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Office of Air Quality
Planning and Standards
Research Triangle Park, NC 27711

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PM-10 GUIDELINE DOCUMENT

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PM-10 GUIDELINE DOCUMENT

U.S. Environmental Protection Agency
Office of Air and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

April 1993

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1.0 INTRODUCTION

1.1 OVERVIEW

This PM-10 (particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers) guideline represents a compilation of currently available policy and guidance for PM-10 programs and does not present any new policy or guidance. The guideline is organized into 12 chapters as follows:

Chapter 1	Introduction
Chapter 2	State Implementation Plans
Chapter 3	Determining Air Quality Status
Chapter 4	Emission Inventories
Chapter 5	Ambient Air Quality Monitoring and Data Usage
Chapter 6	Air Quality Modeling
Chapter 7	Stack Height Regulations
Chapter 8	Control Strategies
Chapter 9	General Provisions
Chapter 10	Permit Requirements
Chapter 11	Compliance and Enforcement
Chapter 12	New Source Performance Standards

Each chapter summarizes relevant policy and guidance and provides detailed references to guide the user to more complete sources. References include statutory and regulatory sources [Clean Air Act and Code of Federal Regulations (CFR)], Federal Register notices, U.S. Environmental Protection Agency (EPA) guideline documents, EPA policy, questions and answers (Q & A's), and guidance memoranda. Where appropriate, quotations are provided from the applicable reference materials to be used as a quick reference. Citations to the CFR should be checked regularly as it is updated annually, and the updated versions may not always be reflected in this document.

This guideline is intended to provide a guide to policy and guidance in effect at the time of its preparation. **The PM-10 guideline should not be cited in regulatory actions because any regulatory decisions should be based on the original sources, rather than**

the summaries in each chapter. In addition, in some instances, it is possible that only part of a document still represents current EPA policy or guidance. Therefore, before citing a document section not excerpted from the PM-10 policy and guidance in the references at the end of each chapter, please consult EPA to assure the information is still current.

It is particularly important to consult with EPA because significant changes were made to the Clean Air Act (Act) in the 1990 Amendments. Section 193 of the Act provides that regulations and guidance issued by EPA prior to the 1990 Amendments remain in effect, except to the extent inconsistent with the Act or revised by EPA. EPA has not undertaken a systematic review of all of its previously-issued regulations and guidance to assess its consistency with the revised Act.

However, EPA has issued significant guidance since the 1990 revisions to the Act. Thus, the key source to focus on in determining the State implementation plan (SIP) requirements applicable to PM-10 nonattainment areas is, of course, the statute itself. Part D, Title I of the Act contains the statutory requirements applicable to PM-10 nonattainment areas. Further, important recently-issued guidance includes the *General Preamble* cited in section 1.3 below.

Finally, the underlying guidance and memoranda summarized in this document describe EPA's non-binding interpretations of certain SIP and SIP-related requirements. Therefore, for example, these interpretations will be given binding effect for a SIP submitted for a particular area only after final EPA rulemaking action on the submittal. During the course of this rulemaking action the public will be afforded an opportunity to comment on the application of any guidance or memoranda to the particular area in question. Thus, EPA will consider the factual circumstances associated with a particular submittal and the submissions made by any persons before giving the preliminary interpretations expressed in guidance and memoranda binding legal effect. Further, use of words like "must", "shall" and "required" in this document or the underlying documents should not be treated as having binding legal effect unless the words are employed to describe or recite an already-adopted statutory or regulatory requirement.

Except where noted, Appendix A to this guideline contains copies of all the memoranda, Federal Register notices, and Q & A's cited in the reference sections arranged in chronological order (lengthier documents, such as guidance documents, guidelines, manuals,

etc., are not included in Appendix A, but can be obtained from EPA or elsewhere). Appendix B contains a compendium of sources of information on PM-10 policy and guidance. It consists of a list of PM-10 policy and guidance and a table indicating what subjects the policy and guidance covers. The list includes items that are not specifically referenced in the chapters of this guideline. These materials are intended to supplement the materials referenced in this guideline with additional information as needed. The table indicates which policy and guidance items are referenced in this document and which are not.

1.2 PROVISIONS FOR UPDATING THE GUIDELINE

The guideline will be updated periodically by adding new pages or replacing existing pages. Revised pages will be dated and copies will be provided by the EPA's Office of Air Quality Planning and Standards (OAQPS) to the EPA Regional Office PM-10 contacts. Citations of the CFR are to the most current version at the time of preparation of this guideline. Users of the guideline should refer to later versions of the CFR since it is updated on a regular basis. The CFR is published annually including changes for that year. However, new/revised regulations can be promulgated at any time and States should be aware of those prior to publication in the bound CFR.

1.3 ADDITIONAL INFORMATION SOURCES

This guideline is intended to be used in conjunction with other guidance documents and policy statements including the following:

- General Preamble (see 57 FR 13598, April 16, 1992 and 57 FR 18070, April 29, 1992).
- Air Programs Policy and Guidance Notebook. Contains many references cited in this guideline which are cross referenced by PN number from the notebook.
- New Source Review Workshop Manual. Contains comprehensive New Source Review guidance.
- New Source Review (NSR)/Prevention of Significant Deterioration (PSD) Notebook: contains comprehensive NSR/PSD guidance.

- Clean Air Act Compliance/Enforcement Policy Compendium: contains comprehensive compliance guidance.

- Guideline for Review of State implementation plan (SIP) Revisions by EPA Regional Offices: contains references on SIP processing.

- Processing procedures for SIP revisions for Part 52, Part 62-III(d) Plans, and Part 82 Redesignations.

- Guideline on Air Quality Models: contains comprehensive modeling guidance.

Where existing guidance is insufficient, State and local agencies should seek clarification from their Regional Office contact. Regional Offices are encouraged to solicit additional guidance when needed from EPA Headquarters personnel. Contact the SO_2/Particulate Matter Programs Branch, AQMD, OAQPS at 919/541-5628.

2.0 STATE IMPLEMENTATION PLANS

2.1 GENERAL

Section 101(b)(1) of the Act as amended in 1990 notes that one of the purposes of the Act is "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population." To this end, the amended Act established provisions for setting national ambient air quality standards (NAAQS) for certain air pollutants, including PM-10. NAAQS for PM-10 were promulgated in 1987.

The amended Act establishes the system of State implementation plans as the method for ensuring that NAAQS are met (section 110). Specifically, the amended Act states that, after promulgation of NAAQS, each State must adopt and submit to EPA a plan which provides for implementation, maintenance, and enforcement of the NAAQS.

According to section 107(d)(1) and (4), areas are to be designated as attainment, nonattainment, or unclassifiable with respect to the NAAQS. When any area's designation changes to nonattainment, the State must prepare a revision to the SIP pursuant to section 172 showing how the area will be brought into attainment.

Prior to 1990, PM-10 areas were classified in terms of the probability of violating the NAAQS. As such, PM-10 areas were divided into three groupings identified as Group I, Group II or Group III areas.[1] Group I areas were areas where the probability of violation of the PM-10 NAAQS was 95 percent or greater. Group II areas were areas where the probability of violation was between 20 and 95 percent. In Group III areas, the probability of violation was less than 20 percent.

The *General Preamble* for the Implementation of Title I of the amended Act states that "on the date of enactment of the 1990 Act, PM-10 areas meeting the qualifications of section 107(d)(4)(B) of the amended act were designated nonattainment by operation of law. These areas included all former Group I areas identified in 52 FR 29383 and clarified in 55 FR 45799 and any other areas violating the PM-10 NAAQS prior to January 1, 1989. All other areas were designated unclassifiable."[2] The *General Preamble* also states that "once an

area is designated nonattainment, section 188 of the amended Act outlines the process for classification of the area and establishes the area's attainment date."[3] A detailed discussion of area designation and classification and attainment dates is presented in Section 9.2 of this guideline.

REFERENCES FOR SECTION 2.1

1. 52 Federal Register 29,383-85 (August 7, 1987), PM-10 Group I and Group II Areas; List of PM-10 Group I and Group II Areas.

2. 57 Federal Register 13,537 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; Designations.

3. 57 Federal Register 13,537 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; Classifications and Attainment Dates.

2.2 GENERAL SIP APPROACH

The general steps for developing a SIP or revising a SIP for a Part D nonattainment area are outlined below.

1. Determine the existing PM-10 concentrations in the ambient air to establish the initial (baseline) air quality. Baseline air quality is determined by using measured air quality data. These baseline air quality data determine the attainment status for an area with regard to PM-10.

2. Determine whether an area is meeting the NAAQS. The 24-hour NAAQS for PM-10 is 150 $\mu g/m^3$, 24-hour average concentration. The 24-hour NAAQS is considered violated when the expected number of days per calendar year having a 24-hour average concentration above 150 $\mu g/m^3$ is greater than one. The annual NAAQS for PM-10 is 50 $\mu g/m^3$, arithmetic mean. The annual PM-10 NAAQS is violated when the expected annual arithmetic mean concentration is greater than 50 $\mu g/m^3$.[1]

   If an area is in violation of the NAAQS, EPA will designate the area as nonattainment. The State will then be required to submit a SIP addressing how the nonattainment area will be brought into compliance with the NAAQS. The amount of time which the State is given to submit the SIP is dependent on whether an area is classified as moderate or serious.

3. Prepare emissions inventories. Emission inventories are needed to determine which industrial sectors or area sources will cause an area to achieve or exceed the ambient standards in future years. The baseline inventory estimates current emissions. A baseline projection estimates future emissions given current controls by taking into account expected emissions growth. Control strategy projections estimate future emissions considering modified or additional control regulations which affect baseline projections. Development of emissions inventories is addressed in Section 4 of this guideline.

4. Evaluate ambient air quality. Developing an implementation plan requires a suitable method for relating pollutant emissions to ambient air quality. The most commonly used method is atmospheric dispersion modeling. When dispersion models are applied to projected emissions, projected air quality can be determined and used to demonstrate attainment of the standard by the attainment deadline.

5. Develop control strategies that ensure attainment and maintenance of the NAAQS. Specific control strategies needed to attain the NAAQS are based on projected controlled emissions and the associated ambient air quality. Control strategies are addressed in Section 8 of this document.

6. Document the plan for attainment in the SIP. Requirements for content of the SIP are addressed in Section 2.3 of this document.

7. Perform post-SIP air quality monitoring to track air quality maintenance and progress toward attainment.

REFERENCES FOR SECTION 2.2

1. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I. Subchapter C, Part 50.6. July 1, 1991.

2.3 STATUTORY REQUIREMENTS FOR PM-10 SIP's

Subsections (A) through (M) of section 110(a)(2) of the amended Act set forth the elements that a SIP must contain in order to be fully approved.[1] Under section 110(a)(2), SIP's must include,among other things, the following:

- Enforceable emissions limitations
- Ambient air quality monitoring
- Provisions for enforcement of control measures and emissions limitations
- Provisions to prohibit sources from significantly affecting NAAQs attainment or maintenance, or conformance with PSD or visibility rules in a neighboring State
- Assurance of adequate personnel, funding and authority to carry out the SIP
- Requirements for emissions monitoring and reporting
- Provisions for emergency powers and contingency plans
- Provisions for plan revisions, as necessary
- Provisions for SIP revisions to meet applicable nonattainment area requirements
- Provisions for necessary air quality modeling
- Provisions to collect permit fees required under the Act from major stationary sources adequate to recover the costs of reviewing and acting upon permit applications and administering the provisions of the permit
- Provisions for participation of local political subdivisions affected by the plan

PM-10 nonattainment area SIP's must meet the following section 172(c) requirements applicable to nonattainment area SIP's generally:

- Implementation of all reasonably available control measures (RACM) (including reductions in emissions from existing sources in the area obtainable by adopting, at a minimum, reasonably available control technology) and attainment of the NAAQS.
- Demonstration of reasonable further progress (RFP) toward attaining the NAAQS by the applicable date

- A comprehensive, accurate, and current inventory of actual emissions from all sources of the relevant pollutant

- Identification and quantification of PM-10 emissions from the construction or operation of major new or modified stationary sources. The SIP must demonstrate that these emissions will be consistent with the achievement of RFP and will not interfere with attainment of the NAAQS

- Require permits for the construction and operation of major new or modified stationary sources in the nonattainment area

- Provisions for appropriate measures to ensure attainment by applicable date, including enforceable emission limits and other necessary control measures, as well as schedules for compliance

- Compliance with applicable provisions of section 110(a)(2)

- Provisions for the implementation of specific contingency measures to be taken if the nonattainment area fails to make RFP or to meet the NAAQS by the applicable date

PM-10 nonattainment area SIP's must meet the following Part D, Subpart 4 PM-10 specific requirements:

- Provisions for implementation of RACM for moderate areas according to a specific schedule.

- Provisions for implementation of best available control measures (BACM) for serious areas according to a specific schedule.

- An attainment demonstration (including air quality modeling).

- Establishment of a permit program providing that permits meeting the requirements of section 173 are required for the construction and operation of major new or modified PM-10 stationary sources.

- The attainment demonstration plan revision must include quantitative milestones to be achieved every 3 years until the area is redesignated attainment and which demonstrate RFP toward attainment by the applicable date.

REFERENCES FOR SECTION 2.3

1. 57 Federal Register 13,556 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; General; Part D, Subpart 1/Section 110(to the Extent Not Covered Under Pollutant-Specific).

3.0 DETERMINING AIR QUALITY STATUS

3.1 SECTION 107 DESIGNATIONS

3.1.1 General

According to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, on the date of enactment of the amended Act (November 15, 1990), PM-10 areas meeting the qualifications of section 107(d)(4)(B) were designated nonattainment by operation of law.[1] These areas included all former Group I areas and any other areas violating the PM-10 NAAQS prior to January 1, 1989. All other areas were designated unclassifiable. A Federal Register notice announcing all of the areas designated nonattainment for PM-10 at enactment of the amended Act and classified as moderate was published in 56 FR 11101 (March 15, 1991) and corrected in 56 FR 37654 (August 8, 1991).[1]

Section 188 of the amended Act outlines the process for classification of nonattainment areas and establishes area-specific attainment dates.[2] At the time of designation, and in accordance with section 188(a), all PM-10 nonattainment areas are initially classified as moderate. In accordance with section 188(b), a moderate area can be reclassified as serious prior to the passage of the applicable attainment date if EPA determines the area cannot "practicably" attain the PM-10 NAAQS by that date. For the initial moderate PM-10 nonattainment areas, the amended Act specifies certain dates by which EPA must propose to reclassify appropriate moderate areas as serious and take final action. In addition, a moderate area can be reclassified as serious subsequent to the passage of the applicable attainment date if EPA determines the area has failed to attain by that date.[2]

3.1.2 Designating Areas as Nonattainment

The amended Act, in accordance with section 107(d)(3), authorizes EPA to promulgate the designation of new areas as nonattainment for PM-10 on the basis of air quality data, planning and control considerations, or any other air quality-related consideration that the Administrator deems appropriate.[3] As part of the designation process, EPA notifies the governors of those States with areas that EPA believes should be redesignated as

nonattainment. Governors of affected States must then submit to EPA the designation they consider appropriate for each area in question within 120 days. No later than 120 days after a Governor's response, if any, EPA must promulgate those redesignations which EPA deems necessary and appropriate.[3] On April 22, 1991 EPA announced in 56 FR 16274 that it had initiated the redesignation process for 16 areas. Pursuant to section 189(a)(2)(B) of the amended Act, States must submit PM-10 SIP's for these areas to EPA within 18 months after EPA promulgates the nonattainment designation.[3]

3.1.3 Area Boundaries

Section 107 nonattainment areas for PM-10 must have clearly identifiable political or physical boundaries and are generally described by EPA as a city, county, or township.[4] Generally, when EPA lists municipal boundaries or other boundaries identifying a perimeter, all of the area within those boundaries is part of the nonattainment area unless otherwise specified. In the process of monitoring and modeling PM-10 concentrations and determining the extent of sources of PM-10 emissions that impact the areas, the States will better identify the boundaries of the area that is or may be violating the standards.[5] Guidance was provided in the *PM-10 SIP Development Guideline* on how to further define the extent of areas violating the PM-10 standards in the process of developing PM-10 SIP's. On October 31, 1990, EPA clarified the description of certain Group I and Group II areas of concern listed in the original August 7, 1987 notice.[6] Further corrections for the initial moderate areas were published on August 8, 1991 in response to comments from States.[7]

3.1.4 Redesignating Areas to Attainment

The following is an expanded discussion of the criteria which must be met before an area can be redesignated from nonattainment to attainment. It is suggested that the reader refer to the memorandum dated September 4, 1992 from John Calcagni to the Regional Air Division Directors entitled *Procedures for Processing Requests to Redesignate Areas to Attainment* for an extended discussion of these criteria.[8]

- Attainment of the NAAQS:

The State must show that the area is attaining the PM-10 NAAQS. There are two components involved in making this demonstration which should be considered interdependently. The first component relies on air quality data. The showing of attainment for PM-10 through air quality data must rely on 3 complete, consecutive calendar years of quality-assured air quality monitoring data, collected in accordance with 40 CFR 50, Appendix K.[9] According to 40 CFR 50.6, the area may be considered as attaining the primary and secondary 24-hour NAAQS (150 $\mu g/m^3$) when the expected number of exceedances per year at each monitoring site is less than or equal to one. In the simplest case, the expected number of exceedances is determined by recording the number of exceedances in each calendar year, and then averaging over the past 3 years. The annual primary and secondary PM-10 NAAQS are attained when the expected annual arithmetic mean PM-10 concentration is less than or equal to the level of the standard (50 $\mu g/m^3$). In the simplest case, the expected annual arithmetic mean is determined by averaging the annual means for the past 3 calendar years. Situations in which 3 years of data are not available and possible adjustments for unusual events or trends are necessary are discussed in Sections 2.3 and 2.4 of 40 CFR 50, Appendix K.[10]

The second component relies on supplemental air quality modeling. Modeling may be necessary to determine the representativeness of the monitored data. For PM-10, dispersion modeling will generally be necessary to evaluate comprehensively a source's impacts and to determine the areas of expected high concentrations based upon current conditions. Regions should consult with OAQPS for further guidance addressing the need for modeling in specific circumstances.[11]

- Approved 110(k) SIP for the area

The SIP for the area must be fully approved under section 110(k) of the Act and must satisfy all requirements that apply to the area. "An area cannot be redesignated if a required element of its plan is the subject of a disapproval; a finding of failure to submit or to implement the SIP; or partial, conditional, or limited approval. However, this does not mean that earlier issues with regard to the SIP will be reopened."[12]

- Permanent and enforceable improvement in air quality

  The State must be able to reasonably attribute the improvement in air quality to emission reductions which are permanent and enforceable. In making this showing, the State should estimate the percent reduction achieved from Federal measures.[13]

- Section 110 and Part D Requirements

  A State must meet all requirements of section 110 and Title I, Part D of the Act that were applicable prior to submittal of the complete redesignation request. Section 110(a)(2) contains general requirements for nonattainment SIP's. Part D consists of general requirements applicable to all areas designated nonattainment and specific requirements applicable to certain NAAQS including PM-10.[14]

- Fully approved maintenance plan

  Before an area can be redesignated to attainment, EPA must approve a maintenance plan which meets the requirements of section 175A.[15] The maintenance plan will constitute a SIP revision and must provide for maintenance of the PM-10 NAAQS in the area for at least 10 years after redesignation.[16] In addition, the maintenance plan shall contain such contingency measures necessary to ensure prompt correction of any violation of the PM-10 NAAQS. At a minimum, these measures must include a requirement that the State will implement all measures contained in the nonattainment SIP prior to redesignation.[17]

The following is a list of the provisions that should be included in a maintenance plan:

Attainment inventory: The State should develop an attainment emissions inventory to identify the level of emissions in the area which is sufficient to attain the PM-10 NAAQS.[18]

Maintenance demonstration: A State may generally demonstrate maintenance of the NAAQS by either showing that future emissions of PM-10 will not exceed the level of the attainment inventory, or by modeling to show that the future mix of sources

and emission rates will not cause a violation of the PM-10 NAAQS.[19] In either case, the State should project emissions for the 10-year period following redesignation.[20]

Monitoring network: Once an area has been redesignated, the State should continue to operate an appropriate air quality monitoring network to verify the attainment status of the area.[21]

Verification of continued attainment: Each State should ensure that it has the legal authority to implement and enforce all measures necessary to attain and to maintain the PM-10 NAAQS. The State submittal should indicate how the State will track the progress of the maintenance plan.[22]

Contingency plan: The maintenance plan must contain contingency provisions that will promptly correct any violation of the PM-10 NAAQS that occurs after redesignation. For the purposes of section 175A, a State is not required to have fully adopted contingency measures that will take effect without further action by the State in order for the maintenance plan to be approved. However, the contingency plan is considered to be an enforceable part of the SIP and should ensure that contingency measures are adopted expediently once they are triggered. The plan should clearly identify the measures to be adopted, a schedule and procedure for adoption and implementation, and a specific time limit for action by the State.[23] The EPA will review what constitutes a contingency plan on a case-by-case basis. At a minimum, it must require that the State will implement all measures contained in the Part D nonattainment plan for the area prior to redesignation. This language suggests that a State may submit a SIP revision at the time of its redesignation request to remove or reduce the stringency of control measures. The EPA can approve such a revision if it provides for compensating equivalent reductions. Alternatively, a State might be able to demonstrate that the measures are not necessary for maintenance of its standard.[24]

REFERENCES FOR SECTION 3.1

1. 57 Federal Register 13,537 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; Designations.

2. 57 Federal Register 13,537 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; Classifications and Attainment Dates.

3. 56 Federal Register 16,274-77 (April 22, 1991), Preparation, Adoption, and Submittal of State Implementation Plans; PM-10, Sulfur Dioxide, and Lead Nonattainment and Unclassifiable Area Designations; Background for PM-10.

4. "Using the above criteria, boundaries of future nonattainment areas should be specified using clearly identifiable political or physical boundaries. This could include city, county, or State boundaries or rivers and mountain ranges. However, the boundaries should encompass the entire area to which a control strategy is expected to apply. The default area for PM-10 designations are the county boundaries." Memorandum from Seitz, John S., Director, OAQPS, to Addressees. Nonattainment Designations and Classifications. November 14, 1990.

5. 52 Federal Register 29,383-85 (August 7, 1987), PM-10 Group I and Group II Areas.

6. 55 Federal Register 45,799-803 (October 31, 1990), Preparation, Adoption, and Submittal of State Implementation Plans; Corrections to PM-10 Areas of Concern.

7. 56 Federal Register 37,654-65 (August 8, 1991), Designations and Classifications for Initial PM-10 Nonattainment Areas.

8. Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

9. "The State must show that the area is attaining the applicable NAAQS. There are two components involved in making this demonstration which should be considered interdependently. The first component relies upon ambient air quality data. The data that are used to demonstrate attainment should be the product of ambient monitoring

that is representative of the area of highest concentration. These monitors should remain at the same location for the duration of the monitoring period required for demonstrating attainment . . . For PM-10, the area may be considered attaining the NAAQS if the number of expected exceedances per year, according to 40 CFR 50.6, is less than or equal to 1.0. In making this showing, both PM-10 and O_3 must rely on 3 complete, consecutive calendar years of quality-assured air quality monitoring data, collected in accordance with 40 CFR 50, Appendices H and K." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

10. U.S. Environmental Protection Agency, Code of Federal Regulations, Title 40, Chapter I, Subchapter C, Part 50, Appendix K. July 1, 1991.

11. "The second component relies on supplemental EPA-approved air quality modeling . . . Modeling may be necessary to determine the representativeness of the monitored data . . . When dealing with SO_2, Pb, PM-10 (except for a limited number of initial moderate nonattainment areas), . . . dispersion modeling will generally be necessary to evaluate comprehensively sources' impacts and to determine the areas of expected high concentrations based upon current conditions. Areas which were designated nonattainment based on modeling will generally not be redesignated to attainment unless an acceptable modeling analysis indicates attainment. Regions should consult with OAQPS for further guidance addressing the need for modeling in specific circumstances." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

12. "The SIP for the area must be fully approved under section 110(k), and must satisfy all requirements that apply to the area. It should be noted that approval action on SIP elements and the redesignation request may occur simultaneously. An area cannot be redesignated if a required element of its plan is the subject of a disapproval; a finding of failure to submit or to implement the SIP; or partial, conditional, or limited approval. However, this does not mean that earlier issues with regard to the SIP will be reopened. Regions should not reconsider those things that have already been approved and for which the Clean Air Act Amendments did not alter what is required. In contrast, to the extent the amendments add a requirement or alter an existing requirement so that it adds something more, Regions should consider those issues. In

addition, requests from areas known to be affected by dispersion techniques which are inconsistent with EPA guidance will continue to be considered unapprovable under section 110 and will not qualify for redesignation." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

13. "The State must be able to reasonably attribute the improvement in air quality to emission reductions which are permanent and enforceable. Attainment resulting from temporary reductions in emission rates (*e.g.*, reduced production or shutdown due to temporary adverse economic conditions) or unusually favorable meteorology would not qualify as an air quality improvement due to permanent and enforceable emission reductions. In making this showing, the State would estimate the percent reduction (from the year that was used to determine the design value for designation and classification) achieved from Federal measures. . ." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

14. "For the purposes of redesignation, a State must meet all requirements of section 110 and Part D of the Act that were applicable prior to submittal of the complete redesignation request. When evaluating a redesignation request, Regions should not consider whether the State has met requirements that come due under the Act after submittal of a complete redesignation request. However, any requirements that came due prior to submittal of the redesignation request must be fully approved into the plan at or before the time EPA redesignates the area. Section 110(a)(2) contains general requirements for nonattainment plans. Most of the provisions of this section are the same as those contained in the pre-amended Act. . . Part D consists of general requirements applicable to all areas which are designated nonattainment based on a violation of the NAAQS. The general requirements are followed by a series of subparts specific to each pollutant. The general requirements appear in subpart 1. The requirements relating to O_3, CO, PM-10, SO_2, NO_2, and Pb appear in subparts 2 through 5. In those instances where an area is subject to both the general nonattainment provisions in subpart 1 as well as one of the pollutant-specific subparts, the general provisions may be subsumed within, or superseded by, the more specific requirements of subparts 2 through 5." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV;

Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

15. "Section 107(d)(3)(E) of the amended Act stipulates that for an area to be redesignated, EPA must fully approve a maintenance plan which meets the requirements of section 175A. A State may submit both the redesignation request and the maintenance plan at the same time and rulemaking on both may proceed on a parallel track. Maintenance plans may, of course, be submitted and approved by EPA before a redesignation is requested. However, according to section 175A(c), pending approval of the maintenance plan and redesignation request, all applicable nonattainment area requirements shall remain in place." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

16. "Section 175A defines the general framework of a maintenance plan. The maintenance plan will constitute a SIP revision and must provide for maintenance of the relevant NAAQS in the area for at least 10 years after redesignation. Section 175A further states that the plan shall contain such additional measures, if any, as may be necessary to ensure such maintenance. Because the Act requires a demonstration of maintenance for 10 years after an area is redesignated (not 10 years after <u>submittal</u> of a redesignation request), the State should plan for some lead time for EPA action on the request. . . In determining the amount of lead time to allow, States should consider that section 107(d)(3)(D) grants the Administrator up to 18 months from receipt of a complete submittal to process a redesignation request." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

17. "In addition, the maintenance plan shall contain such contingency measures as the Administrator deems necessary to ensure prompt correction of any violation of the NAAQS [see section 175A(d)]. The Act provides that, at a minimum, the contingency measures must include a requirement that the State will implement all measures contained in the nonattainment SIP prior to redesignation. Failure to maintain the NAAQS and triggering of the contingency plan will not necessitate a revision of the

SIP unless required by the Administrator, as stated in section 175A(d)." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

18. "The State should develop an attainment emissions inventory to identify the level of emissions in the area which is sufficient to attain the NAAQS. This inventory should be consistent with EPA's most recent guidance on emission inventories for nonattainment areas available at the time and should include the emissions during the time period associated with the monitoring data showing attainment. Source size thresholds are 100 tons/year for SO_2, NO_2, and PM-10 areas, and 5 tons/year for Pb based upon 40 CFR 51.100(k) and 51.322, as well as established practice for AIRS data. The source size threshold for serious PM-10 areas is 70 tons/year according to Clean Air Act section 189(b)(3)." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

19. "A State may generally demonstrate maintenance of the NAAQS by either showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory, or by modeling to show that the future mix of sources and emission rates will not cause a violation of the NAAQS. Under the Clean Air Act, many areas are required to submit modeled attainment demonstrations to show that proposed reductions in emissions will be sufficient to attain the applicable NAAQS. For these areas, the maintenance demonstration should be based upon the same level of modeling. In areas where no such modeling was required, the State should be able to rely on the attainment inventory approach. In both instances, the demonstration should be for a period of 10 years following the redesignation." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

20. "In either case, to satisfy the demonstration requirement the State should project emissions for the 10-year period following redesignation, either for the purpose of

showing that emissions will not increase over the attainment inventory or for conducting modeling. The projected inventory should consider future growth, including population and industry, should be consistent with the attainment inventory, and should document data inputs and assumptions. All elements of the demonstration (*e.g.*, emissions projections, new source growth, and modeling) should be consistent with current EPA modeling guidance." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment.
September 4, 1992.

21. "Once an area has been redesignated, the State should continue to operate an appropriate air quality monitoring network, in accordance with 40 CFR Part 58, to verify the attainment status of the area. The maintenance plan should contain provisions for continued operation of air quality monitors that will provide such verification. In cases where measured mobile source parameters have changed over time (*e.g.*, vehicles miles traveled congestion), the State may also need to perform a saturation monitoring study to determine the need for, and location of, additional permanent monitors." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

22. "Each State should ensure that it has the legal authority to implement and enforce all measures necessary to attain and to maintain the NAAQS. Section 110(a)(2)(b) and (F) of the Clean Air Act, as amended, and regulations promulgated at 40 CFR 51.110(k), suggest that one such measure is the acquisition of ambient and source emission data to demonstrate attainment and maintenance. Regardless of whether the maintenance demonstration is based on a showing that future emission inventories will not exceed the attainment inventory or on modeling, the State submittal should indicate how the State will track the progress of the maintenance plan. This is necessary due to the fact that the emission projections made for the maintenance demonstration depend on assumptions of point and area source growth."
Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division,

Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

23. "Section 175A of the Act also requires that a maintenance plan include contingency provisions, as necessary, to promptly correct any violation of the NAAQS that occurs after redesignation of the area. . . For the purposes of section 175A, a State is not required to have fully adopted contingency measures that will take effect without further action by the State in order for the maintenance plan to be approved. However, the contingency plan is considered to be an enforceable part of the SIP and should ensure that the contingency measures are adopted expediently once they are triggered. The plan should clearly identify the measures to be adopted, a schedule and procedure for adoption and implementation, and a specific time limit for action by the State. As a necessary part of the plan, the State should also identify specific indicators, or triggers, which will be used to determine when the contingency measures need to be implemented." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

24. "The EPA will review what constitutes a contingency plan on a case-by-case basis. At a minimum, it must require that the State will implement all measures contained in the Part D nonattainment plan for the area prior to redesignation [see section 175A(d)]. This language suggests that a State may submit a SIP revision at the time of its redesignation request to remove or reduce the stringency of control measures. Such a revision can be approved by EPA if it provides for compensating equivalent reductions. A demonstration that measures are equivalent would have to include appropriate modeling or an adequate justification. Alternatively, a State might be able to demonstrate (through EPA-approved modeling) that the measures are not necessary for maintenance of the standard. In either case, the contingency plan would have to provide for implementation of any measures that were reduced or removed after redesignation of the area." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to: Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides, and Toxics Division, Region VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. Procedures for Processing Requests to Redesignate Areas to Attainment. September 4, 1992.

3.2 AMBIENT AIR

3.2.1 General

Ambient air is defined in 40 CFR 50.1(e) as "that portion of the atmosphere, external to buildings, to which the general public has access." Generally, this definition signifies that ambient air would constitute any air to which the public could be exposed, even for a short period of time. The only exemption from the ambient air provision is the atmosphere over land that is owned or controlled by the source and to which public access (and, therefore, exposure) is precluded by a fence or other physical barrier.[1] It should be noted that for sources operating on leased property, ambient air is considered to exclude only the atmosphere over the land leased and controlled by the source.[2]

3.2.2 Location Aspects

The EPA considers ambient air to include elevated building receptor sites and parking lots to which the public has access. Although it may not be practical to analyze the air quality at every such location, States should evaluate the air quality impact at these sites if it seems necessary to protect health and welfare.[3,4]

For modeling purposes, ambient air is considered to be everything outside of contiguous plant property where public access is not precluded by an effective physical barrier. Therefore, modeling receptors should be placed anywhere outside of inaccessible plant property, including over bodies of water, unfenced plant property, on buildings, over roadways and over property owned by other sources.[5,6]

The following examples should clarify potential uncertainties regarding receptor location. In the case of waterways, receptors should be placed over any body of water not privately owned and to which public access is allowed. Even where public recreational traffic is limited, the air above a body of water should be considered ambient air as long as the potential for public exposure exists.[7] With respect to roadways dividing plant property, the air above the roadway should be monitored by a receptor, even if the road separates otherwise inaccessible private property owned by a single source.[8,9] Regarding property owned by other

sources, current policy requires that receptors be placed over neighboring property regardless of public accessibility: the atmosphere above neighboring property is considered "ambient air" in relation to emissions from a given source.[10]

3.2.3 Time Aspects

Even if public access to a given site is time-limited, the site should not be excluded from the ambient air definition as long as the other conditions apply. Regardless of the period of exposure at a given site (or receptor), ambient air is defined in terms of public access, not frequency of access, length of stay, age of person or other factors.[11]

3.2.4 Public Access

If an area is owned or leased by the source and public access is prevented, the area is not ambient air with respect to the source's own emissions. However, there must be sufficient barriers to prevent public access. Barriers considered sufficient to prevent access are generally limited to fences. However, a clearly posted area alongside a river that is regularly patrolled by security guards has been determined to qualify as sufficient protection.[12,13]

3.2.5 PSD Considerations

Unlike the NAAQS, PSD increments apply only to the ground level and not to building rooftops. The PSD system, unlike the NAAQS system, does not attempt to achieve one single goal: instead, it represents a balance determined by Congress between economic growth and deterioration of air quality. If building rooftops were included in PSD permitting strategy, the PSD system would be appreciably more stringent than Congress had contemplated.[14] Although rooftops are not defined as ambient air when calculating PSD increment consumption, a State may measure PSD increments at the top of buildings if it so desires.[15,16]

3.2.6 Land Acquisition

Land acquisition and removal of the area from ambient air is not automatically considered a dispersion technique prohibited by section 123, but will instead be reviewed on a case-by-case basis. (Also see the discussion on stack height regulations in Section 7 of this report.) In only a few instances has the EPA tolerated land acquisition to contain modeled violations of the NAAQS.[17]

3.2.7 Monitor Siting Location Considerations

With respect to receptor locations for modeling and ambient air purposes, EPA does not consider whether such sites could meet standard siting criteria for monitors. Although siting criteria may preclude the placement of ambient monitors at certain locations, this does not preclude the placement of model receptors at these sites.[18]

REFERENCES FOR SECTION 3.2

1. "We are retaining the policy that the exemption from ambient air is available only for the atmosphere over land owned or controlled by the source and to which public access is precluded by a fence or other physical barriers." Letter from Douglas M. Costle to Jennings Randolph, Chairman, Committee on Environment and Public Works, United States Senate, Washington, D.C. Reply to letter of October 23, expressing continued interest in the Agency's definition of "ambient air." December 19, 1980. (PN-123-80-12-19-001).

2. "We agree with your position that all property outside of the property leased and controlled by EFKI would be considered ambient air." Memorandum from Helms, G.T., OAQPS, U.S. EPA, to W.S. Baker, Air Branch Chief, Region II. Ambient Air Issues from New Jersey Department of Environmental Protection. July 27, 1987.

3. "Our general policy is that the only exemption to compliance with the provisions of ambient air is for the atmosphere over land owned or controlled by the source and to which public access is precluded by a fence or other physical barriers. While EPA considers ambient air to include elevated building receptor sites, it is not practical to analyze the air quality at every such existing location. Therefore, both EPA and the States must exercise their best technical judgment as to when such sites must be evaluated so as to protect public health and welfare." Letter from Kathleen M. Bennett, Assistant Administrator for Air, Noise, and Radiation, to Harry H. Hovey, Jr. P.E., Director, Division of Air, New York State Department of Environmental Conservation, Albany, New York. March 18, 1983. (PN-110-83-03-18-063).

4. "Having concluded that the air above the parking lot is ambient air, we see no basis for excluding it from coverage by the State's implementation plan." Memorandum from James, M.A., OGC, to C. Simon, Chief, Air Programs Branch, U.S. EPA. Region II. Attainment of National Standards in Open Air Parking Lots. September 27, 1972.

5. "The Regional Meteorologists propose that for modeling purposes the air everywhere outside of contiguous plant property to which public access is precluded by a fence or other effective physical barrier should be considered in locating receptors. Specifically, for stationary source modeling, receptors should be placed everywhere outside inaccessible plant property. For example, receptors should be included over bodies of water, over unfenced plant property, on buildings, over roadways, and over property owned by other sources." Memorandum from Koerber, M., U.S. EPA. Region V, to J. Tikvart, OAQPS, U.S. EPA. Ambient Air. May 16, 1985.

6. "The Regional Meteorologists' memorandum to which you refer does not imply any change in this national policy and simply harmonizes modeling procedures with our long-standing policy. It is intended to ensure consistent Regional implementation of

that policy and to dispel any questions about pollutant concentrations at locations where the general public has access." Letter from Emison, G.A., OAQPS, U.S. EPA, to W.F. O'Keefe, American Petroleum Institute. January 22, 1986.

7. "Case 3 (Wayne County, MI): this case involves the air over the Detroit River, the Rouge River, and the Short-cut Canal. We agree that the air over all three of these is ambient air, since none of the companies owns them or controls public access to them." Memorandum from G.T. Helms, Chief, Control Programs Operations Branch, OAQPS, U.S. EPA, to Steve Rothblatt, Chief, Air Branch, U.S. EPA. Region V. Ambient Air. April 30, 1987. (PN-110-87-04-30-083).

8. "Case 1 (Dakota County, MN): This case involves two noncontiguous pieces of fenced property owned by the same source, divided by a public road. We agree that the road is clearly ambient air and that both fenced pieces of plant property are not." Memorandum from G.T. Helms, Chief, Control Programs Operations Branch, OAQPS, U.S. EPA, to Steve Rothblatt, Chief, Air Branch, U.S. EPA. Region V. Ambient Air. April 30, 1987. (PN-110-87-04-30-083).

9. "Scenario One: We agree with you that the road and the unfenced property are ambient air and could be locations for controlling receptor." Memorandum from G.T. Helms, Chief, Controlled Programs Operations Branch, OAQPS, U.S. EPA, to Bruce Miller, Chief, Air Programs Branch, U.S. EPA. Region IV. Ambient Air. April 30, 1987. (PN-110-87-04-30-082).

10. "Case 5: (involves the placement of receptors on another source's fenced property): As mentioned above in case 2, we feel that present policy <u>does</u> require that receptors be placed over another source's property to measure the contribution of the outside source to its neighbor's ambient air." Memorandum from G.T. Helms, Chief, Control Programs Operations Branch, OAQPS, U.S. EPA, to Steve Rothblatt, Chief, Air Branch, U.S. EPA. Region V. Ambient Air. April 30, 1987. (PN-110-87-04-30-083).

11. "Regardless of whether <u>any</u> member of the public is expected to <u>remain</u> at a particular place for a specific period of time, ambient air is defined in terms of public <u>access</u>, not frequency of access, length of stay, age of the person or other limitations." Memorandum from Tyler, D.D., OAQPS, U.S. EPA, to A. Davis, U.S. EPA. Region VI. Definition of Ambient Air for Lead. May 26, 1983.

12. "We do not think that any of the barriers mentioned are sufficient to preclude public access so as to allow the source to dispense with a fence. An example of an unfenced boundary that would qualify is a property line along a river that is clearly posted and regularly patrolled by security guards." Memorandum from G.T. Helms, Chief, Controlled Programs Operations Branch, OAQPS, U.S. EPA, to Bruce Miller, Chief, Air Programs Branch, U.S. EPA. Region IV. Ambient Air. April 30, 1987. (PN-110-87-04-30-082).

13. "Case 2 (Warrick County, IN): This case involves two large sources on both sides of the Ohio River. We agree that receptors should be located over the river since this is a public waterway, not controlled by the sources. We also agree that the river does indeed form a sufficient natural boundary/barrier and that fencing is not necessary, since the policy requires a fence or other physical barrier. However, some conditions must be met. The riverbank must be clearly posted and regularly patrolled by plant security. It must be very clear that the area is not public. Any areas where there is any question --*i.e.*, grassy areas, etc.-- should be fenced and marked, even if there is only a very remote possibility that the public would attempt to use this property." Memorandum from G.T. Helms, Chief, Control Programs Operations Branch, OAQPS, U.S. EPA, to Steve Rothblatt, Chief, Air Branch, U.S. EPA. Region V. Ambient Air. April 30, 1987.
(PN-110-87-04-30-083).

14. "Given this conclusion, one could argue, based on the text of the relevant regulations and the Clean Air Act, that the PSD increments apply whenever the NAAQS apply, and that both must apply throughout the 'ambient air'. However, the PSD system, unlike the NAAQS system, does not aim at achieving one single goal. Rather it represents a balance struck first by Congress between a given level of protection against degradation and a given potential for economic growth. It appears that the calculations on which that balancing judgment was based all assumed that PSD increments would be measured at ground level." Memorandum from Joseph A. Cannon, Assistant Administrator for Air and Radiation, Office of Air, Noise, and Radiation, to Charles Jeter, Regional Administrator, U.S. EPA. Region IV. Applicability of PSD Increments to Building Rooftops. June 11, 1984. (PN-165-84-06-11-014).

15. "Accordingly, I recommend that we inform Alabama that we do not now require that compliance with PSD increments be measured at the tops of buildings. A State may, of course, adopt such an approach if it so desires." Memorandum from Joseph A. Cannon, Assistant Administrator for Air and Radiation, Office of Air, Noise, and Radiation, to Charles Jeter, Regional Administrator, U.S. EPA. Region IV. Applicability of PSD Increments to Building Rooftops. June 11, 1984. (PN-165-84-06-11-014).

16. "As you correctly pointed out, PSD increment consumption does not apply at the tops of buildings." Memorandum from G.T. Helms, Chief, Control Programs Operations Branch, OAQPS, U.S. EPA, to Bruce P. Miller, Chief, Air Programs Branch, U.S. EPA. Region IV. Ambient Air Definition. September 21, 1987. (PN-110-87-09-21-086).

17. "We have never either flatly stated that land acquisition in general is acceptable or unacceptable under section 123 of the Clean Air Act . . . we will review individual situations on a case-by-case basis." Memorandum from Tyler, D., OAQPS, U.S. EPA, to I. Dickstein, U.S. EPA. Region VIII. Wyoming--Definition of Ambient Air. April 7, 1987.

18. "All receptor locations that may affect control strategy requirements, and meet the definition of 'ambient air', must be included in regulatory modeling applications. Ambient air is defined in 40 CFR Part 50.1(e) as 'that portion of the atmosphere, external to buildings, to which the general public has access'. Receptor points 180 and 197 are adjacent to a roadway to which the public clearly has access; thus, they must be included in the SIP modeling analysis. Although siting criteria may preclude placement of ambient monitors at these receptors, as was discussed by Asarco, this does not preclude the placement of model receptors at these sites." Letter from Douglas M. Skie, Chief, Air Programs Branch, U.S. EPA. Region VIII, to Jeffrey T. Chaffee, Montana Department of Health and Environmental Sciences. East Helena Lead SIP. March 13, 1992.

4.0 EMISSION INVENTORIES

TO BE PROVIDED

5.0 AMBIENT AIR QUALITY MONITORING AND DATA USAGE

5.1 GENERAL

According to the regulations established in 40 CFR Part 58, States are required to establish and maintain an air quality surveillance system for the purpose of measuring ambient air concentrations of those pollutants for which national ambient air quality standards (NAAQS) have been defined. The network of monitoring stations that is to be provided for in State implementation plans is designated as the State and Local Air Monitoring Stations (SLAMS) network. The general SIP monitoring requirements are contained in 40 CFR 58.20 and include the following.[1]

1. Requirements in Appendices A, C, D, and E of 40 CFR Part 58 which pertain to quality assurance for monitoring stations, monitoring methodology, monitoring network design, and probe siting criteria, respectively

2. An annual review of the monitoring network to assure that the monitoring objectives as defined in Appendix D of Part 58 are satisfied

3. Operation of at least one station of the SLAMS network per pollutant during any stage of an air pollution episode

4. Provision of a SLAMS network description for public review and submission to the EPA Administrator

The SIP itself does not have to contain the network description; however, these must be kept on file at the State agency's office, made available for public inspection, and submitted to the Administrator upon request. A State's prior SIP submission that covers air quality monitoring in general may meet the requirements for PM-10 SIP's. The Regional Office should determine whether the State's prior monitoring submission includes PM-10. If the monitoring submission specifically excludes PM-10, the SIP must provide the necessary information on PM-10 monitoring.[2,3] Further information on what the SIP itself must contain is provided in *Guidelines for Implementation of the Ambient Air Monitoring Regulations*, EPA-450/4-79-038.

Any ambient air quality station other than a SLAMS or PSD station from which a State intends to use data for demonstrating attainment or nonattainment or for computing a design value for control purposes must meet the requirements for SLAMS as described in 40 CFR Parts 58.13 and 58.22 as well as the requirements of Appendices A and E of Part 58.[4] In addition, any ambient air quality station other than a SLAMS or PSD station from which a State intends to use data for SIP-related functions other than as part of an attainment or nonattainment demonstration or for computing a design value for NAAQS control purposes, need not necessarily satisfy the requirements for a SLAMS station, but must be operated in accordance with specifications approved by the Regional Administrator.[5]

Measurement of meteorological variables at the location of an air quality monitoring station provides a basis for correlating air pollutant levels with local weather patterns. Meteorological monitoring data are also required for the purposes of air quality modeling. Meteorological inputs to modeling are discussed in Section 6.0 of this document.[6]

Finally, guidelines for sources required to monitor ambient air quality under PSD regulations are contained in the *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*[7] and general considerations for requiring ambient air monitoring under PSD regulations are contained in the *New Source Review Workshop Manual (draft)*.[8] Section 165(e)(2) of the Act requires conducting preconstruction air quality monitoring to determine whether emissions from new sources or source modifications located in attainment or unclassifiable areas will result in exceedance of the NAAQS. Section 167(a)(7) of the Act gives EPA the discretion to require postconstruction air quality monitoring to determine the ambient air quality impacts from emissions of new sources or source modifications on such areas.[7]

Under PSD regulations, source applicants are generally required to collect ambient air quality data for 1 year, but EPA has the discretion to allow a shorter collecting period (not less than 4 months) if the resulting data can demonstrate a complete analysis of the ambient air quality impacts the source will have on the area. Source applicants must also use quality assurance procedures pursuant to Appendix B of 40 CFR Part 58 in order to ensure the accuracy and precision of the data collected.[8,9] EPA requirements for incorporating PSD provisions in SIP's are contained in 40 CFR Part 51.166.

REFERENCES FOR SECTION 5.1

1. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58.20. July 1, 1991.

2. U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline*. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. EPA-450/4-87-013. June 1987. Section 3.0.

3. "Any ambient air quality monitoring station other than a SLAMS or PSD station from which the State intends to use the data as part of a demonstration of attainment or nonattainment or in computing a design value for control purposes of the National Ambient Air Quality Standards (NAAQS) must meet the requirements for SLAMS described in section 58.22 and, after January 1, 1983, must also meet the requirements for SLAMS as described in section 58.13 and Appendices A and E to this part." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58.14 (a). July 1, 1991.

4. "The State shall adopt and submit to the Administrator a revision to the plan which will: . . . (e) Provide for having a SLAMS network description available for public inspection and submission to the Administrator upon request." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58.20(e). July 1, 1991.

5. "Any ambient air quality monitoring station other than a SLAMS or PSD station from which the State intends to use data for SIP-related functions other than described in paragraph (a) of this section is not necessarily required to comply with the requirements of a SLAMS station under paragraph (a) but must be operated in accordance with a monitoring schedule, methodology, quality assurance procedures, and probe or instrument-siting specifications approved by the Regional Administrator." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58.14 (b). July 1, 1991

6. U.S. Environmental Protection Agency. *On-site Meteorological Program Guidance for Regulatory Modeling Applications*. PB87-227542. June 1987.

7. "The court ruled that section 165(e)(2) of the Clean Air Act requires that continuous preconstruction air quality monitoring data must be collected to determine whether emissions from a source will result in exceeding the National Ambient Air Quality Standards (NAAQS) . . ." U.S. EPA. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*. Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA Publication No. EPA-450/4-87-007. May 1987. page 3.

8. "(m)(1)(iv) The plan shall provide that, in general, the continuous air monitoring data that is required shall have been gathered over a period of one year . . . except that, if the reviewing authority determines that a complete and adequate analysis can be accomplished with monitoring data gathered over a period shorter than one year (but not to be less than four months) . . . (m)(3) The plan shall provide that the owner or operator of a major stationary source or major modification shall meet the requirements of Appendix B to Part 58 of this chapter . . ." U.S. Environmental Protection Agency, *Code of Federal Regulations*. Title 40 Chapter I, Subchapter C, Part 51.166. July 1, 1991.

9. U.S. Environmental Protection Agency. *New Source Review Workshop Manual*. Draft document. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. October 1990.

5.2 QUALITY ASSURANCE

Quality Assurance requirements for SLAMS networks are contained in Appendix A of 40 CFR Part 58, and requirements for PSD monitoring are contained in Appendix B of 40 CFR Part 58. The requirements in Appendix A are general in nature in order to allow each State the opportunity to develop the most efficient and effective quality assurance system for its specific circumstances.[1] Accuracy and precision tests for both manual and automated PM-10 sampling are the essence of the quality assurance system established. The results of all valid precision and accuracy tests must be reported on a quarterly basis to the Atmospheric Research and Exposure Assessment Laboratory (AREAL) (formerly the Environmental Monitoring Systems Laboratory (EMSL)). A list of all PM-10 monitoring sites and their Aerometric Information Retrieval System (AIRS) site identification codes shall be kept updated and on file with the appropriate EPA Regional Office and with AREAL.[1] AIRS was formerly known as the Storage and Retrieval of Aerometric Data (SAROAD) system.

The quality assurance procedures of Appendix A of 40 CFR Part 58 do not cover PM-10 methods other than the reference method defined in Appendix J of Part 50 (see Section 5.3 of this document) or equivalent methods designated in accordance with Part 53. Other methods may be allowed for conducting PM-10 episode monitoring. Episode monitoring is discussed in Section 5.6 of this document. States will need to develop their own quality assurance procedures for those methods not defined in Appendix J. Such procedures should be similar or analogous to those procedures described in Section 3.0 of Appendix A for the PM-10 reference method.[2]

Primary guidance for developing the quality assurance program for ambient air monitoring is provided in the *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume I - Principles* (EPA-600/9-76-005), and in the *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II - Ambient Air Specific Methods* (EPA-600/4-77-027a). These documents contain suggested procedures, checks, and control specifications. Specifically, section 2.11.0 provides quality assurance procedures for the reference method for determination of particulate matter as PM-10 in the atmosphere (High Volume PM-10 Sampler Method). As a minimum, each quality assurance program must include operational procedures for the following activities:[3]

1. Selection of methods, analyzers, or samplers
2. Training
3. Equipment installation
4. Selection and control of calibration standards
5. Calibration procedures and frequency
6. Zero/span checks and adjustments of automated analyzers
7. Control checks and their frequency
8. Control limits for zero, span, and other control checks, and respective corrective actions when such limits are surpassed
9. Calibration and zero/span checks for multiple range analyzers
10. Preventive and remedial maintenance
11. Recording and validating data
12. Data quality assessment (precision and accuracy)
13. Documentation of quality control information

Generally, standards used for ambient air monitoring quality assurance must be traceable to standards or devices certified by the National Institute of Standards Technology (NIST), or other approved reference material. Flow and mass standards used for PM-10 sampling and analysis must be traceable to the NIST.[4]

Agencies operating SLAMS network stations are subject to annual EPA systems audits of their ambient air monitoring program and are required to participate in EPA's National Performance Audit Program.[5] Audit procedures are described in section 1.4.16 of the *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume I - Principles* (EPA-600/9-76-005). The EPA's National Performance Audit Program is described in section 2.0.10 of the *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II - Ambient Air Specific Method.* Systems audit criteria and procedures are given in section 2.0.11 of the same document.

REFERENCES FOR SECTION 5.2

1. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix A. July 1, 1991

2. "4.2 Quality Assurance. PM-10 methods other than the reference method are not covered under the quality assessment requirements of Appendix A. Therefore, States must develop and implement their own quality assessment procedures for those methods allowed under this section 4. These quality assessment procedures should be similar or analogous to those described in section 3 of Appendix A for the PM-10 reference method." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix C July 1, 1991.

3. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix A. Section 2.2. July 1, 1991.

4. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix A. Section 2.3. July 1, 1991.

5. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix A. Section 2.4. July 1, 1991.

5.3 AMBIENT MONITORING METHODOLOGY

5.3.1 General

The reference or equivalent methods which must be used in the monitoring methods used in SLAMS networks are defined in 40 CFR Part 50.1 and are listed in Table 5-1.[1]

TABLE 5-1. MANUAL AND AUTOMATED METHODS APPROVED AS OF FEBRUARY 14, 1992

Manual Reference Methods	Automated Equivalent Methods
Wedding & Associates PM-10 Critical Flow HV Sampler	Andersen Inst. FH62I-N PM_{10} Beta Attenuation Monitor
Sierra-Andersen/GMW 1200	Rupprecht & Patashnick TEOM Series 1400 PM-10 Monitor
Sierra-Andersen/GMW 321-B	Wedding & Associates PM-10 Beta Gauge Automated Particle Sampler
Sierra-Andersen/GMW 321-C	
Oregon DEQ MV Special Sampler	
Sierra-Andersen/GMW 241 & 241M Dichot Sampler	

The reference method to be used for measuring ambient concentrations of PM-10 to determine compliance with the primary and secondary NAAQS, as specified in 40 CFR Part 50.6, is contained in Appendix J to 40 CFR Part 50.[2]

In general, the reference method is based on selection of particulate matter with an aerodynamic diameter of less than or equal to a nominal 10 micrometers by inertial separation, followed by filtration and gravimetric determination of the PM-10 mass on filter substrate. In practice, high-volume air samplers with a size selective inlet are used for most sampling for ambient PM-10 concentrations.[2]

SLAMS data collected after August 1, 1988 are not allowed to include data from nonreference method samplers. In the event that a nonreference method sampler is designated as a reference sampler without further future modification, all historical data produced by that sampler are retroactively defined as data produced by a reference sampler.[3] In addition, at collocated sample sites, data from reference samplers are always precedent over data from nonreference samplers. If multiple samplers are collocated for data quality assessment purposes (*i.e.*, precision and accuracy) similar sampler types must be used, and one sampler must be designated *a priori* for data reporting purposes as defined in Appendix A of 40 CFR Part 58. In situations where more than one type of sampler is used by a reporting organization, collocated precision sites should be established for each sampler type.[4]

The air quality regulations allow the use, for a period of time determined by the Administrator, of any manual method or analyzer purchased prior to cancellation of its reference or equivalent method designation in 40 CFR 53.11 or 40 CFR 53.16.[5] Certain allowances are also made, for samplers with more than one range and in specific geographical areas, for methods with higher, nonconforming measurement ranges.[6] No reference method or equivalent method that has been modified in a manner that will, or might, significantly alter the performance characteristic of the method, may be used in a SLAMS network without prior approval by the Administrator.[7]

Finally, additional requirements pertaining to ambient monitoring methodology and data usage under PSD regulations are contained in *Ambient Monitoring Guidelines for Prevention of Significant Deterioration.*[8]

5.3.2 Sampling Schedule

From an historical perspective, the sampling interval for PM-10 monitors consisted of a short-term and long-term sampling strategy as prescribed by 40 CFR Part 58.13. In general, the short term strategy was used during the first full year of sampling and required daily sampling (at a site designated as the site of expected highest concentration) in Group I areas, every other day in Group II areas, and once every six days in Group III areas. The long-term sampling strategy occurred after the short-term strategy ended (in most cases after the first full year of sampling), and the sampling interval varied according to the relationship of air quality levels to the NAAQS. For most PM-10 areas in the United States, it is likely that

the short-term sampling requirements have been met and the long-term sampling strategy is currently in effect.

The current sampling schedule requirements for ambient concentrations of PM-10 are as follows:[9]

- In those areas in which the short-term (24-hour) standard is controlling (*i.e.*, has the highest ratio of design concentration at the site to the NAAQS) the sampling interval is prescribed in Figure 1 of Part 58.13 (the prescribed sampling intervals are once every day, once every other day, or once every six days). In general, Figure 1 shows that the closer the air quality levels are to the NAAQS, the greater the sampling frequency required

- In areas in which the annual standard is the controlling standard, the minimum sampling period for all monitors in a given area is once every six days

The sampling interval for ambient PM-10 monitors under PSD regulations are consistent with the Part 58 regulations for SLAMS networks.[10]

5.3.3 Data Completeness

According to 40 CFR Part 50, Appendix K, for PM-10, all data produced by the National Air Monitoring Stations (NAMS) and SLAMS networks are required to be used in making comparisons with the PM-10 NAAQS and a minimum of 75 percent of the scheduled PM-10 samples per quarter are required.[11] For monitors used in PSD networks, a minimum of 80 percent of the individual 24-hourly values for manual methods should be reported in any sampling period.[12]

REFERENCES FOR SECTION 5.3

1. "(f) Reference method means a method of sampling and analyzing the ambient air for an air pollutant that is specified as a reference method in an appendix to this part, or a method that has been designated as a reference method in accordance with part 53 of this chapter; it does not include a method for which a reference method designation has been canceled in accordance with 53.11 or 53.16 of this chapter." and "(g) Equivalent method means a method of sampling and analyzing the ambient air for an air pollutant that has been designated an equivalent method in accordance with part 53 of this chapter; it does not include a method for which an equivalent method designation has been canceled in accordance with 53.11 or 53.16 of this section." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 50.1. (f) and (g). July 1, 1991.

2. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 50, Appendix J. July 1, 1991

3. "If a nonreference sampler without further modification is designated as a reference sampler in the future, then all of its historical data is retroactively defined as data produced by a reference sampler" Memorandum from Gerald Emison, Director, OAQPS, U.S. EPA, to Distribution. Revision to Policy on the Use of PM-10 Measurement Data. November 21, 1988.

4. "In the event that more than one PM-10 sampler is operating concurrently at a location, data from reference method samplers always takes precedence over data from nonreference samplers. If multiple samplers are collocated for data quality assessment purposes (*i.e.*, precision and accuracy), similar sampler types must be used and one sampler must be designated a priori for data reporting purposes (Appendix A to 40 CFR 58). Furthermore, if more than one type of sampler is used by a reporting organization, collocated precision sites should be established for each sampler type." Memorandum from Gerald Emison, Director, OAQPS, U.S. EPA, to Distribution. Revision to Policy on the Use of PM-10 Measurement Data. November 21, 1988.

5. "2.3 Any manual method or analyzer purchased prior to cancellation of its reference or equivalent method designation under 53.11 or 53.16 of this chapter may be used in a SLAMS following cancellation for a reasonable period of time to be determined by the Administrator." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix C. July 1, 1991.

6. "2.6 Use of Methods with Higher, Nonconforming Ranges in Certain Geographical Areas . . . 2.6.2 Nonconforming ranges. An analyzer may be used (indefinitely) on a range which extends to concentrations higher than two times the upper limit specified in Table B-1 of Part 53 of this chapter if . . ." U.S. Environmental Protection Agency.

Code of Federal Regulations. Title 40, Chapter I, Subchapter C, Part 58, Appendix C. July 1, 1991.

7. "2.8 Modifications of Methods by Users. 2.8.1 Except as otherwise provided in this section (2.8), no reference method, equivalent method, or alternative method may be used in a SLAMS if it has been modified in a manner that will, or might, significantly alter the performance characteristics of the method without prior approval by the Administrator." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix C. July 1, 1991.

8. U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*. Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987.

9. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58.13. July 1, 1991.

10. "2.7 Frequency of Sampling...The frequencies discussed below are consistent with the Part 58 sampling frequencies." U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*. Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987.

11. "2.3 . . . For the purposes of making comparisons with the particulate matter standards, all data produced by National Air Monitoring Stations (NAMS), State and Local Air Monitoring Stations (SLAMS) and other sites submitted to EPA in accordance with the Part 58 requirements must be used, and a minimum of 75 percent of the scheduled PM-10 samples per quarter are required." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40. Part 50, Appendix K. Interpretation of the National Ambient Air Quality Standards for Particulate Matter. June 1990.

12. "8.1 Air quality Data Reporting . . . For manual methods, 80 percent of the individual 24-hour values should be reported in any sampling period." U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*. Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987.

5.4 NETWORK DESIGN

Appendix D of 40 CFR Part 58 provides general criteria for establishing SLAMS networks and for selecting new monitoring stations. EPA employs these criteria in evaluating the adequacy of SLAMS networks.

In general, SLAMS networks should be designed to comply with four basic monitoring objectives:[1]

1. To determine the highest concentrations expected to occur in the area encompassed by the network

2. To determine representative concentrations in areas of high population density

3. To determine the impacts on ambient pollution levels of significant sources or source categories

4. To determine general background levels

Proper siting of a monitoring station requires exact specification of the monitoring objective and commonly involves a definition of a spatial scale of representativeness.[2] Appendix D states that the goal in siting monitoring stations is to correctly match the spatial scale that the sample of monitored air represents with the spatial scale most appropriate for the monitoring objective of the station.[3] The most important spatial scales represented for PM-10 SLAMS monitoring networks are the micro, middle and neighborhood scales. For establishing SLAMS networks to represent large homogeneous areas other than the above scales of representativeness, urban or regional scales would also be needed.[4] It should be noted that in order for States to use receptor modeling for control strategy demonstrations, the following considerations pertaining to spatial scales of representativeness in network design must be addressed:[5]

- PM-10 monitoring networks must be designed in order to monitor the maximum air quality impacts from the predominant sources (*i.e.*, around 90 percent) and source categories in the PM-10 emissions inventory

- For ambient impacts of PM-10 emissions from anti-skid materials used in road surfaces, the PM-10 monitoring networks must be designed in accordance with EPA's monitoring guidance and spatially representative of the maximum air quality impacts from that source category

- In situations where the 24-hour NAAQS is controlling, monitoring networks must collect samples at such frequent intervals which ensure that emissions impacts from the predominant sources are being monitored adequately

In addition to Appendix D, further information pertaining to designing PM-10 networks and siting ambient samplers is contained in *Network Design and Optimum Site Exposure Criteria for Particulate Matter*.[6] Questions and answers pertaining to ambient monitoring network design for PM-10 are contained in *Response to Questions Regarding PM-10 State Implementation Plan (SIP) Development*.[7]

In designing ambient monitoring networks under PSD regulations, such factors as topography, climatology, population, and existing emission sources must be considered; therefore, the ultimate design of the network will be determined on a case-by-case basis by the permitting authority.[8] In general, ambient networks under PSD are designed during a preconstruction phase and a post-construction phase. For both the preconstruction phase and the post-construction phase, the number and location of monitors will be determined through appropriate dispersion modeling techniques. In addition, the number of monitors will depend on the expected spatial variability of the pollutant in the area being studied (*i.e.*, the higher the spatial variability of the pollutant under study, the greater the number of monitors needed in that area).[9]

During the preconstruction phase, the monitors should be (1) located in the area of maximum concentration increase expected from the proposed source or modification; (2) located in the area of the maximum expected concentrations from emissions of existing sources; and (3) located in the area of maximum impact of the pollutant from the combination effect of existing sources and the proposed source or modification. In most multisource settings, one to four sites would be sufficient. For remote settings (*i.e.*, in areas with no significant existing sources), a minimum number of monitors would need to be located (*i.e.*, one or two at the most). Where industrial process fugitive particulate emissions are involved,

a monitor should be located at the proposed source site and a downwind location would also need to be sited if stack emissions are also involved.[10]

For the postconstruction phase, two or three sites would probably be sufficient for most situations involving multi-source areas. For remote areas, one or two sites would be sufficient.[11]

Appendix B of 40 CFR Part 58 specifies the minimum quality assurance requirements for controlling and assessing the quality of the PSD ambient air monitoring data submitted to EPA by organizations operating a network of PSD stations. One requirement is that for a given organization's monitoring network, one sampling site ought to have collocated samplers.[12] For each pair of collocated samplers, one sampler will be designated as the sampler to be used to report air quality for the site and the second sampler will be designated as the duplicate sampler. The difference in measured concentration between each pair of collocated samplers will be used to calculate precision of the PM-10 manual method.[12]

Monitors should be located in areas which satisfy the definition of ambient air. According to 40 CFR 50.1(e), ambient air is defined as "that portion of the atmosphere, external to buildings, to which the general public has access." The definition of Ambient Air as well as related issues such as location and time aspects, public access, PSD considerations, and land acquisition are discussed in detail in Section 3.2 of this document. In situations where modeled locations are in areas excluded from the ambient air, the monitors should be located downwind at the boundary of that area.[13]

REFERENCES FOR SECTION 5.4

1. "The network of stations which comprise SLAMS should be designed to meet a minimum of four basic monitoring objectives. These basic objectives are: (1) To determine highest concentrations expected to occur in the area covered by the network; (2) to determine representative concentrations in areas of high population density; (3) to determine the impact on ambient pollution levels of significant sources or source categories; and (4) to determine general background concentration levels." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40. Part 58, Appendix D. "Network Design for State and Local Air Monitoring Stations (SLAMS) and National Air Monitoring Stations (NAMS)" 1. SLAMS Monitoring Objectives and Spatial Scales. July 1, 1990.

2. "Proper siting of a monitoring station requires precise specification of the monitoring objective which usually includes a desired spatial scale of representativeness." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix D. "Network Design for State and Local Air Monitoring Stations (SLAMS) and National Air Monitoring Stations (NAMS)" 1. SLAMS Monitoring Objectives and Spatial Scales. July 1, 1990.

3. "The goal in siting stations is to correctly match the spatial scale represented by the sample of monitored air with the spatial scale most appropriate for the monitoring objective of the station." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix D. "Network Design for State and Local Air Monitoring Stations (SLAMS) and National Air Monitoring Stations (NAMS)" 1. SLAMS Monitoring Objectives and Spatial Scales. July 1, 1990.

4. "The most important spatial scales to effectively characterize the emissions of PM-10 from both mobile and stationary sources are the micro, middle, and neighborhood scales. For purposes of establishing monitoring stations to represent large homogeneous areas other than the above scales of representativeness, urban or regional scale stations would also be needed." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix D. "Network Design for State and Local Air Monitoring Stations (SLAMS) and National Air Monitoring Stations (NAMS)" 2.7 Lead. July 1, 1990.

5. "The PM-10 monitoring network must be representative of the maximum air quality impacts from the predominant (*i.e.*, generally on the order of 90 percent) sources and source categories in the PM-10 emission inventory . . . In a few areas, emissions of antiskid materials from a small number of road surfaces constitute the predominant PM-10 source category. These emissions should be uniformly distributed along these road surfaces. The monitoring network must be shown to be in accordance with EPA's monitoring guidance and spatially representative of the maximum air quality

impact from this source category . . . If the 24-hour NAAQS is controlling, the network must have samples collected at sufficiently frequent intervals to ensure that the impacts from the governing emission sources are adequately monitored." Memorandum. Bauman, Robert D., Chief, SO_2/Particulate Matter Programs, Branch, U.S. EPA, and Joseph A. Tikvart, Chief, Source Receptor Analysis Branch, U.S. EPA, to Chief, Air Branch, U.S. EPA. Regions I-X. PM-10 SIP Demonstration for Small Isolated Areas with Spatially Uniform Emissions. July 5, 1990.

6. U.S. Environmental Protection Agency. *Network Design and Optimum Site Exposure Criteria for Particulate Matter.* Office of Air Quality Planning and Standards. Research Triangle Park, N.C. EPA-450/4-87-009. May 1987.

7. U.S. Environmental Protection Agency. *Responses to Questions Regarding PM-10 State Implementation Plan (SIP) Development.* Office of Air Quality Planning and Standards, Research Triangle Park, N.C. June 1988.

8. "3.1 Network Design. The design of a network for criteria and noncriteria pollutants will be affected by many factors such as topography, climatology, population, and existing sources. Therefore, the ultimate design of a network for PSD purposes must be decided on a case-by-case basis by the permit granting authority." U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987.

9. "3.2.2. As discussed above for preconstruction monitoring, appropriate dispersion modeling techniques are used to estimate the location of the air quality impact of the new source or modification. Monitors should then be placed at (a) the expected area of the maximum concentrations from the new source or modification, and (b) the maximum impact area(s), *i.e.*, where the maximum pollutant concentration will occur based on the combined effect of existing sources and the new source or modification . . . 3.2 Number and Location of Monitors...Generally, the number of monitors will be higher where the expected spatial variability of the pollutant in the area(s) of study is higher." U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987.

10. "3.2.1 Preconstruction Phase . . . This would provide sufficient information for the applicant to place a monitor at (a) the location(s) of the maximum concentration increase expected from the proposed source or modification, (b) the location(s) of the maximum air pollutant concentration from existing sources of emissions, and (c) the location(s) of the maximum impact area, *i.e.*, where the maximum pollutant concentration would hypothetically occur based on the combination effect of existing sources and the proposed new source or modification . . . Generally, one to four sites would cover most situations in multisource settings. For remote areas in which the permit granting authority has determined that there are no significant existing sources, a minimum number of monitors would be needed, *i.e.*, one or probably two at the

most . . . When industrial process fugitive particulate emissions are involved, the applicant should locate a monitor at the proposed source site. If stack emissions are also involved, a downwind location should also be selected." U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987.

11. "3.2.2 Postconstruction Phase . . . Generally, two or three sites would be sufficient for most situations in multisource areas. In remote areas where there are no significant existing sources, one or two sites would be sufficient." U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987.

12. "3.3.1 TSP and PM-10 Methods . . . A site with the highest expected 24-hour pollutant concentration must be selected. The two samplers must be within 4 meters of each other but at least 2 meters apart to preclude airflow interference. The collocated samplers must be operated as a minimum every third day when continuous sampling is used. When a less frequent sample schedule is used, the collocated samplers must be operated at least once each week." U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 58, Appendix B. "Quality Assurance Requirements for Prevention of Significant Deterioration (PSD) Air Monitoring." 3.3 Precision of Manual Methods. July 1, 1992.

13. "3.2.3 Special Concerns for Location of Monitors . . . However, monitors should be placed in those locations satisfying the definition of ambient air. Ambient air is defined in 40 CFR 50.1(e) as "that portion of the atmosphere, external to buildings, to which the general public has access." Therefore, if the modeled locations are within an area excluded from ambient air, the monitors should be located downwind at the boundary of that area." U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987.

5.5 PROBE SITING CRITERIA

The criteria for determining the correct siting of PM-10 samplers are discussed in Appendix E of 40 CFR Part 58.[1] The criteria are similar to the previous siting criteria for high-volume samplers used in the TSP networks. The new criteria for PM-10 networks include microscale stations which were not previously required for the TSP SLAMS networks.[2]

For the microscale stations, an inlet height of 2 to 7 meters is specified. For all other scales, the inlet height for PM-10 stations is 2 to 15 meters. Spacing requirements from roadways as specified in Part 58, Appendix E are as follows:[3]

- Microscale stations - 5 to 15 meters from major roadways
- Middle, neighborhood, and urban scale stations - a range of separation distances are specified for each as a function of traffic volume and the scale of representativeness. (This range of separation distances is contained in Appendix E of Part 58, section 8, Figure 2.)

When placed on the tops of buildings, samplers must be located at least 2 meters from walls, with no furnace or incineration flues nearby. The samplers should be placed at least 20 meters from trees and must be 10 meters from the drop line when the tree(s) acts as an obstruction. The sampler must be located away from obstacles such as buildings, so that the distance between obstacles and the samplers is at least twice the height that the obstacle protrudes above the sampler, except for street canyons sites. Except for street canyon sites, there must be unrestricted airflow in an arc of at least 270 degrees around the sampler.[4]

These criteria must be adhered to as strictly as possible. In the event that the siting criteria cannot be met, a written request for a waiver must be made justifying the differences in the proposed siting criteria.[5] Section 10 of Appendix E gives the conditions under which EPA would consider an application for waiver from these siting criteria.

The criteria for determining the correct siting of ambient PM-10 samplers under PSD regulations are the same as those contained in Appendix E to Part 58 with the exception that there are no requirements pertaining to considerations regarding scales of representativeness when locating the sampler inlet.[6]

REFERENCES FOR SECTION 5.5

1. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix E. "Probe Siting Criteria for Ambient Air Quality Monitoring."8. Particulate Matter (PM-10). July 1, 1992.

2. "3.2.6 Sampler Inlet Siting...The new criteria for the PM-10 SLAMS include microscale stations which were not previously included for the TSP SLAMS network." U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline*. EPA-450/2-86-001. June 1987.

3. "3.2.6 Sampler Inlet Siting...An inlet height of 2 to 7 meters is specified for PM-10 microscale stations. The inlet height for all other scales for PM-10 stations is 2 to 15 meters as it was previously for all TSP SLAMS. The spacing requirement from roadways is also different. For microscale roadway stations, the PM-10 sampler must be between 5 to 15 meters from major roadways. For middle, neighborhood, and urban scale PM-10 stations a range of separation distances are specified for each as a function of traffic volume and the scale of representativeness." U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline*. EPA-450/2-86-001. June 1987.

4. "If the sampler is located on a roof or other structure, then there must be a minimum of 2 meters separation from walls, parapets, penthouses, etc. No furnace or incineration flues should be nearby...Therefore, the sampler should be placed at least 20 meters from the dripline and must be 10 meters from the dripline when the tree(s) acts as an obstruction. The sampler must also be located away from obstacles such as buildings, so that the distance between obstacles and the sampler is at least twice the height that the obstacle protrudes above the sampler except for street canyon sites...There must be unrestricted airflow in an arc of at least 270^0 around the sampler except for street canyon sites." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix E. "Probe Siting Criteria for Ambient Air Quality Monitoring."8.2 Spacing From Obstructions. July 1, 1992.

5. "The probe siting criteria as discussed below must be followed to the maximum extent possible. It is recognized that there may be situations when the probe siting criteria cannot be followed. If the siting criteria cannot be met, this must be thoroughly documented with a written request for a waiver which describes how and why the siting criteria differ." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix E. "Probe Siting Criteria for Ambient Air Quality Monitoring." 1. Introduction. July 1, 1992.

6. U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987. Section 3.3.2.

5.6 EPISODE MONITORING

Episode contingency plans are used to prevent air pollution levels from reaching levels which would cause imminent and substantial endangerment to the health of the general public.[1] Such plans are required pursuant to section 110(a)(2)(g) of the amended Act. Classification of regions required to have air pollution episode contingency plans is discussed in 40 CFR Part 51 Subpart H. The definition of an air quality emergency and the level of PM-10 associated with it are defined in Appendix L of Part 51. In general, 40 CFR Part 51.152 states that each State contingency plan must satisfy the following:[2]

- Specify two or more stages of episode criteria, as set forth in Appendix L, or their equivalent
- Provide for public announcement whenever any episode stage has been determined to exist
- Specify adequate emission control actions to implement at each episode stage

Section 4.0 of Appendix C of Part 58 describes the sampling procedures to be used for determining air quality levels during air pollution episodes.[3] These procedures are further described in *Guideline for PM-10 Episode Monitoring Methods*.[4] In general, two methods based on the filtration principle are recommended. They are the staggered sampling procedure and the short-term interval sampling method. The staggered sampling procedure uses a 24-hour sampling procedure followed by a 2-hour post sampling filter equilibration period. The short-term interval sampling method requires a 4-hour sampling period followed by a 2-hour filter equilibration period. In addition to these two procedures, other methods may be used provided the user demonstrates a site-specific correlation of the alternative method with the reference method.[5]

REFERENCES FOR SECTION 5.6

1. "The example regulations presented herein reflect generally recognized ways of preventing air pollution from reaching levels that would cause imminent and substantial endangerment to the health of persons." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 51, Appendix L. July 1, 1991.

2. "(a) Each contingency plan must - (1) Specify two or more stages of episode criteria such as those set forth in Appendix L to this Part, or their equivalent; (2) Provide for public announcement whenever any episode stage has been determined to exist; and (3) Specify adequate emission control actions to be taken at each episode stage." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 51.52. July 1, 1991.

3. "4.1. For short-term measurements of PM-10 during air pollution episodes the measurement method must be: 4.1.1 Either the "Staggered PM-10" method or the "PM-10 Sampling Over Short Sampling Times" method, both of which are based on the reference method for PM-10...4.1.2 Any other method for measuring PM-10: 4.1.2.1 Which has a measurement range or ranges appropriate to accurately measure air pollution episode concentration of PM-10, 4.1.2.2 Which has a sample period appropriate for short term PM-10 measurements, and 4.1.2.3 For which a quantitative relationship to a reference or equivalent method for PM-10 has been established at the use site." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 58, Appendix C. "Ambient Air Quality Monitoring Methodology." 4.0 Particulate Matter Episode Monitoring. July 1, 1992.

4. U.S. Environmental Protection Agency. *Guideline for PM-10 Episode Monitoring Methods*. EPA-450/4-83-005, February 1985.

5. "3.3.3 Episode Monitoring...Briefly, two methods based on the filtration principle are recommended: staggered PM-10 sampling and short-term interval sampling. The staggered sampling procedure uses a 24-hour sampling procedure followed by a 2-hour post-sampling filter equilibration period. The short-term interval sampling method requires a 4-hour sampling period followed by a 2-hour filter equilibration period. In addition to these two procedures, other methods may be used provided the user demonstrates a site-specific correlation of the alternative method with the reference method." U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline*. EPA-450/2-86-001. June 1987.

5.7 AMBIENT AIR QUALITY DATA REPORTING

5.7.1 General

States are required to submit an annual report of all the ambient air quality monitoring data from their SLAMS networks (40 CFR Part 58.26). These annual summaries must contain, as a minimum, the following:[1]

- The annual arithmetic mean ($\mu g/m^3$) as specified in Appendix K of Part 50
- All daily PM-10 values above the level of the 24-hour NAAQS and dates of occurrence
- The sampling schedule, used such as once every six days, once every three days, etc.
- The number of additional sampling days beyond the sampling schedule used
- The number of 24-hour average concentrations in the ranges as specified in section 2.7 of Appendix F
- The location, date, pollution source, and duration during which ambient levels of a pollutant reached or exceeded the level of PM-10 specified by 40 CFR Part 51.16(a) as a level which could cause significant harm to the health of the general public
- A certification of accuracy by the State's senior air pollution control officer or his designee

Part 58.26 requires that the annual report be submitted by July 1 of each year for data collected from January 1 to December 31 of the previous year. In addition, the States are required to submit, upon Regional Administrator request, all or part of SLAMS data.[2] As a subset of the SLAMS network, NAMS data are required, under Part 58.35, to be reported quarterly and within 120 days of the end of a quarter.[3]

In addition to the annual SLAMS reporting requirements, section 4.0 of Appendix A of 40 CFR Part 58 requires that the results of all valid precision and accuracy tests be reported to AIRS via the appropriate EPA Regional Office within 120 calendar days after the end of each calendar quarter. The report should include the results of all collocated measurements including those falling below the levels specified in section 5.3.1 of Appendix A (*e.g.*, 20 $\mu g/m^3$ for PM-10). Data from invalid tests, from tests performed during a period

of time for which ambient data immediately prior or subsequent to the tests were invalidated for appropriate reasons, and from tests of methods or analyzers not approved for SLAMS network use under Appendix C of Part 58, should not be reported.[4]

5.7.2 Air Pollution Index

Appendix G of 40 CFR Part 58 requires States to report a daily air quality index to the general public through some prominent means (*e.g.*, radio, television, newspaper) and in accordance with the procedures contained in Appendix G.[5,6] This index provides the general public with an idea of how healthy the ambient air is on a particular day. The air quality index is required to be reported for all urban areas with populations exceeding 200,000 (based on the most current decennial U.S. Census of Population Report).[5]

5.7.3 Exceptional Events

High ambient values of PM-10 may be flagged by the State due to exceptional events. According to 40 CFR Part 50, Appendix K, an exceptional event is an uncontrollable event caused by natural sources of particulate matter or an event that is not expected to recur at a given location.[7] The use of ambient monitoring data which include exceptional events data could result in inappropriate estimates of the expected annual value as outlined in Appendix K of Part 50.[8] As such, EPA has provided criteria and procedures for flagging such exceptional events in the *Guideline on the Identification and Use of Air Quality Data Affected by Exceptional Events*.[9] However, because of new waiver provisions in section 188(f) of the amended Act, which, in effect modify aspects of the exceptional events guidelines, the reader should consult EPA headquarters at the address provided in Section 1.0 of this document before using the exceptional events guidelines.

In general, EPA recognizes 17 exceptional events flags applicable to PM-10. These flags are described in the *Exceptional Events* guideline document. States and local agencies are responsible for the identification and documentation of ambient PM-10 air quality data influenced by exceptional events. The State/local agency must also provide background information in support of such determinations and this information must be submitted to the appropriate EPA Regional Office for concurrence and must be made available for public

review. Decisions on how flagged data are used for a specific purpose (*e.g.*, attainment designation/demonstration, control strategy, etc.) are made on a case-by-case basis.[10]

Appendix K of Part 50 describes the procedure for making the necessary adjustments for exceptional events and trends when estimating the number of exceedances for a single year. Questions and answers pertaining to exceptional events are contained in *Response to Questions Regarding PM-10 State Implementation Plan (SIP) Development.*[11]

Other statutory requirements and EPA policy related to nonanthropogenic and/or uncontrollable PM-10 emissions include the section 188(f) waiver provisions under which EPA may waive any requirement applicable to any serious area where EPA determines that anthropogenic sources of PM-10 do not contribute significantly to the violation of the PM-10 standard in the area. EPA may also waive a specific attainment date where the Agency determines that nonanthropogenic sources contribute significantly to the violation of the PM-10 standard in the area. Other related statutory requirements include the section 179B provisions relating to exemptions for States which submit plans that demonstrate attainment or maintenance of the PM-10 NAAQS, but for emissions emanating from outside the United States. These requirements are discussed in more detail in Section 9.2 of this guideline.

REFERENCES FOR SECTION 5.7

1. U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 58.26, and Appendix F 2.7.1 and 2.7.2. July 1, 1990.

2. "The State shall submit all or a portion of the SLAMS data to the Regional Administrator upon his request. U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40. Part 58.28. "Regional Office SLAMS data Acquisition." July 1, 1992.

3. "(b) The State shall report quarterly to the Administrator (through the appropriate Regional Office) all ambient air quality data and information...(c) The quarterly report must: (1) Be received by the National Aerometric Data Bank within 120 days of the end of each reporting period, after being submitted by the States to the Regional Offices for review; (2) Contain all data and information gathered during the reporting period." U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 58.35. "NAMS Data Submittal." July 1, 1992.

4. U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 58, Appendix A 4.1. July 1, 1991.

5. "(a) The State shall report to the general public on a daily basis through prominent notice an air quality index in accordance with the requirements of Appendix G to this part. (b) Reporting must commence...for all urban areas with a population exceeding 200,000. (c) The population of an urban area for purposes of index reporting is the most recent U.S. census population figure as defined in 58.1 of paragraph (s)." U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 58.40. July 1, 1991.

6. "Prominent public notification consists of at a minimum: (1) Furnishing the daily report to one or more of the appropriate news media (radio, television, newspapers); and (2) making the daily index report publicly available at one or more places of public access. Index reports may also be disseminated by means of recorded messages" U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 58, Appendix G 6. July 1, 1991.

7. "An exceptional event is an uncontrollable event caused by natural sources of particulate matter or an event that is not expected to recur at a given location." U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 50, Appendix K 2.4. July 1, 1991.

8. "Inclusion of such a value in the computation of exceedances or averages could result in inappropriate estimates of their respective expected annual values." U.S.

Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 50, Appendix K 2.4. July 1, 1991.

9. U.S. Environmental Protection Agency. *Guideline on the Identification and Use of Air Quality Data Affected by Exceptional Events*. EPA-450/4-86-007. July 1986.

10. "Under this system, the State and local agency is responsible for identifying and documenting data influenced by exceptional events. Background information in support of this determination must then be submitted to the appropriate EPA Regional Office for concurrence and must also be available for public review. Decisions on how flagged data are used for a specific purpose (attainment designation, control strategy, etc.) are made on a case-by-case basis." U.S. Environmental Protection Agency. *Guidance for Completing the USEPA PM-10 Exceedance Report (draft)*. Office of Air Quality Planning and Standards. Research Triangle Park, N.C. May 1991. Section 5.0.

11. U.S. Environmental Protection Agency. *Responses to Questions Regarding PM-10 State Implementation Plan (SIP) Development*. Office of Air Quality Planning and Standards, Research Triangle Park, N.C. June 1988.

6.0 AIR QUALITY MODELING

6.1 GENERAL

Air quality modeling analyses are performed to demonstrate that a proposed control strategy provides for attainment and maintenance of the NAAQS (40 CFR 51.112a) and protection of the PSD increments (40 CFR 51.166l). SIP submittals must include a description of how the modeling analysis was conducted by providing information on the models used; the justification of model selection; the modes of models used; assumptions involved in model application; the meteorological data; ambient monitoring data used; the justification of off-site data, if used; the model input data; and the model output data.[1]

In certain cases, a modified demonstration may be used in place of a full SIP demonstration, as required in current guidance for the initial moderate PM-10 nonattainment areas, (*i.e.*, those areas, by operation of law, designated nonattainment upon enactment of the Clean Air Act Amendments of 1990 and classified as moderate upon enactment). For those areas, EPA stated that modified demonstrations may be made in those situations where time constraints, inadequate resources, inadequate data bases, lack of a model for some unique situations, and other unavoidable circumstances leave an area unable to submit an attainment demonstration within the short timeframe provided by the 1990 amendments (*i.e.*, by November 15, 1991). With regard to modeling requirements, all modified demonstrations should be accompanied by documentation of the modified modeling method, rationale for the modified demonstration, and justification of the modified demonstration.[2] Demonstrations based on this policy will be considered on a case-by-case basis.[3]

REFERENCES FOR SECTION 6.1

1. "(e) Modeling information required to support the proposed revision, including input data, output data, models used, justification of model selections, ambient monitoring data used, meteorological data used, justification for use of offsite data (where used), modes of models used, assumptions, and other information relevant to the determination of adequacy of the modeling analysis." Appendix V. "Criteria for Determining the Completeness of Plan Submissions." 54 Federal Register 2,138-41 (January 19, 1989), State Implementation Plan Completeness Review.

2. "Generally , all SIP submittals for the initial moderate PM-10 nonattainment areas should follow the existing guidance on PM-10 modeling as noted above. In the situation where an area has completed or can complete its demonstration by November 15, 1991 consistent with existing guidance, an attainment demonstration based on the existing guidance should be submitted. However, in those situations where time constraints, inadequate resources, inadequate data bases, lack of a model for some unique situations, and other unavoidable circumstances would leave an area unable to submit an attainment demonstration within the short timeframe provided by the newly revised law, then a modified demonstration based on the policy statement may be submitted. Section 189(a)(1)(B) of the recently revised Clean Air Act requires that all modified demonstrations be based on some form of 'air quality modeling.' In addition, 40 CFR §51.112 requires that a demonstration be shown to be 'adequate and appropriate.' This supplemental policy is issued in accordance with these statutory and regulatory requirements.

   All such modified demonstrations should be accompanied by the following:
   1. Documentation of Modified Modeling Method. Documentation of the procedures or analyses used in lieu of those set forth in the previously issued guidance.

   2. Rationale for Modified Demonstration. An explanation of why the alternative modeling techniques set forth in the guidance were not used.

   3. Justification of Modified Demonstration. A description of how and why the SIP provides an adequate and appropriate demonstration of areawide attainment."

Memorandum. Calcagni, John, Director, Air Quality Management Division, Research Triangle Park, N.C., and Laxton, William G., Director, Technical Support Division, U .S. EPA, Research Triangle Park, N.C., to Director, Air Pesticides and Toxics Management Division, Regions I, IV, VI; Director, Air and Waste Management Division, Region II; Director, Air Management Division, Regions III and IX; Director, Air and Radiation Division, Region V; Director, Air and Toxics Division, Regions VII,

VIII, X. PM-10 SIP Attainment Demonstration Policy for Initial Moderate Nonattainment Areas. March 4, 1991.

3. "Demonstrations based on this policy will be considered on a case-by-case basis. The policy applies only to those initial moderate PM-10 nonattainment areas which have completed the technical analysis for their SIP submittal and have made a good-faith effort to submit a final SIP by their November 15, 1991 due date." Memorandum. Calcagni, John, Director, Air Quality Management Division, U.S. EPA, Research Triangle Park, N.C., and Laxton, William G., Director, Technical Support Division, U.S. EPA, Research Triangle Park, N.C., to Director, Air Pesticides and Toxics Management Division, Regions I, IV, VI; Director, Air and Waste Management Division, Region II; Director, Air Management Division, Regions III and IX; Director, Air and Radiation Division, Region V; Director, Air and Toxics Division, Regions VII, VIII, X. PM-10 SIP Attainment Demonstration Policy for Initial Moderate Nonattainment Areas. March 4, 1991.

6.2 GUIDANCE ON AIR QUALITY MODELS

Air quality dispersion modeling techniques appropriate for use in SIP, New Source Review (NSR), and PSD analyses are specified in the *Guideline On Air Quality Models (Revised)* and Supplement A (Guideline).[1,2] The Guideline is a primary source of information on the proper selection and regulatory application of dispersion models. Announcements of proposed and final revisions to the Guideline are made in the Federal Register as needed.

Refined dispersion models are generally recommended for PM-10 regulatory application; however, modeling demonstrations may, in some instances, include receptor modeling, and combined dispersion and receptor modeling.[3] Guidance on when and how these various techniques may be applied is provided in the *PM-10 SIP Development Guideline*.[4] Guidance for model reconciliation,[5] and an example model application,[6] are available to assist in PM-10 modeling analyses and control strategy development. The *Receptor Model Technical Series (Volumes I - VI)*[7] provides substantial additional guidance on the theory and application of receptor-oriented techniques.

Clarifications and interpretations of modeling procedures become official EPA guidance through several courses of action: (1) the procedures are published as regulations or guidelines; (2) the procedures are formally transmitted as guidance to Regional Office managers; (3) the procedures are formally transmitted as guidance to Regional Modeling Contacts as a result of a Regional consensus on technical issues; or (4) the procedures are a result of decisions by the Model Clearinghouse that effectively establish a national precedent.[8] The Model Clearinghouse is the single EPA focal point for the review of criteria pollutant modeling techniques for specific regulatory applications.[9] The Clearinghouse serves a major role in promoting fairness and consistency in modeling decisions that deviate from the established modeling guidance.[10] Model Clearinghouse memoranda involving significant decisions with respect to interpretation of modeling guidance are available on the Support Center for Regulatory Air Models Electronic Bulletin Board.[11]

The time at which changes in modeling guidance affect modeling analyses in progress will depend on the type of agreement under which those analyses are being conducted.[12] Normally, ongoing analyses will be grandfathered if there is a written protocol with a legal or regulatory basis or if the analysis is complete and regulatory action is imminent or underway.[13]

REFERENCES FOR SECTION 6.2

1. "This guideline recommends air quality modeling techniques that should be applied to State Implementation Plan (SIP) revisions for existing sources and to new source reviews, including prevention of significant deterioration (PSD)." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 1-1.

2. U.S. Environmental Protection Agency. *Supplement A to the Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1987.
3. U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 7-4.

4. U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-86-001. June 1987. pp. 4-1 through 4-14.

5. U.S. Environmental Protection Agency. *Protocol for Reconciling Differences Among Receptor and Dispersions Models.* EPA-450/4-87-008, 1987.

6. U.S. Environmental Protection Agency. *Example Modeling to Illustrate SIP Development for the PM-10 NAAQS.* EPA-450/4-87-012, 1987.

7. U.S. Environmental Protection Agency. Receptor Model Technical Series (Vols. I - VI).

   - *Volume I: Overview of Receptor Model Application to Particulate Source Apportionment*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-81-016a. July 1981.
   - *Volume II: Chemical Mass Balance*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-81-016b. July 1981.
   - *Volume III (1989 Revision): CMB7 User's Manual*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-90-004. January 1990.
   - *Volume IV: Summary of Particle Identification Techniques.* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-83-018. June 1983.
   - *Volume V: Source Apportionment Techniques and Considerations for Combining Their Use*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-84-020. July 1984.

- *Volume VI: A Guide to the Use of Factor Analysis and Multiple Regression (FA/MR) Techniques in Source Apportionment*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-85-007. June 1985.

8. "Changes in EPA modeling procedures become official Agency guidance when: (1) they are published as regulations or guidelines, (2) they are formally transmitted as guidance to Regional Office managers, (3) they are formally transmitted as guidance to Regional Modeling Contacts as the result of a Regional consensus on technical issues, or (4) they are a result of decisions by the Model Clearinghouse that effectively set a national precedent." Attachment 2 of memorandum from Tikvart, J.A., OAQPS, U.S. EPA, to Regional Modeling Contacts. January 2, 1985. (PN 110-85-01-02-070).

9. "The Model Clearinghouse is the single EPA focal point for reviewing the use of modeling techniques for criteria pollutants in specific regulatory applications." Memorandum from Tikvart, J.A., OAQPS, U.S. EPA, to Regional Chiefs, Air Branch Region VII, Technical Support Branch Region I, Air and Radiation Branch Region V, Air Programs Branch Regions II, III, IV, VI, VIII, IX, X. June 7, 1988.

10. "However, there is also a need to provide for a mechanism that promotes fairness and consistency in modeling decisions among the various Regional Offices and the States." Memorandum from Tikvart, J.A., OAQPS, U.S. EPA, to Regional Chiefs, Air Branch Region VII, Technical Support Branch Region I, Air and Radiation Branch Region V, Air Programs Branch Regions II, III, IV, VI, VIII, IX, X. June 7, 1988.

11. The Support Center for Regulatory Air Models (SCRAM) Electronic Bulletin Board, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711.

12. "(T)he time at which changes in modeling guidance affect on-going modeling analyses is a function of the type of agreement under which those analyses are being conducted." Attachment 2 of memorandum from Tikvart, J.A., OAQPS, U.S. EPA, to Regional Modeling Contacts. January 2, 1985. (PN 110-85-01-02-070).

13. "On-going analyses should normally be 'grandfathered' if (1) there is a written protocol with a legal or regulatory basis (such as the Lovett Power Plant) or (2) the analysis is complete and regulatory action is imminent or underway." Attachment 2 of memorandum from Tikvart, J.A., OAQPS, U.S. EPA, to Regional Modeling Contacts. January 2, 1985. (PN 110-85-01-02-070).

6.3 MODEL SELECTION

Models selected to provide estimates of ambient concentrations of PM-10 must be consistent with the requirements and guidelines specified in the *Guideline on Air Quality Models (Revised).*[1]

Two levels of model sophistication exist: screening and refined. Screening techniques are used initially to eliminate more extensive modeling if it is clearly established, through their application, that the proposed source or control strategy will not cause or contribute to ambient concentrations in excess of either the NAAQS or the allowable PSD increments.[2] Refined air quality models require more detailed and precise input data and consequently provide more accurate estimates of source impact. These refined models are used if a screening technique indicates that a concentration resulting from the source may cause or contribute to an exceedance of the PSD increment or the NAAQS.[3]

The refined model selected should be the one which most accurately represents atmospheric transport, dispersion, and chemical transformations in the area under analysis.[4] Models have been developed for both simple and complex terrain situations; some are designed for urban applications while others are designed for rural applications. In simple terrain, RAM is recommended for urban sources. CRSTER and MPTER are recommended, respectively for single and multiple sources (without downwash) in rural areas. ISCST is recommended for complex industrial sources (with or without downwash) in urban or rural areas. Separate recommendations are provided for areas with intermediate or complex terrain. No model recommended for general use at this time accounts for secondary particulate formation or other transformations in a manner suitable for SIP control strategy demonstrations.[5]

The use of receptor models in conjunction with dispersion models can help to more precisely characterize specific source contributions. Where possible, the use of combined dispersion and receptor modeling is encouraged.[6] The chemical mass balance (CMB) model is considered to be the most advanced of the available receptor models and its use is the most acceptable for attainment demonstration purposes. Other receptor-oriented techniques include factor analysis, and optical and scanning electron microscopy.[7]

Under certain conditions, there may be no recommended dispersion model, or the recommended model may not be applicable. For example, if area sources are the dominant contributors to ambient PM-10 concentrations, an attainment demonstration might be based on rollback of the apportionment derived from two reconciled receptor models. In such instances, the modeling approach must be approved by the appropriate Regional Office on a case-by-case basis.[8,9] Procedures for objectively evaluating alternative modeling techniques are discussed in the EPA documents, *Interim Procedures for Evaluating Air Quality Models (Revised)* and *Interim Procedures for Evaluating Air Quality Models: Experience with Implementation.*[10,11]

REFERENCES FOR SECTION 6.3

1. "(1) All estimates of ambient concentrations required under this paragraph shall be based on the applicable air quality models, data bases, and other requirements specified in the 'Guideline on Air Quality Models (Revised)' (1986) which is incorporated by reference." 51 Federal Register 32,178 (September 9, 1986), Requirements for Preparation Adoption and Submittal of Implementation Plans.

2. "The purpose of such techniques is to eliminate the need of further more detailed modeling for those sources that clearly will not cause or contribute to ambient concentrations in excess of either the National Ambient Air Quality Standards or the allowable prevention of significant deterioration concentration increments." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 2-6.

3. "If a screening technique indicates that the concentration contributed by the source exceeds the PSD increment or the increment remaining to just meet the NAAQS, then the second level of more sophisticated models should be applied." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 2-6.

4. "In all cases, the model applied to a given situation should be the one that provides the most accurate representation of atmospheric transport, dispersion, and chemical transformations in the area of interest." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 1-3.

5. "For urban-wide refined analyses CDM 2.0 or RAM should be used. CRSTER and MPTER are recommended for point sources of small particles. For source-specific analyses of complicated sources, the ISC model is preferred. No model recommended for general use at this time accounts for secondary particulate formation or other transformations in a manner suitable for SIP control strategy demonstrations." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 7-4

6. "Where possible, the use of receptor models in conjunction with dispersion models is encouraged to more precisely characterize the emissions inventory and to validate source-specific impacts calculated by the dispersion model." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 7-4

7. "One key, overriding selection consideration is that CMB is considered the most advanced of the receptor models...The other methods include factor analysis (FA), automatic scanning electron microscopy (ASEM), and microscopy (OM)." U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-86-001. June 1987. pp. 4-1 through 4-14.

8. "For those cases where no recommended technique is available or applicable, modeling approaches should be approved by the appropriate Regional Offices on a case-by-case basis." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 7-4

9. "...This approach is an option provided for in sections 4 and 5 of the *PM-10 SIP Development Guideline.* While it is clear from the guideline that use of dispersion models in combination with receptor models is the preferred approach, in certain limited situations, the use of an RM demonstration alone may be adequate to demonstrate attainment. The State must obtain approval to use the RM demonstration prior to SIP submittal. The decision that an RM demonstration is adequate to demonstrate attainment is the responsibility of the Regional Office; however, the Region should consult the Model Clearinghouse for advice in making this determination." Memorandum. Bauman, Robert D. Chief, SO_2/Particulate Matter Programs Branch, U.S. EPA, Research Triangle Park, NC, and Joseph A. Tikvart, Chief, Source Receptor Analysis Branch, U.S. EPA, Research Triangle Park, NC, to Chief, Air Branch, Regions I-X. PM-10 SIP Demonstration for Small Isolated Areas with Spatially Uniform Emissions. July 5, 1990. (PN-110-90-07-05-106). p. 1.

10. U.S. Environmental Protection Agency. *Interim Procedures for Evaluating Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-84-023. September 1984.

11. U.S. Environmental Protection Agency. *Interim Procedures for Evaluating Air Quality Models: Experience with Implementation.* Office of Air Quality Planning and Standards. Research Triangle Park, NC. EPA-450/4-85-006. July 1985.

6.4 METEOROLOGICAL INPUT

Meteorological data used in air quality modeling should be spatially and climatologically (temporally) representative of the area of interest.[1] Use of site-specific data is preferred for air quality analyses provided that one year or more of quality-assured data are available.[2] Suggestions for the collection and use of on-site data are provided in the Guideline and in the EPA documents, *On-Site Meteorological Program Guidance for Regulatory Modeling Applications, Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)* and *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume IV. Meteorological Measurements.*[3-5]

If one year of site-specific data is not available, five years of other representative meteorological data (ordinarily obtained from the nearest National Weather Service (NWS) station) may be used in the modeling analysis. These five years should be the most recent, readily available consecutive five years of data.[6] The five year period is defined to ensure that the model results adequately represent meteorological conditions conducive to the prediction of maximum ambient concentrations. Potential sources of representative meteorological data include the National Weather Service, local universities, the Federal Aviation Administration, military stations, and air quality agencies. Meteorological data collected by the National Weather Service may be obtained from the Support Center for Regulatory Air Models Electronic Bulletin Board.[7]

When modeling previously permitted sources whose emission limitations are based on a specific year of meteorological data, that year of data should be added to any longer period involved in the modeling analysis.[8]

Gaussian models do not address calm wind conditions. Ambient concentrations predicted by such models during calm conditions should not be considered valid.[9] Proper procedures for calculating average concentrations during calm wind conditions are provided in the Guideline. Some air quality models recommended in the Guideline include algorithms to identify periods of calm so that they may be dealt with separately.

As mentioned earlier, meteorological data collected on-site must be quality-assured prior to their application in air quality modeling analyses. At sites with collocated, continuous air quality monitors, the inspection, maintenance and calibration of each

meteorological instrument operated must be conducted to guarantee a minimum of 90 percent data retrieval (80 percent for remote sites).[10] At the initiation of the monitoring program, and at least every six months thereafter, routine system calibrations and audits should be performed.[11]

Meteorological audits, performed independently of the organization responsible for data collection and system maintenance, should be scheduled on a semiannual basis.[11] Aside from providing for on-site calibration of instruments, these independent evaluations should address network installation; inspection, maintenance and calibration procedures; data reduction procedures; and data logging and tabulation procedures.[12]

As recommended in the *Quality Assurance Handbook*, meteorological data validation can be conducted using a three-fold approach of initial hardcopy audit of the data followed by screening the data through a program designed to note and flag questionable values and finally passing the data through a comparison program which evaluates how well the data fit the synoptic conditions prevalent in the area of on-site measurement.

REFERENCES FOR SECTION 6.4

1. "The meteorological data used as input to a dispersion model should be selected on the basis of spatial and climatological (temporal) representativeness as well as the ability of the individual parameters selected to characterize the transport and dispersion conditions in the area of concern." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-10.

2. "If one year or more, up to five years, of site-specific data is available, these data are preferred for use in air quality analyses." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-12.

3. U.S. Environmental Protection Agency. *On-Site Meteorological Program Guidance for Regulatory Modeling Applications.* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-013. June 1987.

4. U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987.

5. U.S. Environmental Protection Agency. *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume IV. Meteorological Measurements.* Atmospheric Research and Exposure Assessment Laboratory, Research Triangle Park, NC. Office of Research and Development, EPA-600/4-90-003. September 1989.

6. "Five years of representative meteorological data should be used when estimating concentrations with an air quality model. Consecutive years from the most recent, readily available 5-year period are preferred." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-12.

7. The Support Center for Regulatory Air Models (SCRAM) Electronic Bulletin Board, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711.

8. "For permitted sources whose emission limitations are based on a specific year of meteorological data that year should be added to any longer period being used (*e.g.*, 5 years of NWS data) when modeling the facility at a later time." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-12.

9. "Hourly concentrations calculated with Gaussian models using calms should not be considered valid; the wind and concentration estimates for these hours should be disregarded and considered to be missing." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-24.

10. "Inspection, servicing, and calibration of equipment must be scheduled throughout the measurement program at appropriate intervals to assure at least 90 percent data retrieval for each variable measured at sites where continuous air quality monitors are being operated. At remote sites, data retrieval for measured variables should not fall below 80 percent." U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987. p. 55.

11. "Routine system calibrations and system audits should be performed at the initiation of a monitoring program and at least every six months thereafter. More frequent calibrations and audits may be needed in the early stages of the program if problems are encountered, or if valid data retrieval rates are unacceptably low." U.S. Environmental Protection Agency. *On-Site Meteorological Program Guidance for Regulatory Modeling Applications.* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-013. June 1987. p. 8-38.

12. "An independent meteorological audit (by other than one who conducts the routine calibration and operation of the network) should be performed to provide an on-site calibration of instruments as well as an evaluation of (a) the network installation, (b) inspection, maintenance, and calibration procedures, and logging thereof, (c) data reduction procedures, including spot checking of data, and (d) data logging and tabulation procedures. [S]uch independent meteorological audit-evaluations should be performed about each 6 months." U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987. p. 55.

6.5 SOURCE INPUT

6.5.1 General

Emission input data to be used to evaluate SIP's and PSD analyses for compliance with the annual and short-term ambient standards are described in Table 9-1 of the *Guideline On Air Quality Models (Revised).*[1] The model input data requirements in this table apply to stationary point source control strategies.[2] Other model input criteria may apply with regard to emissions trading or NSR. Determination of emission limits for these purposes is discussed in section 9 of this document.

6.5.2 Allowable Versus Actual Emissions

PM-10 concentrations estimated from stationary point sources undergoing a SIP emission limit review must reflect the maximum allowable emission limit or federally enforceable permit limit of the source.[3] A source's total emissions reflected in modeling analyses are determined as the product of the source's emission limit, operating level, and operating factor. The operating level used must be the actual or design capacity (whichever is greater) or the federally enforceable permit condition. Operating levels less than 100 percent of capacity should also be modeled for those cases in which the source operates at a capacity substantially less than design and in which changes in stack parameters associated with the operating conditions could result in higher ground level concentrations.[4] In the case of large power plants, for example, loads such as 50 and 75 percent of capacity should also be modeled. If a source operates at greater than 100 percent load for periods during normal operation that could result in violations of the NAAQS or PSD increments, this load should be modeled.

The operating factor (*e.g.*, hours/year or hours/day) for annual averages should be the actual operating factor averaged over the most recent two years (unless it is determined that this period is not representative). For short term (24-hour) averages, the operating factor should be based on continuous operation; however, if operation is not continuous, and is constrained by a federally enforceable permit condition, an appropriate adjustment to the

modeled emission rate may be made (*i.e.*, modeling for only those hours during which the source is operating).[5]

Identical input requirements apply to sources defined as "nearby" background sources. The term "nearby" refers to those sources expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration.[6] If other background sources are modeled, the maximum allowable emission limit or federally enforceable permit limit should be used in estimating average concentrations. The operating level used for estimating concentrations from these sources should be the annual level when actually operating, averaged over the most recent two years (unless this period is deemed unrepresentative). The operating factors used for other background sources are identical to those indicated previously in this section.

6.5.3 Area Sources

To estimate PM-10 concentrations from area sources, emissions input data should generally be based on annual average conditions.[7]

6.5.4 Background Concentration

Background concentrations are an essential element of the total air quality concentration to be considered in the determination of source impacts for SIP's.[8] These concentrations may include contributions from natural sources, nearby sources other than those currently under consideration, and unidentified sources. Recommendations for determining background concentrations are provided in the Guideline.[9]

In the case of isolated sources, air quality data monitored in the vicinity of the source(s) under consideration should be used to determine the background concentration for the averaging times of concern.[10] Concentrations recorded while the source in question is impacting the monitor should not be used in determining the background concentration.[11] Use of monitored air quality data is recommended for determining that portion of the background attributable to sources other than those nearby (*e.g.*, natural sources, minor sources, and distant major sources).[12] However, Tables 9-1 and 9-2 of the *Guideline on Air Quality*

Models (Revised) may be used to determine background concentrations for modelling applications.

In multi-source areas, nearby sources that are anticipated to cause a concentration gradient in the vicinity of the source or sources under consideration for emission limit(s) should be explicitly modeled.[13,14] The impact of nearby sources should be examined at those locations where interaction exists between the plume of the source under consideration and those of the nearby sources (including natural background).

6.5.5 Stack Height Input to Air Quality Modeling

Specification of stack height is an important consideration in the development of source input for an air quality modeling analysis. Generally, the lesser of the actual stack height or good engineering practice (GEP) stack height is used for air quality modeling (refer to Section 7.2 of this document for definition of GEP). The following guidance on a number of particular modeling questions has been provided by EPA:[15]

- If the actual stack height is greater than GEP height and where it is necessary to reduce stack height credit:

  Use existing stack gas exit parameters -- temperature, flow rate and stack top diameter -- and model the stack at GEP height.

- If the actual stack height is less than GEP height and dispersion techniques are employed:

  Two cases should be modeled in order to establish an appropriate emission limitation for the situation in which it is desired to construct a source at less than GEP height and use dispersion techniques to make up the difference in plume rise. First conduct a modeling analysis using the GEP stack height without enhanced dispersion parameters. Secondly, conduct a modeling analysis using the less than GEP stack height with the increased plume rise. The more stringent emission limitation resulting from each of the two model runs should be the one specified as the enforceable limitation.

- Stack height input for point sources modeled for the purpose of demonstrating protection of the NAAQS or PSD increments:

The lesser of actual or GEP stack height should be used as input.

- Stack height for background sources:

  The lesser of actual or GEP stack height should be used for each background source.

- Excluding the effects of prohibited dispersion techniques for modeling purposes:

  Modeling to exclude the effects of prohibited dispersion techniques on the emission limitations will be accomplished by using the temperature and flow rates as the gas stream enters the stack, and recalculating stack parameters to exclude the use of prohibited techniques.

- If single-flued, merged stacks or multiflued stacks are involved in a modeling analysis refer to Section 7.7 of this guideline to determine if this merging is creditable.

- If plume merging from multiflued stacks is not allowed, then each flue/liner must be modeled as a separate source and the combined impact determined. For single flued, merged stacks where credit is not allowed, each unit should be modeled as a separate stack located at the same point. The stack exit velocity and temperature would be the same as for the existing merged stack conditions and the volume flow rate based on an apportionment of the flow from the individual units.

6.5.6 Stack Downwash and Building Wake Effects

Air quality modeling of sources with stacks which are less than GEP should consider the impacts associated with building wake effects both for the source in question and for nearby sources.[16] In determining which background sources constitute "nearby" sources, the reviewing agency must exercise judgement. Exercising judgement in these cases can minimize the resource burden associated with collecting building dimension data.[17]

REFERENCES FOR SECTION 6.5

1. U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-5.

2. "The EPA's policy for demonstrating stationary point source compliance with the NAAQS for SIP purposes clearly requires the use of emissions which are more closely tied to allowable emissions. The model emission input data requirements for such SIP demonstrations are contained in Table 9-1 of the 'Guideline for Air Quality Models (Revised)'..." Memorandum from Calcagni, J., and Laxton, W., OAQPS, U.S. EPA, to T.J. Maslany, Air Management Division, Region III, and W.B. Hathaway, Air Pesticides, and Toxics Division Region VI. March 16, 1989.

3. U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. Table 9-1 p. 9-5.

4. "Where a source operates at substantially less than design capacity, and the changes in the stack parameters associated with the operating conditions could lead to higher ground level concentrations, loads such as 50 percent and 75 percent of capacity should also be modeled." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986.

5. U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. Table 9-1 p. 9-5.

6. "Nearby Sources: All sources expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration for emission limit(s) should be explicitly modeled." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-8.

7. "Emissions from area sources should generally be based on annual average conditions." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-4.

8. "Background concentrations are an essential part of the total air quality concentration to be considered in determining source impacts." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-7.

9. U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986.

10. "Use air quality data collected in the vicinity of the source to determine the background concentration for the averaging times of concern." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-8.

11. "Determine the mean background concentration at each monitor by excluding values when the source in question is impacting the monitor." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-8.

12. "Other Sources: That portion of the background attributable to all other sources (*e.g.*, natural sources, minor sources and distant major sources) should be determined either by the procedures found in section 9.2.2 or by application of a model using Table 9-1." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-9.

13. "Nearby Sources: All sources expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration for emission limit(s) should be explicitly modeled." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-8.

14. "Nearby sources which are expected to cause a significant concentration gradient in the vicinity of the source under consideration should be explicitly modeled (as 'background' sources)." Memorandum from Calcagni, J., OAQPS, U.S. EPA, to W. Laxton, OAQPS. May 3, 1989.

15. Memorandum from Helms, G.T., OAQPS, U.S. EPA, to Air Branch Chief, Regions I-X. October 10, 1985. (PN 123-85-10-10-007).

16. "If stacks for new or existing major sources are found to be less than the height defined by EPA's refined formula [H + 1.5L] for determining GEP height, then air quality impacts associated with cavity or wake effects due to the nearby building structures should be determined." U.S. Environmental Protection Agency. *Guideline*

On Air Quality Models (Revised), Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 7-7.

17. "This guidance provides considerable flexibility and requires judgement to be exercised by the reviewing agency in identifying which background sources should be fully modeled. The burden of collecting building dimension data may be mitigated somewhat by application of this judgement." Memorandum from Calcagni, J., OAQPS, U.S. EPA, to W.B. Hathaway, Air Pesticides, and Toxics Division, Region VI. March 31, 1989.

6.6 RECEPTOR ANALYSIS

Defining the receptor network used for air quality analyses in support of SIP revisions should be made on a case-by-case basis, taking into consideration the topography, the climatology, existing monitor locations, and results of the initial screening procedure.[1] Receptor sites for any analysis should be assigned in sufficient detail to estimate the highest concentrations and predict any potential violations of the NAAQS or the PSD increment.[2] A modeling analysis performed for the purpose of redesignating an area to attainment must follow the Guideline with respect to the scope of the receptor network and not necessarily address only the area to be redesignated.[3]

REFERENCES FOR SECTION 6.6

1. "This selection of receptor sites should be a case-by-case determination taking into consideration the topography, the climatology, monitor sites, and the results of the initial screening procedure." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p.8-4.

2. "Receptor sites for refined modeling should be utilized in sufficient detail to estimate the highest concentrations and possible violations of a NAAQS or a PSD increment." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards. Research Triangle Park, NC. EPA-45-0/2-78-027R. July 1986. p.8-4.

3. "If a modeling analysis is required for any reason, that analysis must meet the requirements of the Guideline." Memorandum from Bauman, R.D., OAQPS, U.S. EPA, to J. Tikvart, Office of Air Quality Planing and Standards. February 15, 1989.

6.7 OTHER MODEL REQUIREMENTS

The *Guideline on Air Quality Models (Revised)* provides discussion and guidance relative to a number of special modeling considerations for PM-10. Issues that may arise in modeling analyses of PM-10 emissions are treatment of stagnation, fumigation, long range transport, particle settling and deposition, complex terrain, and other situations where model applications are limited.

6.7.1 Stagnation

Stagnation events are characterized by periods of calm or very light winds and variable wind direction. Such conditions may persist from several hours up to several days and may lead to high ground level concentrations. Treatment of calm wind conditions poses a special problem in model applications since Gaussian models assume that concentration is inversely proportional to wind speed. Thus concentrations become unrealistically large when wind speeds are less than 1 m/s.[1] Stagnation periods should be addressed in the air quality modeling analysis; however, special precautions are warranted. The user should consult with the appropriate EPA Regional Office prior to modeling stagnation events for regulatory applications.[2]

6.7.2 Fumigation

Fumigation occurs when a plume is emitted into a stable layer of air that is subsequently mixed to ground level through convective transfer of heat from the surface or through advection to less stable surroundings. Fumigation can cause high ground level concentrations and is an important consideration for sources located near bodies of water. There are no recommended refined techniques to model fumigation conditions; however, there are screening procedures that may be used to approximate expected concentrations. Results obtained from the screening procedures should be used with care.[3,4]

6.7.3 Long Range Transport

Determining the long range transport of PM-10 emissions may be significant in the analysis of source impacts on PSD Class I areas.[5] Assistance with the appropriate techniques to utilize in these modeling situations should be obtained from the EPA Regional Office.

6.7.4 Settling and Deposition

Gravitational settling and deposition may be included in the modeling analysis if either is a significant factor. Given the small particle size, particle settling for PM-10 may be considered as negligible. Neglecting deposition is a conservative approach that is warranted for screening analyses.[6] The Industrial Source Complex (ISC) model contains settling and deposition algorithms and is recommended for use when the size distribution is quantified.[7]

6.7.5 Model Limitations

While modeling is the preferred method for determining emission limitations for both new and existing sources, there may be circumstances in which there is no applicable refined model. These include complex terrain situations, land water interface areas, secondary particulate formation, and urban locations where a large fraction of particulates originate from nontraditional sources. The Guideline provides criteria for determining the acceptability of measured data to be used in these instances.[8] Also, while generally not encouraged, model calibration of long term (annual average) models may be acceptable in some situations as the best alternative for improving the accuracy of the predicted concentration.[9]

REFERENCES FOR SECTION 6.7

1. "Treatment of calm or light and variable wind poses a special problem in model applications since Gaussian models assume that concentration is inversely proportional to wind speed. Furthermore, concentrations become unrealistically large when wind speeds less than 1 m/s are input to the model." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 9-23.

2. "When stagnation periods such as these are found to occur, they should be addressed in the air quality modeling analyses. WYND valley, listed in Appendix B, may be applied on a case-by-case basis for stagnation periods of 24 hours or longer in valley-type situations. Caution should be applied when applying the model to elevated point sources. Users should consult with the appropriate Regional Office prior to regulatory application of WYND valley." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 8-12. (Draft Revised September 1990)

3. "There are no recommended techniques to model this phenomenon [fumigation]. There are, however, screening procedures (see *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources*) that may be used to approximate the concentrations. Considerable care should be exercised in using the results of the screening techniques." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 8-11.

4. U.S. Environmental Protection Agency. *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources.* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-88-010. August 1988.

5. "However, the useful distance to which most Gaussian models are considered accurate for setting emission limits is 50 km. Since in many cases Class I areas may be threatened at distances greater that 50 km from new sources, some procedure is needed to (1) determine if a significant impact will occur, and (2) identify the model to be used in setting an emission limit if the Class I increments are threatened..." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 7-8.

6. "For screening analyses, the conservative assumption of negligible removal is warranted, considering the size of the particles." U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline*, Office of Air Quality Planning and

Standards, Research Triangle Park, NC. EPA-450/2-86-001. June 1987. pp. 4-1 through 4-14.

7. "Gravitational settling and deposition may be directly included in a model if either is a significant factor. At least one preferred model (ISC) contains settling and deposition algorithms and is recommended for use when particulate matter sources can be quantified and settling and deposition are problems." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 8-9.

8. "Modeling is the preferred method for determining emission limitations for both new and existing sources . . . [T]here are circumstances where there is no applicable model, and measured data may need to be used. Examples of such situations are: (1) complex terrain locations; (2) land/water interface areas; and (3) urban locations with a large fraction of particulate emissions from nontraditional sources." U.S. Environmental Protection Agency. *Guideline On Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 11-5.

9. "Calibration of long term multi-source models has been a widely used procedure even though the limitations imposed by statistical theory on the reliability of the calibration process for long term estimates are well known.[61] In some cases, where a more accurate model is not available, calibration may be the best alternative for improving the accuracy of the estimated concentrations needed for control strategy evaluations" U.S. Environmental Protection Agency. *Guideline on Air Quality Models (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/2-78-027R. July 1986. p. 8-13.

6.8 RECEPTOR MODELING

Volume I of the Receptor Model Technical Series describes eight categories of receptor models as follows:

Chemical Mass Balance

This method matches source particle size and chemical "fingerprints" to those measured at the receptor to back-calculate the impact of specific sources or source classes of similar chemical composition. Given data on the ambient concentrations of several chemical species and the percent by weight of these species in the emissions from the sources, a set of equations is prepared and solved to determine the source impacts.

Enrichment Factors

Ambient aerosol composition data are used in association with a reference element (usually a crustal element such as Fe, Al or Si) to provide an estimate of the degree to which a specific ambient aerosol element has been "enriched" by an anthropogenic source. If the "enriched" element is known to be a unique tracer for a specific source, and the concentration of the tracer in the source emissions is known, a crude estimate of the source's impact can be made.

Microscopic Techniques

Particle identification by optical microscopy was one of the first and the most widely used methods of source apportionment of coarse mode particles. Current technology has been expanded to include computer-driven scanning electron microscopy coupled with x-ray fluorescence analysis to provide a particle-by-particle analysis of ambient course particulate filters. As a consequence, particle identification methods traditionally founded on particle size shape, color, bifringence, and surface properties have been expanded to include elemental composition and rapid, computer assisted analysis permitting large numbers of particles to be analyzed at minimum cost.

Multivariate Methods

Statistical methods include factor analysis, regression methods, principal component and cluster analysis techniques. These methods deduce information on source impacts on the basis of the variability of chemical species measured within a large set of particulate samples. Given the premise that chemical species emitted from a specific source will vary in time (as measured at the receptor) in the same manner, multivariate methods detect the common variability of the chemical species. The analyst then identifies the contributing source by comparing those species with similar variability to the chemical composition of sources within the airshed.

Radioisotope Analysis

Measurements of carbon-14/total carbon ratios have recently been used to distinguish "modern" from fossil fuel carbon. Using this method, carbon emitted from contemporary sources (wood burning, fireplaces, leaf fragments) has been distinguished from particles released by the combustion of fossil fuels, *e.g.*, auto and diesel exhaust, coal and fuel oil carbonaceous aerosols.

Spatial Series Analysis

Spatial relationships between aerosol chemistry measured at numerous receptors can provide important clues to likely contributing sources when viewed in relation to emission density maps and given a basic understanding of the chemical composition of source emissions.

Time Series Analysis

Qualitative indications of source impacts based on temporal variations in aerosol mass and chemistry can be used, in association with source emission activity and transport data, to gain insight into likely source impacts over time.

X-ray Diffraction (XRD)

Quantitative identification of crystalline substances in the coarse mode (>2.5 um) by XRD has enabled analysts to determine impacts from fugitive emission sources within reasonable accuracy (±25 percent) for moderate to heavily loaded filters."[1]

Of these eight model types, the chemical mass balance (CMB) is the most widely used and accepted quantitative receptor model. (PM-10 SIP Development Guideline document. p. 4-1). Sources of information on the CMB model include *Receptor Model Technical Series, Volume III (1989 Revision): CMB7 User's Manual*; *Protocol For Applying and Validating the CMB Model*, *Protocol for Reconciling Differences Among Receptor and Dispersion Models*; and *Receptor Model Technical Series, Volume II: Chemical Mass Balance*.[2,3,4]

The *Protocol for Reconciling Differences Among Receptor and Dispersion Models* states that a minimum of five samples of exceedance-day data should be analyzed and compared. If there are fewer than five observed "exceedances" of the NAAQS, the five highest values overall should be used. If a receptor model study were undertaken for a short time period, it must be shown that the period covered was generally representative of the type of source activity and meteorology associated with exceedances observed in other receptor model studies.[5]

REFERENCES FOR SECTION 6.8

1. U.S. Environmental Protection Agency. *Receptor Model Technical Series. Volume I: Overview of Receptor Model Application to Particulate Source Apportionment*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-81-016a. July 1981. pp. vii-x.

2. U.S. Environmental Protection Agency. *Receptor Model Technical Series Volume III (1989 Revision): CMB7 User's Manual*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-90-004. January 1990.

3. U.S. Environmental Protection Agency. *Protocol for Reconciling Differences Among Receptor and Dispersion Models*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-008. March 1987.

4. U.S. Environmental Protection Agency. *Receptor Model Technical Series Volume II: Chemical Mass Balance*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-81-016b. July 1981.

5. "For violations of the 24-hour NAAQS, it is preferable to apply the CMB model on the days on which 'exceedances' of the NAAQS were observed. In this case, one would analyze and compare all observations greater than the level of the NAAQS. In order to obtain representative results, a minimum of five samples (*e.g.*, the five highest values) should be compared. If there are fewer than five observed 'exceedances' of the NAAQS, the five highest values overall should be used so that the analysis is based upon a representative number of days. If a receptor model study were undertaken for a short time period, it must be shown that the period covered was generally representative of the types of source activity and meteorology which are associated with exceedances measured outside of the receptor model study." U.S. Environmental Protection Agency. *Protocol for Reconciling Differences Among Receptor and Dispersion Models*, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-008. March 1987. pp. 5-6.

7.0 STACK HEIGHT REGULATIONS

7.1 GENERAL REGULATIONS

Stack height regulations affect all criteria pollutants. Revised stack height regulations were promulgated by EPA on July 8, 1985 and implement provisions of section 123 of the Act which dictate that the degree of emission limitation required for pollutant control under an applicable SIP shall not be affected by stacks in excess of good engineering practice (GEP), stack height, or by any other dispersion technique.[1,2] Stacks in existence or dispersion techniques implemented before December 31, 1970 are exempt from these provisions (see Section 7.5.1 for definition of "in existence").[3] However, sources defined in section 110(a)(3) of the Act which were constructed, reconstructed or for which major modifications were performed after December 31, 1970 are not exempt from these provisions.[4]

A comprehensive overview of stack height policy is contained in the *Workshop on Implementing the Stack Height Regulations (Revised).*[5] This document includes a discussion of SIP stack height requirements, documentation in outline format and presents several checklists for GEP stack height review.

REFERENCES FOR SECTION 7.1

1. "Section 123, which was added to the Clean Air Act by the 1977 Amendments, regulates the manner in which techniques for dispersion of pollutants from a source may be considered in setting emission limitations. Specifically, section 123 requires that the degree of emission limitation shall not be affected by that portion of a stack which exceeds GEP or by 'any other dispersion technique.'" 50 Federal Register 27,892-907 (July 8, 1985), Stack Height Regulation.

2. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Parts 51.118, 51.164, and 52.21(h). July 1, 1991.

3. U.S. Congress. Clean Air Act, as amended November 1990. 42 U.S.C. 7401 et. seq. Section 123(a). Washington, D.C. U.S. Government Printing Office.

4. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 51.118(b). July 1, 1991.

5. U.S. Environmental Protection Agency. *Workshop on Implementing the Stack Height Regulations (Revised)*. Office of Air Quality Planning and Standards, Research Triangle Park, NC. October 1985.

7.2 GOOD ENGINEERING PRACTICE STACK HEIGHT

7.2.1 General

Discussion of the technical basis and procedures for determining GEP stack height are provided in the *Guideline for Determination of Good Engineering Practice Stack Height (Revised)*.[1] GEP, with respect to stack height, is defined by section 123 of the Act as, "the height necessary to insure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies or wakes which may be created by the source itself, nearby structures or nearby terrain obstacles." According to 40 CFR 51.100(ii), GEP stack height is determined, quantitatively, as the greatest of the following elements:

- <u>De Minimis</u>

  The *de minimis* height is 65 meters, measured from the ground-level elevation at the base of the stack.

- <u>Formula Height</u>

  The formula height is given by:

  Hg = H + 1.5L where,

  Hg = good engineering practice stack height, measured from the ground-level elevation at the base of the stack

  H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack

  L = lesser dimension, height or projected width, of nearby structure(s)

  The EPA, or State or local control agencies may require the use of a field study or fluid modeling to verify GEP stack height for the source.

  For stacks in existence prior to January 12, 1979 and after December 31, 1970 for which the owner or operator had obtained all applicable permits or approvals required under 40 CFR Parts 51 and 52, **Hg = 2.5H**, provided that the owner or operator furnishes evidence that this equation was actually used in establishing an emission limitation.

For stacks which existed prior to December 31, 1970, use the actual stack height to set emission limitations.

- Physical Demonstrations

  The height may be demonstrated by a fluid modeling or field study approved by the EPA, which ensures that the stack emissions do not result in excessive concentrations of any air pollutant as a result of atmospheric downwash, wakes, or eddy effects created by the source itself, nearby structures or nearby terrain features (see Section 7.6).

7.2.2 Definition of "Nearby" for GEP

For the purpose of determining GEP stack height, "nearby" is limited to five times the structure height or width, whichever is less (a distance not to exceed one-half mile) and in the case of a fluid model or field study is limited to one-half mile. This range may be extended for the portion of a terrain feature which exists within a distance of up to 10 times the maximum height of the feature (not to exceed two miles), if such feature reaches a height, at one-half mile from the stack, that is at least 40 percent of the GEP stack height determined by $Hg = H + 1.5L$ above or 26 meters, whichever is greater, as measured from the ground-level elevation at the base of the stack.[2]

7.2.3 Definition of "Excessive Concentration"

The term "excessive concentration," as it applies to a physical (fluid or field) demonstration of GEP stack height, is defined in 40 CFR 51.100(kk) for several situations, all of which require showing a 40 percent increase in the maximum ground-level concentration relative to the maximum concentration observed in the absence of downwash, wakes, or eddy effects. Certain situations also require showing that the stack contributes to a total concentration, due to emissions from all sources, that exceeds the NAAQS or PSD increment. The stack emission rate shall be based on an NSPS emission rate applicable to the source category unless demonstrated infeasible (See Section 7.6.4 for more detailed discussion).

REFERENCES FOR SECTION 7.2

1. U.S. Environmental Protection Agency. *Guideline for Determination of Good Engineering Practice Stack Height (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-80-023R. June 1985.

2. U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 51.100(jj). July 1, 1991.

7.3 DISPERSION TECHNIQUES

7.3.1 General

The revised EPA stack height regulations generally prohibit stationary sources from taking credit for dispersion techniques in determining allowable emission limitations.

7.3.2 Prohibitions

As stated in 40 CFR 51.100(hh)(1), the prohibited dispersion techniques are as follows:

- Using that portion of a stack in excess of GEP stack height
- Varying the pollutant emission rate according to atmospheric conditions or ambient concentrations of that pollutant (referred to as intermittent or supplemental control systems - ICS or SCS)
- Increasing final exhaust gas plume rise by manipulating source process parameters, exhaust gas parameters, stack parameters or combining exhaust gases from several existing stacks into one stack, or other selective handling of exhaust gas streams so as to increase the exhaust gas plume rise

7.3.3 Exceptions

Although credit for selective handling of exhaust gas streams to increase the exhaust gas plume rise is generally prohibited, in certain circumstances, credit is allowed for the following:

- Merging of gas streams in original design and construction (also see Section 7.7)
- Smoke management techniques involved in agricultural or silvicultural programs
- Episodic restrictions on residential wood burning and open burning
- Reheating after a pollution control system[1]

REFERENCES FOR SECTION 7.3

1. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 51.100(hh)(2). July 1, 1991.

7.4 REMANDED REGULATIONS

The following three portions of the revised EPA stack height regulations, promulgated on July 8, 1985, were litigated and remanded to EPA for review:[1]

- Under the definition of excessive concentration:

  Grandfathering pre-October 11, 1983 within-formula stack height increases from demonstration requirements [40 CFR 51.100(kk)(2)]

- Under the definition of dispersion technique:

  Dispersion credit for sources originally designed and constructed with merged or multiflue stacks [40 CFR 51.100(hh)(2)(ii)(A)]

- Under the definition of GEP stack height:

  Grandfathering of pre-1979 use of the unrefined "H + 2.5L" formula [40 CFR 51.100(ii)(2)].

As a result of the remand, an interim policy on stack height regulatory actions is in effect. This policy provides that most actions affected by the remand may proceed, provided appropriate caveat language is incorporated indicating that the action is subject to review and modification on completion of EPA's response to the court decision.[2]

REFERENCES FOR SECTION 7.4

1. "Although the court upheld most provisions of the rules, three portions were remanded to EPA for review: 1. Grandfathering pre-October 11, 1983 within-formula stack height increases from demonstration requirements [40 CFR 51.100(kk)(2)]; 2. Dispersion credit for sources originally designed and constructed with merged or multiflue stacks [40 CFR 51.100(hh)(2)(ii)(A)]; and 3. Grandfathering of pre-1979 use of the refined H + 1.5L formula [40 CFR 51.100(ii)(2)]." Memorandum from Potter, J.C., OAR, to Air Management Division Director, Regions I, III, and IX, Air and Waste Management Division Director, Region II, Air, Pesticides, and Toxics Management Division Director, Regions IV, and VI, Air and Radiation Division Director, Region V, Air and Toxics Division Director, Regions VII, VIII, and X. Interim Policy on Stack Height Regulatory Actions. April 22, 1988.

2. "In general, actions taken at this time to approve or disapprove statewide stack height rules which are affected by the remand must include the qualification that they are subject to review and modification on completion of EPA's response to the court decision." Memorandum from Calcagni, J., OAQPS, to Air Branch Chief, Regions I-X. Application of the Interim Policy for Stack Height Regulatory Actions. May 17, 1988. (PN 123-88-05-17-016).

7.5 SPECIFIC STACK HEIGHT POLICIES

7.5.1 Definition of "In Existence"

In promulgating the 1982 stack height regulations, EPA adopted a definition of "stack heights in existence before December 31, 1970."[1] This definition allowed the grandfathering of stacks either: (a) physically completed; (b) for which continuous construction had begun; or (c) for which construction had not yet commenced, but for which binding contracts had been signed that could not be canceled without substantial loss to the source owner or operator. The revised stack height regulation promulgated on July 8, 1985 does not modify this definition except to restrict its applicability to facilities that have not undertaken major modifications or reconstruction and have not ducted effluent gas streams from post-1970 units into pre-1971 stacks.[2]

Grandfathering exemptions may be supported in one of three ways.[3]

(1) In the case of stacks physically completed prior to December 31, 1970, proof of stack completion must be documented (an acceptable form of documentation, for example, would be a copy of the 1970 Federal Power Commission Report Form 67, which includes information on stack height);

(2) Evidence submitted to support the commencement date of stack construction can include any contemporaneous documentation such as building inspection records, delivery receipts of construction materials, or news clippings that clearly indicate that construction activities were under way before December 31, 1970; or

(3) Date of signature on a contract for stack construction is acceptable for applying grandfathering exemptions provided the "binding contract" is one that commits the source owner or operator to financially undertake stack construction and that did not have an "escape" provision in effect on December 31, 1970 allowing cancellation by the owner or operator without penalty. If a contract contains provisions for assessing penalties for modification or cancellation that were in effect before December 31, 1970, then the provisions must be reviewed to determine whether the penalties and other costs of cancellation would have imposed a "substantial loss" on the owner or operator. In general, EPA will presume that a substantial loss would have resulted in those situations in which penalties exceed 10 percent of the project cost.

Documentation supporting any of these grandfathering exemptions must be made available for public review by the State or source owner or operator.[4]

7.5.2 Tie-ins to Existing Stacks

The definition of "source" that should be used in determining whether tie-ins to grandfathered stacks should be permitted or prohibited is a single emission unit. Hence, credit for tying a single, post-1970 unit(s) into a grandfathered stack serving a number of old units is prohibited under the revised stack height regulations.[5]

REFERENCES FOR SECTION 7.5

1. "Grandfathered Stack Height. The 1970 Clean Air Act became effective on December 31, 1970. Prior to that date some sources had constructed stacks taller than their GEP height. In section 123, Congress recognized this and exempted those sources' stack heights. Section 123 allows credit for stack height in existence on December 31, 1970. A source's stack is considered to be 'in existence' if that stack was part of the design of a facility on which construction commenced prior to December 31, 1970." 47 Federal Register 5,865-69 (February 8, 1982), Stack Height Regulations.

2. "The EPA's definition was upheld by the U.S. Court of Appeals for the D.C. circuit in Sierra Club v. EPA, 719 F.2d 436, and has not been modified in any way by the rule revisions promulgated on July 8, 1985, except to restrict its applicability to facilities that have not undertaken major modifications or reconstruction, and have not ducted the effluent gas streams from post-1970 units into pre-1971 stacks." Memorandum from D.D., Tyler, OAQPS, to Regional Air Management Division Director, Regions I-X. Determining Stack Heights "In Existence" Before December 31, 1970. October 28, 1985. (PN 123-85-10-28-010).

3. Memorandum from D.D., Tyler, OAQPS, to Regional Air Management Division Director, Regions I-X. Determining Stack Heights "In Existence" Before December 31, 1970. October 28, 1985. (PN 123-85-10-28-010).

4. "The burden of proof for showing that a stack is eligible for grandfathering exemption lies with either the State or the source owner or operator, as appropriate, and documentation in support of exemptions must be made available for public review during the rulemaking process." Memorandum from D.D., Tyler, OAQPS, to Regional Air Management Division Director, Regions I-X. Determining Stack Heights "In Existence" Before December 31, 1970. October 28, 1985. (PN 123-85-10-28-010).

5. "Q: What 'source' definition should be used in determining whether tie-ins to grandfathered stacks should be permitted or prohibited? A: The term 'source' in this instance means a single emitting unit. Thus, credit for tying a single post-1970 unit(s) into a grandfathered stack serving a number of old units is prohibited under the regulation." Memorandum from Helms, G.T., OAQPS, to Air Branch Chief, Regions I-X. Questions and Answers on Implementing the Revised Stack Height Regulation. October 10, 1985. (PN 123-85-10-10-007).

7.6 DEMONSTRATIONS BY FLUID MODELING, FIELD STUDIES OR NUISANCE

7.6.1 Applicability

Sources seeking credit for stack height above GEP formula height must demonstrate by a field study or fluid modeling analysis that this height is necessary to avoid excessive pollutant concentrations as a result of downwash, wakes or eddy effects created by the source itself, nearby structures or nearby terrain (refer to Section 7.2 for definitions of "excessive concentration" and "nearby").[1]

Sources seeking credit within formula height may also need to conduct such demonstrations in those cases where it is believed that the formula may significantly overstate the appropriate stack height credit, and to justify certain increases in stack height.[2]

Sources seeking credit for increases in stack heights up to formula GEP may justify the increase by demonstrating the actual presence of a local nuisance caused by the existing stack, as determined by the authority administering the SIP.[3]

7.6.2 Field Studies

A field demonstration of GEP height involves the installation and operation of a monitoring network designed to clearly identify maximum downwind concentrations. Concentration patterns from two release points must be determined: one near the source in the presence of structure(s) and/or terrain and the other in the absence of such features. Except for differences due to structure(s) and/or terrain, the atmospheric flow at the latter location must be similar to that near the source, as verified by meteorological observations upwind of both sites.[4]

7.6.3 Fluid Modeling

Credit for Height Above GEP Formula. In performing fluid modeling demonstrations, sources seeking credit for stacks greater than formula height must use the appropriate emission rate for the source category (see Section 7.6.4) and add the background air quality as determined by procedures described in Section 6.5.3.[5] The following "excessive concentration" criteria must be met: (a) exceedance of the NAAQS or PSD increment, and (b) a concentration of at least 40 percent in excess of the maximum concentration experienced in the absence of downwash, wakes or eddy effects. After these criteria are met, the source must use the lowest stack height necessary to meet the more restrictive of the two excessive concentration criteria in order to set emission limitations. This lowest height becomes the new GEP height.[6]

Credit for Height Less than or Equal to GEP Formula. For sources seeking credit after October 11, 1983 for increases in existing stack height up to GEP formula height, the excessive concentration criteria (a) and (b) given above generally apply. For sources seeking credit after January 12, 1979 for a stack height less than or equal to formula height; for sources seeking credit after November 9, 1984 based on the aerodynamic influence of cooling towers; and for sources seeking credit after December 31, 1970 based on the aerodynamic influence of structures not adequately represented by GEP formula, the 40 percent excess concentration is the only criterion needed to demonstrate equivalence to formula height.[7]

7.6.4 Emission Rate for Physical Demonstrations

For sources seeking credit <u>above formula GEP height</u>, the stack height regulations require that a presumptive emission rate equivalent to the NSPS be established for the source in question before fluid modeling is initiated to determine the stack height necessary to avoid excessive concentrations due to downwash.[8] The NSPS emission rate is "presumptive" in that EPA presumes that all sources seeking to justify stack heights in excess of those established by GEP formulae are capable of controlling their emissions to NSPS levels. If it is infeasible for a source to control its emissions to NSPS levels, then an alternative emission limit representing the lowest feasible emission limit must be met before credit for stack height in excess of GEP formula height can be obtained. These alternative emission rates will be reviewed by EPA based on the Best Available Retrofit Technology (BART) guidelines.[9,10]

Unless the source owner or operator demonstrates that the emission rate prescribed by the NSPS applicable to the source category is infeasible, the allowable emission rate to be used in conducting the field study or fluid modeling demonstrations must be the NSPS emission rate.[11] In cases where no NSPS limit is applicable, a BART analysis must be conducted to determine the emission rate to be used in studies demonstrating GEP stack height greater than formula height.[12]

For certain sources seeking credit for increases in existing stack heights up to GEP formula height, the emission rate used in the demonstration shall be the emission rate specified by the applicable SIP, or, in the case of no established limit, the actual emission rate shall be used.[13] For other sources for which verification of correct GEP height is requested, the satisfying 40 percent excess concentration criterion is sufficient demonstration.[14]

7.6.5 Not in Ambient Air

For the purpose of the physical demonstration, the exceedance of the NAAQS or PSD increment need not occur at a location meeting the definition of ambient air.[15]

7.6.6 Additional Guidance

Sources of guidance on conducting fluid modeling demonstrations have been identified by EPA.[16] Documents which form the basis of information include *Guideline for Use of Fluid Modeling to Determine Good Engineering Stack Height*;[17] *Determination of Good Engineering Practice Stack Height - A Fluid Model Demonstration Study for a Power Plant*;[18] *Guideline for Fluid Modeling of Atmospheric Diffusion*;[19] and *Fluid Modeling Demonstration of Good Engineering Practice Stack Height in Complex Terrain.*[20]

REFERENCES FOR SECTION 7.6

1. U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 51.100(ii)(3). July 1, 1991.

2. "Nevertheless, in response to the court's remand, EPA is including in this final rule a provision for the authority administering these rules to require field studies or fluid modeling demonstrations, even for stacks built to formula height, in cases where it believes that the formula may significantly overstate the appropriate stack height credit. (Quite apart from any such regulatory provision, States have authority to require such demonstrations, on the terms outlined or on stricter or more lenient terms, under the savings provision of section 116 of the Clean Air Act)." 50 Federal Register 27,892-907 (July 8, 1985), Stack Height Regulations.

3. ". . . (ii) the actual presence of a local nuisance caused by the existing stack, as determined by the authority administering the State implementation plan;." U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 51.100(kk)(2). Washington, D.C. Office of the Federal Register. July 1, 1991.

4. "A field demonstration of GEP stack height requires experiments to determine the concentration patterns from two release points -- one with the structure(s) and/or terrain; the other in the absence of structure(s) and/or terrain. [A] monitoring array must be arranged to clearly identify the maximum concentrations downwind of similar releases at both sites." U.S. Environmental Protection Agency. *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document For the Stack Height Regulations) (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-80-023R, June 1985. p. 47.

5. "In conducting a demonstration, a source should use the modeled stack height, input the applicable emission rate that is equivalent to NSPS for that source category (however, sources may on a case-by-case basis demonstrate that such an emission is not feasible for their situations and determine their emission limitations based on Best Available Retrofit Technology), and add in the background air quality as determined by procedures contained in two EPA guidance documents (EPA, 1978, 1981)." U.S. Environmental Protection Agency. *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document For the Stack Height Regulations) (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-80-023R, June 1985. p. 52.

6. "After demonstrating that both excessive concentration criteria are met as defined in section 1, the source must determine the lowest stack height necessary to meet the more restrictive of the two excessive concentration criteria. This lower height is the new GEP height." U.S. Environmental Protection Agency. *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document For the Stack Height Regulations) (Revised).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-80-023R, June 1985. p. 52.

7. U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 51.100(kk)(3). July 1, 1991.

8. "The regulations require that a presumptive emission rate equivalent to the new source performance standards (NSPS) be established for the source in question before modeling may be conducted to determine stack height needed to avoid excessive concentrations due to downwash (where the NSPS has been subject to revision, and the source in question is not subject to the revised NSPS, the earliest standard will be applied; *e.g.*, for power plants a rate of 1.2 lb/MM Btu would be used)." Memorandum from Tyler, D.D., OAQPS, to Regional Air Management Division Director, Regions I-X. Implementation of Stack Height Regulations - Presumptive NSPS Emission Limit for Fluid Modeling Stacks Above Formula GEP Height. October 28, 1985. (PN 123-85-10-28-009).

9. "This emission rate is described as 'presumptive' because it is EPA's presumption that all sources seeking to justify stack heights exceeding those provided by the GEP formulae are capable of controlling their emissions to NSPS levels. However, the regulations also allow source owners or operators to rebut this presumption, establishing an alternative emission rate that represents the most stringent level of control that can feasibly be met by that source in excess of the NSPS level. In the preamble to the regulations, EPA indicated that it will rely on the 'Guidelines for Determination of Best Available Retrofit Technology for Coal Fired Power Plants and other Existing Stationary Facilities' EPA-450/3-80-009b (BART Guidelines) when reviewing these rebuttals." Memorandum from Tyler, D.D., OAQPS, to Regional Air Management Division Director, Regions I-X. Implementation of Stack Height Regulations - Presumptive NSPS Emission Limit for Fluid Modeling Stacks Above Formula GEP Height. October 28, 1985. (PN 123-85-10-28-009).

10. "In conclusion, we are in full agreement with the position taken by Region III that sources seeking credit above formula height must meet an emission rate consistent with BART/NSPS." Letter from Gerald A. Emison, G.A., OAQPS, to J.P. Proctor. April 20, 1989.

11. "Q: Can new or modified sources who have agreed to a case-by-case best available control technology (BACT) emission rate be required to use this rate for fluid modeling rather than a less stringent new source performance standard (NSPS) emission rate? A: As set forth in 40 CFR 51.1(kk), the allowable emission rate to be

used in making demonstrations under this part shall be prescribed by the NSPS that is applicable to the source category unless the owner or operator demonstrates that this emission rate is infeasible." Memorandum from Helms, G.T., OAQPS, to Air Branch Chief, Regions I-X. Questions and Answers on Implementing the Revised Stack Height Regulations. October 10, 1985. (PN 123-85-10-10-007).

12. "Issue: A source seeking stack height credit above formula GEP is required by regulation to demonstrate an exceedance of an ambient air quality standard. The regulation also provides that the allowable emission rate to be used in making the demonstration shall be the new source performance standard (NSPS), unless this is shown to be infeasible. The regulations, however, do not address what emission rates to use when there are no NSPS emission rates applicable. Answer: The preamble to the stack height regulation is clear that the emission rate must be limited to the NSPS or best available retrofit technology (BART) rate (50 FR 27898). The legislative history of the stack height requirement cautioned that credit for stacks above formula height be granted only in rare cases. For this reason, EPA determined that sources seeking credit above formula height should first attempt to reduce their emissions. In establishing an emission rate other than NSPS, the preamble states that EPA will rely on its BART guideline. Thus, we believe that a BART analysis must be conducted to determine the emission rate to be used in studies demonstrating GEP stack height greater than formula height when no NSPS limit is applicable." Memorandum from Calcagni, J., OAQPS, U.S. EPA, to I.L. Dickstein. Stack Height Questions. November 27, 1990.

13. U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, 51.100(kk)(2). July 1, 1991.

14. U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 51.100(kk)(3). July 1, 1991.

15. "Q: Must the exceedance of NAAQS or PSD increment due to downwash, wakes or eddies occur at a location meeting the definition of ambient air? A: No, the exceedance may occur at any location, including that to which the general public does not have access." Memorandum from Helms, G.T., OAQPS, U.S. EPA, to Air Branch Chief, Regions I-X. Questions and Answers on Implementing the Revised Stack Height Regulations. October 10, 1985. (PN 123-85-10-10-007).

16. Memorandum from Tikvart, J.A., OAQPS, U.S. EPA, to D. Stonefield, OAQPS. *Guidance on Fluid Model Demonstrations for Determining GEP Stack Height in Complex Terrain.* September 19, 1985. (PN 123-85-09-19-006).

17. U.S. Environmental Protection Agency. *Guideline for Use of Fluid Modeling to Determine Good Engineering Stack Height.* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-81-003. July 1981.

18. U.S. Environmental Protection Agency. *Determination of Good Engineering Practice Stack Height - A Fluid Model Demonstration Study for a Power Plant.* Environmental Science Research Laboratory. EPA-600/3-83-024. April 1983.

19. U.S. Environmental Protection Agency. *Guideline for Fluid Modeling of Atmospheric Diffusion.* Environmental Science Research Laboratory. EPA-600/8-81-009.

20. U.S. Environmental Protection Agency. *Fluid Modeling Demonstration of Good Engineering Practice Stack Height in Complex Terrain.* Atmospheric Sciences Research Laboratory, EPA-600/3-85-022. April 1985.

7.7 MERGED STACKS

7.7.1 General

Dispersion credit for the retrofit combining or merging of gas streams is generally not allowed under the stack height regulations.[1] Originally designed and constructed merged streams are creditable at this time [40 CFR 51.100(hh)(2)]; however, this provision is affected by the stack height remand (see Section 7.4).

7.7.2 Exceptions

Credit for retrofit merging is allowed under the following circumstances:[2]

- After July 8, 1985 such merging is part of a change in facility operation that includes the installation of pollution controls and is accompanied by a net reduction in the allowable emissions of a pollutant. This exclusion from the definition of "dispersion techniques" shall only apply to the emission limitation for the pollutant affected by such change in operation; and

- Before July 8, 1985 such merging: (1) was part of a change in operation at the facility that included the installation of emission control equipment; (2) was conducted for sound economic or engineering reasons;[3] or (3) was not "significantly motivated by an intent to obtain emissions credit for increased dispersion."[4] Such a demonstration could be made by submitting evidence showing that consideration of dispersion advantages was conspicuously absent in the intent of the source owner or operator.[5]

In addition, exemption from prohibitions on gas stream merging is provided for sources which constructed their stacks before December 31, 1970.

It is incumbent on the State or source owner or operator to demonstrate that any retrofit merging was not motivated by an intent to avoid emission controls. Information indicating that merging was specifically carried out to increase final exhaust gas plume rise serves as a demonstration of dispersion intent that justifies denial of credit for merged gas streams.[6]

REFERENCES FOR SECTION 7.7

1. Memorandum from Tyler, D.D., OAQPS, U.S. EPA, to Air Management Division Directors, Regions I-X. Implementation of Stack Height Regulations - Exceptions From Restrictions on Credit for Merged Stacks. October 28, 1985. (PN 123-85-10-28-008).

2. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 51.100(hh)(2)(ii). July 1, 1991.

3. "Sources that are not covered under these criteria may still qualify for exemption if they can show that merging was conducted for sound economic or engineering reasons." Memorandum from Tyler, D.D., OAQPS, U.S. EPA, to Air Management Division Directors, Regions I-X. Implementation of Stack Height Regulations - Exceptions From Restrictions on Credit for Merged Stacks. October 28, 1985. (PN 123-85-10-28-008).

4. "In some instances, a State or emission source owner may not be able to make a demonstration as described above, or believe that sound economic reasons existed for merging stacks, regardless of the relationship between financial savings attributable to reduced emission control requirements versus lower stack construction costs. In such cases, an opportunity should be provided to affirmatively demonstrate that merged stacks were not 'significantly motivated by an intent to obtain emissions credit for increased dispersion'." Memorandum from Tyler, D.D., OAQPS, U.S. EPA, to Air Management Division Directors, Regions I-X. Implementation of Stack Height Regulations - Exceptions From Restrictions on Credit for Merged Stacks. October 28, 1985. (PN 123-85-10-28-008).

5. "For instance, such a demonstration could be made by submitting documentary or other evidence (*e.g.*, internal company memoranda presenting the alternative construction opportunities available to the company) that indicates the intent of the source owner or operator and shows that consideration of dispersion advantages was conspicuously absent." Memorandum from Tyler, D.D., OAQPS, U.S. EPA, to Air Management Division Directors, Regions I-X. Implementation of Stack Height Regulations - Exceptions From Restrictions on Credit for Merged Stacks. October 28, 1985. (PN 123-85-10-28-008).

6. "Because merged gas streams are generally regarded as prohibited dispersion techniques under the regulations, it is incumbent on the State or the source owner or operator to demonstrate that such merging was conducted for sound economic or engineering reasons, and was not significantly motivated by an intent to avoid emission controls. Consequently, the first step should entail a review of State and EPA files to determine the existence of any evidence of intent on the part of the source owner or operator. Information showing that merging was conducted

specifically to increase final exhaust gas plume rise serves as a demonstration of dispersion intent that justifies a denial of credit for merged gas streams."
Memorandum from Tyler, D.D., OAQPS, U.S. EPA, to Air Management Division Directors, Regions I-X. Implementation of Stack Height Regulations - Exceptions From Restrictions on Credit for Merged Stacks. October 28, 1985.
(PN 123-85-10-28-008).

7.8 STACK HEIGHT NEGATIVE DECLARATIONS

7.8.1 General

Following promulgation of the revised stack height regulations on July 8, 1985, each State was required to review its SIP and determine if any sources were credited with stack heights or dispersion techniques not in accordance with the revised regulations.[1] Where sources are found to be in compliance with the revised regulations, a "negative declaration" is issued in the Federal Register for that State. A Federal Register notice of negative declaration for the stack height requirements does not need to be incorporated into the SIP since it is not required under section 110 of the Act.

7.8.2 Information Needed

There are three primary ways to declare a source as unaffected by the stack height rules[2]

- Source was constructed prior to December 31, 1970
- Source stack height is less than GEP formula height
- Source emission limitation was not affected by stack height or by any other dispersion technique

It is very important that a description of the grandfathering documentation is provided along with the date of documentation, so that proof of the grandfathering can be easily traced back to a specific document.[3]

7.8.3 Modeling Needed

Source remodeling would be required in those situations in which credit for excess stack height or dispersion techniques has been taken. Any remodeling must follow the

Guideline on Air Quality Models (Revised) and Supplement A.[4] If a source has never been analyzed for dispersion, then no modeling is required.[5]

REFERENCES FOR SECTION 7.8

1. "(2)(B) nine months after date of promulgation . . ." U.S. Congress. Clean Air Act, as amended August 1977. 42 U.S.C. 1857 *et. seq.* section 406(2)(b). Washington, D.C. U.S. Government Printing Office. November 1977.

2. U.S. Environmental Protection Agency. *Workshop on Implementing the Stack Height Regulations (Revised).* Control Programs Development Division, Office of Air Quality Planning and Standards, Research Triangle Park, NC. October 1985.

3. "For grandfathering documentation, the date the source was built is not essential, but the type and date of the documentation that the source was built prior to December 31, 1970, must be listed." Memorandum from Helms, G.T., OAQPS, U.S. EPA, to Air Branch Chief, Region I-X. Processing of Stack Height Negative Declarations. October 9, 1987. (PN 123-87-10-09-014).

4. U.S. Environmental Protection Agency. *Guideline on Air Quality Models (Revised).* Office of Air Quality Planning and Standards. Research Triangle Park, NC. EPA-450/2-78-027R. July 1986.

5. "If a source has never been analyzed for dispersion, then it is not necessary to conduct a dispersion analysis now." Memorandum from Tyler, D.D., OAQPS, U.S. EPA, to Air Division Director, Regions I-X. Clarification of Existing Guidance on Dispersion Modeling Requirements for Plants with "Tall Stacks" and Other Prohibited Dispersion Techniques. February 11, 1986. (PN 123-86-02-11-012).

8.0 CONTROL STRATEGIES

8.1 GENERAL

Pursuant to section 110(a)(2) of the amended act, each SIP must contain an enforceable control strategy that provides the degree of emissions reductions required to ensure attainment and maintenance of all NAAQS. The emissions reductions must be sufficient to offset any expected increases in concentrations of air pollutants that might result from population growth, industrial activity, motor vehicle traffic, or other factors.[1] In general, a control strategy will consist of emission limitations applicable to sources within specified categories. Specific emissions limitations are established based on what is required for NAAQS attainment.

REFERENCES FOR SECTION 8.1

1. "Each plan must set forth a control strategy that provides the degree of emission reductions necessary for attainment and maintenance of the national ambient air quality standards. The emission reductions must be sufficient to offset any increase in air quality concentrations that are expected due to projected growth of population, industrial activity, motor vehicle traffic, or other factors." 51 Federal Register 40,665 (November 7, 1986), Attainment and Maintenance of National Standards.

8.2 CONTROL STRATEGY TRANSITION

Particulate matter emissions from most point sources and many area sources have been controlled through SIP's designed to implement the former NAAQS for total suspended particulate (TSP). Existing regulatory requirements (*e.g.*, emission limitations) must continue to be enforced by Federal and State agencies during the transition from a TSP SIP to a PM-10 SIP. If the existing regulations require using reasonably available control technology (RACT), this requirement continues and sources must comply with the regulations. Existing emissions requirements can be relaxed only if the State uses dispersion modeling to demonstrate that a higher allowable emission rate will not result in degradation of the existing air quality and that the PM-10 NAAQS will be maintained. States should utilize the existing control strategy in a TSP SIP as the basis for a PM-10 SIP.[1,2,3]

REFERENCES FOR SECTION 8.2

1. "Existing regulatory requirements (*e.g.*, emission PM limits) must continue to be enforced by Federal and State agencies during the transition from a total suspended particulate (TSP) SIP to a PM-10 SIP. If the existing regulations require using reasonably available control technology (RACT), this requirement continues and sources must comply with the regulation. Existing emissions requirements can be relaxed only if the State demonstrates with dispersion modeling that a higher allowable emission rate will not result in degradation of the existing air quality and still maintain the PM-10 NAAQS." U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline - Supplement.* Office of Air Quality Planning and Standards. June 1988. p. 15.

2. "Particulate matter emissions from most point sources and many area sources have been controlled through SIP's designed to implement the former NAAQS for TSP. . . States should utilize the existing control strategy in a TSP SIP as the basis for a PM-10 SIP." U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline.* Office of Air Quality Planning and Standards. EPA-450/2-86-001. June 1987 p. 7-6.

3. "The State should focus on developing approvable PM-10 SIP's. However, it is likely that the elements of the TSP SIP that were disapproved will be needed for the PM-10 SIP." U.S. Environmental Protection Agency. *Response to Questions Regarding PM-10 State Implementation Plan (SIP) Development.* Office of Air Quality Planning and Standards. June 1988. p. 33.

8.3 ESTABLISHING EMISSION LIMITATIONS

8.3.1 General

Emission limitations for point and area sources of PM-10 are established based on an analysis of ambient concentrations and source contributions to determine the level of control needed to demonstrate attainment of the NAAQS. This involves determination of design concentrations for the appropriate averaging intervals for each location that must be reduced to the level of the respective NAAQS. After design concentrations have been established, a proportioning method is used to estimate the required emission limitations for primary PM-10.[1]

Under section 189(e) of the Act, the control requirements applicable for major stationary sources of PM-10 are also applicable to major stationary sources of PM-10 precursors, except where EPA determines that such sources do not contribute significantly to PM-10 levels which exceed the PM-10 NAAQS in the area. Such a determination will be based on air quality analyses, technical information provided by individual States, and on any other studies conducted by the State or EPA which may help to indicate whether major stationary sources of specific precursors contribute significantly to PM-10 concentrations in a particular area. EPA intends to make a formal determination as to whether major stationary sources of PM-10 precursors contribute significantly to PM-10 levels in a particular area when it takes rulemaking action on the individual moderate area SIP's.[2] Section 8.4.4 of this guideline provides a more detailed discussion of EPA policy on PM-10 precursors.

8.3.2 Design Concentrations

The design concentration is the ambient PM-10 level for a particular site that must be reduced to the level of the NAAQS. With the PM-10 annual and 24-hour NAAQS, two separate design concentrations, one for each standard, are needed per site. The annual design concentration is the expected annual arithmetic mean determined in accordance with Appendix K to 40 CFR Part 50. The 24-hour design concentration is the level at which the expected number of exceedances of the 24-hour standard is less than or equal to one. There are several acceptable approaches for determining the expected number of exceedances of the

24-hour standard. These include a table look-up procedure, fitting a statistical distribution, graphical estimation, and conditional probabilities.[3]

Design concentrations may be based on ambient measurements of PM-10, or model estimates of ambient concentrations at individual sites during one or more years of stable emissions conditions. In all cases where dispersion model estimates are used, the design concentration is assumed to be the sum of the concentrations contributed by the sources and an appropriate background concentration. The preferred approach for estimating a design value is through the use of an applicable dispersion model corroborated by receptor models, any available PM-10 data, and any available TSP data. If corroboration is not possible, a dispersion model should be used except for periods of stagnation. Monitoring data should be used for stagnation periods.[4] In limited instances, the use of a receptor model alone may be sufficient to demonstrate attainment. Approval for such an approach must be obtained prior to SIP submittal.[5]

The uncertainty in the design concentration estimate is reduced to the extent that sufficient, representative meteorological and monitoring data are available. Modeling estimates using 5 years of National Weather Service meteorological data (or at least one year of on-site data), or three years of representative air quality measurements should be considered in determining 24-hour design concentrations. If more years of data with relatively unchanging emissions are available, they also may be considered in calculating design concentrations.[4]

8.3.3 Averaging Periods

Enforceable emission limits must be sufficient to protect both the short-term (24-hour) and annual NAAQS for PM-10. Thus, SIP emission limits should be based on the NAAQS (annual or 24-hour) which result in the most stringent control requirements.[6] Each emission limit must state the appropriate averaging time for that limit. Specific control measures designed to achieve the required emission limitations must then be implemented in the SIP (40 CFR 51.111). Specific control measures for PM-10 are discussed in Section 8.4 of this guideline.

8.3.4 Compliance Methods

Each SIP must identify methods for determining compliance with the emission limitations, according to requirements in 40 CFR 51.111. These methods must be consistent with the averaging period appropriate to each limitation. Thus, a SIP may contain separate compliance test methods for each averaging period. According to section 504(b) of the Act, compliance may be determined by any method that provides sufficiently reliable and timely information for determining compliance, notwithstanding specific requirements elsewhere in the Act. Such methods include source testing, continuous emissions monitoring, or monitoring operating parameters related to the emission rate. Section 11.4 of this guideline provides a more detailed discussion of compliance monitoring.

REFERENCES FOR SECTION 8.3

1. "Once PM-10 design concentrations have been established through the use of air quality measurements or model estimates, a proportioning method can be used at each site to estimate control requirements for SIP development. This proportioning method differs from simple rollback in that the source contributions are determined from receptor or dispersion modeling and not directly from the emissions as in simple rollback." U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline*. Office of Air Quality Planning and Standards. EPA-450/2-86-001. June 1987. p. 6-8.

2. " . . . the control requirements applicable under PM-10 SIP's in effect for major stationary sources of PM-10 are also applicable to major stationary sources of PM-10 precursors, except where EPA determines that such sources do not contribute significantly to PM-10 levels which exceed the PM-10 NAAQS in the area . . . a determination will be based on air quality analyses, on any additional technical information discovered by individual States during SIP development, and on any other studies conducted by the State or EPA which may help to indicate whether major stationary sources of specific precursors contribute significantly to PM-10 concentrations in a particular area. . . . EPA intends to make a formal determination as to whether major stationary sources of PM-10 precursors contribute significantly to PM-10 levels in a particular area when it takes rulemaking action on the individual moderate area SIP's." 57 Federal Register 13,541 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Determination of RACM/RACT; PM-10 Precursors.

3. "There are several acceptable approaches for determining appropriate 24-hour PM_{10} design concentrations. These approaches which are described in the next sections are based on monitored or modeled PM_{10} concentrations. They include: (1) a table look-up procedure; (2) fitting a statistical distribution; (3) graphical estimation; and (4) the use of conditional probabilities. Each of these approaches and corresponding data usage requirements are presented in detail in the ozone guideline." U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline*. Office of Air Quality Planning and Standards. EPA-450/2-86-001. June 1987. pp. 6-1 through 6-8.

4. "Section 6.2 of the PM-10 SIP Development Guideline states that the preferred approach for estimating a design value is through the use of an applicable dispersion model corroborated by receptor models, any available total suspended particulates data, and any available PM-10 data. If corroboration is not possible, we recommend that the dispersion model be used except for periods of stagnation; for periods of stagnation, monitored PM-10 data should be used to establish the design value." Memorandum from Emison, Gerald A., Director, OAQPS, U.S. EPA, to Irwin L.

Dickstein, Director, Air and Toxics Division, Region VIII. Response to PM-10 Control Strategy Issues. June 30, 1989. (PN 110-89-06-30-103).

5. "It is appropriate in certain situations to rely on a receptor model (RM) demonstration as a basis for a control strategy demonstration. While it is clear from the guideline that the use of dispersion models in combination with receptor models is the preferred approach, in certain limited situations, the use of an RM demonstration alone may be adequate to demonstrate attainment. The State must obtain approval to use the RM demonstration option prior to SIP submittal. The decision that an RM demonstration is adequate to demonstrate attainment is the responsibility of the Regional Office. Even when an RM is employed, consideration should be given to initiation of basic meteorological measurements as a contingency to the control program being found inadequate and predictive dispersion modeling being necessary at a later time. The use of dispersion modeling and receptor modeling in combination remains the preferred approach when both models are applicable to a particular circumstance." Memorandum from Bauman, Robert D. Chief, SO_2/Particulate Matter Programs Branch and Joseph A. Tikvart, Chief, Source Receptor Analysis Branch, to Chief, Air Branch, Regions I-X. PM-10 SIP Demonstration for Small Isolated Areas with Spatially Uniform Emissions. July 5, 1990. (PN 110-90-07-05-106).

6. "The SIP-related emission limits should be based on the NAAQS (annual or 24-hour) which result in the most stringent control requirements. For example, if the annual NAAQS requires more stringent control requirements than the 24-hour NAAQS, the annual NAAQS is considered the more restrictive standard and the corresponding emission limit(s) would be adopted." U.S. Environmental Protection Agency. *PM-10 SIP Development Guideline*. Office of Air Quality Planning and Standards. EPA-450/2-86-001. June 1987. pp. 6-1 through 6-8.

8.4 CONTROL METHODS FOR PM-10 SOURCES

8.4.1 RACM/BACM Issuance

Under section 190 of the amended Act, EPA was required to issue technical guidance on reasonably available control measures (RACM) and best available control measures (BACM) for three PM-10 area source categories: (1) urban fugitive dust, (2) residential wood combustion, and (3) prescribed silvicultural and agricultural burning. EPA satisfied its obligation as to the RACM portion of such guidance when it published the *General Preamble*. Specific guidance on RACM for these source categories is provided in appendices C1, C2, and C3, respectively, to the *General Preamble*. In addition, section 190 requires EPA to examine other source categories contributing to PM-10 nonattainment, determine if additional guidance for RACM and BACM is needed, and issue any such guidance by November 15, 1993.[1]

8.4.2 RACM/BACM SIP Requirement

Under section 189(a)(1)(C) of the amended Act, moderate PM-10 nonattainment area SIP's must control PM-10 emissions by providing for the implementation of RACM. In addition, section 172(c)(1) states that the RACM which nonattainment area plans must provide be implemented, must include such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technologies (RACT). Thus, as stated in the *General Preamble*, together these two provisions require that moderate area PM-10 SIP's include RACM and RACT for existing sources of PM-10 emissions.[1]

8.4.3 Determining RACM/RACT

The suggested starting point for specifying RACM in each SIP is the listing of available control measures for fugitive dust, residential wood combustion, and prescribed burning including measures selected from among those listed in the appendices to the *General Preamble*. EPA does not presume that these control measures are reasonably available in any

or all areas; however, EPA expects States to provide reasoned justification for rejection of any measures listed as available in these appendices. Measures determined to be unreasonable because of insignificant emissions contributions from the sources affected may be excluded from further consideration. The resulting available control measures should then be evaluated for reasonableness, considering their technological feasibility and the cost of control in the applicable area. If a State receives public comment, in particular circumstances, demonstrating that additional control measures may be reasonably available, such measures should be added to the list of available measures for that area. The RACM is then determined for the affected area's SIP. States should also consider the feasibility of implementing measures in part when full implementation would be infeasible. When the process of determining RACM is completed, the individual measures should then be converted into a legally enforceable vehicle meeting EPA's criteria regarding the enforceability of SIP's and SIP revisions [see section 172(c)(6) and 110(a)(2)(A) of the Act].[2]

Historically, EPA has defined RACT as "the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility." RACT applies to existing sources of PM-10 stack, process fugitive, and fugitive dust emissions [see section 172(c)(1) of the Act]. EPA recommends that, in moderate nonattainment areas, major stationary sources be the minimum starting point for RACT analysis. EPA also recommends that available control technology be applied to existing sources that are reasonable to control in light of the attainment needs of the area and the feasibility of such controls. Thus, RACT analyses for existing stationary sources should not be limited to major stationary sources, but should include other sources in the area that are reasonable to control given the area's attainment needs.[3]

8.4.4 PM-10 Precursors

Primary emissions of sulfur dioxide, nitrogen oxides, and volatile organic compounds (VOCs) can be converted in the atmosphere to particulate sulfates, nitrates, and organic compounds that contribute to PM-10 levels. According to section 189(e) of the amended Act, the control requirements applicable under PM-10 SIP's in effect for major stationary sources of PM-10 are also applicable to major stationary sources of PM-10 precursors, except where the EPA determines that such sources do not contribute significantly to PM-10 levels which

exceed the PM-10 NAAQS in the area. Thus, for example, because moderate PM-10 nonattainment area SIP's should contain RACT for major stationary sources of PM-10, they should also contain RACT for major stationary sources of PM-10 precursors, unless EPA determines otherwise. EPA intends to make a formal determination of whether major stationary sources of PM-10 precursors contribute significantly to PM-10 levels in a particular area when EPA takes rulemaking action on individual moderate area SIP's. The discussion in the *General Preamble* is intended to provide initial guidance for controlling PM-10 precursors for major stationary sources in PM-10 moderate nonattainment areas. This guidance does not preclude any specific findings made by EPA based on its review of individual PM-10 nonattainment area SIP's.[4]

In the western United States, EPA generally believes that sources of sulfur dioxide and nitrogen oxides may contribute to PM-10 exceedances in several major metropolitan areas, but are not as likely to be significant contributors to the nonattainment problem in other western areas. If EPA determines that major stationary sources of SO_2 and NO_x in western areas do not contribute significantly to exceedances of the PM-10 NAAQS, such sources would not be expected to meet the control requirements (*e.g.*, RACT) applicable to major stationary sources of PM-10. This determination will be based on information contained in the SIP submittals, and on any other additional available information States may provide. In making its determination, EPA will consider the presence of factors which enhance the likelihood of secondary particulate formation, such as source mix and density, nonattainment area size, meteorology and topography.[4]

In the eastern United States, pollutant transport between airsheds can be responsible for a large portion of secondary particle concentrations in nonattainment areas. Under these circumstances, determining whether PM-10 precursor sources in a nonattainment area contribute significantly to PM-10 concentrations in the same area is more difficult. In all cases, as stated earlier, EPA will determine the applicability of section 189(e) based on all available technical information including any information provided by States in their individual SIP submittals. EPA will assess the reasonableness of each SIP submittal in part by considering the fact that regionwide reductions in precursor emissions are expected to result from the implementation of other provisions of the Act. These reductions may mitigate precursor contributions to PM-10 concentrations.[4]

EPA will consider the information submitted by States containing major stationary sources of VOCs in PM-10 nonattainment areas to determine if VOC emissions from such sources contribute significantly to exceedances of the ambient standard. EPA will assess the reasonableness of the submission when reviewing a SIP submittal containing a request for an exemption from PM-10 precursor controls because of VOC reductions obtained from implementing other control requirements of the amended Act.[4]

8.4.5 Condensible PM-10

Condensible particulate matter (CPM) is particulate matter that forms in the atmosphere as exhaust gases from a source cool. CPM emissions form particles in the PM-10 size range and are considered cool PM-10 emissions.[5] EPA believes that it is reasonable (and therefore constitutes RACT) to control CPM only where CPM comprises a significant proportion of the emissions from an existing stationary source.[5] A list of sources suspected of emitting significant amounts of condensible material is provided in the *PM-10 SIP Development Guideline*.[6]

8.4.6 Control Measures Available for Fugitive Dust RACM

Fugitive dust is particulate matter suspended in the air either by mechanical disturbance or by blowing wind. EPA policy is to reduce fugitive dust emissions using preventive measures rather than mitigative measures. Available control measures are listed in Appendix C1 of the *General Preamble* and include the following.[7]

1. Pave, vegetate, or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads and unpaved parking areas.

2. Require dust control plans for construction or land clearing projects.

3. Require haul trucks to be covered.

4. Provide for traffic rerouting or rapid cleaning of temporary sources of dust on paved roads.

5. Require paving or stabilizing of permanent unpaved haul roads, and parking or staging areas at commercial, municipal, or industrial facilities.

6. Develop traffic reduction plans for unpaved roads and apply measures to encourage the use of paved roads.

7. Limit use of recreational vehicles on open land.

8. Require improved material specification for and reduction of usage of skid control sand or salt.

9. Require curbing and pave or stabilize shoulders of paved roads.

10. Pave or chemically stabilize unpaved roads.

11. Establish dust control measures of material storage piles.

12. Provide for storm water drainage to prevent water erosion into paved roads.

13. Require vegetation, chemical stabilization, or other abatement of winderodible soil, including lands subjected to water mining, abandoned farms, and abandoned construction sites.

14. Rely upon the soil conservation requirements of the Food Security Act to reduce emissions from agricultural operations.

These measures apply to all fugitive dust sources except those associated with stationary sources where RACT is applicable. Technical guidance on fugitive dust control measures is found in *Control of Open Fugitive Dust Sources*.[8]

8.4.7 Control Measures Available for Residential Wood Combustion RACM

Wood smoke from residential wood combustion (RWC) is a significant source of PM-10 in some PM-10 nonattainment areas in the western United States. EPA has provided a

new source performance standard for RWC (53 FR 5860, February 26, 1988) to improve the performance of wood burning devices nationwide. EPA does not believe, however, that this standard alone will result in attainment of the PM-10 standards in areas affected by wood smoke.[9] Therefore, additional control measures were identified and are listed in Appendix C2 of the *General Preamble*. These include the following:[9]

1. Establish an episode curtailment program.

2. Establish a public information program.

3. Encourage improved performance of wood burning devices by:

- Establishing a program to identify, through opacity observation, deficiencies in stove operation and maintenance.
- Providing voluntary dryness certification for wood moisture.
- Evaluating and encouraging the accelerated changeover of existing devices to the new source performance standard or other clean burning stoves.

4. Provide inducements that would lead to reductions in the stove and fireplace population (or use) by:

- Slowing the growth of woodburning devices in new housing units.
- Encouraging a reduction in the number of woodburning devices.
- Discouraging the resale of used stoves.
- Discouraging the availability of free (or very inexpensive) firewood.

Additional guidance on control measures for residential wood combustion is contained in *Guidance Document for Residential Wood Combustion Control Measures*.[10]

8.4.8 Control Measures Available for Prescribed Burning RACM

For the purpose of PM-10 SIP development, prescribed burning consists of all open burning of vegetative matter, including silvicultural and agricultural burning. This includes planned ignitions, and prescribed natural fire. Prescribed burning contributes to PM-10 nonattainment in some regions of the United States.[11]

EPA believes that States should establish a smoke management (SM) program which will constitute RACM. Such programs should reduce population exposure to smoke from prescribed burning, while assuring that resource management goals are met. Nothing in a smoke management program constituting RACM is intended to influence vegetation management or fire suppression practices so as to increase the potential for wildfire to the point that natural resources or public safety are compromised.[11]

EPA believes that it is reasonable to apply a SM program in those moderate PM-10 nonattainment areas where it has been shown, through monitoring, modeling, or other analysis, that prescribed burning can or does contribute to exceedances of the PM-10 NAAQS. The smoke management program should also apply to those areas outside of the nonattainment area if it is shown that prescribed burning outside of the nonattainment area can or does contribute to the exceedances. The prescribed burning RACM may be limited only to the season(s) when PM-10 exceedances occur if it can be shown that the annual PM-10 NAAQS is not violated. In addition, it may not be reasonable to control certain source categories with *de minimis* impact based on consideration of their collective influence on PM-10 emissions, duration, season, and proximity to affected populations.[11]

Appendix C3 of the *General Preamble* discusses the control measures available for prescribed burning.[11] An SM program should consist of at least the following components:

1. *Smoke dispersion evaluation.* The program should use meteorological analyses to determine when meteorological conditions are favorable or unfavorable for burning.

2. *Burn planning authorization and administration.* The smoke management program should provide a process (*e.g.*, telephone call-in) for receiving burn requests, evaluating requests and granting approval of burns.

3. *Requirements for ensuring burner qualifications.* Voluntary training in smoke management techniques should be reasonably available for all burners.

4. *Public education and awareness.* Information programs on the nature of and reasons for smoke management should be periodically presented to the public.

5. *Surveillance and enforcement.* The SM program should rely on routine PM-10 monitoring, and/or modeling supplemented by periodic visual assessments of the effectiveness of the dispersion evaluation program.

6. *Emission inventories and emission efforts.* States should develop and maintain an emission inventory for prescribed burning and all burns should be categorized as to their purpose.

7. *State oversight.* The relationship of the State air pollution agency with other State agencies to which management of the SM program may have been delegated will need to be determined on a State-by-State basis.

8.4.9 RACT Determination for Stationary Sources

The amended Act requires RACT for PM-10 nonattainment area SIP's. Appendix C4 of the *General Preamble* discusses RACT determinations for stationary sources. The EPA recommends that RACT for a particular source be determined on a case-by-case basis depending on both the technological and economic feasibility of reducing emissions from that source. Control may be implemented through process changes or through add-on control technology. The technological feasibility of applying an emission reduction should consider the source's process and operating procedures, raw materials, physical plant layout, and any other environmental impacts such as water pollution, waste disposal, and energy requirements. Analysis of economic feasibility should include the cost of reducing emissions and the cost differential between the particular source and other similar sources that have implemented emission reductions.[12]

Alternative approaches to reducing emissions of PM-10 are discussed in *Control Techniques for Particulate Emissions from Stationary Sources - Volume I and Volume II*.[13,14] Additional sources of information on control technology are background information documents for new source performance standards and *Identification, Assessment, and Control of Fugitive Particulate Emissions*.[15]

REFERENCES FOR SECTION 8.4

1. 57 Federal Register, 13,540 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; RACM/RACT.

2. 57 Federal Register, 13,540 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Determination of RACM/RACT; RACM.

3. 57 Federal Register, 13,541 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Determination of RACM/RACT; RACT.

4. 57 Federal Register, 13,541-2 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Determination of RACM/RACT; PM-10 Precursors.

5. 57 Federal Register, 13,542-3 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Determination of RACM/RACT; Condensible PM-10.

6. U.S. Environmental Protection Agency, *PM-10 SIP Development Guideline*, EPA-450/2-86-001, Research Triangle Park, NC, June 1987. P.5-33.

7. 57 Federal Register, 18,072 (April 28, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Supplemental; Proposed Rule; Appendix C1 - Available Fugitive Dust Control Measures.

8. U.S. Environmental Protection Agency, *Control of Open Fugitive Dust Sources*. EPA-450/3-88-008, Research Triangle Park, NC, September 1988.

9. 57 Federal Register, 18,072 (April 28, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Supplemental; Proposed Rule; Appendix C2 - Available Residential Wood Combustion Control Measures.

10. U.S. Environmental Protection Agency, *Guideline Series - Guidance Document for Residential Wood Combustion Emission Control Measures*, EPA-450/2-89-015, Research Triangle Park, NC, September 1989.

11. 57 Federal Register, 18,072-3 (April 28, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Supplemental; Proposed Rule; Appendix C3 - Prescribed Burning Control Measures.

12. 57 Federal Register, 18,073-4 (April 28, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Supplemental; Proposed Rule; Appendix C4 - RACT Determinations for Stationary Sources.

13. U.S. Environmental Protection Agency, *Control Techniques for Particulate Emissions from Stationary Sources - Volume I.* EPA 450/3-81-005a. Research Triangle Park, NC, September 1982.

14. U.S. Environmental Protection Agency, *Control Techniques for Particulate Emissions from Stationary Sources - Volume II.* EPA 450/3-81-005b. Research Triangle Park, NC, September 1982.

15. U.S. Environmental Protection Agency, *Identification, Assessment, and Control of Fugitive Particulate Emissions.* EPA 600/8-86-023. Research Triangle Park, NC, August 1986.

9.0 GENERAL PROVISIONS

9.1 GENERAL

NAAQS are established at a level to protect the public health and welfare. On July 1, 1987, EPA revised the NAAQS for particulate matter, replacing TSP as the indicator for particulate matter with a new indicator that included only those particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers (called PM-10).[1] The amount of time that areas are given to reach the NAAQS depends on whether the standard is a primary standard (health based) or a secondary standard (welfare based).[2,3] The PSD increments are set to prevent relative deterioration in air quality for different classes.

SIP's and SIP revisions provide for the implementation, maintenance, and enforcement of measures needed to attain and maintain the NAAQS. If the provisions in a SIP are found to be substantially inadequate, a SIP call may be issued by the U.S. EPA.

REFERENCES FOR SECTION 9.1

1. 52 Federal Register 24,634 (July 1, 1987), Revisions to the National Ambient Air Quality Standards for Particulate Matter.

2. U.S. Congress. Clean Air Act, as amended November 1990. 42 U.S.C. 7401 *et. seq.* Section 109. Washington, D.C. U.S. Government Printing Office.

3. U.S. Congress. Clean Air Act, as amended November 1990. 42 U.S.C. 7401 *et. seq.* Section 110(a). Washington, D.C. U.S. Government Printing Office.

9.2 CLEAN AIR ACT REQUIREMENTS: TIME FRAMES AND PM-10 NAAQS SIP REQUIREMENTS

9.2.1 Designations

On the date the Clean Air Act Amendments were enacted, (November 15, 1990), by operation of law PM-10 areas were designated as either nonattainment or unclassifiable. Areas meeting the qualifications of section 107(d)(4)(B) were designated nonattainment. These areas included all former Group I areas identified in 52 FR 29383 (August 7, 1987) and 55 FR 45799 (October 31, 1990) and other areas violating the PM-10 NAAQS prior to January 1, 1989. All other areas were designated unclassifiable. A Federal Register notice announcing all of the areas designated nonattainment for PM-10 at enactment of the amended Act and classified as moderate was published in 56 FR 11101 (March 15, 1991). A subsequent notice correcting certain information in the March 15, 1991 notice was published in 56 FR 37654 (August 8, 1991). The amended Act allows EPA to redesignate any of the areas designated unclassifiable to nonattainment in accordance with section 107(d)(3), after the date of enactment. On April 22, 1991 EPA announced in 56 FR 16274 that it had initiated the redesignation process for 16 areas.[1]

9.2.2 Classification

Section 188 of the amended Act outlines the process for classification of areas designated nonattainment and establishes the corresponding attainment date. In accordance with section 188(a), all PM-10 nonattainment areas are initially classified as moderate. If, at any time before the applicable attainment date, EPA determines that a moderate area cannot "practicably" attain the PM-10 NAAQS by the Act deadline, the area may be reclassified as serious. A moderate area may also be reclassified as serious after the passage of the moderate area attainment date if EPA determines that the area has failed to attain the standard. EPA's decisions to reclassify areas will be based on facts specific to each area under review. EPA must provide notices in the Federal Register and an opportunity for public comment before making reclassification decisions. EPA believes its policy of reclassification creates an incentive for the timely submittal and effective implementation of moderate area SIP requirements and facilitates the PM-10 attainment objective.[2]

9.2.3 Attainment Dates

The *General Preamble* addresses only the control measures recommended for moderate PM-10 nonattainment areas. As such, the following discussion is limited to the attainment dates for moderate nonattainment areas. Section 188(c)(1) of the amended Act specifies that moderate nonattainment areas designated nonattainment upon enactment (initial moderate nonattainment areas) are to attain the PM-10 NAAQS as expeditiously as practicable, but no later than December 31, 1994, unless they are reclassified as serious. Those areas designated nonattainment subsequent to enactment and classified as moderate must attain the PM-10 NAAQS as expeditiously as practicable, but no later than the end of the sixth calendar year after the area's designation as nonattainment.[2] Under section 188(d) of the Act, the attainment date for a moderate area may be extended for 1 year provided that the State has fully complied with the applicable SIP, no more than one exceedance of the 24-hour PM-10 standard has occurred in the year preceding the extension year, and the annual mean PM-10 concentration is less than or equal to the annual PM-10 standard. For an area, no more than two such extensions may be granted by EPA.

For moderate areas designated nonattainment by operation of law upon enactment of the amended Act and subsequently determined by EPA to be unable to "practicably" attain the NAAQS by December 31, 1994, the amended Act specifies certain dates by which EPA must propose to reclassify those areas as serious and take final action. Those areas designated nonattainment after enactment, must be reclassified as serious within 18 months after the required submittal date for the moderate area SIP. Taken together with the requirement that a SIP be submitted 18 months after an area is designated nonattainment, EPA is required to reclassify an appropriate moderate area as serious within 3 years of the nonattainment designation.[2]

9.2.3.1 Attainment date waiver

Under section 188(f) of the amended Act, EPA has the authority to waive specific attainment dates for moderate PM-10 nonattainment areas where nonanthropogenic sources contribute significantly to the violation of the PM-10 NAAQS. The attainment date may be waived, however, only for areas that fully implement their moderate area SIP requirements.

As a result, any State requesting an attainment date waiver should nevertheless proceed with SIP development and implementation. Nonanthropogenic sources include only those emissions where the human role is slight or nonexistent. EPA will be issuing additional guidance on the scope of the waiver provision as it applies to both moderate and serious PM-10 nonattainment areas.[3]

9.2.3.2 International border areas

Under section 179B of the amended Act, a SIP for a moderate PM-10 nonattainment area affected by emissions from sources located outside the United States may be approved by EPA, although it fails to demonstrate attainment by the applicable date, provided the plan meets all other applicable requirements of the Act. The State must satisfy EPA that the SIP would be adequate to attain by the applicable date, except for emissions originating outside the United States. The SIP must also meet all of the applicable requirements (*e.g.*, RACM/RACT) under the Act. In general, EPA expects that such areas will be adjacent to international borders.[4]

9.2.4 Plan Submission

States must develop and submit SIP's providing for the attainment of the PM-10 NAAQS for every area designated as nonattainment and classified as moderate for PM-10 under the amended Act. For initial moderate PM-10 areas (designated nonattainment upon enactment), section 189(a)(2) of the amended Act requires States to submit a SIP revision (*e.g.*, including RACM/RACT and an attainment demonstration) by November 15, 1992. The NSR program provisions for these areas were due June 30, 1992. For PM-10 areas designated nonattainment after enactment of the Act, States are required to submit SIP's within 18 months of the date of designation. Specific requirements applicable to moderate nonattainment areas include the requirement that SIP's provide for an NSR permit program; an attainment demonstration (or a demonstration that attainment is impracticable); RFP/quantitative milestones; the control of PM-10 precursors; RACM/RACT; and contingency measures. These requirements are discussed below.[5]

9.2.4.1 NSR permit program

Section 189(a)(1) of the amended Act requires States with moderate PM-10 nonattainment areas to meet the requirements of section 172(c)(5) by submitting an implementation plan containing a permit program meeting the requirements of section 173 for the construction and operation of new and modified major stationary sources of PM-10 (and, in some cases, PM-10 precursors). For initial moderate PM-10 areas designated nonattainment upon enactment, States must submit a SIP revision to EPA containing the NSR program provisions for these areas by June 30, 1992. For PM-10 areas designated nonattainment after enactment of the Act, States are required to submit SIP's containing the NSR program within 18 months after designation of each affected area.[6]

Section 10.2.6 of this guideline provides additional information on NSR permit program requirements under the amended Act.

9.2.4.2 Attainment demonstration

States with moderate PM-10 nonattainment areas are required under section 189(a)(1)(B) of the amended Act to submit a demonstration showing attainment by the applicable attainment date. Such demonstrations must include air quality modeling. Alternatively, the State may show that attainment by the applicable date is impracticable. A SIP submittal demonstrating attainment must contain a comprehensive, accurate, current inventory of actual emissions from all sources of PM-10 in the area as established in section 172(c)(3).[7]

Modeling guidelines to be followed in the demonstration of attainment for the initial moderate PM-10 nonattainment areas include *PM-10 SIP Development Guideline* (June 1987); *Guideline on Air Quality Models (Revised)*; a memorandum from Tikvart and Bauman titled *PM-10 SIP Demonstration for Small Isolated Areas with Spatially Uniform Emissions* (July 5, 1990); and any applicable regulatory requirements. In addition, Appendix C5 of the *General Preamble* provides EPA's supplemental attainment demonstration policy that may be followed in some special circumstances. For moderate areas designated after enactment of the amended Act, the attainment demonstration will be reviewed in accordance with the general guidelines cited above and any other applicable EPA guidance or regulations. The

supplemental policy provided in Appendix C5 of the *General Preamble* will not apply to these areas.[7]

9.2.4.3 Reasonable further progress

States must submit PM-10 nonattainment area SIP's which include quantitative emissions reductions milestones to be achieved every 3 years until an area is redesignated attainment. These milestones should demonstrate RFP as described under section 171(1). States must demonstrate to EPA that the SIP measures are being implemented and the milestones have been met within 90 days after the milestone due date. It is then EPA's responsibility to determine whether the State's demonstration is adequate within 90 days of receiving the demonstration.

If a State fails to submit the quantitative milestone demonstration, or EPA determines that a milestone was not met, the State is required to submit a SIP revision due within 9 months of either the missed reporting date or EPA's determination that a milestone was missed. The SIP revision must also ensure that the next milestone will be achieved by the applicable date and/or the PM-10 attainment date will be met if there are no additional milestones.[8]

Section 189(c) does not define the starting point for counting the 3-year period for RFP milestones. EPA's position concerning this issue is provided in the *General Preamble*. The first quantitative milestone deadline for initial PM-10 moderate nonattainment areas is November 15, 1994.[8]

Note that the December 31, 1994 attainment date is only 46 days after the November 15, 1994 milestone deadline. Therefore, EPA's policy for initial PM-10 moderate nonattainment areas is that the emissions reductions progress made between the SIP submittal due date (November 15, 1991) and the attainment date (December 31, 1994) will satisfy the first quantitative milestone. This policy was adopted because it is administratively impracticable to require separate milestone and attainment demonstrations within such a narrow timeframe. EPA is required to determine whether a nonattainment area has attained the standards within 6 months after the applicable attainment date under sections 179(c) and 188(b)(2) of the Act. Therefore, consistent with the milestone requirement, within 90 days

after the December 31, 1994 attainment date, States must demonstrate that the SIP has been implemented and the area has attained the standards or, alternatively, qualifies for a 1-year extension of the attainment date under section 188(d) of the Act.[8]

EPA plans to issue future guidance on the RFP/quantitative milestone requirements for those areas designated moderate PM-10 nonattainment after enactment of the amended Act.[8]

9.2.4.4 PM-10 precursors

Section 189(e) of the Act provides that the applicable control requirements under PM-10 nonattainment area SIP's in effect for major stationary sources of PM-10 are also applicable to major stationary sources of PM-10 precursors, except where EPA determines that the sources of PM-10 precursors do not contribute significantly to PM-10 levels which exceed the PM-10 NAAQS in the area. In general, EPA's determination will be based upon air quality analysis in which States assess the contribution of precursors. If precursors do contribute to nonattainment, States must consider both the source-receptor relationship and the significance of precursor contributions to overall nonattainment.[9] Section 8.4.4 of this guideline discusses EPA's initial guidance for controlling PM-10 precursors for major stationary sources in moderate PM-10 nonattainment areas.

In determining the significance of and the need to control precursors in a specific area, EPA will rely in part on the technical information contained in the State's submittal. This information includes, but is not limited to, filter analysis, the relative contribution of precursors to overall nonattainment, and the State's RACT/RACM strategy. EPA encourages the States to submit additional material for consideration. All findings will be made on a case-by-case basis due to the different conditions present among the various nonattainment areas. EPA has provided initial guidance for controlling PM-10 precursors for major stationary sources in moderate PM-10 nonattainment areas in the *General Preamble*. EPA intends to provide additional guidance, if necessary, on control requirements for major stationary sources of PM-10 precursors when it issues proposed regulations for the NSR permit program applicable to PM-10 nonattainment areas, and when it issues guidance on control technology requirements applicable to major stationary sources in serious PM-10 nonattainment areas.[9]

9.2.4.5 RACM/RACT

Section 189(a)(1)(C) of the amended Act requires that moderate area SIP's include RACM for the control of PM-10 emissions. Section 172(c)(1) of the amended Act requires that RACM for nonattainment areas include "such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology . . . " Together these two provisions require that moderate area PM-10 SIP's include RACM and RACT for existing sources of PM-10 emissions.[10]

Under section 189(a)(1) of the amended Act, initial moderate PM-10 nonattainment areas must submit SIP's containing RACM/RACT control measures by November 15, 1991. These SIP's must provide for the implementation of RACM/RACT no later than December 10, 1993. Under section 189(a)(2)(B), areas designated nonattainment and classified as moderate after enactment must submit SIP's containing RACM/RACT control measures 18 months after the nonattainment designation. Under section 189(a)(1)(C), these SIP's must provide for the implementation of RACM/RACT no later than 4 years after designation, which is 30 months after the applicable SIP submittal deadline.[10]

9.2.4.6 Contingency measures

As provided in section 172(c)(a) of the amended Act, all moderate PM-10 nonattainment area SIP's must include contingency measures. Contingency measures are measures that become effective without further action by the State or EPA, upon determination by EPA that the area has failed to make RFP or to attain the PM-10 NAAQS by the statutory deadline. Contingency measures should consist of available control measures not included in the primary control strategy.[11]

Under section 172(b), the Administrator of EPA sets a schedule (not to extend 3 years from the affected areas' nonattainment designation) for when the provisions required under section 172(c) must be submitted. The Administrator has not set a schedule for when contingency measures are due for the initial moderate PM-10 nonattainment areas and, therefore, States are not obligated to submit contingency measures. EPA has provided guidelines in a February 25, 1992 memorandum on the contingency measure due date for the

initial moderate PM-10 nonattainment areas. Among other things, guidance also addresses how EPA may treat contingency measure States have already submitted.[12]

REFERENCES FOR SECTION 9.2

1. 57 Federal Register 13,573 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; Designations.

2. 57 Federal Register 13,537 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; Classifications and Attainment Dates.

3. 57 Federal Register 13,544-5 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; SIP's That Do Not Demonstrate Attainment; Attainment Date Waiver Nonanthropogenic Sources.

4. 57 Federal Register 13,545 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; SIP's That Do Not Demonstrate Attainment; International Border Areas.

5. 57 Federal Register 13,538 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; General SIP Requirements.

6. 57 Federal Register 13,538 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; NSR Permit Program.

7. 57 Federal Register 13,538-9 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; Attainment Demonstration.

8. 57 Federal Register 13,539 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; RFP/Quantitative Milestones.

9. 57 Federal Register 13,539-40 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; PM-10 Precursors.

10. 57 Federal Register 13,539-40 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; Statutory Background; RACM/RACT.

11. 57 Federal Register 13,543-4 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; SIP Requirements; Particulate Matter; SIP's That Demonstrate Attainment.

12. " However, the Administrator has not set a schedule for the PM-10 contingency measure submittal. The August 1991 guidance was not issued by the Administrator. Therefore, until the Administrator establishes the due date, States are not obligated to submit contingency measures." Memorandum. John Calcagni, Director, Air Quality Management Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC, to Director, Air Pesticides and Toxics Management Division, Region I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air and Radiation Division; Director, Air, Pesticides, and Toxics Division VI; and Director, Air and Toxics Division, Regions VII, VIII, IX, and X. *Contingency Measure Due Date for Initial PM-10 Moderate Nonattainment Areas.* February 25, 1992.

9.3 CURRENT NAAQS AND PSD PROGRAM

9.3.1 National Ambient Air Quality Standards

The EPA is required, under section 109 of the Act, to establish NAAQS for each pollutant for which air quality criteria are established (under Section 108 of the Act). There are two types of NAAQS: primary and secondary. The primary NAAQS are established to protect public health with an adequate margin of safety. The secondary NAAQS protect public welfare (soil, crops, vegetation, animals, visibility, building materials, etc.) from known or anticipated effects. For PM-10, the primary and secondary NAAQS are the same. The current PM-10 NAAQS is 50 $\mu g/m^3$ based on an expected annual arithmetic mean and 150 $\mu g/m^3$ based on the expected maximum 24-hour concentration not to be exceeded more than once per year.[1]

9.3.2 Prevention of Significant Deterioration Program

Part C of Title I of the Act (sections 160-169) establishes the basis for the PSD program. The PSD regulations apply in section 107 areas designated as attainment or unclassifiable. Each applicable SIP must contain emission limitations and other measures as needed to prevent significant deterioration of air quality in such areas.

The PSD permitting program is intended to balance three primary goals. The first of these goals is to protect public health and welfare. This goal includes avoiding air quality degradation in all areas that are attaining the NAAQS. The second goal emphasizes the protection of air quality in national parks, wilderness areas, and similar areas of special concern where air quality is considered particularly important. The third goal is to ensure that economic growth which causes environmental degradation in clean areas occurs only after careful deliberation by State and local communities.

The PSD regulations require that "major" new stationary sources and "major" modifications be carefully reviewed prior to construction to ensure compliance with the NAAQS, the applicable PSD air increments, and the requirement to apply best available control technology (BACT) to minimize the project's emissions of air pollutants.

The PSD permitting program requirements become effective when the net emissions increase for any pollutant emitted by a source is "significant."[2] The significance threshold established for particulate matter is 25 tpy of total particulate matter emissions and 15 tpy of PM-10 emissions.[3] If a source is subject to PSD review, then PSD review will be applied to each pollutant the source emits in greater than *de minimis* amounts, unless the area is designated a nonattainment.

The PSD program is implemented through the use of ambient air quality increments and area classifications that effectively define "significant deterioration" in a given area for individual pollutants. Air quality increments are the maximum allowable increase in ambient air concentration above a baseline concentration. Note that emissions from all sources within the area, including minor sources, are considered for the purpose of establishing increments.

The area classifications establish three classes of geographical areas. Class I areas are regions of special national environmental concern such as national parks. Class II areas are PSD areas not identified in the Act as Class I areas. There are currently no Class III areas.

Table 9-1 shows the current PSD increments for particulate matter.[4]

TABLE 9-1. CURRENT PSD INCREMENTS FOR PM MEASURED AS TSP

Class	Maximum Allowable Increase ($\mu g/m^3$)	
I	5	(TSP, annual geometric mean)
	10	(TSP, 24-hour maximum)
II	19	(TSP, annual geometric mean)
	37	(TSP, 24-hour maximum)
III	37	(TSP, annual geometric mean)
	75	(TSP, 24-hour maximum)

REFERENCES FOR SECTION 9.3

1. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I. Subchapter C, Part 50.6. July 1, 1991.

2. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I. Subchapter C, Part 51.166(b)(2)(i). July 1, 1991.

3. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I. Subchapter C, Part 51.166(b)(23)(i). July 1, 1991.

4. U.S. Congress. Clean Air Act, as amended November 1990. 42 U.S.C 7401 *et. seq.* Section 163(b). Washington, D.C. U.S. Government Printing Office.

9.4 SIP REVISIONS

9.4.1 General

All SIP revisions must include a demonstration that the NAAQS and PSD increments are not violated in the area. Specific requirements for SIP processing are contained in *Guidelines for the Review of SIP Revisions by EPA Regional Offices.*[1]

9.4.2 SIP Completeness

In accordance with the requirements of section 110(k)(1) of the amended Act, EPA has promulgated minimum completeness criteria that any SIP submittal must meet [see 56 FR 23826 and 56 FR 42216]. The minimum completeness criteria serve as a tool for EPA to assess whether a SIP submittal is complete and, therefore, adequate to trigger an EPA review and action on the submittal. The completeness criteria provide criteria and procedures that can be used by States to prepare adequate SIP submittals.[2]

Two categories of criteria have been developed in order to determine whether a submittal by a State is complete: (1) administrative information and (2) technical support information. Administrative information includes the documentation necessary to demonstrate that the State has adhered to basic administrative procedures during the rule adoption process. Technical support information includes the documentation that adequately identifies all of the required technical components of the plan submission. If a submittal is determined to be complete, EPA will inform the State by letter of its determination and then begin the formal review for approvability. If a submittal is determined to be incomplete, EPA will return it to the State with a letter listing the deficiencies. EPA will attempt to make completeness determinations within 60 days of receiving a submittal in accordance with section 110(k)(1)(B) of the amended Act. However, if a completeness determination is not made by EPA within 6 months of its receipt of the submittal, the submittal will be deemed complete.[2]

9.4.3 Approval Options

In the processing of SIP submittals, there are three general situations that can occur related to each required submittal: (1) the State may fail to submit the required plan; (2) the State may make a submittal that is deemed incomplete; or (3) the State may make a complete submittal. If the State fails to make a required submittal or makes a submittal that is determined by EPA to be incomplete, the sanctions and FIP provisions of sections 179 and 110(c) will be triggered. (The sanctions and FIP provisions of the Act are discussed in section 9.5 of this guideline.) If EPA determines that a submittal is complete, it must either approve or disapprove the submittal within a certain period of time.[3] However, in some instances a State's complete SIP submission may include provisions that do not comply with applicable requirements of the Act. In those instances, EPA may issue a partial approval, a limited approval, or a conditional approval.[4,5]

Section 110(k)(3) of the amended Act addresses the situation in which a separable portion of a submittal meets all applicable requirements of the Act. If the disapproved portions of a SIP submittal are separable (*i.e.*, disapproval of a provision does not affect the stringency of other portions of the SIP), EPA will grant a partial approval of the SIP submittal.[5] The disapproval of any part of a SIP submittal starts the clocks for the sanction and FIP requirements.[6]

In some instances, inseparable portions of a SIP submittal may be disapproved. However, if the submittal as a whole has a strengthening effect on the SIP, EPA may grant a limited approval of the SIP submittal.[5,7] The amended Act does not address situations requiring limited approval. Rather, EPA is using its "gap-filling" authority under sections 301(a) and 110(k)(3) to interpret the Act to provide for such actions.[5,8]

Under section 110(k)(4) of the amended Act, EPA may conditionally approve a plan based on a commitment of the State to adopt specific enforceable measures by a specified date within 1 year from the date of approval of the plan revision that incorporated that commitment.[9,10] If EPA determines that the State fails to meet the commitment within that year, the conditional approval would automatically become a disapproval. The sanctions and FIP clocks do not begin to run until the conditional approval becomes a disapproval.[10]

EPA's stated policy is to grant conditional approvals only in rare situations that merit special consideration and after evaluating specific types of SIP submittals. To ensure consistency, EPA's policy is to urge the Regions not to use conditional approvals without input from Headquarters as to whether such an approach is appropriate.[11] In general, the greater the extent to which a submittal is lacking in important plan elements, the less appropriate the use of conditional approval may be. In some cases, EPA may accept a SIP revision consisting of a commitment only (with no specifically adopted rules) as a candidate for conditional approval.[12]

Because conditional approval relies on a commitment from the State, EPA needs to make a determination of whether the State can reasonably be expected to meet its commitment. This determination would be based on consideration of a number of factors including, but not limited to, (1) the amount of technical work necessary for the measures to be adopted; (2) whether the measures are controversial; (3) the average length of the State adoption process and how far along in the process the State is; and (4) the State's past track record.[13] For conditional approvals, sanctions and FIP clocks start if and when the approval is converted to a disapproval.[14]

9.4.4 Grandfathering

Generally, all SIP revisions are evaluated based on the requirements in existence at the time of EPA's rulemaking. However, EPA does have the flexibility to grandfather certain provisions in new regulations if the following conditions are met: (1) the new rule would represent an abrupt departure from existing practice; (2) affected parties must have relied on the old rule; (3) the new rule would impose a large burden on those affected; and (4) there would be little statutory interest in applying the new rule.[15] (For grandfathering of modeling analyses, see Section 6.2.)

Grandfathering is neither mandatory nor automatic. In determining whether to grandfather a State-submitted rule, the decision-maker should focus on whether good-faith efforts were made to comply with the existing rules. Grandfathering should not allow sources to circumvent tighter requirements or agencies to avoid difficult decisions.[16]

Exceptions to the allowance of grandfathering provisions include the following:

- If a court ruling has explicitly changed a current Federal requirement
- If the old regulation or policy was ill-founded
- If it would have substantial adverse environmental impact
- If lack of compliance with the new requirements renders the SIP inadequate for NAAQS attainment[17]

9.4.5 SIP Relaxations

All SIP relaxations should contain the following information in a Federal Register notice and/or technical support document: (1) plant name and location; (2) facility size (including number of units); (3) revised PM-10 emission limit, existing SIP limit, and corresponding averaging times; and (4) actual and "paper" (allowable) emissions decrease or increase.[18]

9.4.6 SIP Tightening

In general, where a SIP revision will result in an emissions decrease at a specific source and there is no other change in the stack parameters, a new control strategy demonstration will not be required.

REFERENCES FOR SECTION 9.4

1. U.S. Environmental Protection Agency, *Guidelines for the Review of SIP Revisions by EPA Regional Offices*. EPA-450/2-89-005, Research Triangle Park, NC, February 1989.

2. 57 Federal Register 13,565 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; EPA Requirements; SIP Processing Requirements; Completeness.

3. "In general, there are three situations that can occur related to each required submittal: the State may fail to submit the required plan, the State may make a submittal that is not complete, or the State may make a complete submittal. Once a State submits a SIP and EPA has determined that the submittal is complete, EPA must either approve or disapprove the submittal within a specified time period. However, if the State fails to make a required submittal or makes a submittal that is determined to be incomplete, the sanctions and FIP provisions of section 179 and 110(c), respectively, will be triggered." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

4. "There are, however, three alternatives to full approval or full disapproval of a complete SIP submittal: partial approval, limited approval, and conditional approval." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

5. 57 Federal Register 13,565-6 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; EPA Requirements; SIP Processing Requirements; Partial Approvals; Full, Partial, and Limited Approval and Disapproval.

6. "In the case where a separable portion of the submittal meets all of the applicable requirements, partial approval may be used to approve that part of the submittal and disapprove the remainder. It is important that the two parts of the submittal be

separable. The EPA can approve some of the rules and disapprove the rest as long as the rules that are disapproved do not affect those that are approved. The disapproval of any part of a required SIP submittal starts the clocks discussed above for sanctions and FIP's." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

7. "In some cases, a submittal may contain certain provisions that meet the applicable requirements of the Act along with other provisions that do not meet the requirements, and the provisions are not separable. Although a submittal may not meet all of the applicable requirements, EPA may want to consider whether the submittal as a whole has strengthening effect on the SIP. If this is the case, limited approval may be used to approve a rule that strengthens the existing SIP as representing an improvement over what is currently in the SIP and as meeting some of the applicable requirements of the Act." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

8. "The Act does not expressly provide for limited approvals. Rather, EPA is using its 'gap-filling' authority under section 301(a) of the Act in conjunction with section 110(k)(3) approval provision to interpret the Act to provide for this type of approval action. . . A key distinction between the limited approval and a partial approval is that under a limited approval EPA's approval action goes to the entire rule. In other words, although portions of a rule prevent EPA from finding that the rule meets a certain requirement of the Act, EPA believes that the rule, as a whole, strengthens the SIP. Therefore, EPA approves the entire rule -- even those portions that prohibit full approval. Likewise, when EPA issues the limited disapproval, the disapproval applies to the entire rule as failing to meet a specific requirement of the Act. The rule remains a part of the SIP, however, under the limited disapproval, because the rule strengthens the SIP. The primary advantage of using the limited approval approach is to make the State submittal federally enforceable and to increase the SIP's potential to achieve additional reductions. Therefore, limited approval should not be used to approve any rule that is unenforceable for all situations. These rules and any other rules that do not have an overall strengthening effect on the SIP should be disapproved. Limited approval can be used, however, where the rule is unenforceable for some limited number of situations but is enforceable for the majority of situations,

if the rule, as a whole, strengthens the SIP . . . The disapproval coinciding with (or following) the limited approval also starts the sanctions and FIP clocks discussed above." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

9. "Under section 110(k)(4) of the Act EPA may conditionally approve a plan based on a commitment from the State to adopt specific enforceable measures within 1 year from the date of approval." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

10. 57 Federal Register 13,566 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; EPA Requirements; SIP Processing Requirements; Partial Approvals; Conditional Approval.

11. "We will evaluate specific types of SIP submittals [*e.g.*, reasonable available control technology (RACT) catch-ups, particles with aerodynamic diameter less than or equal to a nominal 10 micrometers (PM-10) SIP's] to determine whether certain elements of that type of submittal, or that type of submittal as a whole, merit conditional approval. For this reason and to ensure consistency, Regions should not use conditional approvals without input from Headquarters as to whether such an approach is appropriate." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

12. "As a general matter, the greater the extent to which a submittal is lacking in important plan elements, the less appropriate the use of conditional approval may be. It should be noted however, that there may be circumstances under which EPA would accept a SIP revision consisting of a commitment only (without specifically adopted rules) as a candidate for conditional approval. In such cases, the commitment should

also be accompanied by a work plan detailing any specific measures to be adopted, the steps that will be taken to adopt the measures, and the schedule for adoption of those measures. As stated earlier, a submittal that consists entirely of a commitment will be considered a SIP revision that is subject to the State process for submitting SIP revisions. Where the submittal contains specifically adopted rules that need some revisions or corrections to be fully-approvable, the commitment may not need to be as comprehensive. The commitment should, however, be as explicit as possible concerning the measures that will be adopted, the steps that will be taken to adopt the measures, and the schedule for adoption of those measures." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

13. "Because the conditional approval relies on a commitment from the State, EPA would need some level of confidence that the State would be able to meet such a commitment. In making a determination as to whether a State could reasonably be expected to meet its commitment, EPA would need to consider a number of factors such as: the amount of technical work necessary for measures to be adopted; whether adoption of the measures is expected to be controversial; the average length of the State adoption process; how far along in the process the State is; and the State's past track record. It should be noted that these are only some of the factors that should be considered. Each Region, in making a determination regarding the credibility of the State's commitment, may have to look at a number of other factors." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

14. "Unlike the limited approval/disapproval, the conditional approval does not immediately start the sanctions and FIP clocks. These clocks start if and when the approval is converted to a disapproval. There are at least two ways that the conditional approval may be converted to a disapproval. There are at least two ways that the conditional approval may be converted to a disapproval. First, if the State fails to adopt and submit the specified measures by the end of 1 year (from the final conditional approval), or fails to submit anything at all, EPA will have to issue a finding of disapproval but will not have to propose the disapproval . . . Therefore, at the end of 1 year from the conditional approval, the Regional Administrator (RA) will send a letter to the State finding that it had failed to meet its commitment and that the SIP submittal is disapproved. The 18-month clock for sanctions and the 2-year clock

for FIP start as of the date of the letter. Subsequently, a notice to that effect will be published in the Federal Register, and appropriate language will be inserted in the Code of Federal Regulations. Similarly, if EPA receives a submittal addressing the commitment but determines that the submittal is incomplete, the RA will send a letter to the State making such a finding. As with the failure to submit, the sanctions and FIP clocks will begin as of the date of the finding letter. Second, where the State does make a complete submittal by the end of the 1-year period, EPA will have to evaluate that submittal to determine if it may be approved and take final action on the submittal within 12 months after the date EPA determines the submittal is complete. If the submittal does not adequately address the deficiencies that were the subject of the conditional approval, and is therefore not approvable, EPA will have to go through notice-and-comment rulemaking to disapprove the submittal. The 18-month clock for sanctions and the 2-year clock for a FIP start as of the date of final disapproval." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

15. "However, an agency does have some flexibility to provide grandfathering provisions in new regulations. Generally, such provisions are appropriate where they meet a four-part test. First, the new rule represents an abrupt departure from well-established practice. Second, affected parties have relied on the old rule. Third, the new rule imposes a large burden on those affected. Fourth, there is no strong statutory interest in applying the new rule." Memorandum from Emison, G.A., OAQPS, to Director, Air Management Division Regions I, III, and IX; Director, Air, and Waste Management Division, Region II; Director, Air Pesticides and Toxics Division Region IV and VI; Director, Air and Radiation Division Region V; and Director Air and Toxics Division, Regions VII, VIII, and X. June 27, 1988. (PN 110-88-06-27-095).

16. "Grandfathering is not to be considered mandatory or automatic. In determining whether grandfathering should apply, and what the appropriate date should be, the decision maker should keep in mind the thrust of this guidance, *i.e.*, to honor good faith effort on the part of the State/local agency submitting the revision, balancing equity with other considerations. This guidance expressly is not intended as a vehicle to allow circumvention of tighter requirements or to facilitate the avoidance of difficult decisions." Memorandum from Emison, G.A., OAQPS, to Director, Air Management Division Regions I, III, and IX; Director, Air, and Waste Management Division, Region II; Director, Air Pesticides and Toxics Division Region IV and VI; Director, Air and Radiation Division Region V; and Director Air and Toxics Division, Regions VII, VIII, and X. June 27, 1988. (PN 110-88-06-27-095).

17. "B. There are certain exceptions to the general grandfathering guidance:" Items 2,3,4 and 6. Memorandum from Emison, G.A., OAQPS, to Director, Air Management Division Regions I, III, and IX; Director, Air, and Waste Management Division, Region II; Director, Air Pesticides and Toxics Division Region IV and VI; Director, Air and Radiation Division Region V; and Director Air and Toxics Division, Regions VII, VIII, and X. June 27, 1988. (PN 110-88-06-27-095).

18. "In order to allow us to assess the relative impact of each SO_2 relaxation more accurately, I ask that the following information be included in each action memo.

    1. Plant name and location.

    2. Size of the facility (including the number of boilers) expressed in megawatts or Btu/hour firing capacity (design).

    3. Amount, type, and sulfur content of actual fuel combusted during the previous year.

    4. The revised SO_2 emission limit, the existing SIP limit, and the corresponding averaging times for these limits.

    5. The "paper" as well as actual increase or decrease in emissions.

    Memorandum from Rhoads, R.G., OAQPS, to Director, Air and Hazardous Materials Division, Regions I-V and VIII. Information Required in Federal Register Packages. June 12, 1980.

9.5 SANCTIONS AND FIP REQUIREMENTS

Section 179(a) of the amended Act sets forth specific criteria for EPA to determine when to apply sanctions. Two types of sanctions are specified under section 179(b): (1) highway funding restrictions, and (2) increased emissions offset ratios for new and modified sources. A third type of sanction, restrictions on air grant funding, is provided for under section 179(a). The construction ban provisions of section 110(a)(2)(I) of the 1977 Clean Air Act Amendments were largely repealed with the passage of the amended Act in 1990.[1]

9.5.1 Actions Triggering Sanctions and FIP Requirements

Section 179(a) (1) through (4) of the amended Act sets forth four types of findings which may trigger sanctions. The first is a finding that a State has failed to submit a SIP or an element of a SIP, or that the submittal fails to meet the completeness criteria. The second is a finding that a SIP submission for a nonattainment area is disapproved for failure to meet one or more elements of the plan required by the Act. The third is a finding that the State has not made any other submission required by the Act that meets the completeness criteria or has made a required submission that is disapproved by EPA for not meeting the Act's requirements. The fourth is a finding that a requirement of an approved plan is not being implemented.[1,2]

Section 110(c) sets forth two types of findings that trigger FIP requirements: (1) a finding that a State has failed to make a required submittal or that a submittal does not satisfy the minimum completeness criteria under section 110(k)(1)(A), and (2) a disapproval of a SIP submittal in whole or in part.[3]

9.5.2 Sanction and FIP Clocks

The amended Act provides a "clock" for imposing sanctions and FIP requirements. Section 179(a) allows up to 18 months for the State to correct the deficiency that triggered EPA's disapproval before EPA must impose sanctions. Section 110(c)(1) gives the State two years to correct a deficiency and EPA to approve a new submittal before EPA is obligated to promulgate a FIP.[4]

The sanctions clock, triggered under section 179(a), stops when the State corrects the deficiency prompting the finding. Unless the deficiency is corrected the EPA must apply one of the two sanctions specified under section 179(b) 18 months after the date of the finding. If the deficiency persists, EPA must apply the second sanction 6 months later. EPA must apply both sanctions after 18 months if it determines there is a lack of good faith on the part of the State.[5] The FIP clock can be stopped only if the State corrects the deficiency prompting the finding and EPA issues a final approval of the State submittal.[6]

9.5.3 Available Sanctions

The two sanctions available to EPA are provided under section 179(b) and include restriction on highway funding, and a 2 to 1 emission offset requirement. Under the highway funding sanction, EPA prohibits approval by the Secretary of Transportation of projects or grants in the affected area.[7] Section 179(b)(1) of the amended Act provides exemptions for certain projects and grants for air quality or safety purposes.[8]

The emissions offset sanction refers to the application of the emission offset requirements of section 173 relating to new or modified sources. Under this sanction, the ratio of emissions reductions that must be obtained to offset increased emissions (caused by the new or modified source) in the sanctioned area must be at least 2 to 1.[8,9]

REFERENCES FOR SECTION 9.5

1. 57 Federal Register 13,566 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; EPA Requirements; Sanctions and Other Safeguards; Available Measures Under 1990 CAAA.

2. "The Act in section 179 requires EPA to impose sanctions based on four types of actions (findings) provided in section 179(a): (1) a finding that the State has failed to submit a SIP, a SIP element, or has submitted a SIP or SIP element that does not satisfy the completeness criteria; (2) that EPA disapproval of a SIP submission for a nonattainment area based on its failure to meet one or more elements required by the Act; (3) a determination that the State has not made any other submission, has made an inadequate submission (as required by the Act), or that EPA disapproves such submission; or (4) a finding that a requirement of an approved plan is not being implemented." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

3. "Under section 110(c)(1), EPA is required to promulgate a FIP based on two types of findings: (1) a finding that a State has failed to make a required submittal or that a submittal does not satisfy the minimum completeness criteria under section 110(k)(1)(A), or the EPA disapproval of a SIP submittal in whole or in part." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

4. "For plan submittals required under Part D or in response to a SIP call, section 179(a) allows for up to 18 months for the State to correct the deficiency that is the subject of a finding or disapproval before EPA is required to impose sanctions. Section 110(c)(1) provides for up to 2 years for the State to correct the deficiency and for EPA to approve a new submittal before EPA is obligated to promulgated a FIP." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics

Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

5. "Under section 179(a), in order to stop the sanctions clock, the State must correct the 'deficiency' prompting the finding. The EPA must apply one of the two sanctions available under section 179(b) within 18 months after the date of the finding and both sanctions at 24 months, unless the deficiency has been corrected. Section 179(a) also requires EPA to apply both sanctions after 18 months if EPA finds a lack of good faith on the part of the State." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

6. "In other words, EPA must approve the State submittal in order to stop the FIP clock. Where the sanctions and FIP clocks were started by EPA disapproval of a plan, the clocks will run concurrently. In this case, to correct the deficiency for purposes of the sanctions clock, the State must make a submittal which EPA finds approvable. Such a determination is not made until EPA issues a final approval of the plan. Final approval of a plan is also what is needed to stop the FIP clock." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

7. "For plan submittals required under Part D or in response to a SIP call, if the State does not correct the specific deficiency within the 18-month period allowed under section 179(a), EPA must apply at least one of the two sanctions available under section 179(b) as described: (1) Highway funding sanctions: The EPA may impose a prohibition on the approval by the Secretary of Transportation of certain projects, or the awarding of certain grants." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

8. 57 Federal Register 13,566 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; EPA Requirements; Sanctions and Other Safeguards; Available Measures Under 1990 CAAA; Highway Funding Sanctions.

9. "(2) Offset sanctions. A ratio of at least 2-to-1 will be required for emissions reductions within the nonattainment area to offset emissions from new or modified major facilities (as required under section 173)." Memorandum from Calcagni, John, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, NC, to Director, Air, Pesticides, and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Regions VII, VIII,IX, and X. Processing of State Implementation Plan (SIP) Submittals. July 9, 1992.

9.6 INTERIM CONTROL STRATEGIES

In certain situations, air pollution control equipment may need to be repaired, upgraded or replaced to meet the applicable emission limitations in a revised SIP. During the period until new or upgraded control equipment is operational and the source is in compliance, emissions from the source must not be allowed to increase. The existing control equipment must remain operational to the maximum extent possible, with appropriate maintenance and repair, until construction or linking of new equipment requires its shutdown or removal. A source may choose to implement interim controls that offer a higher degree of emission reduction instead of maintaining existing equipment. However, the use of such interim controls should not be allowed to unnecessarily delay the installation of final control equipment.[1]

Additional interim controls or other interim measures are required to prevent excess emissions during periods when existing control equipment must be taken off line to link or complete construction of new or upgraded equipment. Such measures may include installing additional temporary control equipment or operational controls (such as curtailing production rates, relocating production to complying process lines, "purchasing power or product elsewhere," or temporary shutdown).[2]

The source should also be required to implement an interim continuous emissions monitoring program. This will enable the agency to monitor emissions from the source during the interim period.[3]

REFERENCES FOR SECTION 9.6

1. "During the interim period until the new or upgraded control equipment is operational and the source is in compliance, emissions from the source must not be allowed to increase. The existing though inadequate control equipment must remain operational to the maximum extent possible, including being maintained and repaired, until such time that construction or tie-in of new equipment requires its shut down or removal. In lieu of maintaining the existing though inadequate control equipment, interim controls which offer a higher degree of emission reduction and are readily and reasonably available may be installed. The use of such interim controls shall not unduly delay the installation of final control equipment." Memorandum. Seitz, John S., Director, Stationary Source Compliance Division, OAQPS, U.S. EPA, Washington, DC, to Air Management Division Directors, Regions I, III, and IX; Air and Waste Management Division Director, Region II; Air, Pesticides and Toxics Management Division Directors, Regions IV and VI; Air and Toxics Division Directors, Regions VII, VIII and X; and Air and Radiation Division Director, Region V. Transmittal of OAQPS Interim Control Policy Statement. March 31, 1988. (PN 113-88-03-31-047).

2. "When existing control equipment must be taken off line to tie in or complete construction of new or upgraded equipment, additional interim controls or other interim measures are required to ensure no increase in excess emissions occurs during the tie in period. Such measures may include installation of additional temporary control equipment or operational controls, *e.g.*, curtailment of production rates, relocation of production to complying process lines or facilities, purchase of power or product elsewhere as needed, or temporary shutdown." Memorandum. Seitz, John S., Director, Stationary Source Compliance Division, OAQPS, U.S. EPA, Washington, DC, to Air Management Division Directors, Regions I, III, and IX; Air and Waste Management Division Director, Region II; Air, Pesticides and Toxics Management Division Directors, Regions IV and VI; Air and Toxics Division Directors, Regions Vii, VIII and X; and Air and Radiation Division Director, Region V. Transmittal of OAQPS Interim Control Policy Statement. March 31, 1988. (PN 113-88-03-31-047).

3. "The source should also be required to implement an interim continuous emissions monitoring program, to enable the agency to monitor the emissions performance of the source during the interim period." Memorandum. Seitz, John S., Director, Stationary Source Compliance Division, OAQPS, U.S. EPA, Washington, DC, to Air Management Division Directors, Regions I, III, and IX; Air and Waste Management Division Director, Region II; Air, Pesticides and Toxics Management Division Directors, Regions IV and VI; Air and Toxics Division Directors, Regions Vii, VIII and X; and Air and Radiation Division Director, Region V. Transmittal of OAQPS Interim Control Policy Statement. March 31, 1988. (PN 113-88-03-31-047).

9.7 SIP CALLS

In accordance with Section 110(k)(5) of the amended Act, the Administrator shall require the State to revise the SIP as necessary if the Administrator determines that the applicable implementation plan for any area is substantially inadequate to attain or maintain the relevant NAAQS. The Administrator shall establish deadlines (18 months maximum after date of notice) for the submittal of revised plans. Inadequate plan findings and notice shall be public.

Section 110(a)(2)(H) requires that SIP's provide for plan revisions as necessary to take account of NAAQS revisions or the availability of improved or more expeditious methods for attaining the standards. Such revisions should also be provided for should the Administrator find that the plan is substantially inadequate to attain the applicable NAAQS, or to otherwise comply with any additional requirements of the Act. Relevant exceptions to these requirements for plan revisions are set forth in section 110(a)(3)(C).

Plan revisions for nonattainment areas are addressed in part D of Title I of the Act. Any plan revision for a nonattainment area that is required in response to a section 110(k)(5) finding must correct the plan deficiency and meet all other applicable plan requirements under sections 110(a)(2) and part D of the Act. EPA may reasonably adjust the applicable deadlines to achieve a consistent application of plan requirements if the applicable attainment date has elapsed. EPA will issue written guidelines, as necessary, to facilitate submittal of adequate and approvable plans.

10.0 PERMIT REQUIREMENTS

The discussion below pertains to permit requirements for construction and operation of major new or modified sources. Title V of the Clean Air Act of 1990, however, does include provisions for establishing State-administered operating permit programs. The EPA has promulgated regulations containing the minimum elements necessary for federally enforceable operating permit programs,[1] while EPA has not reached a final determination about the relationship between SIP's and Title V permits.[2] Operating permits may, among other things, largely codify present SIP regulations. For this reason, it is important that SIP's are adequate and enforceable before operating permit programs are in place. The operating permit program is not discussed in this guideline.

10.1 GENERAL

Major new sources and existing sources that have undergone major modifications are generally required to obtain air pollution permits prior to construction/modification and operation. Permits are required to assure that sources do not jeopardize plans to attain or maintain NAAQS or PSD increments. The requirements for these permits vary depending on the size and location of the proposed source. For a complete compendium of new source review and permitting guidance see *New Source Review/Prevention of Significant Deterioration and Nonattainment Area Guidance* Notebook.[3] Additional information is available on the New Source Review Electronic Bulletin Board and the *New Source Review Workshop Manual.*[4]

REFERENCES FOR SECTION 10.1

1. 57 Federal Register 32,250 (July 21, 1992), Operating Permit Program.

2. 57 Federal Register 13,567-9 (April 16, 1992), General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Proposed Rule; Miscellaneous.

3. U.S. Environmental Protection Agency. *New Source Review/Prevention of Significant Deterioration and Nonattainment Area Guidance Notebook, Volumes I and II and Updates.*

4. U.S. Environmental Protection Agency. *New Source Review Workshop Manual, (Draft).* Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711. October 1990. pp. F.2-F.4.

10.2 NONATTAINMENT AREAS

10.2.1 Applicability

All new or modified major stationary sources located within an area designated under section 107 of the Act as nonattainment are required to obtain permits for construction and operation that meet the requirements of section 173. Major PM-10 sources in moderate PM-10 nonattainment areas are sources that have the potential to emit greater than 100 tpy; major modifications occur if they increase emissions by a significant amount.[1]

10.2.2 Control Technology Requirements

All major sources subject to nonattainment area new source review requirements are required to control emissions to a degree that reflects the lowest achievable emission rate (LAER).[2] LAER is defined as the most stringent emission control actually achieved in practice or contained in any SIP regulations. These control techniques must be applied to the proposed new source unless they are demonstrated to be technically infeasible, cost considerations notwithstanding.[3]

10.2.3 Emission Offsets

Offsetting emission reductions in actual emissions for sources locating in nonattainment areas must be obtained to offset increases in allowable emissions that result after the application of LAER.[4]

The emission offset must exceed the net increase from the proposed source and the source growth previously accounted for so that reasonable progress toward attainment of the NAAQS continues. Consistent with provisions of 40 CFR 51.165(a), new sources for which emission offsets are required must also comply with procedures relating to the permissible location of offsetting emissions, which are equivalent or more stringent than those set out in 40 CFR Part 51 Appendix S section IV.D.

10.2.4 Net Air Quality Benefit

For those sources that do not satisfy the location requirements for the emission offsets as specified in 40 CFR Part 51 Appendix S section IV.D, a net air quality benefit must be demonstrated.[5] This demonstration is made with a modeling analysis that predicts that the proposed emission increase LAER and emission offsets proposed will not increase the concentration at an agreed upon number of receptors where NAAQS exceedances have been identified and will not significantly increase the concentration at all other receptors where NAAQS exceedances have been identified.

10.2.5 Other Requirements

Any applicant for a new source permit within a nonattainment area must certify that all other major stationary sources owned or operated by the applicant are in compliance with applicable air quality regulations. Compliance includes being on an approved compliance schedule.[6] An analysis of alternative sites, sizes, production processes, and environmental control techniques is required to demonstrate that the benefits of the proposed source outweigh the environmental and social costs imposed as a result of its location, construction, and modification.[7]

10.2.6 NSR Transition

The amended Act makes numerous changes to the NSR requirements for nonattainment and PSD programs. These include creation of new and expanded nonattainment areas, extension of PSD coverage to Class I area boundaries, and a mandate for a PSD exemption for certain hazardous air pollutants. The EPA has provided its interpretation of the new or revised NSR nonattainment permit program requirements contained in Part D of the amended Act in the *General Preamble*, New Source Review Nonattainment Permit Requirements. The EPA intends to issue regulations setting forth specific requirements for an approvable NSR program.[8]

EPA has published transitional guidance on the most important issues involving the NSR program to be used in preparing SIP revisions in the interim between passage of the amended Act and adoption of the Agency's final regulations. This guidance appeared in a March 11, 1991 memorandum and is published in Appendix D of the *General Preamble*. The transitional guidance is not intended to replace existing State regulations or approved SIP's; however, it calls upon States to implement their NSR programs consistent with provisions of the amended Act that are applicable immediately.[9] The transitional guidance, since it does not represent final EPA action, has not been subject to judicial review and is not intended, and cannot be relied upon, to create any rights enforceable in litigation with the United States. The EPA may decide to follow the transitional guidance, or to act at variance with it based on specific circumstances. The Agency may also change the guidance at any time without public notice.[10]

Major issues relating to NSR PM-10 nonattainment dealt with in the transitional guidance include the following:

- *NSR construction permit requirements in nonattainment areas.* In States where the existing Part D permit program covers all designated nonattainment areas in the State, the program will automatically cover any new or expanded areas under the amended Act and States should apply the requirements of their existing programs. In other States, where a Part D program may be limited to specific areas and does not apply to new or expanded areas, States must implement a transitional permit program until their existing programs are revised to meet the requirements of the amended Act, and expanded to cover all nonattainment areas in the State.[11]

- *Status of construction bans.* An existing construction ban that was imposed due to the absence of approved Part D NSR rules remains in effect until a revised NSR SIP is approved. Specific construction bans may be lifted where appropriate. The status of construction bans in general will be published in the Federal Register. If a construction ban is lifted in a nonattainment area, and the area lacks an approved Part D NSR rule, the State should meet the requirements of appendix S to 40 CFR part 51 in issuing permits for major new sources or major modifications until NSR rules meeting the requirements of the amended Act are adopted.[12]

- *Federal implementation plans.* The NSR permitting program in an existing FIP remains in effect until a SIP is approved or a revised FIP is adopted.[13]

- *Use of previously approved growth allowances.* Growth allowances in existing SIP's are invalidated [pursuant to section 173 (b) of the amended Act] in areas where a SIP call has been received either before or after enactment of the 1990 Amendments. In such areas, previously approved growth allowances cannot be used for NSR permits

issued on or after November 15, 1990. Construction permits that rely on previously approved growth allowances cannot be issued in SIP call areas under existing, approved Part D programs. Emission offsets must be obtained on a case by case basis for any such permits, and any other existing Part D requirements must be met.[14]

In a September 3, 1992 memorandum, the EPA provided a supplement to the transitional guidance in order to clarify EPA's position regarding the NSR permitting when a State does not submit a SIP revision implementing the additional Part D NSR provisions of the amended Act by the applicable statutory deadline. For PM-10, the statutory submittal deadline for such revisions was June 30, 1992. This supplemental guidance is nonbinding in the same sense as the initial transition guidance and does not affect EPA's interpretations of NSR provisions in the amended Act as published in the *General Preamble*.[15]

The supplemental guidance addresses conditions under which permits may be issued to sources and obtain EPA recognition as being in compliance with the Act. In general, sources that have submitted complete permit applications by the submittal deadline may receive permits and be recognized as complying with the Act, provided that specific conditions are met. These conditions are spelled out in the guidance.[16] Sources that have not completed applications by the submittal deadline may be considered as complying with the Act provided that the source obtains a permit from the State that is consistent with the substantive new NSR Part D provisions. Those applicable to PM-10 include new applicability thresholds, offset ratios, and section 173 offset requirements.[17] This guidance does not overrule any State rules or transitional guidance that may be more stringent.[18]

REFERENCES FOR SECTION 10.2

1. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I. Subchapter C, Part 51.165(a)(1)(iv). July 1, 1991.

2. U.S. Congress. Clean Air Act, as amended November 1990. 42 U.S.C. 7401 et. seq. Section 171(3). Washington, D.C. U.S. Government Printing Office.

3. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 51. Appendix S. July 1, 1991.

4. U.S. Congress. Clean Air Act, as amended November 1990. 42 U.S.C. 7401 et. seq. Section 173(a). Washington, D.C. U.S. Government Printing Office. (See also U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 51. Appendix S. July 1, 1991.)

5. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 51. Appendix S.IV.A. July 1, 1991.

6. U.S. Congress. Clean Air Act, as amended November 1990. 42 U.S.C. 7401 et. seq. Section 173(3). Washington, D.C. U.S. Government Printing Office.

7. U.S. Congress. Clean Air Act, as amended November 1990. 42 U.S.C. 7401 et. seq. Section 173(a). Washington, D.C. U.S. Government Printing Office.

8. "The Clean Air Act Amendments of 1990 (1990 Amendments) make numerous changes to the NSR requirements of the prevention of significant deterioration (PSD) and nonattainment area programs. The 1990 Amendments create new and expanded nonattainment areas, extend PSD coverage to current Class I area boundaries, and mandate a PSD exemption for certain hazardous air pollutants. The Environmental Protection Agency (EPA) intends to propose by September of this year a regulatory package that will implement these and other changes to the NSR provisions. Final adoption of these revised regulations is projected for August 1992. In the interim period between passage of the 1990 Amendments and adoption of the Agency's final regulations EPA expects that numerous issues regarding the 1990 Amendments will arise." Memorandum from Seitz, John S., Director, OAQPS, U.S. EPA, Research Triangle Park, NC, to Addressees. New Source Review (NSR) Program Transitional Guidance. March 11, 1991.

9. "This guidance document does not supersede existing State regulations or approved State implementation plans. However, in some cases, it calls upon States to implement their NSR programs in a manner consistent with provisions of the 1990 Amendments that are applicable immediately and with the requirements that flow directly from these provisions." Memorandum from Seitz, John S., Director, OAQPS,

U.S. EPA, Research Triangle Park, NC, to Addressees. New Source Review (NSR) Program Transitional Guidance. March 11, 1991.

10. "Nonetheless, the policies set out in the transition memorandum are intended solely as guidance and do not represent final Agency action. They are not ripe for judicial review for this reason. Moreover, they are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. The EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific circumstances. The Agency also may change this guidance at any time without public notice." Memorandum from John S., Director, OAQPS, U.S. EPA, Research Triangle Park, NC, to addressees. New Source Review (NSR) Program Transitional Guidance. March 11, 1991.

11. "In many States, the existing approved Part D permit program by its terms covers all designated nonattainment areas in the State, so Part D permit program will automatically apply to the new and expanded nonattainment areas which are established under provisions of Title I of the 1990 Amendments. Thus, until new rules are adopted for these new or expanded nonattainment areas, States should apply the requirements of their existing approved Part D permit program. However, in other States Part D program may be limited to specified areas and does not apply to new or expanded areas. In these cases, States must implement a transitional permitting program until their existing Part D programs are revised to meet the requirements of the 1990 Amendments and expanded to cover all nonattainment areas in the State. Otherwise, both the goals of part D and Congress' intent in creating new or expanded nonattainment areas will be frustrated." Memorandum from Seitz, John S., Director, OAQPS, U.S. EPA, Research Triangle Park, NC, to addressees. New Source Review (NSR) Program Transitional Guidance. March 11, 1991.

12. "Pursuant to section 110(n)(3), an existing construction ban that was imposed due to the absence of approved Part D NSR rules remains in effect until a revised NSR SIP is approved. Existing construction bans imposed due to disapproval of primary sulfur dioxide NAAQS attainment plans also remain in effect. A Federal Register notice will be published soon announcing the status of construction bans in general and also lifting specific bans where appropriate. Should a construction ban be lifted in any area designated as nonattainment, and the area lacks an approved Part D NSR rule, the State should meet the requirements of 40 CFR part 51, appendix S, in issuing permits to major new sources or major modifications prior to the adoption of NSR rules meeting the requirements of the 1990 Amendments." Memorandum from Seitz, John S., Director, OAQPS, U.S. EPA, Research Triangle Park, NC, to addressees. New Source Review (NSR) Program Transitional Guidance. March 11, 1991.

13. "The NSR permitting program in an existing FIP remains in effect until a SIP is approved or a revised FIP is adopted." Memorandum from Seitz, John S., Director, OAQPS, U.S. EPA, Research Triangle Park, NC, to addressees. New Source Review (NSR) Program Transitional Guidance. March 11, 1991.

14. "Section 173(b) invalidates growth allowances in existing SIP's in areas that received a SIP call prior to enactment of the 1990 Amendments, or that received one thereafter. For NSR permits issued on or after November 15, 1990, previously-approved growth allowances cannot be used in these areas. Construction permits cannot be issued in SIP-call areas under existing EPA-approved Part D programs to the extent that such permits rely on previously-approved growth allowances. Case-by-case emission offsets must be obtained for any such permits, and other existing Part D requirements must be met." Memorandum from Seitz, John S., Director, OAQPS, U.S. EPA, Research Triangle Park, NC, to addressees. New Source Review (NSR) Program Transitional Guidance. March 11, 1991.

15. "To address some immediate concerns generated by the 1990 CAAA, the Environmental Protection Agency (EPA) issued an initial NSR transitional memorandum on March 11, 1991, entitled 'New Source Review Program Transitional Guidance.' This memorandum supplements that effort by clarifying EPA guidance regarding the permitting of new or modified sources in situations where a State does not submit a State implementation plan (SIP) revision implementing the augmented Part D NSR provisions of the 1990 CAAA by the applicable statutory deadline. The statutory deadlines for submission of revised NSR SIP's are listed in the attachment. Moreover, as more fully set forth in the March 11, 1991 transitional memorandum, this supplemental memorandum sets forth nonbinding guidance that does not create any rights or otherwise predetermine the outcome of any procedures. Also, many of EPA's interpretations of the new Part D NSR requirements are in the 'General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990' (General Preamble) (see 57 FR 1398, 13552-556, April 16, 1992). These interpretations are not affected by this memorandum." Memorandum from Seitz, John S., Director, OAQPS, U.S. EPA, Research Triangle Park, NC, to Addressees. New Source Review (NSR) Program Supplemental Transitional Guidance on Applicability of New Part D NSR Permit Requirements. September 3, 1992.

16. "Where States do not submit the Part D NSR SIP by the applicable statutory deadline ... sources that have submitted <u>complete permit applications</u> ... by the submittal deadline may receive final permits under existing State NSR rules. In this situation, such sources will be considered by EPA to be in compliance with the Act without meeting the amended Part D NSR provisions of the 1990 CAAA, provided they meet the following conditions:

    1. The State and source move expeditiously towards final permit issuance.

    2. Construction begins no later than 18 months from the date of permit issuance unless an earlier time is required under the applicable SIP.

    3. Construction is not discontinued for a period of 18 months or more.

4. Construction is completed within a reasonable time. States may not grant permit extensions beyond these time periods unless the permittee is required in a federally-enforceable manner to meet the new Part D NSR provision."

Memorandum from Seitz, John S., Director, OAQPS, U.S. EPA, Research Triangle Park, NC, to Addressees. New Source Review (NSR) Program Supplemental Transitional Guidance on Applicability of New Part D NSR Permit Requirements. September 3, 1992.

17. "Also, under today's guidance, where States miss the statutory deadline for Part D NSR SIP submittal, for sources that have not submitted complete permit applications by the SIP submittal deadline, EPA will also consider the source to be in compliance with the Act where the source obtains from the State a permit that is consistent with the substantive new NSR Part D provisions in the 1990 CAAA. The substantive new provisions are the new applicability thresholds, the new offset ratios, the offset requirements of Section 173, and the NO_x requirements of section 182(f) for most O_3 nonattainment areas and the NOTR." Memorandum from Seitz, John S., Director, OAQPS, U.S. EPA, Research Triangle Park, NC, to Addressees. New Source Review (NSR) Program Supplemental Transitional Guidance on Applicability of New Part D NSR Permit Requirements. September 3, 1992.

18. "Please note that the Act allows States to implement the new Part D NSR provisions prior to the statutory deadlines and in a manner more stringent than EPA guidance or rules. Thus, today's guidance does not apply in any State to the extent that the State's own rules or transitional guidance is more stringent." Memorandum from Seitz, John S., Director, OAQPS, U.S. EPA, Research Triangle Park, NC, to Addressees. New Source Review (NSR) Program Supplemental Transitional Guidance on Applicability of New Part D NSR Permit Requirements. September 3, 1992.

10.3 PSD AREAS

10.3.1 Applicability

Major new stationary sources located within areas designated attainment or unclassifiable pursuant to section 107 of the Act are required to undergo preconstruction review in accordance with regulations for the prevention of significant deterioration.[1,2] Prevention of significant deterioration defines a new or existing major stationary source as one which has the potential to emit 250 tpy or more (or 100 tpy, if the source category is one of the 28 categories specifically listed in the PSD regulations) of any pollutant subject to regulation under the Act. Any new major stationary source that also has the potential to emit 15 tpy or more of PM-10 in an area designated attainment or unclassifiable for PM-10 (or 25 tpy of particulate matter emissions in an area designated attainment or unclassifiable for TSP) must undergo PSD review with respect to those emissions. Similarly, any existing major stationary source that proposes a physical or operational change that would increase emissions of PM-10 by 15 tpy or more (25 tpy or more for particulate matter emissions) is also subject to PSD review for the resulting net emissions increase.

10.3.2 Control Technology Requirements

Major sources subject to PSD review for PM-10 are required to control emissions of that pollutant to a degree that reflects the best available control technology (BACT).[3] A BACT analysis is completed on a case-by-case basis, and considers energy, environmental, and economic impacts in determining the maximum degree of reduction achievable for the proposed source or modification. In no event can the determination of BACT result in an emission limitation which would not meet any applicable standard of performance under 40 CFR Parts 60 and 61.

10.3.3 Air Quality Analysis

The applicant for a PSD permit is required to demonstrate via a modeling analysis that the proposed new emissions will not cause or constitute to a violation of any NAAQS and

PSD increments.[4,5] The NAAQS impose a ceiling on total ambient concentrations. Increments impose a limit on the maximum amount of increase in ambient concentrations relative to a baseline concentration. NAAQS for PM-10 and increments for TSP are expressed for annual and 24-hour periods.

A demonstration of compliance with the NAAQS is based on a modeling analysis in a manner that is consistent with the *Guideline on Air Quality Modeling (Revised)* (see Chapter 6 for more detail). To meet preconstruction monitoring requirements under the PSD program, monitoring data may need to be provided by the applicant. When monitoring data are required, guidance is available in the *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*[6] (see Chapter 5 for more detail).

The air quality analysis should also be used as a basis for establishing PM-10 emission limits if BACT-derived limits are not sufficient. In either case, the limits must be sufficient to protect the NAAQS and the PSD increments. Thus, PSD emission limits that reflect the air quality analysis will need to be specified based on annual and 24-hour averaging periods.[7]

10.3.4 Other Impacts

Pursuant to 40 CFR Part 51.166(o), the applicant must prepare additional impact analyses for each pollutant subject to regulation under the Act which will be emitted by the proposed new source or modification.[2,8] The analysis assesses the impacts of air, ground, and water pollution on soils, vegetation, and visibility caused by any increase in emissions of any regulated pollutant from the source or modification under review, and from associated growth.

Other impact analysis requirements may also be imposed on a permit applicant under local, State, or Federal laws which are outside the PSD permitting process. Receipt of a PSD permit does not relieve an applicant from the responsibility to comply fully with such requirements. For example, two Federal laws which may apply on occasions are the *Endangered Species Act* and the *National Historic Preservation Act*. Such legislation may require additional analyses (although not as part of the PSD permit) if any federally-listed rare or endangered species, or any sites that are included (or are eligible to be included) in the National Register of Historic Sites, are identified in the source's impact area. Secondary

emissions (*i.e.*, emissions not caused by the new source itself, but from associated growth) must be included in the impact analyses.

An analysis of visibility impairment is conducted using a three-level screening technique. The analysis method is described in the EPA document entitled, *Workbook for Estimating Visibility Impairment.*[9]

10.3.5 Class I Areas

The PSD program is designed to provide the greatest degree of protection to Class I areas. Mandatory Class I areas are those specified by the Act. They are protected by stringent Class I PSD increments and air quality-related values (AQRV's) that the Federal Land Manager (FLM) has an affirmative duty to protect. AQRV's are those attributes of a Class I area that are dependent on the maintenance of a high level of ambient air quality. These may include, among other things, acid deposition effects and visibility impairment in Class I areas. Sources located within 100 kilometers of a designated Class I area with an ambient impact greater than 1 microgram per cubic meter for a 24-hour average are required to notify the FLM, who may require the applicant to conduct a Class I area impact assessment. A Class I impact analysis must show that the source will not cause or contribute to a Class I increments violation. Otherwise, the applicant must demonstrate to the satisfaction of the FLM that no AQRV's are adversely affected. If no increment violations are shown to occur, then the FLM may call for denial of the PSD permit, if adverse impacts on any AQRV can be demonstrated.

Procedures for Class I review, including responsibilities for both the FLM and the reviewing agency, are contained in the EPA *New Source Review Workshop Manual (Draft, October 1990, Chapter E)* and in guidance documents produced by the National Parks Service, Forest Service, and Fish and Wildlife Service.

REFERENCES FOR SECTION 10.3

1. U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 51.166(b)(1)(i). July 1, 1991.

2. U.S. Environmental Protection Agency. *New Source Review Workshop Manual-Part I,* (Draft). Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711. October 1990.

3. U.S. Congress. Clean Air Act, as amended November 1990. 42 U.S.C. 7401 et. seq. Section 165(a)(4). Washington, D.C. U.S. Government Printing Office. (See also U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 51.166(j)(2). July 1, 1991.)

4. U.S. Environmental Protection Agency. *New Source Review Workshop Manual,* (Draft). Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711. October 1990. Chapter C.

5. U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 51.166(k). July 1, 1991.

6. U.S. Environmental Protection Agency. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-007. May 1987.

7. "This is in response to your November 17, 1986 memorandum in which you requested comment on Region V's belief that PSD permits must contain short-term emission limits to ensure protection of the NAAQS and PSD increments. I concur with your position and emphasize that this position reflects our national policy." Memorandum from Emison, G., OAQPS, to D. Kee., Region V. November 24, 1986.

8. U.S. Environmental Protection Agency. *Code of Federal Regulations.* Title 40, Chapter I, Subchapter C, Part 51.166(o). July 1, 1991.

9. U.S. Environmental Protection Agency. *Workbook for Estimating Visibility Impairment.* Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-87-031. November 1980.

10.4 SIP PERMIT REQUIREMENTS

In addition to the special major source permit requirements listed above, SIP permit requirements are specified in 40 CFR Part 51.165(b). These requirements govern the permitting of major new and modified sources in attainment and unclassifiable areas where NAAQS violations exist or are discovered as part of the permitting analysis. Essentially, what is required for PM-10 is that a source demonstrate that its ambient impact would be less than the PM-10 air quality significance levels in all areas and for all time periods where PM-10 NAAQS violations are or will occur.[1] It is not necessary to demonstrate an insignificant impact everywhere in the impact area.

The 40 CFR Part 165(b)(3) requirements also provide for sources that do cause or contribute to PM-10 violations (*i.e.*, cannot demonstrate insignificance at noncomplying receptors). In such situations, sources may devise PM-10 emission reductions to offset their ambient impacts. The particular ambient criteria that must be satisfied to conform to SIP provisions developed pursuant to 40 CFR Part 51.165(b) must be discussed with the reviewing agency and reflect local plans for maintenance and attainment of the PM-10 NAAQS.

REFERENCES FOR SECTION 10.4

1. "I believe the most appropriate course of action to follow is the second approach which considers the significant impact of the source in a way that is spatially and temporally consistent with the predicted violations." Memorandum from Emison, G.A., OAQPS, to T.S. Maslany, Air Management Division, Region III. July 5, 1988.

10.5 VISIBILITY

With respect to visibility protection, PSD permit reviews for new or modified major stationary sources must provide for the following:

- Written notification (including the visibility analysis) of FLMs of any affected Federal Class I areas within 30 days of receipt of and at least 60 days prior to public hearing or, in cases where the reviewing agency receives advance notification (*e.g.*, early consultation with the source prior to submission of the application), written notification shall be provided to the affected FLM(s) within 30 days of such advance notification

- Consideration of any analysis performed by the FLM that is provided within 30 days of written notification as specified above and concludes that the proposed new major stationary source or major modification may have an adverse impact on visibility in any Federal Class I area. Where the reviewing agency finds that such an analysis does not demonstrate to the satisfaction of the State that an adverse impact will result in the Federal Class I area, the State must, in the notice of public hearing, either explain its decision or give notice as to where the explanation can be obtained

New source review with respect to visibility protection must provide for review of any new major stationary source or major modification that:

- Has an impact on any integral vista of a Federal Class I area, if the vista is identified in accordance with 40 CFR Part 51.304 by the FLM at least 12 months before submission of a complete permit application (or within 6 months if the FLM has provided notice and opportunity for public comment)

- Proposes to locate in an area classified as nonattainment under section 107(d)(1)(A)(B)(C) of the Act but which may have an impact on visibility in any Federal Class I area

States may also require monitoring of visibility in any Federal Class I area near the proposed new stationary source or major modification. All new source reviews with respect to visibility shall be performed in accordance with 40 CFR Part 51.320 and 40 CFR Part 52.24 and must ensure that the source's emissions will be consistent with making reasonable progress toward the national visibility goal referred to in 40 CFR Part 51.300(a).

10.6 EMISSIONS TRADING

10.6.1 General Policy Aspects

Emissions trading consists of bubbles, netting, offsets, and emission reduction banking. These trading alternatives do not alter existing air quality requirements (*e.g.*, this policy and guidance does not affect the applicable NSR/PSD rules for offsetting and netting). Still, these trading alternatives provide flexibility to States and industry in meeting their requirements. Emission trading can result in reduced costs and faster compliance with applicable regulations. Any use of bubbles, banking, or similar emissions trading provisions must be approved by the EPA as a SIP revision or must be approved by the State under an EPA approved generic bubble rule. A summary of emissions trading alternatives follows.[1]

10.6.2 Bubbling

EPA's bubble policy lets existing plants (or groups of plants) increase emissions at one or more emission sources in exchange for compensating extra decreases in emissions at other emission sources. To be approvable, each bubble must produce results which are equivalent to or better than the baseline emission levels in terms of ambient impact and enforceability. Thus, bubbles should jeopardize neither ambient standards nor applicable PSD increments and visibility requirements. Under EPA's bubble policy, emissions reductions from existing sources can not be used to meet technology-based requirements applicable to new or modified stationary sources.[2]

10.6.3 Netting

Netting refers to the policy by which EPA may exempt "modifications" of existing major sources from certain preconstruction permit requirements under the New Source Review (NSR) program, so long as there is no net emissions increase within the major source or any such increase falls below significance levels. By "netting out," the modification is not considered "major" and is therefore not subject to associated preconstruction permit requirements for major modifications under 40 CFR 51.18, 52.21, 52.24, 52.27, or 52.28.

The modification must nevertheless meet applicable NSPS, NESHAPs, preconstruction applicability review requirements under 40 CFR 51.18(a)-(h) and (l), and SIP requirements.[3] However, in addition to these Federal definitions for major new sources and modifications, State preconstruction permits for major or minor new sources and modifications may be required under 40 CFR 51.18(a), and some States preclude netting.

10.6.4 Offsets

In nonattainment areas, major new stationary sources and major modifications are subject to a preconstruction permit requirement that they obtain enough emission reductions to more than "offset" their emissions. This requirement is designed to allow industrial growth in nonattainment areas without interfering with attainment and maintenance of the NAAQS.[4]

10.6.5 Banking

Firms may store or bank qualified emission reduction credits (ERC's) in EPA-approvable banks for later use in bubble, offset or netting transactions. Depending on the bank's rules, banked ERC's may also be sold or transferred to other firms which seek to meet certain regulatory requirements by use of emissions trades.[5]

10.6.6 Emission Reduction Credits

Emission reduction credits are the common currency of all trading activity. To ensure that emission trades do not contravene relevant requirements of the Act, only reductions which are surplus, enforceable, permanent, and quantifiable can qualify as emission reduction credits and be banked or used in an emissions trade.

REFERENCES FOR SECTION 10.6

1. 51 Federal Register 43,824-25 (December 4, 1986), Emissions Trading Policy Statement; General Principles for Creation, Banking and Use of Emission Reduction Credits; Final Policy Statements and Accompanying Technical Issues Document.

2. 51 Federal Register 43,830 (December 4, 1986), Emissions Trading Policy Statement; Introduction: Basic Elements of Emissions Trading; The Bubble.

3. 51 Federal Register 43,830 (December 4, 1986), Emissions Trading Policy Statement; Introduction: Basic Elements of Emissions Trading; Netting.

4. 51 Federal Register 43,830-31, (December 4, 1986), Emissions Trading Policy Statement; Introduction: Basic Elements of Emissions Trading; Emission Offsets.

5. 51 Federal Register 43,831 (December 4, 1986), Emission Trading Policy Statement; Introduction: Basic Elements of Emissions Trading; Emission Reduction Banking.

10.7 PM-10 SPECIFIC POLICY ASPECTS

Generally, an emissions trading applicant must demonstrate that the proposed trades will not cause an increase in baseline emissions. The baseline emission depends upon the type of area in which the source operates. Usually, an air quality demonstration for PM-10 using ambient dispersion modeling is required.[1]

The emissions trading policy offers four alternatives States can follow to evaluate whether any bubble or offset is approvable:

1. *De Minimis.* In general, no modeling is needed to determine the ambient equivalence to trades in which applicable net baseline emissions do not increase and in which the gross sum of the emissions increases, after applicable control requirements, total less than 25 tpy for particulate matter.[2]

2. Level I. In general, no modeling is needed to determine ambient equivalence if:

   a. The trade does not result in an increase in applicable net baseline emissions

   b. The relevant sources are located in the same vicinity (within 250 meters of each other)

   c. No increase in baseline emissions occurs in the source with the lower effective plume height as determined under EPA's *Guidelines on Air Quality Models*

   d. No complex terrain is within the area of significant impact of the trade or 50 kilometers, whichever is less

   e. Stacks with increasing baseline emissions are tall enough to avoid possible downwash situations, as determined by the formula at 50 Federal Register 27,892 (July 8, 1985)

   f. The trade does not involve open dust sources

3. Level II. Bubble trades which are neither *de minimis* nor Level I may nevertheless be evaluated for approval based on modeling to determine ambient equivalence limited solely to the impacts of the specific emission sources involved in the trade, if: (1)

there is no increase in applicable net baseline emissions; (2) the potential change in emissions before and after the trade will not cause a significant increase in pollutant concentrations at any receptor for any averaging time specified in an applicable ambient air quality standard; and (3) such an analysis does not predict any increase in ambient concentrations in a mandatory Federal Class I area. The definition of "significant" as used above can be found in the Emission Trading Policy Federal Register Notice, 51 FR 43845 (December 4, 1986), footnote 38.

4. Level III. Full dispersion modeling considering all sources affecting the trade's area of impact is required to determine ambient equivalence if applicable net baseline emissions will increase as a result of the trade, or if the trade cannot meet criteria for approval under *de minimis*, Level I or Level II.[3]

See Section 7.9 of this guideline for discussion on stack height emissions balancing policy.

REFERENCES FOR SECTION 10.7

1. "Bubble applicants must show that their proposed trades are at least equivalent in ambient effect to the SIP emission limits the bubble would replace. For some criteria pollutants (*e.g.*, VOC or NOx) this test may generally be met by showing equal reduction in emissions. For other pollutants (*e.g.*, SO2, TSP, or CO) it was traditionally met, prior to the 1982 policy, through ambient dispersion modeling." 51 Federal Register 43,827 (December 4, 1986), Emissions Trading Policy Statement; General Principles for Creation, Banking and Use of Emission Reduction Credits; Final Policy Statements and Accompanying Technical Issues Document.

2. 51 Federal Register 43,828 (December 4, 1986), Emissions Trading Policy Statement; General Principles for Creation, Banking and Use of Emission Reduction Credits; Final Policy Statements and Accompanying Technical Issues Document.

3. 51 Federal Register 43,844-5, (December 4, 1986), Emissions Trading Policy Statement; General Principles for Creation, Banking and Use of Emission Reduction Credits; Final Policy Statements and Accompanying Technical Issues Document.

11.0 COMPLIANCE AND ENFORCEMENT

11.1 GENERAL

Implementation and enforcement provisions must be included in a SIP to show how the requirements of the plan will be put into effect and how sources that are in violation of the plan's requirements will be brought into compliance. Therefore, the emission limits and other requirements must (1) be written so that they are enforceable; (2) must require continuous compliance with the SIP provisions and with the NAAQS; (3) must include provisions for monitoring, testing, and recordkeeping and reporting to determine compliance; and (4) must include specific, expeditious final compliance data.[1]

11.2 ENFORCEABILITY CRITERIA

To be enforceable, the wording of SIP regulations must unambiguously describe what facilities are affected by the rule and what they are required to do to be in compliance. The requirements should be within the statutory authority of the regulatory agency and, in all cases, the owner or operator of a source should be aware of the standard of conduct required by the regulation.[2] A SIP regulation should address the following issues related to enforceability.[3]

Applicability

- What sources are being regulated?
- What are the criteria for exemption?
- Is the calculation procedure for exemption clearly specified?
- Is the emission inventory listed in the background document of the attainment demonstration?
- Is the averaging time(s) used in the rule different from that of the ambient standard?
- What are the units of compliance?

- Is bubbling or averaging of any type allowed? If yes, state criteria. Could a U.S. EPA inspector independently determine if the criteria were met? Does EPA have to approve each case?

- If there is a redesignation, will this change the emission limitations? If yes, which ones and how?

Compliance Dates

- What is the attainment date?

- What is the date by which compliance is expected (or the date on which noncompliance will be considered a violation of the rule)

Specificity of Conduct

- What test method is required to determine compliance?

- What is the averaging time in compliance test method?

- Is a compliance calculation or evaluation required? If yes, list the formula, period of compliance, and/or evaluation method.

Incorporation by Reference

- What is State authority for rulemaking?

- Are methods/rules incorporated by reference in the right manner?

Record Keeping

- What records are required to determine compliance?

- In what form or units must the record be kept? On what time basis?

- Does the rule affirmatively require that the records be kept?

Exemption

- What are the allowable exemptions?

- Is the criteria for application clear?

Malfunction Provisions

- What exceedance may be excused?

- How is the standard to be applied?
- Who includes the determinations?

Any exemptions to the regulation should be clearly stated in the text of the regulation. For example, exemptions based on the size of the facility or on the emission levels from a source should state explicitly how the owner or operator of the source is to determine size and emission level (*e.g.*, whether emissions are actual or design emissions and how actual emissions are calculated). In addition, provisions of a regulation that allow for variations in the normal mode of compliance should be clearly specified. These variance provisions should also make clear whether case by case approval from EPA is required in order to qualify for the variance, or whether there is general approval.[4]

If the SIP regulation includes provisions of Federal regulations that are incorporated by reference, the wording of those Federal regulations should be examined to determine their appropriateness and relevance. To allow for future changes to the referenced Federal regulations, the SIP regulation could reference the current version of the Federal regulation or any subsequent version promulgated by EPA.

The SIP regulations should explicitly state recordkeeping and reporting requirements. They should describe the records that are to be kept to demonstrate compliance, how long and where the records are to be maintained, accessibility for inspection, and schedules and content requirements for any required reports. Whenever possible, the SIP should specify the form and format of reports or it should give an example of an acceptable report. The SIP regulations should be written so that failure to submit a required report is itself a violation of the regulations.

REFERENCES FOR SECTION 11.2

1. "Each plan must provide for monitoring the status of compliance with any rules and regulations that set forth any portion of the control strategy. Specifically the plan must meet the requirements of this subpart." U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter K. July 1, 1991.

2. "The notion of enforceability encompasses several concepts. At the most basic level, a regulation must be within the statutory authority of the promulgating agency." Memorandum from Alushin, M.S., Associate Enforcement Counsel for Air Enforcement, *et. al.* to Regional Administrators. Regions I-X, *et. al.* Review of State Implementation Plans and Revisions for Enforceability and Legal Sufficiency. September 23, 1987. (PN 113-87-09-23-041)

3. "One critical function that your offices perform is to assure that regulations developed for stationary sources by the States under the Clean Air Act are enforceable and legally sufficient. Our regulations require that the state implementation plans ("SIP's") must "be adopted as rules and regulations <u>enforceable</u> (emphasis added) by the State agency" [40 CFR 51.281 (1987)]. We are concerned that review of SIP's for enforceability has not been receiving adequate attention. The Agency sometimes experiences difficulties in its efforts to enforce the current rules because they are not sufficiently clear. The Regional Offices are at the forefront of the Federal SIP approval process. The purpose of this memorandum is to remind you of the importance of doing the review necessary to assure that all SIP plans and revisions are enforceable and in conformance with the Act. Please do not forward for approval SIP's which fail to satisfy the enforceability criteria in this memorandum. Memorandum from Alushin, M.S., Associate Enforcement Counsel for Air Enforcement, *et. al.* to Regional Administrators. Regions I-X, *et. al.* Review of State Implementation Plans and Revisions for Enforceability and Legal Sufficiency. September 23, 1987. (PN 113-87-09-23-041)

4. "Your review should ensure that the rules in question are clearly worded and explicit in their applicability to the regulated sources." Memorandum from Potter, J.C., OAR, Adams, T.L., Jr., OECM, and Blake, F.S., General Counsel to Regional Administrators, Regions I - X, *et al.* September 23, 1987. (PN 113-87-09-23-041)

11.3 CONTINUOUS COMPLIANCE

11.3.1 General

As a general rule, sources are required to meet all applicable emission limitations and other control requirements incorporated into a SIP regulation at all times. Continuous compliance means that excess emissions should be avoided by proper design, operation, and maintenance of air pollution sources and air pollution control equipment.[1]

11.3.2 Enforcement Discretion Approach

The enforcement discretion approach allows the enforcing agency to determine whether emission limit violations are cases which do not require enforcement actions. In these situations, the source is responsible for proving that enforcement action would be inappropriate. An advantage to this approach is that by using enforcement discretion, an agency encourages sources to establish and follow proper operating and maintenance procedures. Proper procedures help to minimize periods of excess emissions.[2]

If a malfunction occurs such that bypassing pollution control equipment will prevent death, personal injury, or severe property damage, the pollution control agency can consider specific circumstances before choosing to take enforcement action. During such a malfunction or emergency situation, the owner or operator of the pollution source is expected to minimize and eliminate emission limit exceedances as quickly as possible. When an emission exceedance occurs in emergency situations, the source owner or operator is responsible for proving that the excess emissions resulted from a true malfunction (*i.e.*, unpreventable, unavoidable).[3]

Some SIP's provide for an automatic emission limitation exemption during periods of excess emission due to startup, shutdown, maintenance, or malfunction. "Excess emission" means an air emission rate which exceeds any applicable emission limitation. "Malfunction" means a sudden and unavoidable breakdown of process or control equipment. Generally, EPA agrees that imposing a penalty for sudden and unavoidable malfunctions caused by circumstances entirely beyond the control of the owner and/or operator is not appropriate.

However, any activity which can be foreseen and avoided, or planned, is not within the definition of a sudden and unavoidable breakdown. SIP provisions concerning malfunctions must be clearly defined. SIP's may, however, omit any special provisions for malfunctions.[4]

11.3.3 Malfunctions and Unusual Start-up or Shut-down

Any activity or event which can be foreseen and avoided falls outside of the definition of sudden and unavoidable breakdown of equipment. For example, a sudden breakdown which could have been avoided by better operation and maintenance practice is not a malfunction. In such cases, the control agency must enforce violations of the emission limitation. A SIP cannot provide an automatic exemption where a malfunction is claimed by a source.[5]

Startup and shutdown of process equipment are part of the normal operation of a source and should be accounted for in the planning, design, and implementation of operating procedures for the process and control equipment. Therefore, it is reasonable to expect that careful and prudent planning and design will eliminate violations of emission limitations during startup and shutdown. However, for a few sources there may exist infrequent short periods of excess emissions during startup and shutdown which cannot be avoided. Excess emissions during these infrequent short periods do not have to be treated as violations providing that the source adequately shows that the excess could not have been prevented through careful planning and design and that bypassing of control equipment was unavoidable to prevent loss of life, personal injury, or severe property damage.

Scheduled maintenance is a predictable event which can be scheduled at the discretion of the operator and therefore, be made to coincide with maintenance on production equipment or other source shutdowns. Therefore, excess emissions during periods of scheduled maintenance should be treated as a violation unless a source can demonstrate that such emissions could not have been avoided through better scheduling for maintenance or through better operation and maintenance practices.

REFERENCES FOR SECTION 11.3

1. "In the strict legal sense, sources are required to meet, without interruption, all applicable emission limitations and control requirements, unless such limitations specifically provide otherwise." Memorandum from Bennett, K.M., OANR, to Directors, Air and Waste Management Divisions and Air Management Divisions, Regions I - X. Definition of "Continuous Compliance and Enforcement of O&M Violations." June 21, 1982.

2. "EPA can approve SIP revisions which incorporate the enforcement discretion approach." Memorandum from Bennett, K.M., OANR, to Regional Administrators, Regions I - X. Policy on Excess Emissions During Startup, Shutdown, Maintenance, and Malfunctions. September 28, 1982. (PN 113-83-02-15-017).

3. "Therefore, during this latter situation, if effluent gases are bypassed which cause an emission limitation to be exceeded, this excess need not be treated as a violation if the source can show that the excesses could not have been prevented through careful and prudent planning and design and that bypassing was unavoidable to prevent loss of life, personal injury, or severe property damage." Memorandum from Bennett, K.M., OANR, to Regional Administrators, Regions I - X. Policy on Excess Emissions During Startup, Shutdown, Maintenance, and Malfunctions. February 15, 1983. (PN 113-83-02-15-017)

4. "Several of the existing State implementation plans (SIP's) provide for an automatic emission limitation exemption during periods of excess emissions due to startup, shutdown, maintenance or malfunction." Memorandum from Bennett, K.M., OANR, to Regional Administrators, Regions I - X. Policy on Excess Emissions During Startup, Shutdown, Maintenance, and Malfunctions. September 28, 1982. (PN 113-83-02-15-017).

5. "If a SIP contains a malfunction provision, it cannot be the type that provides for automatic exemption where a malfunction is alleged by a source." Memorandum from Bennett, K.M., OANR, to Regional Administrators, Regions I - X. Policy on Excess Emissions During Startup, Shutdown, Maintenance, and Malfunctions. September 28, 1982. (PN 113-83-02-15-017).

11.4 COMPLIANCE MONITORING

11.4.1 Compliance Monitoring Strategy

The Compliance Monitoring Strategy (CMS) provides a flexible approach for determining State inspection commitments. The CMS stresses flexibility with accountability. This strategy recommends the development of a comprehensive inspection plan that identifies all the sources in a source category committed to be inspected by the State agency during the fiscal year. The objectives of the CMS are as follows:

- To identify monitoring objectives vis-a-vis available resources through the development of an inspection plan
- To ensure effective national oversight of the air compliance monitoring program, to permit its evaluation, and to establish a feedback mechanism
- To ensure emission standards are met through effective compliance monitoring activities[1]

11.4.2 Compliance Monitoring Requirements

The EPA regulations require SIP's to contain legally enforceable procedures to require stationary sources to install and operate equipment for continuously monitoring, recording and reporting emissions [40 CFR 51.214(a)].[2] The SIP should identify the types of sources (by source category and capacity) that must install, maintain, and operate the equipment; the planned use of data; calculations, recordkeeping, reporting, and quality assurance procedures; and the pollutants that must be monitored [40 CFR 51.214(b)].[3]

Industries and control agencies benefit from routinely monitoring emissions, keeping records and periodic reporting. The benefits include increased cost-effectiveness by increasing the sources' energy efficiency and through pollution prevention and better targeting of "problem sources".[4] Continuous emission monitoring systems (CEMS) provide the best means for directly determining source compliance with emission regulations. In some situations, CEMS technology might not be feasible, in which case alternative methods of compliance might be necessary. These alternative technologies might include instrumental monitoring of process parameters, such as, temperature, pressure, and voltage. Where

instrumental or manual continuous emission monitoring is not feasible, manual monitoring of process information such as pressure drop reading would be acceptable. Currently, there are no CEMS available for PM-10.[5]

Wherever feasible, CEMS should be the required method for monitoring emissions from a source. This is particularly true for major sources and for sources located in nonattainment areas. CEMS should be used to monitor the continuous compliance of NSPS and PSD sources in attainment areas. Wherever it is technically feasible, CEMS requirements should also be incorporated into NSR preconstruction reviews, operating permits, and resolution of enforcement actions.[6] EPA also intends to require the use of CEMS at all major sources required to have permits under Title V and those subject to NESHAPS regulations.[7]

EPA regulations require SIP revisions to require source-continuous monitoring to determine compliance for some types of sources [40 CFR Part 51, Appendix P]. These sources include power plants, sulfuric acid plants, and FBC catalytic cracking unit regenerators at petroleum refineries that exceed size thresholds. If a State does not have plants that meet these qualifications, these provisions need not be included in the SIP. The State, however, should submit a certification with the SIP that there are no plants meeting these specifications. Many States require CEMS on major sources, such as pulp and paper plants and smelters.

The primary purposes of requiring such monitoring are to assure that the source (1) has timely and accurate compliance data; (2) has a quantitative basis to monitor emissions changes which are caused by process or control equipment changes (*e.g.*, so the source is able to modify maintenance procedures); and (3) can minimize energy and raw product use rates by using information made available by the CEMS. Such monitoring measurably helps agencies ensure continuous compliance and allows them to target resources for the sources which violate their emission limits.[6]

11.4.3 State Inspection Plan Submittal

Each inspection plan submittal will present how that State will address national priorities and will justify exceptions to the national priorities. The plan will also identify

specific sources to be inspected, allocate the total inspection budget among source groups, and cover other issues that are necessary to meet the CMS objectives and requirements.

The targeting model should be used to determine Group I and Group II sources to be included in this inspection plan, in addition to, their priority of inspection.[1]

The above steps will allow the State agency to develop their initial comprehensive inspection plan which will be submitted to the EPA Region for review. To justify exceptions to national priorities, the State must submit the basis for their decisions, such as the inspection targeting model inputs and results.[8]

11.4.4 Negotiated Inspection Plans

State agencies are responsible for providing information and for running the inspection targeting model where applicable. State agencies are also responsible for meeting the commitments of their negotiated inspection plans. Finally, the State agencies are responsible for ensuring the appropriate data are reported in a timely and complete fashion to the Regional Office or directly into AIRS.[9]

When preparing an inspection plan submittal, it is recommended that the State use the inspection targeting model for ranking Group I sources and those Group II sources that may be substituted for Group I source inspections on a State-wide level. The inputs and results are then presented at the inspection plan negotiation meeting with EPA.[6]

REFERENCES FOR SECTION 11.4

1. Memorandum. John Rasnic, Acting Director, Stationary Source Compliance Division, OAQPS, U.S. EPA, Washington, D.C., to Air Management Division Directors, Regions I, III, and IX; Air and Waste Management Division Director, Region II; Air, Pesticides, and Toxics Management Division Directors, Regions IV and VI; Air and Toxics Division Directors, Region VII, VIII, X; and Air and Radiation Division Director, Region V. *Revised Compliance Monitoring Strategy.* March 29, 1991.

2. "The plan must contain legally enforceable procedures to - (1) Require stationary sources subject to emission standards as part of an applicable plan to install, calibrate, maintain, and operate equipment for continuously monitoring and recording emissions." U.S. Environmental Protection Agency, *Code of Federal Regulations.* Title 40. Chapter I, Subchapter C, Part 51.214(a). July 1, 1991.

3. "The procedures must - (1) Identify the types of sources, by source category and capacity, that must install the equipment; and (2) Identify for each source category the pollutants which must be monitored." U.S. Environmental Protection Agency, *Code of Federal Regulations.* Title 40. Chapter I, Subchapter C, Part 51.214(b). July 1, 1991.

4. "EPA recognizes the value of routinely monitoring emissions, keeping records, and requiring periodic reporting from major stationary sources. EPA believes such monitoring is of great benefit both to industry in pollution prevention and energy minimization and to control agencies in continuous compliance and targeting of "problem sources." Letter from William K. Reilly, U.S. EPA, OAQPS, Washington, D.C., to John D. Dingell, Chairman, Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives, Washington, D.C. April 10, 1991.

5. "While EPA considers continuous emission monitoring systems (CEMS) to be the most useful means of directly determining source compliance with emission regulations, the agency also recognizes the need to rely on the application of other means of continuous monitoring. These include instrumental monitoring of process parameters such as temperature, pressure, and voltage, and manual monitoring of process information such as the number of gallons and chemical analysis of specific paints used to coat automobiles. These alternative continuous monitoring techniques are appropriate in situations where the technology does not exist for CEMS or the application of technology is not feasible. Letter from William K. Reilly, U.S. EPA, OAQPS, Washington, D.C., to John D. Dingell, Chairman, Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives, Washington, D.C. April 10, 1991.

6. "This states the OAQPS policy, which is effective immediately, on the use of CEM data and provides guidance as to how that policy should be implemented." Memorandum from Emison, G.A., OAQPS, to Air Management Division Director, Regions I, III, and IX, Air and Waste Management Division Director, Region II, Air, Pesticides and Toxics Management Division Director, Regions VII, VIII, and X, Air and Radiation Division Director, Region V. March 31, 1988. (PN 113-88-03-31-048)

7. "EPA intends to require the use of continuous monitoring at all "major" sources required to have permits under Title V and those subject to new or revised NSPS and NESHAPS regulations, including those defined by the Clean Air Act Amendments of 1990." Letter from William K. Reilly, U.S. EPA, OAQPS, Washington, D.C., to John D. Dingell, Chairman, Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives, Washington, D.C. April 10, 1991.

8. Memorandum. John S. Seitz, Director, Stationary Source Compliance Division, OAQPS, U.S. EPA, Washington, D.C., to Air Management Division Directors, Regions I, III, and IX; Air and Waste Management Division Director, Region II; Air, Pesticides, and Toxics Management Division Directors, Regions IV and VI; Air and Toxics Division Directors, Region VII, VIII, X; and Air and Radiation Division Director, Region V. *Compliance Monitoring Strategy for FY 89*. March 31, 1988. (PN 114-88-31-006). Inspections, Monitoring, and Entry.

9. "The tracking system for CMS stationary sources in Group I is the AIRS/AFS system. As Group II sources are substituted for Group I sources, they are to be entered and subsequently tracked in AIRS/AFS as well... In addition, States are responsible for meeting the negotiated commitments, providing the necessary information to the Regional Office to both negotiate the reference level and enable the Regional Office to conduct the evaluation at the end of the year, reporting inspections in a timely manner to the Regional Office, or directly into AFS, and keeping Regional Office staff informed of problems as well as successes in the implementation of CMS." Memorandum from John Rasnic, Acting Director, Stationary Source Compliance Division, OAQPS, U.S. EPA, Washington, D.C., to Air Management Division Directors, Regions I, III, and IX; Air and Waste Management Division Director, Region II; Air, Pesticides, and Toxics Management Division Directors, Regions IV and VI; Air and Toxics Division Directors, Region VII, VIII, X; and Air and Radiation Division Director, Region V. *Revised Compliance Monitoring Strategy.* March 29, 1991.

11.5 COMPLIANCE PLANS/SCHEDULES

The EPA regulations require each SIP to contain legally enforceable compliance schedules that set forth the dates by which all stationary and mobile sources or categories must be in compliance with the SIP [40 CFR 51.260(a)]. Compliance plans/schedules should include enforceable milestones, stipulated penalties, final compliance dates, and compliance test method. The compliance schedules contained in the SIP must provide for attainment of compliance with the primary standards as soon as practicable, or no later than a specified date [40 CFR 51.26 1(a)].

11.6 COMPLIANCE TESTING METHODS

In accordance with the requirements of Subpart K of Title 40, Chapter I, Part 51 of the *Code of Federal Regulations*, each SIP must provide for monitoring the status of compliance with any rules and regulations that set forth any portion of the control strategy, specifically for testing and enforcement. The plan must provide for periodic testing and inspection of stationary sources and enforceable test methods for each emission limit specified in the plan.[1]

Appendix M of Title 40, Chapter I, Part 51 of the *Code of Federal Regulations* recommends two test methods, Method 201 and 201A, for the determination of PM-10 emissions in the preparation of State implementation plans.[2] Method 201 is based on an exhaust gas recycle procedure, and applies to the in-stack measurement of particulate matter of a size less than or equal to that of PM-10 emitted from stationary sources. In this method, a gas sample is isokinetically extracted from the source. An in-stack cyclone is used to separate particulate matter larger than PM-10, and an in-stack glass fiber filter is used to collect the PM-10. To maintain isokinetic flow rate conditions at the tip of the probe and a constant flow rate through the cyclone, a clean, dried portion of the sample gas at stack temperature is recycled into the nozzle. The particulate mass is determined gravimetrically after removal of uncombined water.

Method 201A, based on a constant sampling rate procedure, applies to the in-stack measurement of particulate matter of a size less than or equal to that of PM-10 emitted from stationary sources.[2] In this method, a gas sample is extracted at a constant flow rate through

an in-stack sizing device, which separates PM larger than PM-10. Variations from isokinetic sampling conditions are maintained within well-defined limits. The particulate mass is determined gravimetrically after removal of uncombined water.

Since condensible particulate matter (CPM) emissions form very fine particles in the PM-10 size range and are considered PM-10 emissions, EPA added (to Appendix M of Title 40, Chapter I, Part 51 of the *Code of Federal Regulations*[3]) a method 202, for measuring CPM emissions from stationary sources. The method may be used in conjunction with Method 201 or 201A if the probes are glass-lined. The CPM is collected in the impinger portion of a Method 17 (Appendix A, 40 CFR Part 60) type sampling train.[4] The impinger contents are immediately purged after the run with nitrogen to remove dissolved sulfur dioxide gases from the impinger contents. The impinger solution is then extracted with methylene chloride. The organic and aqueous fractions are then taken to dryness and the residues weighed. The total of both fractions represents the CPM.

Method 5 is another method used for the determination of particulate emissions from stationary sources.[5] In this method, particulate matter is withdrawn isokinetically from the source and collected on a glass fiber filter maintained at temperatures approved by EPA. The particulate mass, which includes any material that condenses at or above the filtration temperature, is determined gravimetrically after removal from uncombined water.

REFERENCES FOR SECTION 11.6

1. "As an enforceable method, States may use: (1) Any of the appropriate methods in appendix M to this part, Recommended Test Methods for State Implementation Plans; or (2) An alternative method following review and approval of that method by the Administrator; or (3) Any appropriate method in Appendix A to 40 CFR part 60." U.S. Environmental Protection Agency, *Code of Federal Regulations*. Title 40. Chapter I, Subpart K, Part 51.212. July 1, 1991.

2. U.S. Environmental Protection Agency, *Code of Federal Regulations*. Title 40. Chapter I, Subchapter C, Part 51, Appendix M. July 1, 1991.

3. 56 Federal Register 65,433-9 (December 17, 1991), Preparation, Adoption, and Submittal of State Implementation Plans, Method for Measurement of Condensible Particulate Emissions from Stationary Sources.

4. U.S. Environmental Protection Agency, *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60, Appendix A. July 1, 1991.

5. U.S. Environmental Protection Agency, *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60, Appendix A. July 1, 1991.

12.0 NEW SOURCE PERFORMANCE STANDARDS

12.1 GENERAL

Under section 111 of the Act, EPA is required to develop emission regulations for a category of sources which ". . . causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare."[1] These regulations, referred to as new source performance standards (NSPS), are to reflect the degree of emission reduction achievable through technology that has been adequately demonstrated, taking into consideration the cost of the emission reductions and any air quality, health, environmental and energy impacts on meeting the standard.[2]

This chapter summarizes relevant NSPS provisions (including emission limits, compliance testing, and monitoring procedures) for several source categories that are significant emitters of PM-10. NSPS provisions are generally applicable to total particulate matter. At present, there are no NSPS provisions specific to PM-10. NSPS particulate source categories generally include steam generators, smelters, petroleum refineries, and new residential wood heaters. A complete list of NSPS sources of particulate matter is included in Table 12-1. Relevant NSPS provisions for selected particulate matter source categories are discussed in Section 12.2. Aspects of the provisions for modifications and reconstructions are clarified in Section 12.3.

TABLE 12-1. NSPS PARTICULATE MATTER SOURCE CATEGORIES

Part 60	Source Category
Subpart D:	Fossil-Fuel Fired Steam Generators
Subpart Da:	Electric Utility Steam Generating Units
Subpart Db:	Industrial-Commercial-Institutional Steam Generating Units
Subpart E:	Incinerators
Subpart F:	Portland Cement Plants
Subpart I:	Asphalt Concrete Plants
Subpart J:	Petroleum Refineries
Subpart L:	Secondary Lead Smelters
Subpart M:	Secondary Brass and Bronze Production Plants
Subpart N:	Basic Oxygen Process Furnaces (Primary Emissions)
Subpart Na:	Basic Oxygen Process Steelmaking Facilities (Secondary Emissions)
Subpart O:	Sewage Treatment Plants
Subpart P:	Primary Copper Smelters
Subpart Q:	Primary Zinc Smelters
Subpart R:	Primary Lead Smelters
Subpart Y:	Coal Preparation Plants
Subpart Z:	Ferroalloy Production Facilities
Subpart AA:	Steel Plants: Electric Arc Furnaces
Subpart AAa:	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels
Subpart BB:	Kraft Pulp Mills
Subpart CC:	Glass Manufacturing Plants
Subpart DD:	Grain Elevators
Subpart HH:	Lime Manufacturing Plants
Subpart LL:	Metallic Mineral Processing Plants
Subpart NN:	Phosphate Rock Plants
Subpart PP:	Ammonium Sulfate Manufacture
Subpart UU:	Asphalt Processing and Asphalt Roofing Manufacture
Subpart AAA:	New Residential Wood Heaters
Subpart OOO:	Nonmetallic Mineral Processing Plants
Subpart PPP:	Wool Fiberglass Insulation Manufacturing Plants

REFERENCES FOR SECTION 12.1

1. U.S. Congress. Clean Air Act, as amended November 1990. 42 U.S.C 7401 *et seq.* Section 111(b)(1)(A). Washington, D.C. U.S. Government Printing Office.

2. U.S. Congress. Clean Air Act, as amended November 1990. 42 U.S.C. 7401 *et seq.* Section 111(a). Washington, D.C. U.S. Government Printing Office.

12.2 NSPS PROVISIONS FOR PARTICULATE MATTER

12.2.1 Subpart D--Fossil-Fuel Fired Steam Generators[1]

This subpart applies to fossil-fuel fired steam generating units that commenced construction after August 17, 1971, and that have a heat input capacity greater than 250 MM Btu/hr. A fossil-fuel fired steam generating unit is defined as a furnace or boiler used in the process of burning fossil fuel for the purpose of producing steam by heat transfer. For this source category, particulate matter emissions are limited to 43 nanograms per joule (ng/J) (0.10 lb/MM Btu) heat input derived from fossil fuel or fossil fuel and wood residue and 20 percent opacity (except for one six-minute period per hour of not more than 27 percent opacity). Compliance is generally determined by Method 5 to determine the PM concentration at affected facilities without wet flue-gas-desulfurization (FGD) systems and Method 5B at affected facilities after FGD systems; the sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf). Method 9 shall be used to determine opacity.

12.2.2 Subpart Da--Electric Utility Steam Generating Units[2]

This subpart applies to electric utility steam generating units that commenced construction after September 18, 1978, and that have a design heat capacity greater than 250 MM Btu/hr. An electric utility steam generating unit is defined as a steam electric generating unit that supplies more than one-third of its potential electric output and more than 25 MW electrical output to any utility power distribution system for sale. For this source category, particulate matter emissions are limited to 13 ng/J (0.03 lb/MM Btu) heat input derived from the combustion of solid, liquid, or gaseous fuel; 1 percent of the potential combustion concentration when combusting solid fuel; and 30 percent of potential combustion concentration when combusting liquid fuel. Opacity is limited to 20 percent. Compliance is generally determined by Method 5 to determine PM concentration at affected facilities without FGD systems and Method 5B at affected facilities after FGD systems; the sampling time and sample volume for each run shall be at least 120 minutes and 1.70 dscm (60 dscf). Method 9 shall be used to determine opacity.

12.2.3 Subpart Db--Industrial-Commercial-Institutional Steam Generating Units[3]

This subpart applies to industrial, commercial, and institutional steam generating units that commenced construction, modification, or reconstruction after June 19, 1984, and that have a heat input capacity greater than 100 MM Btu/hr. The steam generating unit in this category is defined as a device that combusts any fuel or by-product/waste to produce steam or to heat water or any other transfer medium. For this category, particulate matter emissions are limited to the following:

1. For affected facilities which combust coal or a mixture of coal and other fuels and have an annual operating capacity of ≤10 percent, PM emissions are limited to 22 ng/J (0.05 lb/MM Btu) heat input for affected facilities which combust coal or a mixture of coal and other fuels and have an annual operating capacity of ≥10 percent, PM emissions are limited to 43 ng/J (0.10 lb/MM Btu) heat input for affected facilities which combust coal or a mixture of coal and other fuels and have an annual operating capacity of ≤30 percent, PM emissions are limited to 86 ng/J (0.20 lb/MM Btu) heat input

2. For affected facilities which combust oil, PM emissions are limited to 43 ng/J (0.10 lb/MM Btu) heat input

3. For affected facilities which combust wood or a mixture of wood and other fuels and have an annual operating capacity >30 percent, PM emissions are limited to 43 ng/J (0.10 lb/MM Btu) heat input; for affected facilities which combust wood or a mixture of wood and other fuels and have an annual operating capacity of ≤30 percent, PM emissions are limited to 86 ng/J (0.20 lb/MM Btu) heat input

4. For affected facilities which combust solid waste or a mixture of solid waste and other fuels and have an annual operating capacity of ≤10 percent, PM emissions are limited to 43 ng/J (0.10 lb/MM Btu) heat input; for affected facilities which combust solid waste or a mixture of solid waste and other fuels and have an annual operating capacity of ≤30 percent, PM emissions are limited to 86 ng/J (0.20 lb/MM Btu) heat input.

Compliance is determined by Method 5 to measure PM concentration at affected facilities without wet FGD systems and by Method 5B at affected facilities after wet FGD systems; Method 17 may be used at facilities with or without wet scrubber systems provided the stack gas temperature does not exceed 160^0 C (320^0 F). Method 9 shall be used to determine opacity.

12.2.4 Subpart J--Petroleum Refineries[4]

This subpart applies to petroleum refineries with fuel combustion devices that commenced construction after June 11, 1973, and with Claus sulfur recovery plants (>20 long tons/day capacity) that commenced construction after October 4, 1976. Particulate matter emissions are limited to 1.0 kg/1000 kg (1.0 lb/1000 lb) of coke burn-off in the catalyst regenerator (exception). Opacity is limited to 30 percent (except for one six-minute average opacity reading in any one hour period). Compliance is generally determined by Method 5B or 5F to determine PM emissions and associated moisture content from affected facilities without wet FGD systems; only Method 5B is to be used after wet FGD systems. Sampling time and sampling rate for each run shall be at least 60 minutes and 0.015 dscm/min (0.53 dscf/min) (except that shorter sampling times may be approved by the Administrator when process variables or other factors preclude sampling for at least 60 minutes).

12.2.5 Subpart L--Secondary Lead Smelters[5]

This subpart applies to pot furnaces with a charging capacity of more than 250 kg (550 lb), blast (cupola) furnaces, and reverberatory furnaces in secondary lead smelters that commenced construction or modification after June 11, 1973. A secondary lead smelter is defined as any facility producing lead from a landbearing scrap material by smelting to the metallic form. For blast and reverberatory furnaces, particulate matter emissions are limited to 50 mg/dscm (0.022 gr/dscm). Opacity is limited to 10 percent for pot furnaces and to 20 percent for blast and reverberatory furnaces. Compliance is determined using Method 5 to determine the PM concentration during representative periods of furnace operation, including charging and tapping; the sampling time and sample volume for each run shall be at least 60 minutes and 0.90 dscm (31.8 dscf). Method 9 shall be used to determine opacity.

12.2.6 Subpart P--Primary Copper Smelters[6]

This subpart applies to dryers, roasters, smelting furnaces, and copper converters in primary copper smelters that commenced construction or modification after October 16, 1974. A primary copper smelter is defined as any installation or any intermediate process engaged in the production of copper from copper sulfide ore concentrates through the use of

pyrometallurgical techniques. For this source category, particulate emissions are limited to 50 mg/dscm (0.022 gr/dscf). Visible emissions are limited to 20 percent opacity. Compliance is determined using Method 5 to determine PM concentration; sampling time and sampling volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf). Method 9 shall be used to determine opacity.

12.2.7 Subpart Q--Primary Zinc Smelters[7]

This subpart applies to roaster and sintering machines in primary zinc smelters that commenced construction or modification after October 16, 1974. A primary zinc smelter is defined as any installation engaged in the production, or any intermediate process in the production, of zinc or zinc oxide from zinc sulfide ore concentrates through the use of pyrometallurgical techniques. For this source category, particulate matter is limited to 50 mg/dscm (0.022 gr/dscf). Visible emissions are limited to 20 percent opacity. Compliance is determined using Method 5 to determine the particulate matter concentration; sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf). Method 9 shall be used to determine opacity.

12.2.8 Subpart R--Primary Lead Smelters[8]

This subpart applies to sintering machine, sintering machine discharge end, blast furnace, dross reverberatory furnace, electric smelting furnace, and converters in primary lead smelters that commenced construction or modification after October 16, 1974. A primary lead smelter is defined as any installation or any intermediate process engaged in the production of lead from lead sulfide ore concentrates through the use of pyrometallurgical techniques. For this source category, particulate emissions are limited to 50 mg/dscm (0.022 gr/dscf). Visible emissions are limited to 20 percent opacity. Compliance is determined using Method 5 to determine PM concentration; the sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf). Method 9 shall be used to determine opacity.

12.2.9 Subpart AAA--New Residential Wood Heaters

This subpart applies to wood heaters manufactured on or after July 1, 1988, or sold at retail on or after July 1, 1990. A wood heater is defined as an enclosed, woodburning appliance capable of and intended for space heating and domestic water heating that meets the following criteria: (1) an average air-to-fuel ratio in the combustion chamber less than 35:1; (2) a useable firebox volume of less than 20 cubic feet; (3) a minimum burn rate less than 5 kg/hr; and (4) a maximum weight of 800 kg. For affected facilities manufactured on or after July 1, 1988 or sold at retail on or after July 1, 1990, which are equipped with catalytic combustors, particulate matter emissions are limited to a weighted average of 5.5 g/hr; for affected facilities not equipped with catalytic combustors, emissions are limited to a weighted average of 8.5 g/hr. For wood heaters manufactured on or after July 1, 1990 or sold at retail on or after July 1, 1992, which are equipped with catalytic combustors, particulate matter emissions are limited to a weighted average of 4.1 g/hr. For affected facilities which are not equipped with catalytic combustors, particulate matter emissions are limited to 7.5 g/hr. Compliance is determined using Method 28 to establish the certification test conditions and the particulate matter weighted emission values.

REFERENCES FOR SECTION 12.2

1. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60. Subpart D. July 1, 1991.

2. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60. Subpart Da. July 1, 1991.

3. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60. Subpart Db. July 1, 1991.

4. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60. Subpart J. July 1, 1991.

5. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60. Subpart L. July 1, 1991.

6. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60. Subpart P. July 1, 1991.

7. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60. Subpart Q. July 1, 1991.

8. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60. Subpart R. July 1, 1991.

12.3 MODIFICATION/RECONSTRUCTION PROVISIONS

"Modification" refers to "any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies . . . " as described in the NSPS general provisions. Some of the possible changes that do not qualify as modifications include (1) routine maintenance, repair, and replacement; (2) increases in production rate not accompanied by capital expenditures; (3) increased capacity utilization; (4) fuel switching, provided that facility was originally designed to handle the new fuel; (5) addition of air pollution control and related equipment; and (6) the change in ownership of an existing facility.[1]

"Reconstruction" generally includes "the replacement of components of an existing facility to such an extent that (1) the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, and (2) it is technologically and economically feasible to meet the applicable standards . . ." [2]

REFERENCES FOR SECTION 12.3

1. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60.14. July 1, 1991.

2. U.S. Environmental Protection Agency. *Code of Federal Regulations*. Title 40, Chapter I, Subchapter C, Part 60.15. July 1, 1991.