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Office of Air Quality
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Research Triangle Park, NC 27711

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PM-10 EMISSION INVENTORY REQUIREMENTS

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ACRONYMS

AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AMS	AIRS Area and Mobile Source Subsystem
BACM	Best Available Control Measure
BACT	Best Available Control Technology
CAA	Clean Air Act as amended in 1990
CHIEF	Clearinghouse for Inventories and Emissions Factors
EPA	U.S. Environmental Protection Agency
FIRE	Factor Information Retrieval System
FTA	fail to attain
FTD	fail to demonstrate
Hr	hour
IPP	inventory preparation plan
MMBtu	million British thermal units
NAAQS	National Ambient Air Quality Standard
PM-10	particulate matter that measure less than or equal to 10 micrometers in aerodynamic mass median diameter
QA	quality assurance
QC	quality control
RACM	Reasonably Available Control Measure
RACT	Reasonably Available Control Technology
RE	rule effectiveness
RFP	reasonable further progress
SCRAM	Support Center for Regulatory Air Models
SIP	State implementation plan
TTN	Technology Transfer Network
VMT	vehicle miles traveled

SECTION 1.0
OVERVIEW OF DOCUMENT

1.1 Purpose

This document describes the emission inventory requirements that are contained, either explicitly or implicitly, in the Clean Air Act as amended in 1990 (CAA) for those areas that are required to submit a State Implementation Plan (SIP) for demonstrating attainment of the National Ambient Air Quality Standard (NAAQS) for PM-10. The guidance in this document pertains to PM-10 moderate nonattainment areas and to areas that have been reclassified as serious nonattainment areas. The purposes of the document are to (1) identify the types of inventories required; (2) briefly review the regulatory requirements pertaining to submission of these inventories; (3) describe the objectives, components, and ultimate uses of the inventories; and (4) define documentation and reporting requirements for the inventories.

1.2 How to Use This Document

This document is intended to be a guide for State and local agencies to refer to for the requirements as prescribed by the CAA for submitting their emission inventories; it is not a procedures document covering the methods for compilation or reporting of emission inventories. The U.S. Environmental Protection Agency (EPA) will issue further guidance pertaining to procedures for preparing, compiling, and reporting emission inventories. It is recommended that State and local agencies consult the references listed in the Section 5.0 of this document for additional information.

This section provides an overview of the document organization and contents. The key points and format of the material presented in the remaining sections of this document are as follows.

Section 2.0 contains definitions and discussions of PM-10 categories and presents a brief overview of the regulatory requirements and milestones for PM-10 emission inventories under the CAA. State personnel should reference the General Preamble for specific language on the regulatory requirements and should consult the appropriate Regional Office of EPA to identify any guidance issued subsequent to the General Preamble.

The specific details of inventory development and compilation requirements are the focus of Section 3.0. In this section, requirements for Inventory Preparation Plans (IPPs) are described. The major discussion in this section focuses on the components of the base year inventory, while brief discussion is also included regarding other types of inventories -- modeling, and periodic [i.e., reasonable further progress (RFP) and maintenance plan] inventories. Presentation of the base year inventory includes an overview of the applicable source categories to be included -- point, area, and mobile sources. In addition, requirements regarding the temporal resolution of the inventory and adjustments to the base year inventory are also presented in Section 3.0.

Section 4.0 discusses documentation/data management and reporting requirements for SIP inventories prepared in response to the CAA. Section 5.0 provides the references for this document. Appendix A provides a checklist for IPPs.

SECTION 2.0
DEFINITIONS AND REGULATORY REQUIREMENTS

This section of this document summarizes information in the General Preamble dealing with the regulatory requirements for designations and classifications, nonattainment area boundaries, and SIP submittal timelines. State personnel should reference the General Preamble for specific language on the regulatory requirements and should consult the appropriate Regional Office of EPA to identify any guidance issued subsequent to the General Preamble.

2.1 Definitions of PM-10

PM-10 is defined as particulate matter that measures less than or equal to 10 micrometers in aerodynamic mass median diameter. PM-10 may be directly emitted into the atmosphere from a source or it may be formed in the atmosphere as a result of condensation or chemical reactions of other pollutants.

2.1.1 Primary PM-10

Primary particulate matter is broadly defined as particles that enter the atmosphere as a direct emission from a stack or an open source. It is not formed due to a chemical reaction that occurs once the matter has been emitted. The focus of emission inventories for PM-10 nonattainment areas should be on primary PM-10 emissions. However, in some areas secondary and condensible PM-10 account for a significant portion of PM-10 in the atmosphere and, therefore, these would need to be included in the emission inventory.

2.1.2 Condensible PM-10

Condensible particulate matter (or condensed particulate matter, as it is synonymously described) can be broadly defined as material that is not particulate matter at stack conditions but which condenses and/or reacts (upon cooling and dilution in the ambient air) to form particulate matter immediately after discharge from the stack. Condensible particle matter forms in a few seconds in the stack exhaust due primarily to immediate cooling and air dilution. Condensible particulate matter is of potential importance because it usually is quite fine and thus falls primarily within the PM-10 fraction. As a consequence, condensible particulate matter should always be included in the emission inventory.

2.1.3 Secondary PM-10 (PM-10 Precursors)

Secondary particulate matter can be broadly defined as particles that form through chemical reactions in the ambient air well after dilution and condensation have occurred (i.e., usually at some distance downwind from the emission point). An example of this phenomenon is the formation of sulfate particles in a plume from the oxidation of sulfur dioxide by one of several atmospheric transformation mechanisms. Generally, secondary particulate matter can be distinguished from condensible particulate matter by the time and/or distance downwind from the stack required for formation. Precursor emissions contributing to secondary particulate matter should not be included in the PM-10 inventory except where EPA and the State determines that the sources of PM-10 precursors contribute significantly to PM-10 levels which exceed the PM-10 NAAQS in the area. This determination will be based upon air quality analysis in which States assess the contribution of precursors.

If precursors contribute significantly to nonattainment, States will need to consider both the source-receptor relationship and the significance of

precursor contributions to overall nonattainment. In making a determination regarding significance, EPA will rely in part on the technical information contained in the State's submittal which could include filter analyses, an assessment of the relative contribution of precursors to overall nonattainment, and the State's Reasonable Available Control Technologies (RACT)/Reasonably Available Control Measures (RACM) strategy. States are encouraged to submit additional material for consideration, since all findings will be made on a case-by-case basis.

2.2 Summary of Regulatory Requirements

State personnel should refer to the General Preamble for the Implementation of Title I of the CAA of 1990 for specific language on the regulatory requirements for moderate nonattainment areas according to the CAA. In general, the General Preamble addresses issues concerning condensible and secondary PM-10. States should contact the Sulfur Dioxide/Particulate Matter Programs Branch for case-by-case determinations.

States must develop and submit a SIP which will demonstrate attainment of the PM-10 NAAQS for every area designated nonattainment and classified as moderate for PM-10 under the CAA, within 18 months after being designated nonattainment for PM-10. The Sulfur Dioxide/Particulate Matter Programs Branch has prepared a staff work product as a supplement for the General Preamble which addresses serious nonattainment area requirements (U.S. EPA 1993a).

2.2.1 Nonattainment Designations

On the date of enactment of the CAA Amendments of 1990, areas meeting the qualifications of Section 107(d)(4)(B) of the Act were designated nonattainment by operation of law; all other areas were designated unclassifiable. Subsequent to the date of enactment, the EPA may redesignate any of these unclassifiable areas as nonattainment under the provisions of Section 107(d)(3).

2.2.2 Classification

Once an area is designated nonattainment, Section 188 of the CAA outlines the process for classification of the area and establishes the area's required attainment date. In accordance with Section 188(a), at the time of designation all PM-10 nonattainment areas are classified as moderate by operation of law.

A moderate nonattainment area can be reclassified as serious if the EPA determines that:

1) the area cannot "practicably" attain the PM-10 NAAQS by the applicable attainment date [i.e., fails to demonstrate (FTD)], or

2) the area has failed to attain (FTA) the PM-10 NAAQS by the applicable attainment date [see Section 188(b)].

The EPA also has discretionary authority under Section 188(b)(1) to reclassify any of these areas as serious at any time if the EPA determines they cannot practicably attain the PM-10 NAAQS by the applicable attainment date.

2.2.3 Nonattainment Area Boundaries

The EPA must notify the Governor of each State of the requirements to designate areas with respect to PM-10. For the areas that a Governor designates nonattainment, the Governor will need to define the boundaries of such areas. The boundaries for a nonattainment area should be consistent with Section 107(d)(1)(A)(i) of the CAA, and the emission inventory must correspond

to the boundaries. A defensible rationale must be submitted to EPA to justify an area's designation and boundaries. The boundaries designated by the Governor of a State will be subject to final approval by EPA.

2.2.4 SIP Requirement Submittal Timelines

Tables 2.1 and 2.2 present the schedule and due dates for SIPs for moderate and serious areas, respectively. The moderate area SIPs containing a New Source Review permit program revision, attainment demonstration, and RACM are due 18 months after being designated nonattainment. For serious areas, a SIP containing Best Available Control Measures (BACM) is due 18 months after reclassification. Implementation of either RACM or BACM (dependent upon the area's designation) is to be completed within 4 years after designation.[1]

2.2.5 Attainment Demonstration

Section 189(a)(1)(B) provides that States with moderate PM-10 nonattainment areas must submit a demonstration (including air quality modeling) showing either attainment by the applicable attainment date or that attainment by the applicable date is impracticable. The attainment demonstration projects how the area will come into attainment (or will fail to attain) with the NAAQS based on air quality modeling with forecasted emissions. The SIP must contain the emissions forecasts used in the air quality modeling attainment demonstration. In general, attainment demonstrations for these areas will be reviewed in accordance with the general guidance addressing PM-10 [*PM-10 SIP Development Guideline*, (U.S. EPA, 1987); *PM-10 Moderate Area SIP Guidance: Final Staff Work Product* (U.S. EPA, 1991a); and *PM-10 Serious Area SIP Guidance: Final Staff Work Product* (U.S. EPA, 1993a)] and any future applicable EPA guidance or regulations. For current compilation of available policy and guidance for the PM-10 program, the reader should refer to *PM-10 Guideline Document and Appendix* (U.S. EPA, 1993b).

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[1] RACM and BACM refer to control measures for both point and area sources in moderate and serious PM-10 nonattainment areas, respectively. RACT and best available control technologies (BACT) refer to control measures for only point sources in moderate and serious PM-10 nonattainment areas, respectively. See the General Preamble for further discussion of this terminology.

Table 2.1 Moderate Nonattainment Area Due Dates

Event	Months following designation
Designation as nonattainment	0
Classification (moderate by operation of law)	0
Inventory Preparation Plan (IPP)	3
Draft Inventory	12
SIP due containing: a) New Source Review permit program b) attainment demonstration that includes 1) air quality modeling 2) base year actual emissions inventory 3) modeling inventory (projected allowables at attainment [i.e., at 72 months]) 4) inventory showing projected allowables at 48 months when RACM/RACT is implemented c) RACM/RACT implementation program d) Quantitative milestones (RFP) e) PM-10 precursors assessment	18
Decision by EPA whether to reclassify area as serious for FTD attainment (18 months from submission)	36
Implementation of control strategies, including RACM/RACT	48
RFP Milestone due date	54
Determination by EPA that State's RFP milestone is met	57
SIP revision due for failure to report RFP milestone or determination by EPA that milestone was not met	63
Attainment (as expeditiously as possible but no later than)	72
Redesignation to serious if in violation of NAAQS after attainment date	72-78

Table 2.2 Serious Nonattainment Area Due Dates

Event	Months following reclassification
Reclassification	0
Inventory Preparation Plan (IPP)	3
Draft Inventory (The base year for FTA will be the actual emissions for the year the area should have attained; for FTD areas the base year inventory will become the modeling emission inventory projected to the attainment year)	12
RFP Milestone due date	*
Determination by EPA that State's RFP demonstration is adequate	**
BACM SIP due containing: a) BACM/BACT implementation program (schedule for implementation) b) PM-10 precursors assessment c) base year inventory	18
SIP revision due for failure to report RFP milestone or determination by EPA that milestone was not met	***
Full SIP containing BACM SIP information and: a) attainment demonstration with air quality modeling b) additional BACM/BACT requirements	48
Implementation of BACM/BACT	48
RFP Milestone is due	†
Determination by EPA that State's RFP milestone is met	††
SIP revision due for failure to report RFP milestone or determination by EPA that milestone was not met	†††
RFP Milestone is due	†
Determination by EPA that State's RFP milestone is met	††
SIP revision due for failure to report RFP milestone or determination by EPA that milestone was not met	†††
Attainment (as expeditiously as possible but no later than)	120

* 54 months after designation as a moderate nonattainment area for areas that FTD; 90 months after designation as a moderate nonattainment area for areas that FTA
** 3 months following *
*** 6 months following **
† 3 years following previous RFP milestone due date
†† 3 months following †
††† 6 months following ††

SECTION 3.0
EMISSION INVENTORY

3.1 Summary of Inventory Types

For PM-10 nonattainment areas, there are three (3) basic kinds of inventories that States may need to develop under the CAA. These include base year inventories, periodic inventories, and modeling inventories. The information presented below represents EPA's view of accurate, complete, and approvable inventory submittals.

The **base year inventory** is the primary inventory from which all other inventories are derived. All inventories shall be consistent with data provided in the base year inventory. Section 172(c)(3) of the CAA requires States to ensure that this inventory is comprehensive, accurate, and current for all actual emissions of PM-10. The base year inventory must include emissions from all point, area, and mobile sources.

For moderate nonattainment areas, the SIP base year emission inventory must be based on actual emissions. For moderate and serious nonattainment areas, the base year for emission inventories must be consistent with the 3 years of data which were necessary to designate the area as nonattainment. The base year inventory is the inventory of actual emissions for the chosen base year. The base year inventory should reflect the last year of the 3 years used to determine nonattainment.

Should a moderate nonattainment area "fail to demonstrate" (FTD) attainment, then the area will be reclassified as serious. This will require submission of a serious area base year emission inventory which is due 18 months following reclassification (see Table 2.2). The serious area base year emission inventory also serves as the BACM SIP emission inventory. Moderate areas that FTD attainment and have been reclassified can use the moderate area attainment demonstration emission inventory (see modeling inventories below) as a starting point for their serious area base year/BACM emission inventory, but it must include any changes (such as shutdowns or emission factor changes) that have occurred since the moderate area SIP was submitted. This means that the year that would have been the attainment year under the moderate area provisions becomes the base year for the serious area SIP inventory. It also assumes that the moderate area SIP regulations (i.e., RACM) will be implemented, however, should the area be redesignated as serious, BACM requirements will need to be implemented. BACM implementation may require additional control measures or technologies on processes already controlled under the RACM implementation. All of the above information pertaining to serious areas assumes that the moderate area SIP emission inventory was adequate and that if it was not, it was returned to the State as part of the completeness and SIP review process that is part of the moderate area requirements.

Should an area classified as serious "fail to attain" (FTA), then those areas must reinventory the actual emissions at the time they should have attained. Such an inventory would be due 18 months after determining that the area FTA.

Modeling inventories may be used as a tool for a number of purposes including model performance evaluations, projection to future years, evaluation of the impact of rulemaking, evaluation of control measures and technology, receptor modeling reconciliation, and determination of design concentrations. One of the major roles for modeling inventories will be for use in the attainment demonstration. Modeling inventories can be based upon

either allowable or actual emissions, depending on the purpose of the modeling. For instance, modeling inventories should be based on the actual daily emissions for model performance evaluation. For control measure evaluations and the attainment demonstration, the modeling emission inventory consists of allowable emissions for the base year and projected allowables for the attainment year. Modeling inventories also have additional data requirements (e.g., stack parameters). The *Guideline on Air Quality Models (Revised)* should be consulted to determine the additional data needed (U.S. EPA, 1986).

For moderate areas, an attainment demonstration emission inventory that provides a projection of allowable emissions to the year following full implementation of the moderate area SIP is required. The year of record for this inventory would be the seventh year following designation as a moderate nonattainment area.

For serious areas, the attainment demonstration emission inventory provides a projection of allowable emissions for the year following implementation of the serious area SIP. This inventory is due with the serious area attainment demonstration SIP (see Table 2.2).

The CAA states that the emission inventories may be periodically updated as deemed necessary by the Administrator. A **periodic inventory** may be the consequence of RFP requirements, a maintenance plan for an attainment area, or for other reasons deemed necessary by EPA. The PM-10 program will not arbitrarily require inventories every 3 years. It will rely on "event" oriented periodic emission inventories and, therefore, will be decided on a case-by-case basis. Guidance from EPA for States related to requirements and events that will trigger development of a PM-10 emission inventory is forthcoming. Questions related to this topic should be addressed to the **Office of Air Quality Planning and Standards, Air Quality Management Division, Sulfur Dioxide/Particulate Matter Programs Branch.**

As a result of the RFP requirement, a detailed compliance schedule or inventory (RFP projection inventory) may be required. If an RFP projection inventory were to be used by the States for demonstrating that the emission reductions will be achieved, the following applies.

> For moderate nonattainment areas, the RFP projection inventory (i.e., RFP milestone) will be due 3 years after the SIP inventory submittal (see Table 2.1). The RFP projection inventory is to be based on allowable emissions. It should be based on the base year inventory, but should incorporate any significant changes including rule effectiveness (RE) and RACM implementation.
>
> It should be noted that only one RFP milestone will be required for moderate nonattainment areas assuming that they are in attainment on their required attainment date. The reason for this can be ascertained by referring to Table 2.1. The RFP milestone is due 54 months following designation as a moderate nonattainment area. The next RFP demonstration would be due 3 years later (i.e., 90 months following designation), however, attainment is scheduled for 72 months. Should the moderate area fail to reach attainment at the scheduled time and be reclassified as a serious nonattainment area, then the RFP schedule continues from the original moderate area schedule. Thus, an RFP projection inventory for a serious nonattainment area could be required at the same time as the BACM SIP inventory is due if the area is reclassified as serious 72 months after being designated as a moderate nonattainment area.

Another circumstance which would trigger a periodic inventory would be when an area becomes eligible for redesignation. Maintenance plan emission inventories are required once an area has reached attainment and desires to be

redesignated to and continue as an attainment area. An unclassified area requesting redesignation to attainment must also submit a maintenance plan emission inventory.

> The maintenance plan emission inventory should include an attainment inventory as well as a maintenance inventory. The attainment inventory should include actual emissions at the time of attainment or at the time of the request for redesignation as attainment. The maintenance inventory should present projections of allowable emissions for the ninth year following reclassification to attainment. Another periodic inventory may be required within the 9-year time frame for failure to maintain or for a SIP call. States should refer to the redesignation policy for additional requirements for redesignations.

3.2 Temporal Resolution of Inventory

States will have to model short-term (daily) and long-term (annual) air quality for PM-10 to assure that both standards will be protected, even if air quality measurements show exceedances for only one time period.

Some areas may experience seasonal emissions increases which largely cause their nonattainment problem. If the problem involves only one season (e.g., summer wind blown dust), then a seasonal inventory should be prepared in addition to an annual inventory. In dual season situations (e.g., summer wind blown dust and winter wood burning), an emission inventory should be done for each season separately, and the results combined for the analysis of the annual standard. The reporting convention for seasonal emissions must be consistent for point, area, mobile, and natural sources.

3.3 Inventory Preparation Plan (IPP)

For base year inventories, the EPA requires States to prepare a brief IPP that specifies how they intend to develop, document, and submit their inventories. The plans provide States the opportunity to notify the EPA how they plan to compile the required inventories and to allow the EPA to provide important feedback to prevent the use of approaches that are not consistent with the EPA requirements. With the use of IPPs, the EPA can help guide the preparation of required inventories and ensure that emission estimates are of high quality and are consistent with the PM-10 emission inventory requirements. States shall submit IPPs to the EPA Regional Offices and the EPA headquarters according to the schedule shown in Table 2.1.

In addition to technical data, the IPPs should contain a schedule showing when the State plans to submit the draft and final inventory to the EPA. If the State plans to submit an inventory in component pieces (e.g., point source component, area source component, etc.), the IPP must clearly make this distinction and indicate a draft and final submittal date for each component. The final submittal dates shall be consistent with the PM-10 emission inventory requirements. A complete draft inventory is required to be submitted to the EPA Regional Offices and the EPA headquarters within 12 months after the date that an area is designated nonattainment. The IPP shall also explicitly detail the year chosen as the base year for the inventory, and explain the basis for the selection. Further details on the base year inventory are found in Section 3.4.

In addition to the IPP submittal to the EPA Regional Office, the State shall also submit a copy of the IPP and any correspondence relating to the IPP to the EPA headquarters. **The copy should be addressed to: Chief, Inventory Guidance and Evaluation Section, Emission Inventory Branch (MD-14), Technical Support Division, U.S. EPA, Research Triangle Park, NC 27711.**

States must prepare an IPP for each nonattainment area for which a base year inventory is required by the CAA, to the extent that different approaches will be used. If a State has multiple nonattainment areas but plans to use the same overall approach for each, the State may submit a single IPP that details that approach and the areas to which it will apply. In detailing the approach utilized for developing the inventory for the area(s), the IPP must clearly delineate that the IPP was prepared for the purposes of a PM-10 SIP, must define the nonattainment area(s) addressed by the inventory and the nonattainment classification of the areas. In addition, the IPP should identify the persons responsible for the inventory, the contents and organization of the report, submission schedules, any modifications to the approach used for multiple area submittals, the source categories inventoried, and a summary of the emissions documentation information for each major inventory component (i.e., point, area, and mobile sources).

States must be aware that the EPA considers submittal of an IPP crucial to an approvable SIP inventory. By approving an IPP, the EPA will accept the intended approach for inventory compilation. The EPA's approval of an IPP does not, however, signify that the EPA unconditionally accepts all of the information to be contained in the actual inventory. That inventory will be reviewed separately and on its own merits regardless of how well the IPP was assembled.

3.3.1 IPP Point Source Requirements

For point sources, States shall define how all pertinent emission sources will be identified and located. States shall describe how point source activity levels and associated parameters will be developed, and how these data will be used to calculate emission estimates. States shall also discuss how and when statewide point source reporting to the EPA will be conducted and how it will be coordinated with reporting for area and mobile sources. States must indicate whether or not RE was applied and, if it was, the basis for determining control efficiencies. States must describe any source surveys that are planned, and if they intend to use existing data contained in the Aerometric Information Retrieval System (AIRS)/Facility Subsystem (AFS), individual State emissions systems, or State permitting files.

3.3.2 IPP Area and Mobile Source Requirements

For area sources and mobile sources, the IPP shall explicitly state which source categories will be addressed and which will not be addressed (with justification for exclusion). For those categories to be included, the plan shall indicate what calculational method will be used to estimate emissions. If a State plans on using the EPA's inventory guidance for all categories, it shall report that it will be applying the EPA's guidance and the reference(s) for the guidance. If the EPA guidance has alternative methods for a category, the IPP shall clearly indicate which method the State intends to use in its inventory. Particular emphasis shall be given to categories for which the State plans to use an approach other than that recommended in the EPA's guidance. Any major assumptions that may affect the development of emission estimates in a category shall be clearly stated. The IPP must also identify the sources of activity data, whether RE will be applied (and how it was determined if applied), and the basis for determining control efficiencies.

For on-road mobile sources, the IPP shall include a discussion of how the State intends to develop vehicle miles traveled (VMT) estimates, and how PM-10 emission factors for mobile sources will be determined. The Office of Mobile Sources has developed a mobile source particulate model (PART5). The Part5 model and user's manual may be obtained from EPA's Bulletin Board System for the Office of Mobile Sources on the TTN. The PART5 model provides emission factors for mobile sources travelling on paved and unpaved roads. If

the PART5 emissions model was not utilized or was not available prior to the inventory submittal deadline, the basis for the alternative estimation methods, any key modeling assumptions, and the vehicle classes covered must be discussed in the IPP.

The PART5 model does not address emissions for nonroad mobile sources (e.g., construction, farm, industrial, and lawn and garden equipment; motorcycles; and snowmobiles). Methodologies for estimating emissions from these sources are documented in *Nonroad Engine and Vehicle Emission Study -- Report* (U.S. EPA, 1991b).

3.3.3 Other IPP Requirements

The IPP must indicate the modeling choice for the attainment demonstration, the modeling inventories developed for modeling, a definition of the modeling area, when the modeling inventory data will be submitted, and a discussion of coordination planning between inventory and modeling personnel.

The IPP must also clearly describe how the State plans to present, document, and submit the inventory to the EPA. The types of documentation that will be provided and the form of this documentation must be described to the extent that the EPA can judge if it would be satisfactory for inventory review purposes. The IPP shall specify the written and computerized methods that the State plans to use to compile and submit its data. The State must contact its EPA Regional Office to determine computerized data submittal and format requirements, and must describe in its IPP how its data system (e.g., AIRS, State system) will be used to submit the data to EPA.

States are required to submit Quality Assurance (QA) plans as an initial step in their inventory development work and receive EPA approval on their plans early on in the process. The QA plans must be submitted as part of a State's IPP. The content and general form of QA plans must be consistent with previously issued guidance (U.S. EPA, 1988b). This plan shall describe the overall QA program that the State intends to use during the compilation of the inventory.

IPPs should be concise, and only provide as much detail as is necessary to communicate to the agency how the State intends to develop and present its inventory. However, the document must contain sufficient information to enable the EPA to make a judgement that the State's intended inventory approach is sound and consistent with the EPA's guidance and requirements. Although no specific IPP format is required, the discussion should include the topics listed in Table 3.1. In addition, the checklist that the EPA plans to use to guide the review of the IPPs is included in Appendix A.

3.4 Base Year Inventory

[Note: This section discusses information contained in part in the *Guideline on Air Quality Models (Revised)* (U.S. EPA, 1986). In the future, if information in the *Guideline on* Air Quality Models or official interpretation of the *Guideline on* Air Quality Models are not consistent with the discussion in this section, the *Guideline on* Air Quality Models interpretation shall be used.]

Section 172(c)(3) of the CAA requires that the base year inventory be a comprehensive, accurate, and current inventory of actual emissions in the nonattainment area. The inventory shall include PM-10 emissions from all point, area, and mobile sources.

Table 3.1 Basic Outline of an Inventory Preparation Plan

A. Introduction
- Define the boundaries of the nonattainment area.
- Describe the basis for the inventory (i.e., previous efforts that are viable and related); indicate the starting point.
- Define how the plan is structured and what it contains.
- Specify who is responsible for the inventory and who is actually compiling it (air agency, consultants, etc.).

B. Point Source Approach
- How will sources be identified and located?
- What categories will be addressed and why?
- What categories will be excluded and why?
- Define the use of existing data sources.
- Identify data collection methods to be used.
- Provide the basis for activity level data and emission estimates.
- Provide the basis for control efficiencies.
- Discuss the application of RE.
- Indicate the basis for RE levels.

C. Area and Mobile Sources Approach
- What categories will be addressed and why?
- What categories will be excluded and why?
- What estimation methods will be used (e.g. AP-42, Emission Inventory Procedures Document, site specific surveys, etc.)?
- What methods will be used for collecting activity/commodity level data?
- Provide specification of the mobile source emissions model used.[1]
- Discuss application of RE.
- Provide basis for RE levels.

D. Documentation Approach
- Describe written presentation and documentation.
- Describe computerized compilations and documentation.
- Describe the data required to be submitted to EPA (as defined by the EPA Regional Office) and the computerized format that will be used to submit the data.

E. QA Plan
- Describe the QA program.
- How will the QA program affect and benefit the inventory.
- Verify adherence to previously issued QA guidance (U.S. EPA, 1988b).

[1] PM-10 emissions factors for mobile sources should be obtained by running the PART5 model.

3.4.1 AIRS Compatible Reporting

The official repository for all emission inventory data will be designated by the EPA Regional Office. One of the options that may be designated by the Regional Offices is to have the official data record in AIRS. If this option is selected, all SIP data must be loaded directly into AIRS or submitted in an AIRS compatible format.

Emission Inventory Branch (inventory requirements) and National Air Data Branch (data system enhancements, schedules, and availability) can provide coordination with State and local agencies during the inventory preparation

process for both batch transactions to the AIRS Repository and on-line interactive submittal of AFS and Area and Mobile Source Subsystem (AMS) SIP inventory data. As the PM-10 program defines data-system needs (now and in the future) the system will be enhanced to meet these needs. Therefore, it would be appropriate for State and local agencies to coordinate with EPA regarding availability of new and scheduled enhancements to AIRS during the preparation of IPPs and prior to actual inventory data entry.

3.4.2 Geographic Coverage

The geographic boundaries of the inventory area shall be determined by the area officially designated nonattainment. At a minimum, this area shall be included in the emission inventory. However, the attainment demonstration developed as part of the SIP inventory process must include air quality modeling. As a consequence, sources contributing significant fractions to the ambient concentrations must also be included. This may necessitate the inclusion of sources outside the boundary of the nonattainment area in the emission inventory. The nonattainment area coupled with any other areas containing sources that need to be included in the attainment demonstration modeling effort are considered the modeling domain. Guidance on the geographic coverage and other modeling criteria can be found in the *Guideline on Air Quality Models (Revised)* (U.S EPA, 1986). Current code for EPA approved air quality models are available through the EPA's Office of Air Quality Planning and Standards SCRAM (Support Center for Regulatory Air Models) Bulletin Board System and the related programs can be downloaded to a personal computer diskette. Information is also included with regard to upgrades to various models.

The extent of the sources to be included in the emission inventory outside the immediate nonattainment area must be determined by the State. The decision is based on the types of sources in upwind areas and on their potential impact inside the nonattainment area. However, documentation of rationale used in determining which sources to include or exclude must be provided as part of the emission inventory submittal. In addition, a brief discussion of this rationale should be included in the IPP. Coordination between the State inventory preparation staff and the air quality modeling staff will facilitate efficient inventory preparation and submittal.

3.4.3 Applicable Source Categories

Base year emission inventories are required to include all types of stationary point, area, and mobile sources. The particulate matter emission factors in AP-42 can be used to assess if source categories should be included in the inventory. For point sources, a list of source classification codes and corresponding emission factors can be obtained from the program, FIRE (Factor Information Retrieval System), by accessing the CHIEF (Clearinghouse for Inventories and Emission Factors) Bulletin Board System on the Technology Transfer Network (TTN). A list of area source category codes can be obtained from the AMS training manual by accessing the AIRS Bulletin Board System on the TTN.

3.4.3.1 Point Sources

Point sources are physical emission points or processes usually within a plant that result in pollutant emissions. PM-10 point sources generally refer to specific facilities or stacks for which individual records are collected and maintained.

The nonattainment area classification affects the facility emissions size required to be included in the base year inventory. For moderate areas, all stationary sources which emit directly, or have the potential to emit (i.e., allowable emissions), 100 tons per year or more of PM-10 must be

included in the inventory. These sources are referred to as "major stationary sources" in Section 302(j) of the CAA.

For serious areas, all stationary sources or groups of stationary sources located within a contiguous area and under common control that emit or have the potential to emit at least 70 tons per year of PM-10 must be included. (Section 189(b)(3))

The EPA also believes that the States' inventory may need to go beyond those sources having a tons per year limit to include other sources in the area that are reasonable to control.

3.4.3.2 Area and Mobile Sources

Area sources are generally defined as an aggregation of all sources not defined as point sources in a specific geographic area. Area sources include fugitive dust sources; mobile sources; and stationary sources that are too small, difficult, or numerous to account for individually as point sources. Area sources also include residential wood combustion sources, and prescribed, silvicultural and agricultural burning sources.

The EPA issued technical information guidance documents on BACMs for fugitive dust; residential wood combustion; and prescribed, silvicultural and agricultural burning sources (U.S. EPA, 1988, 1989a, and 1992, respectively). **Fugitive dust** is particulate matter suspended in the air either by mechanical disturbance of the surface material or by wind action blowing across the surface. Mechanical disturbance includes resuspension of particles from vehicles traveling over roadways, parking lots, and other open areas. Wind action includes dust blown off disturbed open areas. Process fugitive emissions should be included in the point source inventory. **Residential wood combustion** includes wood smoke from residential wood stoves and fireplaces. Residential wood combustion is a significant source of PM-10 particularly in nonattainment areas in the western United States. **Prescribed burning** generally describes burning on lands that are being managed. This includes both planned ignition and prescribed natural fire, however, it does not include forest and wildfires. If a State excludes any of the emission sources addressed in the three documents from its emission inventory, it must provide documentation on why the source(s) were excluded.

The EPA has developed the Part5 model for estimating PM-10 emissions from mobile sources. The model can be used to estimate total particulate matter emissions as well as particulate matter fractions ranging from 1.0 to 10 micrometers. For gasoline engines, total exhaust particulate matter includes direct sulfate (exhausted as sulfuric acid) and lead emissions. For diesel engines, total exhaust particulate matter also includes emissions for soluble organic fraction and the remaining carbon portion. Each of these emission components can also be estimated individually. The Part5 model can also be used to estimate the following:

- Particulate matter from brake and tire wear,
- Gaseous sulfur dioxide exhaust emissions,
- Indirect sulfate emissions formed later in the atmosphere associated with sulfur dioxide exhaust emissions,
- Fugitive dust emissions from paved and unpaved roads, and
- Idle-speed exhaust emissions.

The Part5 model and user's manual may be obtained from EPA's Bulletin Board System for the Office of Mobile Sources on the TTN.

3.4.4 Rule Effectiveness

Rule effectiveness, currently not required, may be required by EPA at a later date. The feasibility of and guidance on using RE are being studied by EPA at this time. Until guidance is issued by EPA, RE may be considered by the State at its option. Should the State exercise this option, RE should be applied to all sources that are affected by a regulation and for which emissions are determined by means of emission factors and control efficiency estimates. No RE factor is needed in cases where no control is applied or there is no applicable regulation.

Past inventories have assumed that regulatory programs would be implemented with full effectiveness, achieving all of the required or intended emission reductions and maintaining that level over time. However, experience has shown regulatory programs to be less than 100 percent effective for most source categories in most areas of the country. The concept of applying RE in a SIP emission inventory has evolved from this observation. In short, RE reflects the actual ability of a regulatory program to reduce emissions from all sources at all times that are subject to a specific regulation.

Several factors should be taken into account when estimating the effectiveness of a regulatory program. These include: (1) the nature of the regulation (e.g., whether any ambiguities or deficiencies exist, whether test methods and/or recordkeeping requirements are prescribed); (2) the nature of the compliance procedures (e.g., taking into account the long-term performance capabilities of the control); (3) the performance of the source in maintaining compliance over time (e.g., training programs, maintenance schedule, recordkeeping practices); and (4) the performance of the implementing agency in assuring compliance (e.g., training programs, inspection schedules, follow-up procedures).

For base year PM-10 inventories under the CAA, the EPA will allow the use of reasonable default values **provided the values are justified by the State**. Justification may include a RE study performed according to the March 24, 1988 National Protocol. The RE factor shall be applied along with the estimated control efficiency in the calculation of emissions from a source. An example of the application is as follows:

Uncontrolled emissions	=	50 lbs/day
Estimated control efficiency	=	90%
RE	=	75%
Emissions after control	=	50 [1 - (0.90)(0.75)]
	=	50 [1 - (0.68]
	=	16.25 lbs/day

Thus, the application of RE results in a total emission reduction of 68 percent.

3.5 Updating Inventories

Updating of prior year inventories to the base year inventory will, in general, not be acceptable. A new inventory for the appropriate base year should be prepared. ***A State that believes that a special situation exists in which EPA should allow an existing inventory to be updated should apply to the appropriate Regional Office for a written exception.***

3.6 Adjustment of Base Year Inventory (Backcasting)

The EPA recognizes that adjustment of the base year inventory, or backcasting, may be necessary. Backcasting is the recalculation of a previous inventory due to changes in the parameters used to calculate the emissions initially. Situations where backcasting may be invoked include changes in emission factors, changes in calculational methods, or insufficient data for

the base year that may be more complete in a previous year. ***States may make adjustments to base year inventories only with the approval of the EPA.***

3.7 RFP Projection Inventories

The RFP inventory should "track" all sources that are subject to regulations for the nonattainment area, whether or not they are actually in the area. The inventory must be able to answer the question: "Is the State achieving the agreed emission reductions specified in the SIP at any particular time?" The basis for the reductions required will be the attainment demonstration. Since there are no specific level of reductions required under the CAA for PM-10 as there are for volatile organic compounds, the level of reductions required will be determined by the RACM requirements and what is necessary to demonstrate attainment of the PM-10 NAAQS by the appropriate attainment date.

RFP projection inventories are to be projections of allowable emissions. In addition, the RFP projection inventory should include the effects of control strategy implementation (such as RACM or BACM). Emission reductions determined from the RFP projection inventories are to be based upon the base year inventory which uses actual emissions. It is important to remember that attainment will be based upon a target level of emissions (i.e., an amount of emissions required to meet attainment) and that backcasting may necessitate an adjustment of the target level of emissions. Some air planning agencies may be used to thinking in terms of the emissions reduction required relative to a current control strategy projection, rather than a target level of emissions.

Projections of attainment year emissions would be used to calculate the required emissions reductions expressed on such a basis, by simply taking the difference between the attainment year projection inventory (without controls applied) and the attainment year target level of emissions. However, States that choose this approach should be aware that the attainment year target level is dependent only on the base year inventory, whereas the calculation of an emission reduction required relative to the current control strategy projection depends on the accuracy of the attainment year projection, which in turn depends on the estimate of future growth in activities. The assessment of whether an area has met the emission reduction requirement will be based on whether the area is at or below the target level of emissions and not whether the area has achieved a certain actual emission reduction relative to having maintained the current control strategy.

3.8 Modeling Inventories

Modeling inventories may require inclusion of additional sources outside the nonattainment area, as defined by the modeling domain. For this reason, the modeling domain should be defined as early as possible so that emission data for point, area, mobile, and natural sources can be gathered for the entire modeling domain as part of the base year inventory preparation process.

3.8.1 For Multi-source Areas

According to the *Guideline on Air Quality Models (Revised)* (U.S. EPA, 1986), all sources expected to contribute significantly to the ambient concentrations in the nonattainment area or near the critical receptor for

Table 3.2 Model Emission Input Data for Point Sources *

	Emission Limit (#/MMBtu)**	X	Operating Level (MMBtu/Hr)**	X	Operating Factor (e.g. Hr/Yr, Hr/day)
For Stationary Point Source(s) Subject to SIP Emission Limit(s) Evaluation for Compliance with Ambient Standards (Including Areawide Demonstrations)					
Averaging time Annual & quarterly	Maximum allowable emission limit or federally enforceable permit limit.		Actual or design capacity (whichever is greater), or federally enforceable permit condition.		Actual operating factor averaged over most recent 2 years.***
Short-term	Maximum allowable emission limit or federally enforceable permit limit.		Actual or design capacity (whichever is greater), or federally enforceable permit condition.****		Continuous operation, i.e., all hours of each time period under consideration (for all hours of the meteorological data base).*****
For Nearby Background Source(s)	Same input requirements as for stationary point source(s) above.				
For Other Background Source(s)	If modeled (see Section 9.2.3), input data requirements are defined below.				
Averaging time Annual & quarterly	Maximum allowable emission limit or federally enforceable permit limit.		Annual level when actually operating, averaged over the most recent 2 years.***		Actual operating factor averaged over most recent 2 years.***
Short-term	Maximum allowable emission limit or federally enforceable permit limit.		Annual level when actually operating, averaged over the most recent 2 years.***		Continuous operation, i.e., all hours of each time period under consideration (for all hours of the meteorological data base).*****

* The model input data requirements shown on this table apply to stationary source control strategies for STATE IMPLEMENTATION PLANS. For purposes of emissions trading, new source review, or prevention of significant deterioration, other model input criteria may apply. Refer to the policy and guidance for these programs to establish the input data.

** Terminology applicable to fuel burning sources; analogous terminology, e.g., #/throughput may be used for other types of sources.

*** Unless it is determined that this period is not representative.

**** Operating levels such as 50 percent and 75 percent of capacity should also be modeled to determine the load causing the highest concentration.

***** If operation does not occur for all hours of the time period of consideration (e.g., 3 or 24 hours) and the source operation is constrained by a federally enforceable permit condition, an appropriate adjustment to the modeled emission rate may be made (e.g., if operation is only 8:00 a.m. to 4:00 p.m. each day, only these hours will be modeled with emissions from the source. Modeled emissions should not be averaged across nonoperating time periods).

emission limit(s) should be explicitly modeled. For evaluation for compliance with the short term and annual ambient standards, the nearby sources should be modeled using the emission input data shown in Table 3.2. The number of such sources is expected to be small except in unusual situations. The nearby source inventory should be determined in consultation with the reviewing authority. It is envisioned that the nearby sources and the sources under consideration will be evaluated together using an appropriate model [typically selected from Appendix A of the *Guideline on Air Quality Models (Revised)* (U.S. EPA, 1986)].

The impact of the nearby sources should be examined at locations where interactions from several sources (plus natural background) can occur. Significant locations include: (1) the critical receptor(s) identified as exceeding the NAAQS; (2) areas having a large number of significant sources in a small area; (3) areas close to major sources; and (4) areas with peculiar topography and/or meteorology that may result in enhanced impacts from several sources. These locations may be identified through trial and error analyses or by using screening model approaches.

3.8.2 Background Sources

Other sources not expected to contribute significantly to the ambient concentration may include minor sources and distant major sources. That portion of the background attributable to these sources should be determined by application of a model using Table 3.2 or by the following procedure.

> If there are no ambient PM-10 monitoring stations in the vicinity of the source, a "regional site" may be used to determine the background. A "regional site" is one that is not influenced by major sources.
>
> Alternatively, air quality data collected in the vicinity of the source can be used to determine the background concentration. The average annual background concentration can be calculated by excluding those values when the source impacts the monitoring site.
>
> Line sources commonly included in emission inventories are roadways and streets along which there are well-defined movements of motor vehicles, but they may be lines of stacks such as in aluminum refineries. Area and volume sources are often collections of a multitude of minor sources with individually small emissions that are impractical to consider as separate point or line sources. Large area sources are typically treated as a grid network of square areas, with pollutant emissions distributed uniformly within each grid square.

After determining emissions for background sources, they may be entered into the data system. For example, if AIRS is the data system and the source is large enough to be tracked as a facility, data for the source could be entered in AFS. To enter data in AMS, the activity or emission values must be summed, or partitioned, to fit the geographic units used. For example, highway data are not entered in AMS as "line sources." Highway data for the appropriate vehicle-type and road-type categories are entered for the County (if the County as a whole is the geographic unit being tracked).

SECTION 4.0
DOCUMENTATION/DATA MANAGEMENT AND REPORTING OF THE INVENTORY

4.1 Documentation

Base year emission inventory information under the CAA shall be provided to EPA in written format. The written presentation must contain documentation sufficient for the Agency to reproduce the emission estimates that are submitted in the inventory. Written documentation requirements are summarized in this section.

Under the CAA, EPA is requiring that States prepare written inventory documentation reports according to a more standardized set of guidelines. Although the organization of the inventory report is somewhat flexible, Table 4.1 presents EPA's recommended outline for this report. Inventory reports that are not prepared according to the outline will be harder for EPA to review and are more likely to be deemed unacceptable by the Agency. The EPA's primary interest is that all inventories address the crucial elements inherent in a good inventory and provide summary data and documentation that allow the quality of the inventory effort to be effectively judged. Inventories not meeting the minimum data reporting and documentation standards established in this discussion shall be deemed unacceptable and returned to the States for modification before any further technical quality review will be performed.

The introduction to an inventory report shall contain a description of the nonattainment area that has been inventoried, a listing of the counties/areas covered, a map of the area, an identification of who prepared the inventory and the respective contacts for major inventory components, a description of major inventory problems or deficiencies, and a discussion of how the remainder of the report is organized. After the introduction, the report must contain a thorough summary of the emissions data by source type (point, area, mobile, and natural) and geographic area. At a minimum, the report must include summary emissions tables by source type, summary emissions tables by county/area, and graphics illustrating the contribution to areawide emissions by source type. If PM-10 precursor emissions are reported, they should be presented in separate tables from primary and condensible PM-10 emissions. States are required to report emissions data on an annual basis.

Separate discussions must be presented to describe inventory development procedures and results for point, area, mobile, and natural sources. In addition to the specific parameters germane to these source types, each source type discussion needs to explain how emissions were temporally allocated to a daily basis and how RE was incorporated into each emission estimate.

The point source discussion shall include a description of how the list of sources to be inventoried was identified. The report must also state if any source categories were not considered in the inventory and why. The discussion shall address the issue of completeness of source coverage. Data collection methods and tools shall be thoroughly explained and documented. All information surveys that may have been conducted must be discussed and the results provided (probably in an appendix). All sources inventoried shall be listed according to their source category type (e.g., refinery, plant, etc.). The methodology by which activity levels and emissions were determined for each plant or source category (when applicable) shall be succinctly but explicitly explained. Large volumes of detailed data shall be put into appendices but clearly linked to the text discussion in terms of how they were

Table 4.1 Outline for EPA Recommended Format/Contents for PM-10 Emission Inventory Reports

I. Cover and Title Page
   A. Title (geographic area, type of inventories, pollutants, base year)
   B. Responsible agency [e.g., NC Dept of Health and Natural Resource]
   C. Report 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

      [For example, In response to letter from _____ to _____, dated _____ requesting preparation of a SIP for demonstration of attainment of PM-10 NAAQS in (geographic area), beginning with an emission inventory for the base year. Base year emission inventory serves as the basis for emissions modeling and projections for future years.]

   B. Geographic area covered, base year, type of inventory (PM-10), pollutants included (PM-10, others)

   C. Brief discussion of contents of report

      [Note: Include a paragraph or less describing each major report section. For example, Section 2 summarized stationary point, area and mobile source emissions by county. Section 3 describes stationary point source emissions and includes a discussion of methods used to gather data, calculate annual and/or seasonal emissions, and presents a summary of emissions by plant. Detailed point source emissions data are presented in Appendix F. Section 4 discusses ...]

   D. Discussion of automated data systems used (AFS/AMS, State system)

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

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

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

IV. Summary
   A. Emissions (annual and/or seasonal) of each pollutant by major category (point, area, and mobile sources) in both tabular and graphical form; brief discussion in footnote, etc. to clarify what each includes.

   B. See example tables and graphics given in *Example Emissions Inventory Documentation for Post-1987 Ozone State Implementation Plans (SIPS)* (U.S. EPA, 1989b).

(continued)

Table 4.1 Outline for EPA Recommended Format/Contents for PM-10 Emission Inventory Reports (Continued)

V. Documentation of Emissions Methods/Data/Estimates
   A. Point Source Emissions
      1. discussions of procedures and methodologies including sample calculations
      2. example surveys/questionnaires
      3. list of plants by primary product and total emissions
      4. summary data for each plant by source classification code with details in an appendix
      5. point source emissions summary

   B. Area Source Emissions
      1. discussions of procedures and methodologies including sample calculations
      2. list of and emissions by source category
      3. calculations and discussion for each source category
      4. area source emissions summary

   C. Mobile Source Emissions
      1. discussion of procedures and methodologies including sample calculations
      2. list of vehicle classes and emissions
      3. discussion of how VMT estimates were derived
      4. discussion of key assumptions involved in the use of the PART5 model (or the latest available version)
      5. calculations and discussion for each vehicle class
      6. mobile source emissions summary

VI. Quality Assurance/Quality Control (QA/QC)
   A. QA/QA plan - discussion of QA/QC methodologies used

   B. Results from the application of the QA plan

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

VII. Appendices
   A. Lengthy data, calculations, documentation of methodologies/models

Notes: Annual and/or seasonal emissions shall be presented in the summary and sections describing emissions.

All pages in the report (including appendices) shall be numbered. Sources of information shall be referenced throughout. Include complete list(s) of references within body of report (preferably at end of each section).

Margins of report shall be adequate so that copying of report will not lose text, page numbers, or other important information.

used to determine emissions. Summary tables and graphics shall be prepared to address just point source emissions.

For area and mobile sources, the report must state if any source categories were not considered in the inventory and why. All of the source categories covered shall be listed and the method used to determine emissions identified. If an EPA method was used, but a different emission factor was used, this must be noted. For all approaches used (EPA or otherwise), the derivation of activity/commodity level data shall be thoroughly discussed. As needed, supporting data can be put into appendices but the appendices shall be fully explained and clearly linked back to the text discussion and emission estimates. Like point sources, emission summaries shall be developed for area and mobile sources. The summaries must reflect emissions by county and for the entire nonattainment area.

As an aid to States in the preparation and checking of their inventories prior to submittal to EPA, the Agency has been preparing a set of quality review guidelines. These guidelines will contain what is essentially a checklist of items that an inventory must contain or address in order for the inventory to be considered acceptable for review by EPA. The guidelines will address whether inventories meet developed specifications for completeness, consistency (both internal and with national trends), reasonableness of emission values, and emissions documentation.

States are required to design and implement a QA program to enhance the overall reliability and accuracy of the PM-10 SIP emission inventories prepared in response to the CAA. The inventory report shall have a separate section that describes the implementation of the State's QA plan and the results achieved by the QA program. For all source category types, the QA discussion shall address the completeness of the inventory (e.g., are all of the EPA-recommended area source categories accounted for), reasonableness of the emission estimates (e.g., are estimates for a category consistent with some other related parameter for the area), and relative accuracy of the data (e.g., do all of the individual county emission figures total to the sums given for the whole area). The QA discussion must show the range of quality review that was performed and how this review benefitted the inventory. This QA discussion should reflect the planned QA program that was approved as a part of the IPP. The QA section should discuss how the QA plan was actually implemented, what portion of the QA program did and did not work, the results of any internal or external audits that were performed, and a general QA of the inventory data.

4.2 Data Management and Reporting

Emission inventory information for base year and periodic (if required) inventories under the CAA shall be provided to EPA in electronic format. The level of detail required to be reported to EPA is currently being determined and may be the subject of future EPA guidance. States should consult their Regional Office for the specific level of detail required for the electronic reporting of data to EPA. If a State elects to use the EPA's AIRS, the level of detail required for AIRS submittals would be sufficient for EPA data reporting in coordination with EPA Regional Office requirements. The requirements and instructions for data coding, updating, editing, storage, and retrieval are specified in the AIRS User's Guide manuals. The AIRS User's Guide manuals, along with several other reference documents for using AFS and AMS, are available on the AIRS Bulletin Board System on the TTN. The AFS Data System Helpline (1-800-367-1044) is available to handle technical system questions, software malfunctions, and problems with the system. The AMS also has a user's Help Line (1-800-333-7909) for assistance in all aspects of using AMS. **For more information, contact the EPA Regional Office.**

SECTION 5.0
REFERENCES

U.S. EPA, 1986: U.S. Environmental Protection Agency, *Guideline On Air Quality Models (Revised)*, EPA 450/2-78-027R, and its supplements, July 1986. (Codified in Appendix W of 40 CFR 51.)

U.S. EPA, 1987: U.S. Environmental Protection Agency, *PM-10 SIP Development Guideline*, EPA 450/2-86-001, June 1987 and Supplement June 1988.

U.S. EPA, 1988a: *Control of Open Fugitive Dust Sources*, EPA-450/3-88-008, September 1988.

U.S. EPA, 1988b: U.S. Environmental Protection Agency, *Guidance for Preparation of Quality Assurance Plans for Ozone/Carbon Monoxide SIP Emission Inventories*, EPA 450/4-88-023, December 1988.

U.S. EPA, 1989a: U.S. Environmental Protection Agency, *Guidance Document for Residential Wood Combustion Control Measures*, EPA 450-2-89-015, September 1989.

U.S. EPA, 1989b: U.S. Environmental Protection Agency, *Example Emissions Inventory Documentation for Post-1987 Ozone State Implementation Plans* (SIPS), EPA-450/4-89-018, October 1989.

U.S. EPA, 1990: U.S. Environmental Protection Agency, *Guideline on Air Quality Models (Revised)*, memorandum from Joseph Tikvart and Robert Bauman, July 5, 1990.

U.S. EPA, 1991a: U.S. Environmental Protection Agency, *PM-10 Moderate Area SIP Guidance: Final Staff Work Product*, memorandum from John Calcagni, April 2, 1991.

U.S. EPA, 1991b: U.S. Environmental Protection Agency, *Nonroad Engine and Vehicle Emission Study -- Report*, EPA-21A-2001, November 1991.

U.S. EPA, 1992: U.S. Environmental Protection Agency, *Background Information Document for Prescribed Burning Best Available Control Measures*, EPA 450/2-92-003, September 1992.

U.S. EPA, 1993a: U.S. Environmental Protection Agency, *PM-10 Serious Area SIP Guidance: Final Staff Work Product*, memorandum from Joseph W. Paisie, September 24, 1993.

U.S. EPA, 1993b: U.S. Environmental Protection Agency, *PM-10 Guideline Document and Appendix*, EPA 452/R-93-008, April 1993.

APPENDIX A
INVENTORY PREPARATION PLAN (IPP) REVIEW CHECKLIST

The purpose of this checklist is to provide a decision tool for determining if an IPP meets EPA's minimum requirements. The questions marked with an asterisk (*) are considered crucial to an acceptable IPP, but are not required. Those questions not so marked are considered desirable items.

1.0 APPROACH

*1.1 Does the IPP indicate whether it was prepared for the purposes of a PM-10 SIP inventory?

Yes	No	Comments

*1.2 Does the IPP define the nonattainment area(s) that the inventory will address, and indicate the nonattainment classification for the area(s)?

Yes	No	Comments

1.3 Are the groups/persons responsible for the inventory and the groups/persons compiling the inventory specified?

Yes	No	Comments

1.4 Does the IPP contain a suitable outline for content and organization review of the planned inventory report?

Yes	No	Comments

*1.5 Does the IPP contain schedules of submission dates for draft and final inventories or inventory components if the State plans to submit the inventory in component pieces?

Yes	No	Comments

*1.6 If the IPP covers multiple nonattainment areas, are differences in the approach for the nonattainment areas clearly defined?

Yes	No	Comments

1.7 Does the IPP address which source categories of PM-10, regardless of size, will be inventoried?

Yes	No	Comments

*1.8 Are stationary point, stationary area, on-road mobile, and nonroad mobile, where applicable, addressed?

Yes	No	Comments

*1.9 Does the IPP summarize the basis for the inventory and the source(s) of basic emissions documentation information for each principal inventory component (point, area, on-road mobile, etc.)?

Yes	No	Comments

2.0 POINT SOURCES

*2.1 Does the IPP define how all pertinent emission sources will be identified and located?

Yes	No	Comments

2.2 Does the IPP describe how point source activity levels and associated parameters will be developed and discuss how these data will be used to calculate emission estimates?

Yes	No	Comments

*2.3 Does the IPP discuss how and when statewide point source reporting to the EPA will be conducted and how it will be coordinated with reporting for nonattainment area sources?

Yes	No	Comments

*2.4 Does the IPP indicate whether rule effectiveness (RE) was applied and discuss the basis for its application if it was included in the emission calculations?

Yes	No	Comments

2.5 Does the IPP discuss what emission control efficiencies will be based on?

Yes	No	Comments

3.0 STATIONARY AREA AND NONROAD MOBILE SOURCES

*3.1 Does the IPP explicitly state which source categories will be addressed?

Yes	No	Comments

*3.2 Does the IPP explicitly state which source categories from EPA's emission inventory requirements will not be addressed and provide justification?

Yes	No	Comments

*3.3 For source categories included, does the IPP indicate or reference the approach used to calculate emissions?

Yes	No	Comments

*3.4 If there are alternate EPA methods for a category, does the IPP clearly indicate the method the State intends to use?

Yes	No	Comments

*3.5 Are the major assumptions stated for approaches that differ from EPA's guidance?

Yes	No	Comments

*3.6 Does the IPP define the source of activity level data?

Yes	No	Comments

*3.7 If RE was applied, does the IPP discuss the basis for the application of RE?

Yes	No	Comments

*3.8 Does the IPP discuss what emission control efficiencies will be based on?

Yes	No	Comments

4.0 ON-ROAD MOBILE SOURCES

*4.1 Does the IPP provide a clear indication of how the State intends to develop a VMT estimate?

Yes	No	Comments

*4.2 Does the IPP indicate that PART5 will be used to develop mobile source emission factors?

Yes	No	Comments

*4.3 If PART5 will not be used, does the IPP discuss the alternate emissions estimation methods?

Yes	No	Comments

*4.4 Are the key assumptions for the PART5 model identified (i.e., vehicle speed)?

Yes	No	Comments

4.5 Does the IPP specify the vehicle classes that will be covered?

Yes	No	Comments

5.0 MODELING

*5.1 Is the modeling inventory and the modeling approach for the attainment demonstration discussed in the IPP?

Yes	No	Comments

5.2 Is the modeling area defined?

Yes	No	Comments

5.3 Does the IPP indicate when initial modeling inventory data will be submitted?

Yes	No	Comments

5.4 Does the IPP discuss early coordination between inventory and modeling personnel in inventory planning?

Yes	No	Comments

5.5 Does the IPP discuss how the temporal and spatial resolution will be determined for model inputs?

Yes	No	Comments

6.0 DOCUMENTATION

*6.1 Does the IPP clearly describe how the State plans to present, document, and submit the inventory to EPA?

Yes	No	Comments

6.2 Does the IPP discuss how emission estimates will be summarized for each nonattainment area?

Yes	No	Comments

*6.3 Was the Regional Office contacted to establish the specific level of detail required for the electronic reporting of data to EPA, and does the IPP specify the computerized methods for compiling and submitting the data to EPA?

Yes	No	Comments

*6.4 If a State uses or plans to use AIRS, does the IPP indicate how data will be input into AFS and AMS?

Yes	No	Comments

7.0 QUALITY ASSURANCE (QA) PLAN

*7.1 Does the IPP contain a QA plan for the inventory?

Yes	No	Comments

*7.2 Does the QA plan describe the overall QA program that the State intends to use during compilation of the inventory?

Yes	No	Comments

8.0 QA POLICY STATEMENT

*8.1 Does the QA plan contain a Policy Statement with a formal declaration of management's commitment to the development and implementation of the QA program?

Yes	No	Comments

*8.2 Does the Policy Statement indicate that there is a commitment to develop a quality emission inventory, including the allocation of resources for the QA program?

Yes	No	Comments

*8.3 Is the Policy Statement signed by the QA Coordinator and Agency Administrator?

Yes	No	Comments

9.0 SUMMARY

9.1 Does the QA plan's summary include an overview of the major components of inventory development?

Yes	No	Comments

*9.2 Does the summary include a description of the flow of the inventory data through the Agency or refer to such a flow chart elsewhere in the IPP?

Yes	No	Comments

*9.3 Does the summary indicate the critical points at which QA is applied during the development of the inventory?

Yes	No	Comments

9.4 Are the data QC techniques given in the summary, including an indication of the frequency that they will be applied?

Yes	No	Comments

9.5 Does the summary contain the objectives for emission inventory development?

Yes	No	Comments

9.6 Does the summary discuss the constraints relative to the development of the emission inventory (i.e., given personnel, time, resources, data processing capabilities)?

Yes	No	Comments

*9.7 Does the summary include an organizational chart showing the technical as well as QA personnel?

Yes	No	Comments

*9.8 Does the organizational chart show the QA coordinator reporting to upper management not directly involved in the development of the inventory?

Yes	No	Comments

*9.9 Does the summary provide the names and telephone numbers of the QA coordinator and directors?

Yes	No	Comments

10.0 TECHNICAL CONSIDERATIONS--PLANNING

10.1 Does the QA plan contain a schedule of QA activities?

Yes	No	Comments

10.2 Are the responsibilities of the QA Coordinator given?

Yes	No	Comments

10.3 Is the personnel training program explained in the QA plan?

Yes	No	Comments

*10.4 Are the checkpoints for problem detection given in the QA plan?

Yes	No	Comments

*10.5 Does the QA plan show that the QA/QC program includes assessing data completeness and standard range checking?

Yes	No	Comments

*10.6 Does the QA plan give the critical data elements relative to assessing the completeness of the source data?

Yes	No	Comments

11.0 TECHNICAL CONSIDERATIONS--DATA COLLECTION AND ANALYSIS

*11.1 Does the QA plan explain data collection procedures and QA/QC procedures used to insure quality data were collected?

Yes	No	Comments

11.2 Does the QA plan indicate what QA/QC procedures will be implemented to account for all sources?

Yes	No	Comments

*11.3 Does the QA plan describe QA/QC procedures that will prevent double counting of sources?

Yes	No	Comments

*11.4 Does the QA plan explain how the quality and accuracy of the calculations will be evaluated for:

- Consistency in methodology?

Yes	No	Comments

- Review of engineering judgement?

Yes	No	Comments

- Accuracy of units and unit conversions?

Yes	No	Comments

- Transposition of figures?

Yes	No	Comments

- Misinterpretations of the use of emissions factors?

Yes	No	Comments

*11.5 Does the QA plan explain how the completeness, reasonableness, reliability, and consistency in the use of equations for specific methods will be evaluated?

Yes	No	Comments

11.6 Does the QA plan indicate that the person responsible for evaluating the accuracy of the calculations is not directly involved in the inventory development?

Yes	No	Comments

12.0 TECHNICAL CONSIDERATIONS--DATA HANDLING

*12.1 Does the QA plan explain the data management procedures (i.e., coding, tracking, securing, storing on disks)?

Yes	No	Comments

*12.2 Does the QA plan include procedures which explain how data will be corrected and these corrections tracked?

Yes	No	Comments

*12.3 Are data documentation procedures given (i.e., use of notebooks, computers, work sheets)?

Yes	No	Comments

13.0 QA REPORTING

*13.1 Does the QA plan indicate how applicable data checks (e.g., consistency, completeness, reasonableness, and proofing) will be reported in the inventory?

Yes	No	Comments

14.0 QA AUDITS

*14.1 Does the QA plan contain a statement that the Agency is willing to be audited by EPA?

Yes	No	Comments

14.2 Does the QA plan indicate that the QA program includes routine assessments of the effectiveness of the inventory development procedures (i.e., internal audits)?

Yes	No	Comments

14.3 Does the QA plan indicate the frequency of internal audits?

Yes	No	Comments

14.4 Are the objectives of the audits given?

Yes	No	Comments

14.5 Does the audit procedure include documentation of the findings and periodic reports to management?

Yes	No	Comments

TECHNICAL REPORT DATA

(Please read Instructions on reverse before completing)

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EPA-454/R-94-033		

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15. SUPPLEMENTARY NOTES
EPA Contacts: Robin Dunkins, SDPMPB (MD-15) and Bill Kuykendal, EIB (MD-14)

16. ABSTRACT

This document describes the emission inventory requirements that are contained, either explicitly or implicitly, in the Clean Air Act as amended in 1990 (CAA) for those areas that are required to submit a State Implementation Plan (SIP) for demonstrating attainment of the National Ambient Air Quality Standard (NAAQS) for PM-10. The guidance in this document pertains to PM-10 moderate nonattainment areas and to areas that have been reclassified as serious nonattainment areas. The purposes of the document are to (1) identify the types of inventories required; (2) briefly review the regulatory requirements pertaining to submission of these inventories; (3) describe the objectives, components, and ultimate uses of the inventories; and (4) define documentation and reporting requirements for the inventories.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
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