to develop the build and no-build scenarios under the build-no-greater-than-no-build test.

12. Q. Once the SIP budget is developed, should the same methods be used for regional conformity analyses?

A. Yes. Regional conformity analyses should be based on the same approach used to develop the direct $PM_{2.5}$ and any $PM_{2.5}$ precursor budgets established in the applicable SIP. For example, if the NOx SIP budget was determined using average seasonal inputs in MOBILE6.2 for winter, spring, summer, and fall, the same approach should be used for regional conformity analyses based on that

budget. State and local air quality and transportation agencies should use the interagency consultation process while developing the approach used for the SIP budgets to consider the impact this will have on data collection, modeling, and analysis needs for future regional conformity analyses.

13. Q. What is the National Mobile Inventory Model (NMIM) and how can it be used to determine annual emissions inventories?

A. NMIM is a graphical user interface that contains the MOBILE6.2 and NONROAD[G] models and a database of county-level input information, the National County Database (NCD). NMIM produces monthly inventories by source classification code (SCC) and county. When using NMIM, users can simply select the year, months, and county or counties they wish to evaluate. Since NMIM includes county-level information, it will automatically write MOBILE6.2 input files, run MOBILE6.2 and multiply the emission factors by VMT to produce emission inventories for each county for each month.[H] NMIM also provides a post-processing module that will aggregate the months into an annual inventory and produce tab-delineated ASCII output that can be read into database or spreadsheet software applications.

NMIM is not considered a new model and does not start a new conformity grace period pursuant to 40 CFR 93.111. Because NMIM incorporates MOBILE6.2, it may be used to generate emissions inventories for SIPs and regional conformity analyses. NMIM may provide an easier way for states to develop annual inventories because it is designed to create annual inventories based on monthly inputs. However, before using NMIM, state and local air quality and transportation agencies should work together with EPA and DOT to determine whether NMIM is appropriate given local conditions and modeling methods and to determine what modifications, if any, are needed to the NMIM database to accurately model current local conditions.

The use of NMIM is not required for SIPs or regional conformity analyses. Some areas may choose not to use NMIM simply because it does not provide a significant resource advantage compared to pre- and post-processing methods already being used. State and local agencies should carefully review the NMIM documentation before deciding whether to use it. NMIM has some limitations in some applications and, as a result, the use of NMIM may not be appropriate in all areas. For example, some areas may already be using more sophisticated methods for pre- and post-

[G] Because it incorporates MOBILE6.2 and NONROAD, NMIM can be used to generate emissions inventories for both on-road motor vehicles (cars, trucks, buses, and motorcycles) and off-road equipment (agricultural and construction equipment, lawn and garden equipment, and off-road recreational vehicles among others) for SIP purposes. Because transportation conformity applies only to on-road motor vehicles, only the on-road portion of an inventory generated using NMIM would be used to generate SIP budgets and regional conformity analyses.

[H] "EPA's National Mobile Inventory Model (NMIM), A Consolidated Emissions Modeling System for MOBILE6 and NONROAD". H. Michaels, et al. U.S. EPA. www.epa.gov/otaq/models/nmim/420r05003.pdf.

processing input and emissions data than NMIM can accommodate. In that case, state and local agencies should not use NMIM.

States have provided information for the NCD as part of the National Emissions Inventory (NEI) development process. However, given the NEI cycle, this may not be the most recent or best available information at the time a state initiates modeling as required in the latest planning assumptions provisions of the conformity rules (40 CFR 93.110). For SIPs and regional conformity analyses, state and local agencies should review the information in the NCD to verify that it is still accurate and up-to-date. Where more current information is available, the database must be modified to incorporate the most recent data to meet latest planning assumptions requirements for SIPs and conformity. (EPA encourages states to separately submit updates to the NCD so that the most accurate database is available for both national and local inventory development). The NCD works at the county level and will need to be modified to account for areas containing partial counties, if necessary. The interagency consultation process should be used to evaluate whether the use of NMIM is appropriate in a given area, and to evaluate what changes are needed in the NMIM database.

State and local agencies should take special care to ensure that VMT data used in NMIM is derived appropriately. Areas required to use VMT data from travel demand models need to make sure that the appropriate VMT estimates are incorporated into the NCD. One limitation of the NCD is that it includes VMT data for only select years but not necessarily for the years that need to be evaluated for SIP or transportation conformity purposes. Therefore, even if the VMT data in the NCD are correct for a specific year, areas wishing to use NMIM may need to calculate and enter the necessary VMT inputs for other years into the NCD. Areas should also evaluate the speed assumptions in the NCD and revise them as needed to reflect current local estimates.

The current version of NMIM is available at www.epa.gov/otaq/nmim.htm . EPA is currently working on updates to the NONROAD portion of NMIM and to the NCD and expects to release a revised version of NMIM later in 2005, which will be posted on the website and notice sent out through our list-server.

14. Q. Who can I contact if I have further questions about developing annual $PM_{2.5}$ SIP emissions inventories and budgets, and regional conformity analyses?

A. For specific questions about a particular nonattainment or maintenance area, please contact the SIP or transportation conformity staff person responsible for your state at the appropriate EPA regional office. A listing of regional offices, the states they cover, and contact information for EPA regional conformity staff can be found at the following website: www.epa.gov/otaq/transp/conform/contacts.htm.

General questions about this guidance can be directed to Gary Dolce at EPA's Office of Transportation and Air Quality, dolce.gary@epa.gov or 734-214-4414.

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Office of Air Quality Planning and Standards
Emissions, Monitoring and Analysis Division
Research Triangle Park, NC

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