APPENDIX E

U.S. EPA Guidance on the Use of Models and Other Analyses

Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze

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Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze

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FOREWORD

The purpose of this document is to provide guidance to EPA Regional, State, and Tribal air quality management authorities and the general public, on how to prepare 8-hour ozone and $PM_{2.5}$ attainment demonstrations and regional haze uniform rate of progress analyses using air quality models and other relevant technical analyses. This guidance is designed to implement national policy on these issues. This document does not substitute for any Clean Air Act provision or EPA regulation, nor is it a regulation itself. Thus, it does not impose binding, enforceable requirements on any party, nor does it assure that EPA will approve all instances of its application. The guidance may not apply to a particular situation, depending upon the circumstances. The EPA and State decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. Any decisions by EPA regarding a particular State Implementation Plan (SIP) demonstration will only be made based on the statute and regulations, and will only be made following notice and opportunity for public review and comment. Therefore, interested parties will be able to raise questions and objections about the contents of this guidance and the appropriateness of its application for any particular situation.

This guidance is a living document and may be revised periodically. Updates, revisions, and additional documentation will be provided at *http://www.epa.gov/ttn/scram/*. Any mention of trade names or commercial products in this document is not intended to constitute endorsement or recommendation for use. Users are cautioned not to regard statements recommending the use of certain procedures or defaults as either precluding other procedures or information, or providing guarantees that using these procedures or defaults will result in actions that are fully approvable. As noted above, EPA cannot assure that actions based upon this guidance will be fully approvable in all instances, and all final actions will only be taken following notice and opportunity for public comment. The EPA welcomes public comments on this document and will consider those comments in any future revisions of this guidance document, providing such approaches comply with all applicable statutory and regulatory requirements.

1.0 Introduction

This document describes how to estimate if an emissions control strategy will lead to attainment of annual and 24-hour national ambient air quality standards (NAAQS) for particles smaller than 2.5 μm in diameter (*$PM_{2.5}$*) and the 8-hour NAAQS for ozone. We also describe how to use modeled and monitored data to estimate the visibility improvement in *Class I areas* (e.g., national parks, wilderness areas) as part of a uniform rate of progress analysis[1].

The document describes how to apply air quality models to generate the predictions later used to evaluate attainment and/or uniform rate of progress assessments. Modeling to show attainment of the NAAQS primarily applies to nonattainment areas[2] for which modeling is needed, or desired. Modeling to assess uniform rate of progress for regional haze applies to all States[3]

The guidance consists of two major parts. Part I addresses the question, "how should I use the results of models and other analyses to help demonstrate attainment and/or assess uniform rate of progress?" We begin by describing a *modeled attainment test* for the 8-hour ozone NAAQS, the annual $PM_{2.5}$ NAAQS, and the 24-hour $PM_{2.5}$ NAAQS. We also recommend a modeled test to assess *uniform rate of progress* goals to reduce regional haze. We explain what is meant by a *modeled attainment demonstration*, a *modeled attainment test*, and a *weight of evidence determination*. We also identify additional data which, if available, can enhance the credibility of model results. Part I concludes by identifying what documentation States/Tribes should include as part of an attainment demonstration.

Part II of the guidance describes how to apply air quality models. The recommended procedure for applying a model has nine steps. The results of this process are then used to apply the modeled attainment test to support an attainment demonstration, as described in Part I of the guidance.

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[1]Modeling is not used to determine reasonable progress goals and does not determine whether reasonable progress has been met. Modeling is one part of the reasonable progress analysis. The modeling results are used to determine if future year visibility at Class I areas are estimated to be on a (glide)path towards reaching natural background. This is called a uniform rate of progress analysis or "glidepath" analysis. The uniform rate of progress analysis is described in more detail in section 6.

[2]While this guidance document is primarily directed at modeling applications in nonattainment areas, it may also be useful as a guide for modeling in maintenance areas or to support other rules or sections of the Clean Air Act.

[3]The Regional Haze rule assumes that all 50 States either contain a Class I area or impact visibility within a Class I area. Therefore, a regional haze State Implementation Plan (SIP) is required for all States (40 CFR 50.308(b)).

1. Develop a conceptual description of the problem to be addressed.
2. Develop a modeling/analysis protocol.
3. Select an appropriate model to support the demonstration.
4. Select appropriate meteorological time periods to model.
5. Choose an appropriate area to model with appropriate horizontal/vertical resolution and establish the initial and boundary conditions that are suitable for the application.
6. Generate meteorological inputs to the air quality model.
7. Generate emissions inputs to the air quality model.
8. Run the air quality model with basecase emissions and evaluate the performance. Perform diagnostic tests to improve the model, as necessary.
9. Perform future year modeling (including additional control strategies, if necessary) and apply the attainment test.

Model applications require a substantial effort. States/Tribes should work closely with the appropriate U.S. EPA Regional Office(s) in executing each step. This will increase the likelihood of approval of the demonstration at the end of the process.

1.1 What Is The Purpose Of This Document?

This document has two purposes. The first is to explain how to interpret whether results of modeling and other analyses support a conclusion that attainment of the ozone and/or $PM_{2.5}$ NAAQS, and/or uniform rate of progress for regional haze will occur by the appropriate date for an area. The second purpose is to describe how to apply an air quality model to produce results needed to support an attainment demonstration or a uniform rate of progress analysis.

The guidance herein should be viewed as recommendations rather than requirements. Although this guidance attempts to address issues that may arise in attainment demonstrations, situations which we have failed to anticipate may occur. These should be resolved on a case by case basis in concert with the appropriate U.S. EPA Regional Office.

1.2 Does The Guidance In This Document Apply To Me?

This guidance applies to all locations required to submit a State Implementation Plan (SIP), or Tribal Implementation Plan (TIP) revision with an attainment demonstration designed to achieve attainment of the ozone or $PM_{2.5}$ NAAQS. The guidance also applies to SIPs developed to address regional haze rule requirements. Areas required to submit an attainment demonstration and/or a reasonable progress demonstration are encouraged to follow the procedures described in this document. Details on when a State is required to submit a modeled attainment or reasonable progress demonstration can be found in the regional haze rule[4], the 8-

[4]40 CFR 50.308

hour ozone implementation rule[5] and the $PM_{2.5}$ implementation rule[6].

Implementation plan revisions for ozone and $PM_{2.5}$ are due three years from the effective designation date after an area is designated "nonattainment" (e.g., June 15, 2007 for areas whose effective designation dates are June 15, 2004). Regional haze SIPs (for the first planning period) are due no later than December 17, 2007 (40 CFR 50.308(b)) Attainment and uniform rate of progress analyses supporting these revisions should be completed in time to allow sufficient time to complete the rulemaking process by the SIP due date.

1.3 How Does The Perceived Nature Of Ozone, PM, and Regional Haze Affect My Attainment Demonstration?

Guidance for performing attainment demonstrations needs to be consistent with the perceived nature of the pollutant. In this section, we identify several premises regarding ozone, $PM_{2.5}$, and regional haze. We then describe how the guidance accommodates each.

1.3.1 Ozone, PM, and Regional Haze

Premise 1. There is uncertainty accompanying model predictions. "Uncertainty" is the notion that model estimates will not perfectly predict observed air quality at any given location, neither at the present time nor in the future. Uncertainty arises for a variety of reasons, for example, limitations in the model's formulation which may be due to an incomplete representation in the model of physiochemical processes and/or meteorological and other input data base limitations, and uncertainty in forecasting future levels of emissions. States/Tribes should recognize these limitations when preparing their modeled attainment demonstrations.

We recommend several qualitative means for recognizing model limitations and resulting uncertainties when preparing an attainment demonstration. First, we recommend using models in a relative sense in concert with observed air quality data (i.e., taking the ratio of future to present predicted air quality and multiplying it times an "ambient" design value)[7]. As described later, we believe this approach should reduce some of the uncertainty attendant with using absolute model predictions alone. Second, we recommend that a modeling analysis be preceded by analyses of available air quality, meteorological, and emissions data to gain a qualitative understanding of an area's nonattainment problem. Such a description should be used to help guide a model application and may provide a reality check on the model's predictions. Third, we recommend that States/Tribes use several model outputs, as well as other supporting analyses, to provide corroborative evidence concerning the adequacy of a proposed strategy for meeting the

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[5]40 CFR 50.908

[6]40 CFR 50.1007

[7] Ambient design values are based on observations made at monitor locations.

NAAQS. Modeling results and other supporting analyses can be weighed to determine whether or not the resulting evidence suggests a proposed control strategy is adequate to meet the NAAQS. Finally, we identify several activities/analyses which States/Tribes could undertake, if they so choose, to apply models and corroborative approaches in subsequent reviews and analyses of a control strategy, such as mid-course reviews. These subsequent reviews are useful for determining whether a SIP is achieving progress as expected.

Premise 2. For many areas, nested regional/urban model applications will be needed to support the attainment demonstration. Available air quality data suggest ozone and $PM_{2.5}$ concentrations approach levels specified in the NAAQS throughout much of the eastern U.S. and in large parts of California (U.S. EPA 2004a, U.S. EPA 2004b). A number of analyses (U.S.EPA, 1998b and U.S. EPA, 2005a and 2005b) show that regional ozone and PM transport can impact areas several hundred miles or more downwind. The regional extent of ozone and PM transport patterns and distances in some areas will likely necessitate nested regional model applications.

This guidance identifies several *modeling systems*[8] with nesting capabilities to resolve meteorological parameters, emissions, chemistry, and transport. We believe it is not beneficial to identify any modeling system as the preferred, or "guideline model" for ozone, $PM_{2.5}$[9] or regional haze modeling. States/Tribes may use any appropriate modeling system provided that the requirements of 40 CFR 51.112 are met. In this guidance, we provide certain criteria to assist States/Tribes in justifying the use of such modeling systems. These criteria apply equally to U.S.EPA models and alternative air quality model(s). The guidance also provides recommendations for developing meteorological, air quality and emissions inputs used in nested regional model applications, and makes suggestions for quality assuring inputs and evaluating performance of emissions, meteorological and air quality models.

Premise 3. Resource intensive approaches may often be needed to support an adequate attainment demonstration. This follows from the regional nature of ozone and $PM_{2.5}$ concentrations in the Eastern U.S. While we believe that existing and future regional reductions in NOx and SO_2 emissions will reduce ozone and $PM_{2.5}$ over much of the eastern U.S., elevated regional ozone and $PM_{2.5}$ concentrations will continue to affect local strategies needed to attain the NAAQS in the remaining nonattainment areas.

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[8]A modeling system includes a chemical model, an emissions model and a meteorological model. Terms, such as this one, which are introduced using italics are defined more fully in a glossary at the back of this guidance. "Modeling system" and "air quality model" are used interchangeably. "Air quality model" means "modeling system" in this guidance.

[9]In this context, we are not referring to dispersion modeling of primary $PM_{2.5}$ sources subject to New Source Review (NSR) or Prevention of Significant Deterioration (PSD) analyses. We are only referring to $PM_{2.5}$ analyses for SIP attainment demonstrations.

This guidance recommends using regional modeling domains. Regional modeling applications require coordination, quality assurance and management of data bases covering large areas of the country. Resources used to run recommended models for generating meteorological and emissions inputs and the air quality model itself can be substantial. States/Tribes facing the need to develop an attainment demonstration requiring resource intensive techniques may wish to consider pooling resources in some manner. Examples might include delegating responsibilities for certain parts of the analyses to a single State/Tribe which can "specialize" in that kind of analysis. Another example might be formation of a regional technical center to perform analyses as directed by its client group of States/Tribes (e.g., multi-state and tribal organizations such as the Regional Planning Organizations (RPO) [10], LADCO, and the Ozone Transport Commission (OTC)).

Premise 4. High concentrations of ozone, $PM_{2.5}$ and regional haze often have a common origin. Ozone formation and formation of secondary particulates result from several common reactions and reactants. Secondary particulates are a major part of $PM_{2.5.}$ Often similar sources contribute precursors to both ozone and $PM_{2.5}$. In some regions of the U.S., high regional ozone and secondary particulates are observed under common types of meteorological conditions. Reducing $PM_{2.5}$ is the principal controllable means for improving regional haze. Reducing $PM_{2.5}$ precursors can also lead to reductions in ozone. Models intended to address secondary particulate matter problems need also to be capable of simulating ozone formation and transport. U.S. EPA policy is to encourage "integration" of programs to reduce ozone, $PM_{2.5}$ and regional haze to ensure they do not work at cross purposes and to foster maximum total air quality benefit for lower costs.

1.3.2 How is Measuring and Modeling Particulate Matter Different (and Often More Complicated) than Ozone?

Before modeling the expected $PM_{2.5}$ benefits from emissions controls, it is important to understand the unique and complicated aspects of measuring and modeling particulate matter. For many reasons, $PM_{2.5}$ and regional haze modeling presents many more difficulties compared to ozone modeling. In this section, we identify attributes of $PM_{2.5}$ that are applicable to most attainment or uniform rate of progress demonstrations. There are of course exceptions. As we discuss in Section 11.0, States need to develop a conceptual description of the $PM_{2.5}$ or regional haze problem in each of their areas subject to a demonstration. If a substantially different picture emerges from the general one presented in this section, modeling/analysis procedures which differ from some of those we believe are generally applicable may be warranted.

Premise PM1. Particulate matter is a mixture. Unlike a compound (e.g., ozone) or an element (e.g., lead), a mixture has components which (a) can behave independently of one another (e.g., primary vs. secondary components) or (b) are related to one another in a complex

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[10]EPA provides funding to five regional planning organizations to address regional haze and related issues. http://www.epa.gov/air/visibility/regional.html

way (e.g., different secondary components). Thus, if one only considers $PM_{2.5}$ as a single entity, rather than as the sum of its major *components*, there is a greater risk of choosing an ineffective control strategy. This follows, because models may not perform equally well in predicting major components of $PM_{2.5}$. Nevertheless, balancing errors could (erroneously) indicate good model performance predicting $PM_{2.5.}$ If a control strategy focused on reducing a component of $PM_{2.5}$ which was overestimated by the model, the subsequently observed impact on $PM_{2.5}$ could be less than expected.

Characteristics of $PM_{2.5}$ as a mixture and the possibility that models perform unevenly in predicting the major components of the mixture have two important implications for our guidance. First, the modeling should divide $PM_{2.5}$ into a half a dozen or so major components and note the effects of a strategy on each. The effect on $PM_{2.5}$ should be estimated as a sum of the effects on individual components. Second, to reduce the effects of uneven performance and possible major bias in predicting absolute concentrations of one or more components, models are best used in a "relative" sense in concert with measured $PM_{2.5}$ and estimated composition of the measured $PM_{2.5}$ derived from speciated measurements. That is, responses predicted by models should be applied to observed component concentrations derived from $PM_{2.5}$ measurements and composition of $PM_{2.5}$ estimated from measurements of ambient species.

Premise PM2. In most parts of the country, "Secondary" PM is a more important part of $PM_{2.5}$ than it is of PM_{10}. Size-differentiated ambient particulate data suggest that mass of particulate matter follows a bimodal distribution, with one peak (*fine mode*) reflecting particles with aerodynamic diameters ~ 0.1-1.0 micrometers arising from nucleation and accumulation phenomena, and a second (*coarse mode*) occurring with aerodynamic diameters in the range of 1.0-20 micrometers. As shown in Figure 1.1, derived from Wilson and Suh, (1997), mass of fine particulate matter (i.e., $PM_{2.5}$) attributable to coarse mode particulate matter $\leq$ 2.5 micrometers is relatively small. Mass attributable to fine mode particulate matter with aerodynamic diameters $\geq$ 2.5 micrometers (i.e., coarse particulate matter) is also relatively small.

Origins of coarse and fine mode particulate matter are usually quite different. The former results mostly from physical types of activities (e.g., crushing, grinding, resuspension due to motions, etc.). Nearly all these activities result in particulate matter, with little subsequent chemical change. We call such emissions of particulate matter "primary emissions", because they are measured in more or less the same form in which they are emitted. In contrast, origins of fine mode particulate matter are more diverse. For example, some fine mode particulate matter is directly emitted to the atmosphere as a result of combustion. Such emissions occur either directly as particles or as a result of condensation which occurs very shortly after the emissions occur. These are primary emissions, because what is measured in the ambient air is essentially unchanged (chemically) from what is released. However, many fine mode particles are the result of physicochemical reactions which occur in the atmosphere among gaseous precursors or through absorption or adsorption onto previously existing aerosols. Such particles constitute "secondary" particulate matter, because they undergo transformations in the atmosphere causing the chemical and/or physical nature of what is measured to be different from what is emitted.

Because of the size distribution of ambient particulate matter, most measured $PM_{2.5}$ is likely to be fine mode particulate matter. As a result, it is dominated to a much larger extent than PM_{10} by "secondary" particulate matter and primary particulate emissions arising from combustion. Some of the physicochemical processes leading to secondary particulate matter formation may take hours or days, as do some of the removal processes. Thus, many of the sources of measured secondary particulate matter may not be local emitted sources. This implies that modeling to support *attainment demonstrations* for $PM_{2.5}$ (and, as we will discuss later, regional haze-related applications) will need to cover a very large domain, and will need to include chemical/physical mechanisms important in formation/removal of secondary particulate matter. Because several of the processes are slow and first require thorough mixing with the environment, spatially detailed treatment near sources of precursors may not be necessary. Individual treatment of precursor emissions from relatively nearby large sources of primary $PM_{2.5}$ may be needed on a case by case basis.

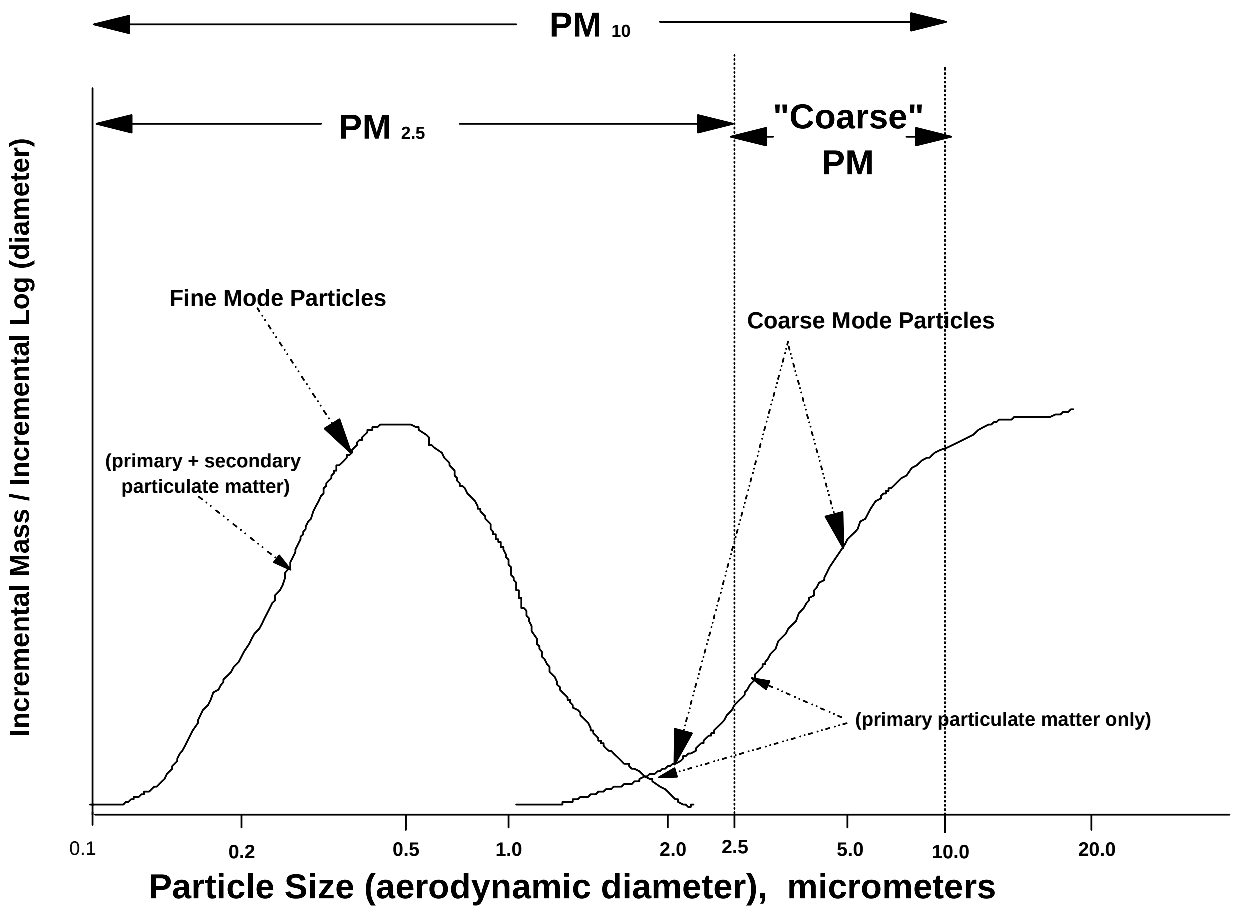

Figure 1.1. Conceptual Diagram Of Particulate Matter Properties

Premise PM3. Regional haze is closely related to presence of high concentrations of fine particulate matter. Light extinction results from scattering and absorption of light. Some scattering occurs by gas molecules in pristine air (i.e., Rayleigh scattering). Nearly all remaining light extinction is caused by the presence of aerosols. For any given mass, fine particles (i.e., $\leq$ 2.5 µm) are more efficient at scattering light than are particles > 2.5 µm aerodynamic diameter. Further, certain components of $PM_{2.5}$ are more efficient at scattering or absorbing light than others. Many of the most efficient are secondary particulate species. For example, sulfates (secondary), nitrates (secondary) and organic (secondary and primary) components scatter light more efficiently than do primary particles composed of soil material. Light extinction is also exacerbated by high relative humidity. Water vapor combines with hygroscopic particulate matter (e.g., sulfates and nitrates) to greatly increase the light scattering efficiency of these species. Previously, we noted that secondary particulate matter is likely to comprise an important fraction of measured $PM_{2.5}$. Secondary particulate matter will be even more important as a cause of regional haze. This follows from the greater efficiency with which these already important components of $PM_{2.5}$ scatter light. This importance can be enhanced further by high relative humidity, which is especially relevant in the Eastern U.S.

The discussion in the preceding paragraph suggests that modeling to assess uniform rate of progress for regional haze will need to address secondary particulate matter. This, in turn, means that large modeling domains will be necessary. Class I areas are generally likely to be far removed from most sources of precursors for secondary particulate matter. Additionally, the measure of visibility (deciviews) with which we are most concerned, addresses maximum range of visibility. This measure reflects an effect which is integrated over a relatively large distance. Thus, the need for a large domain, the prevalence of secondary particles, the relative remoteness of Class I areas from most sources of precursors and the visibility measure of greatest interest suggest that modeling related to regional haze may be done without a fine degree of spatial resolution.

Premise PM4. Sampling anomalies associated with the Federal Reference Method for $PM_{2.5}$ need to be considered as part of the model attainment demonstration. A NAAQS needs to be related to observed health effects. In order to establish this link most clearly, the U.S. EPA has adopted a Federal Reference Method (FRM) for measuring $PM_{2.5}$ similar to procedures used in epidemiological studies in which adverse health effects are associated with exposure to $PM_{2.5}$ (40 CFR Part 50, Appendix L). Since the FRM is included in the definition of the NAAQS, the modeled attainment test we recommend uses the measured concentrations of FRM $PM_{2.5}$ as the "ground truth". The FRM sampling protocol is known to be a precise measurement, but it may not accurately measure $PM_{2.5}$ in the air. There are many known positive and negative sampling artifacts associated with the measurement and analysis protocol. Among them are positive artifacts associated with organics and water retained on the Teflon filter and negative artifacts associated with volatile nitrates and organics (Frank, 2006).

The attainment test recommends using speciated ambient data to estimate $PM_{2.5}$ components. These measurements are from the Speciation and Trends Network (STN) for urban sites and the Interagency Monitoring of PROtected Visual Environments (IMPROVE) network for Class I areas. The Speciation measurements use different protocols than FRM measurements. Therefore, the species measured by STN and IMPROVE are often not directly comparable to the FRM $PM_{2.5}$. The attainment test recommends a set of default procedures to adjust the speciation measurements to make them more comparable to FRM measurements.

Premise PM5. Spatial gradients for primary particulate matter may be more pronounced than those for secondary particulate matter or those for ozone. As previously noted, secondary particulate matter and ozone result from an interaction of meteorology and chemistry taking several hours to days. Because of the time scales and mixing required, sharp spatial gradients in concentrations of these pollutants are unlikely. In contrast, primary particulate matter is emitted in the form it appears at monitoring sites. It is likely that concentrations of primary particulate matter are greatest near major source areas of primary particulate matter.

The preceding implies that it may be necessary to estimate concentrations of primary particulate matter using models with finer spatial resolution than is necessary for secondary particles. Further, there may be several sources or concentrations of sources of primary particulate matter within an area designated as "nonattainment" for $PM_{2.5}$. The guidance will need to address how to evaluate model performance and how to estimate whether attainment of the NAAQS is likely in such locations.

Premise PM6. Seasonal differences are likely in emissions of $PM_{2.5}$ and its precursors, as well as in meteorological conditions affecting source/receptor relationships. Emissions from several potentially important sources of $PM_{2.5}$, such as residential wood burning, wildfires, agricultural burning, prescribed burning and biogenic sources have distinctive seasonal patterns. Further, meteorological factors which may affect $PM_{2.5}$ or regional haze, such as relative humidity, sunlight intensity, mixing heights, precipitation and temperature, have marked seasonal differences in many parts of the United States. The annual NAAQS for $PM_{2.5}$ and the regional haze rule address a composite of conditions measured over many days. To understand how such composites respond to changes in emissions, it will be necessary to model a variety of days with varying emissions and meteorological conditions. This implies that States will need to develop base emissions estimates for a full year (or multiple years) or a representative portion of days may need to be modeled from each season.

Modeling for the 24-hour $PM_{2.5}$ NAAQS is further complicated by the fact that violations of the 24-hour standard may occur during different times of the year and may be caused by a variety of different $PM_{2.5}$ species and precursors.

Premise PM7. Causes of $PM_{2.5}$ concentrations which violate NAAQS may be diverse. Modeling approaches needed to address primary vs. secondary particulate matter differ in their requirements. Earlier, we noted differing requirements for size and resolution of the modeling domain. Another difference is the need to consider atmospheric chemistry in the modeling. It is essential to have some understanding of the nature of an area's $PM_{2.5}$ or visibility problem *before* modeling begins. Otherwise, a State runs the risk of selecting inappropriate analysis tools as well as selecting a strategy which will prove to be ineffective at reducing its problem. Thus, a State needs to perform data analysis before using air quality models. This analysis should be used to develop a *conceptual description* of the problem at hand. The conceptual description may then be used to select a broad strategy (e.g., do I focus on reducing primary or secondary particulate matter or both?) as well as to help implement a modeling protocol to best address the nature of the problem and the qualitative strategy which has been tentatively selected to address it. The guidance needs to provide States with flexibility in choosing model(s) to address specific problems.

Premise PM8. Ability of models to predict future concentrations of the components of $PM_{2.5}$ is limited by a variety of factors. Our ability to characterize emissions on a day to day basis or on a source-specific basis is limited. Fully characterizing meteorological conditions on any given day is also problematic. Further, for regulatory models to be tractable, they must characterize chemical and physical processes by simplifying them in some reasonable manner.

In some cases, most notably for secondary organic particulate matter, the extent to which current simplifications are reasonable is uncertain. These limitations (and others) add to the uncertainty of the model's ability to accurately predict concentrations of $PM_{2.5}$ and its components at a given time and location.

The preceding paragraph has several implications for using models to demonstrate future attainment of a NAAQS for $PM_{2.5}$ or assessing uniform rate of progress for regional haze. It suggests that we should focus on composite responses of the model averaged over several days to help circumvent the problem of not knowing all of the details on an individual day. This composite response then needs to be related to the form of the air quality goal in some manner. Limitations in available models and their underlying data bases also suggest that the guidance should recognize a need for performing other, corroboratory analyses to confirm conclusions reached with a model.

1.4 What Topics Are Covered In This Guidance?

This guidance addresses two broad topics: Part I, "How do I use results of models and other analyses to help demonstrate attainment?", and Part II, "How should I apply air quality models to produce results needed to help demonstrate attainment?". Part I is divided into 8 sections (i.e., Sections 2-9). Part II consists of 9 sections (Sections 10-18).

Part I ("How do I use results of models and other analyses to help demonstrate attainment?") begins in Section 2 with an overview of the procedure for using modeling results to help demonstrate attainment of the 8-hour ozone NAAQS and the annual and 24-hour NAAQS for $PM_{2.5}$. Section 2 also summarizes the uniform rate of progress modeling analysis.

Section 3 describes the recommended modeled attainment tests.

Section 4 describes the attainment test for ozone in more detail.

Section 5 describes the attainment tests for each of the two NAAQS for $PM_{2.5}$.in more detail.

Section 6 outlines a recommended analysis to assess uniform rate of progress at Class I areas.

Section 7 describes how supporting analyses should be performed to complement the attainment test and the uniform rate of progress analysis, as well as how it should be used in a weight of evidence determination.

Section 8 identifies several data gathering activities and analyses which States/Tribes could undertake to enhance the credibility of the modeling and corroborative analyses to support subsequent reviews on progress toward attainment and/or visibility improvements.

Section 9 identifies the documentation necessary to adequately describe the analyses used to demonstrate attainment of the ozone NAAQS.

Part II ("How should I apply air quality models to produce results needed to help demonstrate attainment?") begins in Section 10 with an overview of the topics to be covered.

Section 11 identifies a series of meteorological, emissions and air quality data analyses which should be undertaken to develop a qualitative description of an area's nonattainment problem prior to a model application. As we describe, this qualitative description should be used to guide the subsequent model application.

Section 12 describes the purpose, function, and contents of a modeling protocol.

Section 13 addresses what criteria should be considered in choosing a model to support the ozone and PM attainment demonstrations and uniform rate of progress analyses. Several guidelines are identified for accepting the use of a model for this purpose.

Section 14 provides guidance for selecting suitable time periods (or episodes) to model for an attainment demonstration or uniform rate of progress analysis. Topics include a discussion of the form of the NAAQS and its resulting implications for episode selection.

Section 15 identifies factors which should be considered in choosing; a model domain, the horizontal and vertical resolution, and the initial/boundary conditions for an air quality modeling application.

Section 16 addresses how to develop and evaluate meteorological inputs for use in a modeling exercise supporting an attainment demonstration or uniform rate of progress analysis..

Section 17 discusses how to develop appropriate emissions estimates for use in the selected air quality model.

Section 18 outlines the structure of model performance evaluations and discusses the use of diagnostic analyses.

The guidance concludes with references and a glossary of important terms which may be new to some readers.

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Part I. How Do I Use Results Of Models And Other Analyses To Help Demonstrate Attainment?

2.0 What Is A Modeled Attainment Demonstration?--An Overview

A modeled attainment demonstration consists of (a) analyses which estimate whether selected emissions reductions will result in ambient concentrations that meet the NAAQS and (b) an identified set of control measures which will result in the required emissions reductions. As noted in Section 1, this guidance focuses on the first component of an attainment demonstration, that is, completion and interpretation of analyses to estimate the amount of emission reduction needed to attain the NAAQS. Emission reduction strategies should be simulated by reducing emissions from specific source categories rather than through broad "across-the-board" reductions from all sources.

States/Tribes should estimate the amount of emission reduction needed to demonstrate attainment of the NAAQS using the *modeled attainment test*. We recommend a similar analysis for assessing progress toward reducing regional haze. In addition, a State/Tribe should consider a broader set of model results, as well as perform a set of other corroboratory analyses to further support whether a proposed emission reduction will lead to attainment of the NAAQS or uniform rate of progress.

2.1 What Is The Recommended Modeled Attainment Test for Ozone and $PM_{2.5}$?- An Overview

A *modeled attainment test* is an exercise in which an air quality model is used to simulate current and future air quality. If future estimates of ozone and/or $PM_{2.5}$ concentrations are less than the NAAQS, then this element of the attainment test is satisfied[11]. Our recommended test is one in which model estimates are used in a "relative" rather than "absolute" sense. That is, we take the ratio of the model's future to current (baseline) predictions at monitors. We call these ratios, *relative response factors*. Future ozone and/or $PM_{2.5}$ concentrations are estimated at existing monitoring sites by multiplying a modeled relative response factor at locations "near" each monitor by the observation-based, monitor-specific, "baseline" design value. The resulting predicted "future concentrations" are compared to NAAQS.

The test for ozone is based on the calculation of a single mean ozone RRF for each monitor. The $PM_{2.5}$ attainment test is more complicated and reflects the fact that $PM_{2.5}$ is a mixture. In the test, ambient $PM_{2.5}$ is divided into major components. These are

- mass associated with sulfates
- mass associated with nitrates
- mass associated with ammonium
- mass associated with organic carbon

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[11]As detailed in Section 7, additional corroborative analyses are still needed to supplement the modeled attainment test, even when predicted ozone and/ or $PM_{2.5}$ concentrations are less than the NAAQS.

- mass associated with elemental carbon
-mass associated with particle bound water
- mass associated with “other”primary inorganic particulate matter
-and passively collected mass

A separate RRF is calculated for each of the $PM_{2.5}$ components (except passive mass). We call each of these site-specific ratios, component-specific RRFs. Future $PM_{2.5}$ design values are estimated at existing monitoring sites by multiplying modeled relative response factors “near” each monitor times the observed “component specific design value”. This latter quantity is estimated using measured site-specific design values for $PM_{2.5}$ in concert with available measured composition data. Future site-specific $PM_{2.5}$ design values at a site are estimated by adding the future year values of the seven $PM_{2.5}$ components. If all future site-specific $PM_{2.5}$ design values are $\leq$ the concentration specified in the NAAQS, the test is passed.

2.2 What Is The Recommended Modeling Assessment For Regional Haze?- An Overview

The recommended modeled test for assessing uniform rate of progress in reducing regional haze is similar conceptually to the recommended tests for the two NAAQS for $PM_{2.5}$. Models are used to develop relative response factors for each of 6 components of particulate matter between a base period (2000-2004) and a future 5-year period which will be reviewed in 2018. Components used for regional haze-related applications differ slightly from those used for NAAQS-related applications. They are:

- mass associated with sulfates;
- mass associated with nitrates;
- mass associated with organic carbon;
- mass associated with elemental carbon;
- mass associated with fine soil (i.e., crustal material);
- mass associated with coarse particulate matter (i.e., PM_{10} - $PM_{2.5}$).

Current speciated measurements in a *Class I area* are used in an empirically derived equation to estimate light extinction for each day with measurements. Days are ranked according to their resulting light extinction (measured in deciviews). This ranking is used to identify the 20% of days with worst and 20% of days with best visibility during each year in the base period. The 20% worst and best days are examined to estimate appropriate observed concentrations for the components of PM on “best” and “worst” days.

Observed component concentrations are multiplied by the corresponding relative response factors to estimate future concentrations for each component on “best” and “worst” days. Future component concentrations are then inserted into the equation relating light extinction to concentrations of particulate matter. The resulting estimates for future light extinction on “best” and “worst” days are compared with observations made during the base period to see assess the future year visibility improvement.

2.3 What Does A Recommended Supplemental Analysis/Weight Of Evidence Determination Consist Of? --An Overview

As we describe in more detail in Section 7, States/Tribes should always perform complementary analyses of air quality, emissions and meteorological data, and consider modeling outputs other than the results of the attainment test. Such analyses are instrumental in guiding the conduct of an air quality modeling application. Sometimes, the results of corroboratory analyses may be used in a *weight of evidence determination* to show that attainment is likely despite modeled results which may be inconclusive. The further the attainment test is from being passed, the more compelling contrary evidence produced by corroboratory analyses must be to draw a conclusion differing from that implied by the modeled attainment test results. If a conclusion differs from the outcome of the modeled test, then the need for subsequent review (several years hence) with more complete data bases is increased. If the test is failed by a wide margin (e.g., future design values outside the recommended range at an individual site or multiple sites/locations), it is far less likely that the more qualitative arguments made in a weight of evidence determination can be sufficiently convincing to conclude that the NAAQS will be attained. Table 2.1 contains guidelines for assessing when corroboratory analyses and/or weight of evidence determinations may be appropriate.

Table 2.1 Guidelines For Weight of Evidence Determinations

Results of Modeled Attainment Test			**Supplemental Analyses**
Ozone	**Annual $PM_{2.5}$**	**24-Hour $PM_{2.5}$**	
Future Design Value < 82 ppb, all monitor sites	**Future Design Value <14.5 ug/m3, all monitor sites**	**Future Design Value <62 ug/m3, all monitor sites**	**Basic supplemental analyses should be completed to confirm the outcome of the modeled attainment test**
Future Design Value 82 - 87 ppb, at one or more sites/grid cells	**Future Design Value 14.5-15.5 ug/m3, at one or more sites/grid cells**	**Future Design Value 62-67 ug/m3, at one or more sites/grid cells**	**A weight of evidence demonstration should be conducted to determine if aggregate supplemental analyses support the modeled attainment test**
Future Design Value $\geq$ 88 ppb, at one or more sites/grid cells	**Future Design Value $\geq$ 15.5 ug/m3, at one or more sites/grid cells**	**Future Design Value $\geq$ 68 ug/m3, at one or more sites/grid cells**	**More qualitative results are less likely to support a conclusion differing from the outcome of the modeled attainment test[12].**

[12] Regional modeling completed by EPA indicates that, on average, considerable amounts of precursor control (e.g., 20-25 percent or more) will be needed to lower projected

In a weight of evidence (WOE) determination, States/Tribes should review results from several diverse types of air quality analyses, including results from the modeled attainment test. As a first step, States/Tribes should note whether or not the results from each of these analyses support a conclusion that the proposed strategy will meet the air quality goal. Secondly, States/Tribes should weigh each type of analysis according to its credibility, as well as its ability to address the question being posed (i.e., is the strategy adequate for meeting the NAAQS by a defined deadline?). The conclusions derived in the two preceding steps are combined to make an overall assessment of whether meeting the air quality goal is likely. This last step is a qualitative one. If it is concluded that a strategy is inadequate to demonstrate attainment, a new strategy is selected for review, and the process is repeated. States/Tribes should provide a written rationale documenting how and why the conclusion is reached regarding the adequacy of the final selected strategy. Results obtained with air quality models are an essential part of a weight of evidence determination and should ordinarily be very influential in deciding whether the NAAQS will be met.

2.4 Why Should A Model Be Used In A "Relative" Sense And Why May Corroboratory Analyses Be Used In A Weight Of Evidence Determination?

The procedure we recommend for estimating needed emission reductions differs from that in past guidance (U.S. EPA, 1996a) for ozone and PM in two major respects. First, we recommend a modeled attainment test in which model predictions are used in a relative rather than absolute sense. Second, the role of the weight of evidence determination, when used, has been expanded. That is, these results can now be used as a rationale for concluding that a control strategy will meet the NAAQS, even though the modeled attainment test alone may not be conclusive. There are several reasons why we believe these changes are appropriate.

1. Starting with an observed concentration as the base value reduces problems in interpreting model results. If a model under (or over) predicts an observed daily maximum concentration, the appropriate target prediction is not as clear as might be desired. For example, if an 8-hour daily maximum ozone concentration of 120 ppb were observed and a model predicted 100 ppb on that day, should the target for the day still be 84 ppb? In the relative attainment test, observed data is used to define the target concentration. This has the effect of anchoring the future concentrations to a "real" ambient value. Although good model performance remains a prerequisite for use of a model in an attainment demonstration, problems posed by less than ideal model performance on individual days are reduced by the new procedure.

2. The form of the 8-hour ozone and $PM_{2.5}$ NAAQS necessitates such an attainment test. The NAAQS for ozone and $PM_{2.5}$ requires ambient data to be averaged over three consecutive years. This presents difficulties using the resource-intensive Eulerian models we believe are

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ozone design values by 3 ppb or $PM_{2.5}$ annual design values by 0.5 ug/m3 or 24-hour $PM_{2.5}$ design values by 3 ug/m3.

necessary to capture spatially differing, complex non-linearities between ambient ozone and precursor emissions. That is, it is difficult to tell whether or not a modeled exceedance obtained on one or more days selected from a limited sample of days is consistent with meeting the NAAQS. To do so would require modeling several years and, perhaps, many strategies. This problem is reduced by using the *monitored* design value, as an inherent part of the modeled attainment test.

3. $PM_{2.5}$ consists of a diverse mix of primary and secondary components. This raises a concern about a model's potential inability to correctly predict values for each component which are proportional to the observed mix of components. Failure to predict major measured components of $PM_{2.5}$ in the correct proportion increases the possibility of choosing ineffective control strategies on the basis of incorrect model predictions. This possibility is reduced if the model responses are instead applied to components of $PM_{2.5}$ which are derived from measurements.

4. Model results and projections will continue to have associated uncertainty. The procedure we recommend recognizes this by including modeling plus other analyses to determine whether all available evidence supports a conclusion that a proposed emission reduction plan will suffice to meet the NAAQS. For applications in which the modeled attainment test is not passed, a weight of evidence analysis may be used to support a determination that attainment will be achieved, despite the results of the modeled attainment test. The weight of evidence determination includes several modeling results which are more difficult to relate to the form of the 8-hour ozone and 24-hour $PM_{2.5}$ NAAQS. These results address relative changes in the frequency and intensity of high modeled ozone or $PM_{2.5}$ concentrations on the sample of days selected for modeling. If corroboratory analyses produce strong evidence that a control strategy is unlikely to meet the NAAQS, then the strategy may be inadequate, even if the modeled attainment test is passed.

5. Focusing the modeled attainment test only at monitoring sites could result in control targets which are too low if the monitoring network is limited or poorly designed. We recommend a test which includes a review of the strategy's impact at locations without monitors. This exercise provides a supplemental test to determine whether there is a need for further action despite passing the modeled attainment test at all monitoring sites. While this test may indicate potential unmonitored violations, ultimately, the best way to account for a limited or poorly designed monitoring network is to use the model results, or other available analyses, to help determine locations where additional monitors should be sited.

3.0 What Is The Recommended Modeled Attainment Test?

In Section 2, we provided an overview of the recommended modeled attainment test. In this section we provide more details on the calculation of baseline design values, the definition of "nearby grid cells", and an "unmonitored area analysis" which provides estimates of future year values in unmonitored areas. Sections 4, 5, and 6 provide more specific details and examples for attainment tests for ozone and $PM_{2.5}$, and the uniform rate of progress assessment for regional haze respectively.

We begin by establishing the basic equation on which all of the tests are built upon. Equation (3.1) describes the recommended modeled attainment test, applied near monitoring site I.

$$\mathbf{(DVF)_I = (RRF)_I\ (DVB)_I} \qquad \mathbf{(3.1)}$$

where

$(DVB)_I$ = the baseline concentration monitored at site I, units in ppb or ug/m3[13];

$(RRF)_I$ = the relative response factor, calculated near site I, unitless
The relative response factor is the ratio of the future concentration predicted near a monitor (averaged over multiple days) to the baseline concentration predicted near the monitor (averaged over the same days), and

$(DVF)_I$ = the estimated future design value for the time attainment is required, ppb or ug/m3.

Equation (3.1) looks simple enough. However, several issues must be resolved before applying it.

(1) How is a "site-specific" baseline design value ($(DVB)_I$) calculated?

(2) In calculating the $(RRF)_I$, what do we mean by "near" site I?

(3) Several surface grid cells may be "near" the monitor, which one(s) of these should be used to calculate the $(RRF)_I$?

(4) How do you calculate future design values in unmonitored areas?

(5) Which base year emissions inventory should be projected to the future for the purpose of calculating RRFs?

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[13]The units for ozone is ppb and the units for $PM_{2.5}$ is ug/m3.

(6) Which future year should emissions be projected to in order to assess attainment using the modeled attainment test?

3.1 Calculating site-specific baseline concentrations.

The modeled attainment test is linked to the form of the ozone and $PM_{2.5}$ NAAQS through the use of monitored design values. Official design values are calculated in different ways for 8-hour ozone, annual average $PM_{2.5}$, and 24-hour average $PM_{2.5}$. The following is a brief description of the calculations:

Ozone

The 8-hour ozone design value is calculated as the 3 year average of the fourth highest monitored daily 8-hour maximum value at each monitoring site. The standard is met if the design value is <0.8 ppm (in practice, this translates to < 85 ppb). The detailed description of the methodology can be found in 40 CFR Part 50.10, and Appendix I to Part 50.

Annual Average $PM_{2.5}$

The annual average $PM_{2.5}$ standard is met if, over a consecutive three year period, the average arithmetic mean concentration of $PM_{2.5}$ is less than or equal to 15.0 $\mu g/m^3$. The annual arithmetic mean at a monitoring site is calculated by averaging the four quarterly arithmetic mean concentrations observed during a calendar year at the site. The annual mean concentration averaged over three years must be $\leq$ 15.0 $\mu g/m^3$ at all monitoring sites. The details can be found in 40CFR Part 50, Appendix N

In some cases, two nearby sites can be spatially averaged to determine the annual average design value for both sites. For details on spatial averaging requirements see 40 CFR Part 58, Appendix D, Section 2.8.

24-Hour Average $PM_{2.5}$

The 24-hr NAAQS for $PM_{2.5}$ is met if the 98th percentile 24-hour average concentration of particulate matter with aerodynamic diameter $\leq$ 2.5 micrometers, averaged over three consecutive years, is $\leq$ 65 $\mu g/m^3$.[14] The test applies at *all* monitoring sites--spatial averaging is not allowed for the 24-hour NAAQS. The "98th percentile" concentration (and, thus, the design value concentration) depends on the number of days on which $PM_{2.5}$ is monitored during a year. See 40CFR Part 50, Appendix N for details. Attainment is reached if the design value at the site is $\leq$ 65 $\mu g/m^3$.

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[14]See 40CFR Part 50, Appendix N for a discussion of how data completeness affects the determination of attainment status.

How is a "site-specific" baseline design value ($(DVB)_I$) calculated?

The baseline measured concentrations at each monitoring site is the anchor point for future year projected concentrations. The baseline design values are projected to the future using RRFs. In practice, the choice of the baseline design value can be critical to the determination of the estimated future year design values. Therefore, careful consideration should be given to the calculation of baseline values. The baseline design values should have the following attributes:

1) Should be consistent with the form of the applicable NAAQS.
2) Should be easy to calculate.
3) Should represent the baseline inventory year.
4) Should take into account the year-to-year variability of meteorology.
5) Should take into account the year-to-year variability of emissions.

Several possible methodologies to calculate baseline design values are:

1) The designation design value period (i.e. 2001-2003).
2) The design value period that straddles the baseline inventory year (e.g., the 2001-2003 design value period for a 2002 baseline inventory year).
3) The <u>highest</u> (of the three) design value periods which include the baseline inventory year (e.g. the 2000-2002, 2001-2003, and 2002-2004 design value periods for a 2002 baseline inventory year).
4) The <u>average</u> (of the three) design value periods which straddle the baseline inventory year.

For the modeled attainment tests we recommend using the <u>average</u> of the three design value periods which include the baseline inventory year (choice number 4 from above). Based on the attributes listed above, the average of the three design value periods best represents the baseline concentrations, while taking into account the variability of the meteorology and emissions (over a five year period).

The three design values that are averaged in the calculation cover a five year period, but the average design value is not a straight five year average. It is, in effect, a weighted average of the annual averages. For example, given a baseline inventory year of 2002, the years used to calculate the average design value range from 2000-2004. In the average of the 2000-2002, 2001-2003, and 2002-2004 periods, 2002 is "weighted" three times, 2001 and 2003 are weighted twice, and 2000 and 2004 are weighted once. This has the **desired** effect of weighting the projected ozone or $PM_{2.5}$ values towards the middle year of the five year period, which is the emissions year (2002 in this example). The average design value methodology is weighted towards the inventory year (which is the middle year) and also takes into account the emissions and meteorological variability that occurs over the full five year period (although the emissions and meteorology from the other years are weighted less than the middle year of the 5 year period)[15]. Because of this, the average weighted design value is thought to be more representative of the baseline emissions and meteorology period than other methodologies such as choosing the highest single design value period.

Additionally, the average design value will be more stable (less year to year variability) than any single design value period. An analysis of recent ambient design value data at 471 ozone monitors, over the period 1993-2004, shows that the median standard deviation of design values was 3.3 ppb whereas the standard deviation of the 5 year weighted average design values was 2.4 ppb (Timin, 2005a). Also, moving from the period ending in 2003 to the period ending in 2004, the median change in the ozone design values was 4.0 ppb. The median change in the 5 year weighted average ozone design values was only 0.8 ppb (there was not a long enough data record to do the same analyses for $PM_{2.5}$) . These analyses show that the average design values are clearly more stable and will therefore provide a "best estimate" baseline year design value (DVB_I) for use in future year model projections.

The recommended averaging technique assumes that at least five complete years of ambient data is available at each monitor. In some cases there will less than five years of available data (especially at relatively new monitoring sites). In this case we recommend that data from the monitor is used if there is at least three consecutive years of data. If there are three years of data then the baseline design value will be based on a single design value. If there are four years of data then the baseline design value will be based on an average of two design value periods. If a site has less than three years of data, then the site should not ordinarily be used in the attainment test.

Calculating site-specific "baseline" design values[16] (DVB) to use in the attainment test

Example 3.1

Given:

(1) The baseline inventory year is 2002 (i.e., 2002 emissions are being modeled).

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[15]The emissions trends and meteorological data during the five year period should be evaluated to determine if any large emissions changes and/or "extreme" meteorological conditions have occurred during the period. It is especially important to consider the emissions and meteorology during the middle year of the period. When choosing a base emissions year and calculating baseline design values, extreme conditions that may lead to either abnormally high or abnormally low concentrations should be discussed with the appropriate EPA Regional Office. See section 14 for more information on selecting modeling time periods.

[16]The "baseline design value" is an average of several design values and thus is technically not a design value. The guidance continues to refer to the average design values as "design values" even though they are based on averages of observed design values.

(2) For purposes of illustration, suppose the area contains only three ozone monitors.

Find: The appropriate site-specific baseline design values to use in the modeled attainment test.

Solution: Since the inventory reflects 2002, we need to examine monitored design values for overlapping 3-year periods that include 2002. The three design values are then averaged for each site. These are the values for site-specific baseline design values (DVB) in the modeled attainment test. The procedure is shown in Table 3.1.

Table 3.1 Example Illustrating Calculation Of Baseline Design Values

Monitor	2000-2002 Design Value, ppb	2001-2003 Design Value, ppb	2002-2004 Design Value, ppb	Baseline Design Value (DVB) Used In The Modeled Attainment Test, ppb
1	88	87	90	88.3[17]
2	86	84	91	87.0
3	88	86	85	86.3

3.2 Identifying surface grid cells near a monitoring site.

There are four reasons why we believe it is appropriate, in the modeled attainment test, to consider cells "near" a monitor rather than just the cell containing the monitor. First, one consequence of a control strategy may be "migration" of a predicted peak. If a State were to confine its attention only to the cell containing a monitor, it might underestimate the RRF (i.e., overestimate the effects of a control strategy). Second, monitor siting guidelines recommend spatial scales (for ozone and $PM_{2.5}$) which are generally urban or neighborhood scale. In many cases, the representative spatial scale of a monitor is larger than a single grid cell. Third, we believe that uncertainty in the formulation of the model and the model inputs is consistent with

[17] The average design value should carry one significant figure to the right of the decimal point for ozone and 24-hour $PM_{2.5}$ and 2 significant figures for annual $PM_{2.5}$**.** There are several calculations in the modeled attainment test which carry the tenths digit or hundreths digit. We have found that rounding and/or truncating concentrations and RRFs can lead to an overestimate or underestimate of the impact of emissions controls. In some cases, a few tenths of a ppb change (or a few tenths of a percent reduction) can be meaningful. Rounding or truncating can make the change appear to be equal to a full ppb (or 1%) or equal to zero change. For 8-hour ozone, it is recommended to round to the tenths digit until the last step in the calculation when the final future design value is truncated. For annual $PM_{2.5}$ it is recommended to round to the hundreths digit until the last step when the final future design value is rounded to the nearest tenths place. For daily $PM_{2.5}$ it is recommended to round to the tenths digit until the last step when the final future design value is rounded to the nearest whole number.

recognizing some leeway in the precision of the predicted location of daily average $PM_{2.5}$ and daily maximum ozone concentrations. Finally, standard practice in defining a gridded modeling domain is to start in the southwest corner of the domain, and determine grid cell location from there. Considering several cells "near" a monitor rather than the single cell containing the monitor diminishes the likelihood of inappropriate results which may occur from the geometry of the superimposed grid system.

Earlier ozone modeling guidance (U.S. EPA,1996a) has identified 15 km as being "near" a site. This is also consistent with the broad range of intended representativeness for urban scale ozone monitors identified in 40CFR Part 58, Appendix D. As noted in section 1.3, secondary particulate matter is likely to constitute an important fraction of $PM_{2.5}$. Further, a major purpose of urban monitoring performed to determine attainment of the NAAQS for $PM_{2.5}$ is to estimate likely exposure to $PM_{2.5}$ concentrations over 24-hour periods. For $PM_{2.5}$, sites having "neighborhood" or "urban" scales of representativeness are generally most suitable for estimating exposure or compliance with the NAAQS. Because of the rather long sampling time (i.e., 24 hours) inherent in the $PM_{2.5}$ NAAQS, locations within the lower range of "urban" scale (4-50 km) would seem consistent with a definition of "near" a site. Therefore, we recommend following the same ground rules used for defining "near" as we originally defined for ozone modeling (U.S.EPA, 1999a).

For ease in computation, States/Tribes may assume that a monitor is at the center of the cell in which it is located and that this cell is at the center of an array of "nearby" cells. The number of cells considered "nearby" (i.e., within about a 15 km radius of) a monitor is a function of the size of the grid cells used in the modeling. Table 3.2 provides a set of default recommendations for defining "nearby" cells for grid systems having cells of various sizes. Thus, if one were using a grid with 4 km grid cells, "nearby" is defined by a 7 x 7 array of cells, with the monitor located in the center cell.

The use of an array of grid cells near a monitor may have a large impact on the RRFs in "oxidant limited" areas (areas where NOx decreases may lead to ozone or secondary PM increases) and in areas with large gradients in primary $PM_{2.5}$. The array methodology could lead to unrealistically small or large RRFs, depending on the specific case. Care should be taken in identifying an appropriate array size for these areas. States/Tribes may consider the presence of topographic features, demonstrated mesoscale flow patterns (e.g., land/sea, land/lake interfaces), the density of the monitoring network, the density of emissions (especially primary PM)[18], and/or other factors to deviate from our default definitions for the array of "nearby" grid cells, provided the justification for doing so is documented.

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[18]It may be inappropriate to use an array as large as 7 X 7 in areas with large gradients of primary $PM_{2.5}$ concentrations. Averaging of multiple grid cells may mask changes in local concentrations between the base year and future years.

Table 3.2. Default Recommendations For Nearby Grid Cells Used To Calculate RRF's

Size of Individual Cell, km	Size of the Array of Nearby Cells, unitless
4 - 5[19]	7 x 7
>5 - 8	5 x 5
>8 - 15	3 x 3
>15	1 x 1

3.3 Choosing model predictions to calculate a relative response factor $(RRF)_I$ near a monitor.

8-Hour Ozone NAAQS

Given that a model application produces a time series of estimated 1-hour ozone concentrations (which can be used to calculate running 8-hour averages), what values should be chosen from within the time series? We recommend choosing predicted 8-hour daily maximum concentrations from each modeled day (excluding "ramp-up" days) for consideration in the modeled attainment test. The 8-hour daily maxima should be used, because they are closest to the form of concentration specified in the NAAQS.

The second decision that needs to be made is, "which one(s) of the 8-hour daily maxima predicted in cells near a monitor should we use to calculate the RRF?" We recommend choosing the nearby grid cell with the highest predicted 8-hour daily maximum concentration with baseline emissions for each day considered in the test, and the grid cell with the highest predicted 8-hour daily maximum concentration with the future emissions for each day in the test. Note that, on any given day, the grid cell chosen with the future emissions need not be the same as the one chosen with baseline emissions.

We believe selecting the maximum (i.e., peak) 8-hour daily maxima on each day for subsequently calculating the relative response factor (RRF) is preferable for several reasons. First, it is likely to reflect any phenomenon which causes peak concentrations within a plume to migrate as a result of implementing controls. Second, it is likely to take better advantage of data produced by a finely resolved modeling analysis.

The relative response factor (RRF) used in the modeled attainment test is computed by taking the ratio of the **mean** of the 8-hour daily maximum predictions in the future to the **mean** of the 8-hour daily maximum predictions with baseline emissions, over all relevant days. The

[19] The appropriate size of the array for horizontal grid cells < 4km should be discussed with the appropriate U.S EPA Regional Office.

procedure is illustrated in Example 3.2.

Example 3.2

Given: (1) Four primary days have been simulated using baseline and future emissions.

(2) The horizontal dimensions for each surface grid cell are 12 km x 12 km.

(3) In each of the 9 grid cells "near" a monitor site I, the maximum daily predicted future concentrations are 87.2, 82.4, 77.5, and 81.1 ppb.

(4) In each of the 9 grid cells "near" a monitor site I, the maximum daily predicted baseline 8-hour daily maximum ozone concentrations are 98.3, 100.2, 91.6, and 90.7 ppb.

Find: The site-specific relative response factor for monitoring site I, $(RRF)_I$

Solution:

(1) For each day and for both baseline and future emissions, identify the 8-hour daily maximum concentration predicted near the monitor. Since the grid cells are 12 km, a 3 x 3 array of cells is considered "nearby" (see Table 3.2).

(2) Compute the mean 8-hour daily maximum concentration for (a) future and (b) baseline emissions.

Using the information from above,

(a) $(\text{Mean 8-hr daily max.})_{\text{future}} = (87.2 + 82.4 + 77.5 + 81.1)/4 = 82.1$ ppb
and

(b) $(\text{Mean 8-hr daily max.})_{\text{baseline}} = (98.3 + 100.2 + 91.6 + 90.7)/4 = 95.2$ ppb

(3) The relative response factor for site I is

$(RRF)_I = (\text{mean 8-hr daily max.})_{\text{future}}/(\text{mean 8-hr daily max.})_{\text{baseline}}$

$= 82.1/95.2 = 0.862$

Figure 3.1. Choosing Ozone Predictions To Estimate RRF's

(a) Predictions With Baseline Emissions

Day 1

97.2	95.5	96.2
97.1	95.2	89.1
97.2	98.3	97.6

98.3

Day 2

100.2	98.5	98.1
100.0	99.1	97.3
99.5	95.4	97.9

100.2

Day 3

87.8	90.1	89.9
90.9	91.6	88.7
88.5	89.4	90.2

91.6

Day 4

85.9	87.9	88.9
87.9	90.5	90.7
86.9	87.3	88.4

90.7

Mean Baseline Ozone Concentration = (98.3 + 100.2 + 91.6 + 90.7) / 4 = 95.2 ppb

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(b) Predictions With Future Emissions

Day 1

86.1	85.4	86.8
86.2	84.5	84.3
85.8	87.2	86.9

87.2

Day 2

82.2	80.8	81.2
82.4	79.9	80.5
81.4	77.8	80.1

82.4

Day 3

72.1	76.1	75.5
74.6	77.5	74.3
76.9	77.4	75.6

77.5

Day 4

75.4	78.8	79.8
80.8	79.5	80.9
80.4	76.9	81.1

81.1

Mean Future Ozone Concentration = (87.2 + 82.4 + 77.5 + 81.1) / 4 = 82.1 ppb

$PM_{2.5}$ NAAQS

For $PM_{2.5}$ applications, we recommend choosing predicted 24-hour average concentrations from each modeled day (excluding "ramp-up" days) for consideration in the modeled attainment test[20]. The 24-hour average values should be used, because they are the basis for design value calculations.

The second decision that needs to be made is, "which of the 24-hour average values predicted in cells near a monitor should we use to calculate the RRF?" For the annual PM2.,5 NAAQS, we recommend taking the spatially averaged value of the nearby predictions (mean value of the grid cell array). Each component-specific relative response factor $(RRF)_j$ used in the modeled attainment test is computed by taking the ratio of the mean of the spatially averaged daily predictions in the future to the mean of the spatially averaged daily predictions with current

[20]This includes modeled days for which there is no corresponding monitored data.

emissions. The procedure is the same as the ozone example presented above, except the spatial mean is used instead of the highest concentration near the monitor.

For the 24-hour $PM_{2.5}$ NAAQS and for annual $PM_{2.5}$ NAAQS sites which exhibit strong spatial concentration gradients of primary $PM_{2.5}$, we recommend calculating an RRF based on the single value in the grid cell which contains the monitor. Particularly in areas with strong primary PM concentration gradients, the use of a single grid cell is more likely to accurately capture the local change in $PM_{2.5}$ components.

3.4 Estimating design values at unmonitored locations: what is an unmonitored area analysis and why is it needed?

An additional review is necessary, particularly in nonattainment areas where the ozone or $PM_{2.5}$ monitoring network just meets or minimally exceeds the size of the network required to report data to Air Quality System (AQS). This review is intended to ensure that a control strategy leads to reductions in ozone or $PM_{2.5}$ at other locations which could have baseline (and future) design values exceeding the NAAQS were a monitor deployed there. The test is called an “unmonitored area analysis”. The purpose of the analysis is to use a combination of model output and ambient data to identify areas that might exceed the NAAQS if monitors were located there.

The unmonitored area analysis should identify areas where future year design values are predicted to be greater than the NAAQS. The unmonitored area analysis for a particular nonattainment area is intended to address potential problems within or near that nonattainment area. The analysis should include, at a minimum, all nonattainment counties and counties surrounding the nonattainment area (located within the State). In large States, it is possible that unmonitored area violations may appear in counties far upwind or downwind of the local area of interest. In those cases, the distance to the nonattainment area and ability of the modeling to represent far downwind areas should be evaluated on a case by case basis. In order to examine unmonitored areas in all portions of the domain, it is recommended to use interpolated spatial fields of ambient data combined with gridded modeled outputs.

3.4.1 Why does the unmonitored area analysis need to use both ambient data and model output?

Ambient data can be interpolated to provide a set of spatial fields. The spatial fields will provide an indication of concentrations in monitored and unmonitored areas. But a simple interpolation of the ambient data cannot identify unmonitored areas with higher concentrations than those measured at monitors. The interpolated concentration between monitors will generally be the same or lower than the measured concentration at the monitors (assuming that more sophisticated statistical techniques are not used, such as adding a nugget effect or a trend surface). The interpolation technique does not account for emissions or chemistry information that may be needed to identify potential unmonitored violations.

The gridded model output (absolute) concentrations can also be used to examine unmonitored area concentrations. The model provides an hourly concentration for every grid cell. The concentrations can be analyzed to determine unmonitored areas where the model predicts high values. But the absolute predictions from the model may not be entirely accurate. The model output is only as accurate as the emissions and meteorological input. But unlike the interpolated ambient data, the model output explicitly accounts for emissions, chemistry, and meteorology over the entire domain.

Both the interpolated ambient data and the model outputs have major weaknesses. But they also both have strengths. We can take advantage of the strengths of each dataset by combining the two types of data. The interpolated spatial fields of ambient data provide a strong basis for estimating accurate pollutant concentrations at monitors and near monitors. Given that information, the model outputs can be used to adjust the interpolated spatial fields (either up or down) so that more accurate estimates can be derived in the unmonitored areas[21]. The best way to use the model to adjust the spatial fields is to use modeled *gradients.* It is preferable to assume that the model is predicting areas of generally high or low ozone or PM, as compared to assuming that the absolute predictions from the model are correct. For example, in areas where the model predicts <u>relatively</u> high ozone or PM concentrations, the spatial fields can be adjusted upward. In areas where the model predicts <u>relatively</u> low ozone or PM concentrations, the spatial fields can be adjusted downward. In this way, it may be possible to predict unmonitored areas that may have high concentrations. At the same time, concentrations in rural areas, (which may be overly influenced by high monitored concentrations near urban areas), may be adjusted downward. It may also be possible to predict high $PM_{2.5}$ concentrations in unmonitored areas which contain large sources of primary PM emissions. The combination of interpolated spatial fields and modeled output will be referred to as "gradient adjusted spatial fields"

3.4.2 Implementation of Gradient adjusted Spatial Fields

Gradient adjusted spatial fields are first created for the base year. Future year estimates can then be created by applying gridded RRFs to the gradient adjusted spatial fields. The basic steps are as follows:

1) Interpolate base year ambient data to create a set of spatial fields.
2) Adjust the spatial fields using gridded model output gradients (base year values).
3) Apply gridded model RRFs to the gradient adjusted spatial fields.
4) Determine if any unmonitored areas are predicted to exceed the NAAQS in the future.

EPA has developed a software package called "Modeled Attainment Test Software" (MATS) which will spatially interpolate data, adjust the spatial fields based on model output gradients and multiply the fields by model calculated RRFs (steps 1-3 above) (ABT, 2007).

[21]The accuracy of interpolated fields can be tested by removing sets of monitors to see how well the interpolation scheme estimates known concentrations at ambient monitoring sites.

States will be able to use the EPA-provided software or are free to develop alternative techniques that may be appropriate for their areas or situations.

Step 1

The first step in the analysis is to interpolate ambient data. Ideally, design values should be interpolated. The same 5 year weighted average design values that are used in the monitor based model attainment test can be used in the development of ambient spatial fields. Care should be taken so that the interpolated fields are not unduly influenced by monitoring sites that do not have complete data. Since the design values can vary significantly from year to year, it is important to use a consistent set of data. In some cases, it may be preferable to interpolate individual years of data or individual design values, and then average those up to get the 5 year weighted average.

We are not recommending a single interpolation technique. EPA has provided example analyses in the past using the Kriging interpolation technique (U.S.EPA, 2004c). Alternatively, EPA's BenMAP software, which was used to create interpolated fields for the Clean Air Interstate Rule (CAIR) uses the Voronoi Neighbor Averaging (VNA) technique (Abt, 2003)[22].

For ozone analyses, a single spatial field of ozone values is needed. But for the $PM_{2.5}$ NAAQS, we recommend creating interpolated spatial fields for $PM_{2.5}$ (FRM) and for each component of $PM_{2.5}$. For the annual $PM_{2.5}$ NAAQS, a set of quarterly average spatial fields can be created. The 4 quarters are averaged to get an annual average set of fields.

For the 24-hour $PM_{2.5}$ standard, a spatial field can be created using the high end of the distribution of 24-hour $PM_{2.5}$ concentrations. This is best represented by interpolating the measured high values from each quarter. To be consistent with the attainment test, we recommend interpolating the $PM_{2.5}$ concentration in each quarter which is equal to or less than the 98^{th} percentile value for the year. For the $PM_{2.5}$ component species, we recommend interpolating the high $PM_{2.5}$ days in each quarter. This can be based on the highest monitored days in each quarter.

Interpolated data should be evaluated to quantify the errors associated with the interpolation technique. Additional information on evaluation of spatial fields can be found in (U.S. EPA, 2004c).

Step 2

The second step in the process involves the use of gridded model output to adjust the spatial fields. The BenMAP software contains an example of this technique called eVNA. It uses seasonal average model output data to adjust interpolated spatial fields (MATS also uses the

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[22]MATS also uses a version of VNA.

same technique). The eVNA technique has been used in health benefits assessments (U.S. EPA, 2005a). A specific metric is needed to determine the model predicted gradient in concentrations for each of the NAAQS. For ozone, a logical metric is the 4^{th} highest ozone prediction in each grid cell[23]. For the annual $PM_{2.5}$ NAAQS, the model predicted quarterly mean concentrations for $PM_{2.5}$ and $PM_{2.5}$ species can be used to adjust the ambient spatial fields. For the 24-hour $PM_{2.5}$ NAAQS, the gradient adjusted fields can be derived from the high end of the distribution of daily averages in each quarter. This could be for all days with 24-hour predicted (or measured) $PM_{2.5}$ > 65 ug/m3 (or some relatively high value) or simply the top 10% or 25% of all ($PM_{2.5}$) days in each quarter.

Step 3

The next step is to create future year fields by multiplying the base year gradient adjusted spatial fields by model derived gridded RRFs. The RRFs for the unmonitored area analysis are calculated in the same way as the monitored based attainment test (except that the grid cell array is not used in the spatial fields based analysis). The future year concentrations are equal to the base year concentration times the RRF in each grid cell. The future year gradient adjusted spatial fields are then analyzed to determine if any grid cells are predicted to remain above the NAAQS.

For ozone, a single spatial field is multiplied by a single set of model derived RRFs. For $PM_{2.5}$, the RRFs for each of the species, for each quarter, are multiplied by the spatial fields for each species, for each quarter.

3.4.3 Using the Results of the Unmonitored Area Analysis

It should be stressed that due to the lack of measured data, the examination of ozone and $PM_{2.5}$ concentrations as part of the unmonitored area analysis is more uncertain than the monitor based attainment test. As a result, the unmonitored area analysis should be treated as a separate test from the monitor based attainment test. The results from the unmonitored area analysis should, at a minimum, be included as a supplemental analysis. While it is expected that additional emissions controls are needed to eliminate predicted violations of the monitor based test, the same requirements may not be appropriate in unmonitored areas.

The cause of predicted violations of the unmonitored area analysis may not be obvious. While careful analysis of the emissions in the area may reveal likely sources of an ozone violation, elimination of the violation may not be simple or straightforward. Alternatively, predicted violations of the unmonitored area analysis for $PM_{2.5}$ may, in some cases be simple to diagnose. They may occur in areas with high emissions of primary $PM_{2.5}$. Elimination of the

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[23]The metric should approximate the measured design values at monitoring sites. Depending on the days modeled, other metrics, such as the 2^{nd} or 3^{rd} highest predicted ozone values or an average of several days may be a better proxy for the design value.

predicted violation may be possible by placing controls on one or more sources. Additional dispersion modeling may be helpful in diagnosing the source(s) of high primary $PM_{2.5}$ in a particular grid cell. The results of a more refined dispersion modeling analysis may help identify emissions controls or locations where additional monitoring may be appropriate.

It is recommended that predicted violations of the unmonitored area analysis are carefully scrutinized to determine whether they are likely to exist in the ambient air or whether they may be caused by an error or uncertainty in the modeling system. At a minimum, it may be appropriate to commit to additional deployment of ambient monitors in areas where the unmonitored area analysis predicts future violations[24]. This monitoring would allow a better assessment in the future of whether the NAAQS is being met at currently unmonitored locations.

Violations of the unmonitored area analysis should be handled on a case by case basis. As such, additional analyses and/or tracking requirements may be needed depending on the nature of the problem and the uncertainty associated with the potential violation(s).

3.5 Which base year emissions inventory should be projected to the future for the purpose of calculating RRFs?

The modeled attainment test adjusts observed concentrations during a baseline period (e.g., 2000-2004) to a future period (e.g., 2009) using model-derived "relative response factors". It is important that emissions used in the attainment test correspond with the period reflected by the chosen baseline design value period (e.g., 2000-2004). Deviations from this constraint will diminish the credibility of the relative response factors. Therefore, it is important to choose an appropriate baseline emissions year. There are potentially two different base year emissions inventories. One is the base case inventory which represents the emissions for the meteorology that is being modeled. These are the emissions that are used for model performance evaluations. For example, if a State is modeling a base year of 1998 (or episodes from 1998), "base case" emissions and meteorology would be for 1998. As described in Section 18, it is essential to use base case emissions *together with* meteorology occurring in the modeled episode(s) in order to evaluate model performance.

Once the model has been shown to perform adequately, it is no longer necessary to model the base case emissions. It now becomes important to model emissions corresponding to the period with a recent observed design value. The second potential base year inventory corresponds to the middle year of the baseline average design value (e.g 2002 for a 2000-2004 average design value). This is called the baseline inventory. The baseline emissions inventory is the inventory that is ultimately projected to a future year.

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[24]It would also be appropriate to commit to additional emissions controls in lieu of additional monitoring in unmonitored areas.

In section 17 we recommend using 2002 as the baseline inventory year for the current round of ozone, $PM_{2.5}$, and Regional Haze SIPs. If States/Tribes model the full year of 2002 (or episodes from 2002) then the base case and baseline inventory years will be the same[25]. But if States/Tribes model other years or episodes or full seasons from other years, then the base case inventories should be projected (or "backcasted") to 2002 to provide a common starting point for future year projections.

Alternatively, the baseline emissions year could be earlier or later than 2002, but it should be a relatively recent year (preferably within the 5 year design value window). In order to gain confidence in the model results, the emissions projection period should be as short as possible. For example, projecting emissions from 2002 to 2009 (with a 2000-2004 baseline average design value) should be less uncertain than projecting emissions from 1995 to 2009 (with a 1993-1997 baseline average design value). Use of an older baseline average design value period is discouraged.

It is desirable to model meteorological time periods occurring during the period reflected by the baseline design value (e.g., 2000-2004). However, modeling time periods need not be selected from the period corresponding to the baseline design value, provided they are representative of meteorological conditions which commonly occur when exceedances of the ozone or $PM_{2.5}$ standard occur (or represent typical annual concentrations of $PM_{2.5}$) . The idea is to use selected representative time periods to capture the sensitivity of predicted ozone or $PM_{2.5}$ to changes in emissions during commonly occurring conditions. There are at least three reasons why using time periods outside the period with the baseline design value may be acceptable: (1) availability of air quality and meteorological data from an intensive field study, (2) the desire to use meteorological data which may be "more representative" of typical conditions compared to the baseline design value period and (3) availability of a past modeling analysis in which the model performed well.

Under the regional haze rule, the period for establishing baseline visibility is defined as 2000-2004. Therefore, emissions and meteorological time periods should be chosen from the base time period. Modeling the same year (or time period) for $PM_{2.5}$ NAAQS applications and uniform rate of progress analyses is a logical way to conserve resources.

3.6 Choosing a year to project future emissions.

States/Tribes should project future emissions to the attainment year or time period, based on the area's classification. The "Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard, Phase 1" provides a schedule for implementing emission reductions

[25] The year may be the same, but the emissions may still differ. The base case inventory may include day specific information (e.g. wildfires, CEM data) that is not appropriate for using in future year projections. Therefore the baseline inventory may need to replace the day specific emissions with average or "typical" emissions (for certain types of sources).

needed to ensure attainment by the area's attainment date (40 CFR 51.908). Specifically, it states that emission reductions needed for attainment must be implemented by the beginning of the ozone season immediately preceding the area's attainment date. The $PM_{2.5}$ implementation rule contains similar provisions. It states that emissions reductions should be in place by the beginning of the year preceding the attainment date (40 CFR 51.1007).

The logic for requiring emissions reductions by the year (or season) immediately preceding the attainment year follows from language in the Clean Air Act. The Clean Air Act (172(a)(2)(C)) identifies a process by which attainment is expected to occur. Shortly after the attainment deadline, EPA is to evaluate whether areas have attained. If the area is clean for the last three years, then the area has met the attainment deadline. But if the area was above the standard for earlier years/seasons but has clean data for the single year/season **immediately preceding** the attainment date (and if the area has met planning requirements), the area is eligible for a 1-year extension of the attainment deadline. If the air is clean again the following year, the area is eligible for a second 1-year extension of the attainment deadline. The expectation is then that the third year's data, in combination with data from years 1 and 2, will show attainment (This is commonly referred to as the "clean data policy".) Therefore, emissions in the year **preceding** the attainment year should be at a level that is consistent with attainment. It also follows that the year preceding the attainment year should be modeled for attainment planning purposes.

As an example, based on the language in the Clean Air Act and the ozone and $PM_{2.5}$ rules, areas with an attainment date of no later than June 15th 2010 (for moderate ozone nonattainment areas) or April 5th, 2010 (for $PM_{2.5}$ nonattainment areas)[26], need to have emission reductions implemented no later than the beginning of 2009 (for $PM_{2.5}$) or the beginning of the 2009 ozone season (for 8-hour ozone). Therefore, modeling the year before the attainment deadline (2009 in this case) is generally appropriate for both ozone and $PM_{2.5}$ attainment demonstrations. However, attainment dates are expressed as "no later than" three, five, six, or nine years after designation and nonattainment areas are required to attain <u>as expeditiously as practicable</u>. Therefore, additional considerations are necessary before a modeling year can be established.

Using moderate ozone nonattainment areas as an example, these areas have an attainment date of no later than June 15, 2010, or as expeditiously as practicable. States/Tribes are required to conduct a Reasonably Available Control Measures (RACM) analysis to determine if they can

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[26]One key difference between ozone and $PM_{2.5}$ planning is that all $PM_{2.5}$ nonattainment areas have a single classification and a single set of attainment deadlines. The $PM_{2.5}$ nonattainment areas are required to attain the standard within 5 years of designation or as expeditiously as practicable. They can also request up to a 5 year extension of the attainment deadline. The procedures for justifying an extension of the attainment date are contained in the PM implementation rule (40 CFR 50.1004). In this guidance document, we will assume that areas will model a future year based on attaining within the first 5 year period. Areas that request and are granted attainment date extensions should consult with their Regional Office regarding future year modeling analyses and requirements

advance their attainment date by at least a year[27]. A RACM analysis is also required for $PM_{2.5}$ nonattainment areas[28]. Since areas are required to attain as expeditiously as practicable and perform a RACM analysis, results of the analysis may indicate attainment can be achieved earlier, (e.g., 2008). In this case, the timing of implementation of control measures should be used to determine the appropriate projection year. For example, if emission reductions (sufficient to show attainment) are implemented no later than the beginning of the 2008 ozone season, then the attainment year and the future projection year should be no later than 2008. In all cases, the selection of the future year(s) to model should be discussed with the appropriate EPA Regional Office as part of the modeling protocol development process.

For regional haze assessments, the first review of progress will occur in 2018. This will likely be based on monitored data from the 2013-2017 period. Therefore, a logical future period to model is the middle of the five year review period (2015). But the uniform rate of progress level can be calculated for any year in the future. Therefore, it is appropriate to model any future year between 2015 and 2018. Unless there are reasons to the contrary, any of the years between 2015 and 2018 can be considered to be representative of the regional haze future planning period. The calculation of the uniform rate of progress should be consistent with the emissions projection period. For example, if a future year of 2015 is modeled, the uniform rate of progress calculation should be based on the number of years between the base period and 2015. Similarly, if a future year of 2018 is modeled, then the uniform rate of progress should be based on the number of years between the base period and 2018.

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[27] 40 CFR 51.912(d)

[28] 40 CFR 51.1010(b)

4.0 Ozone Attainment Test

Section 3 contained the details of the modeled attainment test that are common to both ozone and $PM_{2.5}$. This section describes several additional details related to the 8-hour ozone attainment test. The section concludes with an example calculation.

4.1 Limiting modeled 8-hour daily maxima chosen to calculate RRF.

On any given modeled day, meteorological conditions may not be similar to those leading to high concentrations (i.e., values near the site-specific design value) at a particular monitor. If ozone predicted near a monitor on a particular day is much less than the design value, the model predictions for that day could be unresponsive to controls (e.g., the location could be upwind from most of the emissions in the nonattainment area on that day). Using equation (3.1) could then lead to an erroneously high projection of the future design value.

In order to examine this issue, we analyzed modeled baseline and future emissions for 30 episode days during 1995 using a grid with 12 km x 12 km cells and 9 vertical layers[29]. We examined modeled RRF's computed near each of 299 monitoring sites in the eastern half of the United States (Timin, 2005b). The study examined the day to day variability of (daily) RRFs at each site. One purpose of the study was to assess the extent to which a relative response factor (RRF) is dependent on the magnitude of modeled current 8-hour daily maxima.

Figure 4.1 shows an example of the raw data from the analysis for all of the monitoring sites in the Baltimore region. The plot shows the daily RRFs vs. the base case daily maximum modeled concentrations for all days (above 60 ppb in this case). In this example, it can be seen that the model tends to respond more to emissions reductions (lower RRFs) at higher predicted ozone concentrations. There appears to be a general pattern in the model results such that the model predicts less benefit from emissions reductions at lower concentrations. The greater model response at higher concentrations is likely due to more "controllable ozone" at higher concentrations. On days with high ozone concentrations, there is a relatively high percentage of locally and/or regionally generated ozone compared to days with low basecase concentrations. Days with low concentrations likely have a high percentage of ozone due to background and boundary conditions (background ozone is uncontrollable, although boundary conditions may be controllable, depending on the size of the domain.) Since we are generally interested in the model response on high ozone days, these results tend to suggest that the RRF calculation should be limited to days when the model predicts high ozone concentrations.

[29]See http://www.epa.gov/cair/pdfs/finaltech02.pdf for documentation of the base case and future year modeling.

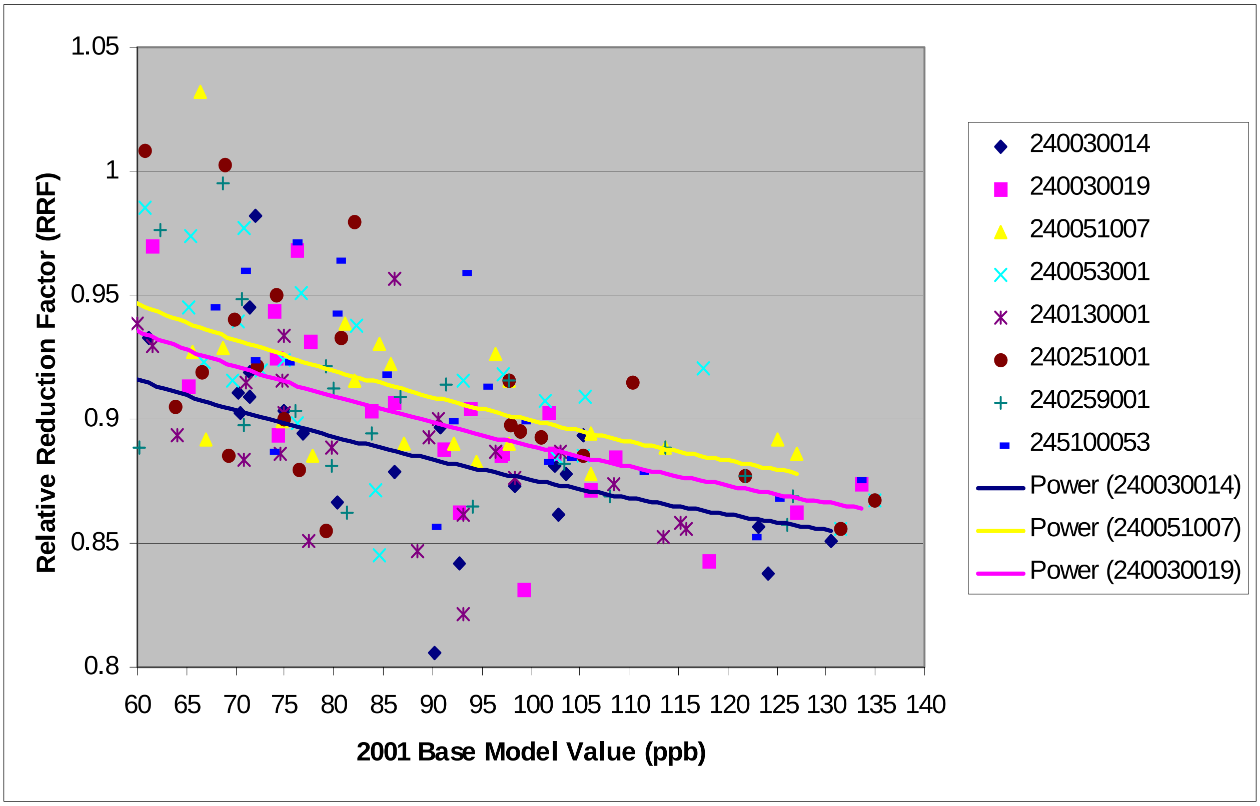

Figure 4.1 - Daily relative response factors as a function of daily maximum base modeled concentrations for monitors in the Baltimore nonattainment area.

The analysis examined daily RRFs, but in practice, the RRFs are not calculated on a daily basis[30]. A mean RRF is calculated based on the mean base case concentration (across model days) divided by the mean future case concentration (across the same model days). As such, we also calculated mean RRFs using various minimum concentration thresholds. The minimum concentration thresholds examined ranged from 70-85 ppb in 5 ppb increments[31]. The

[30] Although it is recommended to calculate mean RRFs, examination of daily RRFs can provide important information. Information gleaned from daily RRFs can be used to examine model response under different meteorological regimes. Additionally, days that are particularly unresponsive to emissions controls can indicate problems in the model inputs and/or formulation and may also provide a focus for the development of control strategies. For example, controlling specific upwind sources may provide benefits on particular days that appear to be otherwise unresponsive.

[31] It was clear from the plots that a minimum threshold value of less than 70 ppb would not be appropriate. An upper threshold of 85 ppb was examined because it is equal to the NAAQS. We are generally concerned about the model response on days that exceed the

monitoring sites were screened to eliminate sites that had a limited number of "high" modeled ozone days. All sites that had less than 10 days with an 8-hour average maximum modeled concentration of 85 ppb were dropped from the analysis. This left 206 sites in the analysis[32].

Table 4.1 shows that the mean RRF (averaged across all sites) is sensitive to the minimum ozone threshold. As the threshold is raised from 70 ppb to 85 ppb, the RRFs become smaller (larger percent decrease in ozone). On average, the model predicts a 0.2% greater ozone reduction for every 5 ppb increase in the minimum threshold. Additionally, the variability of the daily RRFs (as measured by the standard deviation of the daily RRFs) is reduced as the threshold is increased. This is an important finding because lower variability in day to day RRFs indicates lower uncertainty in the mean RRFs, and hence the attainment test results.

Minimum Threshold	Mean RRF	Mean Standard Deviation
70 ppb	0.879	0.030
75 ppb	0.876	0.029
80 ppb	0.874	0.028
85 ppb	0.872	0.026

Table 4.1- Mean RRFs and standard deviations as a function of various minimum thresholds.

As a result of the sensitivity in model response at concentrations below the NAAQS, combined with the increased variability of the RRFs at lower concentrations, we recommend using a minimum concentration threshold of 85 ppb[33]. This will result in RRFs that adequately represent high ozone days and also provide for more robust RRFs and future design values. For a more detailed description of selecting modeling days for ozone, see Section 14.1.1.

NAAQS. But at the same time, it is necessary to have a sufficient number of days in the mean RRF calculation to develop a robust estimate (this is addressed in more detail in section 14.1.1).

[32]The same set of sites was used for each of the threshold concentrations (70-85 ppb).

[33]The analysis suggests a threshold of greater than 85 ppb may be appropriate, but 85 ppb was chosen as the upper end of the threshold because it is equal to the NAAQS. For areas with very high baseline design values (>110 ppb) it may be necessary to use a higher threshold.

Example 4.1

Example 4.1 illustrates how to apply the minimum concentration threshold.

Given: The same simulations as performed in Example 3.2 yield low predictions near site I with baseline emissions on day 3, such that the 8-hour daily maximum ozone concentration predicted for that day is 65.0 ppb (rather than the 91.6 ppb shown in Example 3.2).

Find: The relative response factor near site I ($(RRF)_I$).

Solution: (1) Calculate the mean 8-hour daily maximum ozone concentration obtained near site I for baseline and future emissions. Exclude results for day 3 from the calculations. From Example 3.2,

(a) $(\text{mean 8-hr daily max})_{future} = (87.2 + 82.4 + 81.1)/3 = 83.6$ ppb

(b) $(\text{mean 8-hr daily max})_{baseline} = (98.3 + 100.2 + 90.7)/3 = 96.4$ ppb.

(2) Compute the relative response factor by taking the ratio of future/baseline.

$(RRF)_I = 83.6/96.4 = 0.867$

4.2 How Do I Apply The Recommended 8-Hour Ozone Modeled Attainment Test?

States/Tribes should apply the modeled attainment test at all monitors within the nonattainment area plus other nearby counties within the State[34]. Inputs described in Section 3.1 are applied in Equation (3.1) to estimate a future design value at all monitor sites and grid cells for which the modeled attainment test is applicable. When determining compliance with the 8-hour ozone NAAQS, the standard is met if, over three consecutive years, the average 4th highest 8-hour daily maximum ozone concentration observed at each monitor is $\leq$ 0.08 ppm (i.e., $\leq$ 84 ppb using rounding conventions)[35]. Thus, if all resulting predicted future design values (DVF) are $\leq$ 84 ppb, the test is passed. The modeled attainment test is applied using 3 steps.

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[34]States are responsible for submitting SIPs for all areas of their State. As such, the monitored and unmonitored area attainment tests should be applied both within and outside of the nonattainment area. In the modeling protocol, States should identify the appropriate areas to apply the respective tests. States should work with their EPA Regional Office to help determine the appropriate areas.

[35]40CFR Part 50.10, Appendix I, paragraph 2.3

Step 1. Compute baseline design values. Compute site-specific baseline design values (DVBs) from *observed* data by using the average of the design value periods which include the baseline inventory year.

This is illustrated in Table 3.1 for specific sites. The values in the right hand column of Table 3.1 are site-specific baseline design values.

Step 2. Estimate relative response factors. Use air quality modeling results to estimate a relative response factor for each grid cell near a monitoring site.

This step begins by computing the mean 8-hour daily maximum ozone concentrations for future and baseline emissions. The relative response factor for site I is given by Equation 4.1.

$$(RRF)_I = (\text{mean 8-hr daily max})_{future} / (\text{mean 8-hr daily max})_{baseline} \qquad (4.1)$$

Using Equation (4.1), the relative response factor is calculated as shown in example 3.2. Note that the RRF is calculated to three significant figures to the right of the decimal place. The last significant figure is obtained by *rounding*, with values of “5" or more rounded upward. For the illustration shown in Table 4.2, we have assumed that the same four days described previously in Example 4.1 have been simulated. Note that on day 3, model baseline 8-hour daily maximum ozone concentration was < 85 ppb. As discussed in Section 4.1, predictions for this day are not included in calculating the mean values shown in the last row of the table. We have also assumed that the monitored baseline design value (DVB) at site I is 102.0 ppb.

Step 3. Calculate future design values for all monitoring sites in the nonattainment area. Multiply the observed baseline design values obtained in Step 1 times the relative response factors obtained in Step 2.

In Table 4.2, we see (column (2)) that the baseline observed design value at monitor site I is 102.0 ppb. Using Equation (3.1), the predicted future design value for monitor site I is,

$$(DVF)_I = (102.0 \text{ ppb}) (0.867) = 88.434 \text{ ppb} = 88 \text{ ppb}$$

Note that the final future design value is *truncated*[36] and in this example, the modeled attainment test is not passed at monitor site I.

[36]This effectively defines attainment in the modeled test as <= 84.999 ppb and nonattainment as >= 85.0 ppb.

Table 4.2 Example Calculation of a Site-Specific Future Design Value $(DVF)_I$

Day	Calculated baseline design value, $(DVB)_I$, (ppb)	Baseline 8-hr daily max. concentration at monitor (ppb)	Future predicted 8-hr daily max. concentration at monitor (ppb)	Relative response factor(RRF),	Future design value, $(DVF)_I$, (ppb)
1		98.3	87.2	-	-
2		100.2	82.4	-	-
3		65.0	Not Considered	-	-
4		90.7	81.1	-	-
Mean	102.0	96.4	83.6	0.867 (i.e., 83.6/96.4)	88.434= 88 ppb

5.0 What Are The Modeled Attainment Tests For The Two $PM_{2.5}$ NAAQS?

In this section, we begin by illustrating the monitored tests for the annual and 24-hour NAAQS. We next identify how to derive needed inputs from available modeled data for the two modeled attainment tests and highlight some implications that result from the recommended tests. We conclude the section by describing a primary $PM_{2.5}$ analysis which may be used to better capture the contributions of primary $PM_{2.5}$ to nonattainment and the benefits of controlling primary $PM_{2.5}$ in areas with relatively large contributions from primary sources.

5.1 What Is The Recommended Modeled Attainment Test For The Annual NAAQS?

As described in section 2, the monitored attainment test for $PM_{2.5}$ utilizes both $PM_{2.5}$ and individual $PM_{2.5}$ component species. We therefore call the attainment test for $PM_{2.5}$, the Speciated Modeled Attainment Test (SMAT). A separate RRF is calculated for each $PM_{2.5}$ species. In order to perform the recommended modeled attainment test, States should divide observed mass concentrations of $PM_{2.5}$ into 7 components (plus passive mass):

- mass associated with sulfates
- mass associated with nitrates
-mass associated with ammonium
- mass associated with organic carbon
- mass associated with elemental carbon
-mass associated with particle bound water
- mass associated with "other"primary inorganic particulate matter
-and passively collected mass

To apply the test, States must first have run an air quality model at least twice--to simulate current emissions and to simulate future year emissions. We recommend a modeled attainment test which has 4 basic steps. Additional details are provided later in this section.

Step 1. Compute *observed* quarterly mean $PM_{2.5}$ and quarterly mean composition for each monitor.

Derive current quarterly mean concentrations[37] for each of the major components of $PM_{2.5}$. This is done by multiplying the monitored quarterly mean concentration of Federal Reference Method

[37]Concentrations should be calculated based on calendar quarters for two reasons. First, the NAAQS is calculated for a calendar year, so the quarters need to fit evenly within a year. Second, the monitored data used to calculate design values is averaged on a calendar quarter basis before calculating annual averages.

(FRM) (EPA, 1997a) derived $PM_{2.5}$ by the monitored fractional composition of $PM_{2.5}$ species for each quarter. (e.g., 20% sulfate x 15.0 ug/m^3 $PM_{2.5}$ = 3.0 ug/m^3 sulfate).

Step 2. Using model results, derive component-specific relative response factors (RRF) at each monitor for each quarter.

For each quarter, apply an air quality model to estimate current and future concentrations for each of the components of $PM_{2.5}$. Take the ratio of future to current predictions for each component. The result is a component-specific *relative response factor* (RRF).

The relative response factor for component j at a site i is given by the following expression:

$$(RRF)_{ij} = ([C_{j,\ projected}]/[C_{j,\ current}])_i$$

where $C_{j,\ current}$ is the quarterly mean concentration predicted at or near the monitoring site with emissions characteristic of the period used to calculate the baseline design value for annual $PM_{2.5.}$

$C_{j,\ projected}$ is the future year quarterly mean concentration predicted at or near the monitoring site.

(e.g., given model predicted base year sulfate of 10.0 ug/m^3 and future year concentration of 8.0 ug/m^{3,} then RRF for sulfate is 0.800).

Step 3. Apply the component specific RRFs to observed air quality to obtain projected quarterly species estimates.

For each quarter, multiply the current quarterly mean component concentration (step 1) times the component-specific RRF obtained in step 2. This leads to an estimated future quarterly mean concentration for each component. (e.g., 3.0 ug/m^3 sulfate x 0.800 = future sulfate of 2.4 ug/m^3).

Step 4. Calculate a future year annual average $PM_{2.5}$ estimate.

Sum the quarterly mean components to get quarterly mean $PM_{2.5}$ values. Then average the quarterly mean $PM_{2.5}$ concentrations to get a future year annual average $PM_{2.5}$ estimate for each FRM site.

Compare the projected average annual arithmetic mean $PM_{2.5}$ concentration obtained in Step 4 with 15.0 µg/m^3. If all values are $\leq$ 15.0 µg/m^3, the test is passed.

5.1.1 What Ambient $PM_{2.5}$ Data is Used in the Attainment Test?

$PM_{2.5}$ data collected at FRM sites is used for nonattainment designations. Therefore we recommend using FRM data as the base data for projecting future $PM_{2.5}$ concentrations. As can be seen from the list of steps, the modeled attainment test is critically dependent on the availability of species component mass at FRM sites. This raises several issues. First, the FRM filter measurements and $PM_{2.5}$ speciation measurements do not always measure the same mass (Frank, 2006). There are numerous known issues with positive and negative sampling artifacts. And second, the majority of FRM sites do not have co-located STN[38] speciation samplers[39]. Both of these issues are addressed below.

5.1.2 FRM Monitors that Don't Have Speciation Data

There are approximately 1200 FRM sites and only ~200 urban speciation monitoring sites. This makes it difficult to apply the attainment test at the majority of FRM sites. Species concentration data and/or species fractions are needed in order to apply SMAT. There are several possible ways to estimate species concentrations at FRM monitors that lack speciation data. Among them are:

1) Use concurrent data from a nearby speciation monitor to estimate species concentrations and/or fractions at one or more FRM sites.

2) Use representative speciation data (from a different time period) collected in an area to estimates species data at FRM sites.

3) Use interpolation techniques to create spatial fields using ambient speciation data.

4) Use interpolation techniques to create spatial fields using ambient speciation data and gridded model outputs to gradient adjust the species concentrations.

In general, we recommend using spatial interpolation techniques to estimate species concentrations at FRM sites that do not have speciation data (numbers 3 and 4 above). But in some cases, interpolating data from nearby sites may not be appropriate, may not be feasible, or simply may not be necessary. For the CAIR analysis, a relatively simple interpolation technique was used to estimate species concentrations at all FRM sites in the country. The analysis used a Voronoi Neighbor Averaging (VNA) technique. Other interpolations have been done using Kriging and other more complicated methodologies. States are encouraged to explore techniques that are most appropriate for their area and situation. EPA's MATS software contains routines to interpolate data and model output using the VNA technique.

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[38]References to STN monitors in this document always refer to the overall speciation network which includes both trends sites and SLAMS sites.

[39]There are ~1100 FRM measurement sites and ~200-250 urban speciation sites (trends and SLAMS).

For areas which contain one or more speciation sites, and where FRM sites exhibit very little spatial gradients, it may be appropriate to assume that the speciation site is representative of the entire area. Areas which exhibit strong spatial gradients in $PM_{2.5}$ concentrations should strongly consider using more sophisticated techniques to estimate species concentrations. Combining ambient data with model output concentrations (number 4 above) may help adjust concentrations in areas with strong gradients, but limited speciation data. This technique has great promise but has not been used extensively for $PM_{2.5}$ analyses. The technique is further limited by uncertainties in the representativeness of the model outputs and emissions inventories.

5.1.3 New Species Calculations and Definitions

Recent data analyses (Frank, 2006) have noted that the FRM monitors do not measure the same components and do not retain all of the $PM_{2.5}$ that is measured by routine speciation samplers and therefore cannot be directly compared to speciation measurements from the Speciation Trends Network (STN)[40]. By design, the FRM mass measurement does not retain all ammonium nitrate and other semi-volatile materials (negative sampling artifacts) and includes particle bound water associated with sulfates, nitrates and other hygroscopic species (positive sampling artifacts). This results in concentrations (and percent contributions to $PM_{2.5}$ mass) which may be different than the ambient levels of some $PM_{2.5}$ chemical constituents.

The FRM data is used to determine compliance with the NAAQS. Therefore, it is critical to estimate the species composition as measured on the FRM filters. In addition, for the purposes of predicting changes in $PM_{2.5}$ components, constructed $PM_{2.5}$ mass should match the composition of mass retained by the FRM. As such, we are recommending changes to the calculation and definition of $PM_{2.5}$ species compared to the (original 2001) draft $PM_{2.5}$ modeling guidance[41].

We recommend a SMAT technique which uses an FRM mass construction methodology which results in reduced nitrates (relative to the amount measured by routine speciation networks), higher mass associated with sulfates and nitrates (reflecting water included in gravimetric FRM measurements) and a measure of organic carbonaceous mass which is derived from the difference between measured $PM_{2.5}$ and its non-organic carbon components (Frank,

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[40]The information in this section applies to the most common samplers in the STN network. Some networks use alternative special purpose samplers to collect both $PM_{2.5}$ and $PM_{2.5}$ speciation data. The characteristics of the sampler and the analytical procedures used to produce chemical speciation data should be considered in determining which, if any adjustments are appropriate to make the data useful for comparison to FRM data.

[41]The draft $PM_{2.5}$ modeling guidance recommended a mass reconstruction scheme that was identical to the IMPROVE technique. We are still recommending use of IMPROVE assumptions for regional haze modeling (see section 6).

2006). This characterization of $PM_{2.5}$ mass also reflects "other" primary inorganic $PM_{2.5}$ and other minor constituents. Frank (2006) terms this approach "sulfate, adjusted nitrate, derived water, inferred carbonaceous material balance approach (SANDWICH)". The resulting characterization provides a complete mass balance. It does not have any unknown mass which is sometimes presented as the difference between measured $PM_{2.5}$ mass and the characterized chemical components derived from routine speciation measurements. The recommended SMAT characterizations should yield more accurate assessments of future $PM_{2.5}$ concentrations as measured by FRM monitors.

5.1.4 Recommended Treatment of Species Data

As noted above, special treatment of species component mass is recommended in the SMAT methodology. The goal is to reconstruct the measured species components so that they add up to the measured FRM mass. This concept can generally be represented by the following equation:

$RCFM_{FRM}$ = [Ammoniated Sulfate Mass] + [Retained Nitrate Mass] + [Retained Carbonaceous Mass] + [Other Primary $PM_{2.5}$] + [Other Components] [5.1]

In the above characterization, RCFM equals reconstructed fine mass and all of the listed chemical components reflect those retained during sampling and equilibration on the FRM's Teflon filter. Sulfate and nitrate mass include associated ammonium which may be different than assumed ammonium sulfate and ammonium nitrate compounds. Also, sulfates, nitrates and carbonaceous mass includes particle bound water associated with these hygroscopic aerosols. In this characterization, other primary $PM_{2.5}$ mass is intended to be a more general term that includes fine soil, and oxides that result from other PM emissions. The following section describes the recommended treatment for each of the components.

Retained Nitrate Mass

The first step in the procedure for identifying FRM mass components is to estimate the retained nitrate mass on the FRM filters. The FRM does not capture all of the semi-volatile components of the ambient air, such as ammonium nitrate. The retained amount of nitrate ion, however, can be accurately estimated by a simple thermodynamic model that involves 24-hr ambient nitrate speciation concentrations (as measured by a standard speciation sampler using a nylon filter preceded by a HNO3 denuder) together with hourly ambient temperature and humidity. Atmospheric nitrates are higher during the cooler months. Retention on the FRM is also higher during the cooler months and essentially all the nitrates are lost during the summer. The retention does not appear to depend on ambient NH3 or HNO3. More NO3 is retained at low temperatures and high humidity which varies by sampling location and time of year.

Because nitrate retention varies by site and season, an ammonium nitrate equilibrium model can be used to predict the amount of nitrates retained on the FRM Teflon filter. As used by Hering (Hering, 1999; Zhang, 1992),

$$\text{delta NO3 (ug/m3)} = 745.7/T_R * 1/24 * \sum_{i=1}^{24} (\mathbf{K}_i^{1/2}) \qquad [5.2]$$

where delta NO3 is the amount of volatilized nitrate mass, T_R is the reference temperature for the sampled air volume in degrees Kelvin and **Ki** is the dissociation constant for ammonium nitrate evaluated at the ambient temperature for hour i. The nitrate loss can be predicted for each day, based on hourly temperature and relative humidity data. The SMAT analysis for CAIR used National Weather Service temperature and relative humidity data for the closest station. Other sources of meteorological data may also be appropriate. Further details on the nitrate loss calculations can be found in (Frank, 2006).

Ammonium Associated with Sulfates and Retained Nitrates

To determine the mass associated with nitrates, we first assume retained nitrate is probably all ammonium nitrate. Thus the ammonium associated with nitrates can be derived directly from the measured or predicted $NO3_{FRM}$ as

$$NH4_{NO3} = 0.29 * NO3_{FRM} \qquad [5.3]$$

The difference between total FRM NH4 (amount associated with nitrates and sulfates), termed $NH4_{FRM}$, and the measured NH4, termed $NH4_{STN,}$, is needed to determine the ammoniated form of sulfates as described by equation 5.1. Recent measurement study by Collett (Collett, 2004) shows that NH4 may not be completely retained during collection on nylon filters preceded by a nitric acid denuder. During sampling conditions associated with nitrate volatilization, ammonium nitrate dissociates but the HNO3 downstream of the denuder is recaptured on the basic nylon media and the result is reported as particle nitrate. On the other hand, the NH4+ volatilizes to gaseous NH3 and apparently passes thru the filter. At several FRM study sites, the STN NH4 which is adjusted for evaporated NH4NO3 tends to more closely correspond to the measured NH4 from the FRM Teflon filter. However, for other sites, the measured STN NH4 appears to agree with FRM NH4.

In the CAIR analysis, 50% of the ammonium associated with volatilized nitrate was assumed to also volatilize. But more recent information suggests that using measured ammonium (assuming none is volatilized) may be a better assumption. We recommend using measured ammonium, but further analysis of this issue is warranted.

There are several ways to estimate ammonium mass for use in SMAT. The most direct way is to use measured ammonium concentrations from the STN network (IMPROVE does not measure ammonium ion).

A second, more indirect method is to calculate the ammonium associated with sulfate and the degree of neutralization of sulfate (DON), and then use the resulting information to calculate ammonium mass. Due to uncertainties associated with the ammonium measurements and the lack of ammonium measurements in rural areas, this indirect method was used for the CAIR analysis. The ambient data is such that all of the ammonium data is from urban sites (STN), but the sulfate and nitrate data is from both urban (STN) and rural (IMPROVE) sites. This leads to an overestimation of ammonium concentration in rural areas when ammonium is directly interpolated. Therefore, in the CAIR analysis, calculated DON, SO4 and $NO3_{FRM}$ were interpolated to get quarterly average concentrations at each FRM site. The interpolated species concentrations were then used to calculate $NH4_{FRM}$ using the following equation:

$$NH4_{FRM} = DON * SO4 + 0.29*NO3_{FRM} \quad [5.4]$$

The indirect calculation of ammonium mass from interpolated fields tends to smooth out the gradients in mass. This was deemed to be beneficial, due to the uncertainty in the measurements.

Particle Bound Water

Because ammoniated sulfate and ammonium nitrate are hygroscopic, the retained sulfate and nitrate mass will include water. Particle bound water (PBW) can be estimated using an equilibrium model. The CAIR analysis used the Aerosol Inorganic Model (AIM) *(Clegg, 1998)* to calculate PBW. PBW was derived from quarterly average FRM concentrations of sulfate, ammonium, and nitrate as describe above. Estimated hydronium ion, H+, needed to achieve ionic balance was derived from the latter values. The model enables the distribution of water and ions to be calculated between liquid, solid and vapor phases for specific temperature and relative humidity conditions. Typical FRM filter equilibration conditions of 35% RH and 22 deg C (295 deg K) temperature were used.

Application of AIM at the specified FRM filter equilibration conditions show that PBW is much more dependent on sulfate concentration compared to nitrate and that the relationship varies somewhat by season. There is proportionally less estimated PBW water for wintertime aerosol which has higher NO3 and lower SO4. The PBW concentrations are also sensitive to the degree of neutralization of the sulfate particles (determined by the relative concentration of $NH4_{FRM}$).

For computational convenience, a polynomial regression equation was fit to the calculated water mass from AIM and the three input values that fed into AIM (sulfate, nitrate and ammonium). A polynomial equation can then be used in all SMAT analyses to estimate water.

We recommend calculating PBW as a component of $PM_{2.5}$ mass. The AIM model (or other equilibrium models) can be used, or a regression equation can be developed to simplify the process.

Other Primary $PM_{2.5}$

The terms “crustal”, “fine soil”, “major metal oxides”, “inorganic particulates”, and "other PM" are sometimes used interchangeably. For $PM_{2.5}$ NAAQS calculations we will refer to this material as "other primary $PM_{2.5}$"(OPP). For regional haze calculations, we will continue to refer to this material as fine soil.

For the purposes of estimating other primary $PM_{2.5}$ for SMAT, all measured non-carbon mass that is not organic in nature (not associated with sulfate and/or nitrate) should be counted. As with the other $PM_{2.5}$ components measured on the FRM filter, there is uncertainty associated with this estimate. The "crustal" or "fine soil" definition from IMPROVE can be used to estimate other primary $PM_{2.5}$ [42] or an alternative formula can be defined which better estimates the urban nature of the FRM measurements. The IMPROVE definition of "fine soil" accounts for the typical crustal components (and attached mass) that would be expected in remote Class I areas. Fine soil is represented as five elements (Al, Si, Fe, Ti, and Ca) with coefficients to represent various oxides and material which may be attached to or associated with the major elements. In urban areas, inorganic PM which is not elemental carbon, or associated with sulfate or nitrate, may come from many sources such as re-suspended dust or industrial sources (stack or fugitives). It is generally "crustal" in nature (dominated by silicon), but urban PM is more likely to contain heavy metals and industrial components.

Although the composition of inorganic PM may differ between urban and rural (remote) areas, we recommend using an equation similar to the IMPROVE fine soil equation to estimate other primary $PM_{2.5}$ for the $PM_{2.5}$ attainment test. The recommended equation is suggested by (Frank, 2006) and uses only four elements. The equation removes aluminum (and accounts for associated mass by increasing the coefficient for Si), due to the fact that aluminum is often missing from the speciation measurements. This allows for more complete data.

The recommended equation is as follows:

$$\text{Other primary } PM_{2.5} \text{ mass} = 3.73 \times [Si] + 1.63 \times [Ca] + 2.42 \times [Fe] + 1.94 \times [Ti]$$

<u>Blank mass</u>

The other quantifiable components of $PM_{2.5}$ mass include passively collected mass, represented by a field blank concentration of 0.3-0.5ug/m3 (U.S. EPA, 2002a). This appears to constitute a contamination of the filter resulting from handling or contact with the FRM cassette. This value is deemed to be an important constituent of $PM_{2.5}$ mass (it is assumed to not be dependent on pollutant emissions). We recommend using a default nominal blank mass value of 0.5 ug/m3. This value can be modified based on local FRM blank mass measurements. The blank mass is assumed to remain constant through time (RRF=1.0).

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[42]IMPROVE estimates fine soil as: $2.2 \times [Al] + 2.49 \times [Si] + 1.63 \times [Ca] + 2.42 \times [Fe] + 1.94 \times [Ti]$

Calculation of Carbonaceous Mass

Organic carbon mass is typically estimated from blank corrected speciation data, where organic carbonaceous mass is first estimated by multiplying the organic carbon concentrations by 1.4 or alternative factors to account for the oxygen, hydrogen and other elements associated with ambient carbon particles.

There are many uncertainties in estimating carbonaceous mass from carbon measurements (Turpin, 2001; Chow, 2004). Uncertainties include differences in carbon measurement protocol between urban and rural monitoring locations; a relatively "bumpy" surface of urban carbon concentrations as derived from urban and rural organic carbon measurements; and lack of carbon measurements at all FRM locations. We therefore recommend an alternative approach to estimate the organic carbon contribution to $PM_{2.5}$ mass.

The recommended SMAT approach estimates organic carbon by mass balance. Precisely measured FRM $PM_{2.5}$ mass (U.S. EPA, 2003a) is compared to the sum of its non-organic carbon components. The latter are sulfates, ammonium, nitrates, estimated particle bound water, elemental carbon, estimated other primary $PM_{2.5}$ material plus 0.5 ug/m3 blank mass as discussed earlier.

This approach estimates <u>retained</u> organic carbon FRM mass and explicitly accounts for the following important and difficult to estimate carbon mass properties: (1) regional and urban-rural differences in the mix of carbonaceous aerosols, i.e. the amount of oxygen, hydrogen, etc; (2) retained water associated with hygroscopic carbon compounds (Saxena, 1996; Yua, 2004*)*; (3) volatile carbonaceous material measured by speciation samplers, but not retained in FRM mass; and (4) uncertainties associated with blank corrections of measured organic carbon.

Organic Carbon Mass by mass balance **(OCM_{mb})** is defined as ,

$$\mathbf{OCM_{mb}} = PM_{2.5} - \{ [SO4] + [NO3_{FRM}] + [NH4_{FRM}] + [water] + [EC] + [OPP] + [0.5] \} \quad [5.5]$$

In this expression, all of the above components represent the mass <u>retained</u> on FRM Teflon filters.

This approach completely accounts for FRM mass[43] and OCMmb is often greater than the

[43]The OC by mass balance technique assumes that all other mass is accounted for and therefore all remaining mass is OCM. This may not always be a good assumption. The results of the technique should be carefully evaluated to ensure that OC mass is not overestimated (and therefore other mass components are underestimated). This may be a problem in areas that do not have nearby speciation data and have relatively large concentrations of primary $PM_{2.5}$. The OC by mass balance technique may inadvertently apportion mass to organic carbon which may actually be EC or "other" primary $PM_{2.5}$ mass. All available ambient data and modeling data

amount that would be derived directly from speciation measurements. Because of uncertainties in speciation measurements and their estimates from interpolated surfaces, setting a lower limit (floor) may be necessary so that the OCMmb is not unreasonably low. In the CAIR analysis, the floor was set so that OCMmb could not be more than 30% lower than measured OCM (OC*1.4). We used interpolated measured values of OCM to calculate the floor. The lower limit was equal to interpolated OC * 1.4 * 0.7. If the OCMmb concentration was less than the lower limit, it was set equal to the lower limit. The recommended approach is to simply set the OC floor equal to measured OC.

There may also be situations where an OCM "ceiling" is needed. In remote urban areas with relatively high FRM concentrations that may be surrounded by rural background concentrations, the OC by mass balance technique may apportion 95% or more of the $PM_{2.5}$ mass to OCM. If this is not a reasonable assumption, then a ceiling may be needed to cap the OCM as a percentage of $PM_{2.5}$ mass. Based on measured data (FRM sites with co-located speciation data), it appears that on a quarterly average basis, OCM is rarely more than 80% of total $PM_{2.5}$ mass. This may be a reasonable default ceiling, but a lower value (or in rare circumstances a higher value) may be more appropriate in many regions of the country.

Summary of $PM_{2.5}$ Composition Calculations

The terms of equation 5.6 reflect the final estimated composition of the particles measured by the FRM (for each quarter). Quarterly average FRM mass is equal to the sum of the seven species plus blank mass.

$$PM_{2.5FRM} = \{ [OCMmb] + [EC] + [SO4] + [NO3_{FRM}] + [NH4_{FRM}] + [water] + [OPP] + [0.5] \} \quad [5.6]$$

The recommended order to generate the data is as follows:

1) Calculate adjusted nitrate using hourly meteorology and 24-hour average nitrate measurements.

2) Calculate quarterly averages for adjusted nitrate, sulfate, elemental carbon, ammonium (or degree of sulfate neutralization (DON)), OPP mass , and measured OCM.[44]

3) Quarterly average ammonium is calculated from the adjusted nitrate, sulfate, and DON values (if measured ammonium is not used directly).

4) Calculated ammonium, sulfate, and nitrate values are input into the polynomial water equation to derive particle bound water concentrations.

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should be used to evaluate the species apportionment results.

[44] The measured OCM is only used to calculate the "floor" for OCMmb

5) Carbon mass by difference (OMCmb) is calculated from the $PM_{2.5}$ mass, adjusted nitrate, ammonium, sulfate, water, elemental carbon, other primary $PM_{2.5}$, and blank mass values. The sum of the 7 species plus blank mass is equal to the FRM mass.

We illustrate application of the recommended test in example 5.1.

Example 5.1

Given: (1) Area "C" has 2 monitoring sites.

(2) Monitored FRM air quality data show the following average quarterly mean $PM_{2.5}$ concentrations based on a 5 year weighted average of observations from 2000-2004 at each site (values are in $\mu g/m^3$).

Table 5.1

Site	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1	17.21 ug/m3	16.34	20.30	14.76
2	15.39	17.98	18.23	13.76

(3) The area has 1 urban speciation site which is co-located with FRM site 2. The speciation data is only available for 2003 and 2004. Therefore, the species data for the two years has been interpolated to derive estimated species concentrations at each site. The species concentrations (derived from 2003 and 2004 data) are matched up with FRM data for 2003 and 2004 to derive representative species fractions.

Average monitored air quality for the 3rd quarter of 2003 and 2004 at site 1 is as follows[45]:

Table 5.2

FRM Mass (ug/m3)	Blank Mass (ug/m3)	Non-blank Mass (ug/m3)	Sulfate (ug/m3)	Nitrate (ug/m3)	Organic Carbon Mass (ug/m3)	Elemental Carbon (ug/m3)	Water (ug/m3)	Ammonium (ug/m3)	OPP (ug/m3)
22.57	0 .5	22.07	8.51	1.11	5.21	0.91	2.31	3.31	0.71

The blank mass is subtracted before species fractions are calculated because the blank mass is held constant at 0.5 ug/m3 throughout the analysis. In the example, the measured FRM mass for quarter 3 is 22.57 ug/m3. The non-blank FRM mass is 22.07 ug/m3. The mass of the seven

[45]The species concentrations can be derived from co-located speciation data, nearby speciation data or from interpolated spatial fields. In this example, FRM mass is not interpolated.

species add up to the non-blank mass.

(4) Species fractions are calculated for each quarter for each species. In the example below, a fraction of non-blank mass is calculated for each of the seven species. Blank mass remains fixed at 0.5 ug/m3.

Table 5.3

FRM Mass (ug/m3)	**Blank Mass (ug/m3)**	**Non-blank Mass (ug/m3)**	**% Sulfate**	**% Nitrate**	**% Organic aerosol**	**% Elemental Carbon**	**% Water**	**% Ammonium**	**% OPP**
22.5	0 .5	22.0	38.6	5.0	23.6	4.1	10.5	15.0	3.2

The percentages in table 5.3 above are the relative composition for the 3rd quarter of 2003 and 2004. It is assumed that these species fractions are representative of the 2000-2004 time period[46].

(5) The weighted quarterly average FRM design values are used as the baseline FRM value for each monitoring site (2000-2004). The species fractions from the 2003/2004 speciation data were used to estimate the species concentrations for the baseline year FRM $PM_{2.5}$ data. The percentage compositions for 2003/2004 are applied to the quarterly weighted average design values as shown in table 5.4. In the example below, the weighted average design value for the 3rd quarter for the site from table 5.1 is 20.30 ug/m3. This leads to the following concentrations of $PM_{2.5}$ species:

Table 5.4 Calculation of the "current" species concentrations

Weighted Avg. FRM Mass (ug/m3)	**Blank Mass (ug/m3)**	**Non-blank Mass (ug/m3)**	**Sulfate (ug/m3)**	**Nitrate (ug/m3)**	**Organic aerosol (ug/m3)**	**Elemental Carbon (ug/m3)**	**Water (ug/m3)**	**Ammonium (ug/m3)**	**OPP (ug/m3)**
20.30	0 .5	19.8	7.64	0.99	4.67	0.81	2.08	2.97	0.63

This procedure is repeated for each $PM_{2.5}$ site and quarter to complete the calculation of current (baseline) ambient concentrations used as the basis for future estimates of $PM_{2.5}$ mass and its components.

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[46]If there are less than 5 years of speciation data, then an assumption of representativeness needs to be made. It is generally assumed that the inter-annual variability of the species fractions is small compared to the variability of species concentrations. In the near future, 5 full years of concurrent FRM and speciation data will be available.

(6) Modeled results show the following relative response factors (RRF) in predicted mass of 5 components of $PM_{2.5}$ for the 3rd quarter:

Table 5.5

RRF Sulfate	**RRF Nitrate**	**RRF Organic aerosol**	**RRF Elemental Carbon**	**RRF OPP**
0.876	0.943	0.971	0.932	1.042

(7) The quarterly mean RRFs from table 5.5 are multiplied by the weighted quarterly average species concentrations from table 5.4 to derive future year concentrations.

From the example above, the future year 3rd quarter concentrations are:

$Sulfate_{Future}$ = 7.64 * 0.876 = 6.69 ug/m3
$Nitrate_{Future}$= 0.99 * 0.943 = 0.93 ug/m3
Organic carbon $mass_{Future}$= 4.67 * 0.971 = 4.53 ug/m3
Elemental $Carbon_{Future}$= 0.81 * 0.932 = 0.75 ug/m3
OPP_{Future}= 0.63 * 1.042 = 0.66 ug/m3

(8) The future year concentrations derived in step 5 are used to calculate the future year concentration of ammonium (if the direct ammonium RRF is not used) and particle bound water.

The future year ammonium concentrations are calculated from the sulfate, nitrate, and (current year) DON values. Assuming that the DON is unchanged from the current year[47], the ammonium is calculated using the following formula:

$NH4_{future} = DON * SO4_{future} + 0.29*NO3_{future}$,

In the example above, assuming the base year DON is 0.336,

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[47] In the CAIR analysis, the DON was assumed to stay constant through time due to the uncertainty in the ammonium measurements. The water calculation is sensitive to the ammonium (and therefore the DON value) concentrations. Keeping the DON constant allows for the future year ammonium and water values to be solely a function of the change in sulfate and nitrate concentrations. Otherwise, the water concentration can go up when the sulfate and nitrate concentrations go down. This may occur if sulfate becomes more neutralized in the future. It is a somewhat illogical outcome (although scientifically possible) and is highly dependent on an uncertain measurement (ammonium). Therefore, use of a constant DON creates a more stable set of calculations. If the measured and modeled ammonium concentrations are believed to be accurate and respond in a reasonable way to emissions controls, then it would be more scientifically credible to use the model predicted change in ammonium. Otherwise, it is a reasonable assumption to keep the DON constant over time.

$Ammonium_{Future}$= 0.336 * 6.69 + 0.29 * 0.93 = 2.52 ug/m3

The $NH4_{future}$, $SO4_{future,}$ and $NO3_{future}$ concentrations can then be input into an equilibrium model (AIM or another alternative model) or through a polynomial equation to predict future year particle bound water concentration.

(9) The future species concentrations at each FRM site are then summed over the seven species plus blank mass to estimate the future quarterly average $PM_{2.5}$ concentration.

In the example above, the total $PM_{2.5Future}$=
6.69 + 0.93 + 4.53 + 0.75 + 0.66 + 2.52 + 1.73 + 0.5 = 18.31 ug/m3
(assuming that the future year water concentration is equal to 1.73 ug/m3)

(10) The same calculations are completed for the other 3 quarters to get a future year $PM_{2.5}$ concentration for each quarter. The 4 quarters are then averaged to get a final future year annual average $PM_{2.5}$ concentration for each FRM site.

(11) The future year annual average concentration is compared to 15.0 ug/m3[48].

5.2 What Is The Recommended Modeled Attainment Test For The 24-Hour NAAQS?

Our recommended modeled attainment test for the 24-hour NAAQS for $PM_{2.5}$ is similar to the previously described test for the annual NAAQS in that it uses model predictions in a relative sense to reduce site-specific *observations* (averaged over 5 years). In the test, we are interested in reducing the current design values at each site to $\leq$ 65 μg/m^3 [49,50].

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[48] In the final step, the future year concentration should be rounded to the tenths digit. A (rounded) value of 15.0 ug/m3 meets the NAAQS. A value of 15.1 ug/m3 or greater violates the NAAQS.

[49] $PM_{2.5}$ nonattainment areas are not specifically designated for the annual or 24-hour standard. Therefore, the attainment demonstration must show that the area will meet both forms of the standard. Areas that only violate the annual standard and whose design value is well below the 24-hr standard may not need to apply the 24-hour modeled attainment test. Attainment test requirements should be discussed with the appropriate EPA Regional Office.

[50] The $PM_{2.5}$ 24-hour standard was lowered to 35 ug/m3 in 2006 (71 FR 61224) (40 CFR 50.13) . Planning requirements for areas that violated the old standard are unchanged. We expect the attainment test for the new standard to be the same or similar to the procedures in this version of the modeling guidance. As part of the implementation process for the revised standard, the procedures in the guidance will be re-evaluated. If necessary, we will release a revised modeling guidance document that addresses any changes to the 24-hour test for the new

Ideally, the modeled attainment test should reflect model results obtained for days in each season having observed $PM_{2.5}$ concentrations slightly below as well as above the design value. This may seem strange at first. The underlying reasons are that $PM_{2.5}$ consists of a mixture of pollutants. Composition of the mixture could vary substantially from season to season. Second, there could be a substantial amount of uncertainty associated with predictions on any single day. Thus, our test is most likely to be reliable when relative response factors reflect composite responses from many days. Therefore, we recommend modeling as many days as feasible where observed $PM_{2.5}$ is greater than 65 $\mu g/m^3$. Alternatively, the test can focus on the high end of the distribution of days in each quarter, (e.g. the top 25% of $PM_{2.5}$ days) assuming that many of the high days violate the NAAQS (or are representative of days that violate the NAAQS). As with the annual NAAQS (and for the same reasons), the preferred approach is to develop relative response factors which are season (i.e., quarter) specific.

We have noted that it is desirable to base our conclusions on a composite response of the model(s) over many days. However, there is not likely to be many days with observed concentrations greater than 65 $\mu g/m^3$. If this results in a sample size of smaller than about 5 days per quarter then the analysis should focus on the high end of the distribution of $PM_{2.5}$ days in each quarter (e.g. the top 25% of $PM_{2.5}$ days[51]).

The 24-hour attainment test should be based on the same 5 year weighted average methodology that was used for the annual standard, with some slight modifications. The 24-hour design values are calculated from the 98th percentile value for each year. We recommend applying the attainment test on an annual basis and then averaging the annual average results up to 3 year averages and then averaging again to get a 5 year weighted average.

$PM_{2.5}$ is a complex mixture of components that have significant seasonal variations. If the observed 98th percentile value came from the 1st quarter, it is possible that an observed concentration from a different quarter, which may have a slightly lower concentration, could become the 98th percentile value in the future. It is important to demonstrate that the standard will be met for all seasons. Therefore we recommend applying the test by quarter for each year[52].

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standard.

[51]The top 25% of days may seem like too many days per quarter to use for a 98th percentile based standard, but for sites with a 1 in 6 day sampling schedule meeting minimal completeness criteria (assuming 11 samples per quarter), the top 25% of days is only 3 days per quarter. For most sites, the top 25% of monitored days per quarter will represent between 3 and 8 days.

[52]In some areas it may not be necessary to model and evaluate the NAAQS for all quarters. For example, if $PM_{2.5}$ concentrations only exceed the NAAQS in the 1st and 4th quarters, and concentrations in the 2nd and 3rd quarters are very low, then it may not be necessary

Similar to the annual $PM_{2.5}$ attainment test, we recommend interpolation techniques for FRM monitors that do not have co-located speciation data. Because the 24-hour standard is a 98th percentile based value, the component composition on high concentration days may be highly variable from day to day and from site to site. Therefore, while interpolation techniques may need to be used, we strongly recommend collecting speciation data at all FRM sites that violate the 24-hour NAAQS. A precise estimate of the $PM_{2.5}$ components at violating sites will help reduce uncertainty in the future year concentration estimates.

We recommend a modeled attainment test for the 24-hour $PM_{2.5}$ NAAQS with 6 steps.

Step 1. Compute *observed* 98th percentile values for each year and next highest concentrations for each quarter.

The first step in projecting the daily design value is to identify the maximum daily average $PM_{2.5}$ concentration in each quarter that is less than or equal to the annual 98th percentile value over the entire year. This results in data for each year (for five years) for each site which contains one quarter with the 98th percentile value and three quarters with the maximum values from each quarter which are less than or equal to the 98th percentile value[53].

Step 2. Identify the species composition for each quarter for each monitor.

These quarterly $PM_{2.5}$ concentrations are then separated into their component species by multiplying the quarterly maximum daily concentration at each site by the estimated fractional composition of $PM_{2.5}$ species, by quarter and year, based on observed species fractions for the days > 65 ug/m3 or from the days in the high end of the distribution of $PM_{2.5}$ concentrations (using the same methodology as used in the annual average calculations[54]) (e.g., 30% nitrate x 70.0 ug/m^3 $PM_{2.5}$ = 21.0 ug/m^3 nitrate).

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to model the full year. But for areas that have monitored violations (or high values that are close to the NAAQS) in all 4 seasons, the entire year should be evaluated.

[53]The test should be performed for each monitoring site that meets the data completeness criteria for calculating a 98th percentile value under the 24-hr NAAQS. The highest concentration from the other 3 quarters (less than or equal to the 98th percentile) is taken from any values that are measured at the site. It is necessary to examine the concentrations in other quarters which are less than the design value because PM species may have different responses to emissions controls in different parts of the year. Basecase concentrations that are less than the design value concentrations may end up being higher than the design value concentration in the future (after RRFs are applied). There may not always be data available for all four quarters.

[54]The ambient speciation data for the 24-hour attainment test should use the same adjustments that were recommended for the annual test. The adjusted data should be carefully examined. Adjustments to daily concentrations of speciation data (used for the 24-hr test) may in some cases be large compared to adjusted quarterly average data.

Step 3. Using model results, derive component-specific relative response factors (RRF) at each monitor for each quarter.

For each quarter, apply an air quality model to estimate current and future concentrations for each of the components of $PM_{2.5}$. Take the ratio of future to current predictions for each component on the modeled days with $PM_{2.5}$ > 65 ug/3 or the high end of the distribution of modeled days. The result is a component-specific relative response factor (RRF). (e.g., given model predicted base year nitrate of 20.0 ug/m^3 and future year concentration of 15.0 ug/$m^{3,}$ then RRF for nitrate is 0.750).

The relative response factor for component j at a site i is given by the following expression:

$$(RRF)_{ij} = ([C_{j,\ projected}]/[C_{j,\ current}])_i$$

where $C_{j,\ current}$ is the mean concentration (for the high modeled days for each quarter) predicted at or near the monitoring site with emissions characteristic of the period used to calculate the baseline design value for 24-hour $PM_{2.5.}$

$C_{j,\ projected}$ is the future year mean concentration (for the high modeled days for each quarter) predicted at or near the monitoring site with emissions characteristic of the future year period.

Step 4. Apply the component specific RRFs to observed air quality to obtain projected quarterly species estimates.

For each quarter, multiply the quarterly component concentration (step 2) times the component-specific RRF obtained in step 3. This leads to an estimated future quarterly concentration for each component. (e.g., 21.00 ug/m^3 nitrate x 0.750 = future nitrate of 15.75 ug/m^3).

Step 5. Sum the quarterly components to get quarterly "potential" 98th percentile $PM_{2.5}$ values.

Sum the quarterly components to get quarterly "potential" 98th percentile $PM_{2.5}$ values. Repeat this procedure for each quarter and for each of the 5 years of ambient data. The highest daily value (from the 4 quarterly values) for each year at each monitor is considered to be the estimated 98th percentile value for that year.

Step 6. Calculate future year 5 year weighted average 24-hour design values and compare to the NAAQS.

The estimated 98th percentile values for each of the 5 years are averaged over 3 year intervals to create design values and then the 3 design values are averaged to create the 5 year weighted average for each monitor. Compare the projected 24-hour design values to 65 ug/m3.

The recommended test is illustrated in example 5.2. In the interest of brevity, some of the steps are only illustrated for quarter 1. The actual calculations would also use analogous data for the other three quarters.

Example 5.2

<u>Given</u>: (1) Area "D" has 1 monitoring site. The 98th percentile values for 5 years of observed data are as follows (year 3 is being modeled for the attainment test):

Year 1- 80 ug/m3
Year 2- 68 ug/m3
Year 3- 71 ug/m3
Year 4- 58 ug/m3
Year 5- 74 ug/m3

Step 1- Compute *observed* 98th percentile values for each year and next highest concentrations for each quarter.

The maximum quarterly values from the 5 years which are equal to or less than the 98th percentile concentration are as follows:

	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Quarter 1	80.0 ug/m3	65.0	57.0	58.0	74.0
Quarter 2	67.6	45.5	46.4	45.3	52.2
Quarter 3	41.7	47.6	32.5	39.4	45.3
Quarter 4	52.8	68.4	71.3	49.5	64.2

Step 2- Identify the species composition for each quarter for each monitor.

The mean species composition[55] for the observed high $PM_{2.5}$ days in quarter 1 is:

Nitrate- 30%
Sulfate- 10%
Organic carbon- 23%
Elemental carbon- 5%
Other primary $PM_{2.5}$- 5%
Ammonium- 15%
Water- 12%

This leads to the following baseline concentrations for quarter 1 (ug/m3):

	$PM_{2.5}$	**Nitrate**	**Sulfate**	**OCM**	**EC**	**OPP**	**Ammonium**	**Water**
Year 1	79.5	23.85	7.95	18.29	3.98	3.98	11.93	9.54
Year 2	64.5	19.35	6.45	14.84	3.23	3.23	9.68	7.74
Year 3	56.5	16.95	5.65	13.00	2.83	2.83	8.48	6.78
Year 4	57.5	17.25	5.75	13.23	2.88	2.88	8.63	6.90
Year 5	73.5	22.05	7.35	16.91	3.68	3.68	11.03	8.82

Step 3- Using model results, derive component-specific relative response factors (RRF) at each monitor for each quarter.

The following are RRFs for the 1st quarter derived from the modeled baseline and future year concentrations for the high $PM_{2.5}$ days.

	Nitrate	**Sulfate**	**OCM**	**EC**	**OPP**
RRF	0.942	0.843	0.917	0.930	1.040

[55]The percentages are derived from several steps in the processing. The nitrate, sulfate, elemental carbon, and other primary PM2.5 are derived from measured or interpolated data. The ammonium is calculated from interpolated sulfate, nitrate, and DON (or directly interpolated ammonium). Water is calculated from ammonium, nitrate, and sulfate using a model or equation. The OMC is calculated by mass balance.

Step 4- Apply the component specific RRFs to observed air quality to obtain projected quarterly species estimates.

The quarter 1 concentrations for each year are multiplied by the component RRFs. Ammonium concentrations are calculated from the future year sulfate, nitrate, and (baseline) DON value. Water concentrations are calculated from the future year nitrate, sulfate, and ammonium concentrations, using an empirical equation.

	Nitrate	**Sulfate**	**OCM**	**EC**	**OPP**	**Ammonium**	**Water**
Year 1	22.47	6.70	16.77	3.70	4.14	10.41	8.41
Year 2	18.23	5.44	13.60	3.01	3.36	8.45	6.83
Year 3	15.97	4.76	11.92	2.63	2.94	7.40	5.98
Year 4	16.25	4.85	12.13	2.68	3.00	7.53	6.09
Year 5	20.77	6.20	15.50	3.43	3.83	9.62	7.78

Step 5. Sum the quarterly components to get quarterly "98th percentile" $PM_{2.5}$ values.

The year 1 $PM_{2.5}$ concentration is equal to the sum of the 7 components plus 0.5 ug/m3 blank mass:

Year 1= 22.47 + 6.70 + 16.77 + 3.70 + 4.14 + 10.41 + 8.41 + 0.5 = 72.6

Filling in the quarter 1 values for the other 4 years, plus the other 3 quarters for each year; the full matrix of quarterly values is as follows:

	1999	**2000**	**2001**	**2002**	**2003**
Quarter 1	72.6 ug/m3	58.9	51.6	52.5	67.1
Quarter 2	57.5	38.7	39.4	38.5	44.4
Quarter 3	38.8	44.3	30.2	36.6	42.1
Quarter 4	46.6	60.5	63.0	43.6	57.1

Step 6. Calculate future year 5 year weighted average 24-hour design values and compare to the NAAQS.

In the example, the highest quarterly value for each year in step 5 represents the future year annual 98th percentile. Therefore, the 3 year average design values are:

DV1 = (72.6 + 60.5 + 63.0)/3 = 65.4
DV2 = (60.5 + 63.0 + 52.5)/3 = 58.7
DV3 = (63.0 + 52.5 + 67.1)/3 = 60.9

And finally, the 5 year weighted average is equal to the average of the 3 future year design values:

5 year weighted average future DV= (65.4 + 58.7 + 60.9)/3 = 61.7 = **62 ug/m3**

5.3 Special Considerations for Primary $PM_{2.5}$

Primary particulate matter does not undergo chemical transformation between its being emitted and its arrival at a receptor location. Thus, a relatively lengthy travel time from source to receptor (to enable thorough mixing and chemistry to proceed) is not needed for high concentrations of primary particulate matter to occur. Therefore, unlike secondary particulate matter, we would often expect concentrations of primary particulate matter to increase the closer one gets to its source(s) of emissions. Therefore, if a designated nonattainment area contains a few (as opposed to many which are spread out) concentrated sources of primary particulate matter, we would expect there to be some substantial spatial gradients in the primary portion of the organic carbon component and in the inorganic particulate matter (OPP) and elemental carbon (EC) components of ambient $PM_{2.5}$ (these are often called "hotspots"). Substantial gradients are most likely to be a potential problem in addressing whether a proposed control strategy is sufficient to attain the 24-hour NAAQS for $PM_{2.5}$. This follows, because orientation of a source's plume varies. For many hours, one might expect to find no impact from such a source at a given location. Occasions with no likely impact tend to balance those large impacts occurring over some periods.

The $PM_{2.5}$ NAAQS rulemaking (U.S. EPA 1997a) as well as ambient monitoring rule language[56] indicates that high $PM_{2.5}$ concentrations occuring in "unique" population oriented areas should not be compared to the annual NAAQS and should only be compared to the 24-hour NAAQS (especially when caused by a single source). Furthermore, high $PM_{2.5}$ concentrations measured in non-population oriented areas should not be compared to either of the $PM_{2.5}$ NAAQS. $PM_{2.5}$ monitor siting guidance (U.S. EPA, 1997b) defines the appropriate scales of influence for the $PM_{2.5}$ monitoring network.

High primary PM concentrations can occur at (or near) existing monitors or in unmonitored areas. The modeled attainment test is primarily a monitor based test. As such, the

[56] 40 CFR part 58 subpart D 58.30

focus of the attainment test is whether attainment can be reached at existing monitors. To address the issue of $PM_{2.5}$ concentrations in unmonitored areas, we have recommended an "unmonitored area analysis" (see section 3.4). The unmonitored area analysis is intended to be the primary means for identifying high $PM_{2.5}$ concentrations outside of traditionally monitored locations. The spatial resolution of the modeling that is the underlying basis of the unmonitored area analysis will determine how well it addresses primary PM hotspot issues. The finer the resolution of the grid model, the more likely that primary PM hotspots will be recognized. Based on the monitoring guidance, we believe that an unmonitored area analysis conducted at 12km or finer resolution is sufficient to address unmonitored $PM_{2.5}$ for the annual NAAQS. Conducting the unmonitored analysis at 4km or finer resolution will provide an even more detailed analysis of the spatial gradients of primary $PM_{2.5}$, especially when evaluating violations of the 24-hr. NAAQS.

5.3.1 Analysis of Primary $PM_{2.5}$ Impacts at Monitors

Most $PM_{2.5}$ monitors are located at "urban scale" sites. These sites tend to represent relatively large spatial scales and do not have large gradients compared to other monitors in the area. Some sites are classified as "neighborhood" scale and may be influenced by more local sources. For reasons stated above, local influences creating spatial gradients are likely to consist mostly of primary $PM_{2.5}$ (OC, EC, and other primary particulates). These sources may be local point sources, or they may be nearby roads or other mobile or area sources.

It may be necessary to evaluate the impact of local primary PM sources for contributions to both the 24-hour and annual NAAQS. As stated earlier, it may not be appropriate to compare population oriented FRM sites that are dominated by point sources, to the annual NAAQS. But there are numerous cases where the impact from local sources is not dominant, but a sizable contributor to total $PM_{2.5}$ (~10-30% of total annual average $PM_{2.5}$). In these cases, a more refined analysis of the contribution of local primary $PM_{2.5}$ sources to $PM_{2.5}$ at the monitor(s) will help explain the causes of nonattainment at the monitor and may lead to the more efficient ways to attain the standard by controlling emissions from local sources.

There are several modeling tools that can be used to evaluate contributions of local $PM_{2.5}$ sources. A grid model can be run at very high resolution (down to 1 or 2 km) or a Gaussian dispersion can be used. Grid based models usually simulate chemical transformation and complex meteorological conditions, while dispersion models are generally more simplistic; being limited to a local-scale and using Gaussian approximations with little or no chemistry. Therefore, while dispersion models may not be an appropriate tool for determining secondary $PM_{2.5}$ concentrations, they work well for use in determining local primary $PM_{2.5}$ impacts in a small area. The model(s) and model setup should be evaluated to determine the most appropriate tools for a specific situation.

Regardless of which type of models are used to evaluate changes in primary $PM_{2.5}$ at monitors, we recommend that the model results be used in a relative manner. This is consistent with the already described attainment test. If a grid model is used at very high resolution, the attainment test as described in Section 5.1 should be followed. If a Gaussian dispersion model is used then the application of the attainment test will vary slightly. The test will need to combine results from the photochemical grid based modeled attainment test and the results from local-scale dispersion modeling. If such an approach is taken, the suggested variations on the attainment test are discussed in the following section.

5.3.2 Analysis of Primary $PM_{2.5}$ Impacts at Monitors using a Gaussian Dispersion Model

To apply a dispersion model in an attainment test, it becomes important to determine the local component of primary $PM_{2.5}$ at the monitor and the sources that are contributing to that component. There is no single, simple method for quantifying this contribution, but detailed analysis of ambient data and advanced data analysis techniques, such as receptor modeling, may help quantify the contribution. The simplest method for identifying the local component of $PM_{2.5}$ is to examine local ambient $PM_{2.5}$ concentrations. For this analysis, it is important to identify the local contributions from as small an area as possible. This will make it easier to identify contributing sources. It is most appropriate to examine monitored concentration differences between urban monitors (with the highest concentrations) and more suburban measurements. This is likely to be representative of the excess contribution from a relatively local area. "Urban excess" calculations which pair an urban monitor with a rural background monitor (U.S. EPA, 2004b) are more likely to indicate "local" contributions that may be more representative of an entire metropolitan area. In most cases, the local component will include contributions from more than one source.

Sources identified as contributing to the monitor will be modeled with a dispersion model (or alternatively, a very high resolution grid model) . It is common practice to run dispersion models for limited numbers of point sources in relatively small areas (out to a distance of ~50 km). Dispersion models can also be run with all sources of primary PM in a limited area (including mobile, non-road, and area sources).

When applying the model to evaluate changes in primary $PM_{2.5}$, one should determine the $PM_{2.5}$ species that make up the local primary particulate matter[57]. We recommend that the individual components of primary $PM_{2.5}$ are tracked separately in the dispersion model. This will allow more thorough evaluation of the dispersion modeling results (comparing model output to speciated ambient data) and may aid in the development of primary $PM_{2.5}$ control strategies.

The majority of the primary PM will consist of the primary portion of the organic carbon

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[57]The $PM_{2.5}$ emissions should be broken out into individual species using the best information available. Typically, SCC specific speciation profiles are used to "speciate" the PM into individual components. Local, source specific information should be used whenever possible.

component, elemental carbon (EC), and the general category of "other primary particulate matter" (OPP). In some cases, directly emitted sulfate (and in rare cases nitrate) may also be a significant component of the local primary $PM_{2.5}$.

The dispersion modeling results should be evaluated to ensure adequate model performance. Similar to grid modeling, the dispersion model results should be compared to ambient data to ensure that the model is working well. Although section 18 of this guidance is geared towards evaluating grid models, many of the same statistical calculations can be made for primary $PM_{2.5}$ and $PM_{2.5}$ components predicted by a Gaussian dispersion model. Since secondary $PM_{2.5}$ is often a large component of total $PM_{2.5}$ concentrations, it may be difficult to separate the primary and secondary components of ambient $PM_{2.5}$. EC and OPP should be considered to be primary $PM_{2.5}$. Much of the rest of the primary $PM_{2.5}$ concentration will be primary OC.

As part of the analysis, an estimated concentration of primary OC is needed. There are several methods available for estimating the primary vs. secondary portion of ambient OC. Among these are the EC tracer method and receptor modeling. The EC tracer method is the most common method used to estimate secondary and primary OC concentrations (Turpin, 1995), (Strader, 1999) (Cabada, 2004), (Chu, 2005), (Saylor, 2006) . The method uses measurements of OC and EC and calculated OC to EC ratios to identify periods when OC is likely to be mostly primary. This information is then used to calculate the secondary contribution to OC . Receptor models such as CMB and PMF have also been used to estimate secondary organic concentrations (Na, 2004), (Yuan, 2006).

The following sections discuss a suggested methodology for examining decreases or increases in PM concentrations due to local primary sources for the Annual and 24-hour $PM_{2.5}$ NAAQS. Because each nonattainment area has unique emissions sources and source-receptor relationships, States should work closely with their EPA Regional Office in developing local area analysis applications.

Methodology for the Annual $PM_{2.5}$ NAAQS

The suggested steps outlined below assume that the attainment test has been performed using the photochemical modeling and that the annual DV has been computed as discussed in Section 5.1.

(1) Identify local primary $PM_{2.5}$ sources that are thought to be are contributing to the monitor and causing non-attainment of the annual NAAQS.

(2) By quarter, identify at the monitor, primary versus secondary components of $PM_{2.5}$.

(3) Identify the percentage of total primary $PM_{2.5}$ at the monitor due to the local sources identified in (1). Convert the percentage to an estimated concentration in ug/m3

(4) Model with a dispersion model the current and future concentrations of these local sources using actual emissions.

-Place receptors at and near the monitor location(s)[58].

-The receptor spacing should be fine enough to get an accurate picture of the concentration at the monitor.

-Model the base year and future annual average

-For both base and future year use the same 1 year of met data – the same year as used for the photochemical modeling (if available, use more than 1 year of met data).

(5) From the modeling in (4), calculate quarterly RRFs[59] for total primary $PM_{2.5}$ modeled for the selected sources (using concentration values at receptors at monitors).

(6) Multiply the primary $PM_{2.5}$ identified in (3) by the RRFs from (5).

(7) Subtract the result in (6) from the primary $PM_{2.5}$ identified in (3)

(8) For each quarter, subtract the amount in (7) from the future year quarterly DV provided by the photochemical modeling.

(9) Average the four quarters to get an annual average DV.

Methodology for the 24-Hour NAAQS

The suggested steps outlined below assume that the attainment test has been performed using the photochemical modeling and that the quarterly DV's have been computed as discussed in Section 5.2. As with the annual design value, monitoring data for 5 years are used as the basis for the projection.

(1) Determine the local primary $PM_{2.5}$ sources that are thought to be contributing to the monitor for each of the 4 quarters[60].

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[58]Additional receptors should be placed near monitors to examine predicted concentration gradients. Receptors should only be located in areas that are appropriate for placing FRM monitors for comparison to the annual NAAQS (see EPA, 1997b).

[59]RRFs should be calculated as a ratio of the base and future mean concentrations (a ratio of the means, not a mean of the daily ratios).

[60]The selection of these sources should be representative of the 5-year period used to calculate the 5 year weighted average design values. If large emissions changes have occurred over the 5 year period then it may be necessary to determine the local contribution of identified

(2) For each of the four representative quarters, determine the primary versus secondary components of $PM_{2.5}$ at the monitor on the 98th percentile day and all high days.

(3) Identify percentage of total primary $PM_{2.5}$ at monitor due to the local sources identified in (1). Convert the percentage to an estimated concentration in ug/m3.

(4) Model with a dispersion model the current and future concentrations of these local sources using actual emissions that are representative of emissions on high $PM_{2.5}$ days[61].

- -Place receptors at and near the monitor location(s)[62].
- -The receptor spacing should be fine enough to get an accurate picture of the concentration at the monitor.
- -Model the base and future year.
- -For both base and future year use the same 1 year of met data used for the photochemical modeling (if available, use more than 1 year of met data).
- -Calculate the 24-hour average for each day. Average the high days[63] within each quarter to determine a modeled high concentration for each quarter in the base and future year.

(5) From the modeling in (4), calculate quarterly RRFs[64] for total primary $PM_{2.5}$ modeled for the selected sources.

(6) Multiply the primary $PM_{2.5}$ identified in (3) by the RRFs from (5).

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sources for each year. The identification of the contribution to the monitor should be most influenced by the modeling year (the middle year of the 5 year period) since it is the year being modeled and it has the strongest weighting in the design value calculations.

[61]Because the test is relative, in most cases, actual emissions should be used. The actual emissions should be representative of emissions on high $PM_{2.5}$ days (days that exceed the NAAQS). Since the absolute predicted concentrations are not used directly, allowable emissions may overestimate the changes in concentrations due to the identified sources. This should be evaluated on a case-by-case basis. Allowable emissions may be appropriate if there are sources that often emit above their typical levels on high $PM_{2.5}$ days.

[62]Additional receptors should be placed near monitors to examine predicted concentration gradients. Receptors should only be located in areas that are appropriate for placing FRM monitors for comparison to the 24-hour NAAQS (see EPA, 1997b).

[63]High days may be all days > 65 ug/m3 or the high end of the distribution of modeled days (e.g top 25% days)

[64]RRFs should be calculated as a ratio of the base and future mean concentrations (a ratio of the means, not a mean of the daily ratios).

(7) Subtract the result in (6) from the primary $PM_{2.5}$ identified in (3)

(8) For each of the 5 years used to calculate the 5 year weighted average design value, subtract the result from (7) from each quarter for each year. The "new" annual 98th percentile value is the highest quarterly concentration in each year.

(9) Average the annual 98th percentile concentrations to get 3 design values and then average the 3 DV to get the final future year 5 year weighted average DV.

Annual NAAQS Example:

For quarter 4, a monitor has a 5 year weighted mean concentration of 17.0 ug/m3.

(1) It is believed that several steel mills in the area are contributing to the local component of $PM_{2.5}$ at the monitor

(2) Based on comparisons to other monitors in the area, it is believed that the local $PM_{2.5}$ component at the monitor for quarter 4 is 2 ug/m3.

(3) Using receptor modeling, it is determined that, on average, the steel mills are contributing a local $PM_{2.5}$ component in quarter 4 of approximately 1 ug/m3.

(4) Modeling with a dispersion model shows the following contribution at the monitor from the identified local sources (steel mills):
Base: 2.0 ug/m3
Future: 1.5 ug/m3

(5) Quarter 4 RRF_local = 1.5/2.0 = 0.750.

(6) 1 ug/m3 * 0.750 = 0.75 ug/m3.

(7) 0.75 ug/m3 - 1 ug/m3 = -0.25 ug/m3 (total Q4 reduction from identified local sources is 0.25 ug/m3)

(8) Quarter 4 New DV = 17.0 – 0.25 ug/m3 = 16.75 ug/m3

(9) Steps 1-8 are repeated for each quarter with similar results. The annual DV = (Q1 New DV + Q2 New DV + Q3 New DV + Q4 New DV)/4

24 Hour NAAQS Example:

The baseline design values are calculated from the 5 year base period centered around the modeling year. The dispersion model is run with emissions and meteorology for year 3 (the center year of the 5 year period). The maximum quarterly values from the 5 years which are equal to or less than the 98th percentile concentration are as follows (from example 5.2):

	Year 1	Year 2	Year 3	Year 4	Year 5
Quarter 1	80.0 ug/m3	65.0	57.0	58.0	74.0
Quarter 2	67.6	45.5	46.4	45.3	52.2
Quarter 3	41.7	47.6	32.5	39.4	45.3
Quarter 4	52.8	68.4	71.3	49.5	64.2

The future year $PM_{2.5}$ concentrations from the photochemical modeling described in Section 5.2, Step 5 are as follows:

	Year 1	Year 2	Year 3	Year 4	Year 5
Quarter 1	72.6 ug/m3	58.9	51.6	52.5	67.1
Quarter 2	57.5	38.7	39.4	38.5	44.4
Quarter 3	38.8	44.3	30.2	36.6	42.1
Quarter 4	46.6	60.5	63.0	43.6	57.1

(1) It is believed that several steel mills in the area are contributing to the local component of $PM_{2.5}$ at the monitor

(2) Based on comparison to other monitors in the area, it is believed that the primary local $PM_{2.5}$ component at the monitor (on high PM days) is the following for each of the quarters in 2001:
Quarter 1: 15 ug/m3
Quarter 2: 13 ug/m3
Quarter 3: 8 ug/m3
Quarter 4: 20 ug/m3
It is believed that this is representative of the other four years within the 5-year period.

(3) Using receptor modeling, it is determined that the steel mills are contributing a local $PM_{2.5}$ component (on high PM days) of the following for each of the quarters in 2001:
Quarter 1: 8 ug/m3
Quarter 2: 4 ug/m3
Quarter 3: 4 ug/m3
Quarter 4: 5 ug/m3

It is believed that this is representative of the other four years within the 5-year period.

(4) Modeling with a dispersion model shows the following contribution at the monitor from the identified local sources (steel mills) for total primary $PM_{2.5}$ in each of the quarters in 2001:
Quarter 1: Base: 11.7 ug/m3   Future: 8.3 ug/m3
Quarter 2: Base: 6.3 ug/m3   Future: 4.4 ug/m3
Quarter 3: Base: 5.3 ug/m3   Future: 3.1 ug/m3
Quarter 4: Base: 8.3 ug/m3   Future: 6.2 ug/m3
For each quarter, we computed the 24-hr average for each day and computed the mean of the high days for each quarter to get the base and future year concentrations.

(5) Based on the results from the modeling in (4), the RRF values are:
Quarter 1: 8.3/11.7 = 0.709
Quarter 2: 4.4/6.3 = 0.698
Quarter 3: 3.1/5.3 = 0.585
Quarter 4: 6.2/8.3 = 0.747

(6) Multiplying the primary $PM_{2.5}$ identified in (3) by the RRFs from (5).
Quarter 1: 8 ug/m3 * 0.709 = 5.7 ug/m3
Quarter 2: 4 ug/m3 * 0.698 = 2.8 ug/m3
Quarter 3: 4 ug/m3 * 0.585 = 2.3 ug/m3
Quarter 4: 5 ug/m3 * 0.747 = 3.7 ug/m3

(7) Subtracting the result in (6) from the primary $PM_{2.5}$ identified in (3)
Quarter 1: 5.7 ug/m3 - 8 ug/m3 = -2.3 ug/m3
Quarter 2: 2.8 ug/m3 - 4 ug/m3 = -1.2 ug/m3
Quarter 3: 2.3 ug/m3 - 4 ug/m3 = -1.7 ug/m3
Quarter 4: 3.7 ug/m3 - 5 ug/m3 = -1.3 ug/m3

(8)Subtracting the result from (7) from each quarter for each of the five years:

Year 1:
Q1:   72.6 ug/m3 - 2.3 ug/m3 = 70.3 ug/m3
Q2: 57.5 - 1.2 = 56.3
Q3: 38.8 - 1.7 = 37.1
Q4: 46.6 - 1.3 = 45.3

Year 2:
Q1: 58.9 - 2.3 = 56.6
Q2: 38.7 - 1.2 = 37.5
Q3: 44.3 - 1.7 = 42.6
Q4: 60.5 - 1.3 = 59.2

Year 3:
Q1: 51.6 - 2.3 = 49.3
Q2: 39.4 - 1.2 = 38.2
Q3: 30.2 - 1.7 = 28.5
Q4: 63.0 - 1.3 = 61.7

Year 4:
Q1: 52.5 - 2.3 = 50.2
Q2: 38.5 - 1.2 = 37.3
Q3: 36.6 - 1.7 = 34.9
Q4: 43.6 - 1.3 = 42.3

Year 5:
Q1: 67.1 - 2.3 = 64.8
Q2: 44.4 - 1.2 = 43.2
Q3: 42.1 - 1.7 = 40.4
Q4: 57.1 - 1.3 = 55.8

The "new" 98^{th} percentile values are:

Year 1: 70.3
Year 2: 59.2
Year 3: 61.7
Year 4: 50.2
Year 5: 64.8

(9) Averaging the 3 design values:
DV1 = (70.3 + 59.2 + 61.7)/3 = 63.7
DV2 = (59.2 + 61.7 + 50.2)/3 = 57.0
DV3 = (61.7 + 50.2 + 64.8)/3 = 59.9

Averaging the 3 DV to get the final future year 5 year weighted average DV:
(63.7 + 57.0 + 59.9)/3 = 60.2 **= 60 ug/m3**

In the above examples, emissions reductions from steel mills were modeled with a dispersion model, which provided additional reductions to the future year 5 year weighted average annual and 24-hour design values. Changes in design values derived from photochemical modeling should be evaluated to determine the magnitude (on concentrations) of emissions changes from the flagged steel mills. The change in concentration in the photochemical model from emissions controls on the steel mills may need to be subtracted from the final design value to ensure that there is no double counting of emission reductions.

Double Counting

The methodology discussed above may result in double counting of local emissions sources and reductions. The change in emissions from local sources is counted once in the photochemical modeling and again in the dispersion modeling. There are several ways to account for this issue.

1) Run the photochemical model without the primary $PM_{2.5}$ emissions from the flagged sources in both the base case and future case(s).

2) Run the grid model with a source tagging approach. The flagged sources can be tagged so that their contribution in the grid model can be explicitly tracked (Douglas, 2006) (Environ, 2006a), (Environ, 2006b).

3) Employ a methodology to combine the results of the grid and dispersion models so that double counting is eliminated or minimized. Several techniques have been developed to do this (Isakov,2007).

4) Assume that double counting is small enough to be ignored.

The grid resolution of the photochemical model and the number of flagged sources in the dispersion model will determine the magnitude of the potential double counting. The higher the resolution of the grid model, the more double counting will be a problem (because the local sources will be more finely resolved). And the more sources that are flagged, the more double counting will be a problem. Therefore, the nature of the issue should be evaluated on a case by case basis. The simplest way to evaluate the magnitude of the problem is to run the photochemical model with and without the flagged sources from the dispersion model. This will indicate the maximum impact the sources can have on the photochemical modeling results. A very small impact means that double counting is not a problem. A large impact indicates that double counting needs to be explicitly accounted for.

Quality Assurance

As with any modeling exercise, it is important to quality assure the model inputs and outputs. In particular, we recommend a focused quality assurance check on emissions from sources flagged for a dispersion modeling analysis. Prior to applying a model, States should review available information to ensure that there are no major discrepancies between modeled estimates and nearby monitored data for particulate matter. The emission factors, activity data, and speciation profiles of the $PM_{2.5}$ emissions should also be analyzed for accuracy. If a speciation monitor exists, the speciated data from the monitor can be compared to the speciation profiles of the flagged sources. Receptor models can also be used as a QA tool. Discrepancies between receptor modeling results (which are based on analyzing ambient data) and speciated emissions may indicate a problem with the magnitude and/or the speciation of the emissions sources. If discrepancies are found, those implementing the modeling protocol (see section 12) should consult with the appropriate U.S. EPA regional office to reach agreement on what, if any, adjustments should be made to the emissions estimates for the identified sources.

It is also important to quality assure the model outputs. Modeling each species of primary $PM_{2.5}$ separately within the dispersion model should aid in this analysis, especially if the selected control strategies applied in the future year do not control each primary species to the same degree. If a speciation monitor exists, the speciated data from the monitor may also help quality assure the dispersion model results. However, the relative application of the dispersion model results will help to reduce the impact of possible over- or under-estimations by the dispersion model due to emissions, meteorology, or general selection of other model input parameters.

6.0 What Is The Recommended Modeling Analysis for Regional Haze?

In this section, we describe the recommended modeled test to assess visibility improvement. The visibility analysis has many similarities to the attainment tests described in Section 5. The recommended visibility analysis and the attainment tests both use monitored data to define current air quality. They divide $PM_{2.5}$ into major species, and component-specific relative response factors are multiplied by current monitored values to estimate future concentrations.

Section 6.1 provides background information on the requirements of the Regional Haze rule and defines the components of a reasonable progress analysis. The rest of the section describes the recommended modeling analysis which supports the regional haze rule.

6.1 Regional Haze Rule Background

Section 169A of the Clean Air Act states "Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution." Section 169B calls for EPA to "carry out the Administrator's regulatory responsibilities under [section 169A], including criteria for measuring 'reasonable progress' toward the national goal."

In response to these mandates, EPA promulgated the regional haze rule (RHR) on July 1, 1999.[65] Under section 51.308(d)(1) of this rule, States must "establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions for each Class I area within a State". These reasonable progress goals must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period.[66] Reasonable Progress Goals (RPGs), measured in deciviews, are interim goals that represent incremental visibility improvement over time toward the goal of natural background conditions and are developed in consultation with other affected States and Federal Land Managers.[67]

In determining what would constitute reasonable progress, section 169A(g) of the Clean Air Act requires States to consider the following four factors:

- The costs of compliance;
- The time necessary for compliance;
- The energy and non-air quality environmental impacts of compliance; and

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[65] 64 FR 35714 (codified at 40 CFR 51.300-309).

[66] 40 CFR 51.308(d)(1).

[67] 40 CFR 51.308(d)(1)(iv) and 51.308(i).

- The remaining useful life of existing sources that contribute to visibility impairment.[68]

States must demonstrate in their SIPs how these factors are taken into consideration in selecting the RPG for each Class I area in the State. More details on the setting of RPGs and the appropriate use of the four factors is contained in "Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program" (U.S. EPA, 2007).

The regional haze rule also establishes an additional analytical requirement in the process of establishing RPG. States are required to determine the rate of improvement in visibility needed to reach natural conditions by 2064, and to set each RPG taking this "glidepath" into account.[69] The glidepath is the amount of visibility improvement needed in each review period to stay on a linear path towards visibility improvement to natural conditions by 2064. The glidepath represents a linear or uniform rate of progress. Therefore, the amount of visibility improvement needed to stay on the glidepath is also referred to as "uniform rate of progress". This document uses the terms "glidepath" and "uniform rate of progress" interchangeably.

This document focuses on the modeling analysis required to assess future visibility improvement relative to the glidepath or uniform rate of progress (for each Class I area). As mentioned previously, this document does not address the process of setting and evaluating reasonable progress goals. The actual determination of reasonable progress is a multi-step process which looks at the uniform rate of progress, the predicted rate of progress, and the four factor test. In the end, the reasonable progress goal will be determined by the states for each Class I area by considering the factors and the modeling analysis. The results of the modeling analyses will be one of several components in the determination of reasonable progress.

6.2 Uniform Rate of Progress

Regional haze is calculated by estimating light scattering and absorption by components of $PM_{2.5}$. Baseline conditions represent the visibility conditions which exist for the best and worst days at the time the regional haze program is established for each Class I area. Once established, the baseline represents the starting point from which the uniform rate of progress will be measured. The RHR also requires an estimate of "natural conditions" for each Class I area which represents the visibility conditions that would exist in the absence of man-made impairment.

As explained in the RHR, the baseline for each Class I area is the average visibility (in deciviews) for the 20% most impaired days, or "worst days", and for the 20% least impaired days, or "best days," for the years 2000 through 2004[70].

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[68] 42 U.S.C. § 7491(g)(1); 40 CFR 51.308(d)(1)(i)(A).

[69] 40 CFR 51.308(d)(1)(i)(B).

[70] 64 FR at 35730.

States are asked to calculate the reduction in deciviews (on the worst visibility days) by an amount which is proportional to the number of years between the base period and the first review period vs. the number of years between the base period and 2064. This establishes the glidepath or uniform rate of progress. For example, if a Class I area's mean worst visibility during the 2000-2004 base period were 35 *deciviews* and natural background were estimated to be 8 *deciviews*, the glidepath for 2018 would be to reduce visibility impairment on the worst days by 6.3 *deciviews* (i.e., [35 -8][(2018-2004)/(2064-2004)]). More detailed examples of this calculation are contained in (U.S. EPA, 2003b).

The goal of the regional haze program is to return to natural conditions by 2064, and States are required to demonstrate, by the end of the first planning period (2018), reasonable progress toward meeting that goal. The U.S. EPA has developed guidance on how to track visibility for the regional haze rule (U.S. EPA, 2003b). In Section 6.3, we describe how the ambient trends in regional haze will be determined. The modeling assessment for uniform rate of progress needs to provide a good predictor for what the trend in observed air quality will be in the future. This is most likely to happen if we reproduce the calculations which will be applied to the ambient observations as closely as practical. In Section 6.4, we present and recommend a modeling analysis which closely replicates the ambient data analysis. Section 6.5 addresses how to develop key inputs for the recommended modeling assessment of uniform rate of progress.

6.3 How are Regional Haze Trends Measured?

Regional haze is measured by an *extinction coefficient* (b_{ext}) which represents light attenuation resulting from scattering and absorption of light from ambient particulate matter plus scattering of light due to gas molecules in the air (i.e., Rayleigh scattering). Although b_{ext} can be estimated by several different methodologies, the regional haze rule requires that it be estimated using measured ambient particulate matter. This follows since, for a given set of meteorological conditions, visibility can be improved by reducing concentrations of ambient particulate matter. Thus, deriving b_{ext} in this manner provides a direct link between regional haze and related pollutant concentrations. Equation (6.1) may be applied in each Class I area to estimate b_{ext} (Sisler, 1996, IMPROVE, 2000). The equation reflects empirical relationships derived between measured mass of particulate matter components and transmissometer measurements of b_{ext} at monitoring sites in Class I areas within the IMPROVE network.

$$\mathbf{b_{ext} = 3(\mathit{f(rh)})[SO_4] + 3(\mathit{f(rh)})[NO_3] + 4(\mathit{f'(rh)})[OC] + 10[EC] + 1[Fine\ Soil] + 0.6[CM] + b_{rayleigh}} \quad \textbf{(6.1)}$$

where

the numerical coefficients on the right hand side of the equation represent the light scattering or absorption efficiency, m^2/gm of the corresponding component of particulate matter, *f(rh), f'(rh)* are relative humidity adjustment factors applied to the light scattering efficiency (to be described in greater detail shortly), dimensionless,

SO_4 is the mass associated with sulfates, ug/m^3,

NO_3 is the mass associated with nitrates, ug/m^3,

OC is the mass associated with organic carbon, ug/m^3,

EC is the mass associated with elemental carbon, ug/m^3,

Fine Soil is inorganic primary particulate matter (excluding primary sulfate and nitrate particles) associated with soil components with aerodynamic diameter $\leq$ 2.5 um, $\mu g/m^3$,

CM is coarse particulate matter with aerodynamic diameter > 2.5 um, but $\leq$ 10 um, ug/m^3,

$b_{rayleigh}$ is light-scattering attributable to Rayleigh scattering, Mm^{-1} (i.e., inverse "mega-meters"), assumed to be 10 Mm^{-1}.

b_{ext} is the estimated extinction coefficient, Mm^{-1}.

New IMPROVE Algorithm

The IMPROVE program has recently revised the IMPROVE algorithm (IMPROVE, 2006); (Hand, 2006) . The new algorithm is intended to reduce biases in light extinction estimates compared to the old algorithm. The new algorithm is somewhat more complicated than the old algorithm as follows:

$$\begin{aligned}
\textbf{bext} \approx\ & \mathbf{2.2 \times f_s(RH) \times [Small\ Sulfate] + 4.8 \times f_L(RH) \times [Large\ Sulfate]} \\
& \mathbf{+ 2.4 \times f_s(RH) \times [Small\ Nitrate] + 5.1 \times f_L(RH) \times [Large\ Nitrate]} \\
& \mathbf{+ 2.8 \times \{Small\ Organic\ Mass] + 6.1 \times [Large\ Organic\ Mass]} \\
& \mathbf{+ 10 \times [Elemental\ Carbon]} \\
& \mathbf{+ 1 \times [Fine\ Soil]} \\
& \mathbf{+ 1.7 \times f_{ss}(RH) \times [Sea\ Salt]} \\
& \mathbf{+ 0.6 \times [Coarse\ Mass]} \\
& \mathbf{+ Rayleigh\ Scattering\ (site\ specific)} \\
& \mathbf{+ 0.33 \times [NO_2\ (ppb)]} \qquad \mathbf{[6.2]}
\end{aligned}$$

The total sulfate, nitrate and organic carbon compound concentrations are each split into two fractions, representing small and large size distributions of those components. The organic mass concentration used in the new algorithm is 1.8 times the organic carbon mass concentration, changed from 1.4 times carbon mass concentration used for input into the old IMPROVE algorithm. New terms have been added for sea salt (important for coastal locations) and for absorption by NO_2 (only used where NO_2 data are available). Site-specific Rayleigh scattering is calculated for the elevation and annual average temperature of each IMPROVE monitoring site.

The apportionment of the total concentration of sulfate compounds into the concentrations of the small and large size fractions is accomplished using the following equations.

[Large Sulfate] = [Total Sulfate]/20 ug/m3 x [Total Sulfate], for [Total Sulfate] < 20 ug/m3

[Large Sulfate] = [Total Sulfate], for [Total Sulfate] ≥ 20 ug/m3

[Small Sulfate] = [Total Sulfate] - [Large Sulfate]

The same equations are used to apportion total nitrate and total organic mass concentrations into the small and large size fractions.

Sea salt is calculated as 1.8 x [Chloride] or 1.8 x [Chlorine] if the chloride measurement is below detection limits, missing or invalid. The algorithm also uses three new water growth adjustment terms. They are for use with the small size distribution and the large size distribution sulfate and nitrate compounds and for sea salt ($f_S(RH)$, $f_L(RH)$ and $f_{SS}(RH)$ respectively).

Testing of the new algorithm reveals that, in most regions of the country, the new equation gives somewhat higher light extinction, especially on the worst visibility days. But compared to the old equation, the relative percentage of extinction attributed to the various PM components is nearly unchanged. Therefore, the revised equation is not expected to make a large difference in the rate of visibility changes resulting from potential control strategy simulations. However, the new equation could lead to differences in the relative change in light extinction predicted by the models. Either of the IMPROVE equations are acceptable for use in reasonable progress analyses, although States should provide documentation concerning the choice of equation, especially in situations where large differences are noted between the new and old[71].

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[71]Both algorithms can be independently used to estimate changes in extinction between a base period and a future year. But the same algorithm needs to be used in each calculation (don’t use the old algorithm to calculate base extinction and the new algorithm to calculate future extinction or vice versa). Also, the same algorithm should be used to calculate the

Deciview Haze Index

The regional haze rule stipulates that reasonable progress is to be measured in terms of changes in a deciview haze index or simply "deciviews"(dv). Deciviews are defined as the natural logarithm of the ratio of the extinction coefficient to Rayleigh scattering (Pitchford and Malm, 1994)

$$\textbf{Deciview} = \mathbf{10\ ln(b_{ext}/10)} \qquad (6.3)$$

Where the units of b_{ext} and light scattering due to Rayleigh scattering[72] (i.e., the "10" in the denominator of the logarithmic expression) are both expressed in Mm^{-1}.

A *change* in deciviews, which is how we track progress is given by Equation (6.4). A 1 deciview change is equivalent to ~10% change in b_{ext}.

$$\mathbf{\Delta dv = dv_{future} - dv_{baseline}} \qquad (6.4)$$

A negative number indicates a reduction in deciviews, which is an improvement in visibility.

Estimating Mass Associated With Components Of Particulate Matter.

Regional haze calculations for the modeled uniform rate of progress analysis utilizes IMPROVE measurements at Class I areas. All Class I areas have on-site speciated $PM_{2.5}$ measurements or have been assigned a representative IMPROVE monitoring site with measurements[73]. Therefore, it is generally not necessary to interpolate measured $PM_{2.5}$ species data to a site. The existing IMPROVE database of $PM_{2.5}$ measurements should be adequate to provide data for all Class I areas[74].

FRM data is not used in the regional haze analysis. Therefore, it is not necessary for the sum of species components to equal gravimetric measurements obtained with a Federal

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glidepath (using ambient data) and the modeled visibility changes.

[72]Even though the "new" IMPROVE equation uses a site specific Rayleigh Scattering value, the denominator in the deciview equation should always be 10. In this way, the deciview calculation will be consistent across all Class I areas. Under very clean conditions, the deciview value can be negative, but this should not be considered a problem.

[73]See U.S. EPA 2003b, Appendix A, Table A-2.

[74]There may be a few IMPROVE sites that don't have enough complete data to provide baseline condition information for the 2000-2004 period. It may be necessary to substitute data from other monitoring networks or to interpolate data to the site(s).

Reference or equivalent method for measuring $PM_{2.5}$. Therefore, for regional haze calculations, it is not necessary to use the speciated data adjustment procedures introduced in Section 3 (the "SANDWICH" adjustments).

Sisler (1996) has developed a set of default assumptions[75] for mass associated with each of the components of particulate matter for Equation (6.1). These are presented in Table 6.1. The components in Table 6.1 are similar to those used in the modeled attainment demonstrations for the $PM_{2.5}$ NAAQS. Notice however, that sulfate and nitrate mass are assumed to be fully neutralized (therefore, ammonium is not needed as a separate component); organic carbon is assumed to be equal to 1.4 times **measured** OC mass (1.8 times OC in the new IMPROVE equation); there is no water component; and there is a term for coarse particulate matter.

Table 6.1. Default Assumptions Used To Derive Aerosol Species Concentrations For Estimating Extinction Coefficients

(1) Species	(2) Formula	(3) Assumptions
Sulfate	4.125 (measured sulfur) or 1.375 (measured SO4)	All elemental sulfur is from sulfate, & all sulfate is from ammonium sulfate
Nitrate	1.29 (measured nitrate)	Denuder efficiency is ~100% & all nitrate is from ammonium nitrate
EC	high + low temperature EC	All high temperature carbon is elemental
OC	1.4 (organic carbon) or 1.8* OC for the new IMPROVE equation	Average organic molecule is 70% carbon
Fine Soil	2.2(Al) + 2.49(Si) + 1.63(Ca) + 2.42(Fe) + 1.94(Ti)	(Soil K)=0.6(Fe), FeO & Fe_2O_3 are equally abundant, a factor of 1.16 is used for MgO, Na_2O, H_2O & CO_3
$PM_{2.5}$	measured gravimetrically	Represents dry ambient fine aerosol mass for continental sites
CM (coarse mass)	$(PM_{10}) - (PM_{2.5})$	Consists only of insoluble soil particles

[75]The default assumptions in table 6.1 are applicable to the "old" IMPROVE equation. The new IMPROVE equation assumes that OCM= 1.8 x [OC] and sea salt = 1.8 x [chloride].

Normalizing trends in regional haze- f(rh) factors. It is clear from equations 6.1 and 6.2 that relative humidity can have a substantial effect on estimated extinction coefficients, as well as on the relative importance of changes in different components of particulate matter can have on trends in regional haze. Because of the importance of relative humidity as a determinant of regional haze, it is necessary to normalize any apparent trend in the estimated extinction coefficient for differences in relative humidity. This enables us to assess whether an emissions control strategy will reduce regional haze, without confounding effects of different relative humidity during the base and future periods.

There are two obvious potential ways to normalize trends in visibility for changes in relative humidity. The first is to assume that the same day to day changes in relative humidity which were observed in the base period calculations will occur in future years. Thus, one would use the relative humidity observations made on a specific day together with measured components of particulate matter on that day to compute the day specific visibility extinction coefficient on that day. Subject to the uncertainties posed by the empirically derived coefficients in Equation (6.1), this approach is the most likely to identify the 20% best and worst visibility days during the base period at a Class I site. However, the approach could lead to misleading conclusions if humidity observations were missing for some days or if the humidity observations are atypical in some way. Further, if a State or regional planning organization wanted to perform visibility calculations in a number of Class I areas, they would need to obtain hourly relative humidity data for each area.

The second approach to normalize trends in the extinction coefficient is to review relative humidity data over a long period of record to derive climatological estimates for relative humidity adjustment factors. These climatological estimates would then be used in Equations 6.1 and/or 6.2 to estimate visibility extinction coefficients. These estimates are more likely to reflect "typical" relative humidity at different times of year and, thus, expected future visibility extinction.

The need to use climatological f(rh) data for tracking progress of measured data is obvious. The measured relative humidity on the 20% worst days in a baseline period will be different than the measured relative humidity in a future period. Therefore the only way to normalize for relative humidity is to use a single climatological value. In the context of modeling, there is a choice. We can use climatological data or we can use the modeled (or measured) relative humidity data from the air quality model. Since the meteorological data is held constant when predicting future year air quality, the modeled relative humidity values would also be constant. This would be one way to normalize the data.

Throughout this section we make every attempt to be consistent with the "Guidance for Tracking Progress Under the Regional Haze Program"(hereafter referred to as the "Tracking Guidance") (U.S. EPA, 2003b). It will be easier to interpret the modeling results and compare them to future measured values, if the data are calculated in the same manner. We therefore recommend using climatological f(rh) values to calculate baseline and future visibility. Appendix A (Table A-1) from the Tracking Guidance displays the relationship between relative humidity and f(rh) values. The f(rh) values were calculated from data reported by Tang (1996). The f(rh) values are 1.00 up to 36% relative humidity and grow to a maximum value of 7.40 at a relative humidity of 95%[76]. The Tracking Guidance contains monthly climatological average f(rh) values for each Class I area. These values were calculated using 10 years of meteorological data.

For calculations with the new IMPROVE equation, three separate f(rh) curves are needed. These can be found in (Hand, 2006). The monthly f(rh) values for both the old and new IMPROVE equations have been incorporated into precalculated daily extinction and deciview data that can be found on the Visibility Information Exchange Web System (VIEWS) website (http://vista.cira.colostate.edu/views/). The use of precalculated f(rh) and visibility data will make it more simple for States and RPOs to calculate visibility changes and will also provide for more consistency.

6.4 How Do I Apply A Model To Calculate Changes in Visibility ?

The purpose of a modeling assessment of uniform rate of progress is to determine if a proposed control strategy will result in uniform rate of progress being met when measured concentrations of particulate matter are used to estimate visibility impairment at some future date. The analysis we recommend has 6 steps.

1. For each Class I area, rank visibility (in deciviews) on each day with observed speciated $PM_{2.5}$ data plus PM_{10} data for each of the 5 years comprising the base period.

2. For each of the 5 years comprising the base period, calculate the mean deciviews for the 20% of days with worst and 20% of days with best visibility. For each Class I area, calculate the 5 year mean deciviews for worst and best days from the five year-specific values.

3. Use an air quality model to simulate base period emissions and future emissions. Use the resulting information to develop relative response factors for each component of particulate matter identified on the right hand side of Equations (6.1) and/or (6.2).

4. Multiply the relative response factors times the measured species concentration data during the base period (for the measured 20% best and worst days). This results in daily future year species concentrations data.

5. Using the results in Step 4 and the IMPROVE algorithm (equation 6.1 or 6.2), calculate the future daily extinction coefficients for the 20% best and 20% worst visibility days in each of the five base years.

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[76]For the regional haze calculations, the f(rh) factors have been capped at the f(rh) value associated with 95% relative humidity. Relative humidity value above 95% use the same value.

6. Calculate daily deciview values (from total daily extinction) and then compute the future average mean deciviews for the worst and best days for each year. Then average the 5 years together to get the final future mean deciview value for the worst and best days.

We describe each of these steps more fully below. The methodology follows the same basic procedures outlined in the "Tracking guidance." Further details (for steps 1 and 2) can be found in that document. We conclude this subsection with an example illustrating the recommended modeled uniform rate of progress analysis.

Step 1. Using monitored data, rank baseline visibility for each day with PM_{10}, $PM_{2.5}$ and speciated $PM_{2.5}$ measurements within a Class I area

Ranking should be performed separately for each of the 5 years comprising the base period[77]. The deciview (dv) should serve as the basis for ranking. Day-specific observations for mass associated with SO_4, NO_3, OC, EC, soil, and CM, as defined in Table 6.1, should be used to calculate b_{ext} for each day. The appropriate month- and area-specific climatological relative humidity adjustment factor(s) (*f(rh)*) should be used. Total b_{ext} for all components should be converted to deciviews for each day to get a daily deciview value.

Step 2. Calculate the average baseline deciviews for the 20% of days with worst and the 20% days with best visibility.

For each of the 5 years in the base period, order all days considered in Step 1 from worst (highest deciview value) to best (lowest deciview value) visibility. For each year, note the 20% of days with worst and the 20% of days with best visibility. Calculate the arithmetic mean deciview value for the identified 20% worst- and best visibility days in each year. Average the resulting 5 yearly mean deciview values reflecting worst visibility. This represents the value subject to improvement (i.e., reduction) to meet the glidepath for regional haze. Average the 5 yearly mean deciview values reflecting mean visibility on the days with best visibility.

Step 3. Estimate relative response factors (RRF) for each component of $PM_{2.5}$ and for CM.

This should be done by using emissions during the base period in air quality model simulations performed for a large number of days[78]. Air quality corresponding with future

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[77]Pre-calculated and ranked extinction and deciview calculations for all Class I areas for the base period 2000-2004 (using both the "old" and "new" IMPROVE algorithms) are available on the VIEWS website at http://vista.cira.colostate.edu/views/. This data can be used to satisfy steps 1 and 2.

[78]How many and which days to simulate is discussed in Section 6.3 and in Section 14.1.

emissions (reflecting effects of growth and controls) should be simulated for the same days. Take the (temporal) arithmetic mean concentration for each $PM_{2.5}$ component (and coarse mass) computed near the Class I monitoring site with future emissions and divide this by the corresponding arithmetic mean concentration for each component obtained with current emissions. The resulting quotients are the component-specific RRF's. A separate set of RRF values are calculated for the "worst" and "best" visibility days identified in step 2. The RRFs are calculated using the identified 20% best and 20% worst **monitored days** at each Class I area. This will likely be a different set of days at each monitor.

Step 4. Using the RRFs and ambient data, calculate future year daily concentration data for the best and worst days.

Multiply the relative response factors derived in Step 3 times measured daily concentration data for each component of $PM_{2.5}$ and CM to get future daily estimates of species concentrations for $PM_{2.5}$ components and CM on "worst visibility" and "best visibility"days. These multiplications produce future concentration estimates for SO_4, NO_3, OC, EC, Soil and CM for each of the previously selected "worst" and "best" visibility days. This calculation is performed for each best and worst day for the five year period using an RRF for each PM component (a separate set of RRFs for the best days and the worst days)
.

Step 5. Use the information developed in Step 4 to compute future year daily bext values for the best and worst days.

Use the future year concentration data calculated in step 4 to calculate future year daily b_{ext} values for each PM component for each of the best and worst days for the five year period. This is accomplished by applying either the old or new IMPROVE visibility algorithm (equations 6.1 and 6.2).

Step 6. Use the daily total bext values from step 5 to calculate future mean deciview values for the best and worst days.

The total daily b_{ext} for each day is converted to deciviews. This gives a future year daily deciview value for each of the best and worst days.

Next, compute the arithmetic mean future deciview value for the "worst" and "best" visibility days for each year. This leads to 5 future estimated mean deciview values for the "worst" and 5 future estimated mean deciview values for the "best" visibility days. Compute the arithmetic mean of the 5 mean values for deciviews on the "worst" days, and the arithmetic mean of the 5 mean deciview values estimated for the "best" visibility days.

The resulting 5 year average mean values for deciviews on "worst" and "best" visibility days can be compared to the baseline mean deciview values calculated in step 2. If the resulting change in deciviews is a negative number (future - base), this represents an improvement in visibility. Compare the change in visibility to the previously calculated uniform rate of progress value for each Class I area.

Example 6.2

We use example 6.2 to illustrate the modeled uniform rate of progress assessment. For ease of presentation, we assume there are only 10 speciated samples for PM in the first of 5 years comprising the base period. Since sampling will occur every third day, we anticipate a usual sample size of about 120 days per year. We go through the calculations for the first base year and then furnish information regarding mean deciviews for the other four base years to illustrate subsequent steps in the test. The example uses the old IMPROVE algorithm. The procedure is the same for the new IMPROVE algorithm.

Given:

Ten days have measured components of PM in a Class I area during the first year of a 5-year base period. Table 6.2 below shows the measurements (in $\mu g/m^3$) for each of the 10 days. Table 6.2 also shows the date of each measurement and the corresponding climatological relative humidity adjustment factor (made up for this example) for the appropriate month and area.

Table 6.2

Day	**Date**	***f(rh)***	**SO_4 ($\mu g/m^3$)**	**NO_3 ($\mu g/m^3$)**	**OC ($\mu g/m^3$)**	**EC ($\mu g/m^3$)**	**Soil ($\mu g/m^3$)**	**CM ($\mu g/m^3$)**
1	**2/15**	1.7	4.53	2.23	3.37	0.89	0.32	7.33
2	**3/15**	2.9	5.12	1.78	2.92	0.78	0.44	9.17
3	**4/15**	3.5	5.67	1.25	2.44	0.54	0.43	10.25
4	**5/15**	3.7	6.59	1.12	2.86	0.50	0.66	9.80
5	**6/15**	4.3	7.47	0.93	3.49	0.61	0.98	10.99
6	**7/15**	4.6	8.33	0.79	3.50	0.69	1.08	11.38
7	**8/15**	4.4	9.22	0.89	3.24	0.67	0.89	10.78
8	**9/15**	4.1	8.05	0.97	3.12	0.73	0.71	8.25
9	**9/30**	4.1	6.84	1.15	3.21	0.85	0.42	8.82
10	**10/30**	2.7	5.32	1.41	3.26	0.76	0.64	8.11

The following uniform rate of progress has been calculated: (a) mean visibility on the 20% of days with worst visibility should be improved by 2.0 deciviews; (b) mean visibility on the 20% of days with best visibility should not deteriorate.

Find: Is the control strategy simulated in this model analysis sufficient to meet the uniform rate of progress in this Class I area?

Solution:

Step 1. Using monitored data, rank baseline visibility for each day with PM_{10}, $PM_{2.5}$ and speciated $PM_{2.5}$ measurements within a Class I area.

First, estimate the extinction coefficient for each day with the needed PM measurements. This is done using the information in table 6.2 with Equation (6.1). For day 1 in year 1, the current extinction coefficient is:

$$b_{ext} = (3)(1.7)[4.53] + (3)(1.7)[2.23] + (4)(1)[3.37] + (10)[0.89] + (1)[0.32] + (0.6)[7.33] + 10$$

$$b_{ext} = 71.6 \text{ Mm}^{-1}$$

Then convert extinction into deciviews:

$$dv = 10 * \ln(71.6/10) = 19.7 \text{ dv}$$

Current extinction coefficients and deciviews for the remaining 9 days with monitored data in year 1 are calculated in a similar manner. The days are then ranked. The day with the highest deciviews (i.e., worst visibility) is given a rank of "1". The results of these calculations are displayed in the table 6.3 below. Based on these rankings, days 6 and 7 comprise the 20% of days with worst visibility. Days 1 and 10 comprise the 20% of days with best visibility

Table 6.3

Day	Date	*f(rh)*	SO_4 (Mm^{-1})	NO_3 (Mm^{-1})	OC (Mm^{-1})	EC (Mm^{-1})	Soil (Mm^{-1})	CM (Mm^{-1})	b_{ext} baseline (Mm^{-1})	Deciviews	Rank
1	2/15	1.7	23.1	11.4	13.5	8.9	0.3	4.4	*71.6*	*19.7*	*10*
2	3/15	2.9	44.5	15.5	11.7	7.8	0.4	5.5	*95.5*	*22.6*	*8*
3	4/15	3.5	59.5	13.1	9.8	5.4	0.4	6.2	*104.4*	*23.5*	*7*
4	5/15	3.7	73.1	12.4	11.4	5.0	0.7	5.9	*118.6*	*24.7*	*6*
5	6/15	4.3	96.4	12.0	14.0	6.1	1.0	6.6	*146.0*	*26.8*	*4*
6	7/15	4.6	115.0	10.9	14.0	6.9	1.1	6.8	*164.7*	*28.0*	*2*
7	8/15	4.4	121.7	11.7	13.0	6.7	0.9	6.5	*170.5*	*28.4*	*1*
8	9/15	4.1	99.0	11.9	12.5	7.3	0.7	5.0	*146.4*	*26.8*	*3*
9	9/30	4.1	84.1	14.1	12.8	8.5	0.4	5.3	*135.3*	*26.1*	*5*
10	10/30	2.7	43.1	11.4	13.0	7.6	0.6	4.9	*90.7*	*22.0*	*9*

Step 2. Calculate the average baseline deciviews for the 20% of days with worst visibility and the 20% days with best visibility.

For year 1, mean worst visibility = (28.0 + 28.4) / 2 = 28.2 dv, and

mean best visibility = (19.7 + 22.0) / 2 = 20.9 dv

Mean worst and best visibility for years 2-5 is provided in table 6.4. Table 6.4 below summarizes mean worst and best visibility for each of the 5 years in the base period.

Table 6.4

Year	**Mean $dv_{current}$, Worst Visibility Days**	**Mean $dv_{current}$, Best Visibility Days**
1	**28.2**	**20.9**
2	**29.1**	**20.4**
3	**30.2**	**18.7**
4	**27.8**	**19.1**
5	**28.5**	**19.5**

The "average mean baseline worst and best visibility" is obtained by taking the arithmetic average of the mean worst and best visibility for the 5 years. Thus, the average mean worst visibility is given by

$dv_{baseline}$ = (28.2 + 29.1 + 30.2 + 27.8 + 28.5) / 5 = **28.8 dv**

The average mean best visibility is

$dv_{baseline}$ = (20.9 + 20.4 + 18.7 + 19.1 + 19.5) / 5 = **19.7 dv**

Step 3. Apply a model to develop component specific RRF's for SO_4, NO_3, OC, EC, Soil and for coarse mode particulate matter (CM).

Tables 6.5 and 6.6 show the procedure for calculating component-specific relative response factors using an air quality model. Component-specific relative response factors are computed as described in Section 4.3. The example shows the calculation of RRFs for the worst days in the year modeled. The same calculation is repeated for the best days.

Table 6.5 Base year modeled species concentrations on worst days (in ug/m3)

Modeled Output	SO_4	NO_3	OC	EC	Soil	CM
Day 1	2.12	6.54	3.56	0.87	1.23	5.43
Day 2	8.33	2.11	4.67	1.23	0.34	7.32
Day 3	9.33	1.23	6.32	1.45	0.87	8.21
Day 4	6.43	1.67	4.56	0.54	1.07	4.67
Day 5	10.53	0.57	4.12	0.69	1.54	10.32
Mean Base Concentration	**7.35**	**2.42**	**4.65**	**0.96**	**1.01**	**7.19**

Table 6.6 Future year modeled species concentrations on worst days (in ug/m3)

Modeled Output	SO_4	NO_3	OC	EC	Soil	CM
Day 1	2.01	4.23	3.45	0.77	1.21	5.75
Day 2	7.56	1.89	4.55	1.01	0.32	7.54
Day 3	6.54	1.11	5.99	1.09	1.02	8.71
Day 4	5.32	1.45	4.23	0.35	1.1	5.02
Day 5	7.23	0.43	3.99	0.45	1.51	10.47
Mean Future Concentration	**5.73**	**1.82**	**4.44**	**0.73**	**1.03**	**7.50**

Worst days RRF	SO_4	NO_3	OC	EC	Soil	CM
RRF (mean future/mean base)	**0.780**	**0.752**	**0.956**	**0.768**	**1.022**	**1.043**

Step 4. Multiply the relative response factors times the measured daily species concentration data during the base period to compute future daily species concentrations.

In year 1, we previously identified days 6 and 7 as those included in the 20% of days with worst visibility (i.e., see Step 1). Similarly, days 1 and 10 are the 20% of days with best visibility. In this step, we need to estimate future concentrations for components of $PM_{2.5}$ and for CM for these two sets of days. This is done using information shown in tables presented in Steps 1 and 3 as well as the best days RRFs given in table 6.7 below:

Table 6.7

Best days RRF	SO_4	NO_3	OC	EC	Soil	CM
RRF (mean future/mean base)	**0.870**	**0.823**	**0.976**	**0.784**	**1.112**	**1.058**

Worst Days

Day 6: $[SO_4]_{future}$ = $(RRF)_{SO4}$ $[SO_4]_{baseline}$ = (0.780) [8.33] = 6.50 µg/m^3
$[NO_3]_{future}$ = (0.752) [0.79] = 0.59 µg/m^3
$[OC]_{future}$ = (0.956) [3.50] = 3.35 µg/m^3
$[EC]_{future}$ = (0.768) [0.69] = 0.53 µg/m^3
$(Soil)_{future}$ = (1.022) [1.08] = 1.10 µg/m^3
$[CM]_{future}$ = (1.043) [11.38] = 11.87 µg/m^3

Day 7: $[SO_4]_{future}$ = (0.780) [9.22] = 7.19 µg/m^3
$[NO_3]_{future}$ = (0.752) [0.89] = 0.67 µg/m^3
$[OC]_{future}$ = (0.956) [3.24] = 3.10 µg/m^3
$[EC]_{future}$ = (0.768) [0.67] = 0.51 µg/m^3
$(Soil)_{future}$ = (1.022) [0.89] = 0.91 µg/m^3
$[CM]_{future}$ = (1.043) [10.78] = 11.24 µg/m^3

Best Days

Day 1: $[SO_4]_{future}$ = (0.870) [4.53] = 3.94 µg/m^3
$[NO_3]_{future}$ = (0.823) [2.23] = 1.84 µg/m^3
$[OC]_{future}$ = (0.976) [3.37] = 3.29 µg/m^3
$[EC]_{future}$ = (0.784) [0.89] = 0.70 µg/m^3
$(Soil)_{future}$ = (1.112) [0.32] = 0.36 µg/m^3
$[CM]_{future}$ = (1.058) [7.33] = 7.76 µg/m^3

Day 10: $[SO_4]_{future}$ = (0.870) [5.32] = 4.63 µg/m^3
$[NO_3]_{future}$ = (0.823) [1.41] = 1.16 µg/m^3
$[OC]_{future}$ = (0.976) [3.26] = 3.18 µg/m^3
$[EC]_{future}$ = (0.784) [0.76] = 0.60 µg/m^3
$(Soil)_{future}$ = (1.112) [0.64] = 0.71 µg/m^3
$[CM]_{future}$ = (1.058) [8.11] = 8.58 µg/m^3

Similar calculations (using the same model derived component specific RRFs) are performed for each of the "worst" and "best" days in each of the other 4 years in the base period[79].

Step 5. Using the results in Step 4, calculate the future year extinction coefficients for the 20% best and 20% worst visibility days in each of the five base years.

Using future PM components obtained in Step 4, we can estimate future daily total b_{ext}.

For year 1

Worst Days

Day 6: b_{ext} = (3)(4.6)[6.50] + (3)(4.6)[0.59] + (4)[3.35] + (10)[0.53] + 1.10 + (0.6)[11.87] + 10 = 134.8 Mm^{-1}

Day 7: b_{ext} = (3)(4.4)[7.19] + (3)(4.4)[0.67] + (4)[3.10] + (10)[0.51] + 0.91 + (0.6)[11.24] + 10 = 139.0 Mm^{-1}

Best Days

Day 1: b_{ext} = (3)(1.7)[3.94] + (3)(1.7)[1.84] + (4)[3.29] + (10)[0.70] + 0.36 + (0.6)[7.76] + 10 = 64.6 Mm^{-1}

Day 10: b_{ext} = (3)(2.7)[4.63] + (3)(2.7)[1.16] + (4)[3.18] + (10)[0.60] + 0.71 + (0.6)[8.58] + 10 = 81.4 Mm^{-1}

Step 6. Use the daily total bext values from step 5 to calculate future mean deciview values for the best and worst days.

Calculate daily deciview values (from total daily extinction) and then compute the future average mean deciviews for the worst and best days for each year. Then average the 5 years together to get the final future mean deciview value for the worst and best days.

For Year 1

Worst days

Day 6: 134.8 Mm^{-1} = 10* ln(134.8/10) = 26.0 dv

Day 7: 139.0 Mm^{-1} = 10* ln(139.0/10) = 26.3 dv

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[79]The same mean RRFs (for each component) are applied to the concentrations on all of the worst days for each of the 5 years of data. The mean RRFs are derived from the modeled days. A separate set of RRFs are derived (in the same manner) for the best days.

Future mean visibility on worst days = (26.0 + 26.3) / 2 = 26.2 dv

Best Days

Day 1: 64.6 Mm^{-1} = 10* ln(64.6/10) = 18.7 dv

Day 10: 81.4 Mm^{-1} = 10* ln(81.4/10) = 21.0 dv

Future mean visibility on best days = (18.7 + 21.0) / 2 = 19.8 dv

Similar calculations are performed for previously selected "worst" and "best" days in each of years 2-5. To illustrate the uniform rate of progress assessment, assume these other calculations yield the following estimates for future mean dv on worst and best visibility days.

Table 6.7

Year	Future Mean dv On Worst Visibility Days	Future Mean dv On Best Visibility Days
1	**26.2**	**19.8**
2	**27.3**	**19.3**
3	**27.6**	**17.6**
4	**25.9**	**18.3**
5	**26.1**	**18.6**

Using results in table 6.7, we see that the estimated future average mean visibility for the 20% days with worst visibility is

$$\mathbf{dv_{future}} = (26.2 + 27.3 + 27.6 + 25.9 + 26.1) / 5 = \mathbf{26.6}$$

The estimated future average mean extinction coefficient for the 20% days with best visibility is

$$\mathbf{dv_{future}} = (19.8 + 19.3 + 17.6 + 18.3 + 18.6) / 5 = \mathbf{18.7}$$

The results generated in step 6 are then used to estimate the difference in deciviews for days with worst visibility and then the difference in deciviews for days with best visibility.

For the 20% days with worst visibility,

dv difference = 26.6 - 28.8 = **- 2.2 deciviews**

For the 20% days with best visibility,

dv difference = 18.7 - 19.7 = **- 1.0 deciviews**

The future year strategy leads to an improvement in visibility of 2.2 deciviews. Thus, the visibility improvement for the 20% days with the worst visibility is predicted to exceed the uniform rate of progress (-2.2 dv vs. -2.0 dv). Also visibility is not predicted to deteriorate on the best days but, in fact, is estimated to improve (by 1.0 deciviews)

This information is used in the process of determining reasonable progress. The remaining steps in the process are beyond the modeling guidance. The modeling can only be used to determine the predicted improvement in visibility (and whether the improvement is on, above, or below the glidepath). It cannot determine the reasonable progress goals and it cannot determine whether reasonable progress is met.

6.5 How Do I Select Appropriate Inputs For The Uniform Rate of Progress Analysis?

In Section 6.4, we described the recommended modeled uniform rate of progress analysis. An important part of the analysis requires using component-specific relative response factors (RRF's), obtained with models, to estimate future concentrations of these components and, subsequently, future visibility. In this subsection, we address more details concerning the calculation of RRFs. Second, there are several assumptions inherent in the recommended modeled uniform rate of progress analysis. We identify these in this subsection and comment on their underlying rationale. More specifically, we address eight issues:

- how to estimate base period air quality in a Class I area without monitored data;
- how to handle a base year without data or with a small sample size;
- how to consider a day with missing data for one or several components of PM;
- use of the same days to estimate changes in visibility for the worst days and a different set of same days to estimate changes in visibility for the best days;
- which predictions to use to derive relative response factors;
- how many and what kind of days to use to develop RRF values
- use of relative response factors which are specific for days with poor vs. days with good visibility
-alternative RRF calculations

Estimating baseline "worst" and "best" visibility in a Class I area without monitors. There are 156 Class I areas and there are 110 IMPROVE sites in or near Class I areas. Therefore, approximately 46 Class I areas do not have co-located IMPROVE monitors. EPA's "Tracking Guidance" recommends using IMPROVE data from a nearby site to represent the visibility at each Class I area that does not have ambient data. Table A-2 in Appendix A (of the tracking guidance) lists the recommended monthly f(rh) values[80] for each Class I area as well as the representative site for each Class area. The representative IMPROVE site data will be used to track regional haze progress for the Class I areas. Therefore, it follows that visibility improvement should be predicted at the monitor, not at the actual Class I area. For the purposes of deriving ambient data for modeling, we recommend following the same representative site assignments contained in the tracking guidance. In this way, the 20% worst and best days can be derived for each Class I area from the network of 110 IMPROVE sites[81]. Similarly, the modeling results should be extracted for the location of the representative monitor, not the actual location of the Class I area[82].

Considering a base year with little or no monitored particulate matter or missing data. The Tracking Guidance recommends calculating baseline visibility values for sites with at least 3 out of 5 complete years of data. It further contains recommendations for determining if a year has complete data. In general, a site should have 50% data completeness in all quarters and meet a 75% completeness criteria for the full year. There should be no periods with more than 30 consecutive days without data. The guidance assumes that all IMPROVE sites will have at least 3 complete years of data in the base 2000-2004 period. The guidance also contains procedures for filling in missing data as part of the calculation of the 20% best and worst days. We recommend that these same procedures are followed for calculations in the modeled test.

There are several data completeness issues that may cause problems within the modeling analysis. First, a site may have less than 3 years of complete data. This will be a problem for the purpose of modeling and for tracking progress. States should work with their EPA Regional Office and Federal Land Managers to determine how to estimate baseline visibility for these area(s).

Another issue that is a more specific problem for modeling occurs when data is missing during the meteorological time period that was modeled. It is likely that most States will only be modeling a single year (or less). Therefore it is possible that some or all of the ambient data at one or more Class I areas is missing during that year. Without ambient data, it is impossible to identify the 20% best and worst days (used to calculate modeled RRFs).

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[80]The f(rh) values in the Tracking Guidance were developed for the “old” IMPROVE algorithm and should not be used to calculate visibility using the “new” IMPROVE algorithm.

[81]Bering Sea Wilderness (Alaska) is the only Class I area that has no IMPROVE monitor and no representative IMPROVE site. On-site IMPROVE or representative IMPROVE data can be found for the other 155 sites.

[82]It may be informative to compare model response at the representative IMPROVE site versus the actual location of the Class I area. Large differences in the model response may indicate that the “representative” site may not adequately represent visibility at the Class I area.

Again, if this occurs, States should work with their Regional Office and FLM to determine the best way to calculate visibility on the best and worst days. Potential options are to use data from another nearby IMPROVE site, use nearby data from a different ambient data network, or interpolate ambient data to the site. Another alternative is to estimate the 20% best and worst days from the model outputs[83].

Using a constant sample of days to estimate baseline and future visibility. For a typical Class I area, there will be about 120 days per year having measurements needed to estimate $(dv)_{baseline}$ with Equation (6.1). Thus, there should be about 24 "worst" and 24 "best" visibility days for each of the 5 years in the base period. It is conceivable that the identity of these "worst" and "best" days could change if emissions were altered to reflect net effects of controls and growth. The recommended test described in Section 6.4 assumes that the identity of the "worst" and "best" days remains unchanged. This is done primarily to avoid having to perform iterative analyses to identify future worst and best visibility days and to keep the test relatively simple and more readily understood. This assumption could cause improvement in visibility to be overestimated for the "worst" days and could also cause the test to overestimate the difficulty in preventing deterioration of visibility on the "best" days. However, for the reasons described below, we do not believe the effects of this assumption are substantial.

It is unlikely that there would be any wholesale change in the identity of "worst" or "best" days with future vs. current emissions. Analyses performed by Meyer, et al. (1997) have shown that the predicted ranked severity of high ozone days is largely unaffected by simulated controls and growth (i.e., highest days tend to remain the highest days after the effects of growth and controls are simulated). There is no reason to expect a different outcome for other secondary pollutants. If there are differences, we would expect these to occur near the borderline between the "worst" days and more moderate days.

Because the uniform rate of progress analysis relies on mean visibility values on 20 or more "worst" visibility days and most of these days are unlikely to change, we would expect little difference in the outcome of the analysis. Further, because of the shape of the distribution of extinction coefficients, the mean of the worst days is more heavily influenced by extreme days rather than those on the borderline between "worst" and more moderate light extinction. There could be differences in some "best" visibility days corresponding with pre- and post-control emissions. However, because the differences in concentrations of particulate matter on such

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[83]This is only recommended if the model performance for all species is good (at sites with data). While it is expected that the air quality models will do an adequate job of predicting the $PM_{2.5}$ components which are responsible for the largest visibility degradation, the models may not perform as well in estimating total visibility impairment. Accurately estimating the 20% best and worst days depends on accurately estimating all of the PM components. In particular, overprediction of certain components (e.g nitrates in the winter) could lead to identification of worst or best days in the wrong season and/or for the wrong reasons (e.g. wrong mix of species on the best or worst days).

days are likely to be relatively low, differences in the computed mean visibility for "best" days are likely to be small. Further, any resulting difference in the progress analysis for "best" days is likely to be protective of the environment. If our recommended procedure leads to suspected problems in the outcome of a test, a State may perform a more rigorous version of the analysis (in which the identity of pre-control and post-control days changes) as part of a weight of evidence determination.

Selecting predictions to use in deriving RRF. Relative response factors should be developed for each Class I area. When a Class I area contains a monitoring site, the RRF estimates should be derived using predictions which are made "near" that site. "Near" is defined in Section 3.3. For each day, daily average surface predictions of each component of PM made near a monitor should be estimated. These nearby estimates should then be spatially averaged to estimate a spatially representative daily concentration. Spatially representative daily concentrations obtained for each modeled day with monitored data should then be averaged. This final average should be used to compute the RRF. Thus, component-specific RRF values for a Class I area with a monitor are the ratio of the temporally averaged spatial mean of nearby concentrations predicted with future emissions to that predicted with baseline emissions. The recommended procedure is illustrated in section 3.3 for a grid whose cells are 12 km on a side. Similar to the $PM_{2.5}$ NAAQS attainment test, nearby grid cells should be averaged. Note that for cells larger than 15 km on a side, no spatial averaging is necessary—States should just use the prediction in the cell containing the monitor.

Selecting days to derive RRF values. RRF values should be estimated by taking the ratio of future predictions averaged over several days to current predictions averaged over the same several days. It may often happen that a regional planning organization or a group of States decides to model effects of a strategy for numerous Class I areas simultaneously. As we note in Section 14, this may make it advisable to simulate (at least) a full year so that relative response factor (RRF) values for each Class I area is based on a substantial number of observed "best" and "worst" days. For the "worst" days in the chosen year, the RRF for a component of PM should be estimated as the ratio of its arithmetic mean predicted value on the 20% worst days with future emissions to that with baseline emissions. Thus, the RRF should reflect values averaged over ~ 24 "worst" days in that year. The same procedure is followed to derive RRFs over the ~24 "best" days in the year.

If it is not feasible to model an entire year, or if only a small number of Class I areas is to be considered, a State should examine when worst visibility is observed to occur. Choose a sample of days from each quarter in which an incident of "worst" visibility occurs and calculate a RRF estimate for each component of PM. The appropriate RRF value would be applied to monitored "worst visibility" days. There is not, as yet, a good basis for suggesting a minimum number of days to choose for this purpose. However, information presented in Section 14.1.4 suggests that this number should be $\geq$ ~10 days.

Since meteorological conditions and/or emissions may be markedly different on "best" visibility vs. "worst" visibility days, we recommend calculation of a separate set of RRF values for “best” visibility days.   As with “worst” days, the preferred approach is to model an entire year and select an RRF value for concentrations averaged over the 20% “best” visibility days for each Class I area. If this is not feasible or only a limited number of Class I areas are to be considered in an analysis, States may review when “best” visibility days are observed to occur in the base period. Model $\geq$ ~ 10 days with observed “best” visibility and average predicted baseline and future concentrations for each PM component. The RRF values are the ratios of the future to baseline modeled averages. The appropriate RRF values should then be used in concert with each observed “best” day to estimate future concentrations for each component on each identified “best” day.

Alternative RRF calculations. The default glidepath analysis is relatively simple in that a single mean RRF is calculated for each PM component (separate RRFs on worst and best days). A series of tests with more complicated methods has shown that 1) the difference between various versions of the test are usually small and 2) each of the alternative tests has limitations in its applicability (Environ, 2005). Possible variations include the use of day specific RRFs, season (or quarter) specific RRFs, or climatological based RRFs. In some cases, these more complicated techniques may provide different answers, but sometimes not. There are specific limitations noted with each of these alternatives. We have chosen to keep the single mean RRF test as the default recommendation. States are encouraged to explore other methods for estimating RRFs if it is felt that the default recommendation is too simplistic to accurately capture the change in future visibility at any particular Class I area. The SIP demonstration should use the most appropriate method of projecting future concentrations for the characteristics of each Class I area[84]. Alternative methods should be discussed in the modeling protocol and discussed with the appropriate EPA Regional Office and FLMs.

[84]In particular, issues may arise when dealing with significant visibility contributions from fires, coarse mass and fine soil (mostly wind-blown dust), and international transport (and possibly other issues). Each of these issues should be addressed in the modeling protocol and solutions should be discussed with the appropriate EPA Regional Office(s) on a case by case basis.

7.0 How Can Additional Analyses Can Be Used to Support the Attainment Demonstration?

By definition, models are simplistic approximations of complex phenomena. The modeling analyses used to assess whether various emission reduction measures will bring an individual area into attainment for the NAAQS contain many elements that are uncertain (e.g., emission projections, meteorological inputs, model response). These uncertain aspects of the analyses can sometimes prevent definitive assessments of future attainment status. The confidence in the accuracy of the quantitative results from a modeled attainment test should be a function of the degree to which the uncertainties in the analysis were minimized. In general, by following the recommendations contained within this guidance document, EPA expects that the attainment demonstrations will mitigate the uncertainty as much as is possible given the current state of modeling inputs, procedures, and science. However, while Eulerian air quality models represent the best tools for integrating emissions and meteorological information with atmospheric chemistry and no single additional analysis can match the expected reliability of these models' results, EPA believes that all attainment demonstrations will be strengthened by additional analyses that can supplement the modeling analysis to enhance the assessment of whether the planned emissions reductions will result in attainment.

Supplemental evidence should accompany all model attainment demonstrations. Generally, those modeling analyses that show that attainment will be reached in the future with some margin of safety (e.g., estimated concentrations below 82 ppb for ozone, 14.5 ug/m3 for annual $PM_{2.5}$, and 62 ug/m3 for 24-hour $PM_{2.5}$) will need more limited supporting material. For other attainment cases, in which the projected future design value is closer to the NAAQS, more rigorous supporting analyses should be completed. As noted earlier (see section 2.2), there may be some areas that can expect to achieve timely attainment despite failing the model attainment test, and vice versa. This section of the guidance will discuss some specific additional analyses that can be used to supplement the model projections. Of particular interest are analyses that help determine whether the model likely overpredicts, underpredicts, or accurately predicts the **air quality improvement** projected to occur by the attainment date. States should review these supplemental analyses, in combination with the modeling analysis, in a "weight of evidence" assessment of whether each area is likely to achieve timely attainment. Additional examples of possible weight of evidence determinations are provided in existing EPA guidance (U.S. EPA, 1996a). Again, it should be noted that no single supplemental analysis can serve as an adequate substitute for the air quality model; however, in aggregate, supplemental analyses may provide information which may indicate a different outcome than the modeled test.

In Section 7.1, we identify several broad types of analyses which can be used to corroborate one another as part of a set of supplemental analyses. States should utilize each of these types of analysis to ensure that conclusions regarding adequacy of a proposed strategy are based on a variety of independent analyses. In Section 7.2, we more specifically address the submittal of a weight of evidence demonstration and recommend a framework for compiling and submitting a weight of evidence demonstration.

The goals for regional haze between the base period and 2018 relate to *trends* in light extinction rather than to some absolute value, as is the case for the NAAQS. Thus, supplemental analyses differ in some respects for visibility-related applications. Section 7.3 describes how to use supplemental analyses in regional haze analyses.

7.1 What Types of Additional Analyses Should Be Completed as Part of the Attainment Demonstration?

There are three basic types of analyses that are recommended to supplement the primary modeling analysis. They are:

1) Additional modeling

2) Analyses of trends in ambient air quality and emissions

3) Observational models and diagnostic analyses

These broad groups of supplemental analyses are discussed in more detail below:

Modeling: The relative attainment tests described in sections 3, 4, and 5 are the primary modeling tools used in an attainment demonstration. The application of a photochemical grid model, developed on a regional or local scale, is the best tool available to judge the impacts of changes in future year emissions. In addition to this "primary" modeling analysis, there are various other models, applications, and tools that can be used to supplement the results of the modeled attainment test. These include, but are not limited to:

- Use of available regional or national scale modeling applications that are suitable[85] for the local area,
- Use of other appropriate local modeling attainment demonstrations that include the nonattainment area of interest,
- Use of photochemical source apportionment and/or process analysis modeling tools to help explain why attainment is (or is not) demonstrated,

[85] The resolution, emissions, meteorology, and other model inputs should be evaluated for applicability to the local nonattainment area. Additionally, model performance of the regional modeling for the local nonattainment area should be examined before determining whether the regional model results are suitable for use in the local attainment demonstration.

- Use of multiple air quality models / model input data sets (e.g., multiple meteorological data sets, alternative chemical mechanisms or emissions inventories, etc.). For results to be most relevant to the way we recommend models be applied in attainment demonstrations, it is preferable that such procedures focus on the sensitivity of estimated relative response factors (RRF) and resulting projected design values to the variations in inputs or model formulations.

- Use of dispersion models to address primary $PM_{2.5}$ contributions to monitors. In areas with large spatial gradients of primary $PM_{2.5}$, dispersion models are best suited to characterizing the change in primary $PM_{2.5}$ in the future. Areas that are relying on local primary PM controls to reach attainment should submit a local area analysis as part of the primary attainment demonstration. In other areas, a local area analysis may be useful as a supplemental analysis.

- Application of the attainment test with alternative procedures compared to the default recommendations in Sections 3, 4, and 5 of this guidance. Any alternate approaches should be accompanied with a technical justification as to why the approach is appropriate for the area in question and should be discussed with the appropriate EPA regional office.

As discussed in Section 2, EPA has determined that the best approach to using models to demonstrate attainment of the NAAQS is to use a model in a relative mode. However, for some model applications there may be strong evidence from the performance evaluation that the model is able to reproduce detailed observed data bases with relatively little error or bias. Particularly for cases such as these, some types of "absolute" modeling results may be used to assess general progress towards attainment from the baseline inventory to the projected future inventory[86]. There are several metrics that can be considered as part of this type of additional analysis:

- Percent change in total amount of ozone or $PM_{2.5}$ >= NAAQS[87] within the nonattainment area
- Percent change in number of grid cells >= NAAQS within the nonattainment area
- Percent change in grid cell-hours (days) >= NAAQS within the nonattainment area
- Percent change in maximum modeled 8-hour ozone within the nonattainment area

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[86] Care should be taken in interpreting absolute metrics if the model evaluation shows a large underprediction or overprediction of ozone or $PM_{2.5}$ concentrations. An underprediction of observed concentrations will make it artificially easy to show progress towards absolute attainment levels and an overprediction will make it artificially difficult to show progress towards attainment.

[87]For each of these metrics, the appropriate comparison to the level of the NAAQS is 85 ppb for 8-hour ozone; 65 ug/m3 for 24-hour $PM_{2.5}$; and 15 ug/m3 for annual $PM_{2.5}$.

While these metrics can be used to estimate the magnitude, frequency, and relative amount of ozone or $PM_{2.5}$ reductions from any given future emissions scenario, there are no threshold quantities of these metrics that can directly translate to an attainment determination. Generally, a large reduction in the frequency, magnitude, and relative amount of 8-hour ozone nonattainment (i.e., >= 85 ppb) or $PM_{2.5}$ nonattainment (24-hour and/or annual) is consistent with a conclusion that a proposed strategy would meet the NAAQS. In the context of a weight of evidence determination, these metrics could be used to suggest that a particular location may be "stiff" or relatively unresponsive to emissions controls, while the rest of the modeling domain/nonattainment area is projected to experience widespread reductions. If a sound technical argument can be made for why atypically high RRFs at any particular location are not reasonable, then these types of supplemental modeling metrics would suggest that attainment is more likely to be achieved than the modeling analysis alone would indicate.

As discussed in section 3.4, an unmonitored area analysis may provide evidence that the area may not achieve timely attainment, even if modeling suggests that attainment will occur at all monitoring locations. In such cases, assessment of metrics concerning the frequency, magnitude, and relative amount of nonattainment may help supplement the information from the unmonitored area analysis. If application of the unmonitored area test indicates that most (if not all) of the unmonitored areas will be in attainment, then that information would be evidence that future attainment may be likely.

Uncertainty estimates associated with the spatial interpolation technique can also be considered when reviewing and interpreting the results of an unmonitored area analysis. When making a decision on whether attainment is likely to occur, areas with very high uncertainty estimates for interpolated design values should be given less weight than areas with low uncertainty estimates[88].

The overall modeling analyses can also be evaluated to determine how appropriate the modeling systems are for making regulatory decisions. Roth (2005) has proposed an "idealized evaluation framework" for judging the quality of modeling applications. The paper lists a series of twenty questions which can be used to judge the overall model application. These questions provide an objective way to compare the quality, and identify deficiencies in modeling applications. The absence of major deficiencies may provide a strong basis for acceptance of model results.

Trends in Ambient Air Quality and Emissions: Generally, air quality models are regarded as the most appropriate tools for assessing the expected impacts of a change in emissions. However, it may also be possible to extrapolate future trends in ozone or $PM_{2.5}$ based on measured historical trends of air quality and emissions. There are several elements to this analysis that are difficult to quantify. First, in most cases, the ambient data trends are best

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[88]This is particularly true for $PM_{2.5}$ in areas with little or no ambient speciation data.

assessed by normalizing to account for year-to-year meteorological variations. Second, one must have an accurate accounting of the year-to-year changes in actual emissions (NOx, VOC, and/or SO2 and NH3) for the given area and any surrounding areas whose emissions may impact local concentrations. Third, one must have a solid conceptual model of how ozone or $PM_{2.5}$ is formed in the local area (e.g., NOx-limited, ammonia limited, transport-influenced, etc.). Assuming all of these prerequisites can be met, then it may be possible to develop a curve that relates past emissions changes to historical and current air quality. Once the relationship between past/present emissions and air quality is established, this "response factor" can be applied to the expected emissions reductions from a particular control strategy.

If available, meteorologically adjusted ozone and $PM_{2.5}$ concentrations can be used to establish air quality trends. There are several techniques that have been used to examine the influence of meteorology on air quality. Among them are (a) statistical modeling (U.S. EPA, 2005c); (b) filtering techniques (Rao and Zurbenko, 1995, Flaum, et al., 1996, Milanchus, et al., 1998, Hogrefe, et al., 2000), (c) using a probability distribution of meteorological severity based on climatological data (Cox and Chu, 1993, 1996), (d) using CART analysis to identify meteorological classes and selecting days from each year so that the underlying frequency of the identified meteorological classes remains the same (Stoeckenius, 1990, Deuel and Douglas, 1996). Most of this work has examined the relationship between ozone and meteorology. Only recently have analyses examined the relationship between meteorology and $PM_{2.5}$. Additionally, compared to $PM_{2.5}$, the established relationship between ozone and meteorological variables is stronger (higher r-square values). In the case of $PM_{2.5}$, the relationship between concentration and meteorology is complicated by the fact that $PM_{2.5}$ components experience high concentrations at different times of the year and for different reasons. This makes it more difficult to meteorologically adjust $PM_{2.5}$ concentrations.

If a meteorologically adjusted trend in ozone or $PM_{2.5}$ can be estimated, then the information can be used to establish a link between emissions and air quality trends. This is not always straightforward due to the multitude of emissions precursors that may lead to high ozone and $PM_{2.5}$ concentrations. A careful analysis of (meteorologically adjusted) air quality trends and emissions trends of each of the ozone and PM precursors (as well as primary PM) is needed to fully establish relationships. Detailed emissions information as well as a solid understanding of the conceptual model of ozone or $PM_{2.5}$ formation is needed. If a trend can be established based on past emissions changes and air quality changes, then future year predicted emissions levels can be used to extrapolate future air quality.

A simpler (and more uncertain) way to qualitatively assess progress toward attainment is to examine recently observed air quality and emissions trends. Downward trends in observed air quality and in emissions (past and projected) are consistent with progress towards attainment. Strength of the evidence produced by emissions and air quality trends is increased if an extensive monitoring network exists and if there is a good correlation between past emissions reductions and current trends in ozone or $PM_{2.5}$. EPA recently prepared a report that analyzed statistically significant trends in ozone (U.S. EPA, 2004a and U.S. EPA, 2005c) and ozone precursor emissions as well as a report which examined trends in $PM_{2.5}$ concentrations and precursors (U.S. EPA, 2004b).

Weight given to trend analyses depends on several factors. Analyses that use more air quality data and apply a greater variety of trend parameters provide more credible results. More weight can be placed on the results if the procedure used to normalize the trend for meteorological differences explains much of the variability attributable to these differences. In addition, trend analysis is more believable if the extrapolation does not extend very far into the future. Finally, trend analysis is most credible if the contemplated strategy is similar to a past strategy (e.g., both strategies focus on reducing sulfates for PM or NOx for ozone). For example, if a past strategy focused on reducing sulfates, but a future one envisions controlling OC, there is no guarantee that ambient OC will respond similarly to changes in past emissions.

Observational Models In some cases ambient data can be used to corroborate the effects of a control strategy (e.g., Blanchard et al, 1999; Croes et al, 2003; Koerber and Kenski, 2005). Observational models take advantage of monitored data to draw conclusions about the relative importance of different types of emissions and precursors as factors contributing to observed $PM_{2.5}$ and ozone, as well as inferences which might be drawn about the effectiveness of various strategies to reduce concentrations. Observational models can be used to examine days which have not been modeled with an air quality model, as well as days which have been modeled. The resulting information may be useful for drawing conclusions about the general representativeness of the responses simulated with the air quality model for a limited sample of days. However, their ability to estimate *how much* control is needed is limited. Thus, observational approaches are suitable to corroborate results from more quantitative techniques, like air quality models. Additionally, observational models are limited to analyses based on current or past ambient conditions. A change in the relative mix of precursor emissions in the future (compared to current conditions) may lead to a different set of future control strategies compared to what the observational model may indicate based on current data. There are at least two types of observational models: source apportionment (i.e., "receptor") models and indicator species approaches.

Receptor models A large body of literature describes the theory and use of receptor models to identify and/or apportion sources which may be contributing to monitored air quality. Seigneur, (1997), summarized in Seigneur, (1999), provides a review of receptor models, contains a more complete description of the major approaches, summarizes findings obtained in a number of applications, and provides an extensive list of references. Receptor models are most useful for identifying contributions of various source categories to observed *primary* components of particulate matter, although, to a lesser degree, they can also be used to infer contributions from ozone and secondary PM precursors.

There are two major types of receptor models. The first type is the chemical mass balance model (CMB). A description and user's guide is available for the CMB model (U.S. EPA, 2004d). This model assumes that the user already has a good idea of what source categories potentially contribute to observations at a monitoring site. Speciated emissions profiles for all source categories are then compared with speciated air quality measurements at a monitor on a given day. A combination of source category contributions which minimizes observed differences between calculated and observed concentrations for a set of PM species (i.e., “fitting elements”) is derived. One key assumption of the CMB approach is that there is no substantial chemical transformation of particulate matter between the point of emissions and the site of the ambient measurements. Thus, the technique is limited when a large portion of measured $PM_{2.5}$ is secondary particulate matter.

The second type of receptor models are multi-variate statistical models. Unlike with CMB, a priori assumptions about contributing source categories are not needed. Another distinction from the CMB approach is that multi-variate models look at day to day variations in speciated observations rather than focusing on individual days. The object of this is to identify sets of chemical species which track one another well. Statistical methods like cluster analysis or principal component analysis are used to identify groups of days or groups of chemical species which are associated with one another. Common multi-variate statistical models include positive matrix factorization (PMF) (Paatero and Tapper, 1994), and UNMIX (Maykut, 2003; Poirot et. al, 2001) These models may be useful when confirming whether a strategy is reducing the right sorts of sources.

Indicator Species Indicator species approaches are based on the predicted sensitivity of a secondary pollutant’s concentration to changes in different precursors for that pollutant. It is possible to identify ratios of certain species which are good indicators of whether a secondary pollutant is sensitive to reductions in precursor A or precursor B. Measurement of “indicator species” is a potentially useful means for assessing which precursor category (e.g., VOC or NOx) limits further production of ozone or secondary $PM_{2.5}$ at a monitor’s location at various times of day and under various sets of meteorological conditions. Several indicator ratios have been developed to examine the sensitivity of ozone to changes in NOx and VOC, and the sensitivity of particulate nitrate to changes in NOX, VOC, and ammonia.

Sillman (1998, 2002) and Blanchard, (1997, 1999, 2000, 2001) identify several sets of indicator species which can be compared to suggest whether ozone is limited by availability of VOC or NOx. Comparisons are done by looking at ratios of these species. States/Tribes should consult the Sillman (1998, 2002) and Blanchard, (1997, 1999, 2000, 2001) references for further details on measurement requirements and interpretation of observed indicator ratios (also see Section 18.5.1 for more details).

Ansari and Pandis (1998) have developed an indicator ratio of species and applied it to several combinations of secondary particulate matter present under different environmental conditions. They use this ratio to predict how mass of particulate matter will respond to reductions in sulfate, nitrate and ammonia. Blanchard, et al. (2000) have also examined how indicator species might be used to assess whether particulate nitrate concentrations are limited by NOx, VOC, or by ammonia emissions using mechanisms which incorporate reactions dealing with secondary particulate matter. If a model accurately predicts observed ratios of indicator species, then one can conclude with additional confidence that the predicted change in ozone or PM may be accurate.

The strength of the evidence produced by observational models is increased if an extensive monitoring network exists and at least some of the monitors in the network are capable of measuring pollutants to the degree of sensitivity required by the methods. Evidence produced by observational models is more compelling if several techniques are used which complement one another and produce results for which plausible physical/chemical explanations can be developed. Indications of a strong quality assurance analysis of collected data and measurements that are made by a well trained staff also lend credence to the results.

7.2 What Is Entailed In A Weight Of Evidence Determination?

As discussed in Section 2, augmenting a modeled attainment test with supplemental analyses may yield a conclusion differing from that indicated by the modeled attainment test results alone. Past modeling analyses have shown that future design value uncertainties of 2-4 ppb for ozone[89], can result from use of alternate, yet equally appropriate, emissions inputs, chemical mechanisms, and meteorological inputs (Jones, 2005; Sistla, 2004). Because of this uncertainty, EPA believes that weight of evidence determinations can be used in some cases to demonstrate attainment conclusions that differ from the conclusions of the model attainment test.

As part of their recommendations to transform the SIP process into one that is more performance-oriented, the Clean Air Act Advisory Committee (CAAAC) recommended increased use of weight of evidence within State/Local attainment demonstrations (AQMWG, 2005). One of the workgroup's recommendations to EPA was that "EPA, in conjunction with affected stakeholders, should modify its guidance to promote weight-of-evidence (WOE) demonstrations for both planning and implementation efforts. In particular, these demonstrations should reduce reliance on modeling data as the centerpiece for SIP/TIP planning, and should increase use of monitoring data and analyses of monitoring data, especially for tracking progress. Enhanced tracking and ambient monitoring data is a better use of available resources than intensive local modeling."

A weight of evidence (WOE) determination examines results from a diverse set of analyses, including the outcome of the primary attainment test, and attempts to summarize the results into an aggregate conclusion with respect to whether a chosen set of control strategies will result in an area attaining the NAAQS by the appropriate year. The supplemental analyses discussed above are intended to be part of a WOE determination, although the level of detail

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[89]Few studies have been done to examine similar uncertainties for $PM_{2.5}$. Based on recent modeling analyses, a similar range of +- 2-4% of the NAAQS seems appropriate for $PM_{2.5}$. That translates to roughly 0.3-0.6 ug/m3 for the annual $PM_{2.5}$ standard. Consequently, the recommended weight of evidence range for $PM_{2.5}$ is nominally +- 0.5 ug/m3.

required in a WOE submittal will vary as a function of many elements of the model application (e.g., model performance, degree of residual nonattainment in the modeled attainment test, amount of uncertainty in the model and its inputs, etc.). Each weight of evidence determination will be subject to area-specific conditions and data availability. Area-specific factors may also affect the types of analyses which are feasible for a nonattainment area, as well as the significance of each. Thus, decisions concerning which analyses to perform and how much credence to give each need to be made on a case by case basis by those implementing the modeling/analysis protocol. States/Tribes are encouraged to consult with their EPA Regional office in advance of initiating supplemental analyses to determine which additional analyses may be most appropriate for their particular area.

The most useful supplemental analyses are those providing the best evidence as to how much air quality improvement can be expected as compared to the improvement projected by the air quality modeling analysis. Each analysis is weighed qualitatively, depending on: 1) the capacity of the analysis to address the adequacy of a strategy and 2) the technical credibility of the analysis. If the overall weight of evidence produced by the combination of the primary modeling analysis and the various supplemental analyses supports the attainment hypothesis, then attainment of the NAAQS is demonstrated with the proposed strategy. The end product of a weight of evidence determination is a document which describes analyses performed, data bases used, key assumptions and outcomes of each analysis, and why a State/Tribe believes that the evidence, viewed as a whole, supports a conclusion that the area will, or will not, attain the NAAQS despite a model-predicted DVF concluding otherwise. In conclusion, the basic criteria required for an attainment demonstration based on weight of evidence are as follows:

1) A fully-evaluated, high-quality modeling analysis that projects future values that are close to the NAAQS.

2) Multiple supplemental analyses in each of the three various categories discussed above (modeling, air quality/emissions trends analyses, observational models).

3) A qualitative weighting for each separate analysis based on its ability to quantitatively assess the ability of the proposed control measures to yield attainment.

4) A description of each of the individual supplemental analyses and their results. Analyses that utilize well-established analytical procedures and are grounded with sufficient data should be weighted accordingly higher.

5) Where applicable, a written description as to why the full set of evidence leads to a conclusive determination regarding the future attainment status of the area that differs from the results of the modeled attainment test alone.

7.3 What Role Should Weight Of Evidence Play In Visibility-Related Analyses?

We believe a weight of evidence analysis is an appropriate option for States to use when examining visibility trends. Unlike the NAAQS, progress goals address *trends* in air quality rather than some absolute level of air quality. Thus, the focus of weight of evidence analyses differs from those performed in NAAQS attainment demonstrations. In this subsection, we note some potential supplemental analyses that may be used to examine visibility trends. We then identify several refinements to our recommended modeled test for uniform rate of progress analyses if a State or regional planning organization believes these are warranted for a weight of evidence determination. We conclude by noting some potential concerns about the ability of models to address days with very good visibility.

Additional air quality modeling. Sensitivity tests can be performed to see if conclusions about trends in “worst” and “best” visibility are robust. One example of such an analysis is applying a model with and without a more finely resolved nested grid near one or more Class I areas. A purpose of this would be to see whether conclusions are affected by the degree of detail in which nearby sources are considered A second example of an analysis would be to consider alternative future emissions and/or differing growth rate assumptions. This may be a particular concern for regional haze analyses because the emissions projection period is generally longer than for most ozone and $PM_{2.5}$ attainment demonstrations. Uncertainty in emissions and growth rates become more important as the projection period is lengthened.

If trends in visibility for “worst” and/or “best” days are similar using sensitivity tests, alternative models and/or alternative modeling approaches, this finding supports conclusions reached in the uniform rate of progress analysis.

Review of trends. A review of trends generally involves a comparison, sometimes qualitative, between past trends in reconstructed visibility and estimated changes in emissions (e.g., early ‘90's to mid ‘00's). The IMPROVE dataset has a longer record than the corresponding urban FRM and speciation sites. Some IMPROVE sites have data going back to 1989. This information could be used to confirm that more control measures on previously reduced emissions of a component or its precursors is likely to be useful. It may also be used to see whether certain PM components are becoming increasingly important sources of light extinction.

Observational models. Receptor models are potentially useful for flagging potential importance of local sources, if any, in influencing measurements made in a Class I area. This could lead to a refined treatment of a local source, either through a more finely resolved nested grid model application or plume-in-grid modeling. Trajectory models may also be useful for identifying the types of meteorological conditions most often corresponding to observed “worst” and “best” visibility in various Class I areas. This, in turn, may enable States to draw inferences about the orientation of areas containing sources most likely to influence visibility in a Class I area on days with “poor” and “good” visibility. Grid model based techniques such as tagging, DDM, or source apportionment may also be useful in identifying areas and emissions sources most responsible for visibility impairment on the worst or best days.

Refinements to the recommended uniform rate of progress analysis. If a strategy for meeting the glidepath appears generally successful, but the glidepath is not met in a limited number of Class I areas, States may consider refining the recommended uniform rate of progress analysis in some manner. Refinements are best made if they are based on local observations/analyses which suggest that some of the underlying assumptions in the recommended assessment may not be applicable. We list some potential refinements which could be considered. The list is intended to illustrate types of additional analyses which could be performed.

- Use an alternative light extinction equation such as the revised IMPROVE equation or an area-specific version.

-Available speciated data and other information may be reviewed to see whether the outcome of the test is being influenced by including one or more days with extraordinary events (e.g., a nearby major forest fire lasting a number of days or transported dust events). If convincing arguments can be made that the event is a "natural" one, excluding these days from the calculations should be discussed with the appropriate U.S. EPA regional office.

-Daily component specific RRFs can be examined to determine if one or more days are responding in a different way compared to the majority of the best or worst days. Determining why days may be more or less responsive to emissions controls may lead to conclusions regarding the suitability of particular days to be represented in the mean response. It may be appropriate, in some cases, to re-calculate mean RRFs with suspect days removed.

- Re-rank future estimated light extinction (i.e., b_{ext} values) for all days with current measurements and recompute mean future "best" and "worst" visibility (i.e., do not assume that the identity of baseline "best" and "worst" days remains the same).

Concerns about modeling days with "best" visibility. In some parts of the United States, concentrations of the components of particulate matter used in visibility calculations may be within a $\mu g/m^3$ or two of background levels on days with "best" visibility. Measurements and model estimates may be subject to more relative uncertainty (i.e., lower signal to noise ratio) on days where observed concentrations of particulate matter are very low (and light extinction is also low). Utility of weight of evidence determinations is heightened in such cases. If a State has reason to believe that an atmospheric simulation model's ability to estimate concentrations of components of particulate matter is limited on such days, performance tests described in Section 18 should be applied to the extent feasible for the specific Class I area in question. Next, a State should see whether a model's inability to accurately predict one or more individual components of particulate matter has a substantial effect on the extinction coefficient calculated with Equations (6.1) or (6.2). If it does, and diagnostic tests (also described in Section 18) are unable to resolve a performance problem, a State may need to address the goal for “best” visibility days in the particular Class I area(s) without using results from a grid model.

8.0 What Additional Analyses and Data Collection Can Be Completed to Assess Progress towards Attainment

The purpose of an attainment demonstration is to provide a best estimate as to whether the control measures included in a State Implementation Plan will result in attainment of the NAAQS by a specific date in the future. In most cases, it will be desirable to periodically track the air quality improvements resulting from the SIP to ensure that the plan is going to result in attainment by the appropriate dates. One possible tracking approach is a mid-course review (MCR). Also, the regional haze rule requires periodic tracking of progress towards visibility goals (every 5 years). In this section, we identify measurements and activities which will provide better support for mid course reviews, future modeling exercises and other supplemental analyses designed to determine the progress toward attainment of the NAAQS or reasonable progress goals. Improved data bases will increase the reliability of reviews and enable identification of reasons for attainment or non-attainment of the NAAQS.

Deploying additional air quality monitors. One type of additional monitoring which should be considered has already been mentioned in Section 3. Additional ozone and/or $PM_{2.5}$ monitors should be deployed in unmonitored locations where future design values are predicted to exceed the NAAQS via the unmonitored area test. This would allow a better future assessment of whether the NAAQS is being met at unmonitored locations. Also, additional PM speciation monitors should be deployed in areas that are expected to continue to exceed the NAAQS in the future (particularly if there is not a speciation monitor at the highest FRM sites in a nonattainment area). Additional ambient data can provide an increased understanding of the nature of the problem, which can help lead to the most cost efficient solution.

Collecting Measurements for Indicator Species Measurement of "indicator species" is a potentially useful means for assessing which precursor category limits further production of ozone or secondary $PM_{2.5}$ at a monitor's location at various times of day and under various sets of meteorological conditions. Many of the gas phase species needed to calculate indicator ratios are not routinely measured. Some of the species needed to calculate ozone indicator ratios are NOy and HNO3. Some of the species needed to calculate the gas ratio and excess ammonia (for nitrate analyses) include NH3 and HNO3. Thus, realizing the potential of the "indicator species method" as a tool for model performance evaluation and for diagnosing why observed concentrations do or do not meet previous expectations may depend on deploying additional monitors and/or measurements.

Making measurements aloft. Almost all measured ambient air quality and meteorological data are collected within 20 meters of the earth's surface. However, the modeling domain extends many kilometers above the surface. Further, during certain times of day (e.g., at night) surface measurements are not always representative of air quality or meteorological conditions aloft. Measurements aloft can be made by aircraft (usually during special studies) or on tall buildings or towers. Concentrations aloft can have marked effects when they are mixed with ground-level emissions during daytime. Thus, the weight given to modeling results can be increased if good agreement is shown with air quality measurements aloft. The most important of these measurements are ozone, NOy, NO, NO_2, as well as several relatively stable species like CO and selected VOC species. Measurements of SO_2 may also be helpful for identifying presence of plumes from large combustion sources.

Measurements of altitude, temperature, water vapor, winds and pressure are also useful. Continuous wind measurements, made aloft in several locations, are especially important. They provide additional data to "nudge" meteorological model fields, but more importantly also allow for construction of more detailed conceptual models of local ozone formation (Stehr, 2004). For example, measurements of aloft winds and temperatures from lower atmosphere radar profilers can detect low level jets and be used to infer mixing depths. This information can be used to evaluate meteorological and air quality model outputs. This provides greater assurance that the air quality model correctly reflects the configuration of sources contributing to ozone formation.

Special Studies. Over the last 20 years, many States have embarked upon short term special studies to examine both ozone and PM issues. Data collected from special studies can be used to make improvements in the conceptual model of ozone and/or PM formation and to improve the inputs to models. The results of current modeling can be examined to determine the largest sources of uncertainty. This information can be used to design special studies in an effort to collect data that might allow future improvements in emissions, meteorological, and air quality modeling. Examples of special studies include the Central California Ozone Study (CCOS) (http://www.arb.ca.gov/airways/CCOS/CCOS.htm), California Regional Particulate Air Quality Study (CRPAQS) (http://www.arb.ca.gov/airways/crpaqs/publications.htm), Southern California Ozone Study (SCOS) (http://www.arb.ca.gov/research/scos/scos.htm), Texas Air Quality Study (TexAQS) and TexAQS II (http://www.tceq.state.tx.us/implementation/air/airmod/texaqs-files/TexAQS_II.html), Northern Front Range Air Quality Study (NFRAQS) (http://www.nfraqs.colostate.edu/) , and various NARSTO sponsored field studies (http://www.narsto.org/section.src?SID=9).

Extending measurements year round. Many States do not collect ozone and VOC data (and possibly other species) outside of the officially designated ozone season. Because $PM_{2.5}$ is a year round issue (especially for the annual NAAQS), PM precursor data is needed both during and outside of the ozone season to adequately evaluate secondary $PM_{2.5}$ performance and sensitivity to emissions controls. This is particularly relevant in areas with high wintertime nitrate concentrations. Collection of ozone, VOC, and precursor data on a year round basis may help improve performance evaluations and in particular, diagnostic analyses.

Collecting locally applicable speciated emissions data. While the U.S. EPA maintains a library of default VOC and PM emissions species profiles (U.S. EPA, 1993); (U.S. EPA, 2006a), some of these may be dated or may not properly reflect local sources. Use of speciated emissions data is a critical input to air quality models. For example, the accurate representation of the VOC speciation of current and future gasoline emissions may have an important impact on future ozone concentrations. Efforts to improve speciation profiles for local sources (especially for large sources of primary $PM_{2.5}$) should enhance credibility of the modeling as well as several of the procedures recommended for use in supplemental analyses and the weight of evidence determinations.

9.0 What Documentation Do I Need To Support My Attainment Demonstration?

States/Tribes should follow the guidance on reporting requirements for attainment demonstrations provided in U.S. EPA (1994b). The first seven subjects in Table 9.1 are similar to those in the 1994 guidance. The 1994 guidance envisions an air quality model as the sole means for demonstrating attainment. However, the current guidance (i.e., this document) identifies supplemental analyses as well as a possible weight of evidence determination as a means for corroborating/refuting the modeled attainment test in an attainment demonstration. In addition, feedback received since the earlier guidance has emphasized the need for technical review of procedures used to identify a sufficient control strategy. Thus, we have added two additional subject areas which should be included in the documentation accompanying an attainment demonstration. These are a description of the supplemental analyses and/or weight of evidence determination, and identification of reviews to which analyses used in the attainment demonstration have been subject. In the end, the documentation submitted by the States/Tribes as part of their attainment demonstration should contain a summary section which addresses the issues shown in Table 9.1.

Table 9.1 Recommended Documentation for Modeled Attainment Demonstrations and Regional Haze Analyses

Subject Area	Purpose of Documentation	Issues Included
Conceptual Description	**Characterization (qualitative and quantitative) of the area's nonattainment problem; used to guide the development of the modeling analysis.**	**Emissions and air quality assessment;** **Measurements used;** **Analyses performed;** **Processes, conditions, and influences for ozone, PM, and/or regional haze formation.**

Subject Area	Purpose of Documentation	Issues Included
Modeling/Analysis Protocol	**Communicate scope of the analysis and document stakeholder involvement.**	**Names of organizations participating in preparing and implementing the protocol;** **Types of analyses performed; Steps followed in each type of analyses;** **Rationale for choice of the modeling system and model configurations.**
Emissions Preparations and Results	**Assurance of valid, consistent emissions data base. Appropriate procedures are used to derive emission estimates needed for air quality modeling.**	**Data base used and quality assurance methods applied;** **Data processing used to convert data base to model-compatible inputs;** **Deviations from existing guidance and underlying rationale;** **VOC, NOx, SO2, NH3, $PM_{2.5}$, PM10, and CO (as appropriate) total emissions by State/County and for major source categories.**

Subject Area	Purpose of Documentation	Issues Included
Air Quality/Meteorology Preparations and Results	**Assurance that representative air quality and meteorological inputs are used in analyses**	**Description of data base and procedures used to derive and quality assure inputs for modeling;** **Departures from guidance and their underlying rationale.** **Performance of meteorological model used to generate meteorological inputs to the air quality model.**
Performance Evaluation for Air Quality Model (and Other Analyses)	**Show decision makers and the public how well the model (or other analyses) reproduced observations on the days selected for analysis for each nonattainment area and appropriate sub-regions.**	**Summary of observational data base available for comparison;** **Identification of performance tests used and their results (including diagnostic analyses);** **Ability to reproduce observed temporal and spatial patterns;** **Overall assessment of what the performance evaluation implies.**

Subject Area	Purpose of Documentation	Issues Included
Description of the Strategy Demonstrating Attainment	**Provide the EPA and the public an overview of the plan selected in the attainment demonstration.**	**Qualitative description of the attainment strategy;** **Reductions in VOC, NOx, SO2, NH3, and/or CO emissions from each major source category for each State/county/Tribal land from current (identify) emission levels;** **Clean Air Act mandated reductions and other reductions;** **Show predicted relative response factors for ozone and/or each component of $PM_{2.5}$ and regional haze(as applicable)** **Show predicted future design values for the selected control scenario and identify any location(s) which fails the unmonitored area analysis described in Section 3;** **Identification of authority for implementing emission reductions in the attainment strategy.** **Evidence that emissions remain at or below projected levels throughout the 3-year period used to determine future attainment for $PM_{2.5}$ and ozone and/or 5-year period for uniform rate of progress assessments.**

Subject Area	Purpose of Documentation	Issues Included
Data Access	**Enable the EPA or other interested parties to replicate model performance and attainment simulation results, as well as results obtained with other analyses.**	**Assurance that data files are archived and that provision has been made to maintain them;** **Technical procedures for accessing input and output files;** **Identify computer on which files were generated and can be read, as well as software necessary to process model outputs;** **Identification of contact person, means for downloading files and administrative procedures which need to be satisfied to access the files.**

Subject Area	Purpose of Documentation	Issues Included
Supplemental Analyses/Weight of Evidence Determination	**Assure the EPA and the public that the strategy meets applicable attainment tests and is likely to produce attainment of the NAAQS and/or uniform rate of progress by the required time.**	**Description of the modeled test and observational data base used;** **Identification of air quality model used;** **Identification of other analyses performed;** **Outcome of each analysis, including the modeled attainment test;** **Assessment of the credibility associated with each type of analysis in this application;** **Narrative describing process used to conclude the overall weight of available evidence supports a hypothesis that the selected strategy is adequate to attain the NAAQS.**
Review Procedures Used	**Provide assurance to the EPA and the public that analyses performed in the attainment demonstration reflect sound practice**	**Scope of technical review performed by those implementing the protocol;** **Assurance that methods used for analysis were peer reviewed by outside experts;** **Conclusions reached in the reviews and the response.**

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Part II. How Should I Apply Air Quality Models To Produce Results Needed To Help Demonstrate Attainment?

10.0 How Do I Apply Air Quality Models?-- An Overview

In Part I of this guidance, we described how to estimate whether a proposed control strategy will lead to attainment of the NAAQS or meet the uniform rate of progress goals within a required time frame. We noted that air quality models play a major role in making this determination. We assumed that modeling had been completed, and discussed how to use the information produced. We now focus on how to apply models to generate the information used in the modeled attainment demonstration. The procedure we recommend consists of nine steps:

1. Formulate a conceptual description of an area's nonattainment problem;
2. Develop a modeling/analysis protocol;
3. Select an appropriate air quality model to use;
4. Select appropriate meteorological episodes to model;
5. Choose a modeling domain with appropriate horizontal and vertical resolution and establish the initial and boundary conditions to be used;
6. Generate meteorological and air quality inputs to the air quality model;
7. Generate emissions inputs to the air quality model;
8. Evaluate performance of the air quality model and perform diagnostic tests, as necessary.
9. Perform future year modeling (including additional control strategies, if necessary) and apply the attainment test

In this section, we briefly describe each of these steps to better illustrate how they are inter-related. Because many of these steps require considerable effort to execute, States/Tribes should keep the appropriate U.S. EPA Regional Office(s) informed as they proceed. This will increase the likelihood of having an approvable attainment demonstration when the work is completed. The steps outlined in this section are described in greater depth in Sections 11 - 18.

1. Formulate a conceptual description of an area's nonattainment problem. A State/Tribe needs to have an understanding of the nature of an area's nonattainment problem before it can proceed with a modeled attainment demonstration. For example, it would be difficult to identify appropriate stakeholders and develop a modeling protocol without knowing whether resolution of the problem may require close coordination and cooperation with other nearby States.

The State/Tribe containing the designated nonattainment area or the RPO containing the Class I area is expected to initially characterize the problem. This characterization provides a starting point for addressing steps needed to generate required information by those implementing the protocol. Several examples of issues addressed in the initial description of a problem follow. Is it a regional or local problem? Are factors outside of the nonattainment area likely to affect what needs to be done locally? Are monitoring sites observing violations located in areas where meteorology is complex or where there are large emission gradients? How has observed air quality responded to past efforts to reduce precursor emissions? Are there ambient measurements suggesting which precursors and sources are important to further reduce ozone, $PM_{2.5}$, and/or regional haze? What information might be needed from potential stakeholders? As many of the preceding questions imply, an initial conceptual description may be based largely on a review of ambient air quality data. Sometimes, methods described in Sections 7 and 8 (e.g., trend analysis, observational models) may be used. Other times, these types of analyses may be deferred until after a team is in place to develop and implement steps following a modeling/analysis protocol. The initial conceptual picture may be based on less resource-intensive analyses of available data.

2. Develop a modeling/analysis protocol. A protocol describes how modeling will be performed to support a particular attainment demonstration or uniform rate of progress analysis. The content of the protocol and identification of participating stakeholders are influenced by the previously developed conceptual description of the problem. The protocol outlines methods and procedures which will be used to perform the subsequent steps needed to generate the modeling results and then apply the modeled attainment test and unmonitored area analysis as well as other corroborating analyses. This is accomplished by: a) identifying those responsible for implementing the modeling, b) outlining the specific steps needed to complete the attainment demonstration, c) identifying those who will review each step as it occurs, and d) identifying procedures to be used to consider input/suggestions from those potentially affected by the outcome (i.e., "stakeholders"). In short, the protocol defines the "game plan" and the "rules of the game".

3. Select an appropriate model for use. This step includes reviewing non-proprietary, grid-based photochemical models to select the model that is most appropriate for the application in terms of (a) state-of-the science algorithms to represent the chemical and physical processes associated with ozone and/or PM formation, transport, and removal, (b) peer review, (c) model performance in prior applications, and (d) ease of use. Identifying the air quality model to be used is an early step in the process, since it may affect how emissions and meteorological information are input to the model. It could also affect size of the area modeled and choice of the horizontal/vertical resolution considered. For $PM_{2.5}$ nonattainment applications where large spatial gradients of primary $PM_{2.5}$ exist, a dispersion model may be needed in addition to a photochemical model.

4. Select appropriate meteorological time periods to model. Like the preceding step, this step requires review of available air quality and meteorological data. It also requires a thorough understanding of the form of the ozone and $PM_{2.5}$ NAAQS, the regional haze goals, and the modeled attainment tests described in Sections 3-6. Finally, it requires a review of meteorological conditions which represent annual $PM_{2.5}$ concentrations, both good and bad visibility days, and time periods which have been observed to accompany monitored exceedances of the 8-hour ozone or 24-hour $PM_{2.5}$ NAAQS. The object of these reviews is to select periods which a) include days with observed concentrations exceeding site-specific design values (8-hour ozone or 24-hour $PM_{2.5}$ NAAQS), b) select a representative mix of days for each quarter in applications dealing with the annual NAAQS and/or c) select days which are representative of those corresponding with good and poor visibility.

Due to increased computer speeds, it is now prudent to recommend modeling relatively long time periods. For 8-hour ozone and 24-hour $PM_{2.5}$, at a minimum, modeling episodes which cover full synoptic cycles is desirable. Depending on the area and the time of year, a synoptic cycle may be anywhere from 5-15 days. Modeling even longer time periods of up to a full season may simplify the episode selection process and provide a rich database with which to apply the modeled attainment test. For annual average PM and regional haze applications, we recommend modeling (at least) a full year.

5. Choose a modeling domain with appropriate horizontal and vertical resolution and establish the initial and boundary conditions. Nested grid models will typically be used to support the modeled attainment test. In order to provide reasonable boundary conditions for the local nonattainment area, in many cases it is important to model a large regional domain with relatively coarse resolution, and a smaller sub-regional domain with relatively fine horizontal resolution. Meteorological and air quality data corresponding to the time periods that will be modeled need to be reviewed prior to choosing size of the area modeled. Appropriate domain size is influenced by the air quality goal being addressed, whether the model is being applied to address ozone and/or primary and/or secondary particulate matter, and the choice of days modeled.

The presence of topographical features or mesoscale meteorological features (e.g., land/sea breeze) near or in the nonattainment area of principal interest are factors to consider in choosing size of individual grid cells and the number of required vertical layers for that portion of the modeling grid. Another factor affecting the choice of grid cell size is the available spatial detail in the emissions data used as input to an emissions model. Finally, factors which cannot be ignored in choosing size of a domain and its grid cells include the feasibility of managing large data bases and the resources needed to estimate meteorological inputs and air quality in many grid cells.

6. Generate meteorological inputs to the air quality simulation model. Prognostic meteorological models will ordinarily be used to generate the meteorological inputs used in the attainment demonstration modeling. The application of meteorological models and the choice of model grid resolution in the preceding step are closely related. Meteorological conditions near the area which is the focus of an attainment demonstration may dictate the required spatial resolution. On the other hand, cost and data management difficulties increase greatly for finely resolved grids. Thus, those implementing the protocol will likely be faced with a tradeoff between cost/feasibility of running air quality and meteorological models and resolution at which it might be most desirable to treat dispersion of nearby emissions.

7. Generate emissions inputs to the air quality simulation model. Emissions are the central focus in a modeled attainment demonstration because they are the only input which is altered between the present and future case scenarios and represent the model input to which control strategies are applied. Emissions inputs to an air quality model are generated using an emissions model. Applying such a model is as complicated as the air quality model itself, and demands at least as much attention. In current emissions models, emissions from some of the major source categories are affected by meteorological conditions. This requires an interface between meteorological inputs and emissions. The development of emissions data must also take into account the horizontal/vertical model resolution of the model configuration and the size of the area to be modeled. In short, treatment of emissions is a central and complex one which, itself, involves several steps. These include deriving emission inventories, quality assuring results, applying results in an emission model(s), and (again) quality assuring results. Emission inputs may be needed for number of scenarios including; (1) a base case corresponding to that of the selected meteorological time periods, (2) a baseline corresponding to that represented by the baseline monitored design value, (3) a future base case when attainment of the NAAQS or regional haze progress needs to be demonstrated, and (4) control scenarios in which additional emissions controls are applied to emissions in the future base case.

8. Evaluate performance of the air quality simulation model and perform diagnostic tests. The credibility of a modeled attainment test and other model outputs is affected by how well the model replicates observed historical air quality. Evaluating model performance and conducting diagnostic tests depend on the prior definition of the modeling exercise and specification of model inputs. Hence, this is generally the last step prior to using the model to support an attainment demonstration or glidepath assessment. In the past, the performance evaluation for ozone has relied almost exclusively on numerical tests comparing predicted and observed ozone, or visual inspection of predictions and observations. These are still important tools. However, photochemical grid models have many inputs, and it is possible to get similar predicted ozone and/or $PM_{2.5}$ concentrations with different combinations of inputs. There is no guarantee that ozone and/or secondary $PM_{2.5}$ will respond the same way to controls with these different combinations of inputs. Thus, we place greater emphasis on additional kinds of tests than was the case in past guidance. These include use of precursor observations, indicator species, and corroborative analyses with observational models. Diagnostic tests are separate simulations which are performed to determine the sensitivity of a model's predictions to various inputs to the model. This can be done for a variety of purposes, including selection of effective control strategies, prioritizing inputs needing greatest quality assurance and assessing uncertainty associated with model predictions. In performing such tests, States/Tribes should remember how model results are used in the modeled attainment tests recommended in Sections 3-6. Model results are used in a relative rather than absolute sense. Thus, diagnostic tests should be used to consider how relative, as well as absolute predictions, are affected by changes to model inputs.

9. Perform future year modeling (including additional control strategies, if necessary) and apply the attainment test. The base case model runs for performance evaluations should contain emissions inventories on a highly resolved basis which can best simulate the ozone and/or $PM_{2.5}$ concentrations that were measured. For some sources, it may not be appropriate to project day specific emissions to the future because they may not be representative of typical base case conditions. This is commonly the case for wildfire and continuous emissions monitor (CEM) based utility emissions. If needed, a separate baseline model run should be completed for the purpose of establishing a base to compare against future year model outputs (for calculating relative response factors).

The next step is to run the future year base case model run. The inventory should contain all known emissions controls expected to be in place in the future year, as well as projected growth of emissions to the future. The attainment test should be performed using the future base case and the (current year) baseline. If attainment cannot be shown, then model runs which contain additional control measures are needed. Multiple future year control strategy runs may need to be completed until the attainment test is passed.

11.0 How Do I Get Started?- A "Conceptual Description"

A State/Tribe should start developing information to support a modeled attainment demonstration by assembling and reviewing available air quality, emissions and meteorological data. Baseline design values should be calculated at each monitoring site, as described in Section 3. For PM applications, speciated data should be reviewed to get a sense of what component(s) might be contributing most significantly to nonattainment or light extinction. If past modeling has been performed, the emission scenarios examined and air quality predictions may also be useful. Readily available information should be used by a State/Tribe to develop an initial conceptual description of the nonattainment or regional haze problem in the area which is the focus of a modeled demonstration. A conceptual description is instrumental for identifying potential stakeholders and for developing a modeling/analysis protocol. It may also influence a State's choice of air quality model, modeling domain, grid cell size, priorities for quality assuring and refining emissions estimates, and the choice of initial diagnostic tests to identify potentially effective control strategies. In general, a conceptual description is useful for helping a State/Tribe identify priorities and allocate resources in performing a modeled demonstration.

In this Section, we identify key parts of a conceptual description. We then present examples of analyses which could be used to describe each of these parts. We note that initial analyses may be complemented later by additional efforts performed by those implementing the protocol.

11.1 What Is A "Conceptual Description"?

A "conceptual description" is a qualitative way of characterizing the nature of an area's nonattainment or regional haze problem. It is best described by identifying key components of a description. Examples are listed below. There are 3 different examples. One each for ozone, $PM_{2.5}$, and regional haze. The examples are not comprehensive. There could be other features of an area's problem which are important in particular cases. For purposes of illustration later in the discussion, we have answered each of the questions posed below. Our responses appear in parentheses.

11.1.1 8-Hour Ozone NAAQS

1. Is the nonattainment problem primarily a local one, or are regional factors important?

(Surface measurements suggest transport of ozone close to 84 ppb is likely. There are some other nonattainment areas not too far distant.)

2. Are ozone and/or precursor concentrations aloft also high?

(There are no such measurements.)

3. Do violations of the NAAQS occur at several monitoring sites throughout the nonattainment area, or are they confined to one or a small number of sites in proximity to one another?

(Violations occur at a limited number of sites, located throughout the area.)

4. Do observed 8-hour daily maximum ozone concentrations exceed 84 ppb frequently or just on a few occasions?

(This varies among the monitors from 4 times up to 12 times per year.)

5. When 8-hour daily maxima in excess of 84 ppb occur, is there an accompanying characteristic spatial pattern, or is there a variety of spatial patterns?

(A variety of patterns is seen.)

6. Do monitored violations occur at locations subject to mesoscale wind patterns (e.g., at a coastline) which may differ from the general wind flow?

(No.)

7. Have there been any recent major changes in emissions of VOC or NOx in or near the nonattainment area? If so, what changes have occurred?

(Yes, several local measures [include a list] believed to result in major reductions in VOC [quantify in tons per summer day] have been implemented in the last five years. Additionally, the area has seen large regional NOx reductions from the NOx SIP call.)

8. Are there discernible trends in design values or other air quality indicators which have accompanied a change in emissions?

(Yes, design values have decreased by about 10% at four sites over the past [x] years. Smaller or no reductions are seen at three other sites.)

9. Is there any apparent spatial pattern to the trends in design values?

(No.)

10. Have ambient precursor concentrations or measured VOC species profiles changed?

(There are no measurements.)

11. What past modeling has been performed and what do the results suggest?

(A regional modeling analysis has been performed. Two emission scenarios were modeled: current emissions and a substantial reduction in NOx emissions throughout the regional domain. Reduced NOx emissions led to substantial predicted reductions in 8-hour daily maximum ozone in most locations, but changes near the most populated area in the nonattainment area in question were small or nonexistent.)

12. Are there any distinctive meteorological measurements at the surface or aloft which appear to coincide with occasions with 8-hour daily maxima greater than 84 ppb?

(Other than routine soundings taken twice per day, there are no measurements aloft. There is no obvious correspondence with meteorological measurements other than daily maximum temperatures are always $\geq$ 85 F on these days.)

Using responses to the preceding questions in this example, it is possible to construct an initial conceptual description of the nonattainment area's ozone problem. First, responses to questions 1 and 11 suggest there is a significant regional component to the area's nonattainment problem. Second, responses to questions 3, 4, 7, 8, and 11 indicate there is an important local component to the area's nonattainment problem. The responses to questions 4, 5 and 12 indicate that high ozone concentrations may be observed under several sets of meteorological conditions. The responses to questions 7, 8, and 11 suggest that ozone in and near the nonattainment area may be responsive to both VOC and NOx controls and that the extent of this response may vary spatially. The response to question 6 suggests that it may be appropriate to develop a strategy using a model with 12 km grid cells.

The preceding conceptual description implies that the State/Tribe containing the nonattainment area in this example will need to involve stakeholders from other, nearby States/Tribes to develop and implement a modeling/analysis protocol. It also suggests that a nested regional modeling analysis will be needed to address the problem. Further, it may be necessary to model at least several distinctive types of episodes and additional analyses will be needed to select episodes. Finally, sensitivity (i.e., diagnostic) tests, or other modeling probing tools, will be needed to assess the effects of reducing VOC and NOx emissions separately and at the same time.

11.1.2 Annual $PM_{2.5}$ NAAQS

1. Is the nonattainment problem primarily a local one, or are regional factors important?

(Surface measurements suggest that only design values in or immediately downwind of the city violate the NAAQS. However, other nearby design values come close to the concentration specified in the NAAQS)

2. What is the relative importance of measured primary and secondary components of $PM_{2.5}$ measured at sites violating the NAAQS?

(Secondary components (i.e., SO_4, NO_3, OC) constitute about 80% of the measured mass of $PM_{2.5}$. There are higher concentrations of primary $PM_{2.5}$ in the core urban area compared to the suburbs and more rural areas.)

3. What are the most prevalent components of measured $PM_{2.5}$?

(The most important components in ranked order are mass associated with SO_4, OC and other primary particulate matter).

4. Does the measured mix of PM components appear to roughly agree with mix of emission categories surrounding the monitoring sites?

(No. Relative importance of measured other primary $PM_{2.5}$ (OPP) appears less than what might be inferred from the inventory).

5. Do there appear to be any areas with large gradients of primary $PM_{2.5}$ in monitored or unmonitored areas?

(Cannot really tell for sources of primary $PM_{2.5}$ material until we resolve the preceding inventory/monitoring discrepancy. There are no other obvious major sources of primary particulate matter).

6. Is there any indication of what precursor might be limiting formation of secondary particulate matter?

(No indicator species analyses have been performed. Past analyses performed for ozone-related SIP revisions suggest that ozone in this area may be limited by availability of VOC).

7. Do monitored violations occur at locations subject to mesoscale wind patterns (e.g., at a coastline) which may differ from the general wind flow?

(No.)

8. Have there been any recent major changes in emissions of PM or its precursors in or near the nonattainment area? What?

(Yes, measures believed to result in major reductions in VOC and NOx have been implemented in the last 5 years. Reductions in power plant NOx have resulted from the NOx SIP call and SO_2 emissions reductions have resulted from the national program to reduce acid deposition.)

9. Are there discernible trends in design values or other air quality indicators which have accompanied a change in emissions?

(The trend appears to be downward, but the most recent air quality data has been higher. Overall, the period of record is insufficiently long to tell).

10. Is there any apparent spatial pattern to the trends in design values?

(No.)

11. What past modeling has been performed and what do the results suggest?

(A regional modeling analysis has been performed for ozone and $PM_{2.5}$. Two emission scenarios were modeled: current emissions and a substantial reduction in NOx and SO2 emissions throughout a regional domain. Reduced NOx emissions led to substantial predicted reductions in 8-hour daily maximum ozone in most locations. Modeled SO2 reductions from the CAIR rule had a strong impact on sulfate concentrations)

12. Are there any distinctive meteorological measurements at the surface or aloft which appear to coincide with occasions with $PM_{2.5}$ concentrations in excess of 15.0 $\mu g/m^3$?

(Other than routine soundings taken twice per day, there are no measurements aloft. There is no obvious correspondence with meteorological measurements other than daily maximum temperatures are often $\geq$ 85F on days with the highest $PM_{2.5}$ observations.)

13. Do periods with high measured particulate matter or components of particulate matter appear to track each other or any other measured pollutant?

(There appears to be some correspondence between measured high concentrations of SO_4 and ozone).

Using responses to the preceding questions in this example, it is possible to construct an initial conceptual description of the nonattainment area's $PM_{2.5}$ problem. First, responses to questions 1, 2 and 3 suggest there is a significant regional component to the area's nonattainment problem. Second, responses to questions 1 and 3 indicate there is a local component to the problem.. The responses to questions 11,12 and 13 suggest that there may be a link between reducing ozone and reducing particulate matter. Thus, it may be appropriate to assess effects of previously committed to strategies to reduce ozone and national PM control measures before simulating additional control measures. The responses to questions 4 and 5 suggest that it is premature to determine whether a "local area analysis" will be needed. The response to question 7 suggests that it may not be necessary to model with very small grid cells, at least for the secondary components of $PM_{2.5}$.

The preceding conceptual description implies that the State containing the nonattainment area in this example will need to involve stakeholders from other, nearby States to develop and implement a modeling/analysis protocol. It also suggests that a nested regional modeling analysis will be needed to address the problem.

11.1.3 Example Regional Haze Application

1. What components of particulate matter appear to have high concentrations on days with poor visibility?

(Mass associated with SO_4 and coarse particulate matter (CM) seem to have the highest concentrations on most such days).

2. What are typical values for the humidity adjustment factor during the times of year when most of the days with poor visibility occur?

(Typical values appear to be about “4.0").

3. Does visibility appear to track well among nearby Class I areas?

(Yes, but not always).

4. Does poor visibility seem to occur under any specific meteorological conditions?

(This information is not readily available).

5. Does poor visibility seem to coincide with high observed concentrations of any particular other pollutant?

(There seems to be some correspondence with high regional ozone concentrations)

6. What components of particulate matter appear to have relatively high concentrations on days with good visibility?

(Coarse particulate matter and OC)

7. What are typical values for the humidity adjustment factor during times of year when most of the days with good visibility occur?

(About “2.3")

8. Does good visibility appear to occur under any specific meteorological conditions?

(Don’t know.)

Answers to the preceding questions suggest that strategies to reduce sulfate concentrations and, perhaps, regional ozone concentrations might be effective in reducing light extinction on days when visibility is currently poor. The responses suggest that a strategy which focuses on this alone should first be tried for the days with good visibility as well. Even though sulfate concentrations appear low on such days, the fact that sulfates scatter light efficiently (see Equation (6.1)) and relative humidity is still high enough to enhance this effect is worth considering. Responses suggest that further meteorological analyses would be worthwhile prior to selecting strategies to simulate with a resource intensive regional model.

It should be clear from the preceding examples that the initial conceptual description of an area's nonattainment problem draws on readily available information and need not be detailed. It is intended to help launch development and implementation of a modeling/analysis protocol in a productive direction. It will likely be supplemented by subsequent, more extensive modeling and ambient analyses performed by or for those implementing the modeling/analysis protocol discussed in Section 12.0.

Questions like those posed in Section 11.1 can be addressed using a variety of analyses ranging in complexity from an inspection of air quality data to sophisticated mathematical analyses. We anticipate the simpler analyses will often be used to develop the initial conceptual description. These will be followed by more complex approaches or by approaches requiring more extensive data bases as the need later becomes apparent. These analyses are intended to channel resources available to support modeled attainment demonstrations onto the most productive paths possible. They will also provide other pieces of information which can be used to reinforce conclusions reached with an air quality model, or cause a reassessment of assumptions made previously in applying the model. As noted in Section 7, corroboratory analyses should be used to help assess whether a simulated control strategy is sufficient to meet the NAAQS.

12.0 What Does A Modeling/Analysis Protocol Do, And What Does Developing One Entail?

Developing and implementing a modeling/analysis protocol is a very important part of an acceptable modeled attainment demonstration. The protocol should detail and formalize the procedures for conducting all phases of the modeling study, such as describing the background and objectives for the study, creating a schedule and organizational structure for the study, developing the input data, conducting model performance evaluations, interpreting modeling results, describing procedures for using the model to demonstrate whether proposed strategies are sufficient to attain the NAAQS and/or regional haze goals, and producing documentation to be submitted for EPA Regional Office review and approval. Much of the information in U.S. EPA (1991a) regarding modeling protocols remains applicable. States/Tribes should review the 1991 guidance on protocols. In this document, we have revised the name of the protocol to "Modeling/Analysis Protocol" to emphasize that the protocol needs to address modeling as well as other supplemental analyses.

12.1 What Is The Protocol's Function?

As noted above, the most important function of a protocol is to serve as a means for planning and communicating up front how a modeled attainment demonstration will be performed. The protocol is the means by which States/Tribes, U.S. EPA, and other stakeholders can assess the applicability of default recommendations and develop alternatives. A good protocol should lead to extensive participation by stakeholders in developing the demonstration. It should also reduce the risk of spending time and resources on efforts which are unproductive or inconsistent with EPA policy.

The protocol also serves several important, more specific functions. First, it should identify who will help the State/Tribe or local air quality agency (generally the lead agency) undertake and evaluate the analyses needed to support a defensible demonstration (i.e., the stakeholders). Second, it should identify how communication will occur among States/Tribes and stakeholders to develop consensus on various issues. Third, the protocol should describe the review process applied to key steps in the demonstration. Finally, it should also describe how changes in methods and procedures or in the protocol itself will be agreed upon and communicated with stakeholders and the appropriate U.S. EPA Regional Office(s). Major steps to implement the protocol should be discussed with the appropriate U.S. EPA Regional Office(s) as they are being decided. States/Tribes may choose to update the protocol as major decisions are made concerning forthcoming analyses.

12.2 What Subjects Should Be Addressed In The Protocol?

At a minimum, States/Tribes should address the following topics in their modeling/analysis protocol:

1. Overview of Modeling/Analysis Project
    a. Management structure
    b. Technical committees or other communication procedures to be used
    c. Participating organizations
    d. Schedule for completion of attainment demonstration or uniform rate of progress analyses
    e. Description of the conceptual model for the nonattainment area (or Class I area(s))

2. Model and Modeling Inputs
    a. Rationale for the selection of air quality, meteorological, and emissions models
    b. Modeling domain
    c. Horizontal and vertical resolution
    d. Specification of initial and boundary conditions
    e. Episode selection
    f. Description of meteorological model setup[90]
    g. Development of emissions inputs
    h. Geographic area identified for application of the attainment test(s)
    i. Methods used to quality assure emissions, meteorological, and other model inputs

3. Model Performance Evaluation
    a. Describe ambient data base
    b. List evaluation procedures
    c. Identify possible diagnostic testing that could be used to improve model performance

4. Supplemental Analyses
    a. List additional analyses to be completed to corroborate the model attainment test
    b. Outline plans for conducting a weight of evidence determination, should it be necessary

5. Procedural Requirements
    a. Identify how modeling and other analyses will be archived and documented
    b. Identify specific deliverables to EPA Regional Office

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[90]States may want to document detailed meteorological modeling decisions in a separate document. At least a brief description of the meteorological model and model setup should be contained in the air quality modeling protocol.

13.0 What Should I Consider In Choosing An Air Quality Model?

Photochemical grid models are, in reality, *modeling systems* in which an emissions model, a meteorological model and an air chemistry/deposition model are applied. In this guidance, we use the term "air quality model" to mean a gridded photochemical modeling system. Some modeling systems are modular, at least in theory. This means that it is possible to substitute alternative emissions or meteorological models within the modeling system. Often however, the choice of an emissions or meteorological model or their features is heavily influenced by the chosen air quality model (i.e., an effort is needed to develop software to interface combinations of components differing from the modeling system's default combination). Thus, choosing an appropriate air quality model is among the earliest decisions to be made by those implementing the protocol. In this section, we identify a set of general requirements which an air quality model should meet in order to qualify for use in an attainment demonstration or regional haze application. We then identify several factors which will help in choosing among qualifying air quality models for a specific application. We conclude this section by identifying several air quality models which are available for use in attainment demonstrations or regional haze assessments. Meteorological and emissions models are discussed in Sections 16 and 17, respectively.

13.1 Types of Air Quality Models

States should use a photochemical grid model to simulate the effects of strategies to reduce ozone and the secondary components of particulate matter (i.e., mass associated with SO_4, NO_3 and secondary OC). Because of the regional nature of "regional haze" and relatively high efficiency with which secondary particulate matter scatters light, we believe that photochemical grid models are needed to perform uniform rate of progress assessments. Based on its conceptual description of a $PM_{2.5}$ nonattainment problem, a State could conclude that the $PM_{2.5}$ problem can be addressed solely by reducing primary components of measured $PM_{2.5}$.[91]

Greater flexibility is possible in choosing a modeling approach to address primary components of $PM_{2.5}$ (i.e., OPP, EC and the primary portion of OC) and coarse particulate matter (i.e., needed for regional haze-related applications) than is true for secondary components. That is, it is not necessary to use a model which considers atmospheric chemistry in addressing changes in primary components. Either a numerical grid or a Lagrangian (such as a Gaussian dispersion) model may be used. In general, modeling primary PM components with a grid model is acceptable, but further refined dispersion modeling may be necessary in areas with large spatial gradients of primary PM. If a dispersion model is used to estimate RRF's for

[91]If this is the case, the State may not need to use a photochemical grid model in their attainment demonstration if it can present convincing qualitative arguments that an increase in the secondary components of PM will not cause reductions in the primary components to be insufficient to meet the NAAQS.

primary particulate matter, these estimates should be made at the monitoring location (see Section 5.3). Thus, a State may use a regional photochemical grid model to address both primary and secondary components of particulate matter or they may use a photochemical model to address secondary PM and an inert model applied over a more limited domain to address primary components.

In regional haze-related applications it may suffice when modeling primary particulate matter to use grid cells which are the same size as those used to model secondary components of particulate matter. If there is no reason to believe that there are major individual sources of primary PM within about 50 km which affect the monitor site in a Class I area, primary components can be considered using the same coarse grid used for the photochemical grid model. This is generally a good default assumption.

13.2 What Prerequisites Should An Air Quality Model Meet To Qualify For Use In An Attainment Demonstration?

A model should meet several general criteria for it to be a candidate for consideration in an attainment demonstration or uniform rate of progress assessment. These general criteria are consistent with requirements in 40 CFR 51.112 and 40 CFR part 51, Appendix W (U.S. EPA, 2005d). Note that, unlike in previous guidance (U.S. EPA, 1991a), we are not recommending a specific model for use in attainment demonstration or uniform rate of progress assessment. At present, there is no single model which has been extensively tested and shown to be clearly superior than its alternatives. Thus, 40 CFR Part 51 Appendix W does not identify a "preferred model" for use in attainment demonstrations of the NAAQS for ozone or $PM_{2.5}$ or uniform rate of progress assessments for regional haze[92]. Based on the language in 40CFR Part 51 Appendix W, models used for these purposes should meet requirements for "alternative models".

States/Tribes should use a non-proprietary model, which is a model whose source code is available for free (or for a "reasonable" cost). Furthermore, the user must be able to revise the code[93] to perform diagnostic analyses and/or to improve the model's ability to describe observations in a credible manner. Several additional prerequisites should be met for a model to be used to support an attainment demonstration or uniform rate of progress assessment.

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[92]Appendix W recommends specific dispersion models for primary pollutants, but does not recommend specific photochemical models. Recommended dispersion models should be used for primary $PM_{2.5}$ analyses if dispersion models are used for a "local area analysis"(see Section 5.3).

[93]Air quality models are generally identified by a version number. The version of the model that is used in SIP applications should be identified. Code revisions to standard versions of models should be noted and documented.

(1) It should have received and been revised in response to a scientific peer review.

(2) It should be appropriate for the specific application on a theoretical basis.

(3) It should be used with a data base which is adequate to support its application.

(4) It should be shown to have performed well in past ozone or PM modeling applications. (If the application is the first for a particular model, then the State should note why it believes the new model is expected to perform sufficiently.)

(5) It should be applied consistently with a protocol on methods and procedures.

An air quality model may be considered to have undergone "scientific peer review" if each of the major components of the modeling system (i.e., air chemistry/deposition, meteorological and emissions models) has been described and tested, and the results have been documented and reviewed by one or more disinterested third parties. We believe that it should be the responsibility of the model developer or group which is applying an air quality model on behalf of a State/Tribe to document that a "scientific peer review" has occurred. States/Tribes should then reference this documentation to gain acceptance of an air quality model for use in a modeled attainment demonstration.

13.3 What Factors Affect My Choice of A Model For A Specific Application?

States/Tribes should consider several factors as criteria for choosing a qualifying air quality model to support an attainment demonstration or uniform rate of progress assessment. These factors are: (1) documentation and past track record of candidate models in similar applications; (2) advanced science and technical features (e.g., probing tools) available in the model and/or modeling system; (3) experience of staff and available contractors; (4) required time and resources versus available time and resources; and (5) in the case of regional applications, consistency with regional models applied in adjacent regions. Finally, before the results of a selected model can be used in an attainment demonstration, the model should be shown to perform satisfactorily using the data base available for the specific application.

Documentation and Past Track Record of Candidate Models. For a model to be used in an attainment demonstration, evidence should be presented that it has been found acceptable for estimating hourly and eight-hourly ozone concentrations and/or hourly and 24-hour average $PM_{2.5}$ and PM component concentrations. Preference should be given to models exhibiting satisfactory past performance under a variety of conditions. Finally, a user's guide (including a benchmark example and outputs) and technical description of the model should be available.

Advanced Technical Features. Models are often differentiated by their available advanced science features and tools. For example, some models include advanced probing tools that allow tracking of downwind impacts from upwind emissions sources. Availability of probing tools and/or science algorithms is a legitimate reason to choose one equally capable model over another.

Experience of Staff and Available Contractors. This is a legitimate criterion for choosing among several otherwise acceptable alternatives. The past experience might be with the air quality model itself, or with a meteorological or emissions model which can be more readily linked with one candidate air quality model than another.

Required vs. Available Time and Resources. This is a legitimate criterion provided the first two criteria are met.

Consistency of a Proposed Model with Models Used in Adjacent Regions. This criterion is applicable for regional model applications. If candidate models meet the other criteria, this criterion should be considered in choosing a model for use in a regional or nested regional modeling application.

Demonstration that an "Alternative Model" is Appropriate for the Specific Application. If an air quality model meets the prerequisites identified in Section 13.2, a State/Tribe may use the factors described in this section (Section 13.3) to show that it is appropriate for use in a specific application. The selection of an "alternative model" needs to be reviewed and approved by the appropriate U.S. EPA Regional Office.

Satisfactory Model Performance in the Specific Application. Prior to use of a selected model's results in an attainment demonstration, the model should be shown to perform adequately for the specific application. The approach for evaluating model performance are discussed in Section 18.

13.4 What Are Some Examples Of Air Quality Models Which May Be Considered?

Air quality models continue to evolve and have their own strengths and weaknesses (Russell, 2000). Table 13.1 lists several current generation air quality models which have been used to simulate ambient ozone, PM, and regional haze concentrations. Table 13.2 lists several air quality models which have been used for various ozone and PM applications over the past decade, but are not widely used at this time. Table 13.3 lists several current dispersion models that have used to model primary PM. Table 13.4 lists several receptor models that have been used to identify sources of PM. The list is not intended to be comprehensive. Exclusion of a model from the list does not necessarily imply that it cannot be used to support a modeled attainment demonstration or uniform rate of progress assessment. In the same way, inclusion on the list does not necessarily imply that a model may be used for a particular application. States/Tribes should follow the guidance in Sections 13.1 and 13.2 in selecting an air quality model for a specific application.

Table 13.1 Current Air Quality Models Used To Model Ozone and PM

Air Quality Model	References
CAMx	Environ (2006a)
CMAQ	U.S. EPA (1998a)
UAM-V	Systems Applications International (1996)

Table 13.2 Other Air Quality Models Used to Model Ozone and PM

Air Quality Model	References
CALGRID	Scire, et al. (1989)
MAQSIP	MCNC (1999) Odman, et al. (1996)
SAQM	Chang, et al., (1997) CARB (1996)
URM	Kumar, et al., (1996)

Table 13.3 Current Dispersion Models Used to Model Primary PM

Air Quality Model	References
AERMOD	U.S. EPA (2004f) U.S EPA (2004g)
CALPUFF	Scire (2000)
ISC3	U.S. EPA (1995a) U.S EPA (1995b)

Table 13.4 Current Receptor Models

Air Quality Model	References
PMF	Eberly (2005) Hopke (2001)
UNMIX	Lewis (2003)
CMB	U.S. EPA (2004d)

14.0 How are the Meteorological Time Periods (Episodes) Selected?

Historically, attainment demonstrations have been based on a limited number of episodes consisting of several days each. In the past, the number of days modeled has been limited by the speed of computers and the ability to store the model output files. With the advancement in computer technology over the past decade, computer speed and storage issues are no longer an impediment to modeling long time periods. In fact, many groups have recently modeled entire summers and/or full years for ozone, $PM_{2.5}$, and regional haze (Baker, 2004a) (U.S. EPA, 2005b).

Ozone based research has shown that model performance evaluations and the response to emissions controls need to consider modeling results from relatively long time periods, in particular, full synoptic cycles or even full ozone seasons (Hogrefe, 2000). In order to examine the response to ozone control strategies, it may not be necessary to model a full ozone season (or seasons), but, at a minimum. we recommend modeling “longer” episodes that encompass full synoptic cycles. Time periods which include a ramp-up to a high ozone period and a ramp-down to cleaner conditions allow for a more complete evaluation of model performance under a variety of meteorological conditions.

More limited research has been conducted related to $PM_{2.5}$ modeling. Most model applications for the annual $PM_{2.5}$ NAAQS have modeled a full year (CAIR, RPOs, etc). This is a logical goal since every day of the year is included in the calculation of the annual NAAQS. Several tests have also been made using less than a full year of meteorological data. One study (Environ, 2004) found that modeling 14 days from each quarter provided results with a reasonable amount of uncertainty compared to modeling the full year. The following sections contain further recommendations for choosing appropriate time periods to model for attainment demonstrations and glidepath assessments.

At a minimum, four criteria should be used to select time periods which are appropriate to model:

1) Simulate a variety of meteorological conditions:

a) 8-Hour Ozone- Choose time periods which reflect a variety of meteorological conditions which frequently correspond with observed 8-hour daily maxima > 84 ppb at multiple monitoring sites.

b) 24-Hour $PM_{2.5}$- Choose time periods which reflect a variety of meteorological conditions which frequently correspond with observed 24-hour averages > 65 ug/m3 at violating monitoring sites.

c) Annual $PM_{2.5}$- Choose time periods from each quarter which reflect the variety of meteorological conditions which represent average concentrations for that quarter and year

d) Regional Haze- .Choose time periods which reflect the variety of meteorological conditions which represent visibility impairment on the 20% best and 20% worst days in the Class I areas being modeled.

2) Model time periods in which observed concentrations are close to the appropriate baseline design value or visibility impairment.

3) Model periods for which extensive air quality/meteorological data bases exist.

4) Model a sufficient number of days so that the modeled attainment test applied at each monitor violating the NAAQS is based on multiple days (see section 14.1.1).

These four criteria may sometimes conflict with one another. For example, there may only be a limited number of days with intensive data bases, and these may not cover all of the meteorological conditions which correspond with monitored concentrations close to site-specific design values during the base period. Thus, tradeoffs among the four primary criteria may be necessary in specific applications.

Those implementing the modeling/analysis protocol may use secondary episode selection criteria on a case by case basis. For example, prior experience modeling an episode or year, may result in its being chosen over an alternative. Another consideration should be to choose time periods occurring during the 5-year period which serves as the basis for the baseline design value (DVB). If observed ozone or 24-hour $PM_{2.5}$ exceedances occur on weekends, weekend days should be included within some of the selected time periods. If it has been determined that there is a need to model several nonattainment areas simultaneously (e.g., with a nested regional scale model application), a fourth secondary criterion is to choose time periods containing days of common interest to different nonattainment areas.

In this section, we first discuss each of the four identified primary criteria for choosing meteorological episodes to model. We then discuss the secondary criteria, which may be important in specific applications.

14.1 What Are The Most Important Criteria For Choosing Episodes?

In the following section, we identify how the four selection criteria apply to ozone. We then discuss issues related to time period selection for $PM_{2.5}$ and regional haze. We also recommend minimum time periods to model for 8-hour ozone, 24-hour $PM_{2.5}$, annual $PM_{2.5}$, and regional haze. As a matter of convenience, section 14.1 is organized by pollutant, but it could also be organized by the nature of the ambient data. For example, 8-hour ozone and 24-hour $PM_{2.5}$ episode selection criteria are similar because both standards are based on short term peak concentration periods. Regional haze calculations are based on an average of 20 or more days per year (20% best or worst days). Therefore regional haze episode selection will likely include more days throughout the year. The annual $PM_{2.5}$ NAAQS is unique because each and every ambient observation is included in the average. It is likely that a full year (or more) will be modeled to represent the annual $PM_{2.5}$ standard.

14.1.1 8-Hour Ozone NAAQS

Simulate a variety of meteorological conditions This criterion is important, because we want to be assured that a control strategy will be effective under a variety of conditions leading to elevated ozone concentrations. The time periods chosen should reflect the variety of conditions that lead to 8-hour ozone concentrations > 85 ppb.

Those implementing the modeling/analysis protocol should describe the rationale for distinguishing among episodes which are modeled. The selection may reflect a number of area-specific considerations. Qualitative procedures such as reviewing surface and aloft weather maps, and observed or modeled wind patterns may suffice for distinguishing episodes with distinctively different meteorological conditions. More quantitative procedures, such as a Classification and Regression Tree (CART) analysis or a principal component analysis (PCA), to identify distinctive groupings of meteorological/air quality parameters corresponding with high daily maxima or averages, may sometimes be desirable. An example of a CART analysis applied to select episodes is described by Deuel (1998). LADCO used CART to rank historical years for Midwestern cities by their conduciveness to ozone formation (Kenski, 2004). A PCA may also be used to characterize predominant meteorological conditions and relate those conditions to ozone concentrations (Battelle, 2004). This information can be used to quantify the relative "ozone forming potential" of different days, regimes, and years.

The interpretation of results of a wind rose analysis or a statistical analysis such as PCA or CART should focus on episodic time periods, rather than individual days. The winds may be blowing from different directions on consecutive days, but that does not necessarily mean that those days represent different meteorological regimes. Preference should be given to modeling episodic cycles.

Additionally, statistical analyses such as PCA normally limit the number of identified meteorological regimes to a relatively small number of generalized patterns. The analysis may indicate that only one or two of these patterns are responsible for most or all of the exceedance days in an area. But no two days and no two episodes are exactly the same. Further analysis should be performed on potential episode periods to differentiate subtle, but often important, differences between episodes. For this reason, it may be beneficial to model more than one episode from the most frequently occurring meteorological regimes which lead to ozone exceedances. Modeling a continuous time period which encompasses several episodes or a full ozone season will make it easier to adequately account for all of the potential meteorological conditions which correspond to high measured concentrations.

Choose episodes having days with monitored 8-hour daily maxima close to observed average 4th high daily maximum ozone concentrations.

We want to use episodes whose severity is comparable to that implied by the form of the NAAQS (i.e., an episode whose severity is exceeded, on average, about 3 times/year at the time of the selected episode). The objective is to choose episodes with days which are approximately as severe as the average 4th high 8-hour daily maximum concentration specified in the NAAQS. As such, even if a full summer is being modeled, it is important to analyze the ambient data to ensure that an adequate number of ozone conducive days are modeled.

Air quality measurements recorded during the baseline/current period can be used to characterize episode severity. This is done by selecting a 5-year period which "straddles" a modeled episode. For example, if an episode from 2002 were modeled, we recommend looking at measured 8-hour daily maxima at each site in the nonattainment area during 2000-2004. Using this information it should be possible to assess the relative severity of the days chosen for modeling at each site. Limiting this characterization to the five years straddling an episode avoids problems posed by long term trends in emissions in assessing episode severity. However, it leaves unanswered the question of whether the 5-year period selected to assess severity of a modeled day is typical or atypical. If there is an underlying long term trend in ambient ozone attributable to meteorological cycles or emissions changes, it may not be appropriate to compare different periods with one another using air quality observations. Thus, if one uses a 10-year old episode with an exceptional data base, there is greater uncertainty in ranking its severity relative to the current period of interest than if the episode were drawn from the current period.

Note that if the episode is drawn from a recent time period (especially the three years upon which the nonattainment designation is based), days which are chosen are likely to have monitored observations very close to the baseline design value. In the absence of such information, we suggest "$\pm$ 10 ppb" as a default recommendation for purposes of prioritizing choice of episodes[94]. If the base and baseline/current periods do not coincide, "close to" is within $\pm$ 10 ppb of the design value during the base period straddling the episode. If it is not feasible to meet this default criterion for all monitoring sites, meeting it at sites with *baseline/current* design values $\geq$ 85 ppb should receive greatest priority.

Choose days with intensive data bases.

Preference should be given to days with measurements aloft, available measurements of indicator species (see Section 18) and/or precursor measurements. These preferences result from a desire to incorporate a rigorous model performance evaluation as a part of the attainment demonstration. This reduces the likelihood of "getting the right answer for the wrong reason". Thus, the likelihood of mischaracterizing ozone/precursor sensitivity is reduced.

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[94]The analysis in section 4.1 showed that relative model response may differ on "low" ozone days compared to days that are at or above the level of the NAAQS. Therefore, ambient (and modeled) concentrations that are more than 10 ppb above the design value are preferable to episodes with ambient concentrations that are more than 10 ppb below the design value.

Choose a sufficient number of days to enable the monitored attainment test to be based on multiple days at each monitoring site violating the NAAQS.

Figure 4.1 indicates that the relative response factor computed at any given site appears to be affected by the minimum threshold value. Based on an analysis of modeled data, the recommended minimum (baseline) threshold value is 85 ppb. The minimum threshold value analysis (detailed in section 4.1) was also used to examine how the number of days contained in the mean RRF calculation influences the mean RRF. It was found that, on average, a minimum of 10 modeled days (in the mean RRF calculation) produces mean RRFs that are relatively robust.

The analysis cited earlier in the guidance (Timin, 2005b) was used to help determine the minimum number of days to use in a mean RRF calculation. The dataset consisted of 206 monitoring sites which had at least 10 days with predicted 8-hour daily baseline maximum ozone concentrations > 85 ppb. In the analysis we assumed that a mean RRF calculated from a "large" set of days is more stable than an RRF calculated from a small set of days. Using information on the variability of the model response on individual days, we are able to measure the variability of the mean RRF on any subset of days. The analysis used datasets of 25, 50, and 100 days[95]. The standard deviation of the daily RRFs was used to create the datasets and measure the variability of the RRFs.

Figure 14.1 shows an example of the variability of the mean RRF as a function of the number of days in the mean RRF calculation. The example plot is for a monitoring site in Harford County, MD. The mean RRF for a 50 day sample size is 0.90 (10% ozone reduction). The standard deviation of the daily RRFs was 0.034 (3.4%)[96]. The plot shows the range of the mean RRFs calculated using a sample size ranging from 3 to 25 days (a subset of the 50 days). Each subset (3 days, 4 days, 5 days, etc.) was sampled 1000 times. As can be seen in the plot, the range of mean RRFs varies widely for a small sample size (3 days) and is relatively stable for a large sample size (25 days). As the number of days increases, the variability of the mean RRF decreases. A similar conclusion was reached in a different study (Hogrefe, 2000) which found that the RRF is more variable when based on a small number of days.

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[95]The 25, 50, and 100 day datasets were created by calculating the standard deviation of the daily RRFs for the monitoring sites with at least 10 days > 85 ppb. The distribution of the RRF was calculated from the standard deviation. The original dataset had an actual maximum number of 30 days.

[96]The standard deviation is in "RRF units". For example, an RRF of 0.90 is equal to a10% ozone reduction. A standard deviation of 3.4% is a measure of the variability such that ±3.4% is equal to a range in mean RRF of 0.866-0.934.

The ability to accurately capture a mean RRF with a small number of days is dependent on the variability of the daily RRFs (as measure by the standard deviation). Sites with a small standard deviation of the daily RRFs will be able to replicate the large dataset mean RRF with relatively few days.

Using the available information, we were able to calculate, for each monitoring site, the number of days needed to provide a mean RRF calculation that is within ±1% and ±2% of the "large dataset" mean, with a 95% confidence interval. The number of days needed to produce a robust mean RRF is dependent on the variability of the daily RRFs (as measured by the standard deviation). Therefore, more days are needed to produce a stable RRF if the standard deviation of the daily RRFs is high.

Table 14.1 summarizes the results for the 25th, 50th (median) and 75th percentile of the standard deviation for the 206 monitoring sites. The table presents results for a range of standard deviations, a range of large datasets (25, 50, and 100 days), and both ±1% and ±2% accuracy. The table shows that for the median standard deviation of the monitoring sites (2.4%), a minimum number of 10-16 days is needed to replicate the mean RRF to within ±1% (95% of the time) and a minimum number of 5-6 days is needed to replicate the mean RRF to within ±2% (95% of the time). The table also shows that a smaller standard deviation requires fewer days and a larger standard deviation requires more days.

Value (206 sites)	Standard Deviation	± 1% (25/50/100 days)	± 2% (25/50/100 days)
25th Percentile	1.9%	9/10/12	3/4/4
Median	2.4%	10/13/16	5/5/6
75th Percentile	3.1%	12/17/23	6/8/9

Table 14.1- Number of days needed to replicate the 25/50/100 day dataset mean RRF to within ±1% and ±2%, with a 95% confidence interval.

Based on these results, we recommend a minimum number of 10 days to be included in the mean RRF calculation for each monitoring site. This will ensure a relatively robust mean RRF value that is within ±1% (on average) of the large dataset mean. If relatively few ozone days are being modeled or certain monitors have relatively few exceedances (above 85 ppb), then we recommend using an absolute minimum number of 5 days in the calculation.

The minimum number of days recommendations can be combined with the minimum threshold recommendation to create a hierarchy of number of days/threshold combinations that can address any situation. The recommended minimum concentration threshold identified in section 4.1 is 85 ppb. But similar to the minimum number of days, there may be situations where there are relatively few “high” modeled ozone days at certain monitors. Therefore, when possible, we recommend using the 85 ppb threshold[97], but it is acceptable to use a threshold as low as 70 ppb.

Therefore, the following criteria should be applied to determine the number of days and the minimum threshold at each ozone monitor:

- If there are 10 or more days with daily maximum 8-hour average baseline modeled ozone > 85 ppb then use an 85 ppb threshold.
- If there are less than 10 days with daily maximum 8-hour average baseline modeled ozone > 85 ppb then reduce the threshold down to as low as 70 ppb until there are 10 days in the mean RRF calculation.
- If there are less than 10 days with daily maximum 8-hour average modeled ozone > 70 ppb then use all days > 70 ppb.
- Don’t calculate an RRF for sites with less than 5 days > 70 ppb[98].

The following table illustrates several examples of the recommended hierarchy of choosing the number of days vs. the minimum threshold.

Number of Days > 70 ppb	**Number of Days > 85 ppb**	**Number of Days in Mean RRF**	**Threshold < 85 ppb?**
50	15	**15**	No
20	12	**12**	No
12	7	**10**	Yes
11	3	**10**	Yes
9	6	**9**	Yes
6	1	**6**	Yes
3	0	**N/A**	N/A

Table 14.2- Examples of the recommended hierarchy in choosing the number of days in the mean RRF calculation vs. the minimum threshold. The “number of days” refers to the number of days (at each monitor) when the daily modeled 8-hour ozone maximum is > 70 or 85 ppb.

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[97] As noted in section 4.1, for areas with a very high design value (>110 ppb), a higher threshold might be appropriate.

[98] Any situation where there are less than 5 days available for RRF calculations at monitoring sites with relatively high concentrations, (above the NAAQS and/or close to the area-wide design value) should be discussed with the appropriate U.S. EPA Regional office(s).

In summary, States should try to model enough episode days so that the mean RRF calculation at each monitor contains a minimum of 10 days with a modeled concentration > 85 ppb. If there are less than 10 days > 85 ppb, then the threshold should be lowered until 10 days are included in the calculation. The threshold should not go below 70 ppb and the number of days should always be at least 5. In trying to meet these recommendations, the greatest priority should be given to identifying episode days with appropriate ozone concentrations at the monitoring sites with the highest design values. Sites with design values below the NAAQS should be given a low priority.

14.1.2 Recommendations for the 24-Hour $PM_{2.5}$ NAAQS

The episode selection criteria for the 24-hour $PM_{2.5}$ NAAQS are similar to the ozone criteria. The complicating factor for the 24-hour NAAQS is that exceedances of the standard can occur under a variety of meteorological conditions at different times of the year and can be due to a variety of different PM components. Therefore the universe of episodes could be large and much more varied. The form of the standard is a 3 year average of the 98^{th} percentile concentration from each year. Therefore, modeling 3 full years of meteorological data would best capture the full range of conditions that lead to 24-hour design values. But the standard is only influenced by the very high end of the distribution of $PM_{2.5}$ days (top 2% from each year). This argues for modeling a smaller set of days on an episodic basis. We recommend one of two possible approaches:

1) Model every day for a full year (or multiple years). This is recommended for both dispersion modeling of primary $PM_{2.5}$ components and photochemical modeling of secondary and primary components. Many areas that violate the 24-hour $PM_{2.5}$ NAAQS will also violate the annual $PM_{2.5}$ NAAQS. Therefore, full year modeling may already exist or is being planned for the annual NAAQS attainment test. States that have nonattainment areas that violate both $PM_{2.5}$ standards should take advantage of planning opportunities to address both standards at the same time. Modeling at least a full year will also help ensure that a sufficient number of days are included in the RRF calculations.

2) Model episodes when high $PM_{2.5}$ concentrations occur. Similar to ozone, episodes should be selected where $PM_{2.5}$ concentrations are greater than the NAAQS (> 65 ug/m3) and are close to the baseline design value. Similar to ozone, data analyses can be completed to help select a variety of meteorological episodes which lead to high $PM_{2.5}$ concentrations. In some cases, there may be very limited conditions which lead to high 24-hour average $PM_{2.5}$ concentrations, and in other cases there may be a wide variety of cases. The specific situation in each nonattainment area will determine the number of episodes and the time periods which need to be modeled. For example, if exceedance level $PM_{2.5}$ concentrations in an area only occur in the winter, then a limited number of winter days can be modeled. In other areas, exceedance days may occur in all seasons.

The 98th percentile $PM_{2.5}$ values may be highly variable from year to year. Therefore, it is important to model a year or time periods when high $PM_{2.5}$ episodes occur in the area. The modeling should include a year and/or episodes that are representative of the 24-hour design values.

Calculation of RRFs- Regardless of the time periods modeled, component specific RRFs should be calculated for all four quarters or for all quarters in which high 24-hour $PM_{2.5}$ concentrations occur (following the recommendations in section 5.2). We do not have specific analyses that have analyzed an appropriate minimum threshold concentration for 24-hour average $PM_{2.5}$. If there are very few days that exceed the 65 ug/m3 standard, then a secondary recommendation is to include all days with concentrations > 50 ug/m3, or calculate RRFs based on the highest modeled $PM_{2.5}$ days from each quarter. A reasonable estimate of the high end of the distribution might be between the top 10% of days to the top 25% of days. We recommend that RRF calculations contain a similar number of days as for ozone. This means that each quarterly RRF calculation should contain no less than 5 days[99].

EPA will be re-examining these recommendations as they relate to the new 35 ug/m3 24-hour NAAQS as more information becomes available regarding the typical features of areas violating the revised standard. Additional guidance will be issued at a later date.

14.1.3 Annual $PM_{2.5}$

Similar to episode selection for the daily standards, the most important consideration for the annual $PM_{2.5}$ NAAQS is to model a variety of meteorological conditions throughout the year. The easiest way to accomplish this is to model a full year. Since all days count toward the annual average, each season should be represented in the modeling. If less than a full year is modeled then a minimum number of days should be modeled from each quarter.

One study (Environ, 2004) examined how well a subset of modeled days in each quarter represented modeled quarterly and annual averages. The study calculated the uncertainty associated with absolute model predictions and RRFs that were based on 7, 14, or 28 days from each quarter (the periods were contiguous). They found that the relative uncertainty of the annual average concentrations was in the range of 40-70% for SO4, 30-50% for anthropogenic organics, and 60-90% for nitrates (the low percentage is for 28 days and the high percentage is for 7 days). The uncertainty was lowered by about half when considering the uncertainty in RRFs for the 7-28 day periods vs. the annual average. This shows the advantage of using the models in a relative sense. But it also shows that modeling less than a full year introduces

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[99] A careful analysis is needed for the days that exceed the 24-hour NAAQS. It may be necessary to divide days by species as well as by quarter. For example, exceedence days with high nitrates may respond differently than exceedence days with high organics (in the same quarter). Averaging the response from many dis-similar days may give an unrealistic mean response.

additional uncertainty into the model results (compared to modeling a full year). The conclusion from the study was that at least 14 days are needed to represent each quarter. This assumes that the model results are being used in a relative sense. The study also found that nitrate is the most difficult of the species to adequately represent with a reduced number of modeling days.

Based on current information, for annual average $PM_{2.5}$, we recommend modeling a full year (or more). Reduced modeling of 15 or more days per quarter[100] may be acceptable in some cases, but areas where nitrate is an important component of $PM_{2.5}$ should consider modeling a full year (or at least the time periods when nitrates are high). Modeling less than a full year (e.g. one month per quarter) can be useful for initial strategy development and sensitivity analyses. In this way, information can be learned from partial year runs and can be supplemented with full year model runs later in the process. This may save resources and allow more model runs to be completed (relatively) quickly.

14.1.4 Regional Haze

The goals for regional haze focus on the 20% of days with best and worst visibility. Sampling in Class I areas occurs once every three days. Thus, each year there will be about 24 “worst” days and 24 “best” days to choose from. Since the base period against which reasonable progress is to be gauged is 5 years long, there could be as many as 120 “best” and “worst” days to choose among for modeling.

It is likely that numerous Class I areas will be considered simultaneously in a modeled uniform rate of progress assessment. Thus, the preferred approach for regional haze-related model applications is to simulate an entire, representative year (i.e., one whose mean derived deciview values for “20% worst” and “20% best” days approximates mean values for deciviews averaged over 5 years for the best and worst days). States can then base the RRF values on the best and worst days in each Class I area for the modeled year (the ~24 best and worst days from the modeling year). For areas included in modeling for the annual $PM_{2.5}$ NAAQS, particularly if that modeling simulates an entire representative year (or more), the modeling for $PM_{2.5}$ should also provide adequate results to analyze for regional haze.

In some cases, the meteorology for a particular year may be representative of the five year period, but due to large emissions changes during the period, a single year of ambient visibility is not representative of the five year mean. One solution is to compile the emissions inventory using five year average emissions for the base period. Because the base year and future year visibility represents a five year period, it is appropriate to average both base and future year emissions in a similar manner.

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[100]The recommendation is for 15 or more total days per quarter, not 15 or more days with monitored data.

If it is not feasible to model an entire year, then RRFs are likely to be relatively stable if at least 10 worst days (and 10 best days) are modeled (similar to the ozone recommendations). If the worst days occur throughout the year, then more time periods may need to be modeled. Worst days that occur in the same season are more likely to have similar PM components and are therefore likely to respond in a similar way.

14.2 What Additional, Secondary Criteria May Be Useful For Selecting Time Periods to Model?

In Section 14.0, we noted that there may often be conflicts among the four primary criteria recommended as the basis for choosing episodes to model. Several additional, secondary selection criteria may be helpful for resolving these conflicts.

Choose time periods which have already been modeled. That is, of course, provided that past model performance evaluation for such a time period was successful in showing that the model worked well in replicating observations. Given that the four primary criteria are met approximately as well by such time periods they are by other candidate time periods, a State/Tribe could likely save a substantial amount of work in evaluating model performance. However, large changes in emissions and precursor levels or ratios may make the use of older time periods undesirable.

Choose time periods which are drawn from the period upon which the baseline design value is based. As we note in Section 3, fewer emission estimates and fewer air quality model simulations may be needed if the base case period used to evaluate model performance, and the baseline period used in the recommended modeled attainment test are the same. Following this criterion could also make the second primary criterion more straightforward.

Choose episodes having observed concentrations "close to" the NAAQS on as many days and at as many sites as possible. This criterion mainly applies to the standards with short term averaging times (8-hour ozone and 24-hour $PM_{2.5}$). It is related to the modeled attainment test and to the fourth primary criterion for episode selection. The more days and sites for which it is reasonable to apply the test, the greater the confidence in the outcome of the modeled attainment test.

It is desirable to include weekend days among those chosen, especially if concentrations greater than the NAAQS are observed on weekends. Weekend days often reflect a different mix of emissions than occurs on weekdays[101]. This could also lead to different spatial patterns of 8-hour ozone and/or 24-hour $PM_{2.5}$ concentrations. Thus, for increased confidence that a control strategy is effective it needs to be tested on weekends as well as on weekdays. If emissions and spatial patterns of high ozone or $PM_{2.5}$ do differ on weekends versus

[101] http://www.arb.ca.gov/aqd/weekendeffect/weekendeffect.htm

weekdays, including weekend days in the choice of episodes will provide a mechanism for evaluating the accuracy of a model's response to changes in emissions.

If it has been determined that there is a need to model several nonattainment areas simultaneously, choose time periods which meet the primary and secondary criteria in as many of these nonattainment areas as possible. As discussed in Section 15, a State/Tribe or group of States/Tribes may decide to apply a model on a regional or a nested regional scale to demonstrate attainment or assess uniform rate of progress in several nonattainment areas or Class I areas at the same time. Time and resources needed for this effort could be reduced by choosing time periods which meet the primary and secondary criteria in several nonattainment areas (or Class I areas) which are modeled. Several organizations are modeling much of the Eastern U.S. for an entire year. This type of application should allow for application of the attainment tests at many locations using the appropriate set of days for each area.

15.0 What Should Be Considered When Selecting The Size And Horizontal/Vertical Resolution Of The Modeling Domain?

A modeling domain identifies the geographical bounds of the area to be modeled. The appropriate domain size depends on the nature of the strategies believed necessary to meet the air quality goal. This, in turn, depends on the degree to which air quality observations suggest that a significant part of an observed exceedance is attributable to regional concentrations which approach or exceed levels specified in the NAAQS. The choice of domain size is also affected by data base management considerations. Generally, these are less demanding for smaller domains.

Horizontal resolution is the geographic size of individual grid cells within the modeling domain. Vertical resolution is the number of grid cells (i.e., layers) considered in the vertical direction. The choice of suitable horizontal and vertical resolution depends on spatial variability in emissions, spatial precision of available emissions data, temporal and spatial variation in mixing heights, the likelihood that mesoscale or smaller scale meteorological phenomena will have a pronounced effect on precursor/pollutant relationships, data base management constraints, and any computer/cost constraints.

We begin this section by discussing factors States/Tribes should consider in choosing domain size. Next, we address the selection of horizontal grid cell size and the number of vertical layers. We conclude by discussing factors affecting the decision on the size and resolution of coarse scale and fine scale grids within a nested model.

15.1 How is the Size of the Modeling Domain Chosen?

Historically (until ~1995), ozone attainment demonstrations used urban scale modeling domains which were typically several hundred kilometers (or less) on a side. With the advent of nested grid models, most model applications began to use either relatively fine regional grids, or urban-scale inner grids nested within relatively coarse regional-scale outer grids. Recent PM modeling has generally used nationwide coarse grid domains with regional scale nested domains. We expect that most urban scale ozone and $PM_{2.5}$ attainment demonstrations will utilize a national or regional nested grid modeling approach.

The principal determinants of model domain size are the nature of the ozone and/or $PM_{2.5}$ problem and the scale of the emissions which impact the nonattainment area. Isolated nonattainment areas that are not impacted by regional transport of ozone and/or PM and its precursors may be able to use a relatively small domain[102]. Some areas of the western U.S. may fall into this category. Most nonattainment areas in the eastern U.S. have been shown to be impacted by transported ozone and/or PM and ozone and/or PM precursors from hundreds of

[102]Due to relatively long lifetimes of $PM_{2.5}$ aerosols (compared to ozone), PM modeling domains may generally need to be larger than ozone domains.

miles or more upwind of the receptor area (U.S EPA, 1998b) (U.S. EPA, 2005b). The modeling domain should be designed so that all major upwind source areas that influence the downwind nonattainment area are included in the modeling domain. The influence of boundary conditions should be minimized to the extent possible.

The inner domain of a nested model application should include the nonattainment area and surrounding counties and/or States. The size of the inner domain depends on several factors. Among them are:

1) The size of the nonattainment area.

2) Proximity to other large source areas and/or nonattainment areas.
  - -Relatively isolated areas may be able to use a smaller fine grid domain.
  - -Nearby source areas should be included in the fine grid.

3) Proximity of topographical features which appear to affect observed air quality.

4) Whether the model application is intended to cover multiple nonattainment areas.

5) Typical wind speeds and re-circulation patterns.
  - -Very light wind speeds and re-circulation patterns may obviate the need for a large fine grid domain.

6) Whether the photochemical model utilizes one-way or two-way nested grids.
  - -The fine grid domain of a model with one-way nested grids may need to be larger (compared to a model with two-way nested grids). The grid needs to be large enough to capture re-circulation due to shifting wind directions. A two-way nested grid model allows for continuous feedback from the fine grid to the coarse grid and vice versa.

7) Computer and time resource issues.

15.2 How are the Initial and Boundary Conditions Specified?

Air quality models require specification of initial conditions for model species in each grid cell in the model domain (in all layers) and boundary conditions for all grid cells along each of the boundaries (in all layers). Generation of initial and boundary conditions for individual model species include gas-phase mechanism species, aerosols, non-reactive species and tracer species. There is no satisfactory way to specify initial conditions in every grid cell. Thus, we recommend using a “ramp-up” period by beginning a simulation prior to a period of interest to diminish the importance of initial conditions[103]. We recommend a ramp-up period of at least 2-3 days for ozone modeling. Due to longer lifetimes of fine particulate matter, we recommend a ramp-up period of at least 5-10 days for $PM_{2.5}$. In this way, the choice of initial conditions are not likely to influence the modeling results. For nested model applications, initial conditions can be specified using model predictions from the outer grid if the nested grids are started after the beginning of the simulation for the outer grid.

Boundary conditions can be specified in several ways. One option is to nest the area of interest within a much larger domain using nested regional models, as described previously. As noted above in Section 15.1, use of a large regional domain acts to diminish the importance of boundary conditions. Alternatively, initial and boundary conditions can be derived from another regional nested modeling application or from a global model[104]. Another option is to use default initial and boundary concentration profiles representing relatively clean conditions which have been formulated from available measurements or results obtained from prior modeling studies, (e.g. prescribing 35 ppb for annual ozone). Another approach to consider is using the model's simulated pollutant values (generated for emissions) averaged over one or more of the upper layers to specify a value for the lateral and top boundary conditions. This approach allows for better representation of spatial and temporal variation of boundary conditions (i.e., diurnal/seasonal/vertical profiles). This method also avoids arbitrarily guessing at the future-year boundary conditions.

If there is no larger regional model application available, then it is recommended that background boundary conditions be used to specify initial and boundary concentrations for the attainment demonstration modeling. However, concentration fields derived from a larger domain regional or global chemistry model (i.e. nesting approach) is considered more credible than the assumption of static concentrations, since the pollutant concentration fields reflect simulated atmospheric chemical and physical processes driven by assimilated meteorological observations. Therefore, we recommend using boundary conditions derived from a regional or global scale model, whenever possible.

Diagnostic testing which indicates a large impact on the model results from initial or boundary conditions may indicate that the domain is not large enough or the ramp-up period is too short. In either case, it should generally be assumed that initial and boundary conditions do

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[103]Sensitivity simulations can be completed to determine the necessary length of the ramp-up period. A longer ramp-up period may be needed for very large domains where the characterization of long range transport is important.

[104]One atmosphere model applications for ozone and PM may commonly use global models to specify boundary conditions. This is especially important for PM species due to their long lifetimes. A number of recent studies show that long-range, intercontinental transport of pollutants is important for simulating seasonal/annual ozone and particulate matter (Jacob, 1999; Jaffe, 2003; Fiore, 2003).

not change in the future. The use of altered initial or boundary conditions in the future year should be documented and justified.

15.3 What Horizontal Grid Cell Size Is Necessary?

As we discuss in Section 16, most applications will use a prognostic meteorological model to provide meteorological inputs needed to make air quality estimates. Typically, these models are set up to produce meteorological fields for nested grids with a 3:1 ratio. In past modeling applications, the most commonly used grid cell sizes have been 108, 36, 12 and 4 km cells. In this section we provide recommendations for choosing the grid size to use as an upper limit for regional and urban scale models or for fine portions of nested regional grids.

This section only applies to the use of numerical grid models. If a Lagrangian dispersion model is used, estimates at (or near) the monitor locations should be used to calculate RRF values for primary PM.

In past guidance, we have recommended using horizontal grid cell sizes of 2-5 km in urban scale ozone modeling analyses (U.S. EPA, 1991a). Sensitivity tests performed by Kumar (1994) in the South Coast Air Basin compared hourly base case predictions obtained with 5 km versus 10 km versus 20 km grid cells. Results indicate that use of finer grid cells tends to accentuate higher hourly ozone predictions and increase localized effects of NOx titration during any given hour. However, statistical comparisons with observed hourly ozone data in this heavily monitored area appear comparable with the 5 and 20 km grid cells in this study. Comparisons between hourly ozone predictions obtained with 4 km vs. 12 km grid cells have also been made in an Atlanta study (Haney, 1996). As in Los Angeles, the use of smaller (i.e., 4 km) grid cells again leads to higher domain wide maximum hourly ozone concentrations. However, when reviewing concentrations at specific sites, Haney (1996) found that for some hours concentrations obtained with the 12 km grid cells were higher than those obtained with the 4 km cells. Other studies have shown that model performance does not necessarily improve with finer resolution modeling. In one study, the model performance at 12 km resolution was equal to or better than performance at 4 km resolution (Gego, 2005).

Another important aspect in choosing the horizontal grid cell size is the relative response of the model at various grid cell resolutions. Recent sensitivity tests comparing relative response factors in predicted 8-hour daily maxima ozone near sites in the eastern United States indicate relatively small unbiased differences ($\leq$ .04, in 95% of the comparisons) using a grid with 12 km vs. 4 km grid cells (LADCO, 1999; Arunachalam, 2006). The largest differences in the relative response of models at varying resolution is likely to occur in oxidant limited areas. The horizontal resolution may have a large impact on the spatial distribution and magnitude of NOx “disbenefits” (i.e., ozone increases in oxidant limited areas when NOx emissions are reduced).

A recent study of the Atlanta area (Cohan, 2006) used the Decoupled Direct Method (DDM) to examine the sensitivity of ozone production efficiency to horizontal resolution. The efficiency of ozone production should be closely related to model response to emisions controls. The analysis found that 12km resolution is sufficient (in Atlanta) to predict ozone production efficiency. However, 4km resolution is needed to identify small areas of local NOx inhibition. They also found that model performance for ozone at 4km and 12km resolution was similar.

Horizontal resolution will also have an impact on primary particulate matter. Because there is no chemistry, we expect spatial gradients in concentrations to be much higher for primary PM components compared to secondary components. The model's ability to capture these gradients will depend in large part upon the horizontal resolution of the model. Therefore, emissions density is an important factor in considering grid resolution. Additionally, terrain features (mountains, water) should be considered when choosing grid cell size.

Intuitively, one would expect to get more accurate results in urban applications with smaller grid cells (e.g., 4 km) provided the spatial details in the emissions and meteorological inputs support making such predictions. Thus, using 4 km grid cells for urban or fine portions of nested regional grids and 12 km cells in coarse portions of regional grids are desirable goals. However, model performance at 4 km resolution may not be any better than at 12 km resolution. Additionally, extensive use of urban grids with 4 vs. 12 km grid cells and regional grids with 12 vs. 36 km grid cells greatly increases computer costs, run times and data base management needs. Further, elsewhere in this guidance we identify needs to model large domains, many days, and several emission control scenarios. We also identify a number of diagnostic tests which would be desirable and suggest using more vertical layers than has commonly been done in the past. Also, there may be ways of dealing with potential problems posed by using larger than desired grid cells. For example, use of plume-in-grid algorithms for large point sources of NOx should be considered as an alternative with coarser than desired grid cells. And dispersion modeling of primary PM can be used to offset the need of fine spatial resolution in a grid model.

The relative importance of using a domain with grid cells as small as 4 km should be weighed on a case by case basis by those implementing the modeling/analysis protocol. The most important factor to consider is model response to emissions controls. Analysis of ambient data, sensitivity modeling, and past modeling results can be used to evaluate the expected response to emissions controls at various horizontal resolutions for both ozone and $PM_{2.5}$. If model response is expected to be different (and more accurate) at higher resolution, then higher resolution modeling should be considered. If model response is expected to be similar at both high and lowe(er) resolution, then high resolution modeling may not be necessary.

In this guidance, we identify upper limits for horizontal grid cell size which may be larger than desired for some applications. This is intended to provide flexibility for considering competing factors (e.g., number of modeled days versus grid cell size) in performing a modeling analysis within the limits of time and resources.

15.3.1 Horizontal Resolution Recommendations for Ozone

For coarse portions of regional grids, we recommend a grid cell size of 12 km if feasible, but not larger than 36 km. For urban and fine scale portions of nested regional grids, it may be desirable to use grid cells about 4 km, but not larger than 12 km. States/Tribes should examine past model applications and data analyses for their area when choosing the fine grid resolution. Past model applications and data analyses may help determine whether a grid cell size as small as 4 km (or smaller) is necessary for a particular area. Model performance and the relative response to emissions controls should be considered in the decision. States/Tribes should consider diagnostic tests to assess the difference in model performance and response from varying model grid resolution, particularly in oxidant-limited areas.

All ozone monitor locations within a nonattainment area should ordinarily be placed within the fine scale portion of a nested regional grid if nested models are used. States/Tribes choosing an urban grid or fine portion of a nested grid with cells 12 km or larger should consider applying plume-in-grid algorithms to major point sources of NOx. The use of plume-in-grid should be discussed with the appropriate EPA Regional Office.

15.3.2 Horizontal Resolution Recommendations for the $PM_{2.5}$ NAAQS

The formation of secondary particulate matter shares the same basic photochemical processes as ozone. In fact, they are closely interconnected in many respects. Since there appears to be little difference in RRF estimates for 8-hour ozone with 12 km vs. 4 km grid cells, we would expect this finding to hold for secondary components of particulate matter. But what about primary components of particulate matter? Because there is no chemistry, we expect spatial gradients in concentrations to be much higher for primary particulate matter than for secondary particulate matter. This follows, because it takes some time (less than 24 hours) for the chemistry to occur. Although it is clear that spatial resolution of primary PM will impact the predicted concentrations, it is not clear how it will impact the relative change in concentrations due to controls (RRFs). Areas without strong gradients in primary PM will likely have little benefit from fine scale resolution. Areas that have large gradients in primary PM may need to use finer resolution grid models or may need to supplement the grid modeling with dispersion modeling (see Section 5.3) . This particularly true if violating monitors are strongly impacted by one or more large sources of primary PM.

The bottom line of the preceding discussion is that we feel comfortable recommending that States may use grid cell sizes as large as 12 km for urban scale applications addressing secondary components of particulate matter. We are less sure about an acceptable upper limit for cell size in applications addressing primary components. We believe it is prudent to assume that, in some cases, cells as small as 4 km (or possibly smaller) are needed. Those implementing the modeling/analysis protocol may wish to perform a diagnostic test using a grid model without chemistry to see whether estimated RRF's for primary components are affected if one decreases the grid cell size from 12 km to 4km. Alternatively, large sources of primary PM can be modeled with a dispersion model or a combination of grid and dispersion models (see Section 5.3).

We expect that modeling analyses for nonattainment areas will use grid cell sizes of 12 km or less. If a regional scale model is applied, most of the domain will likely cover rural/remote areas or locations which are not out of compliance with the NAAQS. For the regional outer nest of the domain, grid cells as large as 36 km may be used.

15.3.3 Horizontal Resolution Recommendations for Regional Haze

The glidepath analysis for regional haze focuses on Class I areas. Most of these are in remote or rural locations. Regional haze is not likely to be dominated by local sources. Further, light extinction is more likely to be dominated by secondary particulate matter, due to the efficiency of light scattering by secondary particles. All these attributes indicate that it will be necessary to model a regional scale domain for regional haze related applications. Because of the remoteness of Class I areas, grid cell sizes up to 36 km on a side should suffice for regional haze-related modeling. States may wish to perform diagnostic tests using plume-in- grid analyses, as well as finer horizontal resolution to determine if results may differ using more finely resolved emissions and meteorology. Guidance on vertical resolution presented in Section 15..4 is also applicable for regional haze-related applications.

15.4 How Should the Vertical Layers Be Selected?

As described in Section 16, the preferred approach for generating meteorological data fields for input to air quality simulation models is to use a prognostic meteorological model with four dimensional data assimilation (FDDA). Such models normally use more than 30 vertical layers. To minimize a number of assumptions needed to interface meteorological and air quality models, it is better to use identical vertical resolution in the air quality and meteorological models. However, application of air quality models with as many as 30 vertical layers may not be feasible or cost effective. In this section we identify factors to consider in choosing the number of vertical layers chosen for the air quality model applications.

In the past, short ozone episodes of only several days usually encompassed periods of mostly clear skies with very little precipitation. As such, ozone models often did not explicitly model clouds or precipitation. However, we are recommending modeling longer episodes (or even a full ozone season) for ozone and a full year for $PM_{2.5}$ and regional haze applications. Therefore the photochemical model needs to account for cloud processes and a full range of precipitation types. In order to adequately parameterize these processes, the top of the modeling domain should typically be set at the100 millibar level (~16,000 meters). In turn, this means that many more vertical layers will be needed to capture the meteorological processes both below and above the boundary layer, up to the top of the model.

The accuracy of predicted base case ozone and PM concentrations will be affected by how well the model is able to characterize dilution of ozone, PM, and precursors. This, in turn, depends in part on how precisely the model can estimate mixing heights (i.e., the PBL). The precision of mixing height estimates is affected by the thickness of the model's vertical layers aloft which are near the anticipated mixing height (Dolwick, 1999). Ozone concentrations are most heavily influenced by the rate of rise in the morning mixing height and the maximum afternoon mixing height. Since PM is measured as a 24-hour average concentration, PM is also influenced by the strength of nighttime mixing and the presence of a low level inversion. Because mixing heights may vary on different days and it is necessary to simulate numerous days and locations, model predictions can be influenced by the number of vertical layers considered by the model.

Placement of vertical layers within the planetary boundary layer is also an important issue. For practical reasons, it is best to have an air quality model's vertical layers align with the interface between layers in the meteorological model. In view of the importance of carefully specifying the temporal variation in mixing height, we recommend high precision below and near the anticipated maximum afternoon mixing height. In addition, specifying the vertical extent of mixing overnight during stable conditions is also an important consideration in determining the vertical layer structure. In this regard, we recommend that the lowest layer in the air quality model be no more than 50 meters thick. In general, layers below the daytime mixing height should not be too thick, or large unrealistic step increases in mixing may occur. Layers above the boundary layer are important for characterizing clouds and precipitation, but are less important to the daily mixing processes of pollutants. Therefore, vertical resolution above the boundary layer is typically much coarser.

There is no correct minimum number of vertical layers needed in an attainment demonstration. The vertical resolution will vary depending on the application. Recent applications of one atmosphere models (with model tops at 100mb) have used anywhere from 12 to 21 vertical layers with 8-15 layers approximately within the boundary layer (below 2500m) and 4-6 layers above the PBL (Baker, 2004b), (Hu, 2004).

There are also ozone model applications which may not need to consider the full set of meteorological data through the tropopause. These applications typically use vertical domains which extend up to 4 or 5 km. These applications are most appropriate for short ozone episodes that occur under high pressure conditions (little cloud cover or precipitation). In these cases, fewer vertical layers are needed to represent the atmosphere up to the top of the domain (4-5 km). However, where appropriate, EPA encourages the use of full-scale one-atmosphere models which account for all atmospheric processes up to ~100 mb.

16.0 How are the Meteorological Inputs Prepared for Air Quality Modeling?

In order to solve for the change in pollutant concentrations over time and space, air quality models require certain meteorological inputs that help simulate the formation, transport, and removal of pollutant material. The required meteorological inputs can vary by air quality model, but consistently involve parameters such as wind, vertical mixing, temperature, moisture, and solar radiation. While model inputs can be derived strictly from ambient measurements, a more credible technical approach is to use meteorological grid models to provide the necessary inputs. When these models are applied retrospectively (i.e., for historical time periods) they are able to blend ambient data with model predictions via four-dimensional data assimilation (FDDA), thereby yielding temporally and spatially complete data sets that are grounded by actual observations.

This section provides recommendations for generating, or otherwise acquiring, the meteorological data sets sufficient for air quality modeling purposes. Additional suggestions are provided to assist in the configuration of standard meteorological modeling analyses. The last section outlines procedures for evaluating whether the meteorological input is of sufficient quality for input into the air quality model. In general, it is recommended that States/Tribes spend appropriate effort in accurately characterizing the meteorological fields in view of several sensitivity runs which show that relatively small perturbations in meteorological inputs can have large impacts on resultant air quality modeling results (Dolwick, 2002).

16.1 What Issues are Involved in the Generation and Acquisition of Meteorological Modeling Data?

The recommended approach for generating the meteorological data needed to conduct the attainment demonstration is to apply dynamic meteorological models with FDDA. These models use the fundamental equations of momentum, thermodynamics, and moisture to determine the evolution of specific meteorological variables from a given initial state. When modeling past events, the use of data assimilation helps to "nudge" solutions so that they do not diverge greatly from the actual observed meteorological fields. A major benefit of using dynamic meteorological models is that they provide a way of consistently characterizing meteorological conditions at times and locations where observations do not exist. Examples of frequently used meteorological models are listed below:

- The Penn State University / National Center for Atmospheric Research mesoscale model known as MM5 (Grell, 1994),
- The Regional Atmospheric Modeling System (RAMS) (Pielke, 1992), and
- The Weather Research and Forecasting Model (WRF) (Skamarock, 2005).

Recent advances in relatively low-cost computational power have resulted in widespread use of MM5 and similar models for air pollution applications over the past decade (Olerud, 2000; Doty, 2001; Johnson, 2003; Baker, 2004b). EPA expects that the large majority of future attainment demonstration analyses will be based on meteorological data from these types of dynamic meteorological models. However, there are other acceptable means of generating meteorological data for an air quality modeling simulation. Over the next several years, EPA further expects that more meteorological input data sets will be developed from archived National Weather Service (NWS) model simulations. It is possible that data from archived model simulations (such as WRF) could be used to feed air quality simulations. Some of these prognostic meteorological models are already being used to drive real-time air quality forecasts (McQueen, 2004). Additionally, in some cases the dynamic meteorological model may not adequately capture key meteorological elements of an airshed's conceptual model (e.g., source-receptor transport vectors to key monitoring locations). In cases such as these, it may be appropriate to blend the dynamic model data with wind data from an objective analysis of observed wind fields.

A description of the methods used to generate the meteorological fields should be included in the modeling protocol. In cases in which standard meteorological modeling (e.g., MM5, RAMS, or WRF in a retrospective analysis mode) is not used, it is recommended that a detailed description of the technique that is used to generate the three-dimensional meteorological fields be shared with the appropriate EPA regional office(s) prior to conducting the air quality modeling analysis.

16.2 How Should the Meteorological Modeling Analysis be Configured?

As with other parts of the air quality modeling system, choices made regarding how to configure the meteorological modeling can affect the quality and suitability of the air quality model predictions. Decisions regarding the configuration of complex dynamic meteorological models can be particularly challenging because of the amount of flexibility available to the user. The following are recommendations on how to establish the configuration of a meteorological model for air quality analyses. The focal point in establishing the proper meteorological modeling configuration should be to get the best possible meteorological model performance.

Selecting a Model Domain: As noted in Section 15, it is expected that most attainment demonstrations will cover large areas and use nested grids. The outermost grid should capture all upwind areas that can reasonably be expected to influence local concentrations of ozone, and/or $PM_{2.5}$. In terms of selecting an appropriate meteorological modeling domain, one should extend the grid 3 to 6 cells beyond the domains of each air quality modeling grid to avoid boundary effects. For example, if 4 km grid cells are to be used in the fine portion of a nested regional air quality model, then the meteorological fields at this detail would need to extend 12-24 km beyond the bounds of the 4 km grid used for air quality predictions. In terms of grid resolution, EPA recommends that the dynamic meteorological models use the same grid resolution as desired for the air quality model applications. In some cases, however, this may not always be feasible. One possible reason for modeling with meteorology using a different grid resolution is in the case of unacceptable model performance from the meteorological model at the desired grid resolution. In other instances, the need for finer resolution may be emissions-driven more than meteorologically-driven and the costs do not warrant the generation of additional resolution in the meteorological data. In these specific situations it is recommended that the air quality model application use available results from meteorological models on the next coarser scale (i.e., 36 km for a desired 12 km estimate, 12 km for a desired 4 km estimate). The coarse grid meteorological fields can be mapped to the more finely resolved air quality modeling domain.

Selecting Physics Options: Most meteorological models have a suite of "physics options" that allow users to select how a given feature will be simulated. For example, there may be several options for specifying the planetary boundary layer scheme or the cumulus parameterization. In many situations, the "optimal" configuration cannot be determined without performing an initial series of sensitivity tests which consider various combinations of physics options over specific time periods and regions. While these tests may not ultimately conclude that any one configuration is clearly superior at all times and in all areas, it is recommended that these sensitivity tests be completed, as they should lead to a modeling analysis that is best-suited for the domain and period being simulated. Examples of sensitivity analyses can be found in McNally (2002), Olerud, (2003), and Huang, (2005). Typically, the model configuration which yields predictions that provide the best statistical match with observed data over the most cases (episodes, regions, etc.) is the one that should be chosen, although other more qualitative information can also be considered. Additionally, model configurations should be designed to account for the pollutants and time periods that are of most interest. As an example, a wintertime PM simulation in the Midwest (with high measured nitrate concentrations) may need a meteorological model configuration that employs a land-surface model that properly handles snow cover fields and their effects on boundary layer humidities and temperatures.

Use of Data Assimilation: As noted above, the use of FDDA helps to keep the model predictions from widely diverging from what was actually observed to occur at a particular point in time/space. However, if used improperly, FDDA can significantly degrade overall model performance and introduce computational artifacts (Tesche and McNally, 2001). Inappropriately strong nudging coefficients can distort the magnitude of the physical terms in the underlying atmospheric thermodynamic equations and result in "patchwork" meteorological fields with strong gradients between near-site grid cells and the remainder of the grid. Additionally, if specific meteorological features are expected to be important for predicting the location and amount of pollution formed, based on an area's conceptual model, then the meteorological modeling should be set up to ensure that FDDA does not prevent the model from forming these features (e.g. nocturnal low-level wind jets). In general, analysis nudging strengths should be no greater than 1.0×10^{-4} for winds and temperatures and 1.0×10^{-5} for humidity. In the case of observation nudging (i.e., FDDA based on individual observations as opposed to analysis fields), it is recommended that the resultant meteorological fields be examined to ensure that the results over the entire domain are still consistent. Further, based on past experience, we recommend against using FDDA below the boundary layer for thermodynamic variables like temperature and humidity because of the potential for spurious convection. If the dynamic model is applied without FDDA, it is suggested that the simulation durations be shorter than 24 hours.

Conversion of Meteorological Outputs to Air Quality Model Inputs: Even before determining how the meteorological model is configured, careful thought should be given to the compatibility between candidate meteorological models and the air quality model(s) chosen for use. A variety of post-processors exist to convert the outputs from the meteorological models into the input formats of the air quality models. Some examples include: the Meteorology Chemistry Interface Processor (MCIP) (Otte, 2004), MM5CAMx (Environ, 2006a), and RAMSCAMx (Environ, 2006a). These meteorological preprocessors provide a complete set of meteorological data needed for the air quality simulation by accounting for issues related to: 1) data format translation, 2) conversion of parameter units, 3) extraction of data for appropriate window domains, 4) reconstruction of the meteorological data on different grid and layer structures, and 5) calculation of additional variables.

16.3 How Should the Performance of the Meteorological Modeling Be Evaluated?

While the air quality models used in attainment demonstrations have consistently been subjected to a rigorous performance assessment, in many cases the meteorological inputs to these models are accepted as is, even though this component of the modeling is arguably more complex and contains a higher quantity of potential errors that could affect the results of the analysis (Tesche, 2002). EPA recommends that States/Tribes devote appropriate effort to the process of evaluating the meteorological inputs to the air quality model as we believe good meteorological model performance will yield more confidence in predictions from the air quality model. One of the objectives of this evaluation should be to determine if the meteorological model output fields represent a reasonable approximation of the actual meteorology that occurred during the modeling period. Further, because it will never be possible to exactly simulate the actual meteorological fields at all points in space/time, a second objective of the evaluation should be to identify and quantify the existing biases and errors in the meteorological predictions in order to allow for an downstream assessment of how the air quality modeling results are affected by issues associated with the meteorological data. To address both objectives, it will be necessary to complete both an operational evaluation (i.e., quantitative, statistical, and graphical comparisons) as well as a more phenomenological assessment (i.e., generally qualitative comparisons of observed features vs. their depiction in the model data).

Operational Evaluation: The operational evaluation results should focus on the values and distributions of specific meteorological parameters as paired with and compared to observed data. It is recommended that the observation - model matching be paired as closely as possible in space and time. Typical statistical comparisons of the key meteorological parameters[105] will include: comparisons of the means, mean bias, mean normalized bias, mean absolute error, mean absolute normalized error, root mean square error (systematic and unsystematic), and an index of

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[105] It is difficult to say which meteorological parameters will most affect any particular modeling exercise and it will vary by parameter and location. However, in general, it is expected that following key variables should be most closely evaluated: temperature, water vapor mixing ratio, wind speed, wind direction, clouds/radiation, precipitation, and the depth and evolution of vertical mixing over the modeling periods.

agreement. For modeling exercises over large domains and entire ozone seasons or years, it is recommended that the operational evaluation be broken down into individual segments such as geographic subregions and/or months/seasons to allow for a more comprehensive assessment of the meteorological strengths and weaknesses. Other useful ways of examining model performance include: aloft, surface, individual episodes (e.g., high ozone / $PM_{2.5}$ days), diurnal cycle, as a function of synoptic regimes, or combinations of the above. It is recommended that the ambient data used in these statistical comparisons be quality checked by doing standard range check and buddy analyses. To the extent that modelers can set aside a portion of the ambient data strictly for evaluation purposes (i.e., data not used in the FDDA), that is also encouraged. Figure 16.1 shows a sample operational evaluation summary. This graphic was developed using the Atmospheric Model Evaluation Tool (AMET) (Gilliam, 2005), though other evaluation tools are available.

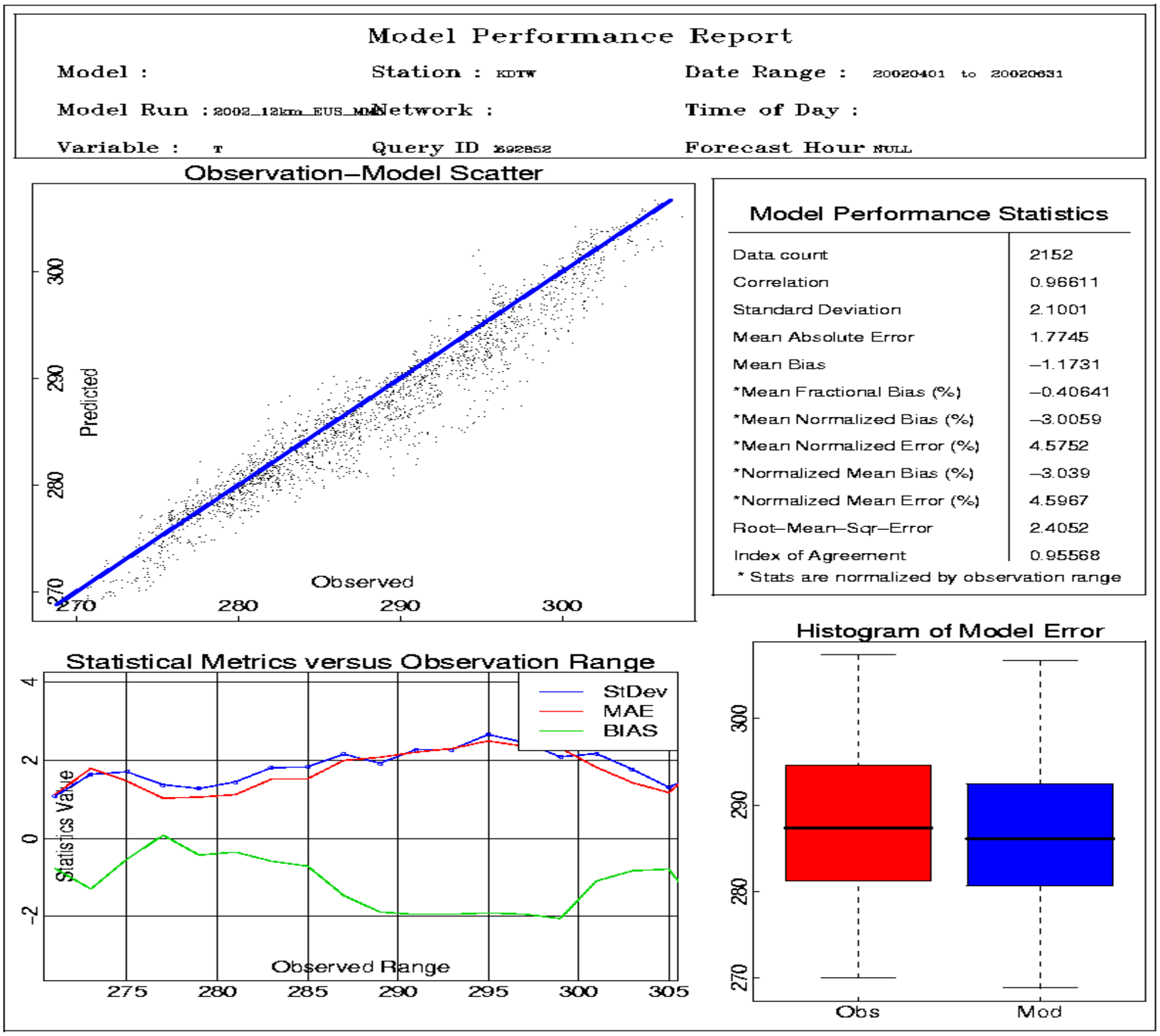

Figure 16.1 Sample operational evaluation summary for a 2002 MM5 case. This particular analysis looked at April through June temperature performance at a single site. The upper left quadrant shows a scatter plot of observed versus predicted temperatures, the lower left traces show how model performance varies as a function of the observation range, the upper right table lists some of the statistical outputs, and the lower right compares the spectrum of predictions against the observational spectrum.

It may be helpful when calculating domainwide and/or regional summary statistics to compare the results against previously generated meteorological model performance "benchmarks" (Emery et al., 2001). However, because of concerns about potentially misleading comparisons of model performance findings across different analyses with differing model configurations and FDDA strengths, EPA does not recommend using these benchmarks in a "pass/fail" mode, but only as a means of assessing general confidence in the meteorological model data. Statistical results that are outside the range of the compiled benchmarks may indicate an issue that should be given further examination. Figure 16.2 shows a sample analysis in this vein.

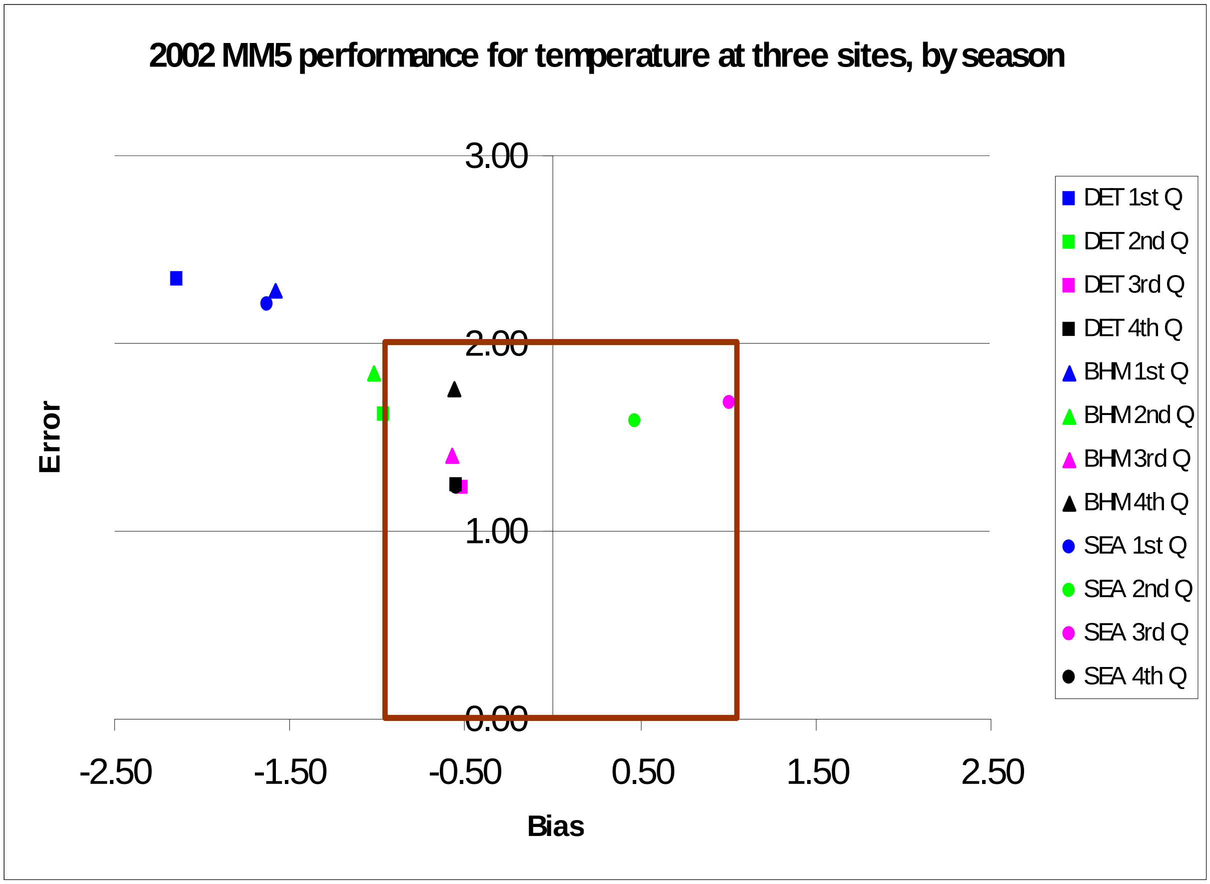

Figure 16.2: Sample "soccer plot" summary of temperatures from a 2002 MM5 case. This particular analysis looked at seasonal temperature performance at three sites. The benchmarks in this case were set at +/- 1.0 K for bias and 2 K for error. This analysis called attention to a relatively large cold bias in the winter.

In most cases the performance evaluation will be completed on the raw meteorological fields. However it is also important to compare the results before and after the meteorological post-processing to ensure that the meteorological fields going into the air quality model have not been adversely affected.

Phenomenological Evaluation: As discussed in Chapter 11, it is recommended that a conceptual description of the area's air quality problem be developed prior to the initiation of any air modeling study. Within the conceptual description of a particular modeling exercise, it is recommended that the specific meteorological parameters[106] that influence air quality be identified and qualitatively ranked in importance. When evaluating meteorological models or any other source of meteorological data, the focus of the phenomenological evaluation should be on those specific meteorological phenomena that are thought to strongly affect air pollution formation and transport within the scope of a specific analysis. It is expected that this event-oriented evaluation will need to summarize model performance in terms of statistical metrics such as probability of detection and false alarm rate. As an example of a potential phenomenological analysis, many regional air quality modeling exercises attempt to assess the effects of transport of emissions from one area to a downwind area with an intent to establish source-receptor relationships. For these types of modeling analyses, accurate transport wind trajectories are needed to properly establish these source-receptor linkages. In this type of model application, a useful event-based meteorological evaluation would be to compare model-derived trajectories versus those based on ambient data to determine what error distance can be associated with the model fields.

[106] Possible examples include: lake/sea breezes, low-level jets, or amount of convection on a given day.

17.0 How Are the Emission Inputs Developed?

Air quality modeling for 8-hour ozone, $PM_{2.5}$, and regional haze requires emission inputs for base case, baseline, and future modeling years. As explained in the EPA Emission Inventory Guidance (U.S. EPA, 2005e), 2002 is designated as a new base year for 8-hour ozone and $PM_{2.5}$ SIPs and regional haze plans; therefore, wherever possible, 2002 should be used for baseline modeling[36]. The use of an alternative baseline year should be discussed with the appropriate EPA regional office. The future-year depends on the nonattainment classification of the individual State or Tribe, as described in Section 3.6. Note that emissions data should be consistent with the data used in the modeled attainment test, described in Sections 3-6.

Preparation of emissions data for air quality models for the base and future years requires several steps. First, States and Tribes need to compile base-year inventories for their modeling region (e.g., the States and Tribes in the modeling grid). For ozone model applications, emission inventories should include a complete accounting of anthropogenic and biogenic VOC (speciated), NOx, and CO**.** For PM and regional haze model applications, emission inventories should also include emissions of SO2, NH3, $PM_{2.5}$ (speciated), and PM coarse (PMC)**.** Second, modelers must collect "ancillary data" associated with the inventories, which prescribes the spatial, temporal, and chemical speciation information about the emission inventory. Third, modelers use the ancillary data for "emissions modeling". Emissions models spatially, temporally, chemically, and vertically allocate emission inventories to the resolution needed by AQMs. Fourth, modelers must collect data on growth rates and existing control programs for use in projecting the base year emission inventories to the future year, and then use an emissions model to prepare that future year inventory data for input to the air quality model. Fifth, emissions inventories that reflect the emissions reductions needed for attainment will have to be prepared for air quality modeling.

Sections 17.1 and 17.2 summarize the issues for preparing emission inventories. Section 17.3 describes the needs for ancillary data. Section 17.4 summarizes the emissions modeling steps. Section 17.5 and Section 17.6 summarizes the issues associated with modeling of future year emissions data. Finally, Section 17.7 provides guidance on emissions to be used for local area primary $PM_{2.5}$ modeling.

17.1 What Emission Inventory Data are Needed to Support Air Quality Models?

Air quality models require hourly emissions for each grid cell and model layer in the modeling domain. Depending on the application, models may be run for episodic periods or for

[36] 2002 is the recommended inventory year for the baseline modeling (the starting point for future year projections). Other years may be modeled for the base case modeling (for performance evaluation) if episodes are chosen from years other than 2002. If all of the episodes are from 2002, then the base case and baseline inventories will be for the same year. See Section 14.1 for more details on selecting modeling time periods.

up to a full year or multiple years. The emissions need to be allocated to the chemical species required for the chemical mechanism and version of the model being used. The speciated emissions of VOC and $PM_{2.5}$ depend on the air quality model and chemical mechanism being used. For primary $PM_{2.5}$ emissions, the models typically divide the PM into (at a minimum) organic carbon, elemental carbon, primary sulfate, primary nitrate, and “all other” $PM_{2.5}$ emissions. Calculating the speciated emissions is part of the emission modeling step, described in Section 17.4 based on data described in Section 17.3.

Emission inventory data from five general categories are needed to support air quality modeling: stationary point-source emissions, stationary area-source emissions (also called non-point), mobile emissions for on-road sources, mobile emissions for nonroad sources (including aircraft, railroad, and marine vessels), and biogenic/geogenic emissions. The emission inventory development and emissions modeling steps can be different for each of these categories.

Point Sources- Point source inventories for modeling should be compiled at a minimum by country, State/Tribe, county, facility, stack, and source category code (SCC) but often are further subdivided by “point” and “segment”(see references below to point-source inventory development). The point source data must include information on the location of sources (e.g., latitude/longitude coordinates); stack parameters (stack diameter and height, exit gas temperature and velocity); and operating schedules (e.g., monthly, day-of-week, and diurnal).

Stationary Area Sources- Stationary-area source emissions data should be compiled by country, State/Tribe, county, and SCC. The most current stationary source emissions methods can be found at http://www.epa.gov/ttn/chief/.

On-Road Mobile- On-road mobile source emissions should be estimated using the most current version of the U.S. EPA MOBILE model (http://www.epa.gov/omswww/m6.htm), and for California, the most current version of EMFAC (http://www.arb.ca.gov/msei/msei.htm) in concert with vehicle miles traveled (VMT) data representative of the time periods modeled. The MOBILE model allows modelers to override default settings to obtain a local-specific on-road inventory, and modelers should consider using these options to improve their inventories. On-road emissions and VMT should be compiled at least at the country, State/Tribe, county, and SCC level, though modelers may optionally compile and use data for individual road segments (called “links”). The link approaches requires starting and ending coordinates for each road link. As noted in Section 17.3, link-based emissions can be based on Travel Demand Models (TDMs).

Nonroad Mobile- For nonroad mobile sources, the emissions should be compiled as country, state/tribe, county and SCC totals. For activities other than aircraft, locomotives, and marine, inventory developers should use the most current version of EPA’s NONROAD model (http://www.epa.gov/oms/nonrdmdl.htm) or alternative model. The California OFFROAD model should be preferentially used for emissions in California, available at http://www.arb.ca.gov/msei/msei.htm. Since the NONROAD model does not include emissions of aircraft, locomotives, and commercial marine vessels, these emissions should be estimated using other approaches described as follows:

- Aircraft emissions should ideally be calculated based on airport-specific landing and takeoff activity data and the Federal Aviation Administrations (FAA) Emissions Data and Dispersion Model (EDMS), available at http://www.faa.gov/about/office_org/headquarters_offices/aep/models/edms_model/. Although aircraft emissions may be at the county and SCC level, point (latitude/longitude) or shape file spatial resolution may be desirable (but possibly more challenging to use in emissions models). County emissions of aircraft at airports can be allocated to point locations using emissions modeling features, such as the SMOKE area-to-point feature.

- Railroad emissions should ideally be calculated at the county and SCC level using fuel usage activity data distributed among train types (e.g., long haul, yard, passenger) and rail ton/miles data.

- Commercial marine vessel emissions should ideally be calculated at the county and SCC level by fuel/cargo activity, or by growth from previously determined inventory efforts. The emissions are distributed to ports and cargo lanes by activity data. County emissions of port-based emissions can be allocated to point locations using emissions modeling features, such as the SMOKE area-to-point feature.

The most current mobile source emissions methods can be found at http://www.epa.gov/ttn/chief/.

Biogenic Emissions - Biogenic emissions from plants and soil contribute VOC (including terpenes that are imported for PM and regional haze modeling), NOx, and CO emissions, which are best calculated as part of the emissions modeling step described in Section 17.4. These emissions require land use data, which is described as an ancillary dataset in Section 17.3. Geogenic emissions (such as volcanic emissions) are often not relevant for many areas, but if geogenic sources in the modeling domain are expected to contribute in a significant way to air quality problems, they should be included.

Other Considerations - For all sectors, emissions data must be compiled at a minimum as an annual total for the base modeling year. Emissions can also be compiled as monthly total emissions or (for ozone) an average summer day inventory. In any case, the temporal allocation step during emissions modeling (see Sections 17.3 and 17.4) must adjust the inventory resolution for the modeling time period. Additionally, we encourage the use of more temporally specific data where it is available and can be expected to improve model performance. For example, hour-specific Continuous Emissions Monitoring (CEM) data may be used as a source for hour-specific NOx and SO_2 emissions and exit gas flow rates[37], and the hourly heat-input CEM data

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[37]Day specific emissions data, such as CEM data or wildfire data may be useful in the base case modeling to improve model performance. But in some cases, it may not be appropriate to project day-specific data to the future. For example, if a large power plant was shutdown for maintenance during the base case period, it would not be logical to project zero emissions for that source in the future (if it is assumed that the plant will be operating in the future year).

can be used to allocate emissions of other pollutants. CEM data are provided by EPA's Clean Air Markets Division in a format suitable for use in emissions processing at http://cfpub.epa.gov/gdm/index.cfm?fuseaction=emissions.prepacksmoke.

Additionally, inventory developers are encouraged to focus their emissions data collection, quality assurance, and emissions modeling efforts on the emissions sources that will have the greatest impact on their modeling results. In other words, inventory developers should devote the greatest attention to the sources that are most important: those in the immediate nonattainment areas, or large sources that may be responsible for transport into the nonattainment areas. Such a hierarchical approach to inventory development is described in (Smith,1998).

Inventories should be built using the most current, accurate, and practical methods available. Several references are available for guidance on building emission inventories. The first is the "Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter NAAQS and Regional Haze Regulations" (U.S. EPA, 2005e). Additionally, modelers may want to consider EPA's approaches used for developing the 2002 NEI. Available NEI documentation may be used to help guide the development of the modeling inventory (http://www.epa.gov/ttn/chief/net/2002inventory.html). Lastly, 10 volumes (many with several chapters comprised of separate documents) have been issued by the Emission Inventory Improvement Program (EIIP) for use in inventory development. Nine of these volumes are relevant to creating emission inventories for ozone, PM, and regional haze modeling (U.S. EPA, 2004h):

- Volume I: Introduction
- Volume II: Point Sources
- Volume III: Area Sources and Area Source Method Abstracts
- Volume IV: Mobile Sources
- Volume V: Biogenics Sources
- Volume VI: Quality Assurance/Quality Control
- Volume VII: Data Management Procedures
- Volume IX: Particulate Emissions
- Volume X: Emission Projections

The EIIP documents are available electronically through the EPA website at http://www.epa.gov/ttn/chief/eiip/techreport/. The quality assurance procedures contain essential steps for inventory preparation, which help assure that the emission inventory is appropriate for SIP air quality modeling.

Therefore, before projecting the baseline to the future, it may be necessary to remove certain day-specific inventory information and replace it with average data. This issue is not a concern for day-specific mobile source or biogenic emissions data which are dependent on day specific (or even hourly) meteorological data for the time periods modeled.

17.2 Can The National Emission Inventory Be Used As a Starting Point?

We recommend that States and Tribes start with available inventories suitable for air quality modeling of the selected time period(s). If no such inventory is available, States/Tribes may derive an inventory suitable for use with models starting from the National Emission inventory (NEI), available from http://www.epa.gov/ttn/chief/net/. The 2002 NEI can be used as a starting for inventory development. However, the detail and accuracy of the emissions in the NEI may not be sufficient for use in attainment demonstration modeling. NEI data may be sufficient for estimating emissions in States that are hundred of kilometers downwind of the nonattainment area, but may not be sufficient for estimating local emissions that are critically important in estimating ozone or PM in the nonattainment area. Thus, States/Tribes should review the contents of the NEI for accuracy and completeness for regional and local scale modeling and amend the data where it is insufficient to meet the needs of the local air quality model application. While some benefits can be realized for states using the same inventory (such as the NEI) as a starting point for their work, the more important goal for SIP inventory development is to ensure that the data are representative and accurate enough for making good control strategy decisions.

17.3 What Other Data are Needed to Support Emissions Modeling?

The emission inventories must be converted (through emissions modeling) from their original resolution (e.g., database records) to input files for air quality models. These input files generally require emissions to be specified by model grid cell, hour, and model chemical species. This section describes the ancillary data that modelers should collect that allow emissions models to convert the emission inventory data.

Ancillary data for temporal allocation are necessary for stationary point, stationary area, and all mobile sources. To facilitate temporal allocation of the emissions, factors (called profiles) must be created to convert annual emissions to specific months (monthly profiles), average-day emissions to a specific day of the week (weekly profiles), and daily emissions to hours of the day (hourly profiles). Additionally, a cross-reference file is needed to assign the temporal profiles to the inventory records by SCC, facility, or some other inventory characteristics. Where available, the operating information that may be available from the point-source inventory should be used to create inventory-specific temporal factors. EPA provides a starting point for the temporal profiles and cross-reference files, available at: http://www.epa.gov/ttn/chief/emch/temporal/.

For point sources, hourly Continuous Emissions Monitoring data are recommended for use in model-evaluation runs. For future-year runs, we recommend creating an “average-year”or “typical year” temporal allocation approach that creates representative emissions for the “baseline inventory” but that also includes similar daily temporal variability as could be expected for any given year. Care should be taken to not reduce or increase day-to-day variability in the averaging approach, with the exception of eliminating year-specific outages or other year-specific anomalies[38] within the years used for the model-attainment test.

The emissions models also need information about the chemical species of the VOC and $PM_{2.5}$ emissions for stationary point, stationary area, and all mobile sources. These data are used to disaggregate the total VOC and $PM_{2.5}$ emissions to the chemical species expected by the air quality model and are called speciation "factors" or "profiles". EPA provides a starting point for the VOC and $PM_{2.5}$ speciation data, which are available at: http://www.epa.gov/ttn/chief/emch/speciation/. For large or critical VOC and $PM_{2.5}$ sources in the modeling domain, States/Tribes should consider determining the individual chemical compounds contributing to the total VOC and $PM_{2.5}$. If collected, this information should then be used to compile improved speciation profiles for the critical facilities or source categories. These speciation profiles should be assigned to the inventory by a speciation cross-reference file, which also needs to be created or updated from the available defaults. The cross-reference files typically assign speciation profiles based on SCC code, though facility-specific assignments for point source code is also possible if plant-specific data are available.

For all source sectors that are compiled at a county resolution, the emissions models also need information about allocating the countywide emissions to individual grid cells that intersect the county. Such sectors include stationary area, nonroad mobile, and non-link on-road mobile sources. The spatial allocation process assigns fractions of county-total emissions to the model's grid cells intersecting the county based on a "surrogate" data type (e.g., population or housing data). The appropriate types of surrogate data to use for each SCC in the inventories should be identified for this processing step. Spatial surrogates can be created using Geographic Information Systems (GISs) to calculate the fraction of countywide emissions to allocate to each grid cell based on the surrogate type. These calculations can also be made using EPA's Surrogate Tool (http://www.cep.unc.edu/empd/projects/mims/spatial/srgtool/), which is based on the Multimedia Integrated Modeling System (MIMS) Spatial Allocator (http://www.cep.unc.edu/empd/projects/mims/spatial/). Additionally, all SCCs needing spatial surrogates should be assigned a surrogate in a cross-reference file. Point sources do not need spatial surrogates, since the emissions models assign the grid location based on the latitude and longitude of the point sources. Additionally, EPA provides spatial surrogates and cross-references for a limited set of modeling grids and surrogate types at: http://www.epa.gov/ttn/chief/emch/spatial/. Finally, for future-year modeling, emissions developers can choose to change their spatial surrogate data based on predicted changes in land

[38]The baseline inventory should contain emissions estimates that are consistent with emissions patterns which might be expected in the future year(s). If unplanned outages or shutdowns at point sources occurred in the base year, then it may not be appropriate to project those emissions to the future. Using a typical or average year baseline inventory provides an appropriate platform for comparisons between the base year and future years. However, certain emissions strategies may depend on capturing temporal emissions patterns on days with peak ambient concentrations. This should be considered when creating typical or average year inventories.

use patterns, population growth, and demographics, however, the impact and utility of such approaches is not well characterized[39].

For biogenic emissions modeling, the Biogenic Emission Inventory System, version 3 (BEIS3) (http://www.epa.gov/asmdnerl/biogen.html) model comes with all needed ancillary data, except the gridded land-use data and meteorology data for a specific air quality modeling domain and grid. Other biogenic models are acceptable as well, provided that the users have demonstrated their suitability for the modeling application. Land use and meteorology data that are compatible with BEIS3 are needed for the specific grid and grid-cell resolution that is being used. For BEIS3, land use data can be created with the MIMS Spatial Allocator (http://www.cep.unc.edu/empd/projects/mims/spatial/), using raw Biogenic Emissions Landcover Data (BELD), version 3 (http://www.epa.gov/ttn/chief/emch/biogenic/). For future-year modeling, emissions developers can choose to change their land cover data based on predicted changes in land use patterns, however, the impact and utility of such approaches is not well characterized. The impact and model characterization of biogenic terpene and sequiterpene on secondary aerosol format for PM modeling is currently evolving. Emissions modelers should consider the latest available information on this issue where biogenic sources are key sources in their modeling region.

On-road emissions for fine-scale model grids (e.g., 4-km grid cells or smaller) may be based on a link-based mentioned in Section 17.2. The VMT and speed data needed for a link-based approach can be provided using a Travel Demand Model (TDM). These models require their own sets of inputs, which depend on the specific TDM used. Details on using TDMs for link-based on-road mobile emissions are available from the EIIP document "Use of Locality-Specific Transportation Data for the Development of Source Emission Inventories" (http://www.epa.gov/ttn/chief/eiip/techreport/volume04/iv02.pdf).

Emissions models have other input files that must be created. For example, criteria may be needed for selecting elevated from non-elevated point sources. Each model has a large number of files and settings which work together in fairly complex ways; therefore, care must be taken to determine the files needed for the emissions model, and to prepare all needed input files in a way that will support using the emissions model for the specific air quality modeling episode.

17.4 How Are Inventory Data Converted Into Air Quality Model Input?

Emissions models are used to convert inventory data to inputs for air quality modeling. As described in Section 17.3, additional ancillary data is needed to complete the process. The emissions data from each of the five emissions sectors are temporally allocated, chemically speciated, and spatially allocated. The resulting hourly, gridded, and speciated emissions from

[39]At the time this document was written, tools to readily predict future-year land use patterns are not readily available in a form for use in emissions modeling.

all sectors are then combined before being used by an air quality model. In this section, we will provide information on several emissions models and summarize some additional issues that are key for emissions modeling.

Emissions models Several emissions models are available for use in SIPs. While no single model has been specifically created for all situations of SIP development, each model is generally capable of performing the temporal, chemical, and spatial allocation steps as well as various other steps. Users of these models are responsible for ensuring that the emissions processing steps are transforming the emission inventories as intended and are not changing the emissions in any unexpected way. The models each have different capabilities, limitations, and nuances. Therefore, when choosing an emissions model, it is worthwhile to discuss the choice with the developers of these systems and/or with EPA to establish which model is best for the specific application.

Currently there are three main emissions models being used to process emissions for input into photochemical grid models and a fourth model that is under construction at the time that this document was written. They are: Sparse Matrix Operator Kernel Emissions (SMOKE); Emissions Modeling System (EMS-2001); and Emissions Preprocessor System - Version 2.5 (EPS 2.5) and version 3.0 (EPS-3). The Consolidated Community Emissions Processing Tool (CONCEPT) is under development by the Regional Planning Organizations.

The Sparse Matrix Operator Kernel Emissions (SMOKE), software and User's Guide are available through the University of North Carolina, Carolina Environmental Program (http://www.cep.unc.edu/empd/products/smoke). SMOKE supports processing of criteria, mercury, and toxics inventories for stationary point, stationary area, mobile, and biogenic emissions. It can create input files for the CMAQ, CAM_X, UAM-V, and REMSAD air quality models. SMOKE was the basis for development of the BEIS3 system, so BEIS3 in its original form can be used easily with SMOKE. Applications of SMOKE have been presented at several of the International Emissions Inventory Workshops (Houyoux, 2000; Strum, 2003). SMOKE is available for UNIX and Linux operating systems and is not recommended for use on a PC. It does not require third party software. It does not include utilities for creating speciation profiles, biogenic land use, or spatial surrogates, though the latter two datasets can be built using the Multimedia Integrated Modeling System (MIMS) Spatial Allocator Tool (http://www.cep.unc.edu/empd/projects/mims/spatial/). Support for the SMOKE system is available through the Community Modeling and Analysis System (CMAS) help desk (http://www.cmascenter.org/html/help.html).

The Emissions Modeling System, (EMS 2001, http://www.ladco.org/tech/emis/ems_2001/) is a later version of EMS-95, which was used in the modeling underlying the U.S. EPA NOx SIP call rule to reduce regional NOx emissions (U.S. EPA 1998b), as well as in other applications of nested regional air quality models. It can create inputs for the CAM_X and UAM-V models. It includes the BIOME3 model, which provides access to similar calculations of biogenic emissions as are available in the BEIS3 system. EMS-2001 can be run on either Linux or Windows NT, and users must purchase a license for the SAS®

software to use it. It includes utilities for creating speciation profiles, biogenic land use, and spatial surrogates. An updated version has new spatial processors, which limit the need for GIS software.

The Emissions Preprocessor System - Version 2.5 (EPS-2.5), software and User's Guide are available through Systems Applications International/ICF Consulting (www.uamv.com). EPS-2.5 is a comprehensive emissions processing system that supports processing of stationary point, stationary area, and mobile emissions for the development of base and future-year modeling inventories for input to the CAM_X, UAM-V, and REMSAD models. EPS-2.5 consists of a set of stand-alone FORTRAN programs that do not require third-party software. The system is capable of preparing local, regional, and continental-scale emission inventories for ozone, particulate matter, mercury, and air toxics modeling applications. EPS 2.5 is available for UNIX and Linux operating systems. It includes utilities for creating source-specific temporal and chemical speciation profiles based on locally provided detailed information for episode specific emission inventories. It also includes utilities for preparing spatial surrogates. In addition, EPS-2.5 has the capability of creating modeling inventories required for the application of source apportionment techniques such as UAM-V's Ozone and Precursor Tagging Methodology (OPTM). A newer version of EPS is also available, called EPS-3.

The Consolidated Community Emissions Processing Tool (CONCEPT) is an open source model written primarily in PostgreSQL. Users are encouraged to make additions and enhancements to the model. The database structure of the model makes the system easy to understand, and the modeling codes themselves are documented to encourage user participation in customizing the system for specific modeling requirements. The CONCEPT model structure and implementation allows for multiple levels of QA analysis during every step of the emissions calculation process. Using the database structures, an emissions modeler can easily trace a process or facility and review the calculation procedures and assumptions for any emissions value. CONCEPT includes modules for the major emissions source categories: area source, point source, on-road motor vehicles, non-road motor vehicles and biogenic emissions, as well as a number of supporting modules, including spatial allocation factor development, speciation profile development, growth and control for point and area sources, and CEM point source emissions handling. Additional work by the emissions modeling community has begun development of CEM preprocessing software, graphical QA tools, and an interface to the traffic demand models for on-road motor vehicle emissions estimation.

Biogenic emissions Estimates for biogenic emissions can be made using the BEIS emissions model (Geron, et al., 1994). The BEIS3 model estimates CO, NOx, and VOC emissions from vegetation and soils in the gridded, hourly, and model-species forms needed for air quality modeling. Guenther, et al., (2000) contains the technical development and review of BEIS3. Vukovich, et al., (2002) summarizes new input data and algorithms as implemented within SMOKE. Arunachalam, et al., (2002) presents the impact of BEIS3 emissions on ozone. For more detailed local estimates, a State or Tribe should review the biogenic emissions on a county basis and update as needed the spatial patterns of land use data. BEIS3.13 was the latest version of BEIS3 in use by EPA at the time this document was written.

Other models for biogenic emissions include the BIOME model that is a part of EMS-2001, the Global Biosphere Emissions and Interactions System (GloBEIS), and the Model of Emissions of Gases and Aerosols from Nature (MEGAN). GloBEIS estimates emissions from natural (biogenic) sources and is designed for use in combination with photochemical modeling systems, such as CAMx (http://www.globeis.com/). The MEGAN model is available from http://bai.acd.ucar.edu/Megan/.

All of the biogenic models require a mix of land uses to be specified for each county or grid cell, as well as hourly temperature and in some cases other meteorological data. If a State or Tribe believes the average land use mix characterized for a county is inappropriate for certain gridded locations within a county, this may be overridden for the grid cells in question on a case by case basis.

Agricultural Ammonia Emissions- Ammonia emissions from agricultural operations are typically estimated using standalone models. A commonly used model to estimate ammonia is the Carnegie Mellon University Ammonia Model (http://www.cmu.edu/ammonia/). A promising model that is under development is the CONCEPT Farm Model (http://www.conceptmodel.org/nh3/nh3_index.html).

17.5 Are there Other Emissions Modeling Issues?

In addition to the general emissions modeling steps and the biogenic emissions modeling, there are several other issues of which the air quality modeler should be aware. These are:

- Elevated point sources
- Advanced approaches for mobile source modeling
- Quality assurance

In the remainder of this section, we briefly address each of these issues.

Elevated Point Sources Point sources need to be assigned to an appropriate model layer[40] (the vertical modeling dimension). Depending on the air quality model that is being used, different emissions modeling steps can be taken. Models such as UAM-V and CAM_X, expect input emissions files separately for layer-1 emissions and elevated point-source emissions. Additionally, elevated point sources may be flagged for treatment with a plume-in-grid (PinG) approach. For these models, emissions modelers must supply a criteria for specifying which point sources will be treated as elevated and as PinG sources. In this case, the air quality model calculates the plume rise of the point source emissions when the model is run.

[40]Point sources generally comprise most of the elevated emissions (above layer 1), although other area sources, such as fires and aircraft, may also have emissions assigned to elevated layers.

Models such as CMAQ expect (1) a 3–D emissions input file, for which the elevated plume rise has already been calculated and (2) a separate optional PinG emissions file. Emissions modelers may optionally specify which sources to treat as elevated and PinG. Since the emissions model must calculate plume rise in advance, it must use meteorological data such as temperature, pressure and wind speeds. For the sake of consistency, the meteorological data that is used in calculating plume rise is usually the same as what is used by the air quality model.

Mobile Source Modeling Mobile source emissions modeling takes two primary approaches. The first approach is to compute emissions from VMT and emission factors from the MOBILE model prior to use by an emissions model. The second approach is to allow an emissions model, such as SMOKE, to drive the MOBILE model using gridded meteorology data. Many more assumptions must be made about using average temperatures in the first approach, since emissions are calculated on an annual total, monthly, or average-day basis and therefore do not include the day-to-day temperature variability that the second approach includes. It is widely assumed that the second approach is more robust for local-scale modeling, though we do not recommend one approach over the other. States/Tribes are encouraged to choose an approach that gives sufficient model performance for their attainment demonstration modeling.

Quality Assurance The third additional emissions modeling topic we have summarized here is emissions modeling quality assurance (QA). A brief synopsis of appropriate quality assurance (QA) approaches for emissions modeling is available in Section 2.19 of the SMOKE manual (http://cf.unc.edu/cep/empd/products/smoke/version2.1/html/ch02s19.html). The purpose of QA for emissions modeling is to ensure that the inventories are correctly processed using the information the modeler intended. (It is assumed here that the inventory itself has already been QA'd through inventory QA procedures, as referenced in Section 17.3.) Emissions modeling QA includes such activities as reviewing log files for errors and warnings and addressing problems; comparing emissions between each of the processing stages (e.g., data import, speciation, temporal allocation) to ensure mass is conserved; checking that the correct speciation, temporal allocation, and spatial allocation factors were applied; ensuring that emissions going into the air quality model are consistent with expected results; and checking modeling-specific parameters such as stack parameters. In addition, the process of running emission inventories through emissions models and air quality models often provides insights into the emission inventories. These insights can lead to inventory changes that improve the quality of inventories for additional modeling iterations.

In general, this guidance also encourages the use of graphical analysis and Geographic Information Systems (GIS) for improved QA of emissions data and processing. A commonly used analysis tool for model-ready emissions data is the Package for Analysis and Visualization of Environmental Data (PAVE), available at http://www.cep.unc.edu/empd/EDSS/pave_doc/index.shtml.

Lastly, at the time this document was written, the EPA is developing the Emissions Modeling Framework (EMF), which includes extensive data management and quality assurance features intended to assist emissions modelers with the enhanced quality of their data. This tool will be available for use in 2007 for support of ozone, $PM_{2.5}$, and regional haze SIPs .

17.6 How Are Emissions Estimated for Future Years?

Emissions estimates for future years are called “emissions projections”. These projections include both emissions growth (due to increased or decreased activities) and emissions controls (due to regulations that reduce emissions in specific ways in the future). The goal in making projections is to obtain a reasonable estimate of future-year emissions that accounts for the key variables that will affect future emissions. Each State/Tribe is encouraged to incorporate in its analysis the variables that have historically been shown to drive its economy and emissions, as well as the changes in growth patterns and regulations that are expected to take place between the time of their base year and future years. For details on which future year(s) should be modeled for attainment demonstrations, refer to Section 3.6.

A report entitled “Procedures For Preparing Emissions Projections” describes emissions projections issues and approaches (U.S. EPA, 1991b; also available at www.epa.gov/ttn/chief/eiip/techreport/volume10/x01.pdf). It is currently the most comprehensive resource available about emissions projections. In this section, we will address an overall approach for tackling emissions projection issues that incorporates use of this document and points out where other approaches or new data are available to amend the information included in that report.

Developers of projection-year emissions are advised to take the steps in the bulleted list below. Each of these steps corresponds to a subsequent subsection.

- Identify sectors of the inventory that require projections and sectors for which projections are not advisable, and prioritize these sectors based on their expected impact on the modeling region (Section 17.6.1).

- Collect the available data and models that can be used to project emissions for each of the sectors (Section 17.6.2).

- For key sectors, determine what information will impact the projection results the most, and ensure that the data values reflect conditions or expectations of the modeling region (Section 17.6.3)

- Create inputs needed for emissions models, create future year inventories, quality assure them, and create air quality model inputs from them (Section 17.6.4)

The remainder of this section provides additional details about these steps.

17.6.1 Identify and prioritize key sectors and regions for projections

Emissions modelers should evaluate their inventories for those sectors and regions that are most critical to their modeling results. The purpose of identifying these key sectors is to direct more resources and efforts to estimating future-year emissions for these sectors in the subsequent steps.

Sectors can be subsets of the larger groups of stationary area, on-road mobile, nonroad mobile, and point sources. For ozone modeling, in regions that are NO_X-limited, sectors with higher NOX emissions will be more important for ensuring correct projections, and for VOC-limited regions, sectors with higher VOC emissions will be more important. Mobile sources are typically large contributors to both VOC and NOx and are therefore usually a priority in estimation of future-year emissions, particularly for urban areas. For PM and regional haze modeling, the relative importance of primary $PM_{2.5}$ emissions and precursors will depend on the area of the country. Primary $PM_{2.5}$ emissions may be important in urban areas. In the East, SO2 emissions may be of primary importance. And NOx, VOC, and NH3 will vary in importance depending on the particular situation.

In some cases, there are sectors that are very difficult or highly uncertain to project into the future. Wildfire emissions is a common example of such a sector, since models are not readily available that estimate the magnitude and location of future-year emissions. In these cases, it may be advisable to create an "average year" inventory and temporal distribution of the emissions.

Emissions modelers can consider the proximity of the emissions and the expectation of long-range transport when reviewing projection assumptions. Those emissions that have an impact on the nonattainment status (whether transported from outside areas or locally generated) should be given highest priority in evaluating the projection assumptions. For example, less priority can be given to emissions from distant states for pollutants that do not transport from those states to the nonattainment area.

17.6.2 Collect available data and models for each sector needing projections

The EIIP projections document (referenced previously) provides a starting point for this step. The EIIP document provides the majority of information about sources of data on growth and controls. This section supplements that document.

For each sector needing projections (and in particular for the priority sectors), emissions modelers should collect and review growth and control information. As noted in the EIIP document, the sources of such information depend upon the sector of interest. New data and approaches beyond those in the EIIP document are available and provided here; likewise, new data and approaches will become available subsequent to the publication of this document. The information provided here is a snapshot of information that will grow and adapt over time, and emissions modelers should seek out such new information as part of this step.

For sectors and regions with lower priority for consideration (as described in Section 17.6.1), emissions modelers can rely on available default data. For sectors and regions that are important to modeling the nonattainment area, emissions modelers should spend additional effort obtaining improved information from other modeling applications (such as modeling done by RPOs or other States) or developing the improved information themselves.

In addition to the sources of control information about non-EGU point and stationary area sources listed in the EIIP projection document, EPA has provides control assumptions with its modeling data used for promulgating air quality rules. For example, emissions growth and control assumptions were provided with the Clean Air Interstate Rule (See http://www.epa.gov/air/interstateairquality/pdfs/finaltech01.pdf for additional information on obtaining actual data files) More current information is usually available than what is available from EPA, which is best obtained by working with state and local regulatory officials for the SIP modeling region. The remainder of this section focuses on sources of growth information.

Point sources.

Section 2 of the EIIP projections document gives details about projection of point-source emissions. There are two major subsets of point sources: electric generating utilities (EGUs) and non-EGUs. The Clean Air Markets Division (CAMD) of the U.S. EPA uses the Integrated Planning Model (IPM) to model emissions trading programs that now dominate the prediction of future-year emissions from EGUs. More information on IPM is available at (http://www.epa.gov/airmarkt/epa-ipm/). Additionally, IPM-based emissions are posted by CAMD on EPA's website (http://www.epa.gov/airmarkets/epa-ipm/iaqr.html). Other trading models may exist and could be used for estimation of future-year emissions.

To prevent double-counting of emissions sources, emissions modelers who use IPM should be careful to match the sources of emissions from IPM with the base year emissions sources. This helps to ensure that the EGU part of their point source inventory is separated from the non-EGU part based on the facilities included in IPM. The facilities included in IPM are defined using the National Electric Energy Database System (NEEDS). The NEEDS dataset should be compared to the point inventory using the Office of Regulatory Information Systems (ORIS) Plant ID field from both. In some cases (e.g., co-generation facilities), only some of the units at these facilities are included in IPM; therefore, the separation of EGUs from non-EGUs should be done by unit and not by facility.

Since base-year emissions of EGU point sources can be based on hour-specific emissions from the CEM program, emissions modelers must choose a temporal allocation approach for estimated future-year emissions. Emissions modelers should choose an approach that is representative of future expected behavior and not limited to any single year's closures and maintenance schedule. Ideally, types of EGUs that are run during high demand conditions would have temporal allocation approaches that reflected those peaks, and units that are run continuously would be temporally allocated in a more uniform way. Analysis of several years of CEM data could be helpful to determine these unit-by-unit trends and develop profiles accordingly.

Additional considerations for projecting point source emissions without the IPM model are provided in the EIIP projection document. However, several of the references in that document are now out of date, as follows.

- The latest SCC codes are available at http://www.epa.gov/ttn/chief/codes/ and not the website provided in the document.
- The AP-42 emission factor website is now http://www.epa.gov/ttn/chief/ap42/index.html.
- The website with further information about point source inventories is http://www.epa.gov/ttn/chief/eiip/techreport/
- The references in Table 2.1-1 web link is no longer applicable. Instead, the following information can be used to help provide similar information:
  - Energy consumption by industry report, 2002: http://www.eia.doe.gov/oiaf/analysispaper/industry/consumption.html
  - Annual Energy outlook report, 2005: http://www.eia.doe.gov/oiaf//aeo/pdf/0383(2005).pdf

The references in Table 2.1-2 are also out of date and should be updated as follows:
- US EPA Emissions trends reports. These reports can be used to provide the historical trends of emissions sectors based on the National Emission Inventory: http://www.epa.gov/air/airtrends/
- Integrated Planning Model: http://www.epa.gov/airmarkt/epa-ipm/
- Multiple Projections System - is no longer in use
- California Emission Forecasting System: http://www.arb.ca.gov/html/databases.htm

The tools and data sources described in the "Additional resources" section below should also be evaluated for use for projection of point source emissions.

Stationary area sources.

Section 3 of the EIIP projections document provides details about projecting area-source (a.k.a nonpoint emissions). However, several of the references or statements in that document are now out of date, as follows.

- The web sites for SCCs, AP-42 emission factors, and more information about area-source inventories are out of date. These should be updated to the same sites as were listed in the point sources section above.

- The ASEM model mentioned in Section 3.2 of the EIIP projection document was not completed and is not available.

- The references in Table 3.1-2 are out of date and should be updated as follows:
  - US EPA Emissions trends reports. These reports can be used to provide the historical trends of emissions sectors based on the National Emission Inventory:

http://www.epa.gov/air/airtrends/
- Multiple Projections System - is no longer in use
- California Emission Forecasting System:
  http://www.arb.ca.gov/html/databases.htm

The tools and data sources described in the "Additional resources" section below should also be evaluated for use for projection of point source emissions.

On-road mobile sources.
Section 3 of the EIIP projections document provides details about projecting on-road mobile-sources**.** It is still a very relevant snapshot of on-road mobile projection approaches; however, several of the references or statements in that document are now out of date, as follows. Additionally, several new capabilities are available, which also are included in the list below.

- The newer versions of the MOBILE model support 28 vehicle types instead of the 8 types listed in this document, however, the NEI and other inventories often group these 28 types to the same 8 described in the document.
- The web sites for SCCs, AP-42 emission factors, and more information about area-source inventories are out of date. These should be updated to the same sites as were listed in the point sources section above.
- The EPA Office of Mobile Sources is now called the Office of Transportation and Air Quality (OTAQ). Its website is http://www.epa.gov/otaq/index.htm.
- The new website for the MOBILE model is http://www.epa.gov/otaq/mobile.htm.
- The PART5 model is no longer used, because it has been superceded by the MOBILE model, starting with version 6 (MOBILE6).
- The increased popularity of sport utility vehicles has continued, but may be affecting more than only the percentage of light duty gasoline vehicles. Additionally, since MOBILE6 includes 28 vehicle types, the increases in larger and heavier vehicles can be more carefully accounted for using MOBILE6 than the EIIP projection document mentions.
- Updates to the SMOKE model and other emissions models permit the temperature information used in MOBILE6 to come from the prognostic meteorological models (e.g., MM5 and MCIP) that are used to prepare inputs to air quality models.
- OTAQ has created the National Mobile Inventory Model, which drives both the MOBILE6 model and the NONROAD model to create base-year and future-year inventories. Additional information on this tool is available at: http://www.epa.gov/otaq/nmim.htm.
- The references in Table 4.1-1 are out of date and should be updated as follows:
  - MOBILE6 - is an operational model and can be used
    See http://www.epa.gov/otaq/mobile.htm
  - The PART5 model is no longer needed because MOBILE6 replaces it
  - The California mobile sources emissions page is now:
    http://www.arb.ca.gov/msei/msei.htm
  - The EIIP mobile source document is now available at:
    http://www.epa.gov/ttn/chief/eiip/techreport/volume04/index.html

- Emission Inventory Guidance documentation is now available at:
  http://www.epa.gov/ttn/chief/eidocs/eiguid/index.html

Additionally, the Economic Growth Analysis System (EGAS) contains VMT growth information and can be used to grow VMT by SCC. This system is further described in the "Additional resources" section below.

Nonroad mobile sources.

Section 4 of the EIIP projections document provides details about projecting nonroad mobile sources**.** Several of the references or statements in that document are now out of date, as follows. Additionally, several new capabilities are available, which also are included in the list below.

- As noted above for on-road sources, the Office of Mobile Sources has changed to the Office of Transportation and Air Quality and has a different web site.
- The EPA's NONROAD model has been completed and has been used in a variety of ways by EPA, states, and local agencies. The website for the NONROAD model is:
  http://www.epa.gov/otaq/nonrdmdl.htm
- California's OFFROAD model website is now:
  http://www.arb.ca.gov/msei/off-road/updates.htm
- OTAQ has created the National Mobile Inventory Model, which drives both the MOBILE6 model and the NONROAD model to create base-year and future-year inventories. Additional information on this tool is available at: http://www.epa.gov/otaq/nmim.htm.
- For aircraft, locomotive, and marine emissions, the best source of data on the impact of national rules from EPA's Office of Transportation and Air Quality (OTAQ) is the Federal Register notices including these rules. Since each rule is different, there is no single guidance that can be made about how these should be incorporated. As EPA OAQPS incorporates these data into their work, it is possible in the future that it will be available on EPA's Emissions Modeling Clearinghouse at http://www.epa.gov/ttn/chief/emch/index.html.
- For aircraft emissions, the Federal Aviation Administration data can be used to assist with growth estimates. More information is provided in the "additional resources" section, below.

Additional resources.

In addition to sector-specific resources, there are other sources of information that can be used for more than a single sector as information to help determine the most applicable growth rates for the modeling region. These include the Economic Growth Analysis System (EGAS), Bureau of Economic Analysis data, Bureau of Labor Statistics "Employment Outlook", Census Bureau data, Trade Organizations and individual facilities, and the Chemical Economics Handbook. The following paragraphs provide a brief description and additional references for each of the sources of data just listed. Section 17.6.3 provides information about how to choose the best information for a given sector.

Multiple sources of information can be used to better inform emissions modelers. For example, if a state and/or industry has shown steady decreases in gross product over the past five years, that information could temper (or be used in place of) a projected 30% growth predicted from EGAS over the next 10 years. Such a discrepancy would simply highlight the fact that all models, including REMI or those used by DOE can produce results that are not consistent with other expectations. In addition, because of changes in technologies and fuel efficiency, economic growth is not necessarily a sufficient indicator of emissions growth. While this guidance does not provide a prescriptive approach for combining such information, the authors recognize that predicting the future of emissions is not an exact science and therefore multiple sources of information should be used to develop an informed approach.

EGAS. The latest EGAS model at this time is version 5 (http://www.epa.gov/ttn/ecas/egas5.htm) The default version of EGAS relies primarily on three sources of data: (1) state-specific economic data from the Regional Economic Model, Inc. (REMI) Policy Insight ® model (version 5.5) that includes population growth estimates, (2) Region-specific fuel-use projections from the U.S. Department of Energy (DOE) Annual Energy Outlook 2004, and (3) VMT projections included in the MOBILE6.0 model. EGAS outputs growth factors that do not include control information for a user-define base year and multiple future years through 2035. EGAS uses default cross-walks from these data sources to SIC, SCC and MACT codes. The DOE data are used to compute growth factors assigned by default to stationary source fuel combustion sectors, the VMT projections are used for on-road mobile, and the REMI data are used for the remaining sectors. Additionally, EGAS5 supports emissions modelers adding new data sources, changing assignments of data sources to SICs, SCCs, and MACT codes, and creating custom configurations of data that best represent the growth expected in their modeling region. The additional sources of information listed below can be input into EGAS to develop such custom scenarios. It should be noted that these sources have very little, if any, projection information. Instead, they provide historical data that could be extrapolated to produce projections or to derive projections using other methods.

EGAS results should be assigned to the inventory to give the best mapping of the raw data to the inventory. Generally, SIC is the preferred cross-walk for point sources and SCC is the preferred cross-walk for non-point sources. However, the DOE-based fuel consumption forecasts (assigned by SCC) can also be useful for some sectors that use fuel combustion.

Bureau of Economic Analysis*.* The Bureau of Economic Analysis (BEA) provides historical data about macroeconomic factors at the state level such as gross state product, personal income by industry, employment by industry, wages and earnings by industry, and population by state. The website to obtain state and/or state-industry data is http://www.bea.doc.gov/bea/regional/gsp/. Such information may be used to verify emissions growth forecasts in EGAS by comparing available historical BEA data (1997-2004) with the REMI economic activity data driving emissions in EGAS for the same set of years. A good use of the gross state product data is to verify growth in sectors/codes that use REMI output and value-added data. Additionally, employment and population statistics can be compared with sectors/codes using REMI employment and population data. The BEA also provides industry-specific national information at http://www.bea.doc.gov/bea/dn2/home/annual_industry.htm. However, since these data are at the national level, the use of the data should be limited to comparisons with national simulations in EGAS.

Bureau of Labor Statistics. The Bureau of Labor Statistics (BLS) provides historical state-specific and national employment data. The BLS database is fairly large and provides more detail than needed for verifying the growth factors generated in EGAS using REMI employment data. However, BLS employment data is likely to be as accurate if not more accurate than employee data provided by BEA and US Census. The data are available at http://www.bls.gov/sae/home.htm**.**

Census Bureau. The US Census Bureau provides data on total employees, total payroll, number of establishments, and value of shipments by NAICS code (2 digit - 6 digit) for 1997 and 2002. This database is ideal for examining changes in the number of establishments from 1997 - 2002. However, it does not provide data from 1998-2001 so its trend information is limited to two "snapshots". Therefore, this data is useful primarily to evaluate the state/SCC and state/SIC combinations from EGAS that show zero emissions growth, which indicates an assumption by EGAS or its input data that those processes or industries do not exist in the state or region of interest. The census data are available at http://www.census.gov/http://www.census.gov/econ/census02/guide/geosumm.htm.

Federal Aviation Administration. The Federal Aviation Administration (FAA) provides aviation data users with summary historical and forecast statistics on passenger demand and aviation activity at U.S. airports. The summary level forecasts are based on individual airport projections. The Terminal Area Forecast (TAF) includes forecasts for active airports in the National Plan of Integrated Airport Systems (NPIAS). The TAF can be accessed at http://www.apo.data.faa.gov/. The TAF model allows users to create their own forecast scenarios. The TAF database, which contains a query data application, allows the public to access and print historical and forecast (up to 2025) aviation activity data by individual airport, state or FAA region.

Trade Organizations and individual facilities. Trade organizations can also be a helpful resource because they often have projections for future-year growth of their industry and may be aware of pending facility closures or new facility construction. This resources is most relevant for large industrial sources that usually are included in point source inventories. In addition, emissions modelers should consider contacting large sources of emissions in their modeling region for their expectations of emissions growth or reduction. In many cases, large industries may be willing to provide such information when presented with what will be used if no additional information can be provided. For these types of data sources, emissions modelers should be aware of possible conflicts of interest, ie. industry groups or facilities may feel an incentive to under-represent future-year emissions in hopes of avoiding additional requirements for reducing emissions; however, many industrial representations have been valuable stakeholders who are interested in providing accurate information.

Chemical Economics Handbook. The Chemical Economics Handbook, produced by Access International, Inc., is a series of reports on prices, production and consumption of hundreds of chemical industry products and commodities. Past and current information on chemical products and commodities is available, and projections of future prices, production and consumption are often available. Reports on specific industries are also available. Reports at an industry level can often be used to verify the efficacy of future industry modeling results. Each report is updated every 3 years. Projections, some up to 5 years from the current day, are often prepared using proprietary methods. Reports are available by subscription, and can be obtained as hard copy, CD, or through the Internet at http://www.sriconsulting.com/CEH/Public/index.html.

EPA base-year control assumptions. EPA OAQPS creates and uses data that quantify assumed base year controls on non-EGU point and stationary area sources. The most recent data published (at the time of this writing) are described with the Clean Air Interstate Rule (CAIR) Technical Support Document (TSD). The Emission Inventory chapter of this TSD contains a description of the base year controls assumed and how to get the data files from an FTP site; it is available online at http://www.epa.gov/air/interstateairquality/pdfs/finaltech01.pdf. Additionally, two possible future references for these types of data include (1) the Emissions Modeling Framework, which will include a Controls Programs Database and (2) the EPA OAQPS Emissions Modeling Clearinghouse, available at http://www.epa.gov/ttn/chief/emch/index.html.

17.6.3 Evaluate and refine data for projections in modeling region

For key sectors, emissions modelers should determine what information will impact the projection results the most, and ensure that the data values reflect conditions or expectations of the modeling region. The key information is identified based on a combination of base-year emissions data and growth and control rates. An iterative process is helpful to complete this step, as follows:

- Estimate future-year emissions by combining the base-year emissions with the projection information.

- Review future-year emissions data to identify large sectors of key pollutants (e.g. NOx, SO2, and VOC). Emissions summaries by state/SCC or state/SIC can be helpful for this step to consolidate the data to review.

- For the largest future-year emissions sectors, review the growth and control assumptions, compare among all available data sources, and/or collect additional information to refine the assumptions. A representative growth rate should be identified from the available data sources and all information known about the sources and sectors. Stakeholder review of the data can be helpful during this step; for example, an industrial facility with large projected emissions may be able to review the data and provide additional information for a more informed future-year emissions estimate.

- Additionally, emission modelers should also compare the future-year emissions to base-year emissions to identify overall growth rates for industrial sectors and reconsider excessively high growth rates, especially when associated with significant emissions.

- Using the new information, repeat step 1 and continue these steps until a satisfactory future-year projection across the entire inventory has been completed.

Emissions models (e.g., SMOKE, MOBILE6, NONROAD, etc.) provide the capability to create future-year inventories using base year inventories and projection information. Emissions modelers will need to convert the projection data into specific formats for input to these models. Prior to starting this step, emissions modelers should determine which emissions model will be used to perform the calculations and make sure that the type of information needed by the model is being collected.

17.6.4 Create future-year inventories and air quality model inputs

Using the final projection data determined in the previous step, create the final inputs to emissions models being used. Then, use the emissions model to create the future-year inventory. Other inputs to emissions models, such as spatial surrogates, speciation profiles, or temporal allocation factors may also need to be adjusted to reflect conditions expected in the future.

Once a future-year inventory and other data have been created, it must undergo the same steps as for the base-year modeling, such as temporal allocation, speciation, spatial allocation, elevated source selection, special on-road mobile processing, and quality assurance. Every attempt should be made to use consistent approaches between the future year and the base year for all of these modeling steps. Inconsistencies in approaches between the future-year modeling and the base-year modeling can lead to artificial differences in air quality modeling results that can affect conclusions. Therefore, it is critical to avoid such differences whenever possible.

17.7 Emissions Preparation for a Local Area Analysis

In section 5.3 we discuss modeling of local primary $PM_{2.5}$ sources with a dispersion model. The emissions for these sources should closely match those used in photochemical models. For example, every effort should be made to temporalize and speciate the primary emissions using available profiles. Information on input and formatting of the emissions for dispersion models can be found in the respective users' guides. Pre-processing of the primary emissions with an emissions model may be needed to derive the detailed information needed to temporalize and speciate the emissions.

In section 5.3 we recommend using "actual emissions" in the local area analysis, as compared to using "allowable emissions". By "allowable emissions", we mean the maximum amount of emissions from a source which is consistent with emission limitations contained in an applicable operating or construction permit for that source. We define "actual emissions"as the best estimate of the actual emissions that occurred during the baseline period being modeled[41].

Modeling with allowable emissions is sometimes warranted. For example, for permit modeling, we generally compare the absolute predicted modeled concentrations against the NAAQS or the PSD increments. In these cases we want the modeling to be conservative. That is, we want to be sure that a maximum permitted level of emissions cannot cause of violation of the NAAQS or PSD increment. Therefore, in the case of permit modeling, it is sometimes appropriate to model with allowable emissions. But for a local area analysis, we are trying to determine the actual (or typical) contribution from sources to a monitor and we are using the model results in a relative sense. Therefore, it is only appropriate (and in fact conservative) to use actual emissions. Using actual emissions should lead to a reasonable estimate of of air quality improvements from reducing emissions at the flagged sources. Using allowable emissions might lead to an overestimate of benefits from emissions controls at flagged sources.

[41]In the emissions baseline modeling, the actual emissions may sometimes be replaced with "typical" emissions (e.g. EGU and fire emissions).

18.0 What are the Procedures for Evaluating Model Performance and What is the Role of Diagnostic Analyses?

The results of a model performance evaluation should be considered prior to using modeling to support an attainment demonstration or regional haze assessment. The performance of an air quality model can be evaluated in two ways: (1) how well is the model able to replicate observed concentrations of $PM_{2.5}$ components, ozone and/or precursors (surface and aloft), and (2) how accurate is the model in characterizing the sensitivity of ozone and/or $PM_{2.5}$ to changes in emissions? The first type of evaluation can be broadly classified as an "operational evaluation" while the second type of evaluation can be classified as a "diagnostic evaluation". The modeled attainment tests recommended in Sections 3-6 use models to predict the response of ozone and $PM_{2.5}$ to changes in emissions and then applies the resulting relative response factors to observed (rather than modeled) ambient data. Thus, while historically, most of the effort has focused on the operational evaluation, the relative attainment test makes the diagnostic evaluation even more important.

In addition to the model performance evaluation, diagnostic analyses are potentially useful to better understand whether or not the predictions are plausible. Diagnostic analyses may also be able to provide: (1) information which helps prioritize efforts to improve and refine model inputs, (2) insight into which control strategies may be the most effective for meeting the NAAQS, and (3) an indication of the "robustness" of a control strategy. That is, diagnostic tests may help determine whether the same conclusions would be reached regarding the adequacy of a strategy if alternative, plausible, assumptions were made in applying the model for the attainment test.

In this section, we first discuss the general concept of operational and diagnostic evaluations. We then identify and discuss issues related to the ambient measurements of ozone and $PM_{2.5}$. We then discuss methods which may be useful for evaluating model performance. It is recommended that performance be assessed by considering a variety of methods. The section continues by identifying potentially useful diagnostic tests which States/Tribes should consider at various stages of the modeling analysis to increase the confidence in the model predictions of future ozone and/or $PM_{2.5}$ levels. The section concludes with a discussion on interpreting the results of the operational and diagnostic evaluations.

18.1 How Do I Assess Model Performance And Make Use of Operational and Diagnostic Evaluations?

As noted above, model performance can be assessed in one of two broad ways: how accurately does the model predict observed concentrations for specific cases, and how accurately does the model predict *responses* of predicted air quality to changes in inputs (e.g. relative response factors)? Given existing data bases, nearly all analyses have addressed the first type of performance evaluation. The underlying rationale is that if we are able to correctly characterize changes in concentrations accompanying a variety of meteorological conditions, this gives us some confidence that we can correctly characterize future concentrations under similar conditions. Typically, this type of operational evaluation is comprised principally of statistical assessments of model versus observed pairs. Operational evaluations are generally accompanied by graphical and other qualitative descriptions of the model's ability to replicate historical air quality patterns. The robustness of an operational evaluation is directly proportional to the amount and quality of the ambient data available for comparison.

The second type of model performance assessment, a diagnostic evaluation, can be made in several ways. One way to evaluate the response of the model is to examine predicted and observed ratios of "indicator species". Indicator species techniques have been developed for both ozone and secondary PM species (in particular nitrate) (Sillman, 1995 and 1998; Ansari and Pandis, 1998; Blanchard et al., 2000). If ratios of observed indicator species are very high or very low, they provide a sense of whether further ozone or secondary $PM_{2.5}$ production at the monitored location is likely to be limited by availability of NOx or VOC (or NH3). Agreement between paired observed and predicted ratios suggests a model may correctly predict the sensitivity of ozone or secondary $PM_{2.5}$ at the monitored locations to emission control strategies. Thus, the use of indicator species has the potential to evaluate models in a way which is most closely related to how they will be used in attainment demonstrations. A second way for assessing a model's performance in predicting the sensitivity of ozone or $PM_{2.5}$ species to changes in emissions is to perform a retrospective analysis. This involves comparing model predicted historical trends with observed trends. Retrospective analyses provide potentially useful means for diagnosing why a strategy did or did not work as expected. They also provide an important opportunity to evaluate model performance in a way which is closely related to how models are used to support an attainment demonstration. More types of diagnostic analyses are provided in Section 18.5. We recommend that diagnostic analyses be performed during the initial phase of the model application and during any mid-course review.

18.2 What Pollutants Are of Interest for Model Performance?

There are a number of gas phase species that can be used to evaluate both ozone and secondary $PM_{2.5}$. Their presence may affect the response of ozone or secondary PM components to emissions strategies. Also, the model's performance in predicting certain gaseous species may provide diagnostic clues which help explain poor performance in predicting ozone or secondary $PM_{2.5}$. Gaseous pollutants of interest include:

- Ozone (O3)
- Nitric acid (HNO3)
- Nitric oxide (NO)
- Nitrogen dioxide (NO2)
- Peroxyacetyl nitrate (PAN)
- Volatile Organic Compounds (VOCs)
- Ammonia (NH3)
- NOy (sum of NOx and other oxidized compounds)
- Sulfur dioxide (SO2)

- Carbon monoxide (CO)
- Hydrogen peroxide (H2O2)

Some of the species listed above are currently available from either existing monitoring network systems and/or special studies. However, it is important to note that many of the species listed above are not routinely measured, (e.g. H2O2, HNO3, and NH3). Model performance can best be assessed using extensive data bases, such as those obtained in major field studies. However, we recognize that such data may not be available for every model application which needs to be performed. At a minimum, a State should supplement its performance tests with available data with a review of results from performance tests for the model(s) which were completed elsewhere where extensive data bases were used.

Because $PM_{2.5}$ is a mixture, a meaningful performance evaluation should include an assessment of how well the model is able to predict individual chemical components that constitute $PM_{2.5}$. Components of $PM_{2.5}$ of interest include:

- Sulfate ion (SO4) and/or Sulfur (S)
- Nitrate ion (NO3)
- Ammonium ion (NH4)
- Elemental Carbon (EC)
- Organic Carbon (OC) and/or Organic Carbon Mass[42]
- Crustal (weighted average of the most abundant trace elements in ambient air)
- Mass of "other" primary particulate matter[43]
- Mass of individual constituents of inorganic PM

18.3 What Are the $PM_{2.5}$ Measurement versus Model Concentration Issues?

Ambient measurements are needed to perform a model evaluation. Historically, ozone model evaluations have used routinely measured ambient data (e.g. ozone) collected on a continuous basis. The measurements tend to be of high frequency and quality. Conversely, $PM_{2.5}$ and $PM_{2.5}$ component measurements are (mostly) filter based measurements which have relatively long sampling times (usually 24 hours) and aren't collected every day (usually once every three or

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[42] For predicted/observed comparisons, organic carbon is preferred over organic carbon mass to allow for transparency between model predictions and observed measurements. Organic carbon mass may include hydrogen, oxygen, and other components.

[43] Other inorganic particulate matter can contribute up to 10% of $PM_{2.5}$ mass in certain locations. Unspeciated inorganic PM (sometimes referred to as "other PM") is often used interchangeably with "crustal" or "soil" PM. The term "soil" usually refers to the specific definition of soil from the IMPROVE program. "Other primary (inorganic) PM" includes heavy metals and other inorganic species in addition to those commonly found in soil.

six days). Speciated data play an especially important role, as the deterministic models predict exact chemical components which can be compared to some of the corresponding measured analytes. In addition, there are known positive and negative sampling artifacts as well as analysis artifacts associated with FRM and speciation monitors. For example, FRM monitors do not measure all of the $PM_{2.5}$ in the air, and the speciation samplers don't measure $PM_{2.5}$ in the same way as the FRM monitors (Frank, 2006). Due to the complex nature of the measurements, a basic understanding of the various $PM_{2.5}$ and speciation monitoring technology and measurements are needed before undertaking a model evaluation. This section attempts to address the range of measurements and measurement issues associated with $PM_{2.5}$ and its components.

Table 18.1 summarizes many of the $PM_{2.5}$ species measurements and networks and lists sampling time and measurement issues. This data will commonly be used as part of an operational evaluation.

Table 18.1 $PM_{2.5}$ Species Measurements by Monitoring Network and Related Sampling Time Issues.[44]

Network	Measurement	Notes	Sampling Time
FRM	$PM_{2.5}$	- Negative artifacts- nitrate, organic carbon - Positive artifacts- organic carbon, water	24-hour average 1/3 days or 1/6 days (some daily sites)
STN	$PM_{2.5}$	-STN total measured mass may not be reliable (cutpoint issues)	24-hour average 1/3 days or 1/6 days
	SO4		
	NO3	- Differences among sampler measurements across network. Different sampler types use different measurement techniques.	
	NH4	- Negative artifacts may occur on the Nylon filters due to volatilization of ammonium from the filter because the alkaline filter may not retain NH3 released in the decomposition of ammonium nitrate.	

[44] Most of the issues identified in Table 18.1 are discussed in (Frank, 2006).

Network	Measurement	Notes	Sampling Time
	Organic Carbon	- Blank correction is needed to account for positive artifact.[45] - OC/EC split is operationally defined using TOT method (NIOSH).	
	Elemental Carbon	- OC/EC split is operationally defined using Thermal Optical Transmittance (TOT) method (NIOSH)	
CASTNet	SO4		weekly average
	NO3	Negative artifact	
	NH4		
	SO2		
	HNO3	Split between NO3 and HNO3 may not be reliable in warm weather due to conversion from NO3 to HNO3	
IMPROVE	$PM_{2.5}$		24-hour average 1/3 days
	SO4 and S	- Sulfur measurements are usually used to estimate sulfate	
	NO3		
	NH4	- Only measured at 3 Eastern sites.	
	Organic Carbon	- OC/EC split is operationally defined using Thermal Optical Reflectance (TOR) analysis. - Blank corrections are applied to all data before they are reported.	
	Elemental Carbon	- OC/EC split is operationally defined using Thermal Optical Reflectance (TOR) analysis.	

In general, the speciation data can be directly compared to the model outputs. Of note, care should be taken in examining issues with blank corrections for organic carbon (especially when measured OC is low) as well as the EC/OC split. The STN and IMPROVE networks use different analysis techniques when estimating EC and OC. This will generally have a larger impact on EC concentrations. It may not be appropriate to compare EC concentrations between networks. The Clean Air Scientific Advisory Committee (CASAC) has recommended to transition the STN network to the IMPROVE carbon protocol (TOR) in order to provide data

[45] Network average blank corrections for many of the STN samplers are large (up to 1.53 ug/m3).

consistency among the two networks (U.S. EPA, 2005f). Over the next two to three years (2007-2009), EPA plans to convert all of the STN sites (approximately 200 trends and supplemental sites) to IMPROVE carbon sampling and analysis protocols.

Due to the previously stated positive and negative artifacts, the FRM data may not be directly comparable with model outputs without some adjustments. The models predict PM species as they might be measured in the ambient air. But the FRM measurements may not always measure what is in the air (due to known positive and negative artifacts). As part of the $PM_{2.5}$ attainment test in Section 5 we recommended default methodologies to adjust speciation (STN and IMPROVE) data to better approximate the FRM data. A similar adjustment could be made to the model output data to allow the direct comparison to FRM measurements. But due to the relatively limited information to be gained by evaluating daily average total measured $PM_{2.5}$ mass (as compared to $PM_{2.5}$ components), it may not be worth the effort. More meaningful information may be gleaned from continuous $PM_{2.5}$ ambient data. Comparisons between model output and continuous data can be made on an hourly basis. This may provide important information with regards to the daily temporal patterns predicted by the model.

Ambient Measurement Networks

Provided below is an overview of some of the various ambient air monitoring networks currently available. Network methods and procedures are subject to change annually due systematic review and/or updates to the current monitoring network/program. Please note, there are other available monitoring networks which are not mentioned here and more details on the networks and measurements should be obtained from other sources.

AQS The **A**ir **Q**uality **S**ystem (AQS) is not an air quality monitoring network. However it is a repository of ambient air pollution data and related meteorological data collected by EPA, state, local and tribal air pollution control agencies from tens of thousands of monitors. The monitoring data in AQS are the result of the various Clean Air Act requirements to provide a national database of ambient air pollution data. This information management system contains over 1000 pollutants from 1957 through the present day. AQS contains all the routine hourly gaseous pollutant data collected from **S**tate and **L**ocal **A**ir **M**onitoring **S**tations (SLAMS) and **N**ational **A**ir **M**onitoring **S**tations (NAMS) sites. SLAMS is a dynamic network of monitors for state and local directed monitoring objectives (e.g., control strategy development) which consists of approximately 4,000 monitoring stations. A subset of the SLAMS network, the NAMS has an emphasis on urban and multi-source areas (i.e, areas of maximum concentrations and high population density).

The AQS database includes criteria pollutant data (SO2, NO2, O3, CO, PM10, $PM_{2.5}$ and Pb) and speciation data of particulate matter (SO4, NO3, NH4, EC, OC, and crustal Material), air toxic data, photochemical assessment data, and meteorological data. The data are measured and reported on an hourly or daily average basis. The AQS system continues to expand as regulations consider to include more ambient air pollutants (U.S. EPA, 2006b). An overview of the AQS can be found at http://www.epa.gov/ttn/airs/airsaqs/index.htm. For querying the database or viewing the data one can use EPA's Air Explorer tool (http://www.epa.gov/mxplorer/aboutthedata.htm) which is a collection of user-friendly visualization tools for air quality analysts. The tools generate maps, graphs, and data tables dynamically.

IMPROVE The Interagency Monitoring of PROtected Visual Environments (IMPROVE) network began in 1985 as a cooperative visibility monitoring effort between EPA, federal land management agencies, and state air agencies (IMPROVE, 2000). Data are collected at Class I areas across the United States mostly at National Parks, National Wilderness Areas, and other protected pristine areas. Currently, there are approximately 160 IMPROVE rural/remote sites that have complete annual $PM_{2.5}$ mass and/or $PM_{2.5}$ species data. Of the total sites, 110 sites are for regional haze and visibility (and are located at or near Class I areas) and 50 are protocol sites (determined by the needs of state and local air pollution control agencies to meet their respective State Implementation Plan (SIP) requirements). The website to obtain IMPROVE documentation and/or data is http://vista.cira.colostate.edu/improve/.

CASTNet Established in 1987, the Clean Air Status and Trends Network (CASTNet) is a dry deposition monitoring network where data are collected and reported as weekly average data (U.S. EPA, 2002b). CASTNet provides atmospheric data on the dry deposition component of total acid deposition, ground-level ozone and other forms of atmospheric pollution. The data are collected in filter packs that sample the ambient air continuously during the week. CASTNet now comprises over 70 monitoring stations across the United States. The longest data records are primarily at eastern U.S. sites. More information can be obtained through the CASTNet website at http://www.epa.gov/castnet/.

STN The Speciation Trends Network (STN) began operation in 1999 to provide nationally consistent speciated $PM_{2.5}$ data for the assessment of trends at representative sites in urban areas in the U.S. The STN was established by regulation and is a companion network to the mass-based Federal Reference Method (FRM) network implemented in support of the $PM_{2.5}$ NAAQS. As part of a routine monitoring program, the STN quantifies mass concentrations and $PM_{2.5}$ constituents, including numerous trace elements, ions (sulfate, nitrate, sodium, potassium, ammonium), elemental carbon, and organic carbon. There are currently 54 Trends sites nationally in operation. Trends sites are largely static urban monitoring stations with protocols for sampling methods; dedicated to characterizing aerosol mass components in urban areas of the U.S. to discern long-term trends and provide an accountability mechanism to access effectiveness of control programs. In addition, there are approximately 181 supplemental speciation sites which are part of the STN network and are SLAMS sites. The STN data at trends sites are collected 1 in every 3 days, whereas supplemental sites collect data either 1 in every 3 days or 1 in every 6 days. Comprehensive information on the STN and related speciation monitoring can be found at http://www.epa.gov/ttn/amtic/specgen.html and http://www.epa.gov/aqspubl1/select.html.

NADP Initiated in the late 1970s, the National Acid Deposition Program (NADP) monitoring network began as a cooperative program between federal and state agencies, universities, electric utilities, and other industries to determine geographical patterns and trends in precipitation chemistry in the U.S. NADP collects and reports wet deposition measurements as weekly average data (NADP, 2002). The network is now known as NADP/NTN (National Trends Network) with nearly 200 sites in operation. The NADP analyzes the constituents important in precipitation chemistry, including those affecting rainfall acidity and those that may have ecological effects. The NTN measures sulfate, nitrate, hydrogen ion (measure of acidity), ammonia, chloride, and base cations (calcium, magnesium, potassium). Detailed information regarding the NADP/NTN monitoring network can be found at http://nadp.sws.uiuc.edu/.

SEARCH The **S**outh **E**astern **A**erosol **R**esearch and **CH**aracterization (SEARCH) monitoring network was established in 1998 and is a coordinated effort between the public and private sector to characterize the chemical and physical composition as well as the geographical distribution and long-term trends of $PM_{2.5}$ in the Southeastern U.S (Edgerton, 2005; Hansen, 2003; Zheng, 2002). SEARCH data are collected and reported on an hourly/daily basis. There are currently six SEARCH measurement sites: Birmingham, Alabama (urban), Centreville, Alabama (rural), Gulfport, Mississippi (urban), Jefferson Street, Atlanta, Georgia (urban), Oak Grove, Mississippi (rural), Yorkville, Georgia (rural), suburban Pensacola, Florida (suburban), and downtown Pensacola, Florida (urban). Background information regarding standard measurement techniques/protocols and data retrieval can be found at http://www.atmospheric-research.com/studies/SEARCH/index.html.

Supersites The Supersite (SS) monitoring program began in 2001 as an EPA OAQPS and ORD co-funded project which measures speciated $PM_{2.5}$ at eight air shed sites. Specifically, these eight monitoring supersites are located in Baltimore, Maryland; Pittsburgh, Pennsylvania; New York City, New York; Atlanta, Georgia; Houston, Texas; St. Louis, Missouri; Fresno, California and Los Angeles, California. These supersites were developed as special study platforms for research and measurement methods to address the scientific uncertainties associated with $PM_{2.5}$. The goals of the SS program include (1) fine particulate characterization to understand processes and source-receptor relationships and to support $PM_{2.5}$ and ozone SIPs, (2) testing of advanced sampling methods to enable a smooth transition from established routine techniques, and (3) development of monitoring data and samples shown in (1) to support health effects and exposure studies. PM Supersites information can be obtained at http://www.epa.gov/ttn/amtic/supersites.html.

18.4 How Should the Operational Evaluation of Performance Be Completed?

As noted above, an operational evaluation is used to assess how accurately the model predicts observed concentrations. Therefore, an operational evaluation can provide a benchmark for model performance and identify model limitations and uncertainties that require diagnostic evaluation for further model development/improvement. Computer graphics, ozone and PM metrics/statistics, and observational models are all potentially useful for evaluating a model's ability to predict observed air quality. This section describes the recommended statistical measures, graphical displays, and other analytical techniques which should be considered as part of an operational evaluation of ozone and $PM_{2.5}$ model performance. Note that model predictions from the ramp-up days should be excluded from the analysis of model performance.

18.4.1 Ozone Operational Evaluation

Statistics: It is recommended that, at a minimum, the following three statistical measures be calculated for hourly ozone and 8-hourly maxima ozone over the episode days in an attainment demonstration.

- Mean Normalized Bias (MNB): This performance statistic averages the model/observation residual, paired in time, normalized by observation, over all monitor times/locations. A value of zero would indicate that the model over predictions and model under predictions exactly cancel each other out. The calculation of this measure is shown in Equation 18.1.

$$MNB = \frac{1}{N}\sum_{1}^{N}\left(\frac{(Model - Obs)}{Obs}\right)\cdot 100\% \qquad (18.1)$$

- Mean Normalized Gross Error (MNGE): This performance statistic averages the absolute value of the model/observation residual, paired in time, normalized by observation, over all monitor times/locations. A value of zero would indicate that the model exactly matches the observed values at all points in space/time. The calculation of this measure is shown in Equation 18.2.

$$MNGE = \frac{1}{N}\sum_{1}^{N}\left(\frac{|Model - Obs|}{Obs}\right)\cdot 100\% \qquad (18.2)$$

- Average Peak Prediction Bias and Error: These are measures of model performance that assesses only the ability of the model to predict daily peak 1-hour and 8-hour ozone. They are calculated essentially the same as the mean normalized bias and error (Equation 18.1 and 18.2), except that they only consider daily maxima data (predicted versus observed) at each monitoring location. In the attainment test, models are used to calculate relative response factors near monitoring sites by taking the ratio of the average 8-hour daily maximum concentrations calculated for the future and current cases. Thus, the model's ability to predict observed mean 8-hour daily maxima is an important indicator of model performance.

Appendix A provides other statistics such as mean bias, mean error, mean fractional bias, mean fractional error, root mean square error, correlation coefficients, etc. which should also be calculated to the extent that they provide meaningful information. Wherever possible, these types of performance measures should also be calculated for ozone precursors and related gas-phase oxidants (NOx, NOy, CO, HNO3, H2O2, VOCs and VOC species, etc.) and ozone (and precursors) aloft.

Thresholds: EPA recommends that the three metrics above be calculated two ways: 1) for pairs in which the 1-hour or 8-hour observed concentrations are greater than 60 ppb[46], and 2) for all pairs (no threshold)[47]. This will help to focus the evaluation on the models ability to predict NAAQS-relevant ozone and minimize the effects of the normalization. In terms of pairing model predictions with monitored observations, EPA recommends that the grid cell value in which the monitor resides be used for the calculations. It would also be acceptable to consider bi-linear interpolation of model predictions to specific monitoring locations[48]. States/Tribes should recognize that, even in the case of perfect model performance, model-observed residuals are unlikely to result in exact matches due to differences between the model predictions which are volume averages and the observations which are point values.

Averaging: The statistics should initially be calculated for individual days (averaged over all sites) and individual sites (averaged over all days). As appropriate, States/Tribes should then aggregate the raw statistical results into meaningful groups of subregions or subperiods. For example, examination of model performance within and near the non-attainment area(s) of interest may be more important than examination of performance in other parts of the modeling domain. Similarly, priority may be placed on examination of the days that are potentially used in the attainment test (base period days with 8-hour ozone > 70 or 85 ppb). That is not to say that model performance evaluations should ignore performance on lower ozone days or in areas outside of the nonattainment areas. Simply, additional factors should be considered when prioritizing more detailed analyses.

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[46] Past ozone modeling applications have used a minimum cutoff of either 40 ppb or 60 ppb. Due to the interest in predicted ozone concentrations at or above the 8-hour standard (85 ppb), the higher cut off (60 ppb) is recommended.

[47] The use of a 0 ppb threshold can add valuable information about the ability of the model to simulate a wide range of conditions. Because of the tendency of the MNB and MNGE metrics to inflate the importance of biases at the lowest observed values (which are in the denominator), it is recommended that the alternate metrics of normalized mean bias (NMB) and normalized mean gross error (NMGE) be used as substitutes for evaluations with no minimum threshold.

[48] In certain instances, States/Tribes may also want to conduct performance evaluations using the “near the monitor” grid cell arrays. A “near the monitor” analysis may be useful when strong ozone gradients are observed, such as in the presence of a sea breeze or in strongly oxidant limited conditions. Furthermore, a “near the monitor” performance evaluation is consistent with the RRF methodology.

Plots/Graphics: Along with the statistical measures, EPA recommends that the following four sets of graphical displays be prepared and included as part of the performance analysis.

- Time series plots of model and predicted hourly ozone for each monitoring location in the nonattainment area, as well as key sites outside of the nonattainment area. These plots can indicate if there are particular times of day or days of the week when the model performs especially poorly. Figure 18.1 shows a sample time series plot. This graphic was developed using the air quality analysis module of the Atmospheric Model Evaluation Tool (AMET) (Appel, 2005), though other evaluation tools exist and can be used.

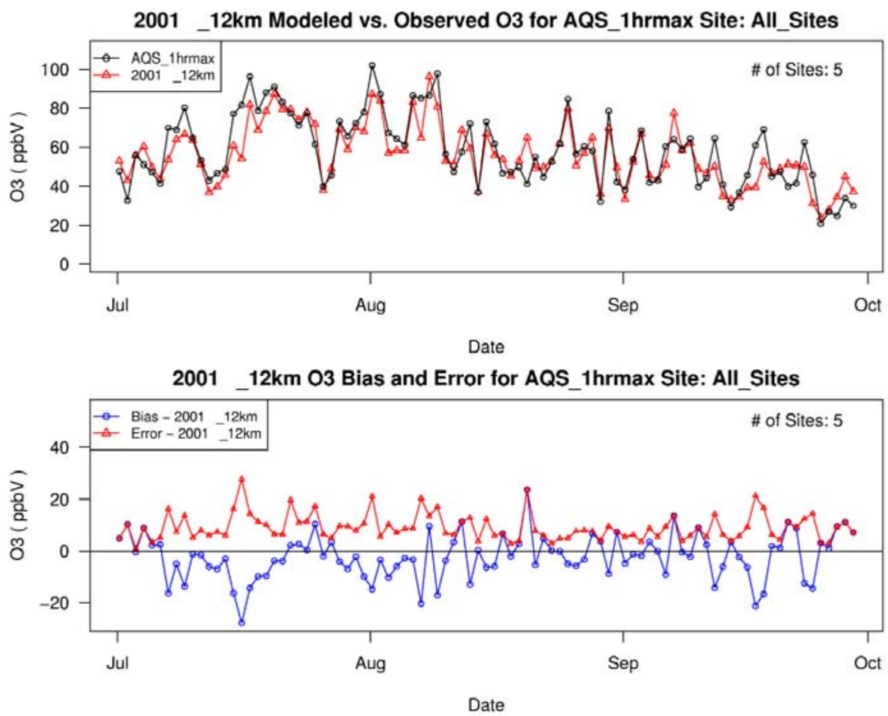

Figure 18.1. Sample time series analysis plot for a 12-km model vs. observed 2001 case. The upper plot shows a particular analysis for 1-hour maxima ozone, July through September performance averaged over five sites in Cleveland, Ohio. The bottom plot shows the bias and error (percentage) calculated based on the predicted 1-hour maxima ozone from the upper plot.

- Scatter plots of predicted and observed ozone at each site within the nonattainment area (and/or an appropriate subregion). These plots should be completed using: a) all hours within the modeling period for hourly ozone, and b) all 8-hour daily maxima within the modeling period. It may also be useful to develop separate plots for individual time periods or key subregions. These plots are useful for indicating if there is a particular part of the distribution of observations that is poorly represented by the model[49]. See Figure 18.2 below for a scatter plot example, which was generated using the AMET.

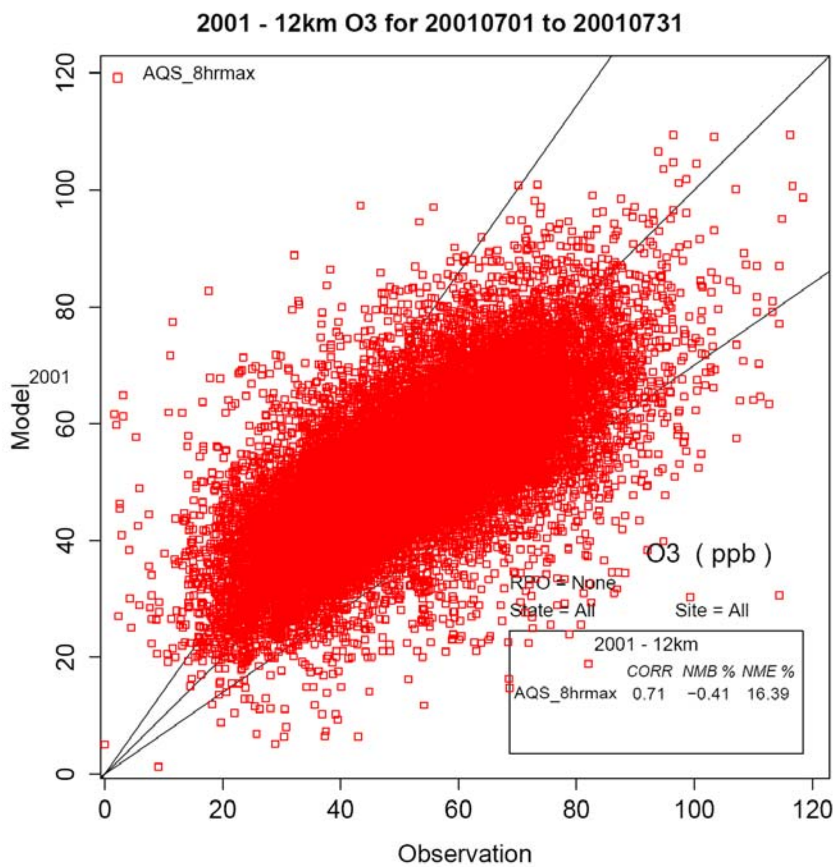

Figure 18.2. Scatter plot analysis for a 12-km model vs. observed 2001 case. The scatter plot shows a performance analysis for daily 8-hour maxima ozone pairs for the month of July.

- Daily tile plots of predicted ozone across the modeling domain with the actual observations as an overlay. Plots should be completed for both daily 1-hour maxima and daily 8-hour maxima. These plots can reveal locations where the model performs poorly. Superimposing observed hourly or daily maximum concentrations on the predicted isopleths reveals useful information on the spatial alignment of predicted and observed plumes.

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[49] Quantile-quantile (Q-Q) plots may also provide additional information with regards to the distribution of the observations vs. predictions. But due to the fact that Q-Q plots are not paired in time, they may not always provide useful information. Care should be taken in interpreting the results.

- Animations of predicted hourly ozone concentrations for all episode days or for certain periods of interest. Animations are useful for examining the timing and location of ozone formation. Animations may also reveal transport patterns (especially when looking at ozone aloft). Animations can also be used to qualitatively compare model outputs with the conceptual model of particular ozone episodes.

18.4.2 PM/RH Operational Evaluation

An operational evaluation for $PM_{2.5}$ and regional haze is similar to that for ozone. Some important differences are that $PM_{2.5}$ consists of many components and is typically measured with a 24-hour averaging time. The individual components of $PM_{2.5}$ should be evaluated individually. In fact, it is more important to evaluate the components of $PM_{2.5}$ than to evaluate total $PM_{2.5}$ itself. Apparent "good performance" for total $PM_{2.5}$ does not indicate whether modeled $PM_{2.5}$ is predicted for "the right reasons" (the proper mix of components). If performance of the major components is good, then performance for total $PM_{2.5}$ should also be good.

This section contains some additional recommended statistics that have typically not been calculated for ozone performance, but have been found to be particularly useful for PM analyses (such as fractional bias and error). We also show examples of some new types of display plots such as "soccer plots" and "bugle plots". Soccer plots provide a convenient way to display a summary of model performance (including bias and error at the same time). Bugle plots have variable bias and error goals, based on ambient concentrations. This allows for a higher percentage error and bias at very low concentrations. This recognizes the fact that models often have difficulty in accurately predicting near background concentrations[50].

Similar to ozone evaluations, it may be useful to prioritize examination of model performance within and near the non-attainment area(s) and/or Class I areas of interest. Additionally, priority may be placed on examination of the days that are potentially used in the attainment test (20% best and worst days for visibility and the days > 65 ug/m3 for 24-hour $PM_{2.5}$).

Statistics: Statistics for PM and regional haze performance are similar to those calculated for ozone. We recommend calculating statistics for components of $PM_{2.5}$, and PM precursors. Useful metrics include mean fractional bias and mean fractional error, normalized mean bias, and normalized mean error. Formulas for estimating these metrics at an individual monitoring site, j, are shown in Equations (18.3) -(18.6). Other statistics such as mean bias, mean error, root mean square error, correlation coefficients, etc. should also be calculated to the extent that they provide meaningful information (see Appendix A for definitions).

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[50]Predicting very low concentrations is not critical for modeling the $PM_{2.5}$ NAAQS. However, predicting low concentrations of PM species can be important for regional haze modeling, where in the cleanest Class I areas, PM concentrations may be less than a few ug/m3 (especially on the 20% best days).

- **Mean Fractional Bias (percent):** Normalized bias can become very large when a minimum threshold is not used. Fractional bias is used as a substitute. The fractional bias for cases with factors of 2 under- and over-prediction are -67 and + 67 percent, respectively (as opposed to -50 and +100 percent, when using normalized bias). Fractional bias is a useful indicator because it has the advantage of equally weighting positive and negative bias estimates. The single largest disadvantage is that the predicted concentration is found in both the numerator and denominator.

  Equation 18.3:

$$FBIAS = \frac{2}{N}\sum_{1}^{N}\left(\frac{(Model - Obs)}{(Model + Obs)}\right)\cdot 100\%$$

- **Mean Fractional Error (percent):** Normalized error can become very large when a minimum threshold is not used. Therefore fractional error is used as a substitute. It is similar to the fractional bias except the absolute value of the difference is used so that the error is always positive.

  Equation 18.4:

$$FERROR = \frac{2}{N}\sum_{1}^{N}\left(\frac{|Model - Obs|}{(Model + Obs)}\right)\cdot 100\%$$

- **Normalized Mean Bias (percent):** This performance statistic is used as a normalization to facilitate a range of concentration magnitudes. This statistic averages the difference (model - observed) over the sum of observed values. Normalized mean bias is a useful model performance indicator because it avoids over inflating the observed range of values.

  Equation 18.5:

$$NMB = \frac{\sum_{1}^{N}(Model - Obs)}{\sum_{1}^{N}(Obs)}\cdot 100\%$$

- **Normalized Mean Error (percent):** This performance statistic is used as a normalization of the mean error to facilitate a range of concentration magnitudes. This statistic averages the difference (model - observed) over the sum of observed values. Normalized mean error is a useful model performance indicator because it avoid over inflating the observed range of values.

  Equation 18.6:

$$NME = \frac{\sum_{1}^{N} |Model - Obs|}{\sum_{1}^{N} (Obs)} \cdot 100\%$$

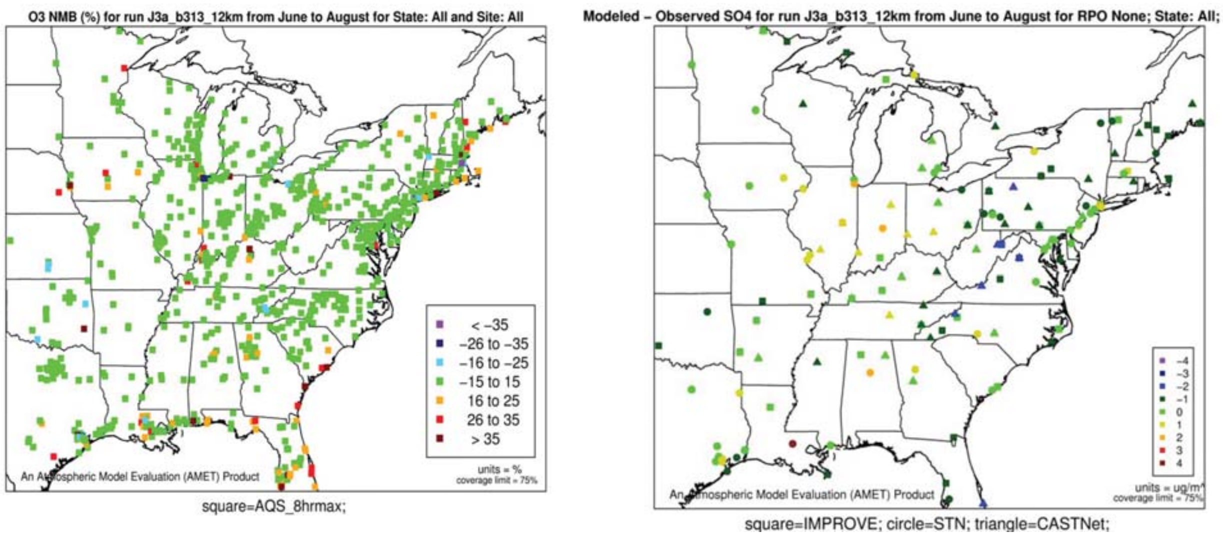
Averaging Times: Note that units of time associated with model and observed concentrations can be days (i.e., usually for particulate matter and its species), hours (i.e., usually for species with continuous measurements, like ozone) or sometimes weeks (CASTNet filter pack measurements). Also note that the preceding metrics may not be meaningful if the number of modeled days with monitored data is limited at a site.

Since modeling for the $PM_{2.5}$ NAAQS and regional haze will likely require modeling different times of year, season-specific statistics and graphic displays are helpful for evaluating and diagnosing model performance. Statistics and graphics can be averaged for various time scales. For example, statistical metrics and scatterplots can show daily averaged ambient-modeled pairs, monthly averaged pairs, quarterly (or seasonal averaged) pairs, or annual average pairs. Each of these averaging times can provide useful information. We recommend a range of different averaging times for annual or seasonal modeling. At a minimum, States should examine daily averaged pairs and seasonal (or quarterly) averaged pairs. It should be noted that statistics and plots tend to look "better" as the averaging time increases from daily to monthly to quarterly to annual. As such, daily pairs should always be examined to ensure a detailed look at model performance on the time scale of the FRM and STN measurements (24-hour average).

Plots/Graphics: As mentioned above in the ozone operational evaluation, graphics are a useful means for understanding *how* predictions and observations differ. For PM evaluations we recommend creating time series plots, tile plots, and scatter plots. Time series plots tell whether there is any particular time of day, day(s) of the week, or months (seasons) of the year when the model performs poorly. Tile plots reveal geographic locations where the model performs poorly. Information from tile plots and time series may provide clues about where to focus quality assurance efforts for model inputs. Scatter plots show whether there is any part of the distribution of observations for which the model performs poorly. These plots are also useful for helping to interpret calculations of bias between observations and predictions. For example, they could show large differences between component $PM_{2.5}$ observations and predictions which just happen to balance, producing low estimated aggregated bias. As mentioned above, since the NAAQS for $PM_{2.5}$ and the regional haze goals will likely require modeling different times of year, season-specific graphic displays are helpful for evaluating and diagnosing model performance.

These above mentioned graphical plots have been provided as examples in the ozone operational evaluation section. Other graphical analysis displays can also be developed to better inform a model performance evaluation. Additional types of graphical plots are shown below. These plots were generated using the AMET tool.

Figure 18.3 shows an example of spatial plots of normalized mean bias and mean bias by monitoring site. These plots allow an analysis of regional differences in model performance (e.g. inland vs. coastal areas).



(a) (b)

Figure 18.3. Example of (a) Spatial plot of NMB; (b) model-observed difference plot (mean bias).

Figure 18.4 shows an example of a "soccer plot" and "bugle plots" (Boylan, 2006) (Tesche, 2006). The soccer plot is so named because the dotted lines resemble a soccer goal. The plot is a convenient way to visualize model performance, as measures of both bias and error are shown on a single plot. As bias and error approach zero, the points are plotted closer to or within the "goal", represented here by the dashed boxes. The "bugle plot", named for the shape formed by the criteria and goal lines, is another plot available for model performance evaluation. The bugle plots are shaped as such because the goal and criteria lines are adjusted based on the average concentration of the observed species. As the average concentration becomes smaller, the criteria and goal lines become larger to adjust for the model's ability to predict at low concentrations. We recommend allowing for larger bias and error when the ambient concentration falls below 2 ug/m3.

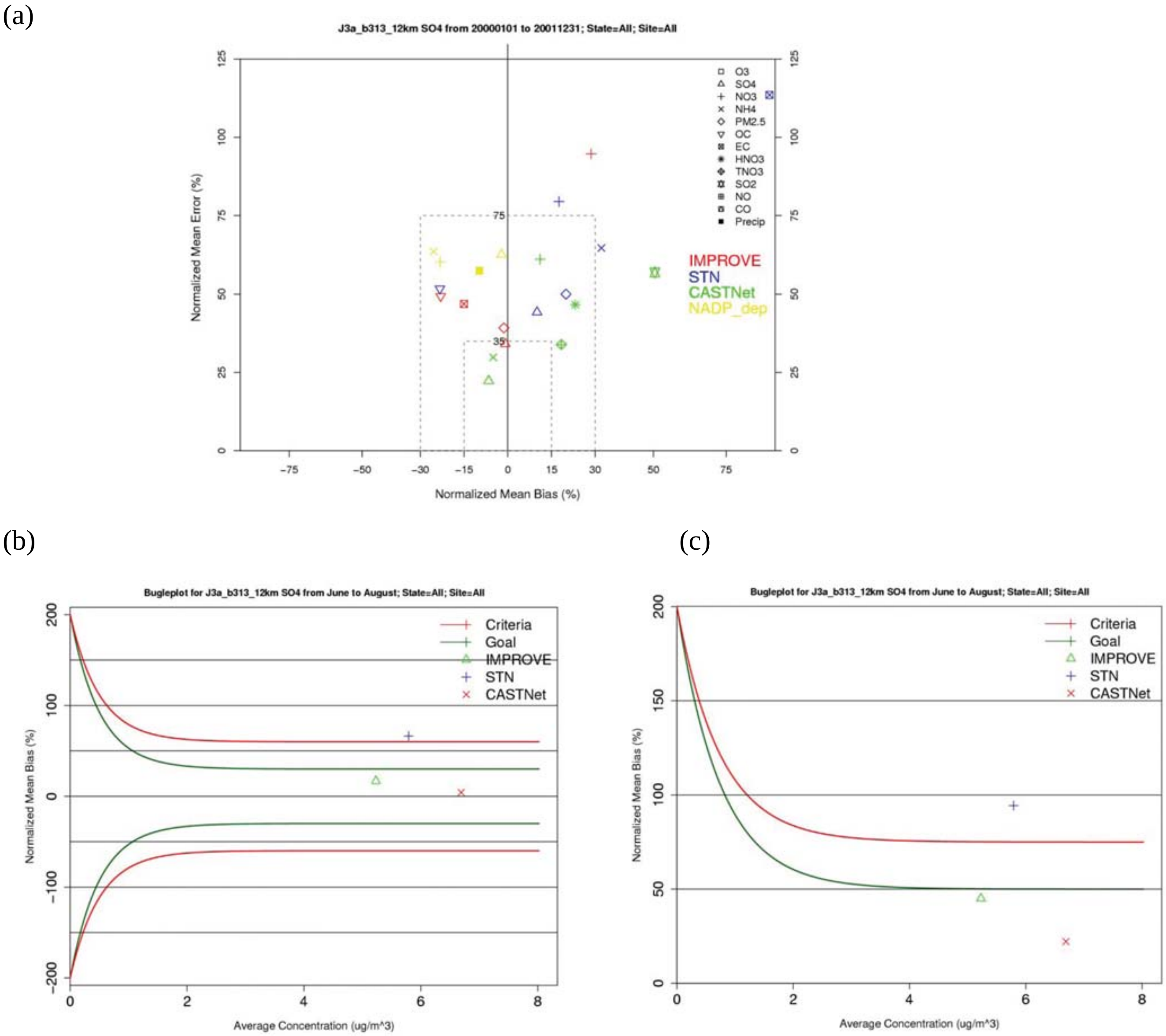


Figure 18.4. (a) The "soccer goal" plot measures both bias and error. The "goal" is represented by the dashed boxes. (b) A "bugle plot" of bias and (c) a "bugle plot" of error. As the average concentration becomes smaller, the criteria and goal lines become larger to adjust for the model's ability to predict at low concentrations.

Figure 18.5 shows an example of two types of box plots can be developed for model performance evaluation. One displays monthly (left) and one that displays hourly (right) information. The box plots show several quantities: the shading represents the 25% to 75% quartiles, while the lines represent the median values, for both model and observation concentrations. The monthly box plot can be used to quickly visualize model performance across the entire year, highlighting the seasonal change in model performance. The hourly or "diurnal" box plot is used with hourly data, and shows how the model predictions compare against observations throughout an entire day.

(a) (b)

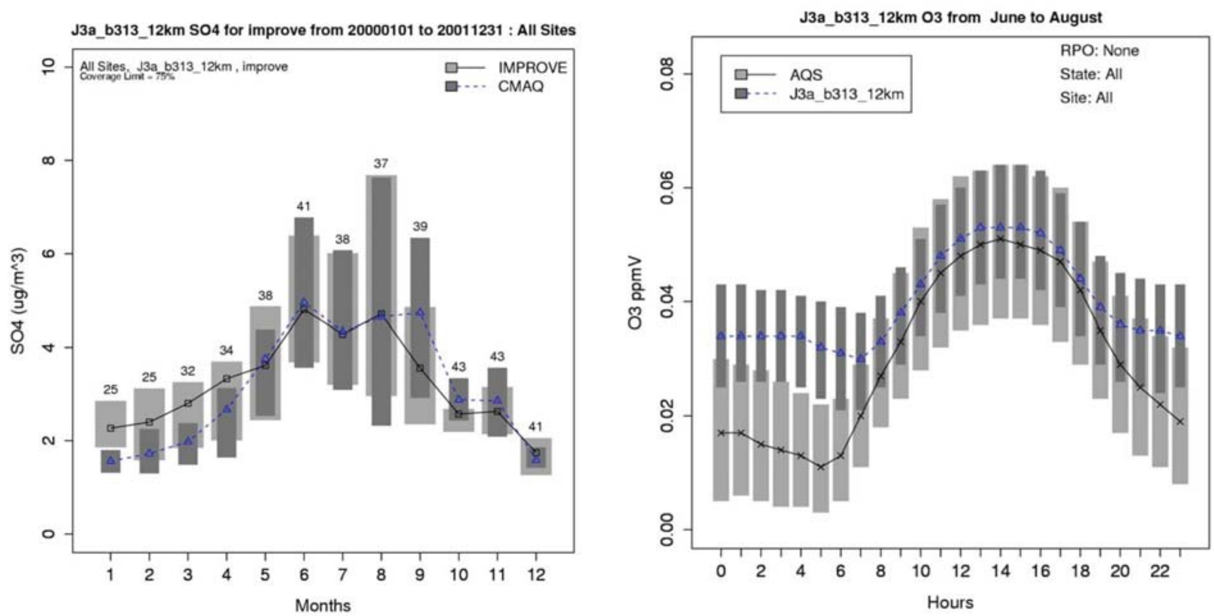


Figure 18.5. The box plots show several quantities: the shading represents the 25% to 75% quartiles, while the lines represent the median values, for both model and observation concentrations. (a) displays monthly data (left) and (b) displays hourly data (right).

18.5 How Do I Assess Model Performance and What Types of Analyses Can be Done to Evaluate the Accuracy of the Model Response: Diagnostic Evaluations?

This section lists possible analyses that could be performed to investigate the ability of the model to accurately forecast changes in predicted concentrations of ozone and PM resulting from changes in ozone and $PM_{2.5}$ precursor emissions. Diagnostic evaluations/tests are used to explain model performance and to provide clues about how to improve the reliability of predictions.

The diagnostic analyses discussed in this section include observational models, probing tools, receptor models, retrospective analyses, and sensitivity analyses. This represents a large variety of tools that can aid in diagnostic analyses. Some of these techniques are based on analysis of ambient data, some require running the photochemical many times, and some of the techniques involve coding of the photochemical model to allow additional outputs. States/Tribes are encouraged to complete as many of these types of diagnostic analyses as possible throughout the modeling process in order to help understand model performance and to help develop information which may help improve performance, as well as increase confidence in the modeled attainment projections.

18.5.1 Observational models

A performance evaluation which includes comparisons between modeled and observed ratios of indicator species carries with it a large potential advantage. For ozone, measurements of certain "indicator species ratios" are a potentially useful way to assess whether local ozone formation is VOC- or NOx-limited at any particular point in space and time as well as, help reveal whether the model is correctly predicting the sensitivity of ozone to VOC and/or NOx controls (e.g., comparisons between modeled and observed ratios: O3/NOy, O3/HNO3) (Sillman, 1995, 1997, 1998, and 2002; Lu and Chang, 1998; Pun and Seigneur, 1999). For PM, such a comparison may reveal whether the model is predicting sensitivity of secondary components of $PM_{2.5}$ to changes in SO_2, NH_3, VOC and/or NOx controls correctly (Ansari and Pandis, 1998; Blanchard et al., 2000; Pun and Seigneur, 2001). If a model accurately predicts observed ratios of indicator species, then one can conclude with additional confidence that the predicted change in future year ozone or PM may be accurate. One precaution with respect to the use of indicator species is that there may be a range of observed ratios for which the preferred direction of control is not clear. When this occurs, agreement between predictions and observations does not necessarily imply that the response to controls, as predicted by the model is correct (especially for secondary particulate matter to changes in precursors). If a model predicts *observed* ratios of indicator species such that observed and predicted ratios fall within the same range of ratios, this provides some confidence that the predicted *change* in particulate matter may be accurate. A second precaution is that application of this method often requires more measurements than are commonly made. In some cases, it may be difficult to achieve the required precision with current routine monitoring. Finally, much of the work done to date with indicator species has focused on peak hourly concentrations of ozone. Despite these precautions, comparing predicted and observed ratios of indicator species provides a means of assessing a model's ability to accurately characterize the sensitivity of predicted ozone and predicted secondary components of $PM_{2.5}$ to changes in precursors.

Many studies and applications of indicator species approaches have addressed ozone-related problems. Sillman (1995), Sillman (1998) and Lu and Chang (1998) provide good descriptions of the method, identify key ratios and illustrate application of the approach. Even though the preceding ratios are oriented toward ozone, they can provide insight into why modeled concentrations of secondary particulate matter are sensitive to changes in VOC, or NOx emissions (Pun and Seigneur, 1999). Ansari and Pandis (1998) have developed an indicator ratio of species and applied it to several combinations of secondary particulate matter present under different environmental conditions. They use this ratio to predict how mass of particulate matter will respond to reductions in sulfate, nitrate and ammonia. Blanchard et al., (2000) have also examined how indicator species might be used to assess whether particulate nitrate concentrations are limited by NOx or by ammonia emissions using mechanisms which incorporate reactions dealing with secondary particulate matter. These authors identify two ratios of indicator species which appear potentially useful for identifying limiting precursors for secondary nitrate particulate matter: (1) the ratio of particulate ammonium plus gas-phase ammonia over the sum of nitric acid plus particulate nitrate plus particulate sulfate, and (2) the ratio of particulate to total nitrate. It is likely that additional indicator species approaches will be identified as the user community continues to gain more experience with chemical mechanisms incorporating secondary particulate formation and more speciated particulate and gas phase ambient measurements become available.

Other observational methodologies exist and can be used in a similar manner. The Smog Production (SP) algorithm is another means by which ambient data can be used to assess areas that are NOx or VOC-limited (Blanchard, 1999). Additionally, it has been postulated that differences in weekend-weekday ozone and $PM_{2.5}$ patterns may also provide real-world information on which precursors are most responsible for ozone and $PM_{2.5}$ formation in any given area (Pun, 2001 and 2003; Heuss, 2003; Fujita, 2003; Blanchard and Tanenbaum, 2003 and 2005; Chinkin, 2003; Yarwood, 2003; Qin, 2004). For example, activity levels and patterns, leading to $PM_{2.5}$ and precursor emissions from mobile, area and some point sources, may differ on weekends vs. week days. In areas where there are large differences between average weekend and weekday ambient ozone and $PM_{2.5}$ concentrations over the span of several seasons, it would be useful to compare statistical model performance for weekends versus weekdays (e.g., does the model accurately reflect observed differences in component concentrations in summer vs. winter?). This would allow one to assess whether the model is capturing the effect of the emissions differences which are presumably driving the real-world concentration differences.

18.5.2 Probing Tools

Recently, techniques have been developed to embed procedures within the code of an air quality model which enable users to assess the contributions of specific source categories or of specific geographic regions to predicted model concentrations at specified sites (e.g. for ozone predictions, Zhang, 2003). Various techniques have been implemented into various air quality models, but three of the most commonly used probing tools are *photochemical source apportionment* (Dunker, 2002a; ENVIRON, 2006a; Tonnesen and Wang, 2004; SAI, 2005; Yarwood, 2005; Douglas, 2006), the *decoupled direct method* (DDM) (Dunker, 1980 1981, and 1984; Yang, 1997a and 1997b; Dunker, 2002b; ENVIRON, 2006a; Cohan, 2002, 2004, and 2005; Hakami, 2003 and 2004), *process analysis* (Jeffries, 1994 and 1997; Jeffries, 1996; Jang, 1995; Lo, 1997; Byun and Ching, 1999; Morris, 2001 and 2003; ENVIRON, 2006a; Henderson, 2006). In the context of model performance evaluation, these attribution procedures are useful in that they allow one to "track" the importance of various emissions categories or phenomena contributing to predicted ozone and particulate matter at a given location. This can provide valuable insight into whether the model is adequately representing the conceptual description of ozone and PM patterns in the nonattainment area. In cases where model performance is subpar, these analyses can be useful for indicating where model input or model algorithm improvements are most needed.

Caution should be applied to the tools and techniques mentioned here as they are limited by the accuracy of the underlying air quality photochemical model, when the tools utilize the same algorithms/modules and assumptions. An overview of these aforementioned probing tools are provided below.

Photochemical source apportionment: A photochemical source apportionment tool tags and tracks the release, transport, chemical transformation, and deposition of precursor species from primary emission sources, source categories, source regions, initial conditions and/or boundary conditions from a photochemical grid model. Therefore, the contribution of tagged sources to simulated concentrations (including secondary pollutants) and deposition can be measured in a single model run. This source apportionment tool can be used to estimate how emissions from individual source areas and regions affect modeled ozone and PM concentrations over space and time. For example, this is achieved by using multiple tracer species to track the fate of ozone precursor emissions (VOC and NOx) and the ozone formation caused by these emissions within an air quality model simulation. There are challenges to consider during implementation of this methodology, i.e., tracking the spatial and temporal relationships between separate groups of emission sources and ozone and particulate matter formation (Douglass, 2006), (Environ, 2006a), (Environ, 2006b). Among them are insuring compatibility with the underlying air quality model formulation so that derived source-receptor relationships will be consistent with model response to emission changes.

The information gleaned from source apportionment can be useful in considering potential control strategies. However, a key consideration in weighing alternative strategies is which types of emissions are cost effective and practical to control, a consideration not addressed by source apportionment modeling.

Decoupled Direct Method (DDM): The DDM calculates the local, first-order sensitivity coefficients of gas-phase pollutant concentrations to perturbations of model inputs, e.g. initial conditions, boundary conditions, emissions. Theoretically, the DDM is applicable to the calculation of higher order sensitivity coefficients as well, but these are much more numerous than the first order coefficients and generally will be less useful (Environ, 2006a). DDM can also be used to explore model sensitivities to perturbations in meteorological parameters and chemical rate constants, although resource intensive and at present somewhat less useful. The decoupled direct method is advantageous both in terms of computational efficiency and stability of the numerical solution. DDM has been used as a sensitivity analysis tool in several studies. A single model run using DDM can potentially provide the information equivalent to tens, if not hundreds of brute force emissions reductions model runs. DDM has been incorporated into several models including CAMx (Environ, 2006a) and CMAQ (Cohan, 2005).

Process analysis: Process analysis techniques allows one to quantitatively track (mass balancing) the contributions of individual physical and chemical atmospheric processes to the overall change in pollutant concentrations at a particular time and location. Thus, process analysis will assess the relative importance of each physical and chemical process for a particular model simulation as well as explain how model predictions are obtained, which is valuable when modeling nonlinear systems such as atmospheric photochemistry. Since models used to simulate ozone and secondary particulate matter are similar, process analysis should also be useful for addressing both ozone and $PM_{2.5}$ (and visibility related) applications.

Three of the most common process analysis tools implemented in grid models are the integrated process rate (IPR) analysis, the integrated reaction rate (IRR) analysis, and the chemical process analysis (CPA). The IPR analysis is used to determine the relative contributions of individual physical (e.g., advection, diffusion, emissions) and chemical (e.g., chemical reaction, aqueous chemistry, aerosol production) processes, potentially revealing unexpected low or high process contributions. The IRR analysis is used to identify and explain the details of the chemical transformations (chemical pathways and key chemical characteristics) in a particular model simulation. Typically, IRR analyses have been used to determine and understand model prediction differences between chemical mechanisms (e.g., CB-IV, SAPRC). Likewise, the CPA is an improvement on the IRR analysis technique where part of the processing of IRR information is internalized within the air quality grid model to yield key chemical parameters directly (e.g., budget terms for ozone and NOx).

Process analysis requires a substantial amount of expertise to be interpreted to full advantage. However, useful insights are also possible with less detailed analyses. An analysis can focus on selected grid cells in a small area. Process analysis then takes advantage of the fact that a numerical grid model addresses physical and chemical factors affecting secondary pollutants in a sequential manner. For example, a typical sequence followed in a model for each time step (e.g., 1 hour) might be (1) advection of $PM_{2.5}$ components and precursors present at the beginning of the time step, (2) $PM_{2.5}$ and precursor emissions added during the time step, (3) vertical diffusion of the advected material and fresh emissions, (4) estimated cloud cover and its effects on photolysis rates, (5) atmospheric chemistry involving advected and diffused material with fresh emissions, and (6) deposition of certain compounds. Process analysis examines incremental effects on changes in component and/or $PM_{2.5}$ predictions from hour to hour attributable to each of the processes described above. In this way, one gets a sense of how important each process is as a contributor to predicted air quality at a specified time and location.

If a focused diagnostic analysis, such as one obtained with process analysis, suggests a particular model prediction may be an artifact of a model assumption rather than a result of real chemical/physical atmospheric processes, States may wish to go back to the meteorological or emissions model to verify that the inputs and assumptions that have been used are correct. If a prediction is the result of an apparent artifact which cannot be resolved, States may wish to discount that prediction in the attainment demonstration or uniform rate of progress assessment.

18.5.3 Receptor Models (Multi-variate Source Apportionment)

Receptor models (also referred to as multi-variate source apportionment models) are mathematical or statistical procedures for identifying and quantifying the sources of air pollutants at a receptor location (Henry, 1991; Hopke, 1991, 1999, 2001; Lewis, 2003; Coulter, 2000; Willis, 2000; Watson, 2002; Maykut, 2003; Mukerjee, 2004). Receptor models are generally used to examine primary pollutants such as the primary components of $PM_{2.5}$. They are not typically used to examine ozone or secondary $PM_{2.5}$ species. Unlike photochemical and dispersion air quality models, receptor models do not use pollutant emissions, meteorological data and chemical transformation mechanisms to estimate the contribution of sources to receptor concentrations. Instead, receptor models use the chemical and physical characteristics of gases and particles measured at source and receptor to both identify the presence of and to quantify source contributions to receptor concentrations. Receptor models can identify possible air quality management strategy solutions especially when used in conjunction with examination of the local emission inventory (Brook, 2004). These models are therefore a natural complement to other air quality models and can be used as part of State Implementation Plans (SIPs) for identifying sources contributing to air quality problems.

Receptor models provide scientific support for current ambient air quality standards and for implementation of those standards by identifying and quantifying contributions of various source types. As mentioned in sections 18.2 and 18.3, the richness of the ambient air quality data sets has been increasing, due to more species being measured, species being stratified by particle size, shorter durations of sampling, and measurements not only at the surface but also aloft. To take advantage of these richer data sets the receptor models have become more complex. To ensure that receptor modeling tools, both simple and complex, are available for use in the development and implementation of air quality standards, the United States Environmental Protection Agency's Office of Research and Development (ORD) has and continues to develop a suite of receptor models (multivariate statistical techniques) that are freely distributed to the air quality management community. The EPA has developed the Chemical Mass Balance (CMB) and UNMIX models as well as the Positive Matrix Factorization (PMF) method for use in air quality management. CMB fully apportions receptor concentrations to chemically distinct source-types depending upon the source profile database, while UNMIX and PMF internally generate source profiles from the ambient data. Details of CMB, UNMIX and PMF are described below.

The Chemical Mass Balance (CMB) Model (most recent version, EPA-CMBv8.2) is one of several receptor models that has been applied to air quality problems over the last two decades (U.S. EPA, 2004d and 2004e; Seigneur, 1997, Coulter, 2000). Based on an effective-variance least squares method (EVLS), EPA has supported CMB as a regulatory planning tool through its approval of numerous State Implementation Plans (SIPs) which have a source apportionment component. The chemical mass balance model is probably the most directly applicable observational approach for this purpose, since it can focus on the same day(s) considered with the air quality model. Cautions raised previously about representativeness of the monitored data continue to apply. CMB requires speciated profiles of potentially contributing sources and the corresponding ambient data from analyzed samples collected at a single receptor site. CMB is ideal for localized nonattainment problems and has proven to be a useful tool in applications where steady-state Gaussian plume models are inappropriate, as well as for confirming or adjusting emissions inventories.

UNMIX is named for its function, which is to "unmix" the concentrations of chemical species measured in the ambient air to identify the contributing sources. The particular mathematical approach used by UNMIX is based on a form of Factor Analysis, but its novelty is that physically-meaningful constraints are imposed which are intended to remove the undesirable ambiguity of the multiple solutions that are characteristic of ordinary Factor Analysis. For a given selection of species, UNMIX estimates the number of sources, the source compositions, and source contributions to each sample. Chemical profiles of the sources are not required, but instead are generated from the ambient data.

The PMF technique is a form of factor analysis where the underlying co-variability of many variables (e.g., sample to sample variation in PM species) is described by a smaller set of factors (e.g., PM sources) to which the original variables are related. The structure of PMF permits maximum use of available data and better treatment of missing and below-detection-limit values. Also available is a document which discusses the PMF methodology: A Guide to Positive Matrix Factorization (PDF).

18.5.4 Retrospective Analyses

A retrospective analysis is intended to examine the ability of the model to respond to emissions changes by comparing recent trends in observed ozone or $PM_{2.5}$ concentrations to the model-predicted trend over the same time period. The approach is a direct assessment of what we are most interested in---does the model accurately predict changes in air quality as a result of changes in emissions? As part of this analysis the model is run for current episodes or time periods and episodes in one or more historical time periods using the emissions and meteorological inputs appropriate for each time period modeled. While retrospective analyses may be useful, it may be difficult to obtain meteorological and emissions inputs for the historical time period(s) that are calculated using techniques and assumptions which are consistent with the calculation of these same inputs for the current time period. Using inconsistent inputs will confound the interpretation of the predicted trend.

Because differences in meteorology between years can confound the apparent change in pollutants, EPA recommends that, in most cases, retrospective analyses use constant meteorology and backcasted emissions. The model should respond in a predictable way if the emissions changes are large enough. Hence, backcasting an emissions change of only a few percent would not be viable. However, if NOx or SO2 emissions have been reduced by a large percentage (e.g. 30% or more), then that may be a good test of the response of the model. In Section 8, we noted that a retrospective analysis can be a useful tool for diagnosing why an area has not attained the NAAQS. Therefore, retrospective analyses are one of the few tools that can be used to determine if the model is responding "adequately" to control measures. Retrospective analyses may be an important tool to show that the models are responding "correctly" to emissions changes.

18.5.5 Alternative Base Cases (Sensitivity tests)

In some cases it may be useful to evaluate how the response of the model to emissions reductions varies as a function of alternative model inputs or model algorithms. Outcomes of these types of sensitivity tests are useful for several purposes. First, the tests can be used to see whether model performance is especially sensitive to a particular input or combination of inputs (Arnold, 2003; Gilliland, 2006; Morris, 2006). Second, sensitivity tests may help prioritize additional data gathering efforts so that a subsequent review/diagnosis can be performed at the time of a mid-course review or required attainment date. Third, the tests can be used to assess the robustness of a control strategy. As an example, States/Tribes could consider the effects of assumed boundary conditions on predicted effectiveness of a control strategy. If the model response does not differ greatly over a variety of alternative plausible configurations, this increases confidence in the model results.

The parameters for sensitivity tests can include, but are not limited to: different chemical mechanisms, finer or coarser grid resolution, meteorological inputs from alternative, credible meteorological model(s), different initial/boundary conditions, and multiple sets of reasonable emission projections. Sensitivity tests can and should be applied throughout the modeling process, not just when model performance is being evaluated. In cases where the operational model performance is considered to be poor, these tests may help indicate where base case input/algorithm changes are warranted.

A new technique has been developed to more efficiently examine a large range of emissions control scenarios. Response Surface Modeling (RSM), has been developed by utilizing advanced statistical techniques to characterize the relationship between model outputs and input parameters in a highly economical manner (U.S. EPA, 2006c). The RSM is a metamodel of a model (i.e., air quality model); it is a reduced-form prediction model using statistical correlation structures to approximate model functions through the design of complex multi-dimension experiments.

The RSM is based on a new approach known as air quality metamodeling that aggregates numerous pre-specified air quality modeling simulations into a multi-dimensional air quality "response surface". Simply, this metamodeling technique is a "model of the model" and can be shown to reproduce the results from an individual modeling simulation with little bias or error (U.S. EPA, 2006c, Hubbell, 2005). The RSM is based on statistical relationships between model inputs and outputs to provide real-time estimate of these air quality changes. The RSM provides a wide breadth of model outputs, which can be used to develop emissions control scenarios. The RSM approach can inform the selection and evaluation of various control scenarios. This approach allows for the rapid assessment of air quality impacts and changes of different combinations of emissions reductions. While the RSM may not provide a complete picture of all changes necessary to reach various alternative standards nationwide, it is highly useful in the context of providing illustrative control scenarios for selected areas, and understanding the contribution of different source categories, source regions and pollutant emissions to air quality across the U.S. The RSM can be used in a variety of ways: (1) strategy design and assessment (e.g. comparison of urban vs. regional controls; comparison across sectors; comparison across pollutants); (2) optimization (develop optimal combinations of controls to attain standards at minimum cost); (3) model sensitivity (systematically evaluate the relative sensitivity of modeled ozone and PM levels to changes in emissions inputs.

18.6 How Should the Results of the Model Evaluation be Assessed (Interpreted)?

In EPA guidance for the 1-hour ozone attainment demonstrations (U.S. EPA, 1991a), several statistical goals were identified for operational model performance. These goals were identified by assessing past modeling applications of ozone models and determining common ranges of bias, error, and accuracy (Tesche et al., 1990). The 1-hour guidance noted that because of differences in the quality of the applications considered, it was inappropriate to establish "rigid criterion for model acceptance or rejection" (i.e., no pass/fail test). It was recommended that these ranges should be used in conjunction with the additional qualitative procedures to assess overall model performance.[51]

With the additional experience of more than a decade of photochemical modeling, it is clear that there is no single definitive test for evaluating model performance. All of the tests identified in Sections 18.2 and 18.3 have strengths and weaknesses. Further, even within a single performance test, it is not appropriate to assign “bright line” criteria that distinguish between adequate and inadequate model performance. In this regard, EPA recommends that a “weight of evidence” approach (like that described in Section 7) be used to determine whether a particular modeling application is valid for assessing the future attainment status of an area. EPA recommends that States/Tribes undertake a variety of performance tests and weigh them qualitatively to assess model performance. Provided suitable data bases are available, greater weight should be given to those tests which assess the model capabilities most closely related to how the model is used in the modeled attainment test. Generally, additional confidence should be attributed to model base case applications in which a variety of the tests described above are applied and the results indicate that the model is performing well. From an operational standpoint, EPA recommends that States/Tribes compare their evaluation results against similar modeling exercises to ensure that the model performance approximates the quality of other applications. To aid in this comparison, we have summarized performance metrics (including information on models and notes on inputs) of recent ozone, $PM_{2.5}$, and regional haze applications in Appendix B.

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[51] In practice, however, most 1-hour ozone modeling applications using the 1991 guidance tended to focus almost entirely on meeting the three statistical "goals" for bias, error, and accuracy at the expense of more diagnostic evaluation.

In summary, we continue to believe that for ozone, $PM_{2.5}$, and regional haze; 1) there should be no bright line performance criteria; 2) the evaluation of statistical performance measures should be compared to current and past modeling applications; and 3) statistical measures should be used in conjunction with diagnostic tests and other qualitative analyses to assess overall model performance.

REFERENCES

Abt Associates, (2003), "Environmental Benefits Mapping and Analysis Program (BenMAP), User's Manual: http://www.epa.gov/ttn/ecas/benmodels.html.

ABT Associates, (2007), "Model Attainment Test Software (MATS) User's Manual".

Air Quality Management Work Group, (2005), "Recommendations to the Clean Air Advisory Committee: Air Quality Management Work Group, Phase 1 and Next Steps", available at http://www.epa.gov/air/caaac/pdfs/report1-17-05.pdf.

Ansari, A.S., and S.N. Pandis, (1998), "Response of Inorganic PM to Precursor Concentrations", *Environ. Sci. Technol.*, **32**, 2706-2714.

Appel, W., S. Howard, R. Gilliam, and S. Phillips, (2005), "The Atmospheric Model Evaluation Tool: Air Quality Module", 4th Annual CMAS Models-3 Users' Conference, September 26-28, 2005, Chapel Hill, NC.

Arnold, J.R., R.L. Dennis, and G.S. Tonnesen, (2003), "Diagnostic Evaluation of Numerical Air Quality Models with Specialized Ambient Observations; Testing the Community Multiscale Air Quality Modeling System (CMAQ) at Selected SOS 95 Ground Sites", *Atmospheric Environment*, **37**, 1185-1198.

Arunachalam, S., Z. Adelman, R. Mathur, and J. M. Vukovich, (2002), "The Impacts of Biogenic Emissions Estimates from BEIS-3 on Ozone Modeling in the Southeastern U.S.", 11th Annual Emissions Inventory Conference of the U.S. EPA", http://www.epa.gov/ttn/chief/conference/ei11/index.html

Arunachalam, S., A. Holland, B. Do, and M. Abraczinskas, (2006), A Quantitative Assessment of the Influence of Grid Resolution on Predictions of Future-Year Air Quality In North Carolina, USA, *Atmospheric Environment*, **40** (26), 5010-5026.

Atmospheric and Environmental Research, Inc., (2002), "Evaluation of Probing Tools Implemented in CAMX", CRC Project A-37-1, Document Number CP099-1-2, August, http://www.crcao.com/reports/recentstudies00-02/A-37-1%20Final%20Report.pdf

Baker, K., (2004a), "Midwest Regional Planning Organization Modeling Protocol", Lake Michigan Air Directors Consortium / Midwest Regional Planning Organization, Des Plaines IL. http://www.ladco.org/tech/photo/docs/RPOModelingProtocolV2_dec2004.pdf

Baker K., (2004b), "Meteorological Modeling Protocol For Application to $PM_{2.5}$/Haze/OzoneModeling Projects", Lake Michigan Air Directors Consortium / Midwest Regional Planning Organization, Des Plaines IL.

Battelle, 2004, “Characterizing Ozone Episodes to Inform Regulatory Modeling”, Technical Report, U.S. EPA Contract No. 68-D-02-061, Work Assignment 2-07

Biswas, J., and S.T. Rao, (2001), “Uncertainties in Episodic Ozone Modeling Stemming from Uncertainties in the Meteorological Fields”, *J. Applied Met*., **40**, 117-136

Blanchard, C.L., and P.M. Roth, (1997), “User’s Guide Ozone M.A.P.P.E.R., Measurement-based Analysis of Preferences in Planned Emission Reductions, Version 1.1", Final Report prepared for the U.S. EPA pursuant to Contract 68-D6-0064 Work Assignment, W.M.Cox, EPA Work Assignment Manager.

Blanchard, C.L., F.W. Lurmann, P.M. Roth, H.E. Jeffries and M. Korc, (1999), “The Use of Ambient Data to Corroborate Analyses of Ozone Control Strategies”, *Atmospheric Environment*, **33**, 369-381.

Blanchard, C. L., (2000), “Ozone process insights from field experiments- Part III: Extent of reaction and ozone formation”, *Atmospheric Environment*, **34**, 2035-2043.

Blanchard, C. L., and T. Stoeckenius, (2001), “Ozone response to precursor controls: comparison of data analysis methods with the predictions of photochemical air quality simulation models”, *Atmospheric Environment*, **35**, 1203-1216.

Blanchard, C.L., and S.t. Tanenbaum, (2003), “Differences between Weekday and Weekend Air Pollutant Levels in South California”, *J. Air & Waste Management Association*, **53**, 816-828.

Blanchard, C.L., and S.T. Tanenbaum, (2005), “Weekday/Weekend Differences in Ambient Ozone and Particulate Matter Concentrations in Atlanta and the Southeastern United States”, Envair, Final Report, CRC Project No. A-47, pp. 78.

Boylan, J.W. and Russell, A.G, (2006), “PM and Light Extinction Model Performance Metrics, Goals, and Criteria for Three-Dimensional Air Quality Models”, *Atmos. Environ.*, **40**, 4946-4959.

Brook, J., E. Vega, and J. Watson, (2004), “Receptor Methods” Chapter 7, In: *Particulate Matter Science for Policy Makers, A NARSTO Assessment*, P.H. McMurry, M.F. Shepherd, J.S. Vickery, ed., Cambridge University Press, Cambridge, UK, 235-281.

Byun, D.W., and J.K.S. Ching, (1999), “Science Algorithms of the EPA Models-3 Community Multiscale Air Quality (CMAQ) Modeling System,” Office of Research and Development, USEPA, EPA/600/R-99/030.

CARB, (1996), “Performance Evaluation of SAQM in Central California and Attainment Demonstration for the August 3-6, 1990 Ozone Episode”, California Air Resources Board, Sacramento, CA.

Cabada, J.C., S. N. Pandis, R. Subramanian., A. L. Robinson, A. Polidori, and B. Turpin, (2004), “Estimating the Secondary Organic Aerosol Contribution to $PM_{2.5}$ Using the EC Tracer Method”, *Aerosol Science and Technology*, 38, 140-155.

Cardelino, C.A., and W.L. Chameides, (1995), “An Observation Based Model for Analyzing Ozone Precursor Relationships in the Urban Atmosphere”, *J. Air & Waste Mgmt. Assoc.*, **45**, 161-181.

Chang, J.S., S. Jin, Y. Li, M. Beauharnois, C.L. Lu, and H. Huang, (1997), “SARMAP Air Quality Model”, prepared by Atmospheric Sciences Research Center, State University of New York (Albany).

Chinkin, L.R., D.L. Coe, T.H. Funk, H.R. Hafner, P.T. Roberts, P.A. Ryan, and D.R. Lawson, (2003), “Weekday versus Weekend Activity Patterns for Ozone Precursor Emissions in California’s South Coast Air Basin”, *J. Air & Waste Management Association*, **53**, 829-843.

Chow, J. C., J. G. Watson, L.-W. A. Chen, W.P. Arnott, and H. Moosmüller, (2004), “Equivalence of Elemental Carbon by Thermal/Optical Reflectance and Transmittance with Different Temperature Protocols”, *Environmental Science and Technology*, 38(16), 4414-4422.

Chu, S.-H., (2005), “Stable estimate of primary OC/EC ratios in the EC tracer method”, *Atmospheric Environment*, 39, 1383–1392.

Clegg, S.L., P. Brimblecombe, and A. S. Wexler, (1998), “Aerosol Inorganics Model; A Thermodynamic Model of the System H+ - NH4+ - SO42- - NO3- - H2O at Tropospheric Temperatures.”, *J. Phys. Chem*., 102A, 2137-2154. http://www.aim.env.uea.ac.uk/aim/project.htm

Clinton, W.J., (July 16, 1997), Subject: “Implementation of Revised Air Quality Standards for Ozone and Particulate Matter”, Memorandum to the Administrator of the Environmental Protection Agency.

Croes, B.E., L.J. Dolislager, L.C. Larsen, and J.N. Pitts, (2003), “The O3 'Weekend Effect' and NOx Control Strategies—Scientific and Public Health Findings and Their Regulatory Implications”; EM, July 2003, 27-35.

Cohan, D.S., (2002), “Implementation of a Direct Sensitivity Method into CMAQ”, Paper 5.3, Presented at 1st CMAS Models-3 User’s Conference - Models-3 Performance and Applications, RTP, NC, (October 2002).

Cohan, D.S., (2004), “Applicability of CMAQ-DDM to Source Apportionment and Control Strategy Development”, Paper 5.3, Presented at 3rd Annual CMAS Models-3 Users’ Conference, RTP, NC, (October 2004).

Cohan, D. S., A. Hakami, Y.T. Hu, and A.G. Russell, (2005), “Nonlinear Response of Ozone to Emissions: Source Apportionment and Sensitivity Analysis.” *Environ. Sci. Technol.* **39**, 6379-6748.

Cohan, D.S., Y. Hu, A.G. Russell, (2006), “Dependence of ozone sensitivity analysis on grid resolution”, *Atmospheric Environment*, 40, 126-135.

Collett, Jeffrey, (2004), Technical note on IMPROVE study.

Coulter, T., R.A. Wagoner, and C.W. Lewis, (2000), “Chemical Mass Balance Software: EPA-CMB8.2", Submitted for inclusion in Proceedings of the AWMA/EPA Symposium, Measurement of Toxic and Related Air Pollutants, September 12-14, 2000, Research Triangle Park, NC.

Cox, W.M., and S. Chu, (1993), “Meteorologically Adjusted Ozone Trends in Urban Areas: A Probabilistic Approach”, *Atmospheric Environment,* **27B**, (4), 425-434.

Cox, W.M., and S. Chu, (1996), “Assessment of Interannual Ozone Variation in Urban Areas from a Climatological Perspective”, *Atmospheric Environment*, **30**, 2615-2625.

Dennis, R.L., (1994), “Using the Regional Acid Deposition Model to Determine the Nitrogen Deposition Airshed of the Chesapeake Bay Watershed”, *Ch.21*, *Atmospheric Deposition of Contaminants to the Great Lakes and Coastal Waters*, J.E. Baker (ed.), SETAC Press, Pensacola, FL.

Deuel, H.P., and S.G. Douglas, (1998), “Episode Selection for the Integrated Analysis of Ozone, Visibility and Acid Deposition for the Southern Appalachian Mountains”, Draft Technical Report Systems Applications International, Inc. (SYSAPP-98/07), prepared for the Southern Appalachians Mountains Initiative.

Dolwick, P.D., C. Jang, and B. Timin, (1999), “Effects of Vertical Grid Resolution on Photochemical Grid Modeling”, *Paper 99-309*, Presented at 99th AWMA Meeting, St.Louis, MO, (June 1999).

Dolwick, P.D., (2002), "USEPA/OAQPS Meteorological Modeling Analyses", presented at the 2002 Ad Hoc Meteorological Modeling Meeting, Des Plaines IL.

Doty. K.G., T.W. Tesche, D.E. McNally, B. Timin, and S. F. Mueller, (2001), “Meteorological Modeling for the Southern Appalachian Mountains Initiative (SAMI)”, Final Report, Southern Appalachian Mountain Initiative. Asheville, NC.

Douglas, S.G., R.C. Kessler, and E.L. Carr, (1990), “User’s Guide for the Urban Airshed Model, Volume III: User’s Manual for the Diagnostic Wind Model”, EPA-450/4-90-007C, U.S. EPA, Research Triangle Park, NC 27711, (NTIS No.: PB91-131243).

Douglas, S., T. Myers, and Y. Wei, (2006). “Implementation of Sulfur and Nitrogen Tagging in the Community Multi-scale Air Quality (CMAQ) Model.” Prepared for the U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. Prepared by ICF International, San Rafael, California (06-076).

Dunker, A.M., (1980), “The response of an atmospheric reaction-transport model to changes in input functions”, *Atmospheric Environment*, **14**, 671-679.

Dunker, A.M., (1981), “Efficient calculations of sensitivity coefficients for complex atmospheric models”, *Atmospheric Environment*, **15**, 1155-1161.

Dunker, A.M., (1984), “The Decoupled Direct Method For Calculating Sensitivity Coefficients In Chemical-Kinetics”, *J. Chem. Phys*. **81**, 2385-2393.

Dunker, A.M., G. Yarwood, J.P. Ortmann, and G.M. Wilson, (2002a), "Comparison of source apportionment and source sensitivity of ozone in a three-dimensional air quality model", *Environ. Sci. Technol.*, **36**, 2953-2964.

Dunker, A.M., G. Yarwood, J.P. Ortmann, and G.M. Wilson, (2002b), "The decoupled direct method for sensitivity analysis in a three-dimensional air quality model–implementation, accuracy, and efficiency", *Environ. Sci. Technol.*, **36**, 2965-2976.

Eberly, S., (2005), "EPA PMF 1.1 User's Guide", June 30, 2005. USEPA, National Exposure Research Laboratory, http://www.epa.gov/heasd/products/pmf/pmf.htm .

Eder, B.K., J.M. Davis, and P. Bloomfield, (1993a), “A Characterization of the Spatiotemporal Variability of Non-urban ozone concentrations over the Eastern United States”, *Atmospheric Environment*, **27A**, No. 16, 2645-2668.

Eder, B.K., J.M. Davis, and P. Bloomfield, (1993b), “An automated Classification Scheme Designed to Better Elucidate the Dependence of Ozone on Meteorology”, *J. Applied Met*., **33**, 1182-1198.

Edgerton E.S., B.E. Hartsell, R.D. Saylor, J.J. Jansen, D.A. Hansen, and G.M. Hidy, (2005), “The Southeastern Aerosol Research and Characterization Study: Part II. Filter-based measurements of fine and coarse particulate matter mass and composition", *J. Air Waste Mange. Assoc.,* **55,** 1527-1542.

Emery, C., and E. Tai, (2001), "Enhanced Meteorological Modeling and Performance Evaluation for Two Texas Ozone Episodes ", prepared for the Texas Near Non-Attainment Areas through the Alamo Area Council of Governments", by ENVIRON International Corp, Novato, CA., http://www.tnrcc.state.tx.us/air/aqp/airquality_contracts.html#met01

ENRIRON International Corporation, (2004), "Annual PM Modeling and Analysis of Episode Aggregation Uncertainties for Annual Average $PM_{2.5}$ and Visibility Modeling", CRC Project A-44a/b, http://www.crcao.com/ .

ENVIRON/Alpine/UCR, (2005), "White Paper- Visibility Projection Approaches- Preliminary Approaches for VISTAS 2018 Modeling".

ENVIRON International Corporation, (2006a), "User's Guide to the Comprehensive Air Quality Model with Extensions (CAMx) version 4.30", Novato, CA. Http://www.camx.com .

ENVIRON International Corporation, (2006b), "Guidance for the Application of the CAMx Hybrid Photochemical Grid Model to Assess Visibility Impacts of Texas BART Sources at Class I Areas", Novato, CA. Prepared for Texas Commission on Environmental Quality (TCEQ) (http://www.tceq.state.tx.us/assets/public/implementation/air/sip/bart/BART_TX_CAMx_PSAT_Guid.pdf).

Frank, N., 2006: "Retained Nitrate, Hydrated Sulfates, and Carbonaceous Mass in Federal Reference Method Fine Particulate Matter for Six Eastern U.S. Cities" *J. Air Waste Mange. Assoc*., 56, 500-511.

Fiore, A.M., D.J. Jacob, H. Liu, R.M. Yantosca, T.D. Fairlie, and Q. Li,(2003), "Variability in surface ozone background over the United States: Implications for air quality policy", *J. Geophys. Res.*, 108, 4787, 2003.

Flaum, J. B., S.T. Rao, and I.G. Zurbenko, (1996), "Moderating the influence of meteorological conditions on ambient ozone concentrations", *Journal of the Air and Waste Management Association* **46**, 35-46.

Gao, D., W.R. Stockwell and J.B. Milford, (1996), "Global Uncertainty Analysis of a Regional Scale Gas-Phase Chemical Mechanism", *J. Geophys. Res.,* **101**, 9107-9119.

Gego, E., H. Hogreffe, G. Kallos, A. Voudouri, J. Irwin, and S. T. Rao, (2005), "Examination of Model Predictions at Different Horizontal Grid Resolutions", *Environmental Fluid Mechanics*, 5, 63-85.

Geron, C., A. Guenther and T. Pierce, (1994), "An Improved Model for Estimating Emissions of Volatile Organic Compounds from Forests in the Eastern United States", *J. Geophys. Res.*, **99**, 12,773-12,791.

Gilliam R., (2005), The Atmospheric Model Evaluation Tool: Meteorology Module, 4th Annual CMAS Models-3 Users' Conference, September 26-28, 2005, Chapel Hill, NC.

Gilliland, A., K.W. Appel, R.W. Pinder, and R. Dennis, (2006), "Seasonal NH3 Emissions for the Continental United States: Inverse Model Estimation and Evaluation", *Atmospheric Environment*, **40** (26), 4986-4998.

Grell, G.A., J. Dudhia and D.R. Stauffer, (1994), "A Description of the Fifth-Generation Penn State/NCAR Mesoscale Model (MM5)", NCAR/TN-398+STR, 138 pp.

Guenther, A., C. Geron, T. Pierce, B. Lamb, P. Harley, and R. Fall, (2000), "Natural emissions of non-methane volatile organic compounds, carbon monoxide, and oxides of nitrogen from North America", *Atmospheric Environment*., **34**, 2205-2230.

Hakami, A., Odman M. T., and Russell, A. G., (2003), "High-order, direct sensitivity analysis of multidimensional air quality models" *Environ. Sci. Technol*, **37**, 2442-2452.

Hakami, A., Odman, M. T., and Russell, A. G., (2004), "Nonlinearity in atmospheric response: A direct sensitivity analysis approach",. *J. Geophys. Res.*, **109**, D15303.

Hand, J.L. and W.C. Malm, (2006), "Review of the IMPROVE Equation for Estimating Ambient Light Extinction Coefficients- Final Report", March 2006, http://vista.cira.colostate.edu/improve/Publications/GrayLit/016_IMPROVEeqReview/IMPROVEeqReview.htm

Haney, J.L., and S.G. Douglas, (1996), "Analysis of the Effects of Grid Resolution on UAM-V Simulation Results for the Atlanta Nonattainment Area", Systems Applications International Technical Memorandum SYSAPP-96/68, prepared for Southeast Modeling Center participants, October 21, 1996.

Hansen, D.A., E.S. Edgerton, B.E. Hartsell, J.J.Jansen, N. Kandasamy, G.M. Hidy, and C.L. Blanchard, (2003), "The Southeastern Aerosol Research and Characterization Study: Part 1 – Overview", *J. Air Waste Mange. Assoc.*, **53,** 1460-1471.

Henderson, B., W. Vizuete, and H. Jeffries, (2006), "Development of a Lagrangian pyPA (Process Analysis in python) tool", Presented at the 5th Annual CMAS Conference, October 16-18, 2006, http://www.cmascenter.org/conference/2006/agenda.cfm

Henry, R.C., (1991), "Multivariate Receptor Models", In: *Receptor Modeling for Air Quality Management*, P.K. Hopke, ed., Elsevier Science Publishers, Amsterdam, 117-147.

Hering, S. and G. Cass, (1999), "The Magnitude of Bias in Measurement of $PM_{2.5}$ Arising from Volatilization of Particulate Nitrate from Teflon Filters." *JAWMA* 49:725-733.

Hogrefe, C., S.T. Rao, I.G. Zurbenko, and P.S. Porter, (2000), “Interpreting the information in time series of ozone observations and model predictions relevant to regulatory policies in the eastern United States”, *Bull. Amer. Met. Soc.*, **81**, 2083-2106.

Holland, D.M., W.M. Cox, R. Scheffe, A.J. Cimorelli, D. Nychka, and P.K. Hopke, (2003), “Spatial Prediction of Air Quality Data”, *EM, August 2003*, 31-35.

Hopke, P.K., ed. (1991), “Receptor Modeling for Air Quality Management”, Elsevier Science, Amsterdam.

Hopke, P.K., ed. (1999), “An Introduction to Source Receptor Modeling”, In: *Elemental Analysis of Airborne Particles*, Landsberger, S., Creatchman, M., Eds. Gordon and Breach Science, Amsterdam, 273-315.

Hopke, P.K., ed. (2001), “Advances in Receptor Modeling”, *Journal of Aerosol Science*, **32**, 363-368.

Houyoux, M.R., J.M. Vukovich, C.J. Coats Jr., N.W. Wheeler, and P.S. Kasibhatla, (2000), “Emission Inventory Development and Processing for the Seasonal Model for Regional Air Quality (SMRAQ) project.” *Journal of Geophysical Research, Atmospheres* 105:D7:9079-9090.

Hu, Y., D. Cohen, M.T. Odman, and T. Russell, (2004), “Fall Line Air Quality Study- Draft Final Report- Air Quality Modeling of the August 11-20, 2000 Air Pollution Episode.”

Huang J-P., J. Fung, Y. Zhang, A. Lau, R. Kwok, and J. Lo, 2005: Improvement of Air Quality Modeling in Hong Kong by Using MM5 Coupled with LSM, 4th Annual CMAS Models-3 Users' Conference, September 26-28, 2005, Chapel Hill, NC.

Hubbell, B.J., P.D. Dolwick, D. Mooney, and M. Morara, (2005), “Evaluating the relative effectiveness of ozone precursor controls: Design of computer experiments applied to the comprehensive air quality model with extensions (CAMx)”, *Air and Waste Management Association Conference Proceedings*

IMPROVE, (2000), “Spatial and Seasonal Patterns and Temporal Variability of Haze and its Constituents in the United States: Report III.” Cooperative Institute for Research in the Atmosphere, ISSN: 0737-5352-47. IMPROVE Web Site: http://vista.cira.colostate.edu/improve.

IMPROVE, (2006), "Revised IMPROVE Algorithm for Estimating Light Extinction from Particle Speciation Data", January 2006, http://vista.cira.colostate.edu/improve/Publications/GrayLit/gray_literature.htm

Isakov, V., J.S. Irwin, and J. Ching, (2007), Using CMAQ for exposure modeling and characterizing the sub-grid variability for exposure estimates", *Journal of Applied Meteorology and Climatology,* (in press).

Jacob, D.J., J. A. Logan, and P.P. Murti, (1999), "Effect of Rising Asian Emissions on Surface Ozone in the United States", *Geophy. Res. Lett.*, 26, 2175-2178.

Jaffe D., McKendry I., Anderson T., and Price H.,(2003), "Six 'new' episodes of trans-Pacific transport of air pollutants", *Atmos. Envir.* 37, 391-404.

Jang, J.C., H.E. Jeffries, and S. Tonnesen, (1995), "Sensitivity of Ozone Model to Grid Resolution Part II: Detailed Process Analysis for Ozone Chemistry", *Atmospheric Environment*, **29** (21), 3101-3114.

Jeffries, H.E., (1994), "Process Analysis for UAM Episode 287", memo to Brock Nicholson, NC DEHNR, April 8, 1994, ftp://airsite.unc.edu/pdfs/ese_unc/jeffries/projprpt/uammod, panel287.pdf.

Jeffries, H.E., T. Keating, and Z. Wang, (1996), "Integrated Process Rate Analysis of the Impact of Nox Emission Height on UAM-modeled Peak Ozone Levels", Final Topical Report, Prepared for Gas Research Institute, Chicago, IL, ftp://airsite.unc.edu/pdfs/ese_unc/jeffries/reports/gri, uncgri.pdf.

Jeffries, H.E., (1997), "Use of Integrated Process Rate Analyses to Perform Source Attribution for Primary and Secondary Pollutants in Eulerian Air Quality Models", Presented at U.S. EPA Source Attribution Workshop, Research Triangle Park, NC, July 16-18, 1997, ftp://airsite.unc.edu/pdfs/ese_unc/jeffries/ipradocs, sourcewksp.pdf, and http://www.epa.gov/ttn/faca/stissu.html, Source Att WS-Proc.analysis/mass track--Jeffries.

Johnson, M., (2003), "Iowa DNR 2002 Annual MM5 Modeling Project", presented at the 2003 Ad Hoc Meteorological Modeling Meeting, Des Plaines IL.

Jones, J. M., C. Hogrefe, R. Henry, J. Ku, and G. Sistla, (2005), "An Assessment of the Sensitivity and Reliability of the Relative response factor Approach in the Development of 8-hr Ozone Attainment Plans", JAWMA, 55 (1), 13-19.

Kenski, D., (2004), "Analysis of Historic Ozone Episodes using CART", http://www.ladco.org/tech/monitoring/docs_gifs/CART%20Analysis%20of%20Historic%20Ozone%20Episodes.pdf

Koerber, M. and D. Kenski, (2005), "The Case for Using Weight of Evidence Demonstrations in State Implementation Planning"; EM, April 2005, 24-28.

Ku, J., H. Mao, K. Zhang, K. Civerolo, S.T. Rao, C.R. Philbrick, B. Doddridge and R. Clark, (2001), "Numerical Investigation of the Effects of Boundary-Layer Evolution on the Predictions of Ozone and the Efficacy of Emission Control Options in the Northeastern United States/Tribes", *Environmental Fluid Mechanics*, **1**, 209-233

Kumar, N., M.T.Odman, and A.G. Russell, (1994), "Multiscale Air Quality Modeling: Application to Southern California", *J. Geophysical Research*, **99**, 5385-5397.

Kumar, N., and A.G. Russell, (1996), "Multiscale Air Quality Modeling of the Northeastern United States", *Atmospheric Environment*, **30**, 1099-1116.

LADCO, (1999), Personal communication.

Lefohn, A.S., D.S. Shadwick, and S.D. Ziman, (1998), "The Difficult Challenge of Attaining EPA's New Ozone Standard", *Environmental Science and Technology, Policy Analysis*, **32**, No.11, (June 1, 1998), 276A-282A.

Lehman, J., K. Swinton, S. Bortnick, C. Hamilton, E. Baldridge, B. Eder and B. Cox, (2004), "Spatial-Temporal characterization of Tropospheric Ozone Across the Eastern United States", *Atmospheric Environment*, **38:26**, 4357-4369, www.sciencedirect.com

Lewis, C.W., G.A. Norris, R.C. Henry, and T.L. Conner, (2003), "Source Apportionment of Phoenix PM-2.5 Aerosol with the Receptor Model", *Journal of the Air & Waste Management Association*, **53**, 325-338.

Lo, C.S., and H.E. Jeffries, (1997), "A Quantitative Technique for Assessing Pollutant Source Location and Process Composition in Photochemical Grid Models", presented at annual AWMA Meeting, Toronto, Ontario (1997), ftp://airsite.unc.edu/pdfs/ese_unc/jeffries/ipradocs, PCA_awma.pdf.

Lu, C.H., and J.S. Chang, (1998), "On the Indicator-Based Approach to Assess Ozone Sensitivities and Emissions Features, *J. Geophysical Research*, **103**, 3453-3462.

Lyons, W.A., C.J. Tremback, and R.A. Pielke, (1995), "Applications of the Regional Atmospheric Modeling System (RAMS) to Provide Input to Photochemical Grid Models for the Lake Michigan Ozone Study (LMOS)", *J. Applied Meteorology*, **34**, 1762-1786.

Maykut, Lewtas, Kim, and Larson, (2003), "Source Apportionment of $PM_{2.5}$ at an Urban IMPROVE Site in Seattle, Washington", *Environmental Science and Technology*, **37**, 5135-5142. (This paper uses UNMIX and PMF)

Meyer, E.L., K.W. Baldridge, S. Chu, and W.M. Cox, (1997), "Choice of Episodes to Model: Considering Effects of Control Strategies on Ranked Severity of Prospective Episode Days", *Paper 97-MP112.01*, Presented at 97th Annual AWMA Meeting, Toronto, Ontario.

MCNC, (1999), MAQSIP air quality model, http://www.iceis.mcnc.org/products/maqsip/.

McNally, D.E., (2002), "A Comparison of MM5 Model Estimates for February and July 2001 Using Alternative Model Physics", report prepared for the United States Environmental Protection Agency, prepared by Alpine Geophysics, LLC, Arvada CO.

McQueen, J., P. Lee, M. Tsidulko, G. DiMego, R. Mathur, T. Otte, J. Pleim, G. Pouliot, D.Kang, K. Schere, J. Gorline, M. Schenk, and P. Davidson, (2004), "Update of The Eta-CMAQ Forecast Model run at NCEP operations and its performance for the Summer 2004", presented at the 2004 CMAS Workshop, Chapel Hill, NC.

Milanchus, M. L., S.T. Rao, and I.G. Zurbenko, (1998), "Evaluating the effectiveness of ozone management efforts in the presence of meteorological variability", *Journal of the Air and Waste Management Association* **48,** 201-215.

Morris R.E., G. Yarwood, C.A. Emery, and G.M. Wilson, (2001), "Recent Advances in CAMx Air Quality Modeling", Presented at the 2001Air and Waste Management Association Annual Conference, http://www.camx.com/publ/pdfs/camx934_AWMA_2001.pdf

Morris R.E., G. Yarwood, C.A. Emery, and G.M. Wilson, (2003), "Recent Advances in Photochemical Air Quality Modeling Using the CAMx Model: Current Update and Ozone Modeling of Point Source Impacts", Presented at the 2003Air and Waste Management Association Annual Conference, www.camx.com/publ/pdfs/camx_advances_AWMA_2002_rev3.pdf

Morris, R.E., B. Koo, A.Guenther, G. Yarwood, D. McNally, T.W. Teshe, G. Tonnesen, J. Boylan, and P. Brewer, (2006), "Model Sensitivity Evaluation for Organic Carbon using Two Multi-pollutant Air Quality Models that Simulate Regional Haze in the Southeastern United States", *Atmospheric Environment*, **40** (26), 4960-4972.

Mukerjee, S., G.A. Norris, L.A. Smith, C.A Noble, L.M. Neas, H.A. Özkaynak, and M. Gonzales, (2004), "Receptor Model Comparisons and Wind Direction Analyses of Volatile Organic Compounds and Submicrometer Particles in an Arid, Binational, Urban Air Shed", *Enviromental Science and Technology*, **38(8)**, 2317-2327.

Na, K. S., A.A. Sawant, C. Song, and D.R. Cocker, (2004), "Primary and secondary carbonaceous species in the atmosphere of Western Riverside County, California", *Atmospheric Environment*, 38, 1345–1355.

NADP, (2002), National Acid Deposition Program 2002 Annual Summary.

Nielsen-Gammon, John W., (2002), “Evaluation and Comparison of Preliminary Meteorological Modeling for the August 2000 Houston-Galveston Ozone Episode (Feb. 5, 2002 interim report)”, http://www.met.tamu.edu/results/.

Odman, M.T., and C.L. Ingram, (1996), “Multiscale Air Quality Simulation Platform (MAQSIP): Source Code Documentation and Validation”, MCNC Technical Report ENV-96TR002-v1.0, 83pp.

Olerud, D., K. Alapaty, and N. Wheeler, (2000), “Meteorological Modeling of 1996 for the United States with MM5", MCNC-Environmental Programs, Research Triangle Park, NC.

Olerud, D., and A. Sims, (2003), “MM5 Sensitivity modeling in support of VISTAS”, prepared for Mike Abraczinskas of the VISTAS Technical Analysis Workgroup by Baron Advanced Meteorological Systems, LLC, Raleigh NC.

Otte, T., (2004), “What’s New in MCIP2", presented at the 2004 CMAS Workshop, Chapel Hill, NC.

Pacific Environmental Services, Inc., (1997), “Draft Technical Memorandum Analysis of 8-hour Ozone Values: 1980-1995", prepared under EPA Contract No.68D30032, Work Assignment III-88, Edwin L. Meyer, Jr., Work assignment manager.

Pielke, R.A., W.R. Cotton, R.L. Walko, C.J. Tremback, W.A. Lyons, L.D. Grasso, M.E. Nicholls, M.D. Moran, D.A. Wesley, T.J. Lee, and J.H. Copeland, (1992), “A Comprehensive Meteorological Modeling System - RAMS”, *Meteor. Atmos. Phys.*, **49**, 69-91.

Pierce, T., C. Geron, G. Pouliot, J. Vukovich, and E. Kinnee, (2004), “Integration of the Biogenic Emissions Inventory System (BEIS3) into the Community Multiscale Air Quality (CMAQ) Modeling System”, 12th Joint Conference on the Application of Air Pollutant Meteorology with the Air and Waste Management Association, http://ams.confex.com/ams/AFMAPUE/12AirPoll/abstracts/37962.htm.

Pitchford, M.L., and W.C. Malm, (1994), “Development and Applications of a Standard Visual Index”, *Atmos. Environ*., **28**(5),1049-1054.

Poirot, Wishinski, Hopke, and Polissar, (2001), "Comparative Application of Multiple Receptor Methods to Identify Aerosol Sources in Northern Vermont", *Environmental Science and Technology*, **35**, 4622-4636 (This paper uses Unmix, PMF, and Ensemble back trajectories (CAPITA's Monte Carlo, PSCF, and RTA)).

Pun, B.K., and C. Seigneur, (1999), “Understanding Particulate Matter Formation in the California San Joaquin Valley: Conceptual Model and Data Needs”, *Atmospheric Environment*, **33**, 4865-4875.

Pun, B.K., and C. Seigneur, (2001), “Sensitivity of Particulate Matter Nitrate Formation to Precursor Emissions in the California San Joaquin Valley”, *Environ. Sci. Technol*., **35** (14), 2979-2987.

Pun, B.K, C. Seigneur, and W. White, (2001), “Data Analysis for a Better Understanding of the Weekday/Weekend Ozone and PM Differences”, Final report prepared by Atmospheric and Environmental Research, Inc., San Ramon, CA, under CRC contract Number A-36B for the Coordinating Research Council, Alpharetta, GA, June 2001.

Pun, B.K., C. Seigneur, and W. White, (2003), “Day-of-Week Behavior of Atmospheric Ozone in Three U.S. Cities”, *J. Air & Waste Management Association*, **53**, 789-801.

Qin, Y., G.S. Tonnesen, and Z. Wang, (2004), “Weekend/Weekday Differences of Ozone, Nox, CO, VOCs, PM_{10} and the Light Scatter during Ozone Season in Southern California”, *Atmospheric Environment*, **38** (19), 3069-3087.

Rao, S. T., E. Zalewsky, E., and I.G. Zurbenko, (1995), “Determining temporal and spatial variations in ozone air quality”, *Journal of the Air and Waste Management Association* **45**, 57-61.

Reynolds, S.D., H.M. Michaels, P.M. Roth, T.W. Tesche, D. McNally, L. Gardner and G. Yarwood, (1996), “Alternative Base Cases in Photochemical Modeling: Their Construction, Role and Value”, *Atmospheric Environment,* **30**, 1977-1988 .

Roth, P.M., S.D. Reynolds, and T.W. Tesche, (2005), “Air Quality Modeling and Decisions for Ozone Reduction Strategies”, *Journal of the Air and Waste Management Association*, **55**, 1558-1573.

Russell, A., and R. Dennis, (2000), “NARSTO critical review of photochemical models and modeling”, *Atmospheric Environment*, **34**, 2283-2324.

Saylor, R. D., E. S. Edgerton, and B. E. Hartsell, (2006), “Linear regression techniques for use in the EC tracer method of secondary organic aerosol estimation”, *Atmospheric Environment*, 40, 7546-7556.

Saxena, P. and Hildemann, L, (1996), “Water Soluble Organics in Atmospheric Particles: A Critical Review of the Literature and Application of thermodynamics to Identify Candidate
Compounds”, *J. Atmos. Chem*., 24:57-109.

Scire, J.S., R.J. Yamartino, G.R. Carmichael, and Y.S. Chang, (1989), "CALGRID: A Mesoscale Photochemical Grid Model", Volume II: User's Guide, Sigma Research Corp., Concord, MA.

Scire, J.S., F.R. Francoise, M.E. Fernau, and R.J. Yamartino, (1998), "A User's Guide for the CALMET Meteorological Model (Version 5.0)", EarthTech., Inc., Concord, MA.

Scire, J.S., D.G. Strimaitis, R.J. Yamartino, (2000), "A User's Guide for the CALPUFF Dispersion Model", Jan 2000, http://www.src.com/calpuff/calpuff1.htm.

Seaman, N.L., (1997), "Use of Model-Generated Wind fields to Estimate Potential Relative Mass Contributions from Different Locations", Prepared for *U.S. EPA Source Attribution Workshop*, Research Triangle Park, NC, July 16-18, 1997, http://www.epa.gov/ttn/faca/stissu.html, Source Attribution Workshop Materials.

Seaman, N.L., (2000), "Meteorological modeling for air quality assessments", *Atmospheric Environment*, **34**, 2231-2259.

Seigneur, C., P. Pai, J. Louis, P. Hopke, and D. Grosjean, (1997), "Review of Air Quality Models for Particulate Matter", Document Number CP015-97-1a , prepared for American Petroleum Institute.

Seigneur, C., P. Pai, P.K. Hopke and D. Grosjean, (1999), "Modeling Atmospheric Particulate Matter", *Environmental Science and Technology/News*, Feb.1, 1999, pp.80-86.

Sillman, S., (1995), "The Use of NOy, H_2O_2, and HNO_3 as Indicators for O3-NOx-ROG Sensitivity in Urban Locations", *J. Geophys. Res.* **100**, 14,175-14,188.

Sillman, S., D. He, C. Cardelino, and R.E. Imhoff, (1997), "The Use of Photochemical Indicators to Evaluate Ozone-NOx-Hydrocarbon Sensitivity: Case Studies from Atlanta, New York and Los Angeles", *J. Air and Waste Mgmt. Assoc. ,* **47** (10), 1030-1040. (Oct. 1997)

Sillman, S., (1998), "Evaluating the Relation Between Ozone, NO_x and Hydrocarbons: The Method of Photochemical Indicators", EPA/600R-98/022, http://www-personal.engin.umich.edu/~sillman/publications.htm.

Sillman, S., and D. He, (2002), "Some theoretical results concerning O3-NO_x-VOC chemistry and NOx-VOC indicators", *J. Geophys. Res.*, **107**, D22, 4659, doi:10.1029/2001JD001123, 2002, http://www-personal.engin.umich.edu/~sillman/publications.htm.

Sisler, J.F. (Editor), (1996), "Spatial and Seasonal Patterns and Long Term Variability of the Composition of the Haze in the United States: An Analysis of Data from the IMPROVE Network", Cooperative Institute for Research in the Atmosphere Report ISSN: 0737-5352- 32, Colorado State University, Fort Collins, CO.

Sistla, G., C. Hogrefe, W. Hao, J. Ku, R. Henry, E. Zalewsky, and K. Civerolo, (2004), "An Operational Assessment of the Application of the Relative response factors in the Demonstration of Attainment of the 8-Hour Ozone National Ambient Air Quality Standard", JAWMA, 54 (8), 950-959.

Skamarock, W. C., J. B. Klemp, J. Dudhia, D. O. Gill, D. M. Barker, W. Wang and J. G. Powers, (2005), A Description of the Advanced Research WRF Version 2, http://www.wrf-model.org/wrfadmin/docs/arw_v2.pdf.

Smith, James H.(1998), "Hierarchical Emissions Inventory Development for Nested Photochemical Modeling, Part I: Conceptual Overview", Proceedings of the Air & Waste Management Association Specialty Conference, Emissions Inventory: Living in a Global Environment, New Orleans, La., December 1998.

Stehr, J., (2004), "How's the Air Up There? A Guide to Mid-Atlantic Air Quality." Presentaion at MANE-VU/MARAMA Science Meeting, January 27, 2004.

Strader, R., F. Lurmann, and S.N. Pandis, (1999), "Evaluation of secondary organic aerosol formation in winter", *Atmospheric Environment*, 33, 4849–4863.

Strum, M., G. Gipson, W. Benjey, R., M. Houyoux, C. Seppanen, and G. Stella, (2003), "The Use of SMOKE to Process Multipollutant Inventories - Integration of Hazardous Air Pollutant Emissions with Volatile Organic Compound Emissions," *12th International Emissions Inventory Conference, Session 10,* http://www.epa.gov/ttn/chief/conference/ei12/index.html.

Systems Applications International, (1996), "Users Guide to the Variable Grid Urban Airshed Model (UAMV)", SYSAPP 96-95/27r, http://uamv.saintl.com/.

Systems Applications Internation, Inc. (SAI), (2005), "Overview of the REMSAD Modeling System", November 15, 2005, see website: http://remsad.saintl.com/overview.htm

Tang, I., (1996), "Chemical and Size Effects of Hygroscopic Aerosols on Light Scattering Coefficients", *J.Geophysical Research* 101 No.D14, pp.19,245-19,250.

Tesche, T.W., P. Georgopoulos, F.L. Lurmann and P.M. Roth,1990, "Improvement of Procedures for Evaluating Photochemical Models", Draft Final Report, California Air Resources Board,
Sacramento, CA.

Tesche, T. W., and D. E. McNally, (2001), "Evaluation of the MM5, RAMS, and SAIMM Meteorological Model for the 6-11 September 1993 COAST and 25 August-1 September 2000 TexAQS2000 Ozone SIP Modeling Episodes", report prepared for the Business

Coalition for Clean Air-Appeals Group, prepared by Alpine Geophysics, LLC, Ft. Wright, KY.

Tesche T. W., D.E. McNally, and C. Tremback, (2002), “Operational evaluation of the MM5 meteorological model over the continental United States: Protocol for annual and episodic evaluation.” Submitted to USEPA as part of Task Order 4TCG-68027015. (July 2002)

Tesche T.W., R. Morris, G. Tonnesen, D. McNally, J. Boylan, and P. Brewer, (2006), CMAQ/CAMx annual 2002 performance evaluation over the eastern US”,Atmospheric Environment, **40**, 4906-4919.

Timin, B., (2005a), “Draft Final Ozone Guidance Comments and Proposed Changes”, presented at the 3rd PM/RH/O3 Modeling Workshop, New Orleans, LA, pages 25-27. http://www.cleanairinfo.com/modelingworkshop/presentations/O3_Guidance_Timin.pdf .

Timin, B., (2005b), “Draft Final Ozone Guidance Comments and Proposed Changes”, presented at the 3rd PM/RH/O3 Modeling Workshop, New Orleans, LA, pages 8-22. http://www.cleanairinfo.com/modelingworkshop/presentations/O3_Guidance_Timin.pdf .

Tonnesen, G., and B. Wang, (2004), “CMAQ Tagged Species Source Apportionment”, July 22, 2004; http://www.wrapair.org/forums/aoh/meetings/040722/UCR_tssa_tracer_v2.ppt

Turpin, B.J., and J.J Huntzicker, (1995),.” Identification of secondary organic aerosol episodes and quantitation of primary and secondary organic aerosol concentrations during SCAQS”, *Atmospheric Environment*, 29, 3527–3544.

Turpin, B. J. and H-J Lim, (2001), “Species Contributions to $PM_{2.5}$ Mass Concentrations: Revisiting Common Assumptions for Estimating Organic Mass.” *Aerosol Science and Technology* 35: 602-610.

U.S. EPA, (1991a), “Guideline for Regulatory Application of the Urban Airshed Model”, EPA-450/4-91-013, http://www.epa.gov/ttn/scram/guidance_sip.htm.

U.S. EPA, (1991b), “Procedures for Preparing Emissions Projections”, EPA-450/4-91-014.

U.S. EPA, (1993), “Volatile Organic Compound (VOC)/Particulate Matter (PM) Speciation Data System (SPECIATE), Version 1.5", EPA/C-93-013, www.epa.gov/ttn/chief/software.html#speciate

U.S. EPA, (1994a), Office of Transportation and Air Quality (OTAQ), http://www.epa.gov/otaq/models.htm, MOBILE Model: MOBILE5, MOBILE6

U.S. EPA, (1994b), “Guidance on Urban Airshed Model (UAM) Reporting Requirements for Attainment Demonstration”, EPA-454/R-93-056.

U.S. EPA, (1995a), "User's Guide for the Industrial Source Complex (ISC3) Dispersion Models: Volume I - User Instructions", Office of Air Quality Planning and Standards, Emissions, Monitoring, and Analysis Division; September 1995; EPA-454/B-95-003a, RTP, NC.

U.S. EPA, (1995b), "User's Guide for the Industrial Source Complex (ISC3) Dispersion Models: Volume II - Description of Model Algorithms", Office of Air Quality Planning and Standards, Emissions, Monitoring, and Analysis Division; September 1995, EPA-454/B-95-003b, RTP, NC.

U.S. EPA, (1996a), "Guidance on Use of Modeled Results to Demonstrate Attainment of the Ozone NAAQS", http://www.epa.gov/ttn/scram/guidance_sip.htm, EPA-454/B-95-007.

U.S. EPA, (1997a): 40 CFR Part 50 National Ambient Air Quality Standards for Particulate Matter; Final Rule, Federal Register / Vol. 62, No. 138 / Friday, July 18, 1997. http://www.epa.gov/ttn/amtic/files/cfr/recent/pmnaaqs.pdf

U.S. EPA, (1997b), "Guidance For Network Design and Optimum Site Exposure For $PM_{2.5}$ and PM_{10}", OAQPS, Research Triangle Park, NC, EPA report no. EPA-454/R-99-022.

U.S. EPA, (1997c), "EIIP Volume I, Introduction and Use of EIIP Guidance for Emission Inventory Development", July 1997, EPA-454/R-97-004a.

U.S. EPA, (1998a), "EPA Third-Generation Air Quality Modeling System, Models-3 Volume 9b Users Manual", EPA-600/R-98/069(b), http://www.cmascenter.org/, and http://www.epa.gov/asmdnerl/models3/cmaq.html.

U.S EPA, (1998b)"Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone; Final Rule," 63 FR 57,356 (October 27, 1998).

U.S. EPA, (1999a), "Draft Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-Hour Ozone NAAQS", EPA-454/R-99-004, http://www.epa.gov/ttn/scram, Modeling Guidance, DRAFT8HR. (May 1999)

U.S. EPA, (1999b), "Implementation Guidance for the Revised Ozone and Particulate Matter (PM) National Ambient Air Quality Standards (NAAQS) and Regional Haze Program".

U.S. EPA, (**1999c**), "Guidance on the Reasonably Available Control Measures (RACM) Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Areas.", http://www.epa.gov/ttn/oarpg/t1pgm.html .

U.S. EPA, (2001), "(Draft) Guidance for Demonstrating Attainment of Air Quality Goals for $PM_{2.5}$ and Regional Haze", http://www.epa.gov/ttn/scram/guidance_sip.htm, U.S. EPA, (2002a), “3 Year Quality Assurance Report- Calendar Years 1999, 2000, and 2001-$PM_{2.5}$ Performance Evaluation Program.”

U.S. EPA, (2002b): Clean Air Status and Trends Network (CASTNet), 2001 annual report. http://www.epa.gov/castnet/

U.S. EPA, (2003a), “Federal Reference Method Quality Assurance Report”.

U.S. EPA, (2003b), “Guidance for Tracking Progress Under the Regional Haze Rule”, September 2003, EPA-454/B-03-004, http://www.epa.gov/ttn/oarpg/t1/memoranda/rh_tpurhr_gd.pdf .

U.S. EPA, (2004a), “The Ozone Report: Measuring Progress Through 2003.” EPA 454/k-04-001. http://www.epa.gov/air/airtrends/aqtrnd04/ozone.html

U.S. EPA, (2004b), “The Particle Pollution Report: Current Understanding of Air Quality and Emissions Through 2003.” EPA 454/R-04-002. http://www.epa.gov/air/airtrends/aqtrnd04/pm.html

U.S. EPA, (2004c), “Developing Spatially Interpolated Surfaces and Estimating Uncertainty”, EPA-454-R-04-0004, http://nsdi.epa.gov/oar/oaqps/pm25/docs/dsisurfaces.pdf.

U.S. EPA, (2004d), “EPA-CMB8.2 Users Manual”, December 2004, EPA-452/R-04-011, Office of Air Quality Planning and Standards RTP, NC, .http://www.epa.gov/scram001/models/receptor/EPA-CMB82Manual.pdf

U.S. EPA, (2004e), “Protocol for Applying and Validating the CMB Model for PM2.5 and VOC”, December 2004, EPA-451/R-04-001, Office of Air Quality Planning and Standards, RTP, NC, http://www.epa.gov/scram001/models/receptor/CMB_Protocol.pdf

U.S. EPA, (2004f), “User's Guide for the AMS/EPA Regulatory Model - AERMOD", EPA-454/B-03-001, September 2004, Office of Air Quality Planning and Standards, RTP, NC.

U.S. EPA, (2004g), “AERMOD: Description of Model Formulation", EPA-454/R-03-004, September 2004, Office of Air Quality Planning and Standards, RTP, NC.

U.S. EPA, (2004h), Emission Inventory Improvement Program (EIIP), series of technical documents, http://www.epa.gov/ttn/chief/eiip.

U.S. EPA, (2005a), “Regulatory Impact Analysis for the Final Clean Air Interstate Rule”, http://www.epa.gov/interstateairquality/pdfs/finaltech08.pdf

U.S. EPA, (2005b), “Technical Support Document for the Final Clean Air Interstate Rule- Air Quality Modeling”, March 2005. Docket number OAR-2003-0053-0162. http://www.epa.gov/CAIR/pdfs/finaltech02.pdf

U.S. EPA, (2005c), “Evaluating Ozone Control Programs in the Eastern United States: Focus on the NOx Budget Trading Program, 2004”, http://www.epa.gov/air/airtrends/2005/ozonenbp/

U.S. EPA, (2005d), 40CFR, Part 51, Appendix W, Revision to the Guideline on Air Quality Models, 68 FR 68235-68236, November 9, 2005. http://www.epa.gov/scram001/guidance/guide/appw_05.pdf

U.S. EPA, (2005e), “Emission Inventory Guidance For Implementation Of Ozone And Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, http://www.epa.gov/ttn/chief/eidocs/eiguid/eiguidfinal_nov2005.pdf .

U.S. EPA, (2005f), “EPA’s Final Draft National Ambient Air Monitoring Strategy”, EPA-SAB-CASAC-05-006, May 2005; posted at http://www.epa.gov/sab/pdf/casac-05-006.pdf

U.S. EPA, (2006a), “SPECIATE 4.0 Speciation Database Development Documentation- Final Report”, EPA/600/r-06-161, November 2006, Office of Research and Development, RTP, NC, http://www.epa.gov/ttn/chief/software/speciate/speciate4/documentation/speciatedoc_1206.pdf

U.S. EPA, (2006b), “AQS Data Dictionary”, Version 2.12, http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm and http://www.epa.gov/ttn/airs/airsaqs/manuals/AQS%20Data%20Dictionary%20v2.12.pdf

U.S. EPA, (2006c), “Technical Support Document for the Proposed PM NAAQS Rule- Response Surface Modeling”, February 2006, Office of Air Quality Planning and Standards, RTP, NC, http://www.epa.gov/scram001/reports/pmnaaqs_tsd_rsm_all_021606.pdf

U.S. EPA. (2007) “Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program”.

Vukovich, J.M., and T. Pierce, (2002), “The Implementation of BEIS3 within the SMOKE modeling framework”, *11th Annual Emissions Inventory Conference of the U.S. EPA,* http://www.epa.gov/ttn/chief/conference/ei11/, Session 10, or http://www.epa.gov/ttn/chief/conference/ei11/modeling/vukovich.pdf

Watson, J.G., (1997), “Observational Models: The Use of Chemical Mass Balance Methods”, Prepared for the U.S. EPA Source Attribution Workshop, Research Triangle Park, NC, July 16-18, 1997, http://www.epa.gov/ttn/faca/stissu.html, Source Attribution Workshop Materials.

Watson, J.G., J.C. Chow, and E.M. Fujita, (2001), "Review of volatile organic compound source apportionment by chemical mass balance", *Atmospheric Environment*, **35**, 1567-1584.

Watson, J.G., T. Zhu, J.C. Chow, J.P. Engelbrecht, E.M. Fujita, and W.E. Wilson, (2002), "Receptor modeling application framework for particle source apportionment", *Chemosphere*, **49**(9), 1093-1136.

Willis, R.D., (2000), *Workshop on UNMIX and PMF as Applied to $PM_{2.5}$*, EPA/600/A-00/048.

Wilson, W.E. and H.H.Suh, (1997), "Fine Particles and Coarse Particles: Concentration Relationships Relative to Epidemiologic Studies", *J.Air & Waste Management Association 47*, pp.1238-1249.

Yang, Y.J., W.R. Stockwell, and J.B. Milford, (1995), "Uncertainties in Incremental Reactivities of Volatile Organic Compounds", *Environmental Science and Technology*, **29**, 1336-1345.

Yang, Y.J., J.G. Wilkinson and A.G. Russell, (1997a), "Fast, Direct Sensitivity Analysis of Multidimensional Air Quality Models for Source Impact Quantification and Area-of-Influence Identification", Prepared for the U.S. EPA Source Attribution Workshop, Research Triangle Park, NC, July 16-18, 1997, http://www.epa.gov/ttn/faca/stissu.html, SAW-Direct Sensi Analys.--PowerP.--T.Russell.

Yang, Y.J., J.G. Wilkinson, and A.G. Russell, (1997b), "Fast, Direct Sensitivity Analysis of Multidimensional Photochemical Models", *Environmental Science and Technology*, **31**, 2859-2868.

Yarwood, G., and R. Morris, (1997a), "Description of the CAMx Source Attribution Algorithm", prepared for U.S. EPA Source Attribution Workshop, Research Triangle Park, NC, July 16-18, 1997, http://www.epa.gov/ttn/faca/stissu.html.

Yarwood, G., G. Wilson, R.E. Morris, and M.A. Yocke, (1997b), "User's Guide to the Ozone Tool: Ozone Source Apportionment Technology for UAM-IV", prepared for Thomas Chico, South Coast Air Quality Management District, Diamond Bar, CA, March 28, 1997.

Yarwood, G., T.E. Stoeckenius,, J.G. Heiken, and A.M. Dunker, (2003), "Modeling Weekday/Weekend Ozone Differences in the Los Angeles Region for 1997", *J.Air & Waste Management Association*, **53**, 864-875.

Yarwood, G., Morris, R. E., and Wilson, G.M., (2005), "Particulate Matter Source Apportionment Technology (PSAT) in the CAMx Photochemical Grid Model", www.camx.com/publ/pdfs/___Yarwood_ITM_paper.pdf

Yua, J. Z., H. Yanga, H. Zhanga, and A.K.H. Lau, (2004), “ Size distributions of water-soluble organic carbon in ambient aerosols and its size-resolved thermal characteristics”, *Atmospheric Environment* 38,1061–1071.

Yuan., Z.B., J. Z. Yu, A. K. H. Lau, P. K. K. Louie, and J. C. H. Fung, (2006), “ Application of positive matrix factorization in estimating aerosol secondary organic carbon in Hong Kong and its relationship with secondary sulfate”, *Atmospheric Chemistry and Physics*, 6, 25-34.

Zhang, X. and P. H. McMurry, (1992), “Evaporative losses of fine particulate nitrates during sampling”, *Atmospheric Environment*, 26, 3305-3312.

Zheng, M., G.R. Cass, J.J. Schauer, and E.S. Edgerton, (2002), “Source apportionment of PM2.5 in the southeastern United States using solvent-extractable organic compounds as tracers”, *Environ. Sci. Technol.*, **36,** 2361-2371.

Glossary

Modeled attainment demonstration - A modeled attainment demonstration consists of two parts: an analysis estimating emission levels consistent with attainment of the NAAQS, and a list of measures that will lead to the desired emission levels once growth is accounted for. The first (analysis) part consists of a modeled attainment test. It may also include an "unmonitored area analysis" and a review of a diverse set of model outputs and emissions, air quality and meteorological data for consideration in a weight of evidence determination to assess whether attainment of the NAAQS is likely with the proposed control strategy.

Modeled attainment test - This test takes the ratio of mean predicted future and current ozone or $PM_{2.5}$ species concentrations averaged over multiple days and multiplies this ratio times the site-specific monitored design value at each monitoring location. If the product is less than the NAAQS near all monitoring sites, the test is passed.

Modeling system - This is a group of models used to predict ambient ozone and/or $PM_{2.5}$ concentrations. The group includes an emissions model which converts countywide emission information into gridded speciated emissions which vary diurnally and reflect environmental conditions. It also includes a meteorological model which provides gridded meteorological outputs and an air chemistry/deposition model which takes information provided by the emissions and meteorological models and uses it to develop gridded predictions of hourly pollutant concentrations.

Relative response factor (RRF) - The ratio of predicted ozone and/or $PM_{2.5}$ concentrations averaged over multiple days near a monitoring site with future emissions to corresponding predictions obtained with current emissions.

Uniform Rate Of Progress (a.k.a Glidepath)- The amount of visibility improvement needed (in each review period) to reach natural background visibilty conditions by 2064 at each Class I area by achieving a linear rate of improvement in visibility between the 2000-2004 base period and 2064.

Unmonitored Area Analysis - An analysis used to ensure that a proposed control strategy will be effective in reducing ozone and/or $PM_{2.5}$ at locations without air quality monitors so that attainment is shown throughout a nonattainment area. The purpose of the analysis is to use a combination of model output and ambient data to identify areas that might exceed the NAAQS if monitors were located there.

Weight of evidence determination (WOE) - This is a set of diverse analyses used to judge whether attainment of the NAAQS is likely. The credibility of each analysis is assessed and an outcome consistent with an hypothesis that the NAAQS will be met is identified beforehand. If the set of outcomes, on balance, is consistent with attainment, then the WOE can be used to show attainment. A weight of evidence determination includes results from the modeled attainment test, the unmonitored area analysis, other model outputs and several recommended analyses of air quality, emissions and meteorological data.

APPENDIX A

Below are the definitions of model performance statistics suggested as part of this ozone modeling guidance.

Mean Observation: The time-average mean observed value (in ppb)

$$OBS = \frac{1}{N}\sum_{1}^{N} Obs$$

Mean Prediction: The time-average mean predicted value (in ppb) paired in time and space with the observations.

$$Model = \frac{1}{N}\sum_{1}^{N} Model$$

Ratio of the Means: Ratio of the predicted over the observed values. A ratio of greater than 1 indicates on overprediction and a ratio of less than 1 indicates an underprediction.

$$Ratio = \frac{1}{N}\sum_{1}^{N} \frac{Model}{Obs}$$

Mean Bias (ppb): This performance statistic averages the difference (model - observed) over all pairs in which the observed values were greater than zero. A mean bias of zero indicates that the model over predictions and model under predictions exactly cancel each other out. Note that the model bias is defined such that positive values indicate that the model prediction exceeds the observation, whereas negative values indicate an underestimate of observations by the model. This model performance estimate is used to make statements about the absolute or unnormalized bias in the model simulation.

$$BIAS = \frac{1}{N}\sum_{1}^{N} \left(Model - Obs\right)$$

Normalized Mean Bias (percent): This statistic averages the difference (model - observed) over the sum of observed values. Normalized mean bias is a useful model performance indicator because it avoids over inflating the observed range of values.

$$NMB = \frac{\sum_{1}^{N}(Model - Obs)}{\sum_{1}^{N}(Obs)} \cdot 100\%$$

Mean Fractional Bias (percent): Normalized bias can become very large when a minimum threshold is not used. Fractional bias is used as a substitute. The fractional bias for cases with factors of 2 under- and over-prediction are -67 and + 67 percent, respectively (as opposed to -50 and +100 percent, when using normalized bias). Fractional bias is a useful indicator because it has the advantage of equally weighting positive and negative bias estimates. The single largest disadvantage is that the predicted concentration is found in both the numerator and denominator.

$$FBIAS = \frac{2}{N}\sum_{1}^{N}\left(\frac{(Model - Obs)}{(Model + Obs)}\right) \cdot 100\%$$

Mean Error (ppb): This performance statistic averages the absolute value of the difference (model - observed) over all pairs in which the observed values are greater than zero. It is similar to mean bias except that the absolute value of the difference is used so that the error is always positive.

$$ERR = \frac{1}{N}\sum_{1}^{N}\left|Model - Obs\right|$$

Normalized Mean Error (percent): This performance statistic is used to normalize the mean error relative to the observations. This statistic averages the difference (model - observed) over the sum of observed values. Normalized mean error is a useful model performance indicator because it avoids over inflating the observed range of values.

$$NME = \frac{\sum_{1}^{N}\left|Model - Obs\right|}{\sum_{1}^{N}(Obs)} \cdot 100\%$$

Mean Fractional Error (percent): Normalized error can become very large when a minimum threshold is not used. Therefore fractional error is used as a substitute. It is similar to the fractional bias except the absolute value of the difference is used so that the error is always positive.

$$FERROR = \frac{2}{N}\sum_{1}^{N}\left(\frac{|Model - Obs|}{(Model + Obs)}\right)\cdot 100\%$$

Correlation Coefficient (R^2): This performance statistic measures the degree to which two variables are linearly related. A correlation coefficient of 1 indicates a perfect linear relationship; whereas a correlation coefficient of 0 means that there is no linear relationship between the variables.

$$CORRCOEFF = \frac{\sum_{1}^{N}\left(Model - \overline{Model}\right)\left(Obs - \overline{Obs}\right)}{\sqrt{\sum_{1}^{N}\left(Model - \overline{Model}\right)^2 \sum_{1}^{N}\left(Obs - \overline{Obs}\right)^2}}$$

Appendix B: Summary of recent model performance evaluations conducted by other modeling groups

1. Boylan, J., VISTAS, "PM Model Performance Goal and Criteria", National RPO Modeling Meeting, Denver, CO, 2005a. • Based on benchmarking with a combination of data from a number of PM modeling studies (SAMI, VISTAS, WRAP, EPA, MANE-NU, EPRI, and Midwest RPO). Proposed performance goals (close to best achievable) and performance criteria (acceptable) for these metrics and showed where the modeling studies fall for the various components of PM. • Proposed to use mean fractional bias (MFB) and mean fractional error (MFE) as the standard performance metrics. Goal: MFE <= 50%, MFB <= +-30% Criteria: MFE <= 75%, MFB <= +-60% Less abundant species should have less stringent goal & criteria • Proposed to use asymptotically approaching goals & criteria when data are greater than 2.5 um, approaching +200% MFE and +-200% MFB for extreme small model & observed data (formula of logarithmic MFB & MFE are proposed) • Based on combined modeling studies described above, for more abundant conditions, MFE and MFB are typical in the range of Sulfate: MFE = 30% ~ 77%, MFB = -45% ~ +51% (> 2 ug/m3) Nitrate: MFE = 55% ~ 125%, MFB = +3% ~ +82% (> 1 ug/m3) Organic: MFE = 35% ~ 95%, MFB = -70% ~ +35% (> 1.5 ug/m3) EC: MFE = 50% ~ 95%, MFB = -45% ~ +50% (> 0.5 ug/m3) $PM_{2.5}$: MFE = 50% ~ 85%, MFB = -55% ~ +60% (> 5 ug/m3) • Suggested to conduct performance evaluation on episode-by-episode basis or month-by-month for annual modeling • Different performance goals & criteria may be needed for gaseous precursors and wet depositions. • Benchmarking should be done for the entire modeling system (meteorology, emissions inventory, and model).
2. Morris, R., et al., "Application of Multiple Models to Simulation Fine Particulate in the Southeastern US", National RPO Modeling Meeting, Denver, CO, 2005a. • Based on model multiple model applications over VISTAS modeling: 1July 1999 & July 2001: CMAQ and CMAQ 36-km & 12-km 2January 2002 & July 2001: CMAQ and CMAQ MADRID 36-km only

3Used same horizontal & vertical grids, CMAQ-to-CAMx emissions, ICs/BCs, but different MM5 interface (MCIP vs. MM5CAMx).

- Both models performed reasonably well, with CMAQ performing better for SO4 and CAMx performing better for OM. Both models did not perform well for NO3, soil, and coarse PM, but CAMx seemed to have much higher positive bias in winter nitrate than CMAQ
- Used fractional bias and fractional error (instead of normalized ones) to illustrate model performance because these statistics do not exhibit such extreme fluctuation.
- Demonstrated the usefulness of "soccer goal" plots for MFB & MFE. Suggested 15%/35% (MFB/MFE) for O3, and illustrated 50%/75% for $PM_{2.5}$ species and bounded at 100%/200%
- Based on modeling studies described above (July 1999 & 2001), MFE and MFB are typical in the range of

Sulfate: MFE = 25% ~ 70%, MFB = -25% ~ +51%
Organic: MFE = 30% ~ 75%, MFB = -50% ~ +45%
EC: MFE = 35% ~ 65%, MFB = -30% ~ +40%

- CMAQ performance improved for OM when they adjusted the Kz min value to 1.0 m^2/sec (from 0.1m^2/sec).
- Data (July 2001) of SO4 and total carbon mass (TCM). Both models seemed to captured the diurnal and daily trends well for both SO4 & TCM, but the magnitude can be significantly off for some of the days.

3. Boylan, J. and Baker, K., "Photochemical Model Performance and Consistency", National RPO Modeling Meeting, Denver, CO, 2005.

- Illustrated model performance comparisons of 36-km daily modeling results by MRPO (CAMx4), VISTAS (CMAQ-CB4), and MANE-VU (CMAQ-SARPC99) for two episodes (July 1999 and January 2002) at three IMPROVE sites; and by MRPO (CAMx4) and VISTAS (CMAQ-CB4 for one episode (July 1999) for the Pittsburgh supersite.
- Indicated that in some cases there was good agreement among the models and selected IMPROVE sites, but in others cases there were noticeable variations (even between the two RPOs running CMAQ).
- Sulfate were more consistent among the three models; nitrate and OM have higher discrepancies; All three models overpredicted nitrate and underpredicted OM (based on model vs. observed scatter plots comparisons)
- Suggested that where models diverge, they may show a different response to control strategies. Reasons for the model variations may include differences between CB4 and SAPRC99, and potential differences in emissions inventories, differences in Kz_min values, differences in met. & land use/soil methodologies, etc.
- Also described a comparison of hourly modeling results by MRPO and VISTAS for a July 1999 episode at the Pittsburgh super site. In some cases these hourly results were

better than daily results and generally captured the diurnal patterns for $PM_{2.5}$ species and gaseous species (O3, NOx, HNO3, SO2, etc.), although the magnitude was considerably off in some cases.

4. Seigneur, C., “Review of CMAQ and REMSAD Performance for Regional PM Modeling”, AER Report for UARG, Doc# CP163-03-01b, March 2003.

- Describe a review of summary performance of CMAQ, CMAQ-MADRID 1, CMAQ-MADRID 2, and REMSAD. Based on the comparison studies by others given below:
  a. BRAVO 1999 study: CMAQ-MADRID 1 & REMSAD
  b. WRAP 1996 studies: CMAQ & REMSAD
  c. WRAP Aug. 1999 & Jan. 2000 studies: CMAQ & REMSAD
  d. EPA/ORD July 1999 studies: CMAQ & REMSAD
  e. Southeast PM - July 1999 study (Nashville/Atlanta):CMAQ, CMAQ-MADRID1,2 & REMSAD
- AER Suggested normalized errors of 50% as the benchmark for sulfate and $PM_{2.5}$ (note: this suggestion was not agreed by other modeling groups, see references #2, #5, #7: the MNE is most biased metrics and has high fluctuations). The review showed only SE PM study meets this criteria for sulfate and $PM_{2.5}$, and all the rest of species failed. No model showed consistently better performance than the others. Suggested that the model inputs has more effect on performance than model formulations.
- Indicated that “the current performance of air quality models for PM is poor”...”There is a dire need for improving model inputs and model formulations in order to obtain acceptable model performance”... “3-D air quality models are the best tools available to address the PM source-receptors relationships because they take into account the non-linearities that affect the formation of secondary PM”.

5. Boylan, J., VISTAS, “Calculating Statistics: Concentration Related Performance Goals”, PM Model Performance Workshop, RTP, NC, 2004b.

- Illustrated a set of standard bias and errors calculations commonly used for model performance statistics and proposed model performance goal.
- Indicated Mean Normalized Bias and Errors (MNBE) are most biased and least useful among “MNBE”, “NMBE” and “MFBE”. The Mean Fractional Bias and Errors (MFBE) is least biased and most useful among the three metrics.
- Recommended MFB & MBE and proposed performance goal: MFE<=50% and MFB <=+-30% for more abundant species (eg., sulfate & $PM_{2.5}$) and less stringent for less abundant species (eg., nitrate, OC, EC, soil, etc.). Performance goal is not criteria and should be prohibit the modeling from being used if it fails to meet the goal.
- Proposed to use “2.5ug/m3" as the “grayline” for 50% MFE & +-30% MFB and asymmetrically approaching 200% MFE & +-200% MFB to extremely small concentrations.

• Recommended to use monthly avg. for annual modeling.
6. Morris, R., et al., "Model and Chemistry Inter-comparison: CMAQ with CB4, CB4-2002, SAPRC99", National RPO Modeling Meeting, Denver, CO, 2005b. • Based on US (36-km) and VISTAS (12-km) January 2002 modeling, conducted chemistry mechanisms inter-comparisons for CMAQ with CB4, CB4-2002,and SAPRC99. • The performance of CB4 and CB4-2002 was similar for PM, and superior to SAPRC99 overall (for the Jan02 case). • The model performance for CMAQ/CB4, US 36-km domain is in the range of: Sulfate: MFE = 42% ~ 73%, MFB = -21% ~ +14% Nitrate: MFE = 62% ~ 105%, MFB = -21% ~ +46% Organic: MFE = 50% ~ 77%, MFB = +3% ~ +59% EC: MFE = 59% ~ 88%, MFB = +2% ~ +70% Soil: MFE = 165% ~ 180%, MFB =+164% ~ +180% $PM_{2.5}$: MFE = 48% ~ 88%, MFB = +25% ~ +81% • Given that the computational cost of SAPRC99 is twice that of CB4, suggested to use 36 and 12 km grids with CB4 chemistry for PM modeling for the time being. • Noted that both CB4 and SAPRC underpredicted winter O3 significantly.
7. Tonnesen, G., et al., "Regional Haze Modeling: Recent Modeling Results for VISTAS and WRAP", CMAS Annual workshop, RTP, NC, 2003. • Illustrated the WRAP 1996 CMAQ 36-km modeling and performance evaluation in the Western U.S. and VISTAS CMAQ 12-km modeling for 3 episodes: January 2002, July 1999, July 2001. Recommended to use the performance metrics of Mean Fractional Bias (MFB)and Mean Fractional errors (MFE) over mean normalized bias & errors (used in earlier WRAP model evaluation). Sulfate: MFB = -47% ~ +48% (1996 WRAP domain) Nitrate: MFB = -95% ~ +30% (1996 WRAP domain) Organic: MFB = -20% ~ +70% (1996 WRAP domain) OC: MFB = -45% ~ +3% (1996 WRAP domain) • VISTAS modeling key findings (1) sulfate performance reasonably well (2) nitrate overpredictions in the winter, underpredictions in summer, may need better NH3 emissions (3) Kv min =1 improved performance, mixing height is important (4) minor differences in 19 vs. 34 layers
8. Zhang, Y., et al., "Performance Evaluation of CMAQ and PM-CAMx for July 1999 SOS Episode", AER Report for CRC, Doc# CP131-03-01, April 2003.

- Conducted CMAQ (2002 version) and PM-CAMx performance evaluation based on July 1999 SOS episode (6/29-7/11) modeling study (32-km nested w/ 8-km in the SE U.S., including Atlanta & Nashville)
- Ozone performance: use MNB & MNE w/ 60 ppb threshold for O3 (CMAQ performed better):
  CMAQ: MNB < 1%, MNE = 18%
  CAMx: MNB = 27%, MNE = 33%
- PM performance: CMAQ & PM-CAMx are generally consistent in the rural areas (vs. IMPROVE); differs significantly over urban/suburban; in general, CMAQ performs much better than PM-CAMx

$PM_{2.5}$: CMAQ: MNB = 38%, MNE = -7%
CAMx: MNB = 55%, MNE = 35%
Sulfate: CMAQ: MNB = 9%, MNE = 45%
CAMx: MNB = 44%, MNE = 63%
Nitrate: CMAQ: MNB = -50%, MNE = 98%
CAMx: MNB =137%, MNE = 158%

- The performance of CMAQ for PM and O3 is consistent with the performance expected for air quality models (however, nitrate issue existed); the performance of CAMx does not generally meet current expectations for AQM.

9. Morris. R., et al.,"Evaluation of CAMx: Issues Related to Section Models ", PM Model Performance Workshop,RTP, NC, 2004c.

- Illustrated a WRAP comparison of CMAQ (v4.3), REMSAD (v7), CAMx (bimodal PM), and CAMx (4-section PM) based on January and July 1996 and annual 1996 over the 36-km WRAP domain.
- Indicated that all models exhibited variations in performance, but no clear winner across all species and periods. Sulfate predictions were reasonable, but nitrate was significantly overpredicted. For all three models,

Sulfate : MFE = 40% ~ 60%, MFB = -40% ~ +14% (July 96)
Nitrate : MFE = 105% ~ 200%, MFB = +45% ~> +100% (Jan. 96)
Organic: MFE = 50% ~ 75%, MFB = -65% ~ +5% (July 96)
EC : MFE = 47% ~ 105%, MFB = -48% ~ +25% (Jan. 96)

- The 1996 model performance is less than stellar, indicating potential issues in 1996 MM5 and emissions.
- Showed the effects of sectional PM distribution on PM Modeling in the Western US. Based on a study in the South Coast Air Basin using CAMx4+, which allows side-by-side comparisons of aqueous-phase chemistry modules (bulk vs. variable size resolution) and of PM size distribution treatments (bimodal vs. sectional).

10. Tonnesen, G., et al..,"Model Performance Metrics, Ambient Data Sets and Evaluation Tools", PM Model Performance Workshop, RTP, NC, 2004a.

- Illustrated model performance metrics, available $PM_{2.5}$ and O3 data, and evaluation software tool. Suggested that air quality modeling should include model evaluation as part of the system.
- Comparing performance metrics may not be enough since performance metrics often show mixed response and it is possible for a better model to have poorer metrics (e.g., bias in met & emissions inputs). Diagnostic evaluation is needed to judge finer grid performance since coarser grid may have compensating errors. But should we assume that finer grid modeling always gives better simulations/physics?
- An example of VISTAS modeling (July 1999) showed differences of hourly sulfate and its wet deposition between CMAQ results using 12-km and 36-km grids, possible due to regional transport (wind speed & direction), precipitations/clouds, and numerical diffusion.
- Recommended bias factor as the best metric for evaluating haze.

11. Wang, Z., et al.,” Comparison and Diagnostic Evaluation of Air Quality Models for Particulate Matter: CAMx, CMAQ, CMAQ-MADRID”, National RPO Modeling Meeting, 2004.

- Conducted model evaluation based on 1999 SOS episode (6/29-7/10) EPRI modeling study,
- CAMx has higher positive bias than CMAQ and CMAQ-Madrid in predicting sulfate; CMAQ underestimated nitrate and CAMx and CMAQ-MADRID overestimated nitrate.
- All three models underestimated OM. However, there was no clear winner in model performance.
- The three models responded differently to a 50% increase in ammonia emissions, indicating a need to further look at the models’ responsiveness to changes in emissions.

12. Ku, C., CENRAP, “CMAQ and CAMx Simulations for January and July 2002”, National RPO Modeling Meeting, Denver, CO, 2005.

- Compared CMAQ and CAMx 36-km simulations Based on January and July 2002 (basB) over a continental US domain.
- Indicated that the results were mixed for the models over CENRAP generally. Both models performed acceptably for $PM_{2.5}$ and sulfate in the summer (when sulfate is abundant) but they were overpredicted in the winter compared against IMPROVE network.
- CAMx significantly overpredicted nitrate in the winter (higher prediction than CMAQ), but has better performance in OM (lower prediction than CMAQ), based on performance measures of normalized bias and errors.
- The study also showed mixed results for the models in three climatically different regions in CENRAP that contain Class I areas, with varying performance depending on region and season. This finding points up the difficulty in improving model performance over the whole CENRAP domain.

13. Eder B. and Yu S., “An Evaluation of the 2003 Release of Models-3/CMAQ”, CMAS Annual workshop, RTP, NC, 2003.

- Illustrated CMAQ 2003 evaluation for two episodes (winter 2002 and Summer 1999) for O3 and $PM_{2.5}$ species against AIRS, CASTNet, IMPROVE, and STN. Suggested the use of the performance metrics of Normalized Mean Bias (NMB)and Normalized Mean errors (NMB) (and correlation coefficient, R).
- Ozone is fairly unbiased and accurate (NMB<10%) and NME=~20%); sulfate performance is quite well, even for STN. NO3 was the worst in the winter (NME ~67% for STN and ~96% for IMPROVE)

14. Frank, N.,”Use of National $PM_{2.5}$ and Speciation Network Measurements for Model Evaluation ”, PM Model Performance Workshop, RTP, NC, 2004.

- Compared correlated speciated monitoring sites (e.g., IMPROVE, CASTNet, STN) for ambient PM species measurements.
- The sulfate agrees very well, but nitrate has both positive & negative bias site-by-site.
- OM is more uncertain than other species, but is still somewhat robust for model evaluation (ie., uncertainty is relatively small compared to current range of uncertainty in modeling). OM is about 50%-80% of urban excess of $PM_{2.5}$.

15. Hu, Y., et.al., “Evaluation of CMAQ with FAQS Episode of August 11th-20th”, 2000, CMAS Annual workshop, RTP, NC, 2003.

- Conducted CMAQ (36/12/4 km nesting) performance evaluation for O3 based on Fall Line Air Quality Study (FAQS) 8/11-20.
- Indicated that CMAQ had a good O3 performance, but has a nighttime problem, which could be due to min Kz used. Analysis suggested that an optimal of min Kz may lie between 0.1~1 m^2/s.
- The Isoprene emissions may be overestimated in the rural area and CO emissions may be underestimated.

16. Tonnesen, G., et al., “Prelim Preliminary Results CMAQ and CMAQ-AIM with SAPRC99”, National RPO Modeling Meeting, 2004b.

- Compared CMAQ and CMAQ-AIM with SAPRC99 based on 2001 VISTAS modeling study. CMAQ-AIM with SAPRC99 has larger negative bias and lower predictions of Sulfate PM than standard released CMAQ.
- Conducted model & chemistry inter-comparisons: CMAQ with CB4, CB4-2002,

SAPRC99. Some chemistry differences were observed in the models based on the 36-km U.S. and the 12-km VISTAS modeling; the performance of CB4 and CB4-2002 was similar, and superior to SAPRC99 overall. • Given that the computational cost of SAPRC99 is twice that of CB4, suggested to use 36 and 12 km grids with CB4 chemistry for current VISTAS modeling study.
17. Yu, S., et al., "Simulation of Primary and Secondary Organic Aerosols over the US by CMAQ: Evaluation and Analysis", CMAS Annual workshop, RTP, NC, 2003. • Evaluated CMAQ w/ SAPRC99 performance of Primary Organic Aerosols (POA), EC, and secondary Organic Aerosols (SOA) based on IMPROVE, SEARCH, and SOS data. • Suggested that model captured general trends & patterns of most EC & POA within a factor of two (based on IMPROVE & SEARCH). • Slight underprediction in the Eastern U.S., likely due to underprediction in biogenic SOA.
18. Chien, C. Y., et al., "CMAQ Model Performance Evaluation with the Updated CB4-2002", CMAS Annual workshop, RTP, NC, 2003. • Evaluated CMAQ w/ CB4 vs. CB4-2002 (and CB4-2002 with removed N2O5 gaseous reaction) against IMPROVE, CASTNet and AQS based on January & July 1996 cases. Described the key updates of CB4-2002 (HNO3, N2O5 & PAN rxns). • CB4-2002 has lower O3, lower N2O5, lower PAN, higher HNO3, higher nitrate, slightly higher sulfate, and slightly lower SOA prediction than CB4. • The performance of CMAQ CB4 and CB4-2002 was similar for PM species. However, CB4-2002 has higher positive bias for winter nitrate (since it predicted higher nitrate).
19. Dennis, R.,"Time-Resolved and In-Depth Evaluation of PM and PM Precursors Using CMAQ ", PM Model Performance Workshop, RTP, NC, 2004. • Evaluated the CMAQ (2003 version) performance of inorganic PM, EC, and gaseous precursors against Atlanta 1999 supersite summer data and 2002 Pittsburgh supersite winter data. • Suggested that collapse of evening PBL is too fast and rise of morning PBL too slow (based on higher modeled EC, NOy & CO against Atlanta data at sunrise & sunset) • Performance for sulfate & ammonium was fairly good; • Overprediction for nitrate, but updated chemistry in CMAQ (included in 2004 version) has improved the nitrate performance (updated reaction probability for HNO3 heterogeneous rxn and remove gaseous N2O5->HNO3 rxn) • Use ratio to define nitrate PM formation being HNO3- or NH3-limited: (NHx-

2*SO4)/(HNO3+NO3)

- Nitrate PM predictions are very sensitive to NHx, and thus the NH3 emissions need serious attention.

20. Kumar, N.,"$PM_{2.5}$ Model Performance: Lessons Learned and Recommendations ", PM Model Performance Workshop, RTP, NC, 2004.

- Illustrated the use of model performance statistics based on two CMAQ-MADRID applications, SOS 1999 episode in the SE U.S. and 12-km BRAVO summer 1999 episode (nested within REMSAD BRAVO 36-km modeling results)
- Indicated model evaluation issues regarding local vs. regional, daily/weekly vs. month/seasonal

Sulfate : MNB= +20% / +51%, MNE = 51% / 89% (SEARCH/IMPROVE)
Nitrate : MNB= +72% / -25%, MNE = 72% / 46% (SEARCH/IMPROVE)
EC : MNB= +14% / -8%, MNE = 52% / 54% (SEARCH/IMPROVE)
$PM_{2.5}$: MNB= -19% / -8%, MNE = 32% / 49% (SEARCH/IMPROVE)

- Described the available performance metrics and illustrated the use of logarithmic and fractional bias and errors as potential benchmarks

21. Baker K., Midwest RPO, "Fine Grid Model Performance", National RPO Modeling Meeting, Denver, CO, 2005.

- Based on the Midwest RPO 36-km and 12-km Modeling study using CAMx4
- Indicated that the model performance for $PM_{2.5}$ species generally was similar for 36 and 12 km grids; there were some differences in running control scenarios for sulfate/nitrate, but we could not determine which one is better

22. Morris, R., et al., "VISTAS Grid Resolution Sensitivity", National RPO Modeling Meeting, Denver, CO, 2005d.

- Based on VISTAS Southeast U.S. modeling study for Phase I episode (Jan. 2002, July 1999, and July 2001), compared results for CMAQ w/ CB4 and SAPRC99 using the 36 km national RPO domain and the 12 km grid VISTAS domain
- Effects of grid resolution on model performance was mixed (performance was not necessarily improving using 12-km)
- CMAQ w/ SAPRC99 (mixed for sulfate, worse for nitrate) was not performing better than w/ CB4
- Compared July 1999 episode for ozone using 36-km & 12-km CMAQ and CAMx. CMAQ O3 performance degraded to underprediction with finer grid; CAMx is similar at 36-km and 12-km.
- Examined the performance of the MM5 model configurations using various cloud schemes (including Kain-Fritsch and Reisner schemes) for the 12 km (WRAP) and 36 km domains. The results showed that cool and moist bias found in the West,

overprediction of convective precipitation using KF.
23. Zhang, Y., et al., "Development and Application of MADRID: A New Aerosol Module in CMAQ", CMAS Annual workshop, RTP, NC, 2003. • Evaluated CMAQ-MADRID against SCAQS 1987 episode. The performance of CMAQ-MADRID seemed to perform well in O3, $PM_{2.5}$, and sulfates, and comparable in other $PM_{2.5}$ species to other models (UAM-IV/CALGRID/UAM-AERO, GATOR, SMOG, CIT, SAQM-AERO) • Described the development and sciences of MADRID aerosol module included in CMAQ. Key features: sectional (size bins), hybrid equilibrium, more sophisticated SOA treatment, CMU aqueous chemistry
24. Morris, R., et al., "WRAP Multi-Model Evaluation Using the 1996 36 km Section 309 Database", National RPO Modeling Meeting, Denver, CO, 2005e. • Conducted WRAP 1996 multi-model evaluation. Compared CMAQ (v4.3), REMSAD (v7), CAMx (bimodal PM), and CAMx (4-section PM) using the 1996 36-km section 309 database. • Indicated that sulfate was the best performing species on an annual basis, with a winter overprediction compensating for a summer underprediction; NO3 was predicted poorly by all models; OC, EC, and CM were underpredicted by all models. concluded that modeling is more challenging in the West than in the Midwest and Southeast.
25. Seigneur, C., "Current Status of Air Quality Models for Particulate Matter", *NARSTO 2000—Tropospheric Aerosols: Science and Decisions in an International Community,* October 23-26, 2000, Queretaro, Mexico, 2000b. • Based on a limited set of comparisons with limited temporal and spatial model studies. • Statistics calculated for aggregated gross error (AGE) and aggregated normalized bias (ANB). Note that the statistics for AGE and AGB were not obtained with the same models nor the same data base. Thus, performance for the two metrics in the table are not associated with each other. $PM_{2.5}$: AGE ~ +30% - +50%, AGB ~ +10% (based on one study) Sulfate : AGE ~ +30% - +50%, AGB ~ -20% - -30% Nitrate : AGE ~ +20% - +70%, AGB ~ -15 - +50% EC : AGE ~ +15% - +60%, AGB = none available OC : AGE ~ -40% - +50%, AGB ~ 38% (based on one study)

United States Environmental Protection Agency	Office of Air Quality Planning and Standards Air Quality Analysis Division Research Triangle Park, NC	Publication No. EPA-454/B-07-002 April 2007

APPENDIX F

Rule to Reduce Interstate Transport of Fine Particles

Federal Register

Friday,
April 28, 2006

Part IV

Environmental Protection Agency

40 CFR Parts 51, 52 et al.

Air Pollution Control—Transport of Emissions of Nitrogen Oxides (NO_X) and Sulfur Dioxide (SO_2); Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 51, 52, 72, 73, 74, 78, 96, and 97

[EPA–HQ–OAR–2004–0076; FRL–8047–5]

RIN 2060–AM99

Rulemaking on Section 126 Petition From North Carolina To Reduce Interstate Transport of Fine Particulate Matter and Ozone; Federal Implementation Plans To Reduce Interstate Transport of Fine Particulate Matter and Ozone; Revisions to the Clean Air Interstate Rule; Revisions to the Acid Rain Program

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of final rulemaking (NFR).

SUMMARY: Today, EPA is taking actions to address the interstate transport of emissions of nitrogen oxides (NO_X) and sulfur dioxide (SO_2) that contribute significantly to nonattainment and maintenance problems with respect to the national ambient air quality standards (NAAQS) for fine particulate matter ($PM_{2.5}$) and 8-hour ozone. As one part of today's action, EPA is providing its final response to a petition submitted to EPA by the State of North Carolina under section 126 of the Clean Air Act (CAA). The petition requests that EPA find that SO_2 and/or NO_X emissions from electric generating units (EGUs) in 13 States are significantly contributing to $PM_{2.5}$ and/or 8-hour ozone nonattainment and maintenance problems in North Carolina, and requested that EPA establish control requirements to prohibit such significant contribution. The EPA is denying the petition because, in today's action, EPA is promulgating Federal implementation plans (FIPs) for all jurisdictions covered by the Clean Air Interstate Rule (CAIR) to address interstate transport.

The FIPs will regulate EGUs in the affected States and achieve the emissions reductions requirements established by the CAIR until States have approved State implementation plans (SIPs) to achieve the reductions. As the control requirement for the FIPs, EPA is adopting the model trading rules that EPA provided in CAIR as a control option for States, with minor changes to account for Federal rather than State implementation.

Today's action also revises CAIR SIP model trading rules in order to address the interaction between the EPA-administered CAIR FIP trading programs being promulgated today and the EPA-administered CAIR State trading programs that will be created by any State that elects to submit a SIP establishing such a trading program to meet the requirements of the CAIR. In addition, EPA is taking final action on our reconsideration of the definition of ''EGU'' as it relates to solid waste incinerators.

Today's action also makes revisions to the Acid Rain Program in order to make the administrative appeals procedures, which currently apply to final determinations by the Administrator under the EPA-administered CAIR State trading programs, also apply to the EPA-administered trading programs under the FIP action. In addition, we are making certain minor revisions to the Acid Rain Program that will apply to all affected units.

DATES: This action is effective on June 27, 2006.

ADDRESSES: The EPA has established a docket for this action under Docket ID No. EPA–HQ–OAR–2004–0076. All documents in the docket are listed on the *http://www.regulations.gov* Web site. Although listed in the index, some information is not publicly available, *e.g.,* confidential business information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically through *http://www.regulations.gov* or in hard copy at the EPA Docket Center (Air Docket), EPA/DC, EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744 and the telephone number for the Air Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: For general questions concerning today's section 126 action, please contact Carla Oldham, U.S. EPA, Office of Air Quality Planning and Standards, Air Quality Policy Division, C504–05, Research Triangle Park, NC 27711, telephone (919) 541–3347, e-mail at *oldham.carla@epa.gov.* For general questions concerning today's FIP action, please contact Tom Coda, U.S. EPA, Office of Air Quality Planning and Standards, Air Quality Policy Division, C539–01, Research Triangle Park, NC 27711, telephone (919) 541–3037, e-mail at *coda.tom@epa.gov.* For legal questions concerning the section 126 action, please contact Steven Silverman, U.S. EPA, Office of General Counsel, Mail Code 2344A, 1200 Pennsylvania Avenue, NW., Washington, DC 20460, telephone (202) 564–5523, e-mail at *silverman.steven@epa.gov.* For legal questions concerning the FIP action, please contact Sonja Rodman, U.S. EPA, Office of General Counsel, Mail Code 2344A, 1200 Pennsylvania Avenue, NW., Washington, DC 20460, telephone (202) 564–4097, e-mail at *rodman.sonja@epa.gov.* For questions regarding the cap-and-trade programs and emissions budgets, please contact Meg Victor, U.S. EPA, Office of Atmospheric Programs, Clean Air Markets Division, Mail Code 6204J, 1200 Pennsylvania Avenue, NW., Washington, DC 20460, telephone (202) 343–9193, e-mail at *victor.meg@epa.gov.* For questions regarding the revisions to the CAIR and Acid Rain Programs, please contact Dwight Alpern, U.S. EPA, Office of Atmospheric Programs, Clean Air Markets Division, Mail Code 6204J, 1200 Pennsylvania Avenue, NW., Washington, DC 20460, telephone (202) 343–9151, e-mail at *alpern.dwight@epa.gov.*

SUPPLEMENTARY INFORMATION:

I. Does This Action Apply to Me?

Categories and entities potentially regulated by this action include the following:

Category	NAICS code [1]	Examples of potentially regulated entities
Industry	221112	Fossil fuel-fired electric utility steam generating units.
Federal government	[2] 221122	Fossil fuel-fired electric utility steam generating units owned by the Federal government.
State/local/Tribal government	[2] 221122	Fossil fuel-fired electric utility steam generating units owned by municipalities.

Category	NAICS code [1]	Examples of potentially regulated entities
	921150	Fossil fuel-fired electric utility steam generating units in Indian Country.

[1] North American Industry Classification System.
[2] Federal, State, or local government-owned and operated establishments are classified according to the activity in which they are engaged.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. To determine whether your facility is affected by this action, you should examine the definitions and applicability criteria in §§ 72.2, 72.6, 72.7, 72.8, and 74.2 for purposes of the Acid Rain Program revisions and §§ 97.102, 97.104, 97.105, 97.202, 97.204, 97.205, 97.302, 97.304, and 97.305 for purposes of the FIP action. If you have any questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding section under **FOR FURTHER INFORMATION CONTACT.**

II. Availability of Related Information

The EPA has conducted separate rulemakings that contain actions and information related to today's action. The final ''Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule)'' was published on May 12, 2005 (70 FR 25162) (see also proposal at 69 FR 4566, January 30, 2004; supplemental proposal at 69 FR 32684, June 10, 2004; and notice of data availability at 69 FR 47828, August 6, 2004). The EPA subsequently reconsidered several aspects of the final CAIR (see 70 FR 72268; December 2, 2005 and 70 FR 77101; December 29, 2005) and is taking final action on reconsideration in a separate action today. In addition, the EPA issued a proposal to include Delaware and New Jersey in CAIR for $PM_{2.5}$ (70 FR 25408, May 12, 2005) and is finalizing that rulemaking today, also in a separate action. Documents related to the CAIR, including the actions on reconsideration and to include Delaware and New Jersey in CAIR for $PM_{2.5}$, are available for inspection in docket EPA–HQ–OAR–2003–0053 at the address and times given above. The EPA has established a website for the CAIR at *http://www.epa.gov/cleanairinterstaterule* or more simply *http://www.epa.gov/cair/* which also includes information on the section 126 rulemaking. The rulemaking docket for the CAIR contains information and analyses that are relied upon in today's actions. Therefore, EPA is including by reference the entire CAIR record for purposes of the section 126 and FIP rulemakings.

III. Judicial Review

Under CAA section 307(b), judicial review of this final action is available only by filing a petition for review in the U.S. Court of Appeals for the District of Columbia Circuit on or before June 27, 2006. Under CAA section 307(d)(7)(B), only those objections to the final rule that were raised with specificity during the period for public comment may be raised during judicial review. Moreover, under CAA section 307(b)(2), the requirements established by today's final rule may not be challenged separately in any civil or criminal proceedings brought by EPA to enforce these requirements.

Section 307(d)(7)(B)also provides a mechanism for the EPA to convene a proceeding for reconsideration if the petitioner demonstrates that it was impracticable to raise an objection during the public comment period or if the grounds for such objection arose after the comment period (but within the time for judicial review) and if the objection is of central relevance to the rule. Any person seeking to make such a demonstration to EPA should submit a Petition for Reconsideration, clearly labeled as such, to the Office of the Administrator, U.S. EPA, Room 3000, Ariel Rios Building, 1200 Pennsylvania Ave., Washington, DC 20460, with a copy to the Associate General Counsel for the Air and Radiation Law Office, Office of General Counsel, Mail Code 2344A, U.S. EPA, 1200 Pennsylvania Ave., NW., Washington, DC 20460.

Outline

I. Background and Summary of Rule

A. Summary of Rule

In this rule, EPA is taking two final actions related to the interstate transport of emissions of NO_X and SO_2 that contribute significantly to nonattainment and maintenance problems with respect to the NAAQS for $PM_{2.5}$ and 8-hour ozone. First, EPA is providing its final response to the petition submitted to EPA by the State of North Carolina under section 126 of the CAA. Second, EPA is promulgating FIPs for all jurisdictions covered by the CAIR. The EPA is also making revisions to the final CAIR to clarify certain provisions, to correct minor errors, and to take final action on reconsideration of the definition of ''EGU'' as it relates to solid waste incinerators. Finally, EPA is making minor revisions to the Title IV Acid Rain Program.

The North Carolina petition requests that EPA establish control requirements for EGUs in 13 States based on findings that these sources are significantly contributing to $PM_{2.5}$ and/or 8-hour ozone nonattainment and maintenance problems in North Carolina. (See Petition, Docket No. EPA–HQ–OAR–2004–0076–0002.)

The EPA's response (as well as the petition itself) is based on extensive analyses conducted for the CAIR (70 FR 25162; May 12, 2005). The EPA is denying the petition in full. For sources in States not shown in the final CAIR to be linked to (that is, to significantly contribute to) nonattainment and maintenance problems in North Carolina, the lack of significant contribution to North Carolina is the basis for this denial. For sources in States that are linked to North Carolina under the CAIR for the $PM_{2.5}$ NAAQS, EPA is denying the petition because, concurrently with the section 126 response, EPA is promulgating FIPs that require elimination of the significant contribution. The FIPs will control the significant transport from sources in States named in the petition as well as from sources in the other CAIR States, in the event that the States do not have timely, approved SIPs meeting the CAIR requirements. The States named in the petition with respect to the $PM_{2.5}$ NAAQS are: Alabama, Georgia, Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia. Of these, Illinois and Michigan are not linked to North Carolina in the final CAIR.

The States named in the petition with respect to the 8-hour ozone NAAQS are: Georgia, Maryland, South Carolina, Tennessee, and Virginia. There are no States linked to North Carolina under the CAIR for the 8-hour ozone NAAQS because North Carolina is projected to be in attainment in the 2010 baseline for the analyses.

As mentioned above, in today's action, EPA is also promulgating FIPs to address interstate transport of NO_X and SO_2 under section 110(a)(2)(D) for all jurisdictions that are covered by the CAIR. In the CAIR, EPA determined that 28 States and the District of Columbia contribute significantly to nonattainment of the NAAQS for $PM_{2.5}$ and/or 8-hour ozone in downwind States. The CAIR explains EPA's basis for determining significant contribution to downwind nonattainment and maintenance problems. In that rule, the EPA required the affected upwind States to revise their SIPs to include control measures to reduce emissions of SO_2 and/or NO_X. Sulfur dioxide is a precursor to $PM_{2.5}$ formation, and NO_X is a precursor to both ozone and $PM_{2.5}$ formation.

In an action published on the same day as the final CAIR, EPA proposed to find that Delaware and New Jersey contribute significantly to $PM_{2.5}$ nonattainment and maintenance problems in downwind States considering these States as a single entity (70 FR 25408; May 12, 2005). These States were included in the final CAIR only with respect to their impacts on downwind 8-hour ozone nonattainment and maintenance problems. Today, in a separate action, EPA is issuing the final rule to include Delaware and New Jersey in the CAIR region for $PM_{2.5}$. Therefore, today's FIP rule includes emissions reductions requirements for Delaware and New Jersey to address their significant contribution to nonattainment or maintenance problems for the $PM_{2.5}$ NAAQS.

The FIPs will regulate EGUs in the affected States and achieve the emissions reductions required by the CAIR until States have approved SIPs to achieve the reductions. The CAIR emissions budgets were based on control requirements that are highly cost effective for EGUs.

The EPA intends the CAIR FIPs to address the requirements of section 110(a)(2)(D)(i) to prevent interstate transport that contributes significantly to nonattainment or interferes with maintenance in downwind areas and to provide a Federal backstop for CAIR. In no way should the FIPs for CAIR be viewed as a sign of any concern about States meeting their SIP responsibilities under CAIR. There are no sanctions associated with these FIPs and EPA does not intend for CAIR FIPs to have any negative consequences for the affected States. The EPA is providing FIP approaches that are flexible and intended to provide States options for getting their SIPs in place.

As the control requirement for the FIPs, EPA is adopting the model trading rules that EPA provided in CAIR as a control option for States, with minor changes to account for Federal rather than State implementation. The CAIR FIP NO_X and SO_2 trading programs provide emissions reductions equal to those required under the CAIR in affected States.

These trading programs provide emissions reductions equal to those required under CAIR in the affected States. The CAIR FIP trading programs are integrated with the EPA-administered State CAIR trading programs that are based on the model rules so that sources can trade with one another under the respective emissions caps. The EPA emphasizes that the FIPs do not limit the options available to States to meet the requirements of the CAIR. We do not intend to record NO_X allocations in sources' allowance accounts (or take any other steps to implement FIP requirements that could impact a State's ability to regulate their sources in a different manner) until a year after the CAIR SIP submission deadline.[1] This will allow EPA time to

[1] The CAIR requires affected sources to begin monitoring 1 year before the initial control periods (*i.e.,* sources begin monitoring in 2008 for the NO_X programs and begin monitoring in 2009 for the SO_2 program). Note that EPA will take any necessary actions to implement the monitoring provisions of the FIP trading rules in time for monitoring to begin in 2008. To the extent that a State chooses to

take rulemaking action to approve timely SIPs before implementation of FIP requirements occurs. In addition, States could replace the FIP requirements at a later time.

In today's action, EPA is also making revisions to the CAIR in order to address the interaction of EPA-administered NO_X and SO_2 trading programs under the CAIR and under the FIP action. In addition, EPA is making revisions to the CAIR in order to clarify certain provisions and to correct certain minor errors and taking final action on reconsideration of the definition of ''EGU'' as it relates to solid waste incinerators.

The EPA is also revising the Title IV Acid Rain Program in order to make the administrative appeals procedures (in 40 CFR part 78), which currently apply to final determinations by the Administrator under the EPA-administered State CAIR trading programs, also apply to the EPA-administered trading programs under the FIPs. In addition, EPA is making minor revisions that would apply to all affected units under the Acid Rain Program.

B. General Background on $PM_{2.5}$ and Ozone

1. The $PM_{2.5}$ Problem

In an action published on July 18, 1997, we revised the NAAQS for particulate matter (PM) to add new standards for fine particles, using as the indicator particles with aerodynamic diameters smaller than a nominal 2.5 micrometers, termed $PM_{2.5}$ (62 FR 38652). We established health- and welfare-based (primary and secondary) annual and 24-hour standards for $PM_{2.5}$. The annual standard is 15 micrograms per cubic meter, based on the 3-year average of annual mean $PM_{2.5}$ concentrations. The 24-hour standard is 65 micrograms per cubic meter, based on the 3-year average of the annual 98th percentile of 24-hour concentrations. The annual standard is generally considered the more limiting value.[2]

Fine particles are associated with a number of serious health effects including premature mortality, aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days), lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems. (See EPA, Air Quality Criteria for Particulate Matter (EPA/600/P–99/002bF, October 2004) at 9.2.2.3).) The EPA has estimated that attainment of the current $PM_{2.5}$ standards would prolong tens of thousands of lives and would prevent, each year, tens of thousands of hospital admissions as well as hundreds of thousands of doctor visits, absences from work and school, and respiratory illnesses in children.

Individuals particularly sensitive to fine particle exposure include older adults, people with heart and lung disease, and children. More detailed information on health effects of fine particles can be found on EPA's Web site at: *http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_index.html.*

The secondary or welfare-based $PM_{2.5}$ standards are designed to protect against major environmental effects caused by PM such as visibility impairment, soiling, and materials damage.

As discussed in other sections of this preamble, SO_2 and NO_X emissions both contribute to fine particle concentrations. In addition, NO_X emissions contribute to ozone concentrations, described in the next section.

The $PM_{2.5}$ ambient air quality monitoring for the 2001–2003 period shows that areas violating the standards are located across much of the eastern half of the United States and in parts of California and Montana. The EPA published the $PM_{2.5}$ attainment and nonattainment designations on January 5, 2005 (70 FR 944) and issued supplemental amendments on April 14, 2005 (70 FR 19844).

2. The 8-Hour Ozone Problem

In an action published on July 18, 1997, we promulgated identical revised primary and secondary ozone standards that specified an 8-hour ozone standard of 0.08 parts per million (ppm). Specifically, under the standards, the 3-year average of the fourth highest daily maximum 8-hour average ozone concentration may not exceed 0.08 ppm. In general, the revised 8-hour standards are more protective of public health and the environment and more stringent than the pre-existing 1-hour ozone standards.

Short-term (1- to 3-hour) and prolonged (6-to 8-hour) exposures to ambient ozone have been linked to a number of adverse health effects. At sufficient concentrations, short-term exposure to ozone can irritate the respiratory system, causing coughing, throat irritation, and chest pain. Ozone can reduce lung function and make it more difficult to breathe deeply. Breathing may become more rapid and shallow than normal, thereby limiting a person's normal activity. Ozone also can aggravate asthma, leading to more asthma attacks that may require a doctor's attention and the use of additional medication. Increased hospital admissions and emergency room visits for respiratory problems have been associated with ambient ozone exposures. Longer-term ozone exposure can inflame and damage the lining of the lungs, which may lead to permanent changes in lung tissue and irreversible reductions in lung function. A lower quality of life may result if the inflammation occurs repeatedly over a long time period (such as months, years, or a lifetime). There is also recent epidemiological evidence suggesting that there may be a correlation between short-term ozone exposure and premature mortality.

People who are particularly susceptible to the effects of ozone include people with respiratory diseases, such as asthma. Those who are exposed to higher levels of ozone include adults and children who are active outdoors.

In addition to causing adverse health effects, ozone affects vegetation and ecosystems, leading to reductions in agricultural crop and commercial forest yields; reduced growth and survivability of tree seedlings; and increased plant susceptibility to disease, pests, and other environmental stresses (*e.g.,* harsh weather). In long-lived species, these effects may become evident only after several years or even decades and have the potential for long-term adverse impacts on forest ecosystems. Ozone damage to the foliage of trees and other plants can also decrease the aesthetic value of ornamental species used in residential landscaping, as well as the natural beauty of our national parks and recreation areas. More detailed information on health effects of ozone can be found at the following EPA Web site: *http://www.epa.gov/ttn/naaqs/standards/ozone/s_o3_index.html.*

Presently, wide geographic areas, including most of the nation's major population centers, experience ozone levels that violate the NAAQS for 8-hour ozone. These areas include much of the eastern part of the United States and large areas of California. The EPA published the 8-hour ozone attainment and nonattainment designations in the **Federal Register** on April 30, 2004 (69 FR 23858).

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control EGUs to meet its CAIR obligations, the monitoring requirements will be identical whether EPA regulations EGUs through the Federal trading programs or the State regulates EGUs through its SIP.

[2] The EPA recently proposed to amend the NAAQS for $PM_{2.5}$ (71 FR 2620; Jan. 17, 2006). The EPA is scheduled to take final action on this proposal by September 27, 2006. These actions are not relevant to this rulemaking because all of the actions herein concern the existing NAAQS.

3. Other Environmental Effects Associated With SO_2 and NO_X Emissions

In addition to the enumerated human health and welfare benefits resulting from reductions in ambient levels of $PM_{2.5}$ and ozone, reductions in NO_X and SO_2 will contribute to substantial visibility improvements in many parts of the eastern United States. Reductions in these pollutants will also reduce acidification and eutrophication of water bodies in the region. In addition, reducing emissions of NO_X and SO_2 from EGUs can be expected to reduce emissions of mercury. Reduced mercury emissions in turn may reduce mercury loadings in lakes and thereby potentially decrease both human and wildlife exposure to fish containing mercury.

C. What Is the Statutory and Regulatory Background for Today's Action?

1. What Is the ''Good Neighbor'' Provision?

Following promulgation of new or revised NAAQS, the CAA requires all areas, regardless of their designation as attainment, nonattainment, or unclassifiable, to submit SIPs containing provisions specified under section 110(a)(2). Among these requirements are those specified by the so-called ''good neighbor'' provision section 110(a)(2)(D) which addresses interstate transport of air pollution.

Section 110(a)(2)(D) requires that a SIP contain adequate provisions—

(i) Prohibiting, consistent with the provisions of this title, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will—

(I) Contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to [any] national primary or secondary ambient air quality standard, or

(II) Interfere with measures required to be included in the applicable implementation plan for any other State under part C to prevent significant deterioration of air quality or to protect visibility.

(ii) Insuring compliance with the applicable requirements of sections 126 and 115 (relating to interstate and international pollution abatement);

Section 126 is discussed in the following section and section II of this preamble explains the relationship between CAA sections 110 and 126 with respect to our final response to the section 126 petition and the CAIR FIPs.

2. What Is the CAA Section 126 Provision?

Subsection (a) of section 126 requires, among other things, that SIPs require major proposed new (or modified) stationary sources to notify nearby States for which the air pollution levels may be affected by the fact that such sources have been permitted to commence construction. Subsection (b) provides:

Any State or political subdivision may petition the Administrator for a finding that any major source or group of stationary sources emits or would emit any air pollutant in violation of the prohibition of section 110(a)(2)(D)[(i)] [of] this section* * *.

Subsection (c) of section 126 states that—

[I]t shall be a violation of this section and the applicable implementation plan in such State [in which the source is located or intends to locate]—

(1) For any major proposed new (or modified) source with respect to which a finding has been made under subsection (b) to be constructed or to operate in violation of this section and the prohibition of section 110(a)(2)(D)[(i)] [3] [of] this section, or

(2) for any major existing source to operate more than three months after such finding has been made with respect to it.

However, subsection (c) further provides that EPA may permit the continued operation of such major existing sources beyond the 3-month period, if such sources comply with EPA-promulgated emissions limits within 3 years of the date of the finding.

3. What Is EPA's Previous Section 126 Rulemaking?

The EPA has previously taken action under section 126 to address interstate ozone transport (64 FR 28250; May 25, 1999 and 65 FR 2674; January 18, 2000). Because there are many parallels between that earlier action and today's rule, we briefly discuss our earlier action here.

Like the present rulemaking, EPA's previous section 126 rulemaking, dealing with interstate transport of NO_X, occurred essentially in conjunction with an EPA rulemaking dealing with interstate transport of the same pollutants, the NO_X SIP Call (62 FR 60318; November 7, 1997). As in today's rule, EPA concluded that section 126 and section 110(a)(2)(D)(i) are integrally connected (due to the reference to the section 110(a)(2)(D)(i) prohibition found in section 126 (b)). Thus, the interstate transport problem at issue could be addressed under either provision, and once the underlying section 110(a)(2)(D)(i) SIP deficiency is eliminated, there no longer is a basis for EPA to make a positive finding under section 126. (See sections II and III below for a more detailed discussion.) In the earlier rulemaking, we therefore concluded that emissions reductions sufficient to eliminate a section 110(a)(2)(D) SIP deficiency would also be sufficient to satisfy section 126.

The NO_X SIP Call required SIP revisions eliminating the amount of emissions that contribute significantly to nonattainment in downwind States, the amount of emissions reductions corresponding to the quantity of emissions that could be eliminated by the application of highly cost-effective controls on specified sources in each upwind State. The section 126 remedy consequently called for the same set of highly cost-effective controls for the section 126 source categories, based on the record of the NO_X SIP Call. We are adopting this same conceptual approach in today's rulemaking.

There are also parallels between our earlier section 126 action and this action with regard to timing of actions in the section 126 proceeding and in the closely-related interstate transport proceeding under section 110(a)(2)(D)(i). Because a section 126 finding turns on the existence of a section 110(a)(2)(D)(i) deficiency, in the May 1999 Section 126 Rule, we determined which petitions had technical merit, but we stopped short of granting the findings sought by the petitions. Instead, we stated that because we had promulgated the NO_X SIP Call, as long as an upwind State remained on track to comply with that rule, EPA would defer making the section 126 findings (See 64 FR 28271–28272). Later judicial action staying the NO_X SIP Call rule resulted in EPA granting the section 126 petitions at issue, but the new rule retained the basic linkage between section 126 and section 110(a)(2)(D)(i) by providing that EPA would withdraw the section 126 findings upon EPA approval of a SIP satisfying the emission reduction requirements of the NO_X SIP Call rule or upon EPA's promulgation of a FIP that achieved the emissions reductions. [See 65 FR at 2683 and *Appalachian Power* v. *EPA*, 249 F. 3d 1032, 1039 (D.C. Cir., 2001).] Similarly, in our proposal on the North Carolina section 126 petition, we proposed to deny the section 126 petition if we approved SIPs which satisfied the emission reduction requirements of the CAIR, or if we promulgated a FIP which included the emission reduction requirements of the CAIR. (In today's final rule, we are denying the petition because we are promulgating FIPs concurrently with the final section 126 response, which FIPs eliminate the significant

[3] While the text of section 126 refers to section 110(a)(2)(D)(ii), this is a scrivener's error. Congress intended to refer to section 110(a)(2)(D)(i). (See 64 FR 28267.) The EPA's interpretation was upheld in *Appalachian Power Co.* v. *EPA,* 249 F. 3d 1032, 1040–44 (D.C. Cir. 2001).

contribution from upwind sources to North Carolina.)

Finally, in the earlier section 126 rule, EPA adopted as a remedy for section 126 a Federal NO_X cap-and-trade program patterned after the model NO_X cap-and-trade program that EPA developed for States as an option to meet their NO_X SIP Call requirements. See 65 FR 2686. The EPA proposed the same approach for the North Carolina section 126 petition, in the event that EPA granted the petition.

4. What Is the Clean Air Interstate Rule?

The EPA developed the CAIR to address interstate pollution transport with respect to the newly adopted $PM_{2.5}$ and 8-hour ozone NAAQS.

In the CAIR, based on air quality modeling analyses and cost analyses, EPA concluded that SO_2 and NO_X emissions in certain States in the eastern part of the country, through the phenomenon of air pollution transport,[4] contribute significantly to $PM_{2.5}$ and/or 8-hour ozone nonattainment and maintenance problems in downwind States. The CAIR establishes emission reduction requirements for the affected upwind States under CAA section 110(a)(2)(D)(i). The affected States and the District of Columbia have until September 11, 2006 to adopt and submit SIP revisions to achieve these required reductions. The SIP revision must contain measures that will assure that sources in the State reduce their SO_2 and/or NO_X emissions sufficiently to eliminate the amounts of SO_2 and NO_X that contribute significantly to nonattainment downwind. Reducing upwind precursor emissions will assist the downwind $PM_{2.5}$ and 8-hour ozone areas in achieving and maintaining the NAAQS. Moreover, attainment will be achieved in a more equitable, cost-effective manner than if each nonattainment area attempted to achieve attainment by implementing local emissions reductions alone. The EPA specified that the CAIR emissions reductions be implemented in two phases. The first phase of NO_X reductions starts in 2009 (covering 2009–2014) and the first phase of SO_2 reductions starts in 2010 (covering 2010–2014); the second phase of reductions for both NO_X and SO_2 starts in 2015 (covering 2015 and thereafter). The emissions reduction requirements are based on controls that are known to be highly cost effective for EGUs; however, States have the flexibility to determine what measures to adopt to achieve the necessary reductions. In the CAIR, EPA provided model SO_2 and NO_X trading programs for EGUs that States can choose to adopt to meet the emissions reduction requirements in a flexible and highly cost-effective manner.

With the inclusion of Delaware and New Jersey in the CAIR $PM_{2.5}$ region, EPA estimates that the CAIR will reduce SO_2 emissions by 3.6 million tons in 2010 and by 3.9 million tons in 2015; and will reduce annual NO_X emissions by 1.2 million tons in 2009 and by 1.5 million tons in 2015. (These numbers reflect the annual SO_2 and NO_X requirements.) If all these States choose to achieve these reductions through EGU controls, then EGU SO_2 emissions in the affected States would be capped at 3.7 million tons in 2010 and 2.6 million tons in 2015;[5] and EGU annual NO_X emissions would be capped at 1.5 million tons in 2009 and 1.3 million tons in 2015.

Based on the promulgated CAIR (70 FR 25162), EPA estimates that the required SO_2 and NO_X emissions reductions would, by themselves, bring into attainment 52 of the 79 counties that are otherwise projected to be in nonattainment for $PM_{2.5}$ in 2010, and 57 of the 74 counties that are otherwise projected to be in nonattainment for $PM_{2.5}$ in 2015. The EPA further estimates that the required NO_X emissions reductions would, by themselves, bring into attainment 3 of the 40 counties that are otherwise projected to be in nonattainment for 8-hour ozone in 2010, and 6 of the 22 counties that are projected to be in nonattainment for 8-hour ozone in 2015. In addition, the CAIR will improve $PM_{2.5}$ and 8-hour ozone air quality in the areas that would remain in nonattainment for those two NAAQS after implementation of the CAIR. Because of CAIR, the States with those remaining nonattainment areas will find it less burdensome and less expensive to reach attainment by adopting additional local controls. The CAIR will also reduce $PM_{2.5}$ and 8-hour ozone levels in attainment areas, providing significant health and environmental benefits in all areas of the eastern United States.

For a more complete description of the CAIR and its impacts, the reader is encouraged to review the preamble to the CAIR.

5. What Are the Findings of Failure To Submit for the Section 110(a)(2)(D) Plans?

In a final rule published on April 25, 2005 (70 FR 21147), we made national findings that States have failed to submit SIPs required under section 110(a)(2)(D) to address interstate transport with respect to the 8-hour ozone and $PM_{2.5}$ NAAQS.

The April 25, 2005 findings started a 2-year clock for EPA to promulgate a FIP to address the requirements of section 110(a)(2)(D). Under section 110(c)(1), EPA may issue a FIP any time after such findings are made and must do so unless a SIP revision correcting the deficiency is approved by EPA before the FIP is promulgated. For States affected by CAIR, an approved SIP meeting the CAIR requirements would satisfy the requirement and turn off the FIP clock. As discussed below in section IV, EPA is today promulgating FIPs for States affected by the CAIR. However, EPA intends to withdraw the FIP in a State in coordination with approval of a SIP for the State that meets the CAIR requirements.

The findings do not start a sanctions clock pursuant to section 179 because the findings do not pertain to a part D plan for nonattainment areas required under section 110(a)(2)(I) and because the action is not a SIP Call pursuant to section 110(k)(5).

6. What Are the Petitions for Reconsideration of the CAIR?

Following publication of the final CAIR, EPA received twelve petitions requesting reconsideration of certain aspects of the final rule. The EPA considered all issues raised in the petitions and decided to reconsider six issues. In the notice of proposed rulemaking for this rule, EPA announced its decision to reconsider one issue: the definition of ''EGU'' as it relates to certain solid waste incineration units. Subsequently, on December 2, 2005 (70 FR 72268), and December 29, 2005 (70 FR 77101), EPA published in the **Federal Register** notices announcing its decisions to reconsider five additional aspects of CAIR and requesting comment on those issues.

As part of this rule, EPA is taking final action on reconsideration of the definition of ''EGU'' as it relates to certain solid waste incineration units. As explained in sections VI.E and VII below, EPA has revised the definition of EGU to establish a specific exemption for certain solid waste incineration units.

In a separate notice signed today, EPA is taking final action on the five

[4] When we use the term ''transport'' we mean to include the transport of both fine particles ($PM_{2.5}$) and their precursor emissions and/or transport of both ozone and its precursor emissions.

[5] It should be noted that the SO_2 trading program provides that sources may bank pre-2010 title IV SO_2 allowances to be used for compliance with CAIR. These provisions encourage sources to make early emission reductions and ease the transition to the CAIR SO_2 program, and as a result, emissions may not reflect the emission caps in any given year.

additional aspects of CAIR for which EPA granted petitions for reconsideration. The EPA also is taking final action today to deny the remaining issues raised in the twelve petitions for reconsideration. These actions are discussed in greater detail in the preamble for the notice of final action on reconsideration, titled ''Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule): Reconsideration'' and all related documents are available in the docket for the CAIR (EPA–HQ–OAR–2003–0053).

D. Summary of North Carolina's Section 126 Petition

1. What Sources Does the Petition Target?

The North Carolina petition requests reductions of certain emissions from large EGUs located in 13 States. With respect to the $PM_{2.5}$ NAAQS, the petition requests that EPA find that NO_X and SO_2 emissions from large EGUs in 12 States (Alabama, Georgia, Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia) are significantly contributing to nonattainment in, or interfering with maintenance by, North Carolina. With respect to the 8-hour ozone NAAQS, the petition requests that EPA find that NO_X emissions from large EGUs in 5 States (Georgia, Maryland, South Carolina, Tennessee, and Virginia) are significantly contributing to nonattainment in, or interfering with maintenance by, North Carolina (Petition, p.1).

The petition defines the term ''EGUs'' as all facilities meeting the criteria described in the proposal for the CAIR. (*See* 69 FR 4566, 4610; January 30, 2004.) In the proposal for the CAIR, we defined EGUs as ''fossil-fuel fired boilers and turbines serving an electric generator with a nameplate capacity of greater than 25 megawatts (MW) producing electricity for sale.'' (Id.) (See sections VI.E. and VII of today's preamble for clarification of the EGU definition.)

2. What Control Remedy Does the Petition Request?

In its petition, North Carolina states that compliance with the NO_X and SO_2 emissions budgets in the proposal for the CAIR would satisfy the requirements of the petition. These emissions budgets were based on controls that are highly cost effective for EGUs [the highly cost effective control metric being a component of determining which emissions contribute significantly (see *State of Michigan* v. *EPA*, 213 F.3d 663, 674–80 (D.C. Cir., 2000) (upholding consideration of cost as an aspect of significant contribution)]. North Carolina also states that it does not oppose the flexibility discussed by EPA (69 FR at 4622) to allow equivalent reductions from other source categories in given States, so long as those reductions are real and enforceable (Petition, p. 24).

In the CAIR, EPA provided model NO_X and SO_2 cap-and-trade programs for EGUs as control options for States to choose to meet the CAIR emissions reductions requirements. The trading programs allow interstate trading among sources in all States subject to the CAIR that adopt the programs. In its petition, North Carolina said it recognizes the value of allowing sources flexibility to reduce their emissions in the most cost-effective manner consistent with the statute. However, North Carolina expressed concerns about a regional trading program (Petition, pp. 25–28). We address this issue below in sections II and VI.

3. What Is the Technical Support for the Petition?

To support its claim that EGUs outside North Carolina are contributing significantly to nonattainment and maintenance problems in the State, North Carolina relies largely on EPA's technical analyses for the proposed CAIR. Therefore, as discussed above, the petition targets sources in the same States that EPA linked to North Carolina in the proposed CAIR. As corroborative support, North Carolina cites analyses conducted by the Southern Appalachian Mountains Initiative (SAMI) on $PM_{2.5}$ transport, North Carolina's further evaluation of the SAMI's analyses, as well as back trajectory analyses performed by the North Carolina Division of Air Quality from $PM_{2.5}$ monitors in two counties. (See Petition, pp. 13–17.)

E. What Is the Consent Decree on the Section 126 Rulemaking Schedule?

On March 19, 2004, EPA received a petition from the State of North Carolina filed under CAA section 126. Section 126(b) requires EPA to make the requested finding, or to deny the petition, within 60 days of receipt. It also requires EPA to provide a public hearing before acting on the petition. In addition, EPA's action under section 126 is subject to the procedural requirements of section 307(d) of the CAA. [See section 307(d)(2)–(5).] One of these requirements is that EPA conduct notice-and-comment rulemaking. Section 307(d)(10) provides for a time extension, under certain circumstances, for rulemakings subject to that provision. Specifically, it allows statutory deadlines that require promulgation in less than 6 months from proposal to be extended to not more than 6 months from proposal to afford the public and the Agency adequate opportunity to carry out the purposes of section 307(d). In an action published on May 26, 2004 (69 FR 30038), EPA extended the deadline for EPA to take action on the North Carolina petition by the full 6 months, to November 18, 2004.

On February 17, 2005, the State of North Carolina and the citizen's group Environmental Defense filed complaints against EPA seeking to compel EPA to take action on the State's section 126 petition: *State of North Carolina* v. *Johnson*, No. 5:05–CV–112 (E.D. N.C.) and *Environmental Defense* v. *Johnson*, No. 5:05–CV–113 (E.D. N.C.). The EPA, North Carolina, and Environmental Defense filed a proposed consent decree that would establish a schedule for EPA to act on the petitions. Pursuant to CAA section 113(g), the EPA solicited comments on the proposed consent decree, by notice dated March 2, 2005 (70 FR 10089). The comment period closed April 1, 2005 without EPA receiving negative comment. On May 9, 2005, the court entered a slightly modified version of the consent decree.

The schedule in the consent decree required EPA to sign a proposal to grant or deny the petition by August 1, 2005, a date EPA met. (See 70 FR 49746.) The consent decree also required EPA to hold a public hearing on the proposal during the week of September 12 in North Carolina, and EPA held hearings in Research Triangle Park, North Carolina and Washington, DC during that week. The EPA must also take final action to grant or deny the petition by March 15, 2006, and is doing so in this rule. With the signature of today's final response to the petition, EPA has thus fulfilled all the deadlines and provisions of the consent decree.

II. What Is EPA's Legal and Analytical Approach for the Section 126 Petition?

For the $PM_{2.5}$ NAAQS, EPA proposed to deny the petition with respect to sources in any State having an approved SIP meeting the CAIR emissions reductions requirements, and with respect to sources in any State for which EPA promulgated a FIP with those same emission reductions requirements. In either case, there would no longer be a violation of the prohibition in section 110(a)(2)(D)(i). Since a violation of that prohibition is a condition precedent for granting a section 126 petition, EPA necessarily would deny the petition. (*See* 70 FR at 49716–49717.)

A number of commenters disagreed with EPA's approach. In their view, section 126 guarantees a particular result: reductions of emissions from designated upwind sources linked to North Carolina nonattainment or maintenance problems, which reductions are to occur within three years.

In the commenters' view, if an approved SIP or a FIP does not provide this result within the three year time frame stated in section 126(c), then EPA must grant the petition. Thus, the argument goes, EPA must find that certain sources significantly contribute to nonattainment problems in North Carolina regardless of whether there is a current violation of the section 110(a)(2)(D)(i) prohibition. The commenters maintain that the statute, case-law, and past EPA practice all compel their interpretation.

EPA disagrees. In our view, section 126 provides a mechanism forcing EPA to act, but does not force adoption of controls beyond those necessary to remove the underlying SIP deficiency which violates the prohibition of section 110(a)(2)(D)(i). In essence, section 126 provides States a means to force EPA to take action to reduce specific emissions when EPA has not taken the actions required by section 110(a)(2)(D)(i) to address significant contribution to downwind receptors, but does not force further action. It follows, therefore, that once EPA has taken action to eliminate the SIP deficiencies by approving SIPs which implement CAIR (*i.e.,* which eliminate the significant contribution), or itself promulgates a CAIR FIP for states with SIP deficiencies, there is no longer a cause of action under section 126.[6]

This interpretation is consistent with the text of the statute, which links action under section 126 inextricably with the existence of an underlying section 110(a)(2)(D)(i) SIP deficiency: ''[a]ny State * * * may petition the Administrator for a finding that any major source or group of stationary sources emits * * * any air pollutant *in violation of the prohibition of section 110(a)(2)(D)[(i)]*[7] *o[f] this section*'' (emphasis added). Case law likewise makes clear that EPA's determination of whether or not to grant a section 126 petition turns on whether SIPs are in violation of section 110(a)(2)(D)(i). *Appalachian Power* v. *EPA*, 249 F.3d 1032, 1045–46 (D.C. Cir. 2001). Similarly, in the rulemaking dealing with a section 126 petition in circumstances most analogous to those here (EPA's response to the Northeastern states' petition regarding interstate transport of ozone precursors, issued roughly contemporaneously with the NO_X SIP Call), EPA stated that it ''interprets section 126 to provide that a source is emitting in violation of the prohibition of section 110(a)(2)(D)(i) where the applicable SIP fails to prohibit (and EPA has not remedied this failure through a FIP) a quantity of emissions from that source that EPA has determined contributes significantly to nonattainment or interferes with maintenance in a downwind [S]tate'' (64 FR at 28272; May 25, 1999). Thus, ''[a]n upwind State and EPA may remedy this excessive interstate transport of air pollutants through adoption and approval of a SIP revision barring the emission of such pollutants. Alternatively, a downwind State and EPA may remedy this excessive interstate transport of air pollutants through the State petitioning EPA under section 126 and EPA regulating the sources directly'' (65 FR 2680; January 18, 2000).

Commenters argued, however, that the reference in section 126(b) and (c) to ''the prohibition of section 110(a)(2)(D) [(i)]'' must be to the functional prohibition in section 110(a)(2)(D)(i), by which they mean a cessation of emissions that contribute significantly to nonattainment in a downwind state. Under this reading, a remedy under section 126 must entail emission reductions, not merely SIP revisions. EPA agrees that the prohibition referred to is the functional prohibition on significant contribution to downwind states, and therefore, for example, EPA cannot defer granting a section 126 petition merely because a state is under a legal obligation to revise its SIP. *Appalachian Power,* 249 F.3d at 1044. However, adoption of a SIP implementing CAIR (or EPA enacting a CAIR FIP) addresses the functional prohibition of section 110(a)(2)(D)(i) by eliminating the SIP deficiency triggering the prohibition through requirements on sources to eliminate the significant contribution to downwind receptors. Moreover, to the extent the commenters are maintaining that the 'functional prohibition in section 110(a)(2)(D)(i)' refers to some specific environmental result, such as North Carolina coming into attainment (see Comments of North Carolina Attorney General at 17), we disagree. EPA interprets ''significant contribution'' in the CAIR and in this proceeding to include both an emission component and a feasibility/cost-effectiveness component, so that what is prohibited are specific levels of emissions which can feasibly be reduced in a highly cost-effective manner. See also 65 FR at 2677 (applying cost effectiveness component of the significant contribution standard in granting a section 126 petition). Adoption of a CAIR SIP (or EPA adopting a CAIR FIP) fully addresses this prohibition.

In the same vein, other commenters argued that sections 110(a)(2)(D) and 126 are independent provisions, and that EPA is vitiating that independence by substituting a section 110 remedy for the section 126 remedy, the implication again being that section 126 commands an environmental result which must be effectuated once the section 110(a)(2)(D) prohibition is violated. EPA disagrees with the premise of the comment. Although the two provisions unquestionably may be applied independently, they are also closely linked in that a violation of the prohibition in section 110(a)(2)(D)(i) is a condition precedent for action under section 126 and, critically, that significant contribution is construed identically for purposes of both provisions (since the identical term naturally is interpreted as meaning the same thing in the two linked provisions). See *Appalachian Power,* 249 F. 3d at 1049–50. If EPA or a State has adopted provisions that eliminate the significant contribution to downwind states, then there simply is no violation of the section 110(a)(2)(D) prohibition. Moreover, since we interpret significant contribution to mean the same thing under both provisions, relief under section 126 to eliminate significant contribution must in any case mean eliminating those emissions which can feasibly be controlled in a highly cost-effective manner as defined in the CAIR. Put another way, requiring additional reductions would result in eliminating emissions which do not contribute significantly, an action beyond the scope of section 126.

Commenters further argued that relief under section 126 must occur within 3 years and therefore that the CAIR emission reductions do not satisfy

[6] This analysis assumes that the facts underlying CAIR remain unchanged. If a Petition were to present new information showing, for example, that there is a different level of contribution than EPA analyzed in CAIR, compliance with CAIR would not automatically be determinative regarding whether upwind sources are emitting in violation of the section 110 (a)(2)(D)(i) prohibition. See 64 FR at 28274 n. 15 and *Appalachian Power,* 249 F.3d at 1067 (later developments can be the basis for another section 126 petition).

[7] As noted earlier, the statutory text refers to subsection (ii) of section 110(a)(2)(D), but this is a scrivener's error. *Appalachian Power,* 249 F.3d 1032, 1040–44.

section 126 because although those reductions commence within 3 years they are phased in over a longer time. These comments assume that EPA must make the section 126 findings, however, in which case sources covered by the petition would indeed have to eliminate significant contribution within 3 years. But as just explained, a condition precedent to making section 126 findings is the existence of an underlying SIP deficiency, which EPA has chosen to address directly through action under section 110(a)(2)(D). Moreover, this choice is appropriate. As a result of today's action, not only will there be an approved SIP or a CAIR FIP in place requiring emission reductions which eliminate the significant contribution to North Carolina, but these reductions occur within 3 years, commencing in 2009 when NO_X controls (a $PM_{2.5}$ precursor) are required (70 FR at 49718). This is similar to EPA's decisions in the parallel NO_X SIP Call/section 126 rulemakings where EPA initially deferred making section 126 findings because there would be approved SIPs in place requiring elimination of significant contribution to downwind States with emission reductions to commence (although not be concluded) within the 3-year period (64 FR at 28275).[8] When the NO_X SIP Call rule was judicially stayed, it was no longer appropriate to defer making the section 126 findings because there were no longer ''explicit and expeditious deadlines for compliance with the NO_X SIP Call'' (65 FR 2680). Here, the certainty of SIP submissions (or action under a CAIR FIP) coupled with explicit and certain compliance deadlines calling for emissions reductions commencing in the same timeframe as the section 126 3-year window make it appropriate for EPA to utilize the section 110(a)(2)(D) remedy.

We note further that in arguing that EPA must order all emissions reductions from designated sources which contribute to North Carolina $PM_{2.5}$ nonattainment to occur within 3 years, commenters again ignore the feasibility/cost-effectiveness prong of the significant contribution test. EPA has found that the CAIR emissions reductions are highly cost effective based on the compliance schedule established in that rule, and further found that that compliance schedule is needed for reasons of technical feasibility (70 FR at 25195–25229). Requiring those reductions to occur on a more rapid timeframe would thus require considerably more than merely eliminating significant contribution, and so would exceed the scope of section 126. Moreover, commenters presented no independent analysis showing that emission reductions from the designated sources could be obtained cost-effectively (or even feasibly) within 3 years.[9]

Commenters also argued that because a SIP (or the CAIR FIP) could (or in the case of the FIP, would) reflect a trading component, such a scheme would not satisfy section 126. The legal argument is that section 126 requires emission reductions to come from designated sources, a result not possible to guarantee under a trading regime. More basically, commenters stated that under a trading regime there was no certainty that there would be reduction of emissions to North Carolina, so that at the least, trading should be limited to sources designated in the petition as contributing significantly to nonattainment in North Carolina. These arguments again assume that EPA must grant the petition, which is not our view so long as the underlying SIP deficiencies are rectified, as explained above. The arguments also do not address the critical point that availability of trading options are part of the basis for EPA's findings that reductions are highly cost effective, and hence are an element of the finding that emissions contribute significantly to nonattainment.[10] The approach here is also consistent with the one EPA adopted initially in the NO_X SIP Call/section 126 rulemaking, where EPA deferred granting section 126 petitions based on the existence of the NO_X SIP Call remedy, which included a trading scheme across the entire region. 63 FR at 56309–320; see generally 64 FR at 28307–309 (appropriateness of trading as a section 126 remedy). Indeed, as noted earlier, EPA adopted a trading scheme when granting that earlier section 126 petition. See 65 FR at 2686; see also *Appalachian Power,* 249 F. 3d at 1039 noting that EPA's section 126 rule included a cap-and-trade program. Further discussion of issues relating to the trading regime are found in section VI.B of this preamble.

Some commenters also challenged EPA's basis for proposing to deny the petition with respect to ozone. EPA did so because no area in North Carolina is projected to be in nonattainment with the ozone 8-hour NAAQS in the CAIR base case and therefore upwind states would (by definition) not be contributing significantly to North Carolina nonattainment (70 FR at 25162). Commenters argued that EPA is obligated to consider current conditions, and not base findings on future conditions, because some areas in North Carolina are presently in nonattainment. They base this argument on the use of the present tense in section 126(b) (''emits or would emit any air pollutant in violation of the prohibition of section 110(a)(2)(D)[(i)]''), plus equitable consideration of the need to address existing pollution problems.

EPA disagrees. With respect to the statutory language, both section 126(b) and 110(a)(2)(D)(i) do not specify the time by which EPA must evaluate significance of contribution. Indeed, section 110(a)(2)(D)(i) is written exclusively in the future tense, and the reference to ''emits or would emit'' in section 126(b) is naturally read as making clear that controls can apply to both existing and new sources. See *Appalachian Power,* 249 F. 3d at 1056–57. Moreover, it makes sense for significant contribution determinations to be based on conditions at the time at which potential controls are contemplated. Suppose, for example, that due to future rules (a clutch of effective mobile source controls, for example) it can reliably be predicted that an area will be in attainment although it is not so presently. We do not believe that the statute mandates immediate assessment of interstate contribution to address a nonattainment problem that will no longer exist at the time controls on the interstate emissions would be implemented. EPA thus has consistently adopted this future-looking approach when assessing interstate transport, and believes it reasonable to continue doing so here. See 63 FR at 57375 (adopting this approach in NO_X SIP Call).

[8] Commenters asserted that all emissions reductions under the SIP Call would have occurred within the three-year period, but this is not the case. The date for achieving the budgets provided by the SIP Call (*i.e.,* the full panoply of annual emission reductions) was 2007, six years from the rule's promulgation date. See 63 FR at 57450.

[9] The petitioner (in its comments on the proposal) stated that ''[c]ontrols for sources contributing to nonattainment in North Carolina would be cost effective. EPA concluded as much in the Proposed CAIR Rule * * *. There is nothing in the Final CAIR Rule that indicates that adding North Carolina to the list of downwind states would 'break the bank' on cost effectiveness.' '' Comments of North Carolina Attorney General at p. 30 n. 16. This statement does not address whether controls on upwind souces would be cost effective (or feasible) in timeframes more rapid than those found to be cost effective and feasible in the CAIR.

[10] Indeed, the Petition relies on EPA's analysis of what constitutes significant contribution, which, as just noted, includes an assumption that sources participate in a trading scheme to achieve highly cost-effective emission reductions. The Petition presents no independent analysis of what would constitute a significant contribution in the absence of a trading program. It is thus illogical for the Petition to argue that sources must eliminate all significant contribution (of which trading is a necessary element) but must do so without a trading program.

Finally, commenters argued that EPA had ignored the statutory requirement in section 110(a)(2)(D)(i) (incorporated within section 126(b) and (c)) to prohibit interstate transport that ''interefere[s] with maintenance'' by North Carolina of the 8-hour ozone NAAQS. They further stated that a number of North Carolina counties projected to attain the ozone NAAQS are modeled to do so by narrow margins that should be deemed to fall within the interfere with maintenance test based on modeling uncertainties and historic ozone variability patterns in the counties in question.

EPA stated in the CAIR rule that it would apply the interfere with maintenance provision in section 110(a)(2)(D) in conjunction with the significant contribution to nonattainment provision and so did not use the maintenance prong to separately identify upwind States subject to CAIR (70 FR at 25193). EPA did this so as not to give the interfere with maintenance requirement greater weight than the significant contribution requirement, thus avoiding giving greater weight to the potentially lesser environmental effect. (See CAIR Response to Comments Response at p. 63.) EPA's reading also promotes a reasonable balance between controls on upwind states and in-state controls, an important objective in applying the section 110 and 126 interstate transport provisions. (See 70 FR at 25193.) Suppose, for example, that a downwind area is projected to attain by the effective date of potential section 110(a)(2)(D) (or section 126(b)) controls, so that those controls are unnecessary to prevent significant contribution to nonattainment. Applying controls on upwind sources in these circumstances not only could be environmentally unnecessary, but could even create a perverse incentive for downwind states to increase local emissions.[11]

We note further that even if (against our view) the interference with maintenance standard were to be applied in cases where there is no evidence of significant contribution to nonattainment, EPA would still interpret the standard as requiring consideration of cost and technical feasibility since EPA already considers these factors as aspects of significant contribution, and it would make little sense to interpret the interfere with maintenance language (the lesser environmental effect) as allowing reductions without considering those same factors. See also 63 FR 57370 (interfere with maintenance must also reflect significant contribution to be cognizable under section 110 remedies for interstate transport. Moreover, given that maintenance addresses the less significant environmental effect, EPA would likely require that emission reductions be no less highly cost effective than those which significantly contribute to nonattainment, and might require that reductions be even more highly cost effective. It is thus difficult to see that further emission reductions than those already required under CAIR would be warranted.

III. What Is EPA's Final Action on the Section 126 Petition?

In determining whether emissions from EGUs in the States named in the North Carolina section 126 petition contribute significantly to 8-hour ozone and/or $PM_{2.5}$ nonattainment and maintenance problems in North Carolina, EPA is relying on the conclusions drawn in the final CAIR. As discussed in section I above, North Carolina based its petition in large part on the analyses for the proposed CAIR—identifying EGUs in the same upwind States that EPA proposed to link to North Carolina. The EPA conducted new modeling analyses using updated emissions inventories for the final CAIR. The EPA also applied a different value for the threshold contribution level for the air quality portion of the significant contribution determination for $PM_{2.5}$ in the final CAIR. Therefore, the upwind State-to-downwind State linkages differed in the final CAIR from the proposal.

A. What Is EPA's Final Action With Respect to the 8-Hour Ozone NAAQS?

In its petition, North Carolina requested that EPA make findings that large EGUs in Georgia, Maryland, South Carolina, Tennessee, and Virginia contribute significantly to nonattainment in, or interfere with maintenance by, North Carolina with respect to the 8-hour ozone NAAQS. In the proposed CAIR, EPA linked these States to 8-hour ozone air quality problems in Mecklenburg County, North Carolina. In the final CAIR, EPA's updated analyses project all of North Carolina to be in attainment for 8-hour ozone in the CAIR 2010 base case. Therefore, EPA did not link any upwind States to North Carolina with respect to the 8-hour ozone NAAQS in the final CAIR (*See* CAIR preamble, Table VI–9 at 70 FR at 25249). Consequently, EPA is denying the section 126 petition with respect to the 8-hour ozone NAAQS.

B. What Is EPA's Final Action With Respect to the $PM_{2.5}$ NAAQS?

In its petition, North Carolina also requested that EPA make findings that large EGUs in Alabama, Georgia, Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia and West Virginia contribute significantly to nonattainment in, or interfere with maintenance by, North Carolina with respect to the $PM_{2.5}$ NAAQS. In the proposed CAIR, these 12 States were linked to $PM_{2.5}$ nonattainment problems in North Carolina. In the final CAIR, as noted, EPA used different, updated modeling and also applied a 0.2 (μ/m³ contribution threshold level rather than the proposed 0.15 (μ/m³ for the air quality portion of the significant contribution determination (70 FR 25190–25191). Based on the updated modeling and the 0.2 (μ/m³ contribution threshold level, EPA determined in CAIR that only the following 10 States are significantly contributing to $PM_{2.5}$ air quality problems in North Carolina: Alabama, Georgia, Indiana, Kentucky, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia (see preamble Table VI–8; 70 FR at 25248–25249). This means for purposes of section 126(b) that sources within these States for which EPA determined highly cost-effective controls are available are also contributing significantly to $PM_{2.5}$ nonattainment problems in North Carolina.

In determining what action to take in response to the $PM_{2.5}$ portion of the section 126 petition, EPA is taking into consideration the CAIR FIPs that are being promulgated today in conjunction

[11] In this case, the three North Carolina counties mentioned in comments as warranting upwind reductions to maintain attainment status, are not only projected to be in attainment in 2010 in both the base case and the CAIR case (considering emission reductions occurring under CAIR to prevent significant contribution) and the 2015 base case and CAIR case. In fact, in 2015, these counties (Mecklenburg, Rowan, and Wake) are projected to be attaining by comfortable margins. CAIR Modeling TSD App. E Table E–1 (projected levels of 75.0 ppb, 74.1 ppb, and 70.8 ppb respectively in the 2015 CAIR case, which are all below the levels (3–5 ppb) EPA considered to raise maintenance concerns in the CAIR. These projections do not consider the effect of local controls other than those already enacted. Projected levels in the 2015 base case, *i.e.* without CAIR and without further local controls, are likewise comfortably below the levels which could raise likely possibility of returning to nonattainment. (It is reasonable to defer consideration of maintenance issues until 2015 in this anlaysis because the CAIR remedy is in two parts. There thus will be further emission controls of NO_X between 2010 and 2015 as a result of CAIR which could subsume any controls adopted for maintenance reasons.) EPA thus in any case does not beleive that further reductions from upwind sources is needed to maintain the 8-hour ozone standard in these counties, and that such emission reductions would not reasonably balance upwind and local controls. See also Response to Comment Document addressing these factual issues.

with the section 126 action (see section IV below). The FIP action establishes control requirements for each of the States affected by the CAIR in order to achieve the emissions reductions required to address interstate transport.

In the proposal for the section 126 action, for EGUs in States linked to North Carolina in CAIR (and therefore, for which EPA proposed a FIP), EPA proposed in the alternative (1) to deny the petition if EPA issued the final FIPs to address the interstate transport no later than the final section 126 response or (2) to grant the petition and make section 126 findings if EPA did not promulgate the FIPs prior to or concurrently with the final section 126 response. Because the FIPs would fully address the $PM_{2.5}$-related interstate transport problem identified in CAIR and thus eliminate the section 110(a)(2)(D) violation, there would no longer be a basis for the section 126 findings. In today's action, EPA is finalizing the CAIR FIPs. Therefore, EPA is denying the section 126 petition for EGUs in States linked to North Carolina for $PM_{2.5}$.

For EGUs located in Illinois and Michigan, which are not linked to North Carolina in the final CAIR with respect to the $PM_{2.5}$ NAAQS (70 FR 25247–25248), EPA is also denying the petition.

IV. What Is the Federal Implementation Plan for the CAIR?

A. What Is the Legal Framework for the FIPs?

Section 110(c)(1) of the CAA requires the Administrator to promulgate a FIP within 2 years of: (1) Finding that a State has failed to make a required submittal, (2) finding that a submittal received does not satisfy the minimum completeness criteria established under section 110(k)(1)(A), or (3) disapproving a SIP submittal in whole or in part. The EPA may issue a FIP any time after making one of these findings or the Agency may issue a SIP disapproval. However, EPA is relieved of the obligation to promulgate the FIP if a SIP revision correcting the deficiency identified is approved by EPA before such a FIP is promulgated.

As discussed in paragraph I.D.5, in a final rule signed the same day as CAIR, EPA found that States have failed to submit SIPs to satisfy the interstate transport requirement under section 110(a)(2)(D)(i) of the CAA for the $PM_{2.5}$ and 8-hour ozone NAAQS (70 FR 21147). These findings started the 2-year clock for the promulgation of a FIP. They did not start a ''sanctions clock'' as there are no mandatory sanctions associated with the FIP or the finding of State failure to submit SIPs to satisfy 110(a)(2)(D)(i).

The EPA's authority to act when it has identified deficiencies in SIPs is derived from multiple sources. First, EPA may promulgate any measure which it is permitted to issue pursuant to pre-existing independent statutory authority—for example, the provisions of title II. That is, EPA may promulgate any measure which it has authority to issue in a non-FIP context, without reliance on section 110(c). Second, EPA may invoke section 110(c)'s general FIP authority and act in accordance with this provision, and the CAA more broadly, to cure a SIP deficiency. Third, under section 110(c), the courts have held that EPA may exercise all authority that the State may exercise under the CAA.

The first type of authority, EPA's general authority, is independent of section 110(c). It is not dependent on or altered by finding a deficiency in a SIP.

The second type of authority, EPA's general authority under section 110(c), is essentially remedial. The EPA has broad power under that section to cure a defective State plan. Thus, in promulgating a FIP, EPA may exercise its own, independent regulatory authority in accordance with section 110(c), and the CAA more broadly. When EPA has promulgated a FIP, courts have not required explicit authority for specific measures: ''We are inclined to construe Congress' broad grant of power to the EPA as including all enforcement devices reasonably necessary to the achievement and maintenance of the goals established by the legislation.'' (*South Terminal Corp.* v. *EPA,* 504 F.2d 646, 669. (1st Cir., 1974)).

Third, the same authority that is exercised by the States under the CAA in connection with the adoption, implementation, and enforcement of a SIP may be assumed to be available to the EPA when the agency issues a FIP, after determining that a State has not adopted a satisfactory SIP. As the Ninth Circuit has held, when EPA acts in place of the State pursuant to a FIP under section 110(c), EPA ''stands in the shoes of the defaulting State, and all of the rights and duties that would otherwise fall to the State accrue instead to EPA,'' (*Central Arizona Water Conservation District* v. *EPA,* 990 F.2d 1531, at 1541 9th Cir., 1993). The First Circuit, in an early FIP case, agreed:

> * * * the Administrator must promulgate promptly regulations setting forth an implementation plan for a State should the State itself fail to propose a satisfactory one. The statutory scheme would be unworkable were it read as giving to EPA when promulgating an implementation plan for a State, less than those necessary measures allowed by Congress to a State to accomplish Federal clean air goals. We do not adopt any such crippling interpretation.
>
> *South Terminal Corporation* v. *EPA,* 504 F.2d 668 (1st Cir., 1974).

In the case of Federally-recognized Indian Tribes, as we explained in the CAIR, (70 FR 25167–25168) Tribes are subject to section 110(a)(2)(D), but are not required to submit implementation plans. The EPA is required to promulgate FIPs for Indian country as necessary or appropriate to protect air quality. See 40 CFR 49.11(a). Presently, there are no emissions sources in Indian country within the region affected by CAIR which would make a FIP necessary or appropriate. In the event of the planned construction of such a source within Indian country in the 28-State region subject to CAIR, EPA will work with the relevant Tribal government to regulate the source through a Tribal or Federal implementation plan. In the case of an EGU, the EPA anticipates that the Tribal implementation plan (TIP) or FIP would involve the participation of the EGU in the EPA administered cap-and-trade program. The EPA will also work with the Tribe and affected States to determine how allowances allocated to the Indian country source will affect State allowance allocations. Because any FIPs for Indian country will necessarily be tailored to the specific circumstances, today's action contains no such FIP. The reader is referred to the CAIR for a more detailed discussion of the potential impact of the CAIR in Indian country (70 FR 25167–25168, 25315).

B. What Is the Timing and Scope of the CAIR FIP Actions?

As described in the CAIR, EPA views seriously its responsibility to address the issue of regional transport. Decreases in NO_X and SO_2 emissions are needed in the States identified in the CAIR to enable downwind States to develop and implement plans to achieve and maintain the $PM_{2.5}$ and 8-hour ozone NAAQS. The CAIR identified the amount of emissions reductions necessary for each State identified in the CAIR to meet their section 110(a)(2)(D) interstate transport obligations. Implementation of these reductions is necessary to help downwind States to achieve the NAAQS in order to provide clean air for their residents.

Therefore, EPA is promulgating FIPs today in conjunction with the action responding to North Carolina's section 126 petition concerning transport of

$PM_{2.5}$ and 8-hour ozone. The EPA is promulgating these FIPs at the same time as its response to North Carolina's section 126 petition, which is required to be finalized no later than March 15, 2006 in accordance with a judicially-enforceable consent decree. The EPA believes it is appropriate to coordinate these two actions because they both address interstate transport, both apply to EGUs, and because the States of concern in the section 126 petition are a geographical subset of the States covered by CAIR. Promulgating the CAIR FIPs at this time provides a backstop of Federal controls for all States covered by CAIR for $PM_{2.5}$ and/or 8-hour ozone, not just those States that significantly contribute to North Carolina for $PM_{2.5}$. This provides a level playing field, giving assurance to all the affected downwind States that the upwind emissions reductions required under CAIR will be achieved on time. Further, EPA believes that the CAIR reductions are best implemented as a unified program. The EPA believes that States will submit SIP revisions implementing the CAIR reductions in their States in a unified manner, and that this reduces workload for the States and provides sources with more certainty. Finally, promulgating the 8-hour ozone FIP as well as the $PM_{2.5}$ FIP as early as possible gives States more flexibility to take advantage of the abbreviated SIP option discussed below and in section VI.C. This could further reduce workload for States to meet the requirements of CAIR. In today's action, EPA is not promulgating FIPs for any States not covered by CAIR.

The Agency is taking this action to provide a Federal backstop for CAIR where all States may not be able to develop and submit timely, approvable SIP revisions. In no way should the FIP for CAIR be viewed as a sign of any concern about States ultimately making the emission reductions required under CAIR. There are no sanctions associated with today's rule, and EPA does not intend CAIR FIPs to have any negative consequences for the affected States. To the contrary, EPA is finalizing FIP approaches that are flexible and allow States a full opportunity to get their SIP revisions in place, with minimal disruption in transitioning from Federal to State implementation.

Moving quickly to promulgate a FIP is consistent with Congress' intent that attaining the standard occurs in these downwind nonattainment areas ''as expeditiously as practicable'' (sections 181(a) and 172(a)(2)(B)). The FIP will help ensure that all emissions reductions required by CAIR, and the associated environmental benefits, will be achieved by the CAIR deadlines. In addition, the FIP will ensure that sources in all States covered by CAIR, regardless of whether they were included in the North Carolina section 126 petition, will be required to achieve emissions reductions at the same time.

By finalizing the FIP well before the deadline for States to submit their CAIR SIPs, EPA is providing States an additional option for complying with the requirements of CAIR. States planning to adopt the model trading programs contained in the CAIR rule, can accept the FIP and significantly reduce the State resources needed to establish a program to implement the CAIR. Since there are no punitive consequences for States associated with the FIP or the finding of failure to submit SIPs to satisfy section 110(a)(2)(D)(i), some States could avoid much of the time and expense of revising their SIPs to comply with CAIR. Some States, particularly those subject to the NO_X SIP Call, may need to prepare minor SIP revisions regardless of whether they accept the FIP implementing the requirements of CAIR; yet the time and expense involved would be significantly reduced.

The EPA is finalizing, with certain changes described in section VI.C, the approach that a State can choose to modify the application of the CAIR FIP through abbreviated SIP revisions. The abbreviated SIP revisions approach covers specific elements of the FIP trading programs without submitting full SIP revisions to meet the requirements of CAIR. By accepting such abbreviated SIP revisions, EPA is providing additional options for States to comply with CAIR. A State can choose to retain control of these specific elements of the trading programs, without submitting a full SIP revision to meet the requirements of CAIR. As there are no sanctions associated with the FIP, EPA anticipates that some States will prefer to avoid spending the time and money necessary to submit a full SIP revision.

The Agency will accept abbreviated SIP revisions for any or all of the following four specific elements of the FIP trading programs: (1) Provisions for otherwise unaffected units to opt-in to the FIP trading programs, (2) allocating annual and/or ozone season NO_X, (3) allocating allowances from the annual NO_X Compliance Supplement Pool (CSP), and (4) including NO_X SIP Call trading sources that are not EGUs under CAIR in the Federal CAIR ozone season NO_X cap-and-trade program. Upon approval of any such SIP revisions, EPA anticipates that the corresponding portions of the FIP for that State would be replaced or their application to sources would be modified.

In offering a framework for abbreviated SIP revisions, the Agency anticipates that many States will wish to retain control over the allocation of allowances. Additionally, the Agency recognizes that States may wish to meet their NO_X SIP Call obligations by allowing NO_X budget units (that is, units in the NO_X SIP Call trading program) that are not EGUs under CAIR to participate in the CAIR ozone season trading program.

In its proposal, the EPA invited comment on the option for States to submit abbreviated SIPs covering specific elements of the Federal trading programs. A more complete discussion of the proposed abbreviated SIP provisions and the comments received is found in section VI of today's preamble.

Thus, the FIP will increase the options available for a State to comply with CAIR. Through the CAIR rulemaking actions, EPA has provided States with a great deal of data and analyses concerning air quality and control costs, as well as a determination whether upwind sources contribute significantly to downwind nonattainment under section 110(a)(2)(D). The EPA recognizes that States would face great difficulties in developing transport SIPs to meet the requirements of section 110(a)(2)(D) without these data and policies. Indeed, EPA acknowledged in the CAIR that the Agency's extensive analyses and data, including the multi-year operation of a federally-funded monitoring system (and the considerable information generated through that system) was a necessary element in the Agency's conclusion that it was appropriate to impose such requirements on States (70 FR 25267).

States have 18 months from the signature date of the CAIR, or until September 11, 2006, to develop, adopt, and submit revisions to their SIPs that meet the requirements of CAIR. The EPA will withdraw the FIP once EPA approves a SIP that meets the CAIR requirements in that State.

Having the FIP in place early provides for a transition to a CAIR trading program with the greatest continuity, administrative ease, and cost savings for States that would otherwise develop a program identical to the model trading programs. The EPA's goal is to have approvable programs in place that meet the requirements of the CAIR whether they are in the form of a SIP or a FIP. By finalizing a FIP today, EPA in no way precludes a State from developing its own SIP to either adopt the trading rules with any discretionary elements allowed by the CAIR or from meeting the State emissions budget through different measures of the State's choosing. The EPA has considered the timing of each element of the FIP process to make sure to preserve each State's freedom to develop and implement SIPs. In this way, EPA has enhanced each State's options for complying with the requirements of the CAIR while ensuring that all the emissions reductions and environmental benefits of the CAIR are realized.

C. What Are the FIP Control Measures?

In contrast to the SIP process—where selection and implementation of control measures is the primary responsibility of the State—in the case of a FIP, it is EPA's responsibility to select the control measures for sources and assure compliance with those measures. Thus, while the FIP is designed by EPA to achieve the same total emissions reductions described in the CAIR, the specific control measures assigned in the FIP may be different from what a State might choose.

In selecting the control measures for the FIP, EPA is adopting the same measures used in the CAIR for calculating the required emissions reductions. In the CAIR, EPA is requiring States to achieve specified levels of emissions reductions based on levels that are achievable through implementation of highly cost-effective controls on EGUs. See the discussion in section IV of the CAIR, ''What Amounts of SO_2 and NO_X Emissions Did EPA Determine Should Be Reduced?'' The EPA is including by reference the technical basis and supporting rationale for EPA's conclusions as to the highly cost-effective strategy developed for the CAIR.

The SO_2 and NO_X cap-and-trade programs for the FIP are discussed below in section VI. The unit NO_X allocations will be provided in a later action and will meet the State EGU budgets that are established in the CAIR for States that choose to meet the required emissions reductions by controlling EGUs only.

D. When and How Will EPA Remove the FIP Requirements if EPA Approves a SIP To Meet the CAIR?

As discussed previously, EPA is finalizing the FIP today concurrently with EPA's response to the section 126 petition from North Carolina. The EPA intends to withdraw the FIP in a State in coordination with EPA's approval of a SIP for that State that meets the CAIR requirements. It is EPA's preference that States regulate sources to control the interstate transport; therefore, EPA will work with States to help ensure that the FIP would not need to be implemented.

The EPA intends to withdraw the FIP requirements as soon as practical after receiving approvable CAIR SIP revisions. The EPA will work with States to ensure a timely withdrawal of the FIP and recording of State NO_X allocations in source accounts (for States choosing to allocate NO_X allowances). A more detailed discussion of the timing for recording allocations is found in section VI.F.1 of this preamble.

V. Emission Reduction Requirements for the CAIR FIP

A. Introduction

In the CAIR (70 FR 25162), EPA determined that SO_2 and NO_X emissions from sources in the District of Columbia and the following 23 States contribute significantly to downwind $PM_{2.5}$ nonattainment: Alabama, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, and Wisconsin.

In a separate rulemaking signed the same day as this action, EPA finds that SO_2 and NO_X emissions from sources in Delaware and New Jersey also contribute significantly to downwind $PM_{2.5}$ nonattainment.

In the CAIR, the Agency also determined that the District of Columbia and the following 25 States contribute significantly to downwind 8-hour ozone nonattainment: Alabama, Arkansas, Connecticut, Delaware, Florida, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Mississippi, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia, and Wisconsin.

The EPA established CAIR annual SO_2 and NO_X emission reduction requirements for States that contribute significantly to downwind $PM_{2.5}$ nonattainment and established NO_X ozone season emission-reduction requirements for States that contribute significantly to downwind 8-hour ozone nonattainment. The CAIR requires upwind States to revise their SIPs to include control measures to reduce emissions of SO_2 and/or NO_X to meet the requirements in CAIR (SO_2 is a precursor to $PM_{2.5}$ formation, and NO_X is a precursor to both ozone and $PM_{2.5}$ formation).

The CAIR requires that the emission reductions be implemented in two phases. The first phase of CAIR NO_X reductions starts in 2009 (covering 2009–2014) and the first phase of CAIR SO_2 reductions starts in 2010 (covering 2010–2014); the second phase of CAIR reductions for both NO_X and SO_2 starts in 2015, covering 2015 and thereafter.

In CAIR, EPA determined the extent of reductions required to eliminate significant contribution (*i.e.*, to remove the section 110(a)(2)(D) violation). EPA interprets significant contribution as a specific level of emissions that can be feasibly reduced in a highly cost-effective manner. The required reductions are expressed as statewide budgets of SO_2 and NO_X emissions. Regionwide emissions trading programs for large EGUs (within the constraints of the emissions caps based on these statewide emission budgets [12]) provide one option for eliminating significant contribution and thus also eliminating the section 110(a)(2)(D) violation. The violation is eliminated once a State adopts a SIP containing the CAIR trading programs (or a SIP containing other emission reduction options meeting the requirements specified in CAIR), or EPA promulgates a FIP to achieve those same reductions. The CAIR includes model rules for regionwide EGU SO_2 annual, NO_X annual, and NO_X ozone season emission cap-and-trade programs. States can choose to adopt these model rules (the CAIR SIP model trading rules) to obtain the required reductions in a flexible and cost-effective manner.

Today, EPA is finalizing FIPs that implement the emission reduction requirements of the CAIR in all States covered by CAIR. The Agency is promulgating today's FIPs to provide a federal backstop for CAIR.

EPA decided to adopt, as the FIP for each State in the CAIR region, the SIP model trading programs in the final CAIR, modified slightly to allow for federal instead of State implementation.[13] The specific requirements of the FIP trading programs are explained in greater detail in section VI below.

The CAIR FIPs will require SO_2 annual and NO_X annual emission

[12] It should be noted that the SO_2 trading program provides that sources may bank pre-2010 title IV SO_2 allowances to be used for compliance with CAIR. These provisions encourage sources to make early emission reductions and ease the transition to the CAIR SO_2 program, and as a result, emissions may not reflect the emission caps in any given year.

[13] Today's action includes revisions to the CAIR SIP model rules as described in section VII in this preamble. For the FIP trading programs the Agency adopts the SIP model rules as finalized today and modified for federal implementation.

reductions from EGUs in States contributing significantly to $PM_{2.5}$ nonattainment and NO_X ozone season emission reductions from EGUs in States contributing significantly to ozone nonattainment through participation in the regionwide cap-and-trade programs. The requirements of these trading programs were developed in the SIP model trading rules. The SIP model trading rules provide flexibility to the implementing organization only in certain specific areas. In adopting these model trading programs as FIPs, the Agency adopts the requirements of the model trading rules. As the implementing organization, therefore, it has only the same flexibility that is available to States that choose to implement the model trading programs.

The CAIR FIP trading programs will achieve the emission reductions required by CAIR by the deadlines established in that rule, with the same highly cost-effective EGU control measures forming the basis for the emission budgets. The regionwide emission reduction requirements, State emission budgets and trading rules that are the basis for today's FIPs were established in the final CAIR rule. They were developed through a process that involved significant public participation. In the CAIR rulemaking, EPA determined that the CAIR emission reduction requirements can be met in a highly cost-effective manner using regionwide SO_2 and NO_X cap-and-trade programs for large EGUs (70 FR 25195–25229). The incentives provided by such regionwide cap-and-trade programs encourage economically efficient compliance over the entire region.

The applicability provisions of the FIPs promulgated in today's final rule, which cover large EGUs, are identical to the applicability provisions in the CAIR SIP model rules including the revisions finalized today. *See* sections VI.E and VII in today's preamble for detailed discussion of applicability. The FIPs and the CAIR SIP model rules apply to large EGUs because EPA determined that their emissions can be reduced through the application of highly cost-effective controls (70 FR 25195–25229).

During development of the CAIR, the Agency considered the interactions between the existing title IV Acid Rain Program and the new CAIR (*see* the preamble to the final CAIR for discussion, 70 FR 25290). As explained in CAIR, ''In the absence of an approach for taking account of the title IV program, a new program (*i.e.,* the CAIR) that imposes a significantly tighter cap on SO_2 emissions for a region encompassing most of the sources and most of the SO_2 emissions covered by title IV would likely result in a significant excess in the supply of title IV allowances, a collapse of the price of title IV allowances, disruption of operation of the title IV allowance market and the title IV SO_2 cap-and-trade system, and the potential for increased SO_2 emissions.'' These impacts would undermine the efficacy of the title IV program and could erode confidence in emissions trading programs in general. For these same reasons, today's FIP SO_2 trading program is integrated with the title IV program (*see* discussion of FIP SO_2 trading program in section VI, below). EPA was petitioned for and granted reconsideration of CAIR on claims that inequities result from applying the SO_2 allocation methodology (which is based on title IV allocations). In the notice of final action on reconsideration, signed the same day as this action, EPA decided not to alter the approach taken in the final CAIR (*see* further discussion of reconsideration in section VI.G, below).

Today's FIPs implement the CAIR emission reduction requirements by adopting the CAIR SIP model trading rules; the FIPs do not develop new emission reduction requirements or trading programs. For these reasons, the Agency did not re-open in the FIP rulemaking any elements of the reduction requirements and trading programs (except for the elements such as NO_X allocations and opt-ins where States had flexibility) that were determined in the CAIR NFR and that were not modified by today's rule. By adopting as FIPs the CAIR SIP model trading programs, the Agency intends to implement the requirements of CAIR in a highly cost-effective manner and to ease the transition for sources that might initially be covered by the FIP programs and subsequently be covered by SIP programs that also adopt the model trading rules.

The Agency is promulgating these FIPs to provide a Federal backstop for CAIR. In no way should the FIPs be viewed as a sign of any concern about States ultimately making the emission reductions required under CAIR. There are no sanctions associated with today's rule, and EPA does not intend CAIR FIPs to have any negative consequences for the affected States. To the contrary, EPA is finalizing FIP approaches that are flexible and allow States a full opportunity to get their SIP revisions in place, with minimal disruption in transitioning from Federal to State implementation.

B. Regionwide SO_2 and NO_X Caps

Today's final rule provides a federal backstop for achieving the CAIR emission reduction requirements. Today's rule does not establish those reduction requirements, which were established in the CAIR rulemaking.

In the preamble to the CAIR NFR, the Agency explained how it determined regionwide SO_2 and NO_X emissions caps. See section IV in the CAIR NFR preamble (70 FR 25195–25229). The EPA also summarized the process for determining the regionwide CAIR SO_2 and NO_X emissions caps in the preamble to the proposed CAIR FIP (70 FR 49722). The CAIR FIP proposal did not reopen for public comment EPA's determination of the CAIR regionwide caps or the caps themselves. The EPA received a few comments on the CAIR regionwide caps during the public comment process on the proposed FIP. Those comments are not within the scope of today's final rule. As discussed above, in today's FIP rule the Agency is implementing the emission reduction requirements (including regionwide SO_2 and NO_X caps) that EPA developed in the CAIR rulemaking through a process that included extensive public participation.

The CAIR regionwide caps (including the States of Delaware and New Jersey) are: for SO_2, 3.7 million tons and 2.6 million tons in 2010 and 2015, respectively; for NO_X annual, 1.5 million tons and 1.3 million tons in 2009 and 2015, respectively; for NO_X ozone season, 0.6 million and 0.5 million tons in 2009 and 2015, respectively.

C. State SO_2 Emission Budgets

In the preamble to the final CAIR, the EPA explained how it determined CAIR State annual SO_2 emission budgets (*see* section V.A.1.a of the CAIR NFR preamble, 70 FR 25229–25230; *see also* the rulemaking, signed the same day as this action, to include Delaware and New Jersey in CAIR for $PM_{2.5}$). The EPA also summarized the process for determining CAIR State SO_2 budgets in the preamble to the proposed FIP (70 FR 49723). The CAIR FIP proposal did not reopen for public comment EPA's determination of the CAIR State SO_2 budgets or the budgets themselves. As discussed above, in today's FIP rule, the Agency is implementing the emission reduction requirements (including State SO_2 emission budgets) that EPA developed in the CAIR rulemaking through a process that included extensive public participation.

Today's final FIP rule will achieve the required SO_2 emission reductions through a regionwide SO_2 cap-and-trade program for EGUs. As discussed further in section VI, below, the CAIR FIP SO_2 cap-and-trade program will rely on title IV allowances, which sources will retire at specified ratios generally greater than 1-to-1 for compliance with the CAIR FIP SO_2 program. Congress has already allocated title IV SO_2 allowances to sources in perpetuity. State SO_2 emissions budgets would not affect the distribution of SO_2 allowances for the CAIR FIP SO_2 trading program (because SO_2 allowances are already allocated to sources) and are not directly relevant for today's final FIP rule.

After EPA finalized CAIR, the Agency was petitioned for and granted reconsideration on claims that inequities result from applying the CAIR SIP model rule SO_2 allocation methodology (which is based on existing title IV allocations). The Agency announced its decision to reconsider this issue in a **Federal Register** action dated December 2, 2005 (70 FR 72268) and is taking final action on the reconsideration in a separate action signed the same day as this action. EPA decided not to alter the approach taken in the final CAIR (*see* further discussion of reconsideration in section VI.G, below).

A few commenters on the proposed CAIR FIP expressed concern with the use of title IV to establish State SO_2 emission budgets. The FIP State SO_2 budgets and the FIP unit SO_2 allocations are both based on existing title IV allocations. The EPA responds to comments on the budgets and allocations for the FIP together in section VI.G, below.

The Agency is finalizing its proposed approach regarding SO_2 budgets for the CAIR FIP SO_2 trading programs.

D. State NO_X Annual and NO_X Ozone Season Emission Budgets

In the preamble to the final CAIR, the EPA explained how it determined CAIR State NO_X annual and NO_X ozone season emission budgets (*see* section V.A.1.a of the CAIR NFR preamble, 70 FR 25230–25233; *see also* the rulemaking, signed the same day as this action, to include Delaware and New Jersey in CAIR for $PM_{2.5}$).

The EPA also summarized the process for determining CAIR State NO_X annual and NO_X ozone season budgets in the preamble to the proposed FIP (70 FR 49723). The CAIR FIP proposal did not reopen for public comment EPA's determination of the CAIR State NO_X annual and NO_X ozone season budgets or the budgets themselves. As discussed above, in today's FIP rule the Agency is implementing the emission reduction requirements (including State NO_X annual and NO_X ozone season emission budgets) that EPA developed in the CAIR rulemaking through a process that included extensive public participation.

After EPA finalized CAIR, the Agency was petitioned for and granted reconsideration on the use of fuel adjustment factors in determining CAIR State NO_X annual and NO_X ozone season emission budgets. The EPA announced its decision to reconsider this issue in a **Federal Register** notice dated December 2, 2005 (70 FR 72268) and is taking final action on the reconsideration in a separate action signed the same day as this action. EPA decided not to alter the approach taken in the final CAIR.

A commenter on the proposed CAIR FIP raised concerns regarding the use of fuel adjustment factors in determining State NO_X emission budgets. Concerns raised by the commenter with respect to EPA's use of fuel adjustment factors in determining State emission budgets are the same issues that the Agency is addressing in the context of the CAIR reconsideration process. The Agency's responses to this commenter on the use of fuel adjustment factors in setting FIP State NO_X emission budgets are addressed in the CAIR reconsideration notice. See the December 2, 2005 **Federal Register** notice announcing the reconsideration (70 FR 72268) as well the notice of final action on reconsideration signed the same day as this action.

Some commenters addressed the use of fuel adjustment factors in the proposed FIP methodology for unit-by-unit NO_X allocations. The Agency's responses regarding the use of fuel adjustment factors in the NO_X allocation methodology are discussed in section VI.F in this preamble.

The State annual and ozone season EGU NO_X budgets for today's final CAIR FIP trading programs are the same as the budgets in the final CAIR. For each State affected by the FIP NO_X trading programs, the State NO_X budgets are the total amount of allowances [14] that the Agency will allocate to sources in the State or that States will allocate using an abbreviated SIP revision. *See* section VI.F, below, for EPA's methodology and schedule for allocating NO_X allowances to affected sources.

Table V–1 shows the State NO_X emission budgets for the final FIP NO_X cap-and-trade program. These are the same State NO_X budgets as in the final CAIR (*see* Table V–2 in the CAIR NFR preamble (70 FR 25231); *see also* the rulemaking, signed the same day as this action, to include Delaware and New Jersey in CAIR for $PM_{2.5}$).

[14] As in CAIR, a NO_X annual allowance will authorize the emission of a ton of NO_X during a calendar year, and a NO_X ozone season allowance will authorize the emission of a ton of NO_X during an ozone season.

TABLE V–1.—CAIR FIP NO_X ANNUAL ELECTRIC GENERATING UNITS BUDGETS

[tons]

State	State NO_X annual budget 2009–2014	State NO_X annual budget 2015 and thereafter
Alabama	69,020	57,517
Delaware	4,166	3,472
District of Columbia	144	120
Florida	99,445	82,871
Georgia	66,321	55,268
Illinois	76,230	63,525
Indiana	108,935	90,779
Iowa	32,692	27,243
Kentucky	83,205	69,337
Louisiana	35,512	29,593
Maryland	27,724	23,104
Michigan	65,304	54,420
Minnesota	31,443	26,203
Mississippi	17,807	14,839
Missouri	59,871	49,892
New Jersey	12,670	10,558
New York	45,617	38,014
North Carolina	62,183	51,819
Ohio	108,667	90,556
Pennsylvania	99,049	82,541
South Carolina	32,662	27,219
Tennessee	50,973	42,478
Texas	181,014	150,845
Virginia	36,074	30,062
West Virginia	74,220	61,850
Wisconsin	40,759	33,966
CAIR Region Total	1,521,707	1,268,091

Table V–2 shows the State NO_X ozone season emission budgets for the final CAIR FIP NO_X ozone season cap-and-trade program. These are the same State NO_X ozone season budgets as in the final CAIR (*see* Table V–4 in the CAIR NFR preamble (70 FR 25233).

TABLE V–2.—CAIR FIP NO_X OZONE SEASON ELECTRICITY GENERATING UNIT BUDGETS

[tons]

State *	State NO_X ozone season budget 2009–2014	State NO_X ozone season budget 2015 and thereafter
Alabama	32,182	26,818
Arkansas	11,515	9,596
Connecticut	2,559	2,559
Delaware	2,226	1,855
District of Columbia	112	94
Florida	47,912	39,926

TABLE V–2.—CAIR FIP NO_X OZONE SEASON ELECTRICITY GENERATING UNIT BUDGETS—Continued

[tons]

State *	State NO_X ozone season budget 2009–2014	State NO_X ozone season budget 2015 and thereafter
Illinois	30,701	28,981
Indiana	45,952	39,273
Iowa	14,263	11,886
Kentucky	36,045	30,587
Louisiana	17,085	14,238
Maryland	12,834	10,695
Massachusetts	7,551	6,293
Michigan	28,971	24,142
Mississippi	8,714	7,262
Missouri	26,678	22,231
New Jersey	6,654	5,545
New York	20,632	17,193
North Carolina	28,392	23,660
Ohio	45,664	39,945
Pennsylvania	42,171	35,143
South Carolina	15,249	12,707
Tennessee	22,842	19,035
Virginia	15,994	13,328
West Virginia	26,859	26,525
Wisconsin	17,987	14,989
CAIR Region Total	567,744	484,506

* For States that have lower EGU budgets under the NO_X SIP Call than their 2009 CAIR budget, table V–2 includes their SIP Call budget. For Connecticut, the NO_X SIP Call budget is also used for 2015 and beyond.

E. State NO_X Annual Compliance Supplement Pool

The CAIR established State Compliance Supplement Pools (CSP) of NO_X annual allowances of vintage 2009. In the FIP NPR, the Agency proposed to include in the CAIR FIP NO_X trading program the same State CSP amounts as were established in CAIR.

The Agency received several comments on its proposal to include the CAIR CSPs in the CAIR FIP NO_X trading program. The EPA responds to comments on inclusion of the CAIR CSPs in the FIP program, as well as comments on EPA's proposed method for distributing CSP allowances to sources, in section VI.I in today's preamble, below.

The Agency is finalizing its proposal to include the CAIR CSPs in the FIP trading programs. Table V–3 shows the State CSP amounts for the final CAIR FIP NO_X trading program. These are the same CSP amounts as shown in the CAIR NFR preamble (*see* Table V–3 in the CAIR NFR at 70 FR 25232; *see also* the rulemaking, signed the same day as this action, to include Delaware and New Jersey in CAIR for $PM_{2.5}$).

The CSPs provide, for each affected State, a pool of CAIR NO_X annual allowances from which EPA, or a State using an abbreviated SIP revision, can distribute allowances for use in complying with the CAIR FIP NO_X annual trading program (*see* section VI.I in today's preamble for further discussion regarding distribution of CSP allowances).

TABLE V–3.—CAIR FIP NO_X ANNUAL COMPLIANCE SUPPLEMENT POOL

[tons]

State	Compliance supplement pool
Alabama	10,166
Delaware	843
District Of Columbia	0
Florida	8,335
Georgia	12,397
Illinois	11,299
Indiana	20,155
Iowa	6,978
Kentucky	14,935
Louisiana	2,251
Maryland	4,670
Michigan	8,347
Minnesota	6,528
Mississippi	3,066
Missouri	9,044
New Jersey	660
New York	0
North Carolina	0
Ohio	25,037
Pennsylvania	16,009
South Carolina	2,600
Tennessee	8,944
Texas	772
Virginia	5,134
West Virginia	16,929
Wisconsin	4,898
Total	199,997

VI. CAIR FIP NO_X and SO_2 Cap-and-Trade Programs for EGUs

A. Purpose of CAIR FIP NO_X and SO_2 Cap-and-Trade Programs and Relationship to the CAIR

In today's action, EPA is finalizing CAIR FIP NO_X and SO_2 cap-and-trade programs for EGUs as the Implementation Plan remedy for CAIR. The Agency is finalizing 3 separate CAIR FIP cap-and-trade programs: (1) SO_2 annual; (2) NO_X annual; and (3) NO_X ozone season. The EPA decided to adopt, as the FIP for each State in the CAIR region, the model cap-and-trade programs in the final CAIR, modified slightly to allow for Federal instead of State implementation. [15] Emissions cap-and-trade programs are a proven method for achieving highly cost-effective emissions reductions while providing regulated sources of emissions with flexibility in adopting compliance strategies. The incentives provided by regionwide cap-and-trade programs encourage economically efficient compliance over the entire region. The specific elements of the 3 trading programs in the FIP were developed by EPA, with significant public participation, during the CAIR development process.

Participation in the new CAIR FIP NO_X and SO_2 cap-and-trade programs is mandatory for all sources covered by the final CAIR FIP. *See* section VI.E in today's preamble for discussion of affected sources (applicability). Regulatory text for today's new CAIR FIP NO_X and SO_2 cap-and-trade programs will be located in part 97 in title 40 of the CFR.

The CAIR established State EGU emissions budgets that each State will use to determine its required emissions reductions. Today's final CAIR FIP cap-and-trade programs set specific rules for EGUs to decrease NO_X and SO_2 emissions sufficiently to achieve emission reductions that are required under CAIR. As explained above in section IV, EPA will withdraw a State's FIP in coordination with approval of a SIP implementing the requirements of CAIR.

States may choose to meet their emission reduction obligations under CAIR by adopting, as part of their SIPs, the model cap-and-trade rules set forth in the CAIR and participating in the EPA administered trading programs. Any such participation will be fully integrated with the CAIR FIP NO_X and SO_2 cap-and-trade programs that are finalized in today's action.

In order to be eligible to participate in an emissions cap-and-trade program, the Agency believes that there are two principal criteria that sources must meet, as stated in the supplemental proposal for the NO_X SIP Call (62 FR 25923). The first criterion requires that sources be able to account accurately and consistently for all of their emissions to ensure the trading program goal of maintaining emissions within a cap. Emissions monitoring must be accurate and consistent among all sources so that each allowance turned in, represents its assigned amount of emissions. The second criterion for participation in a trading program is the ability to identify a responsible party for each regulated source who would be accountable for demonstrating and ensuring compliance with the program's provisions. The EPA believes that today's rule meets those criteria. The Agency also believes that, because

[15] Today's action includes revisions to the CAIR SIP model rules as described in section VII in this preamble. For the FIP trading programs the Agency adopts the SIP model rules as finalized today and modified for federal implementation.

today's rule contains the same mandatory program elements as are in the part 96 CAIR SIP model trading programs and is designed to meet the same environmental goals and caps sources at the same levels as those model trading programs, it is appropriate to integrate today's CAIR FIP with the CAIR SIP trading programs.

Sources subject to trading programs under the FIP and sources in States choosing to participate in the EPA-administered CAIR SIP trading programs will be able to trade allowances with one another under common emissions caps across participating States. Integration of the trading programs reduces the possibility of inconsistent or conflicting deadlines or requirements, increases the potential cost savings for sources, and streamlines program administration. Unnecessary inconsistency in trading programs could hamper sources' ability to plan and achieve the needed reductions as cost effectively as possible. In addition, if a State submits and EPA approves a SIP revision including the CAIR SIP model trading programs after EPA establishes trading programs under today's FIP, disruptions to sources that shift from regulation under a FIP to regulation under a SIP will be minimized due to the consistency between the respective CAIR SIP and FIP programs.

The EPA establishes (in part 97) the geographic boundaries of the common trading programs as those States that submit SIP revisions in response to the CAIR implementing the EPA-administered trading programs or that are subject to FIPs. The EPA will administer these common trading programs in collaboration with affected States.

For the final CAIR FIP NO_X and SO_2 cap-and-trade programs, EPA adopted the CAIR model trading programs with slight revisions to allow for Federal implementation. The FIP trading programs are thus virtually identical to the CAIR SIP model trading programs. The CAIR FIP cap-and-trade programs include all of the mandatory elements that States are required to include in their SIPs in order to participate in the EPA-administered cap-and-trade programs for CAIR.

The Agency is finalizing, with certain changes described in section VI.C, the proposal to provide States that are subject to today's CAIR FIP requirements with the option to submit abbreviated SIP revisions covering specific elements of the FIP trading programs without submitting full SIP revisions to meet the requirements of CAIR. *See* section VI.C in this preamble for further discussion of abbreviated SIP revisions.

B. Relationship of Emissions Trading Programs to Section 126 Relief

In section II of today's preamble, EPA responds to commenters who argued that, because a CAIR SIP could or the CAIR FIP would reflect a trading component, such an implementation plan would not satisfy section 126 as a matter of law. As explained in section II, these arguments assume that the Agency must grant the petition, which is not EPA's view so long as the underlying SIP deficiencies are rectified.

Although EPA is denying the section 126 petition as discussed elsewhere in today's preamble, based on modeling projections the Agency believes that sources in States upwind of North Carolina will reduce emissions under the CAIR trading regime.

As discussed in the FIP NPR (70 FR 49737), EPA believes that upwind sources in States that were found to contribute significantly to North Carolina nonattainment will in fact reduce emissions of $PM_{2.5}$ precursors under the CAIR trading regime. The Agency explained that its Integrated Planning Model (IPM) [16] analysis conducted for the CAIR NFR—which assumes emissions trading—projects decreases in annual SO_2 and NO_X emissions under CAIR compared to the Base Case (*i.e.,* compared to projections without CAIR) in both 2010 and 2015 for each of the States found in the CAIR NFR analysis to contribute significantly to nonattainment of the $PM_{2.5}$ NAAQS in North Carolina.

The EPA further explained that the Agency's CAIR modeling—which, again, assumes interstate emissions trading—projects that under CAIR by 2010, with the projected emission reductions, there will be no remaining $PM_{2.5}$ nonattainment counties in North Carolina. Thus, the emission reductions under CAIR are projected to be sufficient to eliminate $PM_{2.5}$ nonattainment in North Carolina and, necessarily, no States will contribute to nonattainment.[17] This discussion of the Agency's analysis of CAIR is informational and is not intended to reopen or reconsider any issue related to that analysis.

As discussed in section II in today's preamble, some commenters argued that relief under section 126 must occur within 3 years and therefore that the CAIR emission reductions do not satisfy section 126 because although those reductions commence within 3 years they are phased in over a longer time. We respond to legal arguments in section II, above.

In any case, the EPA believes that many emission sources in States upwind of North Carolina will install NO_X and/or SO_2 emission control technology before 2009. As explained above, EPA modeling projects that North Carolina will come into attainment of the $PM_{2.5}$ standards by 2010 under CAIR, including trading programs. Much of the emission reductions that will bring North Carolina counties into attainment with the $PM_{2.5}$ standards will result from use of selective catalytic reduction (SCR) for NO_X control and flue gas desulphurization (FGD) for SO_2 control on units in upwind States. For the following reasons, EPA believes that many of these controls will be installed before 2009.

Early emission reductions occur for several reasons. Today's CAIR FIP trading rules and the CAIR SIP model trading rules include incentives for early emission reductions. For example, sources may bank title IV SO_2 allowances into the CAIR FIP or CAIR SIP SO_2 trading programs (*see* section VI.I, below, for further discussion of incentives for early reductions). Another reason why sources may reduce emissions early is the need to stagger control installations at plants where multiple units will be retrofitted to avoid operational disruptions.

As discussed elsewhere in today's preamble, the 10 States that EPA determined in CAIR contribute to North Carolina's nonattainment of the $PM_{2.5}$ standards are Alabama, Georgia, Indiana, Kentucky, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia. Table VI–1, below, summarizes for these 10 States the total coal-fired electric generating capacity expected to be on-line by the end of 2006 as well as the portion of that capacity expected to be controlled with SCR or FGD.[18] In addition, the table

[16] The IPM is a multiregional, dynamic, deterministic linear programming model of the U.S. electric power sector. The Agency uses IPM to examine costs and, more broadly, analyze the projected impact of environmental policies on the electric power sector in the 48 contiguous States and the District of Columbia.

[17] IPM emissions modeling conducted for the final CAIR is in the CAIR docket EPA–HQ–OAR–2003–0053; air quality modeling results are in the Air Quality Modeling Technical Support Document for the Final Clean Air Interstate Rule, March 2005, Appendix F; *see also* Table VI–10 to the preamble of the CAIR final rule at 70 FR 25251.

[18] Generating capacity through the end of 2006 (with capacity greater than 25 MWe) based on EPA's v.2.1.9 NEEDS database (2004). Capacity expected to be controlled with SCR or FGD by the end of 2006 based on research EPA conducted on planned control retrofits on coal-fired units.

summarizes for the 10 States the generating capacity that EPA expects to be controlled with SCR or FGD through the end of 2008 based on research that the Agency conducted for today's action.[19] The table also summarizes for the 10 States the generating capacity that EPA projects will be controlled with SCR or FGD by the end of 2010 based on IPM modeling projections.[20] As Table VI–1 indicates, many of the emission controls that EPA's modeling projects will be installed by the end of 2010 are actually likely to be installed before 2009.

TABLE VI–1.—SCR AND FGD SUMMARY FOR 10 STATES CONTRIBUTING TO NORTH CAROLINA'S NONATTAINMENT OF THE $PM_{2.5}$ STANDARDS

Total generating capacity by end of 2006	Expected capacity with emission controls by end of 2006	Expected capacity with emission controls by end of 2008	Projected capacity with emission controls by end of 2010 under CAIR
132 GW (466 units)	SCR: 67 GW (126 units) FGD: 48 GW (111 units)	SCR: 70 GW (130 units) FGD: 64 GW (137 units)	SCR: 82 GW (184 units) FGD: 73 GW (167 units)

EPA believes that even more controls may be installed before 2009 than were identified in the Agency's research. It is reasonable to suppose that, once CAIR SIP revisions are submitted and approved, additional plans for control retrofits will be adopted due to SIP revisions.

Some commenters supported the use of trading programs in connection with a section 126 remedy and some did not. A commenter, using South Carolina as an example, questioned why emissions can be above State budget amounts through allowance trading. This commenter points out that EPA's IPM modeling for CAIR projects emissions in South Carolina above the State's 2015 SO_2 emissions budget 5 years after 2015 and asserts that emissions over the State budget "will still contribute to attainment problems in North Carolina." However, as explained above, based on modeling for CAIR—which assumes interstate emissions trading—by 2010 there will be no remaining $PM_{2.5}$ nonattainment counties in North Carolina. In other words, the EGU emission reductions projected by IPM to occur under the CAIR trading regimes *are* the amounts that are projected to be sufficient to bring North Carolina into attainment in 2010, regardless of whether for some States emissions are projected to be above the State EGU emissions budgets.

C. Abbreviated SIP Revisions Covering Elements of the CAIR FIP Cap-and-Trade Programs

In the FIP NPR (70 FR 49720, 49727–49739), the Agency proposed to provide States that are covered by CAIR with the option to submit abbreviated SIP revisions covering specific elements of the CAIR FIP trading programs without submitting full SIP revisions to meet the requirements of CAIR. By proposing to accept such abbreviated SIP revisions, the Agency intended to increase the options available for States to comply with CAIR. A State could choose to retain control of these specific elements of the trading programs without submitting a full SIP revision.

As proposed, a State would submit an abbreviated SIP revision that would modify the application of certain elements of the FIP in order to better meet the needs of the State. The EPA proposed that a State could choose to modify the application of the FIP through abbreviated SIP revisions that would do any or all of the following:

• Make applicable, to the State, provisions in the FIP for otherwise unaffected units to opt into the FIP trading programs,

• Allow the State, rather than EPA, to allocate NO_X annual and/or NO_X ozone season allowances,

• Allow the State, rather than EPA, to allocate allowances from the NO_X annual Compliance Supplement Pool (CSP), and

• Include NO_X SIP Call trading sources that are not EGUs under CAIR in the CAIR FIP NO_X ozone season cap-and-trade program.

As there are no sanctions or penalties for leaving the CAIR FIP trading programs in place, EPA anticipates that some States may prefer to avoid spending the time and money necessary to submit a full SIP revision and may just modify the application of certain parts of the FIP.

The final CAIR (70 FR 25162) requires States to submit SIP revisions complying with the CAIR requirements to the Agency by September 11, 2006 and to submit the initial set of NO_X allocations by October 31, 2006.

In the CAIR FIP NPR, the Agency proposed that States choosing to submit abbreviated SIP revisions addressing the specific elements identified in the proposal would be required to submit such revisions to EPA by March 31, 2007, and—if choosing to address NO_X allocations in an abbreviated SIP revision—would be required to submit the initial set of NO_X allocations by September 30, 2007 (70 FR 49731).[21] The EPA proposed allowing States to submit abbreviated SIP revisions later than full revisions because the Agency anticipates that it will be able to complete the approval process more quickly for abbreviated revisions due to their narrower scope.

The Agency proposed to include appendices in part 97 that will be amended in the future to list any States for which the Administrator approves abbreviated SIP revisions covering opt-ins, allocation of NO_X allowances, distribution of CSP allowances, or inclusion of non-CAIR NO_X SIP Call trading sources in the CAIR FIP NO_X ozone season trading program.

The Agency received a number of comments on its proposal to allow submission of abbreviated SIP revisions for CAIR. Several commenters supported the abbreviated SIP revision approach. A commenter states that the approach provides States added flexibility, helps facilitate eventual transitions from a FIP-implemented to a State-implemented CAIR, and provides

[19] This includes expected capacity (greater than 25 MWe) with control retrofits through the end of 2008 based on EPA research of planned control retrofits on coal-fired units. Research included searching the Internet for company announcements regarding contracts for control retrofits. For 2007 and 2008 retrofits EPA focused its research on units with capacity greater than 100 MWe; if smaller units were included, we might have identified additional planned retrofits.

[20] These 2010 projections are from IPM modeling conducted for the final CAIR and include units with capacity greater than 25 MWe (IPM version 2.1.9, 2004).

[21] The proposed regulatory text at § 51.123 (70 FR 49746) would require States using the abbreviated SIP revision approach for NO_X allocations to notify EPA of such allocations by September 30, 2007 for 2009, 2010 and 2011. Through an inadvertent error, the preamble listed a different date—the preamble indicated that the proposed deadline for such allocations would be October 31, 2007 (70 FR 49731). The Agency intended the proposed date to be September 30, 2007 as indicated in the regulatory text.

sources with better certainty regarding key operational elements (such as NO_X allocations) over the initial years of the program. Commenters generally supported the choice of specific elements that EPA proposed to allow States to control using abbreviated SIP revisions.

Several commenters argued against the Agency's proposed submission deadline for abbreviated SIP revisions. Commenters who argued against the proposed submission deadline generally did so in relation to the timing for NO_X allocations. The EPA discusses the schedule for determining and recording NO_X allocations in detail in the NO_X allocations section in today's preamble (section VI.F, below) and responds in that section to commenters' concerns regarding submission deadlines for abbreviated SIP revisions in relation to NO_X allocation timing.

One commenter that did not support the proposal for abbreviated SIP revisions suggested that allowing such revisions to be submitted later than the deadline for a full SIP revision sets a poor procedural precedent. The Agency disagrees. The proposal to allow abbreviated SIP revisions for CAIR is based on the unique circumstances in this case and does not set precedent for other different circumstances.

The EPA is finalizing, with certain changes described below, the approach that a State can choose to modify the application of the CAIR FIP through abbreviated SIP revisions that do any or all of the following:

- Make applicable, to the State, provisions in the FIP for otherwise unaffected units to opt into the FIP trading programs,
- Allow the State, rather than EPA, to allocate annual and/or ozone season NO_X allowances,
- Allow the State, rather than EPA, to allocate allowances from the annual NO_X Compliance Supplement Pool (CSP), and
- Include NO_X SIP Call trading sources that are not EGUs under CAIR in the CAIR FIP NO_X ozone season cap-and-trade program.

Thus a State could choose, through its abbreviated SIP revision, to bring its NO_X SIP Call trading sources that are not EGUs under CAIR from the NO_X SIP Call trading program into the CAIR NO_X ozone season trading program.

With regard to the provision allowing an abbreviated SIP revision to provide for State allocation of annual and/or ozone season NO_X allowances, EPA is revising that provision to give States the same flexibility concerning such allocations as States have in a full SIP revision. In a full SIP revision, States have the option of allocating allowances to CAIR units or to other entities (such as renewable energy facilities) or of auctioning allowances. The States must submit the CAIR unit allocations to the Administrator by specified deadlines so that the allowances can be recorded in the allowance tracking system, but the requirements for a full SIP revision do not address what happens if the State fails to meet these deadlines. In contrast, under the proposed provision for an abbreviated SIP revision allowing for State allowance allocations, a State's allocation provisions must provide that, if a State does not inform the Administrator of the allocations to CAIR units by the specified deadlines, the Administrator will assume that the units get the same allocations for the year as in the prior year and will record such unit allocations. (EPA notes that the deadline for submitting the initial set of allocations is changed, as described below, from the proposed deadline of September 30, 2007 to April 30, 2007.)

The difficulty with the proposed approach is that it assumes that the State is distributing (not auctioning) allowances and is providing them to CAIR units (not to other entities). In order to clarify that States have the same flexibility in allocating in abbreviated SIP revisions and full SIP revisions, EPA is removing the abbreviated SIP revision language concerning the Administrator's actions in the event a State fails to inform in a timely manner the Administrator of the allocations. However, it should be noted that the provisions for both abbreviated SIP revisions and full SIP revisions set deadlines for State submission of allocations to the Administrator for recordation and that, in reviewing such SIP revisions, EPA intends to ensure that the SIP revisions are consistent with those deadlines.

With regard to the provision allowing an abbreviated SIP revision to provide for State allocation of the CSP, EPA is revising that provision to give States the same flexibility with regard to CSP allocations as States have in a full SIP revision. Under § 51.123(e)(4)(iii), States may use in a full SIP revision one or both of the mechanisms described for CSP allocation, one based on early reductions and one based on need. Under the proposed provision for an abbreviated SIP revision concerning State CSP allocations, a State must use the allocation methods detailed in either § 96.143 or § 97.143. In order that an abbreviated SIP revision provides States the same flexibility as a full SIP revision, EPA is revising the abbreviated SIP revision language to give States the options of using the § 96.143 or § 97.143 provisions or the provisions under § 51.123(e)(4).

The EPA will include appendices in part 97 that will be amended in the future to list any States for which the Administrator approves abbreviated SIP revisions covering any of the 4 specific elements listed above. The EPA anticipates coordinating such amendments of the appendices with the Administrator's final decision to approve such SIP revisions.

D. Overall Structure of the CAIR FIP Cap-and-Trade Programs

In the CAIR NFR, the Agency provided SIP model rules for the CAIR NO_X annual, CAIR NO_X ozone season, and CAIR SO_2 annual trading programs that States can use to meet the emission reduction requirements in the CAIR (in part 96). For the final CAIR FIP cap-and-trade programs, EPA decided to adopt the CAIR SIP model rules with minor changes to allow for Federal implementation.

The emission reductions mandated by today's final rule will be achieved from EGUs (*see* sections VI.E and VII, below, for discussion of applicability provisions).

The CAIR FIP cap-and-trade programs rely on the detailed unit-level emissions monitoring and reporting procedures of part 75 and consistent allowance management practices. All affected sources are required to monitor and report their emissions using part 75. Source information management, emissions data reporting, and allowance trading will be accomplished using on-line systems similar to those currently used for the Acid Rain SO_X and NO_X SIP Call trading programs.

The penalty provisions for excess emissions under today's FIP trading programs were also adopted from the CAIR model trading rules. As discussed in section VII in today's preamble, the Agency revised the excess emission penalties in the CAIR SO_2 trading program to clarify the penalties for units that have excess emissions under both the Acid Rain Program and the CAIR SO_2 trading program. The penalty provisions adopted for the final FIP thus are the excess emissions penalty provisions in the CAIR with the revised CAIR SO_2 trading program penalties.

1. SO_2 Annual Program

The final CAIR FIP SO_2 cap-and-trade program requires affected sources to hold SO_2 allowances sufficient to cover their emissions for each control period. For the FIP SO_2 program, EPA decided to adopt the CAIR model SO_2 trading rule (with minor changes to allow for Federal implementation) which is based on the existing Acid Rain Program and relies on title IV SO_2 allowances.

As in the CAIR SIP SO_2 model trading program, the SO_2 reductions for the CAIR FIP SO_2 trading program will be achieved by requiring sources to retire, in most cases, more than one title IV allowance for each ton of SO_2 emissions.[22] Sources can use pre-2010 title IV SO_2 allowances for compliance with the CAIR FIP SO_2 cap-and-trade program at a 1-to-1 ratio (*i.e.,* SO_2 allowances of vintage 2009 and earlier will offset one ton of SO_2 emissions). Allowances of vintages 2010 through 2014 will offset 0.5 tons of emissions (*i.e.,* such allowances will need to be retired at a ratio of 2-to-1 for CAIR compliance, in other words 2 allowances for every ton of emissions). Allowances of vintages 2015 and beyond will offset 0.35 tons of emissions (*i.e.,* such allowances will need to be retired at a ratio of 2.86-to-1, in other words 2.86 allowances for every ton of emissions). The emission value of an SO_2 allowance is independent of the year in which it is used, but rather is be based on its vintage (*i.e.,* the year for which the allowance is issued). These SO_2 allowance retirement ratios are the retirement ratios in the CAIR NFR, which EPA adopted in the CAIR FIP SO_2 trading program (*see* discussion in section VII in the CAIR NFR preamble at 70 FR 25255–25273, as well as in section IX at 70 FR 25290–25291).

The Agency uses the single term, ''CAIR SO_2 allowance, '' to refer to an SO_2 allowance under a CAIR SIP using the model trading rule or CAIR FIP.[23] A CAIR SO_2 allowance can be used for compliance with the SO_2 allowance-holding requirement in a CAIR SIP or CAIR FIP SO_2 trading program. Sources in States governed by either of these SO_2 trading programs can trade CAIR SO_2 allowances with each other.

2. NO_X Annual Program

The final CAIR FIP NO_X annual cap-and-trade program requires affected sources to hold NO_X annual allowances sufficient to cover their emissions for each control period. For the FIP NO_X trading program, EPA adopted the CAIR SIP model NO_X trading program with minor revisions to allow for Federal implementation. The FIP NO_X program relies on CAIR NO_X annual allowances that will be allocated to affected units by the EPA (*see* section VI.F in today's preamble for discussion of the methodology and schedule for allocating NO_X allowances) or allocated by States using abbreviated SIP revisions. A NO_X annual allowance authorizes the emission of one ton of NO_X.

The Agency is finalizing the proposed Compliance Supplement Pool (CSP) of allowances that will be allocated to sources and can be used for compliance with the CAIR FIP NO_X annual cap-and-trade program. *See* sections V and VI.I in today's preamble for further discussion of the CSP.

NO_X ozone season allowances issued under the NO_X SIP Call or under the CAIR FIP NO_X ozone season trading program can't be used for compliance with the CAIR FIP NO_X annual reduction requirement. (Pre-2009 NO_X ozone season allowances issued under the NO_X SIP Call can be banked into the CAIR FIP NO_X ozone season program; *see* discussion of FIP NO_X ozone season program, below.)

The Agency uses the single term, ''CAIR NO_X allowance,'' to refer to a NO_X allowance issued under a CAIR SIP using the model trading rule or CAIR FIP. A CAIR NO_X allowance can be used for compliance in a CAIR SIP or CAIR FIP NO_X annual trading program. Sources in States governed by either of these NO_X annual trading programs can trade CAIR NO_X allowances with each other.

3. NO_X Ozone Season Program

The final CAIR FIP NO_X ozone season cap-and-trade program requires affected sources to hold CAIR NO_X ozone season allowances sufficient to cover their emissions for each control period. For the ozone season program, the control period extends from May 1 through September 30 for each year of the program. For this trading program also, EPA adopted the trading program from the CAIR SIP model NO_X ozone season trading rule with minor modifications to allow for Federal implementation. Under the FIP program, a NO_X ozone season allowance authorizes the emission of one ton of NO_X during the ozone season.

The FIP program relies on CAIR NO_X ozone season allowances that will be allocated to affected sources by the EPA (*see* section VI.F in today's preamble for discussion of the methodology and schedule for allocating NO_X allowances) or allocated by States using abbreviated SIP revisions. In addition, pre-2009 NO_X SIP Call allowances can be banked into the CAIR FIP NO_X ozone season program and used by affected sources for compliance with that program. NO_X allowances issued under the CAIR FIP NO_X annual program can't be used for compliance with the CAIR FIP NO_X ozone season reduction requirement.

As discussed in the CAIR NFR and the CAIR FIP NPR, certain emission sources that do not meet the applicability requirements of CAIR are included in the existing EPA-administered NO_X Budget Trading Program under the NO_X SIP Call. (The types of NO_X Budget Trading Program units that are not EGUs under CAIR include industrial boilers and turbines, cement kilns, and small EGUs.) As explained in the CAIR NFR and CAIR FIP NPR, EPA will no longer administer the NO_X SIP Call ozone season cap-and-trade program for ozone seasons after 2008; however, NO_X SIP Call requirements will remain in place. The CAIR NFR provides that States that choose to participate in the CAIR EPA-administered NO_X ozone season cap-and-trade program may choose whether or not to bring their non-CAIR NO_X SIP Call trading sources into the CAIR ozone season trading program, through their SIP revisions. Bringing the non-CAIR NO_X SIP Call trading sources into the CAIR ozone season program is one way to continue to meet NO_X SIP Call requirements. *See* section VII in the CAIR NFR (70 FR 25255–25273) and section IX.A. (70 FR 25289–25290).

As discussed above, the Agency is finalizing its proposal that States may choose to submit an abbreviated SIP revision to bring their non-CAIR NO_X SIP Call trading sources into the CAIR FIP NO_X ozone season cap-and-trade program. The abbreviated SIP revision may increase a State's NO_X ozone season trading budget under the CAIR FIP NO_X ozone season cap-and-trade program by an amount equal to the portion of the State's NO_X SIP Call State trading budget that is attributed to such units.

The Agency uses the single term, ''CAIR NO_X Ozone Season allowance,'' to refer to a NO_X ozone season allowance issued under a CAIR SIP using the model trading rule or CAIR FIP. A CAIR NO_X ozone season allowance could be used for compliance in a CAIR SIP or CAIR FIP NO_X ozone season trading program. Sources in States governed by either of these NO_X ozone season trading programs can trade CAIR NO_X Ozone Season allowances with each other.

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[22] Allowances of pre-2010 vintage will be retired at a ratio of one allowance per ton of emissions. For allowances of later vintages, more than one allowance will be retired per ton of emissions.

[23] A CAIR SO_2 allowance is generally a tilte IV SO_2 allowance; the only exception is where a State adopts the provisions allowing units not otherwise covered by the CAIR SO_2 trading program to opt in and allocates allowances (which are not title IV allowances) to such units. For purposes of compliance with the EPA-administered CAIR SIP SO_2 trading program or with the CAIR FIP SO_2 trading program in today's rule, the value of SO_2 allowances are discounted based on the allowance vintage year, as explained above.

E. Sources Subject to the CAIR FIP Cap-and-Trade Programs

Under the proposed CAIR FIP cap-and-trade programs, only EGUs were subject to the proposed rules. The proposed applicability provisions are, by design, identical to the provisions for applicability the CAIR SIP model trading programs and incorporated the FIP NPR revisions to the applicability provisions of the final CAIR SIP model trading rules. The revisions to CAIR SIP model rule applicability include exemptions for (1) municipal solid waste incinerators and (2) existing units that have not served a generator since before November 15, 1990. Incorporating these exemptions into the applicability provisions in both the CAIR SIP and CAIR FIP trading programs provides clarity and aligns the provisions more closely with the provisions in the title IV Acid Rain Program. A detailed discussion of the rationales for including these exemptions may be found in section VII of the CAIR FIP NPR. (See section VIII.C. in the CAIR NFR preamble for applicability discussion at 70 FR 25276–25278 and section VII in today's preamble for additional discussion of changes to the CAIR EGU definition).

Public comment on the proposed applicability provisions of the CAIR FIP trading programs primarily expressed interest in additional exemptions for waste coal-fired units, biomass-fired units, and low emissions units. These are discussed in detail below.

Applicability in the Final CAIR FIP. Today's action finalizes that, in any jurisdiction for which a final CAIR FIP is promulgated, units will be subject to the CAIR FIP trading programs (*i.e.,* to the CAIR FIP SO_2, NO_X annual, or NO_X ozone season programs, as appropriate) if they are stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale. Certain cogeneration units or solid waste incinerators are exempt from the CAIR FIP and are described below.

Cogeneration Unit Exemption. As in the CAIR NFR, certain cogeneration units are exempt from the CAIR FIP trading programs. Cogeneration units include units having equipment used to produce electricity and useful thermal energy for industrial, commercial, heating, or cooling purposes through sequential use of energy and meeting certain operating and efficiency standards. The program has different applicability provisions for non-cogeneration units and cogeneration units. Any cogeneration unit, serving (since the later of November 15, 1990 or the start-up of the unit), a generator with a nameplate capacity of greater than 25 MW and supplying more than ⅓ potential electric output capacity and more than 219,000 MW-hrs annually to any utility power distribution system for sale, will be subject to the requirements of the CAIR FIP trading rules. Otherwise, the unit will qualify for an exemption under the FIP rules. This cogeneration unit exemption is identical to the exemption in the CAIR NFR, as revised by today's action. Section VIII.C.3. of the CAIR NFR preamble describes the cogeneration unit exemption and discusses the specific elements of how units would qualify and remain qualified for the exemption (70 FR 25276–25278).

Solid Waste Incinerator Exemption. Today's action includes an exemption for certain solid waste incinerators in both the CAIR and CAIR FIP cap-and-trade programs. Specifically, a solid waste incineration unit commencing operation before January 1, 1985, for which the average annual fuel consumption of non-fossil fuels during 1985–1987 exceeded 80 percent and during any 3 consecutive calendar years after 1990 the average annual fuel consumption of non-fossil fuels exceeds 80 percent, is not subject to either the CAIR or CAIR FIP cap-and-trade programs. (Section VII of the preamble for today's rule provides additional discussion.)

Individual Unit Opt-ins. Today's action includes provisions for individual units to opt-in to the CAIR FIP trading programs. These units, when they opt-in, become ''affected'' by the CAIR FIP trading program and, as a result, must comply with allowance holding requirements, monitor and report emissions, and receive CAIR allowances.

The opt-in provisions of the CAIR FIP trading programs would become applicable to sources in a given State only if the State chooses to submit an abbreviated SIP revision that would provide for the inclusion of opt-ins in the CAIR FIP trading programs. The EPA considered requiring all States to have opt-in provisions in the proposed CAIR FIP trading programs. By not requiring opt-in provisions in all States covered by the proposed FIP trading programs, the Agency seeks to preserve the States' flexibility to decide whether to allow opt-in units. In addition, the EPA believes that including opt-in provisions only in States that have elected to include them in an abbreviated SIP revision avoids the possibility of ''stranding'' some opt-in units. More specifically, this requirement avoids a situation where a unit might make investments based upon assumption that it will opt-in to a CAIR FIP trading program only to be stranded if the CAIR FIP program was later supplanted by EPA approving a CAIR SIP submitted by the State that did not include opt-in provisions.

If States choose to submit abbreviated SIP revisions to provide for the inclusion of opt-ins in the CAIR FIP trading programs, the SIP revisions must include the opt-in provisions that are provided in the CAIR final rule. See section VIII.G. of the CAIR NFR preamble for discussion of opt-in provisions (70 FR 25286–25288).

Waste Coal-Fired Units Under CAIR FIP. The EPA received comments requesting an exemption for waste coal-fired units from both the CAIR and CAIR FIP SO_2 annual programs. Some commenters claimed that their costs to comply with the programs are excessively high. The economics of a waste coal-fired unit are different depending upon whether the unit has a fixed price power purchase agreement in place or whether it is selling electricity on the wholesale market.

Units that had power purchase agreements with fixed prices in place on November 15, 1990, are exempt from title IV and do not receive title IV allowances. The commenters state that, while their agreements are in effect, these units are not able to pass through cost increases, such as the cost of compliance with CAIR, except where specific escalations are provided (*e.g.,* compensation for increases in fuel costs or inflation).

While under the agreements and exempt from title IV, the units can opt into the title IV program and receive allowances as opt-in units. Commenters claim that the title IV opt-in provisions could allocate allowances to them at levels below their projected emissions because the years on which title IV bases the allocations are early in the units operation and might under-represent the unit's typical heat input. The commenters add that it is not cost effective for the units to reduce SO_2 emissions by installing advanced emission controls because the units already achieve significant reductions and have fixed price contracts that do not allow them to pass through control costs.

The second scenario is the period beginning when the units' power purchase agreements expire and the units lose their title IV exemption. As title IV affected units, they lose their title IV opt-in status and can no longer receive title IV allowances under the title IV opt-in provisions. These units are no longer locked into their power purchase contracts and are free to participate in the wholesale electricity markets. The commenters contend that reducing emissions—even when they are free to pass through the cost of compliance—is not cost-effective, because most waste coal-fired facilities already operate at lower SO_2 emission rates than many other sources. This, however, belies the real issue, since under a trading program, sources have multiple compliance options including installing emission controls, switching fuels or purchasing allowances. If a source's control costs are above the marginal cost of control in the region, the unit is likely to comply by purchasing allowances, thereby reducing their cost of control to the market price.

In general, information regarding the cost of generation, electricity markets, and cost of controlling emissions may be found through publicly available sources. This information is used, and in some cases developed, by EPA in its regulatory efforts (*e.g.,* IPM modeling results, technical support documents (TSD) examining the cost and feasibility of control options). However, information regarding specific terms of the contracts, such as found in the power purchase agreements of the waste coal-fired units, is generally proprietary and is claimed to vary widely from contract to contract. Although complete information on contracts (*e.g.,* the fixed price for electricity, price escalators) could have been provided in order to perform a thorough analysis, commenters provided EPA with some limited information (much of it after the public comment period closed) that did not support the commenters' case for the broad closure of waste coal-fired units as a category of sources. In addition, commenters presented some limited analysis of the ratio of their estimated cost of compliance with CAIR to their projected revenue. Again, EPA's evaluation of this limited analysis showed that it did not support the commenters claims that they would not be economically viable. (The results of EPA's evaluation of the commenters' analysis are discussed later in this section.) Because the unit-specific information provided by the commenters was limited, EPA conducted an analysis using generally available information to evaluate the potential impact of the cost of complying with CAIR for a typical CFB combusting waste coal. This analysis shows that the typical waste coal-fired unit would remain economically viable under CAIR. (The results of this analysis are discussed later in this section.)

EPA understands that waste coal-fired facilities have not received a title IV SO_2 allowance allocation because they have been exempt from title IV under the IPP exemption. Title IV's IPP exemption applies to units that had power purchase agreements with fixed prices in place on November 15, 1990, and includes units other than waste coal-fired facilities. Congress limited this exemption to only those units with power purchase commitments in effect, thereby acknowledging that once the unit was freed from its power purchase commitment, it was free to pass through compliance costs to its customers. The unit may lose this exemption even before the full-term of the contract if the power purchase commitment changes after November 15, 1990, in a way that allows the cost of compliance with the Acid Rain Program to be shifted to the purchaser. For example, expiration or termination of the power purchase commitment or modification so that the price is increased (*e.g.,* changed to a market price) results in loss of the exemption. The purpose of the exemption is to protect IPP facilities subject to contract prices that were set before passage of the CAA Amendments of 1990 (including the Acid Rain Program in title IV) and that did not allow pass through of the costs of Acid Rain Program compliance. Congress has limited the exemption to apply to the Acid Rain Program and did not mandate the Agency with maintaining the exemption in future programs. EPA believes that this exemption was aimed at easing the transition of such facilities into the Acid Rain Program and that there is no basis for maintaining this exemption for every subsequent cap-and-trade program.

Waste coal-fired units are designed and operated for the purpose of generating electricity for sale. As a result, they are reasonably treated as part of the power generation sector, which comprises the category of sources the CAIR and CAIR FIP trading programs aimed at regulating. For this reason, EPA modeling for CAIR included waste coal-fired EGUs as part of the power sector, which was shown to collectively be able to make highly cost-effective SO_2 and NO_X emission reductions. The marginal cost of control and the average cost of control, shown to be highly cost-effective, reflect a range of power sector control costs that include costs from sources such as waste coal-fired units. Notably, the model considers where control will be least expensive and that some units will purchase allowances in the determination of which units are projected to dispatch. EPA modeling shows that waste coal-fired units continue to be dispatched even when the cost of complying with CAIR is part of the unit's production costs. Commenters did not provide any basis for changing EPA's treatment of waste coal-fired units in the modeling or for challenging EPA's modeling results.

EPA agrees that these units do not have large SO_2 emissions. These units may emit based on a reduction in SO_2 from sulfur content in the fuel of approximately 90 percent, or in some cases greater, reductions in SO_2 from sulfur content of the fuel.[24] However, many continue to emit at rates above those recently achieved by coal-fired units with advanced SO_2 controls (*i.e.*, scrubbers). Nevertheless, because these units tend to be relatively small and have lower total emissions, they would be required to purchase significantly fewer allowances than other, potentially higher emitting, sources that also may not have received SO_2 allowances under title IV.

However, EPA does not believe that the CAIR SO_2 annual requirements would impose an undue or inequitable ''economic burden'' on waste coal-fired units that would ''threaten the viability'' of all, or even many, of these units. EPA considered the potential impacts for both the periods of the concern identified by the commenter: (1) When the power purchase agreement is in place and the unit is exempt from title IV; and (2) after the power purchase agreement has expired and the unit is title IV affected.

For the period in which the waste coal-fired unit has a power purchase contract in place, EPA examined the analysis presented by the commenters in support of their argument that CAIR compliance costs would threaten their economic viability. EPA believes the commenters' analysis substantially overestimated the potential compliance costs of CAIR and the CAIR FIP (by inaccurately accounting for the future projected cost of emitting one ton of SO_2, underestimating access to title IV SO_2 allowances through the title IV opt-in provisions, and inaccuracies in other analytical assumptions) and, when more realistic assumptions are correctly applied, these units are much better off. (Section VI.A of the CAIR FIP Response to Comment Document presents the results of this analysis.)

[24] Reduction in SO_2 from CFB units are EPA estimates based upon the design of the facilities.

As mentioned above, while waste coal-fired units have a valid power purchase agreement (and, subsequently, an exemption from title IV), they may choose to opt-in to the title IV program and receive SO_2 allowances. The title IV opt-in provisions provide units with SO_2 allowances based upon their heat input (*i.e.*, the average of their annual heat input for the years 1985 through 1987 or their first 3 whole years of operation) and their emission rate (*i.e.*, the lesser of their actual emission rate during the first baseline year or, their lowest permitted emission limit in year they apply that will be effective that year or any time after). As a result, these units could receive SO_2 allowances sufficient to authorize all of their future, annual emissions under the title IV program. Other units, that may operate more than they did during the baseline years, may receive SO_2 allowances from the title IV opt-in provisions at levels lower than their future emissions. Assuming the waste coal-fired units made no additional reduction in SO_2 emissions, this same opt-in allocation level would authorize half of their emissions, and require them to purchase SO_2 allowances equal to half of their emissions, under the first phase of CAIR or the CAIR FIP.[25] Considering that waste coal-fired CFB units generally achieve greater than 90 percent SO_2 emission reductions, the unit would purchase SO_2 allowances equal 5 percent of this total, uncontrolled emissions. The retirement ratio for the second phase of CAIR or the CAIR FIP would result in the sources purchasing SO_2 allowances equivalent to 7 percent of this uncontrolled emissions level (*i.e.*, two thirds of the remaining 10 percent of the uncontrolled emissions). From the evidence that EPA has been provided, the commenters have not demonstrated that purchasing allowances equal to approximately 5 percent or 7 percent of uncontrolled emissions in the phases 1 and 2 of the CAIR FIP (and CAIR), respectively, would result in the units not being economically viable.

The commenters concerns about the economic viability of waste coal-fired units continue for periods of time when the power purchase agreements have expired (*i.e.*, the units have lost the exemption from title IV) and the units are free to participate in the electricity markets. EPA addressed this concern by conducting additional analysis using generally available information to evaluate the potential impact of the cost of complying with CAIR for a typical CFB combusting waste coal. More specifically, EPA examined how the potential cost to operate a typical waste coal-fired CFB unit (in $/MWh) compares to the potential price it would receive on the electricity market. This analysis estimated the potential cost of producing electricity for a waste coal-fired CFB (including the cost of complying with CAIR) to be significantly less than the EPA projected wholesale price and the forecasted price of electricity. In general, waste coal-fired facilities will continue to be profitable, even when factoring in the cost of complying with CAIR.

EPA also notes that, upon the expiration of the power purchase agreements, waste coal-fired units will participate in the electricity markets and be required to comply with all applicable emission control programs, including the title IV Acid Rain Program, just as other coal-fired facilities. Some of these coal-fired units have installed emission control equipment, emit SO_2 at lower rates than the waste coal-fired units, and are complying with title IV while they compete in the electricity markets. Additionally, new units continue to come online and are economically viable even though they must acquire title IV SO_2 allowances on the market.

In addition, commenters mentioned that waste coal-fired facilities provide benefits outside of air emissions, such as assisting in the mitigation of waste coal impacts on the land. EPA notes that, in case of waste coal-fired units, there are a variety of avenues of potential relief for States that wish to assist these units as they transition to competitive markets. Options for States to encourage certain types of generation include, but are not limited to: Revenue from renewable portfolio standards (where waste coal-fired units can qualify); and providing valuable CAIR NO_X annual and ozone season allowances, as well as mercury allowances under the Clean Air Mercury Rule (which are options in Pennsylvania, where most of the commenters waste coal-fired units are located). EPA also notes that, in the case of waste coal-fired units that have contended that they provide multi-media benefits, that they will have the flexibility to develop integrated, multi-pollutant compliance strategies under CAIR.

In summary, EPA does not agree with commenters that believe that complying with the CAIR FIP or CAIR SO_2 annual program would result in this category of units not being economically viable. These units are designed to generate electricity for sale on the grid and are part of the power generation sector. The CAIR FIP and CAIR trading programs are designed to achieve emission reductions from EGUs while providing the flexibility for the markets to find the least-cost reductions. Once their contracts expire, waste coal-fired units, just as other coal-fired generation sources which may or may not receive title IV SO_2 allowances, will be expected to hold SO_2 allowances and compete in the electricity markets. In addition, the commenter has not provided analysis that demonstrates that waste coal-fired units, as a category, would not be economically viable as a result of CAIR. For these reasons, EPA has not included an exemption for waste coal-fired units or IPPs in the CAIR FIP or CAIR trading programs.

Biomass-Fired Units under CAIR FIP. EPA received comment that biomass-fired units should be exempt from the CAIR and CAIR FIP trading programs. These commenters claimed that their operations are similar to those of solid waste incineration units, which EPA proposed to exempt in the CAIR FIP NPR. Commenters added that they could meet fossil fuel use criteria used in the solid waste incineration unit exemption (*i.e.,* the average annual fuel consumption of non-fossil fuels not exceeding 80 percent for the years 1985–1987 (or for a unit commencing operation after January 1, 1985, the first 3 years of operation) and during any 3 consecutive calendar years after 1990). In addition, commenters noted that this would be consistent with the title IV exemptions for biomass-fired units as ''qualifying facilities.''

EPA disagrees with commenters that request that biomass-fired EGUs be exempted from the CAIR and CAIR FIP trading programs because they are similar to solid waste incinerators. While biomass-fired EGUs may be able to meet the criteria for limited combustion of fossil fuel used in the solid waste incineration unit exemption in the CAIR and CAIR FIP trading programs, they differ from solid waste incineration units in that biomass-fired units are designed and operated for the purpose of generating electricity for sale. As a result, they are reasonably treated as part of the power generation sector, which comprises the category of sources the CAIR and CAIR FIP trading programs aimed at regulating. For this reason, EPA modeling for CAIR included biomass-fired EGUs as part of the power sector, which was shown to be able to make highly cost-effective SO_2 and NO_X emission reductions. The marginal cost of control and the average

[25] Assumes sources receive title IV opt-in allowances equal to their current emissions. The 2-to-1 retirement ratio of CAIR's first phase requires CAIR sources to hold twice as many allowances.

cost of control, shown to be highly cost-effective, reflect a range of power sector control costs that include costs from sources such as biomass-fired units. Commenters did not provide any basis for changing EPA's treatment of biomass-fired units in the modeling or for challenging EPA's modeling results.

Biomass-fired units included in the CAIR and CAIR FIP trading programs are distinguishable from solid waste incineration units exempt from the CAIR and CAIR FIP trading programs. First, while the purpose of biomass-fired units are to generate electricity (and, in some cases, useful thermal energy), solid waste incineration units are designed and operated for the purpose of disposing of solid waste, with electricity generation incidental to this purpose. In fact, the term ''solid waste incineration unit'' excludes sources whose primary purpose is something other than waste disposal, such as ''material recovery facilities * * * which combust for the primary purpose of recovering materials'' and ''qualifying small power production facilities * * * or qualifying cogeneration facilities * * * which burn homogeneous waste for the production of electric energy * * * for the production of electric energy and steam or forms of useful energy (such as heat) * * *'' (18 U.S.C. 7429(g)(1)) Thus, it was reasonable for EPA to treat biomass-fired units, but not solid waste incineration units, as part of the power sector. Second, as explained in the CAIR FIP NPR, emission reductions from solid waste incineration units, treated as a separate source category, were not considered in EPA's determination of highly cost-effective reductions from the power sector. Biomass-fired units were treated as part of the power sector, which was shown in EPA's modeling to be able to make highly cost-effective reductions.

EPA does not believe that the title IV exemption for qualifying biomass-fired units means that these units should be exempt from all cap-and-trade programs developed after the Acid Rain Program. Under the Acid Rain Program, an IPP facility (such as a biomass-fired unit) that has, as of November 15, 1990, a qualifying power purchase commitment (including a sales price) to sell at least 15 percent of planned net output capacity and has installed net output capacity not exceeding 130 percent of planned net output capacity is exempt from the program. However, if the power purchase commitment changes after November 15, 1990 in a way that allows the cost of compliance with the Acid Rain Program to be shifted to the purchaser, then the IPP facility loses the exemption. For example, expiration or termination of the power purchase commitment or modification so that the price is increased (*e.g.,* changed to a market price) results in loss of the exemption. The purpose of the exemption is to protect IPP facilities subject to contract prices that were set before passage of the CAA Amendments of 1990 (including the Acid Rain Program in title IV) and that did not allow pass through of the costs of Acid Rain Program compliance. However, EPA maintains that this exemption was aimed at easing the transition of such facilities into the Acid Rain Program and that there is no basis for maintaining this exemption for every subsequent cap-and-trade program.

Under the CAIR trading programs, a biomass-fired unit can be allocated NO_X allowances, just as any other CAIR unit. Further, although biomass-fired units are not generally allocated title IV allowances, which are used in the CAIR SO_2 annual trading program, those units can opt into the Acid Rain Program and receive title IV allowances as long as they retain their IPP exemption. If they lose the exemption because they are no longer bound by their power purchase commitment, then they can pass through compliance costs to the same extent any CAIR unit can do so.

For the reasons discussed above, the EPA is not including an exemption from the CAIR and CAIR FIP trading programs for biomass-fired units in today's final rule.

Low Emissions Units Under CAIR FIP. EPA received comment requesting that units with low emissions, such as units that emit less than 25-tons annually, be exempt from the CAIR and CAIR FIP trading programs. This includes simple cycle turbines that are operated infrequently, primarily during peak demand or when there are operational difficulties with baseload units. Commenters claim that the cost of monitoring and reporting their emissions is excessively burdensome and that special provisions in part 75 monitoring for low mass emitting (LME) units does not provide adequate relief.

Today's final CAIR FIP trading rules do not include an exemption for low emitting units. While low emitting, these units are designed and operated for the purposes of generating electricity for sale. As a result, they are reasonably treated as part of the power generation sector, which comprises the category of sources the CAIR and CAIR FIP trading programs aimed at regulating. For this reason, low-emitting units were included as part of the power sector, which was shown through EPA modeling for CAIR to be able to make highly cost-effective emission reductions. The marginal cost of control and the average cost of control, shown to be highly cost effective, reflect a range of power sector control costs that include costs from low-emitting units (including simple-cycle turbines).

Commenters advocating an exemption of these units did not provide any basis for changing EPA's treatment of these units in the modeling or for challenging EPA's modeling results.

The NO_X SIP Call did include an exemption for units that could demonstrate that their permits imposed an operating hour limitation under which their potential emissions during the ozone season did not exceed 25 tons (the ''25-ton exemption''). Units wishing to obtain the 25-ton exemption were required to use conservative emission estimates of their potential emissions and State budgets were adjusted to remove the equivalent of their potential emissions from that State's trading program budget. In general, this exemption was undersubscribed and complex. EPA also notes that it received little comment on including a 25-ton exemption, with only a single facility claiming that this exemption is necessary. EPA does not see compelling justification to include this exemption in the CAIR and CAIR FIP trading programs.

EPA does not agree with commenters that contend that the LME provisions do not adequately relieve the cost of monitoring and reporting for low emitting units. The part 75 LME provisions provide qualifying sources with multiple options to allow facilities to choose the approach that best fits their circumstances. First, units may choose to use EPA-provided, conservative emission factors in lieu of installing and operating Continuous Emissions Monitoring Systems (CEMS). The LME provisions provide a second option that allows facilities to determine unit-specific emission factors for use in estimating their annual emissions. Additionally, EPA provides the software necessary to generate the quarterly emissions reports for these sources to further lessen the burden on these sources. These streamlined monitoring and reporting procedures relieve much of the administrative burden, and therefore, the compliance costs, for LME qualifying units. This allows EPA to accurately and cost-effectively account for the emissions, even at low emission levels, and allow these units to participate in the CAIR trading programs.

F. Allocation of NO_X Emission Allowances to Sources

The EPA presented in the NPR (70 FR 49730–49734) its proposed schedules and methods for allocating NO_X allowances to sources, including allowances for the CAIR FIP NO_X annual trading program and the CAIR FIP NO_X ozone season trading program. The Agency proposed to use NO_X allocation methods that are consistent with the NO_X allocation methods in the CAIR SIP model trading rules.

As discussed above, the Agency proposed that a State could choose to modify the application of the FIP through abbreviated SIP revisions that would allow the State, rather than EPA, to allocate NO_X annual and/or ozone season allowances for the CAIR FIP trading programs.

The EPA proposed formulas for EPA-determined allocations of NO_X allowances to units (both existing units with sufficient baseline data and new units) under the CAIR FIP trading programs. Further, the Agency proposed schedules for applying the allocation formulas and for determining such NO_X allocations for the CAIR FIP trading programs. The EPA also proposed schedules for States to apply State-determined allocation formulas under abbreviated SIP revisions. In addition, EPA proposed a schedule for the Administrator to record NO_X allocations (whether EPA-or State-determined) in source accounts.

The EPA received a number of comments on each of these elements of its proposed schedules and methods for NO_X allocations. The Agency discusses the comments and presents the final schedules and methods for NO_X allocations below.

See section VI.I in today's preamble for a discussion of the Agency's method for distributing FIP NO_X annual allowances from the NO_X annual CSP.

1. Schedule for Determining and Recording NO_X Allocations

The Agency's preference is for States to make decisions about NO_X allocations for their sources. Although EPA will determine NO_X allocations for the CAIR FIP trading programs, we intend to only record EPA-determined allocations in allowance accounts for sources located in a State without a timely, approved CAIR SIP revision (or timely, approved abbreviated CAIR SIP revision providing for State-determined allocations).

While EPA's proposal included schedules for determining and recording NO_X allocations for both existing units with sufficient baseline data and new units, this section of the preamble—and the public comments—focus on the allocations for existing units.[26]

As discussed further below, EPA intends to determine NO_X allocations for the CAIR FIP trading programs by October 31, 2006 (covering 2009–2014). For any State choosing to determine CAIR FIP NO_X allocations using an abbreviated SIP revision, the deadline for States to notify EPA of their first set of NO_X allocations (covering at least 2009–2011) is April 30, 2007. The Agency will record EPA-determined allocations for the CAIR FIP trading programs by September 30, 2007 (covering 2009), September 30, 2008 (covering 2010) and September 30, 2009 (covering 2011–2013). If State-determined NO_X allocations are approved earlier than these recordation deadlines (under a full SIP revision or an abbreviated SIP revision), the Agency intends to record the State-determined allocations in source accounts rather than EPA-determined allocations, as soon as possible. Table VI–2, below, summarizes the final deadlines for recording CAIR FIP NO_X allocations (EPA-determined allocations or State-determined allocations using an abbreviated SIP revision). Table VI–3 summarizes the final deadlines for recording CAIR SIP NO_X allocations for States choosing to use the CAIR model trading rules (full SIP revisions).

As discussed in the NPR, the Agency developed proposed schedules for recording CAIR FIP NO_X allocations for existing units in source accounts with the objective of balancing the following two goals: (1) Providing both adequate certainty to sources regarding their CAIR NO_X allocations and adequate time for sources to make compliance decisions, and (2) providing States choosing to allocate CAIR NO_X allowances with time to submit, and EPA to approve, abbreviated or full SIP revisions that provide for State-determination of allowance allocations.

The final CAIR (70 FR 25162) requires States to submit SIP revisions complying with the CAIR requirements to the Agency by September 11, 2006 and to submit the initial set of NO_X allocations by October 31, 2006.

In the CAIR FIP NPR, the Agency proposed that States choosing to submit abbreviated SIP revisions would be required to submit such revisions to EPA by March 31, 2007, and—if choosing to address NO_X allocations in an abbreviated SIP revision—would be required to submit the initial set of NO_X allocations by September 30, 2007. The EPA proposed allowing States to submit abbreviated SIP revisions later than full revisions because the Agency anticipates being able to complete the approval process more quickly for abbreviated revisions due to their narrower scope.

The Agency stated in the FIP NPR its intention to determine final NO_X allocations for 2009 through 2014 for the FIP trading programs prior to December 1, 2007 (70 FR 49732). The EPA has further considered its plans for determining these final NO_X allocations and now intends to determine them by October 31, 2006. The Agency intends to publish a Notice of Data Availability (NODA) during spring 2006 with NO_X allocations for 2009 through 2014. The public will have an opportunity to make objections to any of the data used in these allocations. EPA will publish a NODA with the final NO_X allocations for 2009 through 2014 (adjusted if necessary in light of any objections) by October 31, 2006. In this manner, the Agency intends to provide earlier notice to sources of the EPA-determined NO_X allocations.

The EPA proposed to determine NO_X allocations by July 31, 2011 and July 31 of each year thereafter for the control period in the fourth year after the year of the deadline for the determination and then to provide opportunity for submission of objections to the determination. The EPA would make any necessary adjustments to the allocations in light of any objections, before the deadline for EPA to record the allocations. The EPA is now finalizing this schedule. For example, the Agency will determine allocations by July 31, 2011 for the 2015 control period and then provide opportunity for submission of objections. The Agency intends to make any necessary adjustments to these allocations, in light of any objections, as soon as possible after the receipt of objections and before the recordation deadline[27] of December 1, 2011. As discussed further below, the Agency intends to record EPA-determined NO_X allocations in source accounts only in the absence of a timely, approved full CAIR SIP revision or a timely, approved abbreviated CAIR SIP revision providing for State-determined allocations.

The EPA presented in the FIP NPR its proposed deadlines for recording NO_X allocations in source accounts for the CAIR FIP trading programs (*see* Table

[26] The Agency is finalizing the proposed schedules for determiing and recording FIP NO_X allocations for new units; see §§ 97.141, 97.341, 97.153 and 97.353.

[27] Recordation deadline means the date by which the Administrator will record allocations in source accounts in the allowance tracking systems.

VI–1 in the NPR at 70 FR 49732.) The proposed recordation deadlines for FIP NO_X allocations were as follows: By December 1, 2007 for the 2009 control period; by December 1, 2008 for the 2010 control period; by December 1, 2009 for the 2011, 2012 and 2013 control periods; by December 1, 2010 and December 1 of each year thereafter for the control period in the fourth year after the recordation deadline. These proposed recordation deadlines were the latest dates by which EPA proposed to record NO_X allocations for the CAIR FIP trading programs. The EPA proposed to record EPA-determined NO_X allocations *only* in the absence of a timely, approved full CAIR SIP revision or a timely, approved abbreviated CAIR SIP revision providing for State-determined NO_X allocations. The Agency intended to record any NO_X allocations determined by a State using an abbreviated SIP revision as soon as feasible after approval of the abbreviated SIP revision; EPA did not intend to wait until the proposed deadlines to record such State-determined allocations. Likewise, the Agency intended to record any NO_X allocations determined by a State using a full SIP revision as soon as feasible after approval of the full revision (and according to the recordation deadlines in the CAIR SIP rules at §§ 96.153 and 96.353).[28]

In the FIP NPR (70 FR 49739), the Agency proposed to remove the deadline to record NO_X allocations for the first set of years submitted in a SIP revision (*i.e.,* in a full SIP revision) that used the model allocation method in part 96, but to retain the deadlines to record the subsequent allocations. The CAIR NO_X model trading rules, as finalized at 70 FR 25162, required the Administrator to record the initial set of NO_X allocations submitted by the States by December 1, 2006 (§§ 96.153 and 96.353). However, since the SIP revisions that include such allocations are not due until September 11, 2006, it is highly unlikely that all the SIP revisions will be approved by EPA in time for the allocations to be recorded by December 1, 2006. CAIR NO_X allowance allocations should not be recorded, and thereby be tradable in the allowance market, before the SIP revision on which the allocations are based is final; it would be highly disruptive to the allowance market if allocations that are recorded and could be traded could subsequently be rendered invalid due to disapproval of the SIP revision on which the allocations are based.

The Agency's proposal to remove the deadline to record the first set of NO_X allocations submitted in a full SIP revision did not include an alternative recordation deadline. Some commenters suggested that EPA should set an alternative deadline, and one commenter suggested that the deadline should be within 30 to 60 days following EPA approval of a State's SIP revision. The Agency is finalizing a recordation deadline of September 30, 2007 for the first set of NO_X allocations submitted with a full SIP revision. This recordation deadline is based on the Agency's belief that full SIP revisions can be approved in about a year from submission, that is by about September 2007.

Some industry commenters who supported the abbreviated SIP revision approach did not support the proposed schedule for abbreviated revisions, in particular with regard to the schedule for NO_X allocations. Some suggested that abbreviated SIP revisions should be due on the same schedule as full SIP revisions (*i.e.,* that the deadline for abbreviated SIP revisions should be September 11, 2006, instead of March 31, 2007 as proposed) or, as suggested by one commenter, on an even earlier schedule than full SIP revisions. Similarly, some suggested that the deadline for the first set of NO_X allocations submitted with an abbreviated SIP revision should be the same as the NO_X allocations deadline for a full SIP revision (*i.e.,* that the deadline for allocations in an abbreviated revision should be October 31, 2006, instead of the proposed deadline).[29] Some commenters suggested that sources should be provided earlier knowledge of their allocations in order to plan for compliance.

A State commenter asserts that submitting an abbreviated SIP revision under the proposed schedule will be problematic for some States that may not be able to complete a State rulemaking prior to the deadline for such submission.

The EPA is finalizing the proposed March 31, 2007 deadline for submission of abbreviated SIP revisions to the Agency. Because of the narrower scope of abbreviated SIP revisions, EPA anticipates that it will be able to complete the approval process more quickly for such revisions than for full SIP revisions. The EPA believes that it can approve abbreviated SIP revisions in about 6 months from submission. With abbreviated SIP revisions due to the Agency about 6 months later than the deadline for full SIP revisions, EPA anticipates that approval for both types of submissions would be feasible by about the same time, that is by about September 2007.

The Agency is finalizing a deadline of April 30, 2007—instead of September 30, 2007 as proposed—for States to submit to EPA their first set of NO_X allocations associated with an abbreviated SIP revision (covering at least 2009, 2010 and 2011). The Agency revised this deadline in order to provide sources with an earlier opportunity to have notice of the State-determined NO_X allocations.

A few industry commenters argued that the deadlines for recording NO_X allocations in source accounts for the CAIR FIP trading programs should be earlier than proposed, to provide earlier knowledge to sources of their allocations. One recommended that NO_X allocations for the CAIR FIP trading programs—whether determined by EPA or determined by a State using an abbreviated SIP revision—be recorded in source accounts by December 1, 2006 for 2009 through 2011.

Another industry commenter suggested that, if a State fails to meet the October 31, 2006 deadline for allowance allocations in a full SIP revision, EPA should immediately record the FIP allowance allocations. The same commenter also suggested that NO_X allocations should be recorded in source accounts a minimum of 3 years prior to the date they can be used for compliance and asserted that, if a source did not know until a year before the compliance deadline what its allocation will be, the source ''would be completely unable to plan for compliance.''

A State commenter suggests that the requirements for notification of allocations under CAIR SIP trading programs and the CAIR FIP trading programs should be the same. According to the commenter, if EPA finalizes a lead time for recording NO_X allocations under the CAIR FIP trading programs of less than 3 years for the first 4 control periods, ''the same flexibility

[28] The FIP NPR preamble contained an inaccurate statement regarding proposed NO_X allocation recordation deadlines. The preamble (70 FR 49731) indicated that the recordation deadlines would be the same whether the allocations were in a full SIP revision or in an abbreviated revision; however the proposed recordation deadlines relevant to abbreviated revisions are different from deadlines for full SIP revisions.

[29] The deadline that EPA proposed for submitting NO_X allocations with an abbreviated SIP revision is September 30, 2007 for 2009, 2010 and 2011, as specified in the proposed regulatory text at § 51.123 (70 FR 49746). Through an inadvertent error the preamble to the NPR listed a different date; the preamble indicated that the proposed deadline for such allocations would be October 31, 2007 (70 FR 49731).

should be extended to approved CAIR SIP trading programs.''

In determining the final NO_X allocation recordation deadlines, abbreviated SIP submission deadlines, and schedules for determining NO_X allocations, the Agency is balancing the goals of (1) providing information in advance to source owners and operators regarding their future CAIR NO_X allocations in order to facilitate their decision-making concerning compliance with the requirements to hold allowances and (2) providing States choosing to allocate CAIR NO_X allowances sufficient time to prepare and submit SIP revisions (full or abbreviated revisions) setting forth the State allocation methodology and prepare and submit unit allocations for specific years and providing EPA sufficient time to review and approve these SIP revisions and record these unit allocations. The EPA made adjustments to the proposed NO_X allocation schedules in response to public comments received on the proposal. The Agency believes that the final schedules achieve a reasonable balance between these goals within the constraints of the available time.

The Agency is finalizing a deadline of September 30, 2007 (instead of December 1, 2007 as proposed) for recording NO_X allocations for 2009 for the CAIR FIP trading programs, whether EPA-determined or State-determined using an abbreviated SIP revision. This is the same deadline that EPA is finalizing for recording the first set of State-determined NO_X allocations in a full SIP revision, as discussed above. This is the earliest feasible recordation date based on EPA's assumption that it will take about a year to approve a full revision and about 6 months to approve an abbreviated revision. The EPA would like to stress that, if State-determined NO_X allocations are approved earlier than this deadline (under a full SIP revision or an abbreviated SIP revision) the Agency intends to record the State-determined allocations in source accounts as soon as possible. The Agency does not intend to wait until the recordation deadline to record State-determined allocations and will record EPA-determined allocations for 2009 by this deadline in the absence of an approved full SIP revision or an approved abbreviated SIP revision providing for State-determined allocations.

Similarly, the Agency is finalizing a recordation deadline of September 30, 2008 (instead of December 1, 2008) for recording CAIR FIP NO_X allocations for 2010; and September 30, 2009 (instead of December 1, 2009) for recording CAIR FIP NO_X allocations for 2011, 2012 and 2013. The Agency does not intend to wait until these deadlines to record State-determined allocations and will record EPA-determined allocations for 2010, 2011, 2012 and 2013 according to these deadlines in the absence of an approved full SIP revision or an approved abbreviated SIP revision providing for State-determined allocations. The Agency will record EPA-determined allocations in source accounts one year at a time for 2009 and 2010 in order to provide flexibility to States to determine allocations for their sources.

Beginning with allocations for the 2014 compliance year, EPA is finalizing the proposed recordation deadlines for CAIR FIP NO_X allowances. That is, beginning with the 2014 control period and for each control period thereafter, EPA intends to record NO_X allocations for the CAIR FIP trading programs in source accounts by December 1 of each year for the control period 4 years after the year in which the allocations are recorded. This approach will provide sources with their allocations about 3 years in advance. For example, EPA will record FIP allocations for the 2014 control period by December 1, 2010. The Agency will record EPA-determined allocations only in the absence of an approved full SIP revision or an approved abbreviated SIP revision providing for State-determined allocations.

Table VI–2, below, summarizes the final NO_X allocation recordation deadlines for the CAIR FIP trading programs. Deadlines for future control periods not shown in the table follow the same pattern shown for 2014 through 2016. Note that these are the latest dates by which EPA will record CAIR FIP NO_X allocations. The EPA intends to record State-determined CAIR FIP NO_X allocations as soon as possible after approval of abbreviated SIP revisions.

TABLE VI—2.—RECORDATION DEADLINES FOR CAIR FIP NO_X ALLOCATIONS

CAIR control period	Deadline by which FIP NO_X allocations are recorded (EPA-determined allocations or state-determined allocations using abbreviated SIP revision)
2009	September 30, 2007.
2010	September 30, 2008.
2011	September 30, 2009.
2012	September 30, 2009.
2013	September 30, 2009.
2014	December 1, 2010.
2015	December 1, 2011.
2016	December 1, 2012.

As discussed in the FIP NPR (70 FR 49731), EPA acknowledges that it is preferable for source owners and operators to have at least 3 years lead time with regard to allowance allocations when feasible. A shorter lead time would reduce the period for buying or selling allowances and could prevent sources from participating in allowance futures markets, a mechanism for hedging risk and lowering costs (CAIR NFR, 70 FR 25279). Although lead time may impact the selection of trading strategies, as discussed further below, EPA believes that the selection of compliance methods (*e.g.,* installation of emission control technology, fuel switching, or allowance purchases) should not be impacted by the amount of allowances a source is allocated for a given year.

The final schedule for recording NO_X allocations for the CAIR FIP trading programs in today's rulemaking provides that allocations will be recorded with at least 3 years lead time in all but the initial 4 compliance years. For those initial years, the Agency will work with the States to be able to record State-determined NO_X allocations as soon as feasible and will record EPA-determined allocations by the recordation deadlines in the absence of timely, approved full SIP revisions or timely, approved abbreviated SIP revisions providing for State-determined allocations.

Table VI–3, below, summarizes the final recordation deadlines for NO_X allocations for the CAIR SIP model trading rules (*i.e.,* NO_X allocations contained in full SIP revisions). Deadlines for future control periods not shown in the table follow the same pattern shown for 2015 and 2016. The EPA intends to record State-determined allocations as soon as possible after approval of full SIP revisions.

TABLE VI—3.—RECORDATION DEADLINES FOR CAIR SIP MODEL RULE NO_X ALLOCATIONS

CAIR control period	Deadline by which SIP NO_X allocations are recorded (for States choosing to use the CAIR SIP model rules)
2009	September 30, 2007.
2010	September 30, 2007.
2011	September 30, 2007.
2012	September 30, 2007.
2013	September 30, 2007.
2014	September 30, 2007.
2015	December 1, 2009.
2016	December 1, 2010.

It is likely that source owners and operators will know or at least have a reasonable understanding of the likely amounts of their NO_X allocations substantially earlier than the deadlines for recording allocations in source accounts. States submitting full CAIR SIP revisions must notify EPA of their initial set of unit-by-unit NO_X allocations (covering at least 2009, 2010 and 2011) by October 31, 2006. As indicated in the CAIR, the States have broad discretion in making unit-by-unit allocations, and EPA's review will center on whether the total allocations in a given year exceed the State's trading budget. *See* §§ 51.123(o)(2)(ii)(A) and (aa)(2)(iii)(A). The Agency intends to determine unit-by-unit NO_X allocations for the initial compliance years of the CAIR FIP trading programs by the same date, October 31, 2006 (covering 2009 through 2014). States submitting abbreviated SIP revisions must notify EPA of their unit-by-unit NO_X allocations for the CAIR FIP trading programs by April 30, 2007 (covering at least 2009, 2010 and 2011). As is the case for States submitting full SIP revisions, EPA's review of unit-by-unit allocations will center on ensuring that the State budget would not be exceeded.

Moreover, through each State's public rulemaking, adjudicative, and/or legislative processes for determining allocations, source owners and operators will likely be aware of their State's plans regarding NO_X allocations even in advance of the deadlines by which the States must submit their unit-by-unit allocations to EPA. For example, the public is likely to know whether the State is planning to allocate using the example NO_X allocation method provided in the CAIR SIP model rules, or what alternative allocation method the State is planning to use. This knowledge would give owners and operators a sense for what their allocations will be.

An industry commenter asserted that, if a source did not know until a year before the compliance deadline what its allocation will be the source ''would be completely unable to plan for compliance,'' stating as a reason ''it takes longer than a year to install the controls that might be necessary to meet an unexpectedly low allocation.'' Another commenter asserted that ''Sources use the period of time between finalization of source-by-source allocations and the control period to plan and implement any strategy necessary to achieve compliance.'' The Agency disagrees with these arguments. The EPA believes—and general economic theory suggests—that for owners and operators of sources covered by CAIR trading programs, the determination regarding what will be the lowest cost compliance methods (*e.g.,* installation of emission control technology, fuel switching, or allowance purchases) should not be impacted by the amount of allowances a source is allocated for a given year.

The Agency believes the decision to install NO_X control technology will be made based on evaluating the cost to that source of installing controls compared to the price of NO_X allowances in the allowance market. For a particular source, if the cost to control a ton of NO_X emissions is lower than the NO_X allowance price, then the source will likely choose to control emissions. This is the case regardless of the amount of allowances allocated to the source since using an allocated allowance to cover emissions has an opportunity cost (*i.e.,* the value of that allowance if it were sold in the allowance market) just as using a purchased allowance to cover emissions has a cost (*i.e.,* the price of purchasing that allowance in the allowance market).

Such a source may choose to over-control and make greater reductions than those required on average by the NO_X trading program cap either to free up allocated allowances that can then be sold for more than it cost to free up the allowances or in order to avoid purchasing allowances in the allowance market. In contrast, for a particular source, if the cost to control a ton of NO_X emissions is higher than the NO_X allowance price, the source will likely choose to use allocated allowances or buy allowances to cover its NO_X emissions since that will cost less than installing control technology.

The Agency strongly urges States to submit CAIR SIP revisions (full or abbreviated revisions) to EPA in a timely manner. The EPA will endeavor to work with States to ensure that the Agency can timely approve SIP revisions and record State NO_X allocations in source accounts.[30] However, once EPA-determined NO_X allocations are recorded for a particular control period (which would only occur in the absence of a timely, approved full CAIR SIP revision, or a timely, approved abbreviated CAIR SIP revision providing for State-determined allocations), EPA intends not to record overlapping State-determined allocations for that same control period. Rather, EPA will work with the States to approve SIP revisions with State allocations for control periods after the last control period for which EPA-determined allocations have been recorded in source accounts. It would be highly disruptive to the allowance market if EPA-determined allocations that had been recorded and could be traded in the market could subsequently be rendered invalid due to approval of overlapping State allocations for the same control period.[31]

For States choosing to submit full SIP revisions for CAIR, the Agency suggests they consider designating any of the 4 specific elements that can be included in abbreviated SIP revisions (*e.g.,* NO_X allocations) as being submitted for purposes of both a full SIP revision and an abbreviated SIP revision. Because the Agency anticipates that it will be able to approve abbreviated SIP revisions more quickly than full SIP revisions, a State's designation of its NO_X allocations as an abbreviated SIP revision (as well as part of a full SIP revision) may result in EPA being able to approve the allocations portion more quickly and being able to record the State-determined unit-by-unit allocations sooner.

The Agency intends to work with any State choosing to allocate NO_X allocations (whether through a full SIP revision or an abbreviated SIP revision) and to ensure that the State's allocations, rather than EPA-determined allocations, will be recorded as soon as possible.

The Clean Air Act is designed to give States the first obligation (and opportunity) to prevent significant contribution to a downwind State's nonattainment problems. The EPA only acts in the case where a State does not meet this obligation. The Agency is promulgating CAIR FIPs as soon as possible to assure downwind States that emission reductions will occur in time to help them meet their nonattainment deadlines. Even though EPA is

[30] EPA believes that, if a State submits its CAIR SIP revision later than the submission deadline (September 11, 2006 or March 31, 2007 for a full or abbreviated SIP revision, respectively), it is unlikely that there will be adequate time for the Agency to review and approve the SIP revision and record State-determined NO_X allocations by the recordation deadline under the FIP for the 2009 compliance year. For a CAIR SIP revision submitted after its deadline, EPA intends to withdraw FIP requirements in a State as soon as practical after receiving approvable SIP revisions and will work with any State to ensure a timely withdrawal of the FIP and recording of State NO_X allocations in source accounts. The deadlines for recording CAIR FIP NO_X allocations and CAIR SIP NO_X allocations are presented above in Tables VI–2 and VI–3, respectively.

[31] The discussion in this section focuses on the time frame in which EPA plans to record EPA-determined allocations in order to coordinate with the approval of SIP revisions and the recordation of State allocations, assuming States choose to participate in the EPA-administered CAIR NO_X trading programs. The Agency will also carefully consider the timing of a transition from federal to State-implemented programs for any States choosing to use a method other than the EPA-administered CAIR SIP trading programs to meet their CAIR obligations.

promulgating FIPs, the Agency recognizes that the Clean Air Act assigns first responsibility to the States, and it is EPA's preference to defer, wherever possible, to States the decisions about control mechanisms to prevent significant contribution, including States' decisions about allocation of NO_X allowances.

2. Method for Allocating NO_X Allowances

Proposed NO_X Allocation Methodology. In the NPR, EPA proposed a NO_X allocation approach for both annual and ozone season allowances that is consistent with the example methodology presented in the CAIR SIP model trading rules. The proposed methodology was the same for annual NO_X allowances and for ozone season NO_X allowances, except that the ozone season method uses ozone season heat input not annual heat input.

For existing units, the proposed NO_X allocation methodology used input-based allocations, adjusting the heat input by factors based on fuel type (described later in this section). As in the example allocation methodology in the CAIR SIP model trading rules, for existing units the Agency proposed to use heat input based on the average of the 3 highest amounts of a unit's adjusted heat input for 5 years (2000 through 2004). The EPA took comment on using heat input based on 3 or 4 years of data rather than 5 years.

For new units that have established baselines, EPA proposed that allocations would be based on generation using a modified output approach to convert output to heat input (described below), and allocations to existing units would be updated to take into account new generation, because new units would receive allocations from the pool of allowances shared with existing sources. New units that have not yet established baseline data would receive allowances from a new unit set-aside.

The Agency proposed that EPA would allocate allowances to existing units from the State's EGU NO_X budget for the first 6 control periods (2009 through 2014) for existing sources on the basis of historic baseline heat input. Consistent with CAIR, EPA proposed January 1, 2001 as the proposed cut-off on-line date for considering units as existing units. Allowances for 2015 and later would be allocated from the State's EGU NO_X budget annually, 3 years in advance. These allocations would take into account output data from new units with established baselines (modified by heat input conversion factors to yield heat input numbers, as described below). As new units enter into service and establish a baseline, they would be allocated allowances in proportion to their share of the total calculated region-wide heat input. Allowances allocated to existing units would slowly decline as their share of total calculated heat input decreases with the entry of new units. (Note that once a baseline heat input was established for existing units, this baseline heat input would not change).

EPA proposed to allocate allowances from a new unit set aside to new units that have entered service but have not yet established a 5-year baseline. The allowances from the set-aside would be distributed based on a unit's reported emissions from the previous control period, which would provide allowances for use in meeting the allowance-holding requirement during the interim period before the unit would be allocated allowances on the same basis as existing units.

Consistent with the CAIR SIP example allocation methodology, the new unit set-aside would be equal to 5 percent of a State's emission budget for the years 2009–2013 and 3 percent of a State's emission budget for subsequent years. New units would begin receiving allowances from the set-aside for the control period immediately following the control period in which the new unit commences commercial operation, based on the unit's emissions from the preceding control period. EPA would allocate allowances from the set-aside to all new units in any given year as a group. If there were more allowances requested than exist in the set-aside, allowances would be distributed on a pro-rata basis.

EPA received a number of comments on various aspects of the proposed NO_X allocation methodology. First, while most commenters were supportive of allocating allowances to existing units using historic heat input, some commenters advocated the use of output data for determining allocations, suggesting that such an approach would reward cleaner, more efficient generation, particularly with updating.

Second, most commenters supported the use of a 5-year baseline for allocating allowances based on heat input, noting that a longer period of data collection is more likely to capture a unit's normal operating conditions. One commenter suggested that a shorter baseline period would allow new sources to enter the existing source pool in a more timely manner and thus provide existing sources with more certainty.

One commenter requested clarification on the treatment of replacement units under the allocation provisions, regarding whether they would be treated as new units, and have to reestablish a baseline, or maintain their allowance allocation similarly to retired units.

Several industry commenters made suggestions regarding the use of new unit set-asides in the FIP NO_X allocation methodology. Some stated that EPA should provide that unused allowances from the set-aside would be returned to existing units. The Agency proposed to do so, and is finalizing that any unallocated allowances that remain in the new unit set-asides will be allocated on a prorated basis to the units that received allocations. See §§ 97.142(d) and 97.342(d). One commenter argued against using a new unit set-aside. Another commenter supported the use of a set-aside but argued that new units should be provided access to allocations during their initial year of operation.

In today's rule, EPA is finalizing most of the NO_X allowance allocation provisions as proposed. First, EPA is finalizing the use of an input-based approach for allocating allowances. This approach uses a baseline heat input comprised of operating data from the years 2000–2004, and uses the average of the 3 highest heat input years from this time period for allowance allocation calculations for existing units. This baseline heat input will not be updated over time.

EPA believes, as it stated in the final CAIR, that allocating to existing units based on a baseline of historic heat input data, rather than output data, is desirable because accurate protocols currently exist for monitoring this data and reporting it to EPA, and several years of certified data are available for most of existing units. EPA has chosen not to utilize an updating system for allocating allowances, in order to avoid the subsidization of increased fuel use (or increased electricity generation) and the associated market distortions. If allocations were based on updated heat input (or updated output) data then increased fuel use (or increased electricity generation) would result in increased future allocations and thus would in effect be subsidized.

For new units, EPA is finalizing the use of the proposed modified output approach for calculating baseline heat input, described in detail below, as well as the allocation to new units without a baseline from a new unit set aside of 5 percent of a State's emission budget for the years 2009–2013 and 3 percent of a State's emission budget for subsequent years.

The Agency believes that it is reasonable to provide a set-aside for allocations to new units and further believes that it is reasonable not to provide access to allocations for a new unit during its initial year of operation. The Agency's final methodology provides allocations to new units based on the prior year's emissions until the new unit establishes a baseline and is allocated as an existing unit. The methodology does not provide allowances to a unit in its first year of operation; however, it is straightforward, reasonable to implement, and predictable (see preamble to final CAIR, 70 FR 25281).

As in the CAIR SIP example methodology, after 5 years of operation, a new unit will have an adequate operating baseline of output data to be incorporated into the calculations for NO_X allocations for existing units. (However, as discussed below in section VII of this preamble, allowances are allocated to existing units several years in advance, and a new unit with a baseline may need to continue to get allowances from the new unit set-aside for a few years after the unit's baseline is established.) The average of the highest 3 years from these 5 years will be multiplied by a heat-input conversion factor of 7,900 Btu/KWh to calculate the heat input value used to determine the new unit's allocation from the pool of allowances for existing units. New units will update the heat input numbers only once—for the initial 5-year baseline period after they start operating. As in the CAIR SIP example methodology, existing units as a group will not update their heat input. This eliminates the potential for a generation subsidy because current or future operating behavior will not impact the units' allocations. Retired units will continue to receive allowances indefinitely, thereby avoiding creation of a disincentive to retire less efficient units.

As discussed in section VII in today's preamble, EPA is adopting technical changes to the SIP rules that make it clear that a separate request for new-unit-set-aside allowances must be submitted for each control period for which they are sought and must be submitted by May 1 (rather than July 1) of that control period; the final FIP rules are consistent with these technical changes.

Regarding replacement units, EPA's allocation approach allows such units to retain their NO_X allowance allocation, so as not to provide a disincentive to replace (*e.g.,* repower) older, less-efficient units. As discussed in section VII in today's preamble, a definition of ''replacement'' has been added and the definition of ''commence commercial operation'' has been clarified in the CAIR SIP model trading rules in order to clarify the treatment of replacement units. The final CAIR FIP rules are consistent with these changes in the SIP rules.

Adjustments to Heat Input Data by Fuel Factors. In the NPR, EPA proposed an allocation methodology based on the example allocation methodology in the CAIR SIP model rules, which included adjustments to heat input by fuel type, using fuel adjustment factors that are based on average historic NO_X emissions rates by 3 fuel types (coal, natural gas, and oil) for the years 1999—2002. These adjustment factors are 1.0 for coal-fired units, 0.6 for oil-fired units, and 0.4 for units fired with all other fuels (*e.g.,* natural gas). The factors reflect the inherently different emissions rates of different fossil fuel-fired units.

A number of commenters supported the use of the proposed fuel factors to adjust heat input, arguing that adjusting heat input for fuel type results in a more equitable allocation scheme that would provide allowances that are in closer proportion to historic emissions. Commenters supporting the use of fuel factors also noted that EPA should retain these fuel factors in order to maintain consistency with the model cap-and-trade rule, which would ease any necessary transitions from a CAIR FIP to a CAIR SIP if most States are expected to eventually adopt the model rule. One commenter opposing the use of fuel factors for individual unit allocations argued that adjusting baseline heat input for fuel use is inequitable and penalizes clean generation and is irreconcilable with EPA's ''highly cost-effective'' determination and EPA's air quality modeling. This same commenter also questioned EPA's legal authority to use fuel adjustment factors in the allocation of allowances.

EPA is finalizing the use of the proposed adjustment factors (1.0 for coal-fired units, 0.6 for oil-fired units, and 0.4 for units fired with all other fuels (*e.g.,* natural gas)), to adjust baseline heat input. EPA believes that these adjustment factors appropriately consider the inherently higher emissions rate of coal-fired units and the relatively greater burden on these units to control emissions.

EPA's determination that CAIR control levels are highly cost effective was assessed at the regional, rather than the State, level because of the ability of sources to meet control requirements through a regional cap-and-trade program for EGUs. While the chosen allocation methodology can affect the distribution of compliance costs under the cap-and-trade program, it will have little effect on overall compliance costs or environmental outcome. This is because the incentives provided by cap-and-trade encourage economically efficient compliance over the entire region, as discussed above. The economically efficient outcome will not depend on the relative levels of individual unit allowance allocations.

For this same reason, air quality modeling is not relevant to the determination of allowance allocations, and a given allowance allocation approach, particularly one based on historic data, would have no affect on air quality modeling.

Finally, EPA disagrees with the commenter who questioned its legal authority to use this allocation scheme. The approach selected by EPA is reasonable, is supported by the information available to EPA and is well within the scope of EPA's authority to act. For further discussion of this issue, see the CAIR notice of final action on reconsideration signed the same day as the final FIP notice. While the reconsideration notice addresses the use of fuel factors in the context of determining the State NO_X budgets, the same rationale applies to the use of fuel factors for individual unit allocations.

Cogeneration Units. In the NPR, EPA proposed that for a new cogeneration unit that is a boiler, annual heat input values used to calculate the unit's baseline heat input for purposes of allowance allocations would be determined by converting the available thermal output (Btu) of useable steam from the boiler to an equivalent heat input by dividing the total thermal output (Btu) by a standard boiler/heat exchanger efficiency rate of 80 percent. In today's rule, EPA is finalizing this approach.

For new cogeneration combustion turbines, EPA proposed in the NPR to calculate annual heat input for such a unit by: Converting the available thermal output of useable steam from a heat recovery steam generator (HRSG) to an equivalent heat input by dividing the total thermal output (Btu) by a standard boiler/heat exchanger efficiency rate of 80 percent; and then adding the equivalent heat input for the electrical generation from the combustion turbine, which is calculated by multiplying the turbine's generation (in KWh) by the conversion factor of 3,413 Btu/kWh. EPA is finalizing this approach as proposed.

One commenter suggested that EPA's approaches for allocating to new cogeneration boilers and combustion turbines be modified. This commenter argued that EPA's proposed methodology improperly rewards new cogeneration units by not matching the rate of allocation with the degree of benefits realized by a specific cogeneration unit. The commenter further asserts that EPA's methodology would give a unit that only slightly improves its efficiency the same allowance allocation benefit as a unit that achieves a large increase in efficiency.

The commenter proposes an alternative allocation approach for cogeneration units, the primary goal of which is rewarding electricity as a higher value product than steam.

As EPA noted in the final CAIR preamble, steam and heat output, like electrical output, are useable forms of energy that can be utilized to power other processes. Because it would be nearly impossible to adequately define the efficiency in converting steam energy into the final product for each of the various processes and uses for these outputs, EPA selected an approach that focuses on the effectiveness of a cogeneration unit in capturing energy from fuel input and converting it into the useable forms of steam and electricity. EPA's approach does not attempt to regulate the efficiency of the processes that are powered by the steam output from cogeneration units.

Further, EPA disagrees with the commenters suggestion that the Agency's approach would not provide an incentive for cogeneration units to operate efficiently. The use of modified output, rather than actual heat input, as the basis of determining allowance allocations will promote the development of cleaner and more efficient generation of both electricity and process steam. EPA's approach rewards cogeneration combustion turbines that have HRSGs capable of recapturing greater than 80 percent of the available heat from the combustion turbine exhaust and any auxiliary burners. Furthermore, EPA's use of a 3,413 btu/KWh factor to convert electrical output from the combustion turbine to an equivalent heat input assumes that 100 percent of the combustion turbine's heat input that is not converted to electricity is sent to the HRSG as heat. This approach neglects energy losses in the combustion turbine and generator. EPA believes that any efficiency gains made by reducing these losses will be rewarded by the Agency's approach, by resulting in greater electricity and/or steam output for a given amount of heat input.

Comments on providing sources owned by small entities with a greater share of allowances: In the NPR, EPA took comment on allocating NO_X allowances in such a way as to provide sources owned by small entities with a greater share of allowances. As discussed at proposal, this option was based on the recommendation of one of the Small Business Advocacy Review Panel members. This option would necessitate reducing the number of NO_X allowances available to other affected sources in order to ensure that the overall reduction requirements of CAIR are achieved, but could potentially provide economic relief to small entities that demonstrate economic hardship as a result of the rulemaking.

A number of commenters expressed opposition to such an allocation approach arguing that it is inappropriate for EPA to subsidize small entity sources through additional allocations that result in reduced allowance allocations and increased compliance costs for larger sources. Additionally, some of these commenters noted that such an approach could open the NO_X allowance allocation system to gaming, such as through a company establishing subsidiaries in order to obtain additional allowances made available for small entities. Finally, one of these commenters suggested that such an approach would deviate from the CAIR model rules, and could restrict a State's freedom if the State plans to transition from CAIR FIP allocations to CAIR SIP allocations. One commenter expressed support for the approach described in the NPR, but noted the need for additional clarification on the definition of hardship and how such an approach would fit in with the compliance supplement pool. No potentially affected small entities, as defined in the NPR, submitted comments in support of this approach.

EPA is not finalizing a NO_X allocation approach that gives a greater share of allowances to small entities that demonstrate hardship. EPA believes that the flexibilities inherent in the CAIR FIP trading program, as well as the existence of the Compliance Supplement Pool in the first year of the program, will reasonably address concerns about the economic impact of the rule on all sources. Additionally, the lack of commenter support for such an approach suggests that such an approach may not be warranted.

Comments on use of an auction to distribute NO_X allowances. In the NPR, the Agency asked for comment on using a combination of direct allocation and auctions for distributing NO_X allowances in the proposed CAIR FIP trading programs. The proposed approach was analogous to the approach in the Administration's proposed Clear Skies legislation: For the first CAIR NO_X control period (2009) the Agency would allocate 100 percent of the allowances using the fuel-factor adjusted heat input approach described above. For the second control period (2010) the Agency would allocate 99 percent of allowances to units and auction the remaining 1 percent. The percentage of allowances distributed via auction would increase over time, with the Agency distributing via auction an additional 1 percent of allowances every year for 20 years and then an additional 2.5 percent of allowances every year thereafter, until eventually 100 percent of allowances would be distributed via auction. The Agency also requested comment on appropriate auction procedures for the proposed CAIR FIP trading programs.

The majority of commenters opposed the use of an auction for allocating allowances. One commenter expressed support for an auction and the specific approach that EPA outlined at proposal. This commenter suggested that EPA modeled the auction procedure after that used in the Acid Rain Program. EPA does not necessarily agree with the specifics of the arguments submitted by commenters opposing the use of an auction. However, in light of the comments, EPA is concerned that adoption of the auction approach would be premature because the Agency lacks sufficient information about the potential impact of such auctions on sources and about the appropriate procedures for implementing such auctions. Consequently, the allocation provisions for today's final rule do not include auctions. Today's final allocation methodology, described earlier in this section, provides for the direct distribution of allowances to affected units.

G. Allocation of SO_2 Allowances to Sources

The Agency proposed a CAIR FIP SO_2 cap-and-trade program substantively identical to the CAIR SIP model SO_2 trading rule, which relies on title IV allowances. Title IV allowances have already been allocated in perpetuity to individual units by title IV of the CAA (70 FR 25278). Thus, the FIP proposal did not include an allocation methodology for SO_2 allowances, except with regard to opt-in units.

The Agency received several comments on the use of the title IV allowances in the CAIR FIP SO_2 program. EPA also received several petitions for reconsideration of the CAIR, and granted reconsideration concerning claims that inequities result from using title IV allowance allocations in the CAIR program. EPA received, considered, and responded to numerous comments on this issue as part of the reconsideration process. As explained in the CAIR Notice of Final Action on Reconsideration signed the same day as this action, EPA has decided not to alter the approach taken in the final CAIR.

In today's action, EPA is adopting the CAIR model SO_2 trading rules as the CAIR FIP SO_2 trading rules, with minor revisions to allow for Federal implementation. Thus, EPA is adopting the approach taken in the final CAIR for SO_2 allowance allocation and State SO_2 budgets, which was not changed during the reconsideration process. This approach is explained below, with a brief explanation of EPA's response to the major comments received on this process. A more complete discussion of this issue and the comments received appears in the preamble to the CAIR Notice of Final Action on Reconsideration.

Several issues on SO_2 allowance allocations and State budgets were raised both in comments on the proposed CAIR FIP and in the context of the CAIR reconsideration process. EPA has responded to such FIP comments in the CAIR Notice of Final Action on Reconsideration, a separate action signed the same day as this notice. These comments include the following claims:

- Inequities result from EPA's allocation approach, *i.e.,* using title IV allowance allocations in the CAIR FIP trading program. A few commenters suggested that EPA instead create new CAIR SO_2 allowances and allocate these allowances using a methodology similar to that adopted in the CAIR SIP model trading rule for NO_X.
- EPA's approach to SO_2 allowance allocation and State budgets creates inequities between States.
- New units and independent power production (IPP) facilities, which did not receive allocations under the Acid Rain Program, are unfairly disadvantaged by the CAIR SO_2 budget and allocation methodology.

A variety of approaches to SO_2 allowance allocation were raised and analyzed during the CAIR rulemaking process, including the approach EPA adopted in the final CAIR SIP model rule and in today's final FIP trading rule. Alternative approaches analyzed for the final CAIR included the creation of new CAIR SO_2 allowances and allocating on the basis of historic tonnage emissions, heat input (with alternatives based on heat input from all fossil generation or heat input from coal- and oil-fired generation only), and output (with alternatives based on all generation and all fossil-fired generation). (*See* CAIR Corrected Response to Comments, section X.A.26, Docket #: EPA–HQ–OAR–2003–0053–2172).

Furthermore, as a part of the CAIR reconsideration, EPA reanalyzed State differences in allocation approaches using the same methodology as for the final CAIR, comparing the title IV approach and seven alternative approaches (those discussed above, and those raised by the commenters on the reconsideration, discussed below). EPA also performed additional analyses to evaluate the use of title IV allowance allocations in the final CAIR to see how companies and States fared in terms of the amount of allowances allocated relative to their projected SO_2 emissions. In these analyses, EPA compared 3 alternative SO_2 allowance allocation methodologies that were either referred to by the petitioner in the petition for reconsideration or by commenters on the proposed response to the petition, to the use of title IV SO_2 allowance allocations. EPA considered the following approaches, all using 1999–2002 data: (1) Pure heat input; (2) heat input adjusted for fuel type (*e.g.,* coal, oil and gas); and (3) heat input adjusted for fuel type and coal type (*e.g.,* bituminous, sub-bituminous, and lignite).

Each allocation methodology suggested by the petitioner and commenters during the CAIR rulemaking results in both advantages and disadvantages for different companies and States. However, as EPA explained in the CAIR Response to Comments and again in the CAIR Notice of Final Action on Reconsideration, the analyses performed by EPA demonstrate that EPA's use of title IV allowance allocations is reasonable (*see* CAIR Notice of Final Action on Reconsideration, signed in a separate action the same day as this notice).

Comments about new units and IPPs, which did not receive allocations under the acid rain program, being disadvantaged by the CAIR SO_2 budget and allocation methodology are also addressed in the CAIR Notice of Final Action on Reconsideration, as well as in the applicability section (VI.E) of this final FIP action. EPA considered the allocation of title IV allowances to CAIR region units that are not currently in the Acid Rain Program but that could opt into the Acid Rain Program and receive title IV allowances (*see* 42 U.S.C. 7651i and 18 CFR part 74). EPA assumes that companies owning non-Acid Rain units subject to CAIR will opt into the Acid Rain Program to receive title IV allowances to cover a portion of the units' emissions under CAIR. EPA believes this assumption is reasonable because, as explained in the CAIR Notice of Final Action on Reconsideration, each of these units has the option of becoming an Acid Rain Program opt-in unit at little cost.

The fact that non-Acid Rain units may opt into the Acid Rain Program and receive allocations addresses the concern that the CAIR applicability provisions sweep in units that are not covered under the Acid Rain Program and thus do not receive Acid Rain Program allocations. EPA maintains that the statutory and regulatory provisions governing Acid Rain Program opt-in units allow units that are subject to CAIR, but not to the Acid Rain Program, to opt into the Acid Rain Program. *See* CAIR Notice of Final Action on Reconsideration—signed the same day as the final FIP rule—for additional discussion of authority under section 410(a) of the Clean Air Act.

Further, it should be noted, that not all units required to participate in the Acid Rain Program receive allocations under the Acid Rain Program. While, as noted above, the Acid Rain Program provides allowances for non-Acid Rain units opting into the program as long as they remain non-Acid Rain units, the Acid Rain Program provides no allocations for virtually all new Acid Rain units (*i.e.,* Acid Rain units commencing commercial operation on or after November 15, 1990) and for all existing units that were not Acid Rain units when the allowance allocations were completed in 1998 but that become Acid Rain units thereafter. By using title IV allowance allocations in the CAIR SIP SO_2 model trading program (adopted today as the CAIR FIP SO_2 trading program), EPA is taking the same approach to allocations for these units.

Finally, it is worth noting that not all title IV allowances for future years have been allocated. 250,000 allowances will continue to be auctioned for the years 2012 and thereafter, and these allowances could be used to comply with the requirements of CAIR. The availability of these allowances ensures that all sources, including new units and non-title IV sources, will have access to a pool of allowances.

In summary, EPA's use of title IV allowances in the CAIR (and CAIR FIP) SO_2 trading program is supported by: (1) EPA's determination that this approach is necessary to maintain the efficacy of the title IV program and prevent erosion of confidence in cap-and-trade programs in general; and (2) the results of EPA's analysis which indicate that the allocations resulting from this approach are reasonable.

A few comments related to SO_2 budgets and allocations submitted in response to the proposed CAIR FIP were unique to this action and, therefore, are addressed below.

One FIP commenter states that the CAIR final allocation methodology is ''inequitable'' because lower emitting units would buy allowances from higher emitting units that install emission controls. However, it is unclear why such a result would actually be inequitable. On the contrary, the owner of each of the units involved would be choosing to adopt the most economic compliance strategy in light of the unit's emission control costs and the market value of allowances. The ability of the owners to make such choices reflects the flexibility provided by a cap-and-trade program.

Moreover, EPA believes that for purposes of evaluating various allocation methodologies, computing allocations on a company-by-company basis is more appropriate than comparing allocations on a unit-by-unit basis. This is because, while one unit could be allocated fewer allowances under one methodology, another unit owned by the same company could be allocated more allowances, which may offset the smaller allocation of the first unit.

This same commenter performed its own analysis of differences in SO_2 State budgets for select States, comparing EPA's finalized method to ''a heat input method (similar to the NO_X allowance allocation method).'' The commenter described the 6 of its selected States as ''[l]ow-emitting states that already have made substantial investments in SO_2 emissions controls (*e.g.,* South Carolina, Minnesota, Iowa, Wisconsin, Virginia, and North Carolina).'' Another 5 States the commenter analyzed were described as ''high-emitting states (*e.g.,* Ohio, Georgia, West Virginia, Pennsylvania and New York).'' *See* Docket ID: EPA–HQ–OAR–2004–0076–0204. The commenter's characterization of States as ''low-'' or ''high-emitting'' and as having made ''substantial'' SO_2 control investments is entirely unsupported. The commenter provided no criteria or factual basis for making such characterization, and the analysis submitted by the commenter appears to disregard the cost of installing controls in order to generate any excess allowances in States that are characterized as ''high-emitting.'' Further, only 3 utilities from the State's listed as ''low-emitting'' by the commenter, submitted adverse comments on EPA's use of title IV.

Nevertheless, as mentioned above, EPA performed a comprehensive State-by-State SO_2 budget analysis of all CAIR States and a variety of alternative methodologies to evaluate the claim of inequity as a part of the CAIR Notice of Final Action on Reconsideration. In that analysis, EPA demonstrated that the CAIR (and CAIR FIP) SO_2 State budget and allocation methodology provides a reasonable result. EPA's use of title IV allowances in the CAIR (and CAIR FIP) SO_2 trading program is supported by: EPA's determination that this approach is necessary to maintain the emissions reductions from, and effectiveness of, the title IV program; prevent erosion of confidence in cap-and-trade programs in general; and EPA's analysis showing that the allocations resulting from this approach is reasonable.

H. Allowance Banking

Allowance banking is the retention of unused emissions allowances from one calendar year for use in a later calendar year (or from one ozone season for use in a later ozone season). Banking allows sources to make reductions beyond required levels and ''bank'' the unused allowances for use later. Generally speaking, banking has several advantages. Allowance banking can encourage earlier or greater reductions than are required from sources, stimulate the market and encourage efficiency, and provide flexibility in achieving emissions reduction goals. The CAIR FIP NPR proposed a trading program with unrestricted banking.

Comments on the Banking of Allowances

Several commenters supported EPA's proposal to allow unrestricted banking of allowances. In general, they agreed with EPA that this approach: provides incentives for sources to make emission reductions beyond required levels, in some cases earlier emission reductions; is consistent with the CAIR SIP model trading rules; and provides flexibility in compliance strategies. Supporters of unrestricted banking also agreed with the EPA assessment that the use of banking restrictions, such as the ''flow control'' in the Ozone Transport Commission (OTC) cap-and-trade program, is complicated to understand and implement and caused market complexity.

Other commenters supported the use of banking restrictions claiming that allowing unrestricted banking delays emission reductions. These commenters did not provide additional details regarding an alternative to banking or, if banking were to be restricted, what restrictions should be used.

Final CAIR FIP Cap-and-Trade Program

Today's final CAIR FIP cap-and-trade programs allow unrestricted banking. EPA disagrees with commenters who claimed that unrestricted banking simply delays emission reductions. The ability of sources to sell allowances, without restriction, provides incentives for sources to over-control their emissions prior to emission reduction deadlines. As discussed in the CAIR NFR (section VIII.E), this creates a ''glide path'' towards the final emission cap levels. Emission levels along the glide path, which may not equate to the emissions caps for any given year, are the levels of emission reductions that are shown to address the pollution transport issue.

EPA also agrees with supporting commenters that banking restrictions, such as ''flow control,'' introduce uncertainty into source planning by introducing the potential for devaluing allowances on short notice. EPA also agrees that allowing unrestricted banking in the CAIR FIP cap-and-trade programs provides consistency with the CAIR cap-and-trade programs.

I. Incentives for Early Reductions

When sources reduce their SO_2 and NO_X emissions prior to the first phase of a multi-phase cap-and-trade program, it creates a slope of emissions that gradually declines over time, an emission reduction ''glide path'' that provides early environmental benefit and lowers the costs of compliance. Each of the cap-and-trade programs proposed in the CAIR FIP NPR incorporated the incentives for early reductions provided in the respective CAIR model trading programs: *i.e.,* the banking of title IV allowances allocated of vintage years pre-2010 into the CAIR SO_2 trading program, the compliance supplement pool (CSP) in the CAIR NO_X annual program, and the banking of NO_X SIP Call allowances of pre-2009 vintage into the CAIR NO_X ozone season program. While EPA believes that modeling has shown that the CAIR and CAIR FIP timelines are as early as feasible, early reductions incentives provide a mechanism for those facilities that can reduce their emissions prior to the implementation deadline to receive some credit. By shifting some emission reductions earlier, some environmental benefit is realized earlier. In addition, the CAIR FIP trading programs' early reduction mechanisms provide a way for companies that may have some difficulty meeting the implementation timeline to start early and achieve the mandated reductions on a more gradual pace. These mechanisms, along with public comment on each, are discussed below.

1. SO_2 Annual Program

The proposed CAIR FIP SO_2 annual cap-and-trade program would provide incentives for sources to reduce their SO_2 emissions prior to the 2010 implementation date by allowing affected sources to use title IV SO_2 allowances of vintage 2009 and earlier for compliance with the CAIR FIP program at a 1-to-1 ratio. The CAIR FIP trading program adopts the early reductions incentive mechanism in the CAIR model trading rules. The modeling for the CAIR assumed the existence of such incentive mechanisms and showed that the SO_2 cap-and-trade program, with this early incentive mechanism, will achieve the level of SO_2 reductions needed to meet the CAIR goals.

Comments on Early Emission Reduction Incentives in the CAIR FIP SO_2 Cap-and-trade Program. In general, commenters supported EPA's approach of allowing sources to bank title IV SO_2 allowances into the CAIR FIP SO_2 trading program at a 1-to-1 ratio. One commenter opposed this mechanism because ''EPA does not explain how carrying these allowances over to the CAIR bank creates an incentive for reductions if the allowances already exist.'' The commenter continues by highlighting that EPA modeling projects emissions to be approximately 37 percent above the annual CAIR emission caps for the first 5 years after the compliance deadline.

Final CAIR FIP SO_2 Annual Cap-and-trade Program. Today's action allows sources to bank title IV SO_2 allowances into the Federal CAIR SO_2 annual cap-and-trade program at a 1-to-1 ratio. EPA disagrees with the comment that allowing banked allowances does not promote early reductions because allowances were banked before CAIR was proposed or finalized. Allowing sources to bank title IV allowances in the CAIR FIP SO_2 annual program provides incentive for sources to: (1) Preserve reductions already made (whether before or after CAIR was proposed) rather than negating these reductions by increasing their emissions before 2010 and ''spending down'' their bank; and (2) to reduce further emissions before 2010 and increase their bank. This incentive is created by allowing sources to benefit financially from allowances banked before 2010 that retain their value in the CAIR FIP and CAIR SO_2 trading programs. All pre-2010 vintage allowances will retain their value in the CAIR and CAIR FIP trading programs because they can be used (on a one-allowance-per-ton basis) to meet the requirement to hold allowance to cover emissions under the CAIR FIP (and CAIR) trading programs. In summary, a source has an incentive to continue banking allowances before 2010, which results in the preservation of existing emission reductions and the creation of further reductions.

The commenter noted that allowing banking into the CAIR FIP SO_2 annual program results in the emissions being greater than the cap levels. However, the gradually declining emissions ''glide slope'' is one of the keys to cap-and-trade programs achieving cost-effective reductions. As discussed above, EPA's modeling for CAIR showed that, with the pre-2010 title IV SO_2 allowance banking and subsequent use of the bank, the environmental goals of reducing the interstate transport of pollution will be achieved.

2. NO_X Annual Program

The FIP NPR proposed a CAIR FIP NO_X annual cap-and-trade program that included a Compliance Supplement Pool (CSP) to provide an incentive for early, annual NO_X annual emission reductions. The CSP would provide, for each affected State, a pool of CAIR NO_X annual allowances from which EPA could distribute allowances for early, surplus NO_X emissions reductions occurring in the years 2007 and 2008. The CSP would provide a total of 200,000 annual NO_X allowances of vintage 2009 for the CAIR region (including Delaware and New Jersey's share of the pool), apportioned to each State, which would be in addition to each State's annual NO_X budgets. Table V–3 in this preamble sets forth the CSP amounts by State. The CAIR FIP trading program adopts the CSP established in the CAIR model trading program. However, where the CAIR model trading program provides States with flexibility to determine what constitutes an early reduction qualifying for an allocation of allowances from the CSP, the Administrator allocates the CSP in the CAIR FIP trading program. As a result, the CAIR FIP, provides a specific methodology for determining early reductions than is in the CAIR model rules. This methodology is explained below.

As proposed, Federal CSP allowances could be distributed to sources based upon: (1) Implementing NO_X control measures that result in early emission reductions in 2007 or 2008, *i.e.,* reductions beyond what is required by any applicable State or Federal emissions limitation; or, (2) a demonstration of need for an extension of the 2009 deadline for implementing emission controls. See section VII.A. in the CAIR NFR preamble (70 FR 25256–25263). The Agency proposed that, in order for early emission reductions to qualify for allowances from the CAIR FIP CSP, sources would have to demonstrate that—for each year for which they apply for CAIR FIP CSP allowances—they had an annual NO_X emission rate below 0.25 lb/mmBtu. In addition, sources who also participate in a title IV NO_X averaging plan would have to demonstrate that the plan-wide weighted-average annual NO_X emission rate for each such year was equal to or lower than the plan-wide rate for the preceding year. Sources meeting this criterion could request early reduction credit equal to the difference between 0.25 lb/mmBtu and the unit's actual emission rate multiplied by the unit's actual heat input for the applicable control period.

Comments on Federal CSP. Several commenters supported the use of a CAIR FIP CSP to encourage early emission reductions and provide sources access to some additional allowances for demonstrated reliability needs. Some commenters supported including a CAIR FIP CSP but were concerned about the use of additional criteria (*i.e.,* a 0.25 lb/mmBtu threshold and the limitation on emissions under a title IV NO_X averaging plan). Other commenters believed that providing additional allowances would delay emission reductions and that EPA's analysis already demonstrated that the mandated emission reduction levels and timelines are feasible.

EPA disagrees with commenters that believe the CAIR FIP CSP should not include the criterion that units can only request early reduction credit equal to the difference between 0.25 lb/mmBtu and the unit's actual emission rate multiplied by the unit's actual heat input for the applicable control period. EPA believes that the 0.25 lb/mmBtu threshold (coupled with the limitation on emissions under a title IV NO_X averaging plan) provides a reasonable proxy for the more general standard that emission reductions exceed what is required under State or Federal law.[32] Applying these criteria will provide reasonable assurance that only early reductions (*i.e.,* reductions exceeding existing requirements) will be awarded CAIR FIP CSP allowances. Further, because these criteria are clearer and more precise than the general standard that reductions exceed existing

[32] The 0.25 lbs/mmBtu criterion is based upon EPA analysis described in the CAIR FIP CSP Technical Support Document and is similar to the criterion used for the CSP established under the NO_X SIP Call section 126 action. (65 FR 2674, January 18, 2000).

requirements, the criteria will give owners and operators greater certainty when making reasonable projections about how many allowances they may receive for their early reductions and will, thereby, encourage early emission reductions.

Additionally, EPA disagrees with commenters that believe the CAIR FIP CSP should not include the distribution criterion that units in a title IV NO_X averaging plan would have to demonstrate that the current plan-wide average NO_X emission rate be less than the plan-wide average for the previous year. The averaging plan criterion acknowledges the unique circumstances for units that are in title IV NO_X averaging plans, where emission reductions by one unit in the plan may be offset by emission increases by another unit in the plan, thereby, making it difficult to determine whether early reductions are taking place. As discussed above, EPA believes that this criterion, coupled with the 0.25 lb/mmBtu criterion, provides a reasonable proxy for the general standard that reductions exceed existing requirements and that the criteria provide greater certainty about the rewarding of CAIR FIP CSP allowances. EPA believes it is appropriate to base the averaging plan criterion on a single, prior year's plan-wide average emission rate because the averaging of emissions across a plan tends to mitigate year-to-year fluctuations.

EPA disagrees with commenters that believe a CAIR FIP CSP will significantly delay emission reductions. For the CAIR NFR, EPA conducted IPM modeling of the CAIR trading programs to evaluate the effect of the 200,000 CAIR annual CSP NO_X allowances. The modeling shows that these CSP allowances do not have a significant impact on regionwide NO_X emissions.

CAIR FIP CSP Finalized in Today's Action. Today's rule finalizes the CAIR FIP CSP mechanism proposed in the FIP NPR. EPA believes that including a CAIR FIP CSP will encourage early emission reductions and alleviate concerns of some sources that they have unique issues concerning compliance with the 2009 implementation deadline of the CAIR FIP trading program. (See 70 FR 25286 for additional discussion of the CAIR CSP.) EPA also believes that the CSP will not significantly impact the achievement of emission reduction goals.

The CAIR FIP CSP includes specific criteria for distributing allowances based upon early emission reductions that do not appear in the CAIR SIP trading programs. (Note that, as discussed in section IV.E of today's action, States choosing the abbreviated SIP revision option may choose to use the CAIR FIP CSP or the CAIR CSP mechanism or may choose another mechanism consistent with § 51.123(e)(4).) EPA believes that the criteria will reasonably ensure that the award of CSP allowances will be aimed at early reductions and give owners and operators greater certainty to make reasonable projections about how many allowances they may receive for their early reductions.

3. NO_X Ozone Season Program

The final CAIR FIP NO_X ozone season cap-and-trade program allows the banking of NO_X SIP Call allowances of vintage years 2008 and earlier and their use in the CAIR FIP NO_X ozone season program to meet the requirement to hold allowances covering their emissions. This provides incentive for sources in the NO_X SIP Call to reduce their ozone season NO_X emissions before 2009 and bank additional allowances into the CAIR FIP NO_X ozone season program. This early-reduction incentive mechanism is in the CAIR NO_X ozone season model rule and is adopted as part of the CAIR FIP NO_X ozone season cap-and-trade programs. EPA did not receive any comments specifically addressing the early-reduction incentive mechanism in the CAIR FIP NO_X ozone season program. However, several commenters generally supported mechanisms to provide incentives for early emission reductions. The Agency is finalizing this mechanism.

J. Monitoring and Reporting Requirements

Under the CAIR SIP model cap-and-trade rules, sources are required to monitor and report NO_X and SO_2 mass emissions in accordance with 40 CFR part 75. (*See* Section VIII.H. of the CAIR NFR preamble, 70 FR 25288.) Many CAIR sources are measuring and reporting SO_2 mass emissions and NO_X emission rate year round under the Acid Rain Program. Many additional sources are also reporting NO_X mass emissions at least during the ozone season and often year round under the NO_X SIP Call. The CAIR SIP model rules require continuous monitoring of NO_X mass emissions by all existing, affected units by January 1, 2008 using part 75 certified monitoring systems for the NO_X annual program and May 1, 2008 for the NO_X ozone season program. SO_2 emissions must be monitored by those same units beginning January 1, 2009.

Today's rulemaking requires part 75 monitoring, reporting, and recordkeeping for all units subject to the CAIR FIP cap-and-trade programs. This is consistent with the CAIR model cap-and-trade programs. For additional discussion on monitoring and reporting requirements, *see* Section VIII.H. in the CAIR NFR preamble (70 FR 25288).

K. Interactions With Other CAA Programs

In the CAIR NFR preamble, section IX discusses interactions between the NO_X SIP Call and CAIR. Section IX also discusses interactions between the title IV Acid Rain Program and CAIR. Today's final rule covers the same States as the CAIR and adopts as FIP trading programs the CAIR SIP model trading rules, thus the interactions would be as described in CAIR (70 FR 25289–25299).

VII. What Are the Revisions of the CAIR SIP Rule, Including the CAIR Model Cap-and-Trade Rules?

The EPA is adopting several revisions of the CAIR SIP rule. One such revision is part of EPA's final action on reconsideration concerning the applicability provisions as they relate to solid waste incineration units. In particular, for the reasons stated in the preamble of the August 24, 2005 proposed rule, EPA is finalizing the EGU definition in §§ 51.123(cc) and 51.124(q). The EGU definition, as adopted, excludes certain solid waste incineration units from being EGUs; limits EGUs to units that, as of November 15, 1990 or any time later, serve a generator with a greater than 25 MWe nameplate capacity producing electricity for sale; and clarifies language concerning cogeneration units. The final EGU definition is the same as the definition proposed on reconsideration except for a few minor changes, *e.g.,* to clarify the circumstances under which a unit that is not an EGU, but that begins to combust fossil fuel or to serve a generator with a 25 MWe nameplate, becomes an EGU. (For the reasons in the preamble of the August 24, 2005 proposed rule, the language in the final EGU definition is also reflected in final applicability provisions of the CAIR model trading rules and the CAIR FIP trading programs.) EPA is also finalizing, as discussed in detail above, provisions allowing States to submit abbreviated SIP revisions.

EPA is also adopting a number of revisions of the CAIR SIP model cap-and-trade rules. The revisions are generally necessary to integrate each of the CAIR SIP model cap-and-trade programs with its corresponding CAIR FIP cap-and-trade program, and some of the final revisions reflect needed technical and clarifying changes. The revisions are consistent with the analogous provisions of the final CAIR FIP trading programs. One such revision is part of EPA's final action on reconsideration concerning the applicability provisions as they relate to solid waste incineration units.

In particular, several definitions of terms are revised, and a few new definitions are added. For example, the definitions of ''CAIR designated representative'' and ''alternate CAIR designated representative'' are modified to require that the respective individuals designated for these positions be the same individuals as designated, for a given source, as the designated representative and alternate designated representative under any applicable trading program under the Clean Air Mercury Rule (CAMR). (CAMR was promulgated in May 2005 to achieve reduction of national mercury (Hg) emissions. *See* 70 FR 28606, May 18, 2005.) This will greatly simplify the administration of the allowance tracking systems for the trading programs, including the Hg trading programs, for which EPA intends to propose analogous changes. (In order to implement this change, a new definition for ''Hg Budget Trading Program'' is added to the CAIR SIP model trading rules.)

As a further example, a new definition is added (''solid waste incineration unit''), and certain definitions are modified (''commence commercial operation'' and ''commence operation''), to reflect final changes in the applicability provisions for the CAIR model trading rule and to clarify and streamline the language in the definitions. In particular, the modified definitions are consistent with the above-noted revisions of the applicability provisions that: exempt certain solid waste incineration units from the CAIR trading programs; limit applicability to units that, as of November 15, 1990 or any time later, serve a generator with a greater than 25 MWe nameplate capacity producing electricity for sale; and clarify the language concerning cogeneration units. In addition, the ''commence commercial operation'' and ''commence operation'' definitions are simplified by removing unnecessary language, such as the language referring to CAIR opt-in units, which is unnecessary because these terms are not used in the CAIR opt-in rule provisions. Also, the simplified definition of ''commence operation'' means that all units will use the same ''commence operation'' definition in determining, for purposes of allocations under § 96.142 and 96.342, their baseline periods for calculating adjusted or converted heat input. (The provisions for opt-in units that subsequently become subject to the allocation provisions of § 96.142 and 96.342 and lose their opt-in status are also revised to reflect this approach.)

Further, a definition of ''replacement,'' a term used in the ''commence commercial operation'' and ''commence operation'' definitions, is added in order to clarify the application of the latter two terms to cases when a unit is replaced by another unit, rather than simply being modified. The revised applicability provisions and related definitions in the CAIR SIP model trading rules are consistent with the applicability provisions and related definitions in the final CAIR FIP trading rules and with the above-discussed EGU definition in §§ 51.123(cc) and 51.124(q).

In addition, the definitions of ''CAIR NO_X allowance,'' ''CAIR NO_X Annual Trading Program,'' ''CAIR SO_2 allowance,'' ''CAIR SO_2 Annual Trading Program,'' ''CAIR NO_X Ozone Season allowance,'' and ''CAIR NO_X Ozone Season Trading Program'' are modified to provide for integrated operation of each CAIR SIP trading program administered by EPA for any State with its corresponding CAIR FIP trading program for any State. Under these revised definitions, CAIR NO_X, SO_2, or NO_X Ozone Season allowances issued under either type of program for any State would be a ''CAIR NO_X allowance,'' ''CAIR SO_2 allowance,'' or ''CAIR NO_X Ozone Season allowance,'' respectively, usable by owners and operators for meeting the allowance-holding requirement under the corresponding CAIR SIP model trading program or CAIR FIP trading program for any State.

EPA is also simplifying and clarifying other definitions. For example, the term ''allocate'' is simplified to cover allocation of allowances for either the CAIR SIP or FIP trading programs. The definition of ''maximum design heat input'' is simplified, and the definition of ''nameplate capacity'' is clarified.

Further, the retired unit exemption provisions are revised. The revisions clarify that the provisions concerning CAIR designated representatives and the appeal procedures generally applicable to final actions of the Administrator are applicable to retired units and to final actions of the Administrator with regard to retired units.

In addition, the provisions listing the content of a certificate of representation are revised to clarify that the identification of each unit covered by the certificate of representation includes identification and nameplate capacity of each generator served by the unit. EPA believes that the current rule language requiring ''identification'' of each unit subject to the trading program is already broad enough to encompass such information concerning each generator served by the unit, particularly since only a unit serving a generator with a nameplate capacity greater than 25 MWe can be subject to the CAIR trading programs. However, EPA is revising the language to make it clear that generator information is required in the certificate of representation.

EPA is also making technical revisions to the provisions concerning the reflection in certificates of representation of the owners and operators of the source and units involved. The changes make it clear that all owners and operators must be listed and that those that should be, but are not, listed are still bound by the certificate of representation and the CAIR designated representative.

Further, new provisions concerning designated representatives and authorized account representatives are added to clarify that such individuals may use agents in order to make electronic submissions. The existing CAIR SIP model trading rules provide for certain submissions (*i.e.,* certificates of representation, applications for general account, allowance transfers, and quarterly emissions reports) required to be ''in a format prescribed'' or ''in a format specified'' by the Administrator. (The terms ''prescribed'' and ''specified'' have the identical meaning in these contexts.) These submissions may be made, and in the case of quarterly emissions reports must be made, electronically. Although the formats for the CAIR trading programs have not yet been developed, other EPA-administered trading programs (*i.e.,* the Acid Rain Program and the NO_X Budget Trading Program) have analogous language concerning submission formats and have existing, prescribed formats for submissions. The electronic formats prescribed by the Administrator for the Acid Rain Program and the NO_X Budget Trading Program allow the designated representative or authorized account representative, as appropriate, to designate other individuals (''agents'') who may make the electronic submissions for the designated representative or authorized account representative, who is fully bound by the agent's actions. EPA maintains that the references in the Acid Rain Program and NO_X Budget Trading Program regulations to ''prescribed'' (or ''specified'') formats, coupled with the existing electronic formats, provide the legal authority necessary for designated representatives and authorized account representatives to use agents to make electronic submissions in the applicable trading programs. EPA plans to adopt electronic formats for the CAIR trading programs that, similarly, allow for the use of agents. EPA believes that the existing references in the CAIR SIP model trading rules to ''format[s] prescribed '' or ''specified'' by the Administrator, when coupled with the appropriate electronic formats, will similarly provide the legal authority necessary for the use of agents. However, in order to remove any uncertainty about such legal authority, EPA is adding provisions to the CAIR SIP model trading rules (and to the CAIR FIP trading rules) that explicitly authorize the use of agents for electronic submissions.

In addition, in the permitting provisions, EPA is revising the deadline for submission of CAIR permit applications to run from the later of January 1, 2009 (for the NO_X programs) or 2010 (for the SO2 program) or the date on which the unit commences commercial operation, rather than the date on which the unit simply commences operation. A unit's date of commencement of commercial operation is not likely to range from more than a few days to a few months later than the unit's date of commencement of operation since owners and operators of EGUs generally prefer to minimize using fuel without producing electricity. Moreover, running the permit application deadline from the commencement of commercial operation avoids the need for complex provisions in the definition of ''commence operation'' to address, solely for permitting purposes, units that are not subject to the CAIR trading programs when they first combust fuel and that subsequently become CAIR units. (The simplified definition of ''commence operation'' reflects this revision.)

Further, EPA is adopting certain technical corrections in the NO_X allowance allocation provisions. In particular, the current provisions concerning timing of submission of unit allocations by the permitting authority to the Administrator provide that if the unit allocations are not submitted on time, the Administrator will assume that the allocations are the same as in the prior year. If the year for which allocations are submitted late is 2015 (the beginning of phase II of the CAIR trading programs, the Administrator will assume that the allocations are 83% of the 2014 allocations. EPA is removing these provisions both for existing and new units because they seem unlikely to be used, are unduly complicated, and may result in 2015 in total allocations that do not equal the respective State trading budget. Moreover, there are no comparable provisions in the CAIR FIP trading rules.

EPA is also revising the current provisions for new unit allocations that provide that a new unit is eligible for allocations from the new unit set-aside until that unit has operated long enough to develop a baseline heat input using the 3 highest figures for converted control period heat input out of such figures for the first 5 years of operation. At that point, the unit is supposed to be allocated allowances from the pool of allowances allocated to all units that have a baseline heat input. However, allowances for units with baselines are allocated a number of years in advance of the first year for which such allowances may be used to meet the allowance-holding requirement. Consequently, it is possible for a new unit to have a baseline as of a given year but find that no more allowances are available for that year for units with baselines because the allowances for that year were allocated before the time when the new unit's baseline was developed. A new unit could find that, for some years, it was both ineligible for the new unit set-aside and unable to obtain an allocation from the pool for units with baselines. EPA intended that new units move seamlessly from new-unit-set-aside eligibility to units-with-baselines allocations and not to fall in between the two types of allocation procedures. EPA is revising the allocation provisions to clarify that a new unit continues to be eligible for the new unit set-aside so long as the unit is not allocated allowances from the pool for units with baselines allocations either because the new unit does not yet have a baseline or because all the allowances for units with baselines have already been allocated for the year involved.

EPA also is adopting technical changes that make it clear that a separate request for new-unit-set-aside allowances must be submitted for each control period for which they are sought and must be submitted by May 1 (for the NO_X annual program) or February 1 (for the NO_X ozone season program) of that control period. This approach will reasonably put the burden on owners and operators to inform the State permitting authority each year. This will ensure that the State permitting authority can keep track, for each control period in the future, of which units are seeking new-unit-set-aside allowances for that control period. These submission deadlines will give the State permitting authorities more time to process (which may include, when appropriate, opportunity for public comment) the requests in time to submit the allocations to the Administrator for recordation by December 1 (for the NO_X annual program) or September 1 (for the NO_X ozone season program). Similarly, EPA is revising the deadline for submission of requests for allowances from the compliance supplement pool to be May 1, 2009 (rather than July 1, 2009). Just as emissions data for 2008 will be available in time for new-unit-set-aside requests due on May 1, emissions data for 2008 (and 2007) will be available in time for compliance-supplement-pool requests due on May 1. The July 1, 2009 deadline did not provide sufficient time for State permitting authorities to process the requests.

In addition, EPA is adopting technical changes to the provisions for recordation of allowance allocations, for the reasons discussed below and elsewhere in this preamble. For example, the current provisions require the Administrator to record the initial allocations for 2010–2014 by December 1, 2006. Because State plans are not due until September 11, 2006, EPA cannot review and approve all State plans in time to record allowance allocations in those plans by December 1, 2006, which date is changed to September 30, 2007. Further, the current provisions also require the recordation of allocations for subsequent years to occur only after completion of the end-of-year compliance determination process for a previous year. Because of the need to finalize emissions data for a year before the compliance determination process for that year can be completed, the current provisions may delay recordation for a number of months. However, as a matter of logic, there is no necessary connection between one year's compliance determination and the future year's allocation recordation. Consequently, EPA is removing the connection made in the current provisions and is setting an independent deadline (December 1) for allocation recordation, which will result in recordation several months earlier than under the current provisions.

Further, EPA is adopting technical changes to the provisions referring to when an allowance transfer by the owner of an allowance to another allowance tracking system account is ''correctly submitted.'' The changes clarify that a ''correctly submitted'' allowance transfer is one that references allowances that both: Were in the owner's allowance tracking system account when the allowance transfer form was submitted to the

Administrator; and continue to be in such account when the allowance transfer form is processed by the Administrator.

In addition, EPA is revising the provisions for deducting allowances to determine compliance with the allowance-holding requirement under the trading programs. The revisions do not change the requirements that an allowance usable for compliance: be allocated for the year, or a year before the year, for which compliance is being determined; and be in or covered by a proper request for transfer into the source's compliance account by the allowance transfer deadline. However, the statement indicating that the allowance must also not be necessary to account for excess emissions for a prior year is removed because it is confusing and inconsistent with the compliance procedures that EPA has been using in its ongoing cap-and-trade programs, *i.e.,* the Acid Rain Program and the NO_X Budget Trading Program.

Further, as explained in the preamble of the August 24, 2005 proposed rule, EPA is adopting revisions clarifying the application of excess emissions penalties for a source that is subject to, and has excess emissions under, both the Acid Rain Program and the CAIR SO_2 model trading rule. Under these revisions, a given ton of SO_2 excess emissions at a source, the owners and operators of the source will be liable, if that ton is an excess emission under both the Acid Rain Program and the CAIR trading program, for the offset (the deduction of one allowance) and the dollar penalty ($2,000 inflation adjusted) under the Acid Rain Program and liable, if that ton is only an excess emission under the CAIR trading program, for the 3-for-1 allowance deduction under the CAIR trading program.

In addition, EPA is revising certain provisions concerning the use of substitute data when the owner or operator of a unit adds a new stack or flue and fails to meet the deadline for monitoring certification. EPA proposed, but is not finalizing, procedures that would allow for substitute data other than data reflecting maximum potential emissions. Because EPA believes that the proposed provisions would in fact still result in the use of data reflecting maximum potential emissions, EPA is not adopting the proposed provisions.

Further, EPA is removing a provision that separately requires units to monitor heat input. The provision is unnecessary because heat input monitoring is already explicitly required in the monitoring provisions in § 96.170, 96.270, and 96.370.

In addition, EPA is revising the requirements for CAIR opt-in permits for owners and operators planning to repower an opt-in unit and seeking special allowance allocations for such unit. The revisions require that the owners and operators state, in the permit application, that they intend to repower the opt-in unit before January 1, 2015. EPA believes that this is a reasonable requirement to prevent frivolous requests for the special allocations for opt-in units to be repowered. The permit application, like any submission for owners and operators, must of course include a certification as to the truth, accuracy, and completeness of the submission.

A few changes are adopted for some other provisions (concerning, *e.g.,* the submission deadlines for quarterly emissions reports for CAIR opt-in units and units applying to be CAIR opt-in units and inclusion of the CAIR opt-in permit in the CAIR permit and the title V permit for the source that includes the CAIR opt-in unit) of the CAIR SIP model trading rules. These other changes are similarly technical or clarifying in nature. All of these changes are consistent with the analogous provisions in the final CAIR FIP trading rules.

VIII. What Are the Revisions of Acid Rain Program Regulations?

A few changes are adopted for the Acid Rain Program regulations. As explained in the preamble of the August 24, 2005 preamble, EPA is adopting revisions aimed at facilitating interaction among the CAIR FIP trading programs, any EPA-administered CAIR SIP trading programs, and the Acid Rain SO_2 trading program and revisions related to the change, finalized in the CAIR rulemaking, from unit-level to source-level compliance with the Acid Rain SO_2 trading program.

In addition, EPA is revising the provisions listing the content of a certificate of representation to clarify that the identification of each unit covered by the certificate of representation includes identification and nameplate capacity of each generator served by the unit. EPA believes that the current rule language requiring ''identification'' of each unit subject to the trading program is already broad enough to encompass such information concerning each generator served by the unit, particularly since only a unit serving a generator with a nameplate capacity greater than 25 MWe can be subject to the Acid Rain Program. However, EPA is adopting revised language to make it clear that generator information is required in the certificate of representation.

EPA is also making technical revisions to the provisions concerning the reflection in certificates of representation of the owners and operators of the source and units involved. The changes make these provisions consistent with those in the CAIR trading programs. The changes make it clear that all owners and operators must be listed and that those that should be, but are not, listed are still bound by the certificate of representation and the CAIR designated representative.

Further, EPA is adding a new § 72.26 and a new § 73.33(g) that are analogous to provisions adopted in the CAIR SIP model trading rules and the CAIR FIP trading rules and concern the use of agents by a designated representative and authorized account representative. As discussed above in Section VII of this preamble, EPA maintains that the existing Acid Rain Program regulations already authorize a designated representative or authorized account representative to use agents to make certain electronic submissions. However, in order to remove any uncertainty about such legal authority, EPA is adding provisions to the Acid Rain Program regulations that explicitly authorize such use of agents.

In addition, EPA is revising the appeal provisions of part 78 to apply to the appeals procedures to final actions of the Administrator under the CAIR FIP trading rule, just as these provisions already apply to final Administrator actions under the CAIR SIP model trading rules. Part 78 is revised to refer specifically, where appropriate, to the CAIR FIP trading rules in a similar way to how part 78 currently refers specifically, where appropriate, to the CAIR SIP model trading rules.

IX. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

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

1. Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the

environment, public health or safety, or State, local, or Tribal governments or communities;

2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

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

Today's action both provides a response to the Section 126 Petition filed by North Carolina and promulgates FIPs to implement the requirements of the recently published CAIR (May 2005) in all affected States. It also makes minor changes to the CAIR and the Acid Rain Program. The FIPs require the same set of air pollution emissions reductions required by the CAIR. For this reason, EPA is relying on the economic analysis conducted for CAIR entitled ''Regulatory Impact Analysis of the Final Clean Air Interstate Rule'' (March 2005) to serve as the analysis for these rulemakings.

This economic analysis shows that substantial net economic benefits to society are likely to be achieved due to reduction in emissions resulting from the CAIR program. The results show that the CAIR program would be highly beneficial to society, with annual net benefits (benefits less costs) of approximately $71.4 or $60.4 billion in 2010 and $98.5 or $83.2 billion in 2015. These alternative net benefits estimates occur due to differing assumptions concerning the social discount rate used to estimate the annual value of the benefits of the rule with the lower estimates relating to a discount rate of 7 percent and the higher estimates a discount rate of 3 percent. All amounts are reflected in 1999 dollars. The costs and benefits presented in the CAIR economic analysis are an accurate representation of the benefits and costs anticipated for the FIPs. For more information, see the NFR for the CAIR published in the **Federal Register** (70 FR 25162; May 12, 2005) and the ''Regulatory Impact Analysis for the Final Clean Air Interstate Rule'' (March 2005).

In view of its important policy implications and potential effect on the economy of over $100 million, this action has been judged to be an economically ''significant regulatory action'' within the meaning of the Executive Order. As a result, today's action was submitted to OMB for review. Changes made in response to OMB suggestions or recommendations are documented in the public record.

B. Paperwork Reduction Act

The EPA believes that the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*) requirements of this rule are satisfied through the Information Collection Request (ICR) (EPA ICR number 2152.02; OMB control number 2060–0570) submitted to the OMB for review and approval on May 12, 2005 as part of the CAIR (70 FR 25162–25405) and approved by the OMB in September 2005. The ICR describes the nature of the information collection and its estimated burden and cost associated with that final rule. In cases where information is already collected by a related program, the ICR takes into account only the additional burden. [This situation arises in States that are also subject to requirements of the Consolidated Emissions Reporting Rule (EPA ICR number 0916.10; OMB control number 2060–0088) or for sources that are subject to the Acid Rain Program (EPA ICR number 1633.13; OMB control number 2060–0258) or NO_X SIP Call (EPA ICR number 1857.03; OMB number 2060–0445) requirements.]

The burden of today's rule is essentially the same as the burden estimated for the CAIR. There is a modest transfer of burden from the States to EPA if the Federal plan is implemented rather than the CAIR State plan. The overall total burden is essentially unchanged. Thus, the ICR prepared for CAIR satisfies the requirements of the Paperwork Reduction Act for this rule.

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

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR, after appearing in the preamble of the final rule, are listed in 40 CFR part 9.

C. Regulatory Flexibility Act

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

For the purposes of this rulemaking, EPA defined small entities according to the following three criteria:

(1) A small business according to the Small Business Administration size standards by the North American Industry Classification System (NAICS) category of the owning entity. The range of small business size standards for electric utilities is 4 billion kilowatt-hours of production or less;

(2) A small government jurisdiction that is a government of a city, county, town, district, or special district with a population of less than 50,000; and

(3) A small organization that is any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

Table IX–1 lists entities potentially affected by this rule with applicable NAICS code.

TABLE IX–1.—POTENTIALLY REGULATED CATEGORIES AND ENTITIES [a]

Category	NAICS code [b]	Examples of potentially regulated entities
Industry	221112	Fossil fuel-fired electric utility steam generating units.
Federal Government	[c] 221112	Fossil fuel-fired electric utility steam generating units owned by the Federal government.

TABLE IX–1.—POTENTIALLY REGULATED CATEGORIES AND ENTITIES [a]—Continued

Category	NAICS code [b]	Examples of potentially regulated entities
State/Local/	[c] 221112	Fossil fuel-fired electric utility steam generating units owned by municipalities.
Tribal Government	921150	Fossil fuel-fired electric utility steam generating units in Indian Country.

[a] Include NAICS categories for source categories that own and operate electric generating units only.
[b] North American Industry Classification System.
[c] Federal, State, or local government-owned and operated establishments are classified according to the activity in which they are engaged.

After considering the economic impacts of today's final rule on small entities, EPA is certifying that this action will not have a significant economic impact on a substantial number of small entities.

EPA has assessed the potential impact of today's action on small entities. Pursuant to section 603 of the RFA, EPA prepared an initial regulatory flexibility analysis (IRFA) for the proposed rule (70 FR 49708, 49743). Approximately 140 of the estimated 3,000 EGUs potentially affected by today's action are owned by the 58 potentially affected small entities identified by EPA. Of the 140, 49 units are owned by small entities that also share ownership with large entities. Of these units, 34 are believed to be more than 50 percent owned by a large entity.

Beyond the 140, an additional 185 units owned by small entities in these states could be exempted because they have a nameplate capacity less than 25 MW. The above estimates include a number of units that are owned jointly by small and non-small entities. In addition, these estimates represent the maximum number of units potentially affected by the CAIR FIP. Only units in States that fail to submit an approved SIP would be directly regulated under the CAIR FIP. The actual number of affected units will depend on the number of States that do not submit a SIP or do not get their SIP submittal approved.

This analysis is based in large part on EPA's prior analysis of the potential impact of regulations implementing the CAIR model trading programs in the CAIR region. The analysis of the model trading programs was based on the best information available at that time and assumed that 75 small entities could be affected by any eventual implementation of the trading programs. However, EPA subsequently determined that some of these 75 entities either did not meet the definition of a small entity, or had units that were no longer generating. EPA's final analysis thus concluded that only 58 entities would be affected by today's action. Because the Agency's analysis of small entity impacts was based on the earlier estimate of affected small entities (*i.e.,* the impacts were analyzed based on 75 affected entities, not 58 entities), the impact analysis overstates the maximum potential impact of today's action on small entities.

Overall, EPA analysis suggested that about 445 MW of total small entity capacity, or 1.0 percent of total small entity capacity in the CAIR region, is projected to be uneconomic to maintain under regulations implementing the CAIR trading programs relative to the Base Case. In practice, units projected to be uneconomic to maintain may be ''mothballed'', retired, or kept in service to ensure transmission reliability in certain parts of the grid. Our IPM modeling is unable to distinguish between these potential outcomes.

Of the 75 initially identified as potentially impacted by regulations implementing the model trading programs, EPA determined that 29 might experience compliance costs in excess of one percent of revenues in 2010 and 46 might in 2015. Potentially affected small entities experiencing compliance costs in excess of 1 percent of revenues have some potential for significant impact resulting from implementation of CAIR.

Pursuant to section 609(b) of the RFA, EPA convened a Small Business Advocacy Review Panel to obtain advice and recommendations from representatives of small entities that would potentially be regulated by the rule. A detailed discussion of the Panel's advice and recommendations is found in the Panel Report (EPA–HQ–OAR–2004–0076–0074). A summary of the Panel's recommendations is presented at 70 FR 49708, 49741.

A detailed discussion of the panel process is provided in the proposed rule. In the proposed rule, EPA took comment on all aspects of the proposed FIP and its impact on small entities. EPA did not receive significant comments in this regard. In addition, in section VI.D of the proposed rule preamble, EPA specifically took comment on one of the panel recommendations, which was to consider providing a greater share of NO_X allowances to small entities. A number of utilities submitted comments opposing such a provision, and one State expressed support for such a provision. These comments are discussed in more detail in section VI.F of this preamble.

The decision to certify that this rule will not have a significant economic impact on a substantial number of small entities is largely a result of two factors. First, because the rule only affects sources with a capacity greater than 25 MW, the majority of potentially affected small entities are exempted. The decision to include only units greater than 25 MW in size exempts 185 small entities that would otherwise be potentially affected by today's actions. In the final CAIR, EPA stated its belief that it is reasonable to assume no further control of air emissions from these smaller EGUs. Second, as EPA's analysis of potential impacts of this rulemaking on small entities progressed, we determined that our initial estimates were too high, because some of the entities that EPA had projected to be affected either did not meet the definition of a small entity, or had units that were no longer generating. Finally, as was discussed in the NPR, the use of cap-and-trade in general will limit impacts on small entities relative to a less flexible command-and-control program.

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995, Public Law 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and Tribal governments and the private sector. Under section 202 of the UMRA, 2 U.S.C. 1532, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ''Federal mandates'' that may result in expenditures by State, local, and tribal governments, in the aggregate, or by the private sector, of

$100,000,000 or more in any 1 year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and to adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted.

In addition, before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including Tribal governments, it must have developed under section 203 of the UMRA, a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

The EPA has determined that this rule contains a Federal mandate that may result in expenditures of $100 million or more in 1 year. The costs of compliance will be borne predominately by sources in the private sector although a small number of sources owned by State and local governments may also be impacted. EPA prepared a written statement meeting the requirements of section 202 of the UMRA during the CAIR rulemaking process. The Federal mandates in today's action relate to its implementation of the CAIR and thus the analyses prepared for CAIR are applicable to today's action.

In accordance with section 202(c) of UMRA, EPA prepared the statement required by section 202 in conjunction with the Regulatory Impact Analysis prepared for the CAIR. This document is available at *http://www.epa.gov/cair/pdfs/finaltech08.pdf* and contains analyses that meet the requirements of section 202(a) of UMRA. That is, it contains a qualitative and quantitative assessment of the anticipated costs and benefits of the Federal mandate; estimates of future compliance costs and any disproportionate budgetary effects upon any particular regions of the nation; and estimates of the effect on the national economy.

Consultation with State, local and Tribal governments potentially affected by the CAIR emission reduction requirements was conducted during the CAIR rulemaking process. Such consultation was conducted in a manner consistent with the intergovernmental consultation provisions of section 204 of the UMRA, and Executive Order 12875, ''Enhancing the Intergovernmental Partnership.''

EPA has determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments. Therefore, development of a small government plan under section 203 of the Act is not required. The requirements in this action do not distinguish EGUs based on ownership, either for those units that are included within the scope of the rule or for those units that are exempted by the generating capacity cut-off. Consequently, the rule has no requirements that uniquely affect small governments that own or operate EGUs within the region. Further, with respect to the significance of the rule's provisions, EPA's UMRA analysis demonstrates that the economic impact of the rule will not significantly affect State or municipal EGUs or non-EGUs, either in terms of total cost incurred and the impact of the costs on revenue, or increased cost of electricity to consumers.

E. Executive Order 13132: Federalism

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

This rule does not have federalism implications. It does not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. These effects do not occur from the final rule itself because it is the provisions of the CAA that require EPA, after a State has failed to submit a SIP or a complete SIP, to make a finding to that effect and then to promulgate a FIP within 2 years of the finding. Although EPA is exercising discretion to promulgate the FIP within the early part of the 2-year period, EPA intends to rescind the FIP for each State that submits a SIP that EPA approves, and, if the FIP remains, sources are not required to implement controls until after the close of the 2-year period. Moreover, as emphasized throughout the preamble, States are not required to adopt the FIP provisions, or any particular portion thereof, in order for EPA to approve their SIPs. Thus, Executive Order 13132 does not apply to this rule.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

Executive Order 13175, entitled ''Consultation and Coordination with Indian Tribal Governments'' (65 FR 67249, November 9, 2000), requires EPA to develop an accountable process to ensure ''meaningful and timely input by Tribal officials in the development of regulatory policies that have Tribal implications.'' This rule does not have ''Tribal implications'' as specified in Executive Order 13175.

This rule addresses transport of pollution for precursors of ozone and $PM_{2.5.}$ The CAA provides for States and Tribes to develop plans to regulate emissions of air pollutants within their jurisdictions. The regulations clarify the statutory obligations of States and Tribes that develop plans to implement these rules. The Tribal Authority Rule (TAR) gives Tribes the opportunity to develop and implement CAA programs, but it leaves to the discretion of the Tribe whether to develop these programs and which programs, or appropriate elements of a program, the Tribe will adopt.

This rule does not have Tribal implications as defined by Executive Order 13175. It does not have a substantial direct effect on one or more Indian Tribes because no Tribe has implemented a federally-enforceable air quality management program under the CAA at this time. Furthermore, this rule does not affect the relationship or distribution of power and responsibilities between the Federal Government and Indian Tribes. The CAA and the TAR establish the relationship of the Federal Government and Tribes in developing plans to attain the NAAQS, and this rule does nothing to modify that relationship. Because this rule does not have Tribal implications, Executive Order 13175 does not apply.

If one assumes a Tribe is implementing a Tribal Implementation Plan, today' rule could have implications for that Tribe, but would not impose substantial direct costs upon the Tribe, nor preempt Tribal law. The EPA has estimated the total annual private costs for the FIP for the CAIR region as implemented by State, local, and Tribal governments to be approximately $2.4 billion in 2010 and $3.6 billion in 2015 (1999$). There are currently very few emissions sources in Indian country that could be affected by these rules and the percentage of Tribal land that will be impacted is very small. For Tribes that choose to regulate sources in Indian country, the costs would primarily be attributed to inspecting regulated facilities and enforcing adopted regulations.

EPA consulted with Tribal officials in developing the final CAIR, which provides the basis for the FIPs in today's rule. The EPA encouraged Tribal input at an early stage. Also, EPA held periodic meetings with the States and the Tribes during the technical development of CAIR. Three meetings were held with the Crow Tribe, where the Tribe expressed concerns about potential impacts of the rule on their coal mine operations. In addition, EPA held three calls with Tribal environmental professionals to address concerns specific to the Tribes. These discussions have given EPA valuable information about Tribal concerns regarding the development of CAIR. During the CAIR rulemaking process, the EPA provided briefings for Tribal representatives and the newly formed National Tribal Air Association (NTAA), and other national Tribal forums. Input from Tribal representatives was taken into consideration in development of CAIR.

G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks

Executive Order 13045, ''Protection of Children from Environmental Health and Safety Risks'' (62 FR 19885, April 23, 1997) applies to any rule that (1) is determined to be ''economically significant'' as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, Section 5–501 of the Order directs the Agency to evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

This rule is not subject to the Executive Order, because it does not involve decisions on environmental health or safety risks that may disproportionately affect children. The EPA believes that the emissions reductions from the strategy in this rule would further improve air quality and would further improve children's health.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

Executive Order 13211 (66 FR 28355, May 22, 2001) provides that agencies shall prepare and submit to the Administrator of the Office of Regulatory Affairs, OMB, a Statement of Energy Effects for certain actions identified as ''significant energy actions.'' Section 4(b) of Executive Order 13211 defines ''significant energy actions'' as ''any action by an agency (normally published in the **Federal Register**) that promulgates or is expected to lead to the promulgation of a final rule or regulation, including notices of inquiry, advance notices of proposed rulemaking, and notices of proposed rulemaking: (1)(i) That is a significant regulatory action under Executive Order 12866 or any successor order, and (ii) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (2) that is designated by the Administrator of the Office of Information and Regulatory Affairs as a significant energy action.''

This final rule is a significant regulatory action under Executive Order 12866 and this rule may have a significant adverse effect on the supply, distribution, or use of energy. The energy impacts of this rule come from its implementation of the emission reduction requirements in the CAIR. The impacts for this rule will therefore not differ from those for the CAIR. These impacts are detailed in the final CAIR (70 FR 25315). As discussed in the CAIR NFR, EPA's analysis shows that the EGU emission reductions required under the trading programs are projected to result in a 1.6 percent or less increase in natural gas prices projected from 2010 to 2020. If base case natural gas prices are higher than EPA has assumed in its primary analysis, the impact on natural gas price will be even less.

I. National Technology Transfer Advancement Act

Section 12(d) of the National Technology Transfer Advancement Act (NTTAA) of 1995 (Pub. L. 104–113; 15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory and procurement activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (*e.g.,* materials specifications, test methods, sampling procedures, business practices) developed or adopted by one or more voluntary consensus bodies. The NTTAA directs EPA to provide Congress, through annual reports to OMB, with explanations when an agency does not use available and applicable voluntary consensus standards.

Today's rule implements requirements largely identical to the requirements in the CAIR. This rule requires all sources that participate in the trading programs under part 97 (analogous to the CAIR SIP trading programs under part 96) to meet the applicable monitoring requirements of part 75. Part 75 already incorporates a number of voluntary consensus standards. Consistent with the Agency's Performance Based Measurement System (PBMS), part 75 sets forth performance criteria that allow the use of alternative methods to the ones set forth in part 75. The PBMS approach is intended to be more flexible and cost effective for the regulated community; it is also intended to encourage innovation in analytical technology and improved data quality. At this time, EPA is not recommending any revisions to part 75; however, EPA periodically revises the test procedures set forth in part 75. When EPA revises the test procedures set forth in part 75 in the future, EPA will address the use of any new voluntary consensus standards that are equivalent. Currently, even if a test procedure is not set forth in part 75, EPA is not precluding the use of any method, whether it constitutes a voluntary consensus standard or not, as long as it meets the performance criteria specified; however, any alternative methods must be approved through the petition process under § 75.66 before they are used under part 75.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires Federal agencies to consider the impact of programs, policies, and activities on minority populations and low-income populations. According to EPA guidance, U.S. Environmental Protection Agency, 1998. Guidance for Incorporating Environmental Justice Concerns in EPAs NEPA Compliance Analyses. Office of Federal Activities, Washington, D.C., April, 1998. Agencies are to assess whether minority or low-income populations face risks or a rate of exposure to hazards that are significant and that appreciably exceed or is likely to appreciably exceed the risk or rate to the general population or to the appropriate comparison group (EPA, 1998).

In accordance with Executive Order 12898, the Agency has considered whether this rule may have disproportionate negative impacts on minority or low income populations. The Agency expects this rule will lead to reductions in air pollution and exposures generally. In addition, EPA has conducted an air quality modeling analysis to estimate the changes in exposure of minority and low-income populations to ambient concentrations of $PM_{2.5}$ as a result of implementation of a cap-and-trade program similar to CAIR: the Acid Rain Program. The analysis shows that each racial, ethnic, and income-level group studied is projected to experience similar average improvement in ambient concentrations of $PM_{2.5}$ in the eastern U.S. (where the vast majority of the emission reductions took place) as a result of the Acid Rain Program in 2010. No disproportionately high and adverse human health or environmental effects of the Acid Rain Program were found for any minority, low-income, or other population. For these reasons, negative impacts to these sub-populations that appreciably exceed similar impacts to the general population are not expected.

K. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 et seq., as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. Therefore, EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is a ''major rule'' as defined by 5 U.S.C. 804(2). This rule will be effective June 27, 2006.

List of Subjects

40 CFR Parts 51 and 52

Environmental protection, Administrative practice and procedure, Air pollution control, Intergovernmental relations, Nitrogen dioxide, Ozone, Particulate matter, Reporting and recordkeeping requirements, Sulfur oxides.

40 CFR Parts 72, 73, 74, and 78

Environmental protection, Acid rain, Administrative practice and procedure, Air pollution control, Electric utilities, Intergovernmental relations, Nitrogen oxides, Reporting and recordkeeping requirements, Sulfur oxides.

40 CFR Parts 96 and 97

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

Dated: March 15, 2006.

Stephen L. Johnson,

Administrator.

■ For the reasons set forth in the preamble, parts 51, 52, 72, 73, 74, 78, 96, and 97 of chapter I of title 40 of the Code of Federal Regulations are amended as follows:

PART 51—[AMENDED]

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

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

■ 2. Section 51.123 is amended as follows:

■ a. In paragraph (o)(2)(ii)(B), by revising the words ''for the year after the year of'' to read ''for the 4th year after the year of'' and by removing the word ''and'' at the end;

■ b. In paragraph (o)(2)(ii)(C), by revising the words ''allocated.'' to read allocated; and'';

■ c. By adding a new paragraph (o)(2)(ii)(D);

■ d. By adding a new paragraph (p);

■ e. In paragraph (cc), by amending the definition of ''Electric generating unit'' or ''EGU'' by:

■ i. In paragraph (1) of the definition, by redesignating the paragraph as paragraph ''(1)(i)'', by revising the words ''since the start-up'' to read ''since the later of November 15, 1990 or the start-up'', and by adding a new paragraph (1)(ii); and

■ ii. By revising paragraph (2) of the definition; and

■ f. In paragraph (cc), by adding a new definition for ''Solid waste incineration unit''; and

■ g. By adding a new paragraph (ee).

§ 51.123 Findings and requirements for submission of State implementation plan revisions relating to emissions of oxides of nitrogen pursuant to the Clean Air Interstate Rule.

* * * * *

(o) * * *

(ii) * * *

(D) The State's methodology for allocating the compliance supplement pool must be substantively identical to § 97.143 (except that the permitting authority makes the allocations and the Administrator records the allocations made by the permitting authority) or otherwise in accordance with paragraph (e)(4) of this section.

* * * * *

(p) Notwithstanding any other provision of this section, a State may adopt, and include in a SIP revision submitted by March 31, 2007, regulations relating to the Federal CAIR NO_X Annual Trading Program under subparts AA through HH of part 97 of this chapter as follows:

(1) The State may adopt, as CAIR NO_X allowance allocation provisions replacing the provisions in subpart EE of part 97 of this chapter:

(i) Allocation provisions substantively identical to subpart EE of part 96 of this chapter, under which the permitting authority makes the allocations; or

(ii) Any methodology for allocating CAIR NO_X allowances to individual sources under which the permitting authority makes the allocations, provided that:

(A) The State's methodology must not allow the permitting authority to allocate CAIR NO_X allowances for a year in excess of the amount in the State's Annual EGU NO_X budget for such year.

(B) The State's methodology must require that, for EGUs commencing operation before January 1, 2001, the permitting authority will determine, and notify the Administrator of, each unit's allocation of CAIR NO_X allowances by April 30, 2007 for 2009, 2010, and 2011 and by October 31, 2008 and October 31 of each year thereafter for the 4th year after the year of the notification deadline.

(C) The State's methodology must require that, for EGUs commencing operation on or after January 1, 2001, the permitting authority will determine, and notify the Administrator of, each unit's allocation of CAIR NO_X allowances by October 31 of the year for which the CAIR NO_X allowances are allocated.

(2) The State may adopt, as compliance supplement pool provisions replacing the provisions in (97.143 of this chapter:

(i) Provisions for allocating the State's compliance supplement pool that are substantively identical to § 97.143 of this chapter, except that the permitting authority makes the allocations and the Administrator records the allocations made by the permitting authority;

(ii) Provisions for allocating the State's compliance supplement pool that are substantively identical to § 96.143 of this chapter; or

(iii) Other provisions for allocating the State's compliance supplement pool that are in accordance with paragraph (e)(4) of this section.

(3) The State may adopt CAIR opt-in unit provisions as follows:

(i) Provisions for CAIR opt-in units, including provisions for applications for CAIR opt-in permits, approval of CAIR opt-in permits, treatment of units as CAIR opt-in units, and allocation and recordation of CAIR NO_X allowances for CAIR opt-in units, that are substantively identical to subpart II of part 96 of this chapter and the provisions of subparts AA through HH that are applicable to CAIR opt-in units or units for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied;

(ii) Provisions for CAIR opt-in units, including provisions for applications for CAIR opt-in permits, approval of CAIR opt-in permits, treatment of units as CAIR opt-in units, and allocation and recordation of CAIR NO_X allowances for CAIR opt-in units, that are substantively identical to subpart II of part 96 of this chapter and the provisions of subparts AA through HH that are applicable to CAIR opt-in units or units for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied, except that the provisions exclude § 96.188(b) of this chapter and the provisions of subpart II of part 96 of this chapter that apply only to units covered by § 96.188(b) of this chapter; or

(iii) Provisions for applications for CAIR opt-in units, including provisions for CAIR opt-in permits, approval of CAIR opt-in permits, treatment of units as CAIR opt-in units, and allocation and recordation of CAIR NO_X allowances for CAIR opt-in units, that are substantively identical to subpart II of part 96 of this chapter and the provisions of subparts AA through HH that are applicable to CAIR opt-in units or units for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied, except that the provisions exclude § 96.188(c) of this chapter and the provisions of subpart II of part 96 of this chapter that apply only to units covered by § 96.188(c) of this chapter.

(cc) * * *

Electric generating unit or *EGU* means:

(1)(i) * * *

(ii) If a stationary boiler or stationary combustion turbine that, under paragraph (1)(i) of this section, is not an electric generating unit begins to combust fossil fuel or to serve a generator with nameplate capacity of more than 25 MWe producing electricity for sale, the unit shall become an electric generating unit as provided in paragraph (1)(i) of this section on the first date on which it both combusts fossil fuel and serves such generator.

(2) A unit that meets the requirements set forth in paragraphs (2)(i)(A), (2)(ii)(A), or (2)(ii)(B) of this definition paragraph shall not be an electric generating unit:

(i)(A) Any unit that is an electric generating unit under paragraph (1)(i) or (ii) of this definition:

(1) Qualifying as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and continuing to qualify as a cogeneration unit; and

(2) Not serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe supplying in any calendar year more than one-third of the unit's potential electric output capacity or 219,000 MWh, whichever is greater, to any utility power distribution system for sale.

(B) If a unit qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and meets the requirements of paragraphs (2)(i)(A) of this section for at least one calendar year, but subsequently no longer meets all such requirements, the unit shall become an electric generating unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of paragraph (2)(i)(A)*(2)* of this section.

(ii)(A) Any unit that is an electric generating unit under paragraph (1)(i) or (ii) of this definition commencing operation before January 1, 1985:

(1) Qualifying as a solid waste incineration unit; and

(2) With an average annual fuel consumption of non-fossil fuel for 1985–1987 exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(B) Any unit that is an electric generating unit under paragraph (1)(i) or (ii) of this definition commencing operation on or after January 1, 1985:

(1) Qualifying as a solid waste incineration unit; and

(2) With an average annual fuel consumption of non-fossil fuel for the first 3 calendar years of operation exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(C) If a unit qualifies as a solid waste incineration unit and meets the requirements of paragraph (2)(ii)(A) or (B) of this section for at least 3 consecutive calendar years, but subsequently no longer meets all such requirements, the unit shall become an electric generating unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a solid waste incineration unit or January 1 after the first 3 consecutive calendar years after 1990 for which the unit has an average annual fuel consumption of fossil fuel of 20 percent or more.

* * * * *

Solid waste incineration unit means a stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine that is a ''solid waste incineration unit'' as defined in section 129(g)(1) of the Clean Air Act.

* * * * *

(ee) Notwithstanding any other provision of this section, a State may adopt, and include in a SIP revision submitted by March 31, 2007, regulations relating to the Federal CAIR NO_X Ozone Season Trading Program under subparts AAAA through HHHH of part 97 of this chapter as follows:

(1) The State adopt, as applicability provisions replacing the provisions in § 97.304 of this chapter, provisions for applicability that are substantively identical to the provisions in § 96.304 of this chapter expanded to include all non-EGUs subject to the State's emissions trading program approved under § 51.121(p).

(2) The State may adopt, as CAIR NO_X Ozone Season allowance allocation provisions replacing the provisions in subpart EEEE of part 97 of this chapter:

(i) Allocation provisions substantively identical to subpart EEEE of part 96 of this chapter, under which the permitting authority makes the allocations; or

(ii) Any methodology for allocating CAIR NO_X Ozone Season allowances to individual sources under which the permitting authority makes the allocations, provided that:

(A) The State may provide for issuance of an amount of CAIR Ozone Season NO_X allowances for an ozone season, in addition to the amount in the State's Ozone Season EGU NO_X Budget for such ozone season, not exceeding the portion of the State's trading program budget, under the State's emissions trading program approved under § 51.121(p), attributed to the non-EGUs that the applicability provisions in § 96.304 of this chapter are expanded to include under paragraph (ee)(1) of this section.

(B) The State's methodology must not allow the State to allocate CAIR Ozone Season NO_X allowances for an ozone season in excess of the amount in the State's Ozone Season EGU NO_X Budget for such ozone season plus any additional amount of CAIR Ozone Season NO_X allowances issued under paragraph (ee)(2)(ii)(A) of this section for such ozone season.

(C) The State's methodology must require that, for EGUs commencing operation before January 1, 2001, the permitting authority will determine, and notify the Administrator of, each unit's allocation of CAIR NO_X Ozone Season allowances by April 30, 2007 for 2009, 2010, and 2011 and by October 31, 2008 and October 31 of each year thereafter for the 4th year after the year of the notification deadline.

(D) The State's methodology must require that, for EGUs commencing operation on or after January 1, 2001, the permitting authority will determine, and notify the Administrator of, each unit's allocation of CAIR NO_X Ozone Season allowances by July 31 of the year for which the CAIR NO_X Ozone Season allowances are allocated.

(3) The State may adopt CAIR opt-in unit provisions as follows:

(i) Provisions for CAIR opt-in units, including provisions for applications for CAIR opt-in permits, approval of CAIR opt-in permits, treatment of units as CAIR opt-in units, and allocation and recordation of CAIR NO_X Ozone Season allowances for CAIR opt-in units, that are substantively identical to subpart IIII of part 96 of this chapter and the provisions of subparts AAAA through HHHH that are applicable to CAIR opt-in units or units for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied;

(ii) Provisions for CAIR opt-in units, including provisions for applications for CAIR opt-in permits, approval of CAIR opt-in permits, treatment of units as CAIR opt-in units, and allocation and recordation of CAIR NO_X Ozone Season allowances for CAIR opt-in units, that are substantively identical to subpart IIII of part 96 of this chapter and the provisions of subparts AAAA through HHHH that are applicable to CAIR opt-in units or units for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied, except that the provisions exclude § 96.388(b) of this chapter and the provisions of subpart IIII of part 96 of this chapter that apply only to units covered by § 96.388(b) of this chapter; or

(iii) Provisions for applications for CAIR opt-in units, including provisions for CAIR opt-in permits, approval of CAIR opt-in permits, treatment of units as CAIR opt-in units, and allocation and recordation of CAIR NO_X allowances for CAIR opt-in units, that are substantively identical to subpart IIII of part 96 of this chapter and the provisions of subparts AAAA through HHHH that are applicable to CAIR opt-in units or units for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied, except that the provisions exclude § 96.388(c) of this chapter and the provisions of subpart IIII of part 96 of this chapter that apply only to units covered by § 96.388(c) of this chapter.

■ 3. Section 51.124 is amended as follows:

■ a. In paragraph (q), by amending the definition of ''Electric generating unit'' or ''EGU'' by:

■ i. In paragraph (1) of the definition, redesignating the paragraph as paragraph ''(1)(i)'', revising the words ''since the start-up'' to read ''since the later of November 15, 1990 or the start-up'', and adding a new paragraph (1)(ii); and

■ ii. Revising paragraph (2) of the definition; and

■ b. In paragraph (q), add a new definition for ''Solid waste incineration unit''; and

■ c. Add a new paragraph (r).

§ 51.124 Findings and requirements for submission of State implementation plan revisions relating to emissions of sulfur dioxide pursuant to the Clean Air Interstate Rule.

* * * * *

(q) * * *

Electric generating unit or *EGU* means:

(1)(i) * * *

(ii) If a stationary boiler or stationary combustion turbine that, under paragraph (1)(i) of this section, is not an electric generating unit begins to combust fossil fuel or to serve a generator with nameplate capacity of more than 25 MWe producing electricity for sale, the unit shall become an electric generating unit as provided in paragraph (1)(i) of this section on the first date on which it both combusts fossil fuel and serves such generator.

(2) A unit that meets the requirements set forth in paragraphs (2)(i)(A), (2)(ii)(A), or (2)(ii)(B) of this definition paragraph shall not be an electric generating unit:

(i)(A) Any unit that is an electric generating unit under paragraph (1)(i) or (ii) of this definition:

(1) Qualifying as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and continuing to qualify as a cogeneration unit; and

(2) Not serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe supplying in any calendar year more than one-third of the unit's potential electric output capacity or 219,000 MWh, whichever is greater, to any utility power distribution system for sale.

(B) If a unit qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and meets the requirements of paragraphs (2)(i)(A) of this section for at least one calendar year, but subsequently no longer meets all such requirements, the unit shall become an electric generating unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of paragraph (2)(i)(A)*(2)* of this section.

(ii)(A) Any unit that is an electric generating unit under paragraph (1)(i) or (ii) of this definition commencing operation before January 1, 1985:

(1) Qualifying as a solid waste incineration unit; and

(2) With an average annual fuel consumption of non-fossil fuel for 1985–1987 exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(B) Any unit that is an electric generating unit under paragraph (1)(i) or (ii) of this definition commencing operation on or after January 1, 1985:

(1) Qualifying as a solid waste incineration unit; and

(2) With an average annual fuel consumption of non-fossil fuel for the first 3 calendar years of operation exceeding 80 percent (on a Btu basis)

and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(C) If a unit qualifies as a solid waste incineration unit and meets the requirements of paragraph (2)(ii)(A) or (B) of this section for at least 3 consecutive calendar years, but subsequently no longer meets all such requirements, the unit shall become an electric generating unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a solid waste incineration unit or January 1 after the first 3 consecutive calendar years after 1990 for which the unit has an average annual fuel consumption of fossil fuel of 20 percent or more.

* * * * *

Solid waste incineration unit means a stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine that is a ''solid waste incineration unit'' as defined in section 129(g)(1) of the Clean Air Act.

* * * * *

(r) Notwithstanding any other provision of this section, a State may adopt, and include in a SIP revision submitted by March 31, 2007, regulations relating to the Federal CAIR SO_2 Trading Program under subparts AAA through HHH of part 97 of this chapter as follows. The State may adopt the following CAIR opt-in unit provisions:

(1) Provisions for CAIR opt-in units, including provisions for applications for CAIR opt-in permits, approval of CAIR opt-in permits, treatment of units as CAIR opt-in units, and allocation and recordation of CAIR SO_2 allowances for CAIR opt-in units, that are substantively identical to subpart III of part 96 of this chapter and the provisions of subparts AAA through HHH that are applicable to CAIR opt-in units or units for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied;

(2) Provisions for CAIR opt-in units, including provisions for applications for CAIR opt-in permits, approval of CAIR opt-in permits, treatment of units as CAIR opt-in units, and allocation and recordation of CAIR SO_2 allowances for CAIR opt-in units, that are substantively identical to subpart III of part 96 of this chapter and the provisions of subparts AAA through HHH that are applicable to CAIR opt-in units or units for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied, except that the provisions exclude § 96.288(b) of this chapter and the provisions of subpart III of part 96 of this chapter that apply only to units covered by § 96.288(b) of this chapter; or

(3) Provisions for applications for CAIR opt-in units, including provisions for CAIR opt-in permits, approval of CAIR opt-in permits, treatment of units as CAIR opt-in units, and allocation and recordation of CAIR SO_2 allowances for CAIR opt-in units, that are substantively identical to subpart III of part 96 of this chapter and the provisions of subparts AAA through HHH that are applicable to CAIR opt-in units or units for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied, except that the provisions exclude § 96.288(c) of this chapter and the provisions of subpart III of part 96 of this chapter that apply only to units covered by § 96.288(c) of this chapter.

PART 52—[AMENDED]

■ 1. The authority citation for part 52 continues to read as follows:

Authority: 42 U.S.C. 7401 *et seq.*

Subpart A—General Provisions

■ 2. Subpart A is amended by adding §§ 52.35 and 52.36 to read as follows:

§ 52.35 What are the requirements of the Federal Implementation Plans (FIPs) for the Clean Air Interstate Rule relating to emissions of nitrogen oxides?

The Federal CAIR NO_X Annual Trading Program provisions of part 97 of this chapter constitute the Clean Air Interstate Rule Federal Implementation Plan provisions that relate to annual emissions of nitrogen oxides (NO_X). These provisions apply to sources in each State that is described in § 51.123(c)(1) and (2) of this chapter, Delaware, and New Jersey, each of which States is subject to a finding by the Administrator that the State failed to submit a State Implementation Plan (SIP) to satisfy the requirements of section 110(a)(2)(D)(I) of the Clean Air Act for the $PM_{2.5}$ NAAQS. The Federal CAIR NO_X Ozone Season Trading Program provisions of part 97 of this chapter constitute the Clean Air Interstate Rule Federal Implementation Plan provisions for emissions of nitrogen oxides (NO_X) during the ozone season, as defined in § 97.302 of this chapter. These provisions apply to sources in each State that is described in § 51.123(c)(1) and (3) of this chapter, each of which States is subject to a finding by the Administrator that the State failed to submit a State Implementation Plan (SIP) to satisfy the requirements of section 110(a)(2)(D)(I) of the Clean Air Act for the 8-hour ozone NAAQS. These provisions do not invalidate or otherwise affect the obligations of States, emissions sources, or other responsible entities with respect to all portions of plans approved or promulgated under this part, nor the obligations of States under the requirements of § 51.123 and 51.125 of this chapter.

§ 52.36 What are the requirements of the Clean Air Interstate Rule Federal Implementation Plans relating to emissions of sulfur dioxide?

The Federal CAIR SO_2 Trading Program provisions of part 97 of this chapter constitute the Clean Air Interstate Rule Federal Implementation Plan provisions for emissions of sulfur dioxide (SO_2). These provisions apply to sources in each State that is described in § 51.124(c) of this chapter, Delaware, and New Jersey, each of which States is subject to an EPA finding that the State failed to submit a State Implementation Plan (SIP) to satisfy the requirements of section 110(a)(2)(D)(I) of the Clean Air Act for the $PM_{2.5}$ NAAQS. These provisions do not invalidate or otherwise affect the obligations of States, emissions sources, or other responsible entities with respect to all portions of plans approved or promulgated under this part, nor the obligations of States under the requirements of §§ 51.124 and 51.125 of this chapter.

Subpart B—Alabama

■ 3. Subpart B is amended by adding §§ 52.54 and 52.55 to read as follows:

§ 52.54 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Alabama and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.55 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Alabama and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart E—Arkansas

■ 4. Subpart E is amended by adding §§ 52.184 to read as follows:

§ 52.184 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Arkansas and for which requirements are set forth under the Federal CAIR NO_X Ozone Season Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart H—Connecticut

■ 5. Subpart H is amended by adding §§ 52.386 to read as follows:

§ 52.386 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Connecticut and for which requirements are set forth under the Federal CAIR NO_X Ozone Season Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart I—Delaware

■ 6. Subpart I is amended by adding §§ 52.440 and 52.441 to read as follows:

§ 52.440 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Delaware and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.441 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Delaware and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart J—District of Columbia

■ 7. Subpart J is amended by adding §§ 52.484 and 52.485 to read as follows:

§ 52.484 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the District of Columbia and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.485 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the District of Columbia and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart K—Florida

■ 8. Subpart K is amended by adding §§ 52.540 and 52.541 to read as follows:

§ 52.540 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Florida and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.541 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Florida and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart L—Georgia

■ 9. Subpart L is amended by adding §§ 52.584 and 52.585 to read as follows:

§ 52.584 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Georgia and for which requirements are set forth under Federal CAIR NO_X Annual Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.585 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Georgia and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart O—Illinois

■ 10. Subpart O is amended by adding §§ 52.745 and 52.746 to read as follows:

§ 52.745 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Illinois and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.746 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Illinois and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart P—Indiana

■ 11. Subpart P is amended by adding §§ 52.789 and 52.790 to read as follows:

§ 52.789 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Indiana and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.790 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Indiana and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart Q—Iowa

■ 12. Subpart Q is amended by adding §§ 52.840 and 52.841 to read as follows:

§ 52.840 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Iowa and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.841 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Iowa and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart S—Kentucky

■ 13. Subpart S is amended by adding §§ 52.940 and 52.941 to read as follows:

§ 52.940 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Kentucky and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.941 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Kentucky and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart T—Louisiana

■ 14. Subpart T is amended by adding §§ 52.984 and 52.985 to read as follows:

§ 52.984 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Louisiana and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.985 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Louisiana and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart V—Maryland

■ 15. Subpart V is amended by adding §§ 52.1084 and 52.1085 to read as follows:

§ 52.1084 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Maryland and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.1085 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Maryland and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart W—Massachusetts

■ 16. Subpart W is amended by adding § 52.1140 to read as follows:

§ 52.1140 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Massachusetts and for which requirements are set forth under the Federal CAIR NO_X Ozone Season Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart X—Michigan

■ 17. Subpart X is amended by adding §§ 52.1186 and 52.1187 to read as follows:

§ 52.1186 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Michigan and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.1187 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Michigan and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart Y—Minnesota

■ 18. Subpart Y is amended by adding §§ 52.1240 and 52.1241 to read as follows:

§ 52.1240 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Minnesota and for which requirements are set forth under the Federal CAIR NO_X Annual Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.1241 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Minnesota and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart Z—Mississippi

■ 19. Subpart Z is amended by adding §§ 52.1284 and 52.1285 to read as follows:

§ 52.1284 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Mississippi and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.1285 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Mississippi and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart AA—Missouri

■ 20. Subpart AA is amended by adding §§ 52.1341 and 52.1342 to read as follows:

§ 52.1341 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Missouri and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.1342 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Missouri and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart FF—New Jersey

■ 21. Subpart FF is amended by adding §§ 52.1584 and 52.1585 to read as follows:

§ 52.1584 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of New Jersey and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Program in part 97 of this chapter must comply with such applicable requirements.

§ 52.1585 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of New Jersey and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart HH—New York

■ 22. Subpart HH is amended by adding §§ 52.1684 and 52.1685 to read as follows:

§ 52.1684 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of New York and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.1685 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of New York and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart II—North Carolina

■ 23. Subpart II is amended by adding §§ 52.1784 and 52.1785 to read as follows:

§ 52.1784 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of North Carolina and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.1785 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of North Carolina and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart KK—Ohio

■ 24. Subpart KK is amended by adding §§ 52.1891 and 52.1892 to read as follows:

§ 52.1891 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Ohio and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.1892 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Ohio and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart NN—Pennsylvania

■ 25. Subpart NN is amended by adding §§ 52.2040 and 52.2041 to read as follows:

§ 52.2040 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Pennsylvania and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.2041 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Pennsylvania and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart PP—South Carolina

■ 26. Subpart PP is amended by adding §§ 52.2140 and 52.2141 to read as follows:

§ 52.2140 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of South Carolina and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.2141 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of South Carolina and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart RR—Tennessee

■ 27. Subpart RR is amended by adding §§ 52.2240 and 52.2241 to read as follows:

§ 52.2240 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Tennessee and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.2241 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Tennessee and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart SS—Texas

■ 28. Subpart SS is amended by adding §§ 52.2283 and 52.2284 to read as follows:

§ 52.2283 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Texas and for which requirements are set forth under the Federal CAIR NO_X Annual Trading Program in part 97 of this chapter must comply with such applicable requirements.

§ 52.2284 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Texas and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart VV—Virginia

■ 29. Subpart VV is amended by adding §§ 52.2440 and 52.2441 to read as follows:

§ 52.2440 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Virginia and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.2441 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Virginia and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart XX—West Virginia

■ 30. Subpart XX is amended by adding §§ 52.2540 and 52.2541 to read as follows:

§ 52.2540 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of West Virginia and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.2541 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of West Virginia and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

Subpart YY—Wisconsin

■ 31. Subpart YY is amended by adding §§ 52.2587 and 52.2588 to read as follows:

§ 52.2587 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?

The owner or operator of each NO_X source located within the State of Wisconsin and for which requirements are set forth under the Federal CAIR NO_X Annual and Ozone Season Trading Programs in part 97 of this chapter must comply with such applicable requirements.

§ 52.2588 Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of sulfur dioxide?

The owner or operator of each SO_2 source located within the State of Wisconsin and for which requirements are set forth under the Federal CAIR SO_2 Trading Program in part 97 of this chapter must comply with such applicable requirements.

PART 72—[AMENDED]

■ 1. The authority citation for Part 72 continues to read as follows:

Authority: 42 U.S.C. 7601 and 7651, *et seq.*

■ 2. Section 72.2 is amended, in the definition of ''Receive or receipt'', by revising the words ''official correspondence log'' to read ''official log''.

■ 3. Section 72.7 is amended as follows:

■ a. By revising paragraph (f)(2); and

■ b. In paragraph (f)(4)(i), by revising the words ''become an affected unit under the Acid Rain Program and parts 70 and 71 of this chapter'' to read, for purposes of applying parts 70 and 71 of this chapter, shall be treated as an affected unit under the Acid Rain Program''. The revision reads as follows:

§ 72.7 New units exemption.

* * * * *

(f) * * *

(2) For any period for which a unit is exempt under this section:

(i) For purposes of applying parts 70 and 71 of this chapter, the unit shall not be treated as an affected unit under the Acid Rain Program and shall continue to be subject to any other applicable requirements under parts 70 and 71 of this chapter.

(ii) The unit shall not be eligible to be an opt-in source under part 74 of chapter.

* * * * *

■ 4. Section 72.8 is amended as follows:

■ a. By revising paragraph (d)(4); and

■ b. In paragraph (d)(6)(i) introductory text, by revising the words ''become an affected unit under the Acid Rain Program and parts 70 and 71 of this chapter'' to read ,'' for purposes of applying parts 70 and 71 of this chapter, shall be treated as an affected unit under the Acid Rain Program''.

The revision reads as follows:

§ 72.8 Retired units exemption.

* * * * *

(d) * * *

(4) For any period for which a unit is exempt under this section:

(i) For purposes of applying parts 70 and 71 of this chapter, the unit shall not be treated as an affected unit under the Acid Rain Program and shall continue to be subject to any other applicable requirements under parts 70 and 71 of this chapter.

(ii) The unit shall not be eligible to be an opt-in source under part 74 of chapter.

* * * * *

§ 72.20 [Amended]

■ 5. Section 72.20 is amended, in paragraph (b), by revising the words ''his or her actions'' to read ''his or her representations, actions''.

§ 72.22 [Amended]

■ 6. Section 72.22 is amended, in paragraph (b), by revising the words ''any action, representation, or failure to act'' to read ''any representation, action, inaction, or submission'' whenever they appear.

§ 72.23 [Amended]

■ 7. Section 72.23 is amended as follows:

■ a. In paragraphs (a) and (b), by revising the words ''submissions, actions, and inactions'' to read ''representations, actions, inactions, and submissions''; and

■ b. In paragraph (c)(1), by revising the words ''a new owner'' to read ''an owner'', by revising the words ''such new owner'' to read ''such owner'', by revising the words ''submissions, actions, and inactions'' to read ''representations, actions, inactions, and submissions'', and by revising the words ''the new owner'' to read ''the owner.''

§ 72.24 [Amended]

■ 8. Section 72.24 is amended as follows:

■ a. In paragraph (a)(1) by revising the words ''is submitted.'' to read ''is submitted, including identification and nameplate capacity of each generator served by each such unit'';

■ b. In paragraph (a)(6), by revising the words ''actions, inactions, or submissions'' to read ''representations, actions, inactions, or submissions''; and

■ c. In paragraph (a)(9)(ii), by revising the words ''or ,if such multiple'' to read '', except that, if such multiple''.

§ 72.25 [Amended]

■ 9. Section 72.25 is amended, in paragraph (b), by revising the words ''submission, action or inaction'' to read ''representation, action, inaction, or submission'' and revise the words ''submission, action, or inaction'' to read ''representation, action, inaction, or submission''.

■ 10. Add a new 72.26 to read as follows:

§ 72.26 Delegation by designated representative and alternate designated representative.

(a) A designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission (in a format prescribed by the Administrator) to the Administrator provided for or required under this part and parts 73 through 77 of this chapter.

(b) An alternate designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission (in a format prescribed by the Administrator) to the Administrator provided for or required under this part and parts 73 through 77 of this chapter.

(c) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (a) or (b) of this section, the designated representative or alternate designated representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(1) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such designated representative or alternate designated representative;

(2) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(3) For each such natural person, a list of the type or types of electronic submissions under paragraph (a) or (b) of this section for which authority is delegated to him or her; and

(4) The following certification statements by such designated representative or alternate designated representative, as appropriate:

(i) ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a designated representative or alternate designated representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 72.26(d) shall be deemed to be an electronic submission by me.''

(ii) ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 72.26(d), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 72.26 is terminated.''

(d) A notice of delegation submitted under paragraph (c) of this section shall be effective, with regard to the designated representative or alternate designated representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such designated representative or alternate designated representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(e) Any electronic submission covered by the certification in paragraph (c)(4)(i) of this section and made in accordance with a notice of delegation effective under paragraph (d) of this section shall be deemed to be an electronic submission by the designated representative or alternate designated representative submitting such notice of delegation.

PART 73—[AMENDED]

■ 1. The authority citation for part 73 continues to read as follows:

Authority: 42 U.S.C. 7601 and 7651, *et seq.*

§ 73.31 [Amended]

■ 2. Section 73.31 is amended, in paragraph (c)(1)(v), by revising the words ''actions, inactions, or submissions'' to read ''representations, actions, inactions, or submissions''.

■ 3. Section 73.33 is amended as follows:

■ a. In paragraph (d)(4), by revising the words ''action, representation, or failure to act'' to read ''representation, action, inaction, or submission'' and by revising the word ''an action'' to read ''a representation, action, inaction, or submission'';

■ b. In paragraph (e), by revising the word ''actions'' to read ''representations, actions, inactions, or submissions'';

■ c. In paragraph (f), by revising the words ''any submission to'' to read ''any representation, action, inaction, or submission to'' and revise the words ''the recordation of transfers submitted by'' to read ''any representation, action, inaction, or submission of''; and

■ d. By adding a new paragraph (g) to read as follows:

§ 73.33 Authorized account representative.

* * * * *

(g) *Delegation by authorized account representative and alternate authorized account representative.* (1) An authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission (in a format prescribed by the Administrator) to the Administrator provided for or required under this part.

(2) An alternate authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission (in a format prescribed by the Administrator) to the Administrator provided for or required under this part.

(3) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (g)(1) or (2) of this section, the authorized account representative or alternate authorized account representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(i) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such authorized account representative or alternate authorized account representative;

(ii) The name, address, e-mail address, telephone number, and, facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(iii) For each such natural person, a list of the type or types of electronic submissions under paragraph (g)(1) or (2) of this section for which authority is delegated to him or her;

(iv) The following certification statements by such authorized account representative or alternate authorized account representative:

(A) ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a authorized account representative or alternate authorized representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 73.33(g)(4) shall be deemed to be an electronic submission by me.''

(B) ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 73.33(g)(4), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 73.33(g) is eliminated.''

(4) A notice of delegation submitted under paragraph (g)(3) of this section shall be effective, with regard to the authorized account representative or alternate authorized account representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such authorized account representative or alternate authorized account representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(5) Any electronic submission covered by the certification in paragraph (g)(3)(iv)(A) of this section and made in accordance with a notice of delegation effective under paragraph (g)(4) of this section shall be deemed to be an electronic submission by the designated representative or alternate designated representative submitting such notice of delegation.

PART 74—[AMENDED]

■ 1. The authority citation for Part 74 continues to read as follows:

Authority: 7601 and 7651 *et seq.*

§ 74.4 [Amended]

■ 2. In § 74.4, paragraph (c) is removed.

PART 78—[AMENDED]

■ 1. The authority citation for part 78 continues to read as follows:

Authority: 42 U.S.C. 7401, 7403, 7410, 7426, 7601, and 7651, *et seq.*

■ 2. Section 78.1 is amended as follows:

■ a. In paragraph (b)(8)(ii), by revising ''§ 97.256'' to read ''§ 96.256''.

■ b. By adding new paragraphs (b)(10), (b)(11), and (b)(12) to read as follows:

§ 78.1 Purpose and scope.

* * * * *

(b) * * *

(10) Under subparts AA through II of part 97 of this chapter,

(i) The decision on the allocation of CAIR NO_X allowances under subpart EE of part 97 of this chapter.

(ii) The decision on the deduction of CAIR NO_X allowances, and the adjustment of the information in a submission and the decision on the deduction or transfer of CAIR NO_X allowances based on the information as adjusted, under § 97.154 of this chapter;

(iii) The correction of an error in a CAIR NO_X Allowance Tracking System account under § 97.156 of this chapter;

(iv) The decision on the transfer of CAIR NO_X allowances under § 97.161 of this chapter;

(v) The finalization of control period emissions data, including retroactive adjustment based on audit;

(vi) The approval or disapproval of a petition under § 97.175 of this chapter.

(11) Under subparts AAA through III of part 97 of this chapter,

(i) The decision on the deduction of CAIR SO_2 allowances, and the adjustment of the information in a submission and the decision on the deduction or transfer of CAIR SO_2 allowances based on the information as adjusted, under § 97.254 of this chapter;

(ii) The correction of an error in a CAIR SO_2 Allowance Tracking System account under § 97.256 of this chapter;

(iii) The decision on the transfer of CAIR SO_2 allowances under § 97.261 of this chapter;

(iv) The finalization of control period emissions data, including retroactive adjustment based on audit;

(v) The approval or disapproval of a petition under § 97.275 of this chapter.

(12) Under subparts AAAA through IIII of part 97 of this chapter,

(i) The decision on the allocation of CAIR NO_X Ozone Season allowances under subpart EEEE of part 97 of this chapter.

(ii) The decision on the deduction of CAIR NO_X Ozone Season allowances, and the adjustment of the information in a submission and the decision on the deduction or transfer of CAIR NO_X Ozone Season allowances based on the information as adjusted, under § 97.354 of this chapter;

(iii) The correction of an error in a CAIR NO_X Ozone Season Allowance Tracking System account under § 97.356 of this chapter;

(iv) The decision on the transfer of CAIR NO_X Ozone Season allowances under § 97.361;

(v) The finalization of control period emissions data, including retroactive adjustment based on audit;

(vi) The approval or disapproval of a petition under § 97.375 of this chapter.

* * * * *

■ 3. Section 78.3 is amended as follows:

■ a. In paragraph (b)(3)(i), by revising the words ''under paragraph (a)(4), (5), or (6) of this section'' to read ''under paragraph (a)(4), (5), (6), (7), (8), or (9) of this section'';

■ b. In paragraph (d)(3), by revising the words ''account certificate of representation submitted by a CAIR designated representative'' to read ''certificate of representation submitted by a CAIR designated representative'' and by revising the words ''or subparts AAAA through IIII of part 96 of this chapter'', the words ''subparts AAAA through IIII of part 96 of this chapter, or under part 97 of this chapter''; and

■ c. By adding new paragraphs (a)(7), (a)(8), (a)(9), (d)(8), (d)(9), and (d)(10) to read as follows:

§ 78.3 Petition for administrative review and request for evidentiary hearing.

(a) * * *

(7) The following persons may petition for administrative review of a decision of the Administrator that is made under subparts AA through II of part 97 of this chapter and that is appealable under § 78.1(a):

(i) The CAIR designated representative for a unit or source, or the CAIR authorized account representative for any CAIR NO_X Allowance Tracking System account, covered by the decision; or

(ii) Any interested person.

(8) The following persons may petition for administrative review of a decision of the Administrator that is made under subparts AAA through III of part 97 and that is appealable under § 78.1(a):

(i) The CAIR designated representative for a unit or source, or the CAIR authorized account representative for any CAIR SO_2 Allowance Tracking System account, covered by the decision; or

(ii) Any interested person.

(9) The following persons may petition for administrative review of a decision of the Administrator that is made under subparts AAAA through IIII of part 97 and that is appealable under § 78.1(a):

(i) The CAIR designated representative for a unit or source, or the CAIR authorized account representative for any CAIR Ozone Season NO_X Allowance Tracking System account, covered by the decision; or

(ii) Any interested person.

* * * * *

(d) * * *

(8) Any provision or requirement of subparts AA through II of part 97 of this chapter, including the standard requirements under § 97.106 of this chapter and any emission monitoring or reporting requirements.

(9) Any provision or requirement of subparts AAA through III of part 97 of this chapter, including the standard requirements under § 97.206 of this chapter and any emission monitoring or reporting requirements.

(10) Any provision or requirement of subparts AAAA through IIII of part 97 of this chapter, including the standard requirements under § 97.306 of this chapter and any emission monitoring or reporting requirements.

PART 96—NO_X BUDGET TRADING PROGRAM AND CAIR NO_X AND SO_2 TRADING PROGRAMS FOR STATE IMPLEMENTATION PLANS

■ 1. The heading of part 96 is revised to read as set forth above.

■ 2. The authority citation for part 96 continues to read as follows:

Authority: 42 U.S.C. 7401, 7403, 7410, 7601, and 7651, *et seq.*

■ 3. Section 96.102 is amended as follows:

■ a. By revising the definition of ''Allocate or allocation'';

■ b. In the definition of ''Allowance transfer deadline'', by revising the words ''midnight of March 1, if it is a business day, or, if March 1 is not a business day, midnight of the first business day thereafter'' to read ''midnight of March 1 (if it is a business day), or midnight of the first business day thereafter (if March 1 is not a business day),'';

■ c. In the definition of ''Alternate CAIR designated representative'', by revising the words ''in accordance with'' to read '', in accordance with'' and by adding at the end the words ''If the CAIR NO_X source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the alternate Hg designated representative under the Hg Budget Trading Program.'';

■ d. In the definition of ''CAIR authorized account representative'', by revising the words ''subparts BB and II'' to read ''subparts BB, FF, and II'';

■ e. In the definition of ''CAIR designated representative'', by adding at the end the words ''If the CAIR NO_X source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the Hg designated representative under the Hg Budget Trading Program.'';

■ f. By revising the definition of ''CAIR NO_X allowance'';

■ g. In the definition of ''CAIR NO_X allowance deduction or deduct CAIR NO_X allowances'', by adding, after the words ''compliance account'', the words '', *e.g.,*'';

■ h. In the definition of ''CAIR NO_X Annual Trading Program'', by revising the words ''§ 51.123 of this chapter,'' to read ''§ 51.123 of this chapter or established by the Administrator in accordance with subparts AA through II of part 97 of this chapter and §§ 51.123(p) and 52.35 of this chapter,'';

■ i. In the definition of ''CAIR NO_X emissions limitation'', by revising the words ''tonnage equivalent of'' to read ''tonnage equivalent, in NO_X emissions in a control period, of'' and by revising the words ''for a control period'' to read ''for the control period'';

■ j. In the definition of ''CAIR NO_X Ozone Season source'', by revising the words ''includes one or more CAIR NO_X Ozone Season units'' to read ''is subject to the CAIR NO_X Ozone Season Trading Program'';

■ k. In the definition of ''CAIR NO_X Ozone Season Trading Program'', by revising the words ''§ 51.123 of this chapter,'' to read ''§ 51.123 of this chapter or established by the Administrator in accordance with subparts AAAA through IIII of part 97 of this chapter and §§ 51.123(ee) and 52.35 of this chapter,'';

■ l. By removing the definition of ''CAIR NO_X Ozone Season unit'';

■ m. In the definition of ''CAIR SO_2 source'', by revising the words ''includes one or more CAIR SO_2 units'' to read ''is subject to the CAIR SO_2 Trading Program'';

■ n. In the definition of ''CAIR SO_2 Trading Program'', by revising the words ''§ 51.124 of this chapter,'' to read ''§ 51.124 of this chapter or established by the Administrator in accordance with subparts AAA through III of part 97 of this chapter and §§ 51.124(r) and 52.36 of this chapter,'';

■ o. By removing the definition of ''CAIR SO_2 unit'';

■ p. In paragraph (2) of the definition of ''Cogeneration unit'', by revising the words ''calendar year after which'' to read ''calendar year after the calendar year in which'';

■ q. In paragraph (2) of the definition of ''Combustion turbine'', by revising the words ''any associated heat recovery steam generator''to read ''any associated duct burner, heat recovery steam generator,'';

■ r. By revising the definition of ''Commence commercial operation'';

■ s. By revising the definition of ''Commence operation'';

■ t. In the definition of ''Control period'', by revising the words ''January 1 of a calendar year and'' to read ''January 1 of a calendar year, except as provided in § 96.106(c)(2), and'';

■ u. By revising the definition of ''Maximum design heat input'';

■ v. In the definition of ''Nameplate capacity'', by revising the words ''other deratings) as specified'' to read ''other deratings) as of such installation as specified'' and by revising the words ''maximum amount as specified'' to read ''maximum amount as of such completion as specified'';

■ w. In the definition of ''Oil-fired'', by revising the words ''in a specified year.'' to read ''in a specified year and not qualifying as coal-fired.'';

■ x. In the definition of ''Receive or receipt'', by revising the words ''official correspondence log'' to read ''official log''; and

■ y. By adding new definitions of ''Hg Budget Trading Program'', ''Replacement, replace, or replaced'', and ''Solid waste incineration unit'' to read as follows:

§ 96.102 Definitions.

* * * * *

Allocate or *allocation* means, with regard to CAIR NO_X allowances, the determination by a permitting authority or the Administrator of the amount of such CAIR NO_X allowances to be initially credited to a CAIR NO_X unit, a new unit set-aside, or other entity.

* * * * *

CAIR NO_X allowance means a limited authorization issued by a permitting authority or the Administrator under provisions of a State implementation plan that are approved under § 51.123(o)(1) or (2) or (p) of this chapter, or under subpart EE of part 97 or § 97.188 of this chapter, to emit one ton of nitrogen oxides during a control period of the specified calendar year for which the authorization is allocated or of any calendar year thereafter under the CAIR NO_X Program. An authorization to emit nitrogen oxides that is not issued under provisions of a State implementation plan that are approved under § 51.123(o)(1) or (2) or (p) of this chapter or subpart EE of part 97 or § 97.188 of this chapter shall not be a CAIR NO_X allowance.

* * * * *

Commence commercial operation means, with regard to a unit:

(1) To have begun to produce steam, gas, or other heated medium used to generate electricity for sale or use, including test generation, except as provided in § 96.105 and § 96.184(h).

(i) For a unit that is a CAIR NO_X unit under § 96.104 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit that is a CAIR NO_X unit under § 96.104 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1) or (2) of this definition as appropriate.

(2) Notwithstanding paragraph (1) of this definition and except as provided in § 96.105, for a unit that is not a CAIR NO_X unit under § 96.104 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition, the unit's date for commencement of commercial operation shall be the date on which the unit becomes a CAIR NO_X unit under § 96.104.

(i) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1) or (2) of this definition as appropriate.

Commence operation means:

(1) To have begun any mechanical, chemical, or electronic process, including, with regard to a unit, start-up of a unit's combustion chamber, except as provided in § 96.184(h).

(2) For a unit that undergoes a physical change (other than replacement of the unit by a unit at the same source) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the date of commencement of operation of the unit, which shall continue to be treated as the same unit.

(3) For a unit that is replaced by a unit at the same source (*e.g.,* repowered) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the replaced unit's date of commencement of operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of operation as defined in paragraph (1), (2), or (3) of this definition as appropriate, except as provided in § 96.184(h).

* * * * *

Hg Budget Trading Program means a multi-state Hg air pollution control and emission reduction program approved and administered by the Administrator in accordance subpart HHHH of part 60 of this chapter and § 60.24(h)(6), or established by the Administrator under section 111 of the Clean Air Act, as a means of reducing national Hg emissions.

* * * * *

Maximum design heat input means the maximum amount of fuel per hour (in Btu/hr) that a unit is capable of combusting on a steady state basis as of the initial installation of the unit as specified by the manufacturer of the unit.

* * * * *

Replacement, *replace*, or *replaced* means, with regard to a unit, the demolishing of a unit, or the permanent shutdown and permanent disabling of a unit, and the construction of another unit (the replacement unit) to be used instead of the demolished or shutdown unit (the replaced unit).

* * * * *

Solid waste incineration unit means a stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine that is a ''solid waste incineration unit'' as defined in section 129(g)(1) of the Clean Air Act.

* * * * *

■ 4. Section 96.103 is revised to read as follows:

§ 96.103 Measurements, abbreviations, and acroynyms.

Measurements, abbreviations, and acronyms used in this subpart and subparts BB through II are defined as follows:

Btu—British thermal unit.
CO_2—carbon dioxide
H_2O—water
Hg—mercury
hr—hour
kW—kilowatt electrical
kWh—kilowatt hour
lb—pound
mmBtu—million Btu
MWe—megawatt electrical
MWh—megawatt hour
NO_X—nitrogen oxides
O2—oxygen
ppm—parts per million
scfh—standard cubic feet per hour
SO_2—sulfur dioxide
yr—year

■ 5. Section 96.104 is revised to read as follows:

§ 96.104 Applicability.

(a) Except as provided in paragraph (b) of this section:

(1) The following units in a State shall be CAIR NO_X units, and any source that includes one or more such units shall be a CAIR NO_X source, subject to the requirements of this subpart and subparts BB through HH of this part: any stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale.

(2) If a stationary boiler or stationary combustion turbine that, under paragraph (a)(1) of this section, is not a CAIR NO_X unit begins to combust fossil fuel or to serve a generator with nameplate capacity of more than 25 MWe producing electricity for sale, the unit shall become a CAIR NO_X unit as provided in paragraph (a)(1) of this section on the first date on which it both combusts fossil fuel and serves such generator.

(b) The units in a State that meet the requirements set forth in paragraph (b)(1)(i), (b)(2)(i), or (b)(2)(ii) of this section shall not be CAIR NO_X units:

(1)(i) Any unit that is a CAIR NO_X unit under paragraph (a)(1) or (2) of this section:

(A) Qualifying as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and continuing to qualify as a cogeneration unit; and

(B) Not serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe supplying in any calendar year more than one-third of the unit's potential electric output capacity or 219,000 MWh, whichever is greater, to any utility power distribution system for sale.

(ii) If a unit qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and meets the requirements of paragraphs (b)(1)(i) of this section for at least one calendar year, but subsequently no longer meets all such requirements, the unit shall become a CAIR NO_X unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of paragraph (b)(1)(i)(B) of this section.

(2)(i) Any unit that is a CAIR NO_X unit under paragraph (a)(1) or (2) of this section commencing operation before January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for 1985–1987 exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(ii) Any unit that is a CAIR NO_X unit under paragraph (a)(1) or (2) of this section commencing operation on or after January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for the first 3 calendar years of operation exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(iii) If a unit qualifies as a solid waste incineration unit and meets the requirements of paragraph (b)(2)(i) or (ii) of this section for at least 3 consecutive calendar years, but subsequently no longer meets all such requirements, the unit shall become a CAIR NO_X unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a solid waste incineration unit or January 1 after the first 3 consecutive calendar years after 1990 for which the unit has an average annual fuel consumption of fossil fuel of 20 percent or more.

§ 96.105 [Amended]

■ 6. Section 96.105 is amended as follows:

■ a. In paragraph (a)(1), by revising the words "§ 96.106(c)(4) through (8), § 96.107, and subparts EE through GG of this part" to read "§ 96.106(c)(4) through (7), § 96.107, § 96.108, and (subparts BB and EE through GG";

■ b. In paragraph (b)(3), by revising the words "shall retain at the source" to read "shall retain, at the source"; and

■ c. In paragraph (b)(7), by revising the words "commences operation and commercial operation" to read "commences commercial operation".

§ 96.106 [Amended]

■ 7. Section 96.106 is amended as follows:

■ a. In paragraph (a)(1)(i), by revising the words "in § 96.121(a) and (b)" to read "in § 96.121";

■ b. In paragraph (c)(2), by revising the words "under paragraph (c)(1) of this section" to read "under paragraph (c)(1) of this section for the control period" and by revising the words "under § 96.170(b)(1), (2), or (5)" to read "under § 96.170(b)(1), (2), or (5) and for each control period thereafter";

■ c. In paragraph (c)(4), by revising the words "subpart EE" to read "subparts FF, GG, and II";

■ d. In paragraph (c)(7), by revising the words "under subpart FF, GG, or II" to read "under subpart EE, FF, GG, or II", by revising the words "from a CAIR NO_X unit's compliance account" to read "from a CAIR NO_X source's compliance account", and by removing the words "that includes the CAIR NO_X unit";

■ e. In paragraph (d)(1), by removing the paragraph designation "(1)" and by redesignating paragraph (i) as paragraph (d)(1); and

■ f. By removing paragraph (d)(2) and by redesignating paragraph (ii) as paragraph (d)(2).

§ 96.111 [Amended]

■ 8. Section 96.111 is amended, in paragraph (c), by revising the words "§ 96.151 and 96.182" to read "96.115, 96.151, and 96.182".

§ 96.112 [Amended]

■ 9. Section 96.112 is amended, in paragraph (c)(1), by revising the words "a new owner" to read "an owner", by revising the words "such new owner" to read "such owner", and by revising the words "the new owner" to read "the owner".

§ 96.113 [Amended]

■ 10. Section 96.113 is amended as follows:

■ a. In paragraph (a)(1), by revising the words "is submitted" to read "is submitted, including identification and nameplate capacity of each generator served by each such unit"; and

■ b. In paragraph (a)(4)(iv), by revising the words "where a customer" to read "where a utility or industrial customer".

■ 11. Add a new § 96.115 to read as follows:

§ 96.115 Delegation by CAIR designated representative and alternate CAIR designated representative.

(a) A CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(b) An alternate CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(c) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (a) or (b) of this section, the CAIR designated representative or alternate CAIR designated representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator that includes the following elements:

(1) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR designated representative or alternate CAIR designated representative;

(2) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(3) For each such natural person, a list of the type or types of electronic submissions under paragraph (a) or (b) of this section for which authority is delegated to him or her; and

(4) The following certification statements by such CAIR designated representative or alternate CAIR designated representative:

(i) ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR designated representative or alternate CAIR designated representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 96.115(d) shall be deemed to be an electronic submission by me.''

(ii) ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 96.115(d), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 96.115 is terminated.''

(d) A notice of delegation submitted under paragraph (c) of this section shall be effective, with regard to the CAIR designated representative or alternate CAIR designated representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR designated representative or alternate CAIR designated representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(e) Any electronic submission covered by the certification in paragraph (c)(4)(i) of this section and made in accordance with a notice of delegation effective under paragraph (d) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

§ 96.120 [Amended]

■ 12. Section 96.120 is amended, in paragraph (a), by revising the words ''otherwise by this subpart and'' to read ''otherwise by § 96.105, this subpart, and''.

§ 96.121 [Amended]

■ 13. Section 96.121 is amended as follows:

■ a. In paragraph (a), by revising the words ''commences operation'' to read ''commences commercial operation, except as provided in § 96.183(a)''; and

■ b. In paragraph (b), by revising the words ''permit renewal'' to read ''permit renewal, except as provided in § 96.183(b)''.

§ 96.123 [Amended]

■ 14. Section 96.123 is amended, in paragraph (b), by revising the words ''subpart FF, GG, or II'' to read ''subpart EE, FF, GG, or II''.

§ 96.141 [Amended]

■ 15. Section 96.141 is amended as follows:

■ a. In paragraph (b)(1), removing the paragraph designation ''(1)'';

■ b. By removing paragraph (b)(2);

■ c. In paragraph (c)(1), removing the paragraph designation ''(1)''; and

■ d. By removing paragraph (c)(2).

■ 16. Section 96.142 is amended as follows:

■ a. In paragraph (a)(2)(ii)(C), by revising the words ''3,414 Btu/kWh'' to read ''3,413 Btu/kWh'';

■ b. By revising paragraph (c) introductory text;

■ c. In paragraph (c)(1), by revising the words ''2009 through 2013'' to read ''2009 through 2014'' and by revising the words ''in 2014'' to read ''in 2015'';

■ d. In paragraph (c)(2), by revising the words ''The CAIR NO_X allowance allocation request must be submitted on or before July 1 of the first control period for which CAIR NO_X allowances are requested'' to read ''A separate CAIR NO_X allowance allocation request for each control period for which CAIR NO_X allowances are sought must be submitted on or before May 1 of such control period''; and

■ e. In paragraph (c)(4)(ii), by revising the words ''On or after July 1'' to read ''On or after May 1''; and revising to read as follows:

§ 96.142 CAIR NO_X allowance allocations.

* * * * *

(c) For each control period in 2009 and thereafter, the permitting authority will allocate CAIR NO_X allowances to CAIR NO_X units in a State that are not allocated CAIR NO_X allowances under paragraph (b) of this section because the units do not yet have a baseline heat input under paragraph (a) of this section or because the units have a baseline heat input but all CAIR NO_X allowances available under paragraph (b) of this section for the control period are already allocated, in accordance with the following procedures:

* * * * *

§ 96.143 [Amended]

■ 17. Section 96.143 is amended as follows:

■ a. In paragraphs (b)(2), (c)(1), and (d), by revising the words ''July 1'' to read ''May 1'';

■ b. In paragraph (d)(3), by revising the words '' 'Unit's allocation' is the number of CAIR NO_X allowances'' to read '' 'Unit's allocation' is the amount of CAIR NO_X allowances'';

■ c. In paragraph (d)(4), by revising the words ''paragraph (d)(3) or (4)'' to read ''paragraph (d)(2) or (3)''; and

■ d. In paragraph (d)(5), by revising the words ''paragraph (d)(5)'' to read ''paragraph (d)(4)''.

■ 18. Section 96.151 is amended as follows:

■ a. In paragraph (b)(2) introductory text, by revising the word ''representative'' to read ''representative or alternate CAIR authorized account representative'';

■ b. In paragraph (b)(3)(iii)(A), by revising the words ''a new person'' to read ''a person'', by revising the words ''such new person'' to read ''such person'', and by revising the words ''the new person'' to read ''the person'';

■ c. In paragraph (b)(3)(iii)(B), by revising the words ''addition of persons'' to read ''addition of a new person'';

■ d. In paragraph (b)(4) introductory text, by revising the word ''representative'' to read ''representative or alternate CAIR authorized account representative'';

■ e. In paragraphs (b)(4)(ii) and (iii), by revising the words ''alternative CAIR'' to read ''alternate CAIR'' whenever they appear; and

■ f. By adding a new paragraph (b)(5) to read as follows:

§ 96.151 Establishment of accounts.

* * * * *

(b) * * *

(5) *Delegation by CAIR authorized account representative and alternate CAIR authorized account representative.* (i) A CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FF and GG of this part.

(ii) An alternate CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FF and GG of this part.

(iii) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (b)(5)(i) or (ii) of this section, the CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(A) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR authorized account representative or alternate CAIR authorized account representative;

(B) The name, address, e-mail address, telephone number, and, facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(C) For each such natural person, a list of the type or types of electronic submissions under paragraph (b)(5)(i) or (ii) of this section for which authority is delegated to him or her;

(D) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR authorized account representative or alternate CAIR authorized representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 96.151(b)(5)(iv) shall be deemed to be an electronic submission by me.''; and

(E) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 96.151 (b)(5)(iv), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 96.151 (b)(5) is terminated.''

(iv) A notice of delegation submitted under paragraph (b)(5)(iii) of this section shall be effective, with regard to the CAIR authorized account representative or alternate CAIR authorized account representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(v) Any electronic submission covered by the certification in paragraph (b)(5)(iii)(D) of this section and made in accordance with a notice of delegation effective under paragraph (b)(5)(iv) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

* * * * *

■ 19. Section 96.153 is amended as follows:

■ a. In paragraph (a), by revising the words ''By December 1, 2006,'' to read ''By September 30, 2007,'' and revising the words ''at a source'' to read ''at the source'';

■ b. In paragraphs (b) and (d), by removing the words ''or as determined by the Administrator''; and

■ c. By revising paragraph (c) to read as follows:

§ 96.153 Recordation of CAIR NO_X allowance allocations.

* * * * *

(c) By December 1, 2009 and December 1 of each year thereafter, the Administrator will record in the CAIR NO_X source's compliance account the CAIR NO_X allowances allocated for the CAIR NO_X units at the source, as submitted by the permitting authority in accordance with § 96.141(b), for the control period in the sixth year after the year of the applicable deadline for recordation under this paragraph.

* * * * *

§ 96.154 [Amended]

■ 20. Section 96.154 is amended as follows:

■ a. In paragraph (a)(1), by revising the words ''prior year;'' to read ''prior year; and'';

■ b. In paragraph (a)(2), revising the words ''§ 96.160 by the allowance transfer deadline for the control period; and'' to read ''§§ 96.160 and 96.161 by the allowance transfer deadline for the control period.'';

■ c. By removing paragraph (a)(3);

■ d. In paragraph (c)(2)(ii), by revising the words ''to any unit'' to read ''to any entity'';

■ e. In paragraph (e), by revising the words ''under paragraph (b) or (d) of this section'' to read ''under paragraphs (b) and (d) of this section and subpart II'';

■ f. In paragraph (f)(2), by revising the words ''of this section.'' to read ''of this section, and record such deductions and transfers.''

§ 96.155 [Amended]

■ 21. Section 96.155 is amended, in paragraph (b), by revising the words ''§ 96.156, or subpart GG'' to read ''§ 96.156, or subpart GG or II''.

§ 96.157 [Amended]

■ 22. Section 96.157 is amended, in paragraphs (a) and (b), by revising the words ''§ 96.160'' to read ''§§ 96.160 and 96.161''.

■ 23. Section 96.170 is amended as follows:

■ a. In paragraph (b) introductory text, by revising the words ''The owner'' to read ''Except as provided in paragraph (e) of this section, the owner'';

■ b. In paragraph (b)(5), by revising the words ''paragraphs (b)(1), (2), and (4) of this section and solely for purposes of § 96.106(c)(2), for the owner'' to read ''paragraphs (b)(1) and (2) of this section, for the owner'';

■ c. In paragraph (c)(1), by removing the paragraph designation ''(1)'' and by revising the words ''Except as provided in paragraph (c)(2) of this section, the owner'' to read ''The owner'';

■ d. By removing paragraph (c)(2);

■ e. In paragraph (d)(3), by revising the words ''the atmosphere'' to read ''the atmosphere or heat input''; and

■ f. By adding a new paragraph (e) to read as follows:

§ 96.170 General Requirements.

* * * * *

(e) *Long-term cold storage.* The owner or operator of a CAIR NO_X unit is subject to the applicable provisions of part 75 of this chapter concerning units in long-term cold storage.

§ 96.171 [Amended]

■ 24. Section 96.171 is amended, in paragraph (c), by revising the words ''§ 75.12, § 75.17, or subpart H of part 75'' to read ''§ 75.12 or § 75.17''.

§ 96.173 [Amended]

■ 25. Section 96.173 is amended by removing the words '', except that if the unit is not subject to an Acid Rain emissions limitation, the notification is only required to be sent to the permitting authority''.

■ 26. Section 96.174 is amended as follows:

■ a. In paragraph (d)(1)(i), by revising the words ''2008; or'' to read ''2008;'';

■ b. In paragraph (d)(1)(ii), by revising the words ''2008.'' to read ''2008;'';

■ c. By adding new paragraphs (d)(1)(iii) and (iv); and

■ d. In paragraph (d)(3), by revising the words ''or CAIR SO_2 Trading Program,'' to read '', CAIR SO_2 Trading Program, or Hg Budget Trading Program,'' and by revising the words ''subparts F through H'' to read ''subparts F through I'' and revising to read as follows:

§ 96.174 Recordkeeping and reporting.

* * * * *

(d) * * *

(1) * * *

(iii) Notwithstanding paragraphs (d)(1)(i) and (ii) of this section, for a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart II of this part, the calendar quarter corresponding to the date specified in § 96.184(b); and

(iv) Notwithstanding paragraphs (d)(1)(i) and (ii) of this section, for a CAIR NO_X opt-in unit under subpart II of this part, the calendar quarter corresponding to the date on which the CAIR NO_X opt-in unit enters the CAIR NO_X Annual Trading Program as provided in § 96.184(g).

* * * * *

§ 96.176 [Removed]

■ 27. Section 96.176 is removed.

■ 28. Section 96.183 is amended as follows:

■ a. By revising paragraph (a)(5); and

■ b. In paragraph (b)(2), by revising the words ''CAIR opt-in unit''to read ''CAIR NO_X opt-in unit'' and revising to read as follows:

§ 96.183 Applying for CAIR opt-in permit.

(a)* * *

(5) A statement, in a format specified by the permitting authority, whether the CAIR designated representative requests that the unit be allocated CAIR NO_X allowances under § 96.188(b) or § 96.188(c) (subject to the conditions in §§ 96.184(h) and 96.186(g)). If allocation under § 96.188(c) is requested, this statement shall include a statement that the owners and operators of the unit intend to repower the unit before January 1, 2015 and that they will provide, upon request, documentation demonstrating such intent.

* * * * *

§ 96.184 [Amended]

■ 29. Section 96.184 is amended as follows:

■ a. In paragraph (c)(2), by revising the words ''for the control period under paragraph (b)(1)(ii) of this section and for the control periods under paragraph (b)(2) of this section''to read''for the control periods under paragraphs (b)(1)(ii) and (2) of this section'';

■ b. In paragraph (d)(2), by revising the words ''for the control period under paragraph (b)(1)(ii) of this section and the control periods under paragraph (b)(2) of this section''to read''for the control periods under paragraphs (b)(1)(ii) and (2) of this section'';

■ c. In paragraph (d)(3), by revising the words ''for such control period'' with words''for such control periods'';

■ d. In paragraph (f), by revising the words ''CAIR NO_X opt-in permit'' to read ''CAIR opt-in permit''; and

■ e. In paragraph (h)(2), by revising the words ''a CAIR opt-in unit'' to read ''a CAIR NO_X opt-in unit''.

■ 30. Section 96.185 is amended as follows:

■ a. In paragraph (a)(5), by revising the words ''under § 96.188(c)''to read''§ 96.188(b) or § 96.188(c)''; and

■ b. By adding a new paragraph (c) to read as follows:

§ 96.185 CAIR opt-in permit contents.

* * * * *

(c) The CAIR opt-in permit shall be included, in a format specified by the permitting authority, in the CAIR permit for the source where the CAIR NO_X opt-in unit is located and in a title V operating permit or other federally enforceable permit for the source.

§ 96.186 [Amended]

■ 31. Section 96.186 is amended as follows:

■ a. In paragraph (a), by revising the words ''CAIR opt-in unit'' to read ''CAIR NO_X opt-in unit''; and

■ b. In paragraph (b)(2), by revising the words ''equal in number to'' to read ''equal in amount to''.

■ 32. Section 96.187 is amended as follows:

■ a. In paragraph (b)(1), by revising the words ''under § 96.123'' to read ''under § 96.123, and remove the CAIR opt-in permit provisions,'';

■ b. In paragraph (b)(2)(i), by revising the words ''equal in number to'' to read ''equal in amount to'';

■ c. By revising paragraph (b)(3)(i);

■ d. In paragraph (b)(3)(ii), by revising the words ''Notwithstanding paragraph (b)(3)(i) of this section, if'' to read ''If'', by revising the words ''January 1'' to read ''December 31,'' and by revising the words ''number of CAIR NO_X allowances'' to read ''amount of CAIR NO_X allowances''; and

■ e. In paragraph (b)(3)(ii)(A), by revising the words ''number of CAIR NO_X allowances'' to read ''amount of CAIR NO_X allowances'' and revising to read as follows:

§ 96.187 Change in regulatory status.

* * * * *

(b) * * *

(3)(i) For every control period after the date on which the CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 96.104, the CAIR NO_X opt-in unit will be allocated CAIR NO_X allowances under § 96.142.

* * * * *

§ 96.188 CAIR NO_X allowance allocations to CAIR NO_X opt-in units.

■ 33. Section 96.188 is amended as follows:

■ a. By revising the heading of the section as set forth above;

■ b. In paragraph (a)(2), by revising the words ''of the control period in which a CAIR opt-in unit'' to read ''of the control period after the control period in which a CAIR NO_X opt-in unit'';

■ c. In paragraph (c), by revising the words ''issues a CAIR opt-in permit'' to read ''issues a CAIR opt-in permit (based on a demonstration of the intent to repower stated under § 96.183(a)(5))''; and

■ d. In paragraph (d)(2), by revising the words ''CAIR opt-in unit'' to read ''CAIR NO_X opt-in unit'' and revising the words ''CAIR opt-in unit''.

■ 34. Section 96.202 is amended as follows:

■ a. By revising the definition of ''Allocate or allocation'';

■ b. In the definition of ''Allowance transfer deadline'', by revising the words ''midnight of March 1, if it is a business day, or, if March 1 is not a business day, midnight of the first business day thereafter'' to read ''midnight of March 1 (if it is a business day), or midnight of the first business day thereafter (if March 1 is not a business day),'';

■ c. In the definition of ''Alternate CAIR designated representative'', by adding at the end the words ''If the CAIR SO_2

source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the alternate Hg designated representative under the Hg Budget Trading Program.'';

■ d. In the definition of ''CAIR authorized account representative'', by revising the words ''subparts BBB and III'' to read ''subparts BBB, FFF, and III'';

■ e. In the definition of ''CAIR designated representative'', by adding at the end the words ''If the CAIR SO_2 source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the Hg designated representative under the Hg Budget Trading Program.'';

■ f. In the definition of ''CAIR NO_X Annual Trading Program'', by revising the words ''§ 51.123 of this chapter,'' to read ''§ 51.123 of this chapter or established by the Administrator in accordance with subparts AA through II of part 97 of this chapter and §§ 51.123(p) and 52.35 of this chapter,'';

■ g. In the definition of ''CAIR NO_X Ozone Season source'', by revising the words ''includes one or more CAIR NO_X Ozone Season unit'' to read ''is subject to the CAIR NO_X Ozone Season Trading Program'';

■ h. In the definition of ''CAIR NO_X Ozone Season Trading Program'', by revising the words ''§ 51.123 of this chapter,'' to read ''§ 51.123 of this chapter or established by the Administrator in accordance with subparts AAAA through IIII of part 97 of this chapter and §§ 51.123(ee) and 52.35 of this chapter,'';

■ i. By removing the definition of ''CAIR NO_X Ozone Season unit'';

■ j. In the definition of ''CAIR NO_X source'', by revising the words ''includes one or more CAIR NO_X units'' to read ''is subject to the CAIR NO_X Annual Trading Program'';

■ k. By removing the definition of ''CAIR NO_X unit'';

■ l. In the definition of ''CAIR SO_2 allowance'', by revising in the introductory text the words ''under § 96.288,'' to read ''under provisions of a State implementation plan that are approved under § 51.124(o)(1) or (2) or (r) of this chapter or § 97.288 of this chapter,'', by designating the last sentence of the definition as paragraph (4), and by revising in paragraph (4) the words ''(Program or under the provisions of a State implementation plan that is approved under § 51.124(o)(1) or (2) of this chapter'' to read ''(Program, provisions of a State implementation plan that are approved under § 51.124(o)(1) or (2) or (r) of this chapter, or § 97.288 of this chapter'';

■ m. In the definition of ''CAIR SO_2 allowance deduction or deduct CAIR SO_2 allowances'', by adding, after the words ''compliance account'', the words '', *e.g.*,'';

■ n. In the definition of ''CAIR SO_2 emissions limitation'', by revising the words ''tonnage equivalent of'' to read ''tonnage equivalent, in SO_2 emissions in a control period, of'' and by revising the words ''for a control period'' to read ''for the control period''

■ o. In the definition of ''CAIR SO_2 Trading Program'', by revising the words ''§ 51.124 of this chapter,'' to read ''§ 51.124 of this chapter or established by the Administrator in accordance with subparts AAA through III of part 97 of this chapter and §§ 51.124(r) and 52.36 of this chapter,'';

■ p. In paragraph (2) of the definition of ''Cogeneration unit'', by revising the words ''calendar year after which'' to read ''calendar year after the calendar year in which'';

■ q. In the definition of ''Combustion turbine'', by revising the words ''any associated heat recovery steam generator'' to read ''any associated duct burner, heat recovery steam generator,'';

■ r. By revising the definition of ''Commence commercial operation'';

■ s. By revising the definition of ''Commence operation'';

■ t. In the definition of ''Control period'', by revising the words ''January 1 of a calendar year and'' to read ''January 1 of a calendar year, except as provided in § 96.206(c)(2), and'';

■ u. By revising the definition of ''Maximum design heat input'';

■ v. In the definition of ''Nameplate capacity'', by revising the words ''other deratings) as specified'' to read ''other deratings) as of such installation as specified'' and by revising the words ''maximum amount as specified'' to read ''maximum amount as of such completion as specified'';

■ w. In the definition of ''Receive or receipt'', by revising the words ''official correspondence log'' to read ''official log'';

■ x. In the definition of ''Useful thermal energy'', by revising in paragraph (2) the word ''heat'' with the word ''heating''; and

■ y. By adding new definitions of ''Hg Budget Trading Program'', ''Replacement, replace, or replaced'', and ''Solid waste incineration unit'' to read as follows:

§ 96.202 Definitions.

* * * * *

Allocate or *allocation* means, with regard to CAIR SO_2 allowances issued under the Acid Rain Program, the determination by the Administrator of the amount of such CAIR SO_2 allowances to be initially credited to a CAIR SO_2 unit or other entity and, with regard to CAIR SO_2 allowances issued under provisions of a State implementation plan that are approved under § 51.124(o)(1) or (2) or (r) of this chapter or § 97.288 of this chapter, the determination by a permitting authority of the amount of such CAIR SO_2 allowances to be initially credited to a CAIR SO_2 unit or other entity.

* * * * *

Commence commercial operation means, with regard to a unit:

(1) To have begun to produce steam, gas, or other heated medium used to generate electricity for sale or use, including test generation, except as provided in § 96.205 and § 96.284(h).

(i) For a unit that is a CAIR SO_2 unit under § 96.204 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit that is a CAIR SO_2 unit under § 96.204 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1) or (2) of this definition as appropriate.

(2) Notwithstanding paragraph (1) of this definition and except as provided in § 96.205, for a unit that is not a CAIR SO_2 unit under § 96.204 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition, the unit's date for commencement of commercial operation shall be the date on which the unit becomes a CAIR SO_2 unit under § 96.204.

(i) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1) or (2) of this definition as appropriate.

Commence operation means:

(1) To have begun any mechanical, chemical, or electronic process, including, with regard to a unit, start-up of a unit's combustion chamber, except as provided in § 96.284(h).

(2) For a unit that undergoes a physical change (other than replacement of the unit by a unit at the same source) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the date of commencement of operation of the unit, which shall continue to be treated as the same unit.

(3) For a unit that is replaced by a unit at the same source (*e.g.,* repowered) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the replaced unit's date of commencement of operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of operation as defined in paragraph (1), (2), or (3) of this definition as appropriate, except as provided in (96.284(h).

* * * * *

Hg Budget Trading Program means a multi-state Hg air pollution control and emission reduction program approved and administered by the Administrator in accordance subpart HHHH of part 60 of this chapter and § 60.24(h)(6), or established by the Administrator under section 111 of the Clean Air Act, as a means of reducing national Hg emissions.

* * * * *

Maximum design heat input means the maximum amount of fuel per hour (in Btu/hr) that a unit is capable of combusting on a steady state basis as of the initial installation of the unit as specified by the manufacturer of the unit.

* * * * *

Replacement, replace, or *replaced* means, with regard to a unit, the demolishing of a unit, or the permanent shutdown and permanent disabling of a unit, and the construction of another unit (the replacement unit) to be used instead of the demolished or shutdown unit (the replaced unit).

* * * * *

Solid waste incineration unit means a stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine that is a ''solid waste incineration unit'' as defined in section 129(g)(1) of the Clean Air Act.

* * * * *

■ 35. Section 96.203 is revised to read as follows:

§ 96.203 Measurements, abbreviations, and acronyms.

Measurements, abbreviations, and acronyms used in this subpart and subparts BBB through III are defined as follows:

Btu—British thermal unit
CO_2—carbon dioxide
H_2O—water
Hg—mercury
hr—hour
kW—kilowatt electrical
kWh—kilowatt hour
lb—pound
mmBtu—million Btu
MWe—megawatt electrical
MWh—megawatt hour
NO_X—nitrogen oxides
O_2—oxygen
ppm—parts per million
scfh—standard cubic feet per hour
SO_2—sulfur dioxide
yr—year

■ 36. Section 96.204 is revised to read as follows:

§ 96.204 Applicability.

(a) Except as provided in paragraph (b) of this section:

(1) The following units in a State shall be CAIR SO_2 units, and any source that includes one or more such units shall be a CAIR SO_2 source, subject to the requirements of this subpart and subparts BBB through HHH of this part: any stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale.

(2) If a stationary boiler or stationary combustion turbine that, under paragraph (a)(1) of this section, is not a CAIR SO_2 unit begins to combust fossil fuel or to serve a generator with nameplate capacity of more than 25 MWe producing electricity for sale, the unit shall become a CAIR SO_2 unit as provided in paragraph (a)(1) of this section on the first date on which it both combusts fossil fuel and serves such generator.

(b) The units in a State that meet the requirements set forth in paragraph (b)(1)(i), (b)(2)(i), or (b)(2)(ii) of this section shall not be CAIR SO_2 units:

(1)(i) Any unit that is a CAIR SO_2 unit under paragraph (a)(1) or (2) of this section:

(A) Qualifying as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and continuing to qualify as a cogeneration unit; and

(B) Not serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe supplying in any calendar year more than one-third of the unit's potential electric output capacity or 219,000 MWh, whichever is greater, to any utility power distribution system for sale.

(ii) If a unit qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and meets the requirements of paragraphs (b)(1)(i) of this section for at least one calendar year, but subsequently no longer meets all such requirements, the unit shall become a CAIR SO_2 unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of paragraph (b)(1)(i)(B) of this section.

(2)(i) Any unit that is a CAIR SO_2 unit under paragraph (a)(1) or (2) of this section commencing operation before January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for 1985–1987 exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(ii) Any unit that is a CAIR SO_2 unit under paragraph (a)(1) or (2) of this section commencing operation on or after January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for the first 3 calendar years of operation exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(iii) If a unit qualifies as a solid waste incineration unit and meets the requirements of paragraph (b)(2)(i) or (ii) of this section for at least 3 consecutive calendar years, but subsequently no longer meets all such requirements, the unit shall become a CAIR SO_2 unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a solid waste incineration unit or January 1 after the first 3 consecutive calendar years after 1990 for which the unit has an average annual fuel consumption of fossil fuel of 20 percent or more.

§ 96.205 [Amended]

■ 37. Section 96.205 is amended as follows:
■ a. In paragraph (a)(1), by revising the words ''§ 96.206(c)(4) through (8), § 96.207, and subparts FFF and GGG'' to read ''§ 96.206(c)(4) through (7), § 96.207, § 96.208, and subparts BBB, FFF, and GGG'';
■ b. In paragraph (b)(2), by revising the words ''shall retain at the source'' to read ''shall retain, at the source''; and
■ c. In paragraph (b)(6), by revising the words ''commences operation and commercial operation'' to read ''commences commercial operation''.

§ 96.206 [Amended]

■ 38. Section 96.206 is amended as follows:
■ a. In paragraph (a)(1)(i), by revising the words ''in § 96.221(a) and (b)'' to read ''in § 96.221'';
■ b. In paragraph (c)(2), by revising the words ''under paragraph (c)(1) of this section'' with ''under paragraph (c)(1) of this section for the control period'' and by revising the words ''under § 96.270(b)(1), (2), or (5)'' to read ''under § 96.270(b)(1), (2), or (5) and for each control period thereafter'';
■ c. In paragraph (c)(7), by revising the words ''from a CAIR SO_2 unit's compliance account'' to read ''from a CAIR SO_2 source's compliance account'' and by removing the words ''that includes the CAIR SO_2 unit''; and
■ d. In paragraph (d)(1), by removing the paragraph designation ''(1)'' and by redesignating paragraph (i) as paragraph (d)(1); and
■ e. By removing paragraph (d)(2) and by redesignating paragraph (ii) as paragraph (d)(2).

§ 96.211 [Amended]

■ 39. In paragraph (c), by revising the words ''96.251 and 96.282'' to read ''96.215, 96.251, and 96.282''.

§ 96.212 [Amended]

■ 40. Section 96.212 is amended, in paragraph (c)(1), by revising the words ''a new owner'' to read ''an owner'', by revising the words ''such new owner'' to read ''such owner'', and by revising the words ''the new owner'' to read ''the owner''.

§ 96.213 [Amended]

■ 41. Section 96.213 is amended as follows:
■ a. In paragraph (a)(1), by revising the words ''is submitted'' to read ''is submitted, including identification and nameplate capacity of each generator served by each such unit''; and
■ b. In paragraph (a)(4)(iv), by revising the words ''where a customer'' to read ''where a utility or industrial customer''.
■ 42. Add a new section 96.215 to read as follows:

§ 96.215 Delegation by CAIR designated representative and alternate CAIR designated representative.

(a) A CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(b) An alternate CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(c) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (a) or (b) of this section, the CAIR designated representative or alternate CAIR designated representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator that includes the following elements:

(1) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR designated representative or alternate CAIR designated representative;

(2) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of each such natural person ''referred to as an ''agent'');

(3) For each such natural person, a list of the type or types of electronic submissions under paragraph (a) or (b) of this section for which authority is delegated to him or her; and

(4) The following certification statements by such CAIR designated representative or alternate CAIR designated representative:

(i) ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR designated representative or alternate CAIR designated representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 96.215(d) shall be deemed to be an electronic submission by me.''

(ii) ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 96.215(d), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 96.215 is terminated.''.

(d) A notice of delegation submitted under paragraph (c) of this section shall be effective, with regard to the CAIR designated representative or alternate CAIR designated representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR designated representative or alternate CAIR designated representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(e) Any electronic submission covered by the certification in paragraph (c)(4)(i) of this section and made in accordance with a notice of delegation effective under paragraph (d) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

§ 96.220 [Amended]

■ 43. Section 96.220 is amended as follows:
■ a. In paragraph (a), by revising the words ''otherwise by this subpart and'' to read ''otherwise by § 96.205, this subpart, and''; and
■ b. In paragraph (b), by replacing the words ''CAIR SO_2 units at the source'' to read ''CAIR SO_2 units at the source covered by the CAIR permit''.

§ 96.221 [Amended]

■ 44. Section 96.221 is amended as follows:
■ a. In paragraph (a), by revising the words ''commences operation'' to read ''commences commercial operation, except as provided in § 96.283(a)'' and
■ b. In paragraph (b), by revising the words ''permit renewal'' to read ''permit renewal, except as provided in § 96.283(b)''.

■ 45. Section 96.251 is amended as follows:
■ a. In paragraph (b)(2) introductory text, by revising the word ''representative'' to read ''representative

or alternate CAIR authorized account representative'';

■ b. In paragraph (b)(3)(iii)(A), by revising the words ''a new person'' to read ''a person'', revise the words ''such new person'' to read ''such person'', and revise the words ''the new person'' to read ''the person'';

■ c. In paragraph (b)(3)(iii)(B), by revising the words ''addition of persons'' to read ''addition of a new person'';

■ d. In paragraph (b)(4) introductory text, by revising the word ''representative'' to read ''representative or alternate CAIR authorized account representative'';

■ e. In paragraphs (b)(4)(ii) and (iii), by revising the words ''alternative CAIR'' to read ''alternate CAIR'' whenever they appear; and

■ f. By adding a new paragraph (b)(5) to read as follows:

§ 96.251 Establishment of accounts.

* * * * *

(b) * * *

(5) *Delegation by CAIR authorized account representative and alternate CAIR authorized account representative.* (i) A CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FFF and GGG of this part.

(ii) An alternate CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FFF and GGG of this part.

(iii) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (b)(5)(i) or (ii) of this section, the CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(A) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR authorized account representative or alternate CAIR authorized account representative;

(B) The name, address, e-mail address, telephone number, and, facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(C) For each such natural person, a list of the type or types of electronic submissions under paragraph (b)(5)(i) or (ii) of this section for which authority is delegated to him or her;

(D) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR authorized account representative or alternate CAIR authorized representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 96.251(b)(5)(iv) shall be deemed to be an electronic submission by me.''; and

(E) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 96.251 (b)(5)(iv), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 96.251 (b)(5) is terminated.''

(iv) A notice of delegation submitted under paragraph (b)(5)(iii) of this section shall be effective, with regard to the CAIR authorized account representative or alternate CAIR authorized account representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(v) Any electronic submission covered by the certification in paragraph (b)(5)(iii)(D) of this section and made in accordance with a notice of delegation effective under paragraph (b)(5)(iv) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

* * * * *

§ 96.254 [Amended]

■ 46. Section 96.254 is amended as follows:

■ a. In paragraph (a)(1), by revising the words ''prior year;'' to read ''prior year; and'';

■ b. In paragraph (a)(2), revising the words ''§ 96.260 by the allowance transfer deadline for the control period; and'' to read ''§§ 96.260 and 96.261 by the allowance transfer deadline for the control period.'';

■ c. Removing paragraph (a)(3);

■ d. In paragraph (b)(1)(ii), by removing the words ''available under paragraph (a) of this section and'';

■ d. In paragraphs (c)(2)(ii), (c)(2)(iv), and (c)(2)(vi), by revising the words ''to any unit'' to read ''to any entity'';

■ e. In paragraph (d)(1), by revising the words ''3 times the number of tons of the source's excess emissions'' to read ''3 times the following amount: the number of tons of the source's excess emissions minus, if the source is subject to an Acid Rain emissions limitation, the amount of the CAIR SO_2 allowances required to be deducted under paragraph (b)(1)(ii) of this section'';

■ f. In paragraph (e), by revising the words ''under paragraph (b) or (d) of this section'' to read ''under paragraphs (b) and (d) of this section) and subpart III''; and

■ g. In paragraph (f)(2), by revising the words ''of this section'' to read ''of this section, and record such deductions and transfers''.

§ 96.255 [Amended]

■ 47. Section 96.255 is amended, in paragraph (b), by revising the words ''§ 96.256, or subpart GGG'' to read ''§ 96.256, or subpart GGG or III''.

§ 96.257 [Amended]

■ 48. Section 96.257 is amended, in paragraphs (a) and (b), by revising the words ''96.260''; to read ''§§ 96.260 and 96.261''.

■ 49. Section 96.261 is amended as follows:

■ a. In paragraph (a)(1), by revising the words ''§ 96.260; and'' to read ''§ 96.260;'';

■ b. In paragraph (a)(2), by revising the words ''transfer.'' to read ''transfer; and''; and

■ c. By adding a new paragraph (a)(3) to read as follows:

§ 96.261 EPA recordation.

(a) * * *

(3) The transfer is in accordance with the limitation on transfer under § 74.42 of this chapter and § 74.47(c) of this chapter, as applicable.

* * * * *

■ 50. Section 96.270 is amended as follows:

■ a. In paragraph (b) introductory text, by revising the words ''The owner'' to read ''Except as provided in paragraph (e) of this section, the owner'';

■ b. In paragraph (b)(5), by revising the words ''paragraphs (b)(1) and (2) of this section and solely for purposes of § 96.206(c)(2), for the owner'' to read ''paragraphs (b)(1) and (2) of this section, for the owner'';

■ c. In paragraph (c)(1), by removing the paragraph designation ''(1)'' and by revising the words ''Except as provided in paragraph (c)(2) of this section, the owner'' to read ''The owner'' and the words ''SO_2 concentration, SO_2 emission rate,'' to read ''SO_2 concentration,'';

■ d. By removing paragraph (c)(2);

■ e. In paragraph (d)(3), by revising the words ''the atmosphere'' to read ''the atmosphere or heat input''; and

■ f. By adding a new paragraph (e) to read as follows:

§ 96.270 General requirements.

* * * * *

(e) *Long-term cold storage.* The owner or operator of a CAIR SO_2 unit is subject to the applicable provisions of part 75 of this chapter concerning units in long-term cold storage.

§ 96.271 [Amended]

■ 51. Section 96.271 is amended by removing and reserving paragraph (c).

§ 96.273 [Amended]

■ 52. Section 96.273 is amended by removing the words '', except that if the unit is not subject to an Acid Rain emissions limitation, the notification is only required to be sent to the permitting authority''.

■ 53. Section 96.274 is amended as follows:

■ a. In paragraph (d)(1)(i), by revising the words ''2009; or'' to read ''2009;'';

■ b. In paragraph (d)(1)(ii), by revising the words ''2009.'' to read ''2009;'';

■ c. By adding new paragraphs (d)(1)(iii) and (iv); and

■ d. In paragraph (d)(3), by revising the words ''or CAIR NO_X Ozone Season Trading Program,'' to read '', CAIR NO_X Ozone Season Trading Program, or Hg Budget Trading Program,'' and by revising the words ''subparts F through H'' to read ''subparts F through I'' and revising to read as follows:

§ 96.274 Recordkeeping and reporting.

* * * * *

(d) * * *

(1) * * *

(iii) Notwithstanding paragraphs (d)(1)(i) and (ii) of this section, for a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart III of this part, the calendar quarter corresponding to the date specified in § 96.284(b); and

(iv) Notwithstanding paragraphs (d)(1)(i) and (ii) of this section, for a CAIR SO_2 opt-in unit under subpart III of this part, the calendar quarter corresponding to the date on which the CAIR SO_2 opt-in unit enters the CAIR SO_2 Trading Program as provided in § 96.284(g).

* * * * *

§ 96.276 [Removed]

■ 54. Section 96.276 is removed.

■ 55. Section 96.283 is amended as follows:

■ a. In paragraph (a)(2)(iii), by revising the words ''CAIR opt-in unit'' to read ''CAIR SO_2 opt-in unit'';

■ b. By revising paragraph (a)(5);

■ c. In paragraph (b)(1), by revising the words ''or permitting authority's'' to read ''or the permitting authority's'';

■ d. In paragraph (b)(2), by revising the words ''withdrawal of the CAIR opt-in unit'' to read ''withdrawal of the CAIR SO_2 opt-in unit'' and revising to read as follows:

§ 96.283 Applying for CAIR opt-in permit.

(a) * * *

(5) A statement, in a format specified by the permitting authority, whether the CAIR designated representative requests that the unit be allocated CAIR SO_2 allowances under § 96.288(b) or § 96.288(c) (subject to the conditions in §§ 96.284(h) and 96.286(g)). If allocation under § 96.288(c) is requested, this statement shall include a statement that the owners and operators of the unit intend to repower the unit before January 1, 2015 and that they will provide, upon request, documentation demonstrating such intent.

* * * * *

§ 96.284 [Amended]

■ 56. Section 96.284 is amended as follows:

■ a. In paragraph (a), by revising the words ''heat input of the unit'' to read ''heat input of the unit and all other applicable parameters'';

■ b. In paragraph (c)(2), by revising the words ''for the control period under paragraph (b)(1)(ii) of this section and the control periods under paragraph (b)(2) of this section'' to read ''for the control periods under paragraphs (b)(1)(ii) and (2) of this section'';

■ c. In paragraph (d)(2), by revising the words ''for the control period under paragraph (b)(1)(ii) of this section and the control periods under paragraph (b)(2) of this section'' to read ''for the control periods under paragraphs (b)(1)(ii) and (2) of this section'';

■ d. In paragraph (d)(3), by revising the words ''for such control period'' with words ''for such control periods'';

■ d. In paragraph (f), by revising the words ''CAIR SO_2 opt-in permit'' to read ''CAIR opt-in permit''; and

■ e. In paragraph (h)(2), by revising the words ''a CAIR opt-in unit'' to read ''a CAIR SO_2 opt-in unit''.

■ 57. Section 96.285 is amended as follows:

■ a. In paragraph (a)(5), by revising the words ''under § 96.288(c)'' to read ''§ 96.288(b) or § 96.288(c)''; and

■ b. By adding a new paragraph (c) to read as follows:

§ 96.285 CAIR opt-in permit contents.

* * * * *

(c) The CAIR opt-in permit shall be included, in a format specified by the permitting authority, in the CAIR permit for the source where the CAIR SO_2 opt-in unit is located and in a title V operating permit or other federally enforceable permit for the source.

§ 96.286 [Amended]

■ 58. Section 96.286 is amended as follows:

■ a. In paragraph (a), by revising the words ''CAIR opt-in unit'' to read ''CAIR SO_2 opt-in unit''; and

■ b. In paragraph (b)(2), by revising the words ''equal in number to'' to read ''equal in amount to'' and by revising the words ''§ 96.188'' to read ''§ 96.288''.

§ 96.287 [Amended]

■ 59. Section 96.287 is amended as follows:

■ a. In paragraph (b)(1), by revising the words ''under § 96.223'' to read ''under § 96.223, and remove the CAIR opt-in permit provisions,'';

■ b. In paragraph (b)(2)(i), by revising the words ''equal in number to'' to read ''equal in amount to''; and

■ c. By removing paragraph (b)(3).

§ 96.288 CAIR SO_2 allowance allocations to CAIR SO_2 opt-in units.

■ 60. Section 96.288 is amended as follows:

■ a. By revising the heading of the section as set forth above;

■ b. In paragraph (a)(2), by revising the words ''of the control period in which a CAIR opt-in unit'' to read ''of the control period after the control period in which a CAIR SO_2 opt-in unit'';

■ c. In paragraph (c), by revising the words ''issues a CAIR opt-in permit'' to read ''issues a CAIR opt-in permit (based on a demonstration of the intent to repower stated under § 96.283(a)(5))''; and

■ d. In paragraph (d)(2), by revising the words ''CAIR opt-in unit'' to read ''CAIR SO_2 opt-in unit''.

■ 61. Section 96.302 is amended as follows:

■ a. By revising the definition of ‘‘Allocate or allocation’’;

■ b. In the definition of ‘‘Allowance transfer deadline’’, by revising the words ‘‘midnight of November 30, if it is a business day, or, if November 30 is not a business day, midnight of the first business day thereafter’’ to read ‘‘midnight of November 30 (if it is a business day), or midnight of the first business day thereafter (if November 30 is not a business day),’’;

■ c. In the definition of ‘‘Alternate CAIR designated representative’’, by adding at the end the words ‘‘If the CAIR NO_X Ozone Season source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the alternate Hg designated representative under the Hg Budget Trading Program.’’

■ d. In the definition of ‘‘CAIR authorized account representative’’, by revising the words ‘‘subparts BBBB and IIII’’ to read ’’subparts BBBB, FFFF, and IIII’’;

■ e. In the definition of ‘‘CAIR designated representative’’, by adding at the end the words ‘‘If the CAIR NO_X Ozone Season source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the Hg designated representative under the Hg Budget Trading Program.’’

■ f. In the definition of ‘‘CAIR NO_X Annual Trading Program’’, by revising the words ‘‘§ 51.123 of this chapter,’’ to read ‘‘§ 51.123 of this chapter or established by the Administrator in accordance with subparts AA through II of part 97 of this chapter and §§ 51.123(p) and 52.35 of this chapter,’’;

■ g. Revising the definition of ‘‘CAIR NO_X Ozone Season allowance’’;

■ h. In the definition of ‘‘CAIR NO_X Ozone Season allowance deduction or deduct CAIR NO_X Ozone Season allowances’’, by adding, after the words ‘‘compliance account’’, the words ‘‘*, e.g.,*’’;

■ i. In the definition of ‘‘CAIR NO_X Ozone Season emissions limitation’’, by revising the words ‘‘tonnage equivalent of’’ to read ‘‘tonnage equivalent, in NO_X emissions in a control period, of’’ and by revising the words ‘‘for a control period’’ to read ‘‘for the control period’’;

■ j. In the definition of ‘‘CAIR NO_X Ozone Season Trading Program’’, by revising the words ‘‘§ 51.123 of this chapter,’’ to read ‘‘§ 51.123 of this chapter or established by the Administrator in accordance with subparts AAAA through IIII of part 97 of this chapter and §§ 51.123(ee) and 52.35 of this chapter,’’;

■ k. In the definition of ‘‘CAIR NO_X source’’, by revising the words ‘‘includes one or more CAIR NO_X units’’ to read ‘‘is subject to the CAIR NO_X Annual Trading Program’’;

■ l. By removing the definition of ‘‘CAIR NO_X unit’’;

■ m. In the definition of ‘‘CAIR SO_2 source’’, by revising the words ‘‘includes one or more CAIR SO_2 units’’ to read ‘‘is subject to the CAIR SO_2 Trading Program’’;

■ n. In the definition of ‘‘CAIR SO_2 Trading Program’’, by revising the words ‘‘§ 51.124 of this chapter,’’ to read ‘‘§ 51.124 of this chapter or established by the Administrator in accordance with subparts AAA through III of part 97 of this chapter and §§ 51.124(r) and 52.36 of this chapter,’’;

■ o. By removing the definition of ‘‘CAIR SO_2 unit’’;

■ p. In paragraph (2) of the definition of ‘‘Cogeneration unit’’, by revising the words ‘‘calendar year after which’’ to read ‘‘calendar year after the calendar year in which’’;

■ q. In the definition of ‘‘Combustion turbine’’, by revising the words ‘‘any associated heat recovery steam generator’’ to read ‘‘any associated duct burner, heat recovery steam generator,’’;

■ r. By revising the definition of ‘‘Commence commercial operation’’;

■ s. By revising the definition of ‘‘Commence operation’’;

■ t. In the definition of ‘‘Control period’’, by revising the words ‘‘May 1 of a calendar year and’’ to read ‘‘May 1 of a calendar year, except as provided in § 96.306(c)(2), and’’;

■ u. By revising the definition of ‘‘Maximum design heat input’’;

■ v. In the definition of ‘‘Nameplate capacity’’, by revising the words ‘‘other deratings) as specified’’to read ‘‘other deratings) as of such installation as specified’’ and by revising the words ‘‘maximum amount as specified’’ to read ‘‘maximum amount as of such completion as specified’’;

■ w. In the definition of ‘‘Oil-fired’’, by revising the words ‘‘in a specified year.’’ to read ‘‘in a specified year and not qualifying as coal-fired.’’;

■ x. In the definition of ‘‘Receive or receipt’’, by revising the words ‘‘official correspondence log’’ to read ‘‘official log’’;

■ y. In the definition of ‘‘Useful thermal energy’’, by revising in paragraph (2) the word ‘‘heat’’ with the word ‘‘heating’’; and

■ z. By adding new definitions of ‘‘Hg Budget Trading Program’’, ‘‘Replacement, replace, or replaced’’, and ‘‘Solid waste incineration unit’’ and revising to read as follows:

§ 96.302 Definitions.

* * * * *

Allocate or *allocation means*, with regard to CAIR NO_X Ozone Season allowances, the determination by a permitting authority or the Administrator of the amount of such CAIR NO_X Ozone Season allowances to be initially credited to a CAIR NO_X Ozone Season unit, a new unit set-aside, or other entity.

* * * * *

CAIR NO_X Ozone Season allowance means a limited authorization issued by a permitting authority or the Administrator under provisions of a State implementation plan that are approved under § 51.123(aa)(1) or (2) (and (bb)(1)), (bb)(2), (dd), or (ee) of this chapter, or under subpart EEEE of part 97 or § 97.388 of this chapter, to emit one ton of nitrogen oxides during a control period of the specified calendar year for which the authorization is allocated or of any calendar year thereafter under the CAIR NO_X Ozone Season Trading Program or a limited authorization issued by a permitting authority for a control period during 2003 through 2008 under the NO_X Budget Trading Program in accordance with § 51.121(p) of this chapter to emit one ton of nitrogen oxides during a control period, provided that the provision in § 51.121(b)(2)(ii)(E) of this chapter shall not be used in applying this definition and the limited authorization shall not have been used to meet the allowance-holding requirement under the NO_X Budget Trading Program. An authorization to emit nitrogen oxides that is not issued under provisions of a State implementation plan approved under § 51.123(aa)(1) or (2) (and (bb)(1)), (bb)(2), (dd), or (ee) of this chapter or subpart EEEE of part 97 or § 97.388 of this chapter or under the NO_X Budget Trading Program as described in the prior sentence shall not be a CAIR NO_X Ozone Season allowance.

* * * * *

Commence commercial operation means, with regard to a unit:

(1) To have begun to produce steam, gas, or other heated medium used to generate electricity for sale or use, including test generation, except as provided in § 96.305 and § 96.384(h).

(i) For a unit that is a CAIR NO_X Ozone Season unit under § 97.304 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit that is a CAIR NO_X Ozone Season unit under § 96.304 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1) or (2) of this definition as appropriate.

(2) Notwithstanding paragraph (1) of this definition and except as provided in § 96.305, for a unit that is not a CAIR NO_X Ozone Season unit under § 96.304 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition, the unit's date for commencement of commercial operation shall be the date on which the unit becomes a CAIR NO_X Ozone Season unit under § 96.304.

(i) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1) or (2) of this definition as appropriate.

Commence operation means:

(1) To have begun any mechanical, chemical, or electronic process, including, with regard to a unit, start-up of a unit's combustion chamber, except as provided in § 96.384(h).

(2) For a unit that undergoes a physical change (other than replacement of the unit by a unit at the same source) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the date of commencement of operation of the unit, which shall continue to be treated as the same unit.

(3) For a unit that is replaced by a unit at the same source (*e.g.,* repowered) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the replaced unit's date of commencement of operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of operation as defined in paragraph (1), (2), or (3) of this definition as appropriate, except as provided in § 96.384(h).

* * * * *

Hg Budget Trading Program means a multi-state Hg air pollution control and emission reduction program approved and administered by the Administrator in accordance subpart HHHH of part 60 of this chapter and § 60.24(h)(6), or established by the Administrator under section 111 of the Clean Air Act, as a means of reducing national Hg emissions.

* * * * *

Maximum design heat input means the maximum amount of fuel per hour (in Btu/hr) that a unit is capable of combusting on a steady state basis as of the initial installation of the unit as specified by the manufacturer of the unit.

* * * * *

Replacement, *replace*, or *replaced* means, with regard to a unit, the demolishing of a unit, or the permanent shutdown and permanent disabling of a unit, and the construction of another unit (the replacement unit) to be used instead of the demolished or shutdown unit (the replaced unit).

* * * * *

Solid waste incineration unit means a stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine that is a ''solid waste incineration unit'' as defined in section 129(g)(1) of the Clean Air Act.

* * * * *

■ 62. Section 96.303 is revised to read as follows:

§ 96.303 Measurements, abbreviations, and acronyms.

Measurements, abbreviations, and acronyms used in this subpart and subparts BBBB through IIII are defined as follows:

Btu—British thermal unit
CO_2—carbon dioxide
H_2O—water
Hg—mercury
hr—hour
kW—kilowatt electrical
kWh—kilowatt hour
lb—pound
mmBtu—million Btu
MWe—megawatt electrical
MWh—megawatt hour
NO_X—nitrogen oxides
O_2—oxygen
ppm—parts per million
scfh—standard cubic feet per hour
SO_2—sulfur dioxide
yr—year

■ 63. Section 96.304 is revised to read as follows:

§ 96.304 Applicability.

(a) Except as provided in paragraph (b) of this section:

(1) The following units in a State shall be CAIR NO_X Ozone Season units, and any source that includes one or more such units shall be a CAIR NO_X Ozone Season source, subject to the requirements of this subpart and subparts BBBB through HHHH of this part: Any stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale.

(2) If a stationary boiler or stationary combustion turbine that, under paragraph (a)(1) of this section, is not a CAIR NO_X Ozone Season unit begins to combust fossil fuel or to serve a generator with nameplate capacity of more than 25 MWe producing electricity for sale, the unit shall become a CAIR NO_X Ozone Season unit as provided in paragraph (a)(1) of this section on the first date on which it both combusts fossil fuel and serves such generator.

(b) The units in a State that meet the requirements set forth in paragraph (b)(1)(i), (b)(2)(i), or (b)(2)(ii) of this section shall not be CAIR NO_X Ozone Season units:

(1)(i) Any unit that is a CAIR NO_X Ozone Season unit under paragraph (a)(1) or (2) of this section:

(A) Qualifying as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and continuing to qualify as a cogeneration unit; and

(B) Not serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe supplying in any calendar year more than one-third of the unit's potential electric output capacity or 219,000 MWh, whichever is greater, to any utility power distribution system for sale.

(ii) If a unit qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and meets the requirements of paragraphs (b)(1)(i) of this section for at least one calendar year, but subsequently no longer meets all such requirements, the unit shall become a CAIR NO_X Ozone Season unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of paragraph (b)(1)(i)(B) of this section.

(2)(i) Any unit that is a CAIR NO_X Ozone Season unit under paragraph (a)(1) or (2) of this section commencing operation before January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for 1985–1987 exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(ii) Any unit that is a CAIR NO_X Ozone Season unit under paragraph (a)(1) or (2) of this section commencing operation on or after January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for the first 3 calendar years of operation exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(iii) If a unit qualifies as a solid waste incineration unit and meets the requirements of paragraph (b)(2)(i) or (ii) of this section for at least 3 consecutive calendar years, but subsequently no longer meets all such requirements, the unit shall become a CAIR NO_X Ozone Season unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a solid waste incineration unit or January 1 after the first 3 consecutive calendar years after 1990 for which the unit has an average annual fuel consumption of fossil fuel of 20 percent or more.

§ 96.305 [Amended]

■ 64. Section 96.305 is amended as follows:

■ a. In paragraph (a)(1), by revising the words ''CAIR NO_X Ozone Season opt-in unit'' to read ''CAIR NO_X Ozone Season opt-in unit under subpart IIII of this part'' and by revising the words ''§ 96.306(c)(4) through (8), § 96.307, and subparts EEEE through GGGG'' to read ''§ 96.306(c)(4) through (7), § 96.307, § 96.308, and subparts BBBB and EEEE through GGGG'';

■ b. In paragraph (b)(3), by revising the words ''shall retain at the source'' to read ''shall retain, at the source''; and

■ c. In paragraph (b)(7), by revising the words ''commences operation and commercial operation'' to read ''commences commercial operation''.

§ 96.306 [Amended]

■ 65. Section 96.306 is amended as follows:

■ a. In paragraph (a)(1)(i), by revising the words ''in § 96.321(a) and (b)'' to read ''in § 96.321'';

■ b. In paragraph (c)(2), by revising the words ''under paragraph (c)(1) of this section'' with ''under paragraph (c)(1) of this section for the control period'' and by revising the words ''under § 96.370(b)(1), (2), (3), or (7)'' to read ''under § 96.370(b)(1), (2), (3), or (7) and for each control period thereafter'';

■ c. In paragraph (c)(4), by revising the words ''subpart EEEE'' to read ''subparts FFFF, GGGG, and IIII'';

■ d. In paragraph (c)(7), by revising the words ''from a CAIR NO_X Ozone Season unit's compliance account'' to read ''from a CAIR NO_X Ozone Season source's compliance account'', and by removing the words ''that includes the CAIR NO_X Ozone Season unit''; and

■ e. In paragraph (d)(1), by removing the paragraph designation ''(1)'' and by redesignating paragraph (i) as paragraph (d)(1); and

■ f. By removing paragraph (d)(2) and by redesignating paragraph (ii) as paragraph (d)(2).

§ 96.311 [Amended]

■ 66. In paragraph (c), by revising the words ''96.351 and 96.382'' to read ''96.315, 96.351, and 96.382''.

§ 96.312 [Amended]

■ 67. Section 96.312 is amended, in paragraph (c)(1), by revising the words ''a new owner'' to read ''an owner'', by revising the words ''such new owner'' to read ''such owner'', and by revising the words ''the new owner'' to read ''the owner''.

§ 96.313 Amended]

■ 68. Section 96.313 is amended as follows:

■ a. In paragraph (a)(1), by revising the words ''is submitted'' to read ''is submitted, including identification and nameplate capacity of each generator served by each such unit''; and

■ b. In paragraph (a)(4)(iv), by revising the words ''where a customer'' to read ''where a utility or industrial customer''.

■ 69. A new section 96.315 is added to read as follows:

§ 96.315 Delegation by CAIR designated representative and alternate CAIR designated representative.

(a) A CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(b) An alternate CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(c) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (a) or (b) of this section, the CAIR designated representative or alternate CAIR designated representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(1) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR designated representative or alternate CAIR designated representative;

(2) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(3) For each such natural person, a list of the type or types of electronic submissions under paragraph (a) or (b) of this section for which authority is delegated to him or her; and

(4) The following certification statements by such CAIR designated representative or alternate CAIR designated representative:

(i) ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR designated representative or alternate CAIR designated representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 96.315(d) shall be deemed to be an electronic submission by me.''

(ii) ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 96.315(d), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 96.315 is terminated.''.

(d) A notice of delegation submitted under paragraph (c) of this section shall be effective, with regard to the CAIR designated representative or alternate CAIR designated representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR designated representative or alternate CAIR designated representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(e) Any electronic submission covered by the certification in paragraph (c)(4)(i) of this section and made in accordance with a notice of delegation effective under paragraph (d) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

§ 96.320 [Amended]

■ 70. Section 96.320 is amended, in paragraph (a), by revising the words ''otherwise by this subpart and'' to read ''otherwise by § 96.305, this subpart, and''.

§ 96.321 [Amended]

■ 71. Section 96.321 is amended as follows:

■ a. In paragraph (a), by revising the words ''commences operation'' to read ''commences commercial operation, except as provided in § 96.383(a)''; and

■ b. In paragraph (b), by revising the words to read ''permit renewal'', to read ''permit renewal, except as provided in § 96.383(b)''.

§ 96.341 [Amended]

■ 72. Section 96.341 is amended as follows:

■ a. In paragraph (b)(1), removing the paragraph designation ''(1)'';

■ b. By removing paragraph (b)(2);

■ c. In paragraph (c)(1), removing the paragraph designation ((1)(; and

■ d.. By removing paragraph (c)(2).

■ 73. Section 96.342 is amended as follows:

■ a. In paragraph (a)(2)(i), by revising the words ''during a calendar year'' to read ''during a control period in a calendar year'';

■ b. In paragraph (a)(2)(ii)(C), by revising the words ''3,414 Btu/kWh'' to read ''3,413 Btu/kWh'';

■ c. By revising paragraph (c) introductory text;

■ d. In paragraph (c)(1), by revising the words ''2009 through 2013'' to read ''2009 through 2014'' and revise the words ''in 2014'' to read ''in 2015'';

■ e. In paragraph (c)(2), by revising the words ''The CAIR NO_X Ozone Season allowance allocation request must be submitted on or before April 1 of the first control period for which CAIR NO_X Ozone Season allowances are requested'' to read ''A separate CAIR NO_X Ozone Season allowance allocation request for each control period for which CAIR NO_X allowances are sought must be submitted on or before February 1 of such control period''; and

■ f. In paragraph (c)(4)(ii), by revising the words ''On or after April 1'' to read ''On or after February 1'' and revising to read as follows:

§ 96.342 CAIR NO_X Ozone Season allowance allocations.

* * * * *

(c) For each control period in 2009 and thereafter, the permitting authority will allocate CAIR NO_X Ozone Season allowances to CAIR NO_X Ozone Season units in a State that are not allocated CAIR NO_X Ozone Season allowances under paragraph (b) of this section because the units do not yet have a baseline heat input under paragraph (a) of this section or because the units have a baseline heat input but all CAIR NO_X Ozone Season allowances available under paragraph (b) of this section for the control period are already allocated, in accordance with the following procedures:

* * * * *

■ 74. Section 96.351 is amended as follows:

■ a. In paragraph (b)(2) introductory text, by revising the word ''representative'' to read ''representative or alternate CAIR authorized account representative'';

■ b. In paragraph (b)(3)(iii)(A), by revising the words ''a new person'' to read ''a person'', by revising the words ''such new person'' to read ''such person'', and by revising the words ''the new person'' to read ''the person'';

■ c. In paragraph (b)(3)(iii)(B), by revising the words ''addition of persons'' to read ''addition of a new person'';

■ d. In paragraph (b)(4) introductory text, by revising the word ''representative'' to read ''representative or alternate CAIR authorized account representative'';

■ e. In paragraphs (b)(4)(ii) and (iii), by revising the words ''alternative CAIR'' to read ''alternate CAIR'' whenever they appear; and

■ f. By adding a new paragraph (b)(5) to read as follows:

§ 96.351 Establishment of accounts.

* * * * *

(b) * * *

(5) *Delegation by CAIR authorized account representative and alternate CAIR authorized account representative.* (i) A CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FFFF and GGGG of this part.

(ii) An alternate CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FFFF and GGGG of this part.

(iii) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (b)(5)(i) or (ii) of this section, the CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(A) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR authorized account representative or alternate CAIR authorized account representative;

(B) The name, address, e-mail address, telephone number, and, facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(C) For each such natural person, a list of the type or types of electronic submissions under paragraph (b)(5)(i) or (ii) of this section for which authority is delegated to him or her;

(D) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR authorized account representative or alternate CAIR authorized representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 96.351(b)(5)(iv) shall be deemed to be an electronic submission by me.''; and

(E) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR

96.351(b)(5)(iv), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 96.351(b)(5) is terminated.''.

(iv) A notice of delegation submitted under paragraph (b)(5)(iii) of this section shall be effective, with regard to the CAIR authorized account representative or alternate CAIR authorized account representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(v) Any electronic submission covered by the certification in paragraph (b)(5)(iii)(D) of this section and made in accordance with a notice of delegation effective under paragraph (b)(5)(iv) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

* * * * *

■ 75. Section 96.353 is amended as follows:
■ a. In paragraph (a), by revising the words ''By December 1, 2006,'' to read ''By September 30, 2007,'' and revising the words ''at a source'' to read ''at the source'';
■ b. In paragraphs (b) and (d), by removing the words ''or as determined by the Administrator''; and
■ c. By revising paragraph (c) to read as follows:

§ 96.353 Recordation of CAIR NO_X Ozone Season allowance allocations.

* * * * *

(c) By December 1, 2010 and December 1 of each year thereafter, the Administrator will record in the CAIR NO_X Ozone Season source's compliance account the CAIR NO_X Ozone Season allowances allocated for the CAIR NO_X Ozone Season units at the source, as submitted by the permitting authority in accordance with § 96.341(b), for the control period in the sixth year after the year of the applicable deadline for recordation under this paragraph.

* * * * *

§ 96.354 [Amended]

■ 76. Section 96.354 is amended as follows:
■ a. In paragraph (a)(1), by revising the words ''prior year;'' to read ''prior year; and'';
■ b. In paragraph (a)(2), revising the words ''§ 96.360 by the allowance transfer deadline for the control period; and'' to read ''§§ 96.360 and 96.361 by the allowance transfer deadline for the control period.'';
■ c. Removing paragraph (a)(3);
■ d. In paragraph (c)(2)(ii), by revising the words ''to any unit ''to read ''to any entity'';
■ e. In paragraph (e), by revising the words ''under paragraph (b) or (d) of this section'' to read ''under paragraphs (b) and (d) of this section and subpart IIII''; and
■ f. In paragraph (f)(2), by revising the words ''of this section'' to read ''of this section, and record such deductions and transfers''.

§ 96.355 [Amended]

■ 77. Section 96.355 is amended, in paragraph (b), by revising the words ''§ 96.356, or subpart GGGG'' to read ''§ 96.356, or subpart GGGG or IIII''.

§ 96.357 [Amended]

■ 78. Section 96.357 is amended, in paragraphs (a) and (b), by revising the words ''§ 96.360'' to read ''§§ 96.360 and 96.361''.
■ 79. Section 96.370 is amended as follows:
■ a. In paragraph (b) introductory text, by revising the words ''The owner'' to read ''Except as provided in paragraph (e) of this section, the owner'';
■ b. In paragraph (b)(2)(ii), by removing the words '', if the compliance date under paragraph (b)(2)(i) is before May 1, 2008'';
■ c. In paragraph (b)(3) introductory text, by revising the words ''commences operation'' to read ''commences commercial operation'';
■ d. In paragraph (b)(7), by revising the words ''paragraphs (b)(1), (2), and (3) of this section and solely for purposes of § 96.206(c)(2), for the owner'' to read ''paragraphs (b)(1), (2), and (3) of this section, for the owner'' and by revising the words ''CAIR NO_X Ozone Season opt-in unit'' to read ''CAIR NO_X Ozone Season opt-in unit under subpart IIII of this part'';
■ e. In paragraph (c)(1), by removing the paragraph designation ''(1)'' and by revising the words ''Except as provided in paragraph (c)(2) of this section, the owner'' to read ''The owner'';
■ f. By removing paragraph (c)(2);
■ g. In paragraph (d)(3), by revising the words ''the atmosphere'' to read ''the atmosphere or heat input''; and
■ h. By adding a new paragraph (e) to read as follows:

§ 96.370 General Requirements.

* * * * *

(e) *Long-term cold storage.* The owner or operator of a CAIR NO_X Ozone Season unit is subject to the applicable provisions of part 75 of this chapter concerning units in long-term cold storage.

§ 96.371 [Amended]

■ 80. Section 96.371 is amended, in paragraph (c), by revising the words ''§ 75.12, § 75.17, or subpart H of part 75'' to read ''§ 75.12 or § 75.17''.

§ 96.373 [Amended]

■ 81. Section 96.373 is amended by removing the words '', except that if the unit is not subject to an Acid Rain emissions limitation, the notification is only required to be sent to the permitting authority''.
■ 82. Section 96.374 is amended as follows:
■ a. In paragraph (d)(1)(i), by revising the words ''2008; or'' to read ''2008;'';
■ b. In paragraph (d)(1)(ii), by revising the words ''2008.'' to read ''2008;'' and by revising the words ''fourth quarter of 2007'' to read ''fourth quarter of 2007 or the first quarter of 2008'';
■ c. In paragraph (d)(2)(ii)(B), by revising the words ''such date.'' to read ''such date;''; and
■ d. By adding new paragraphs (d)(1)(iii) and (iv) and (d)(2)(ii)(C) and (D);
■ e. By renumbering the second paragraph (d)(2) and the second paragraph (d)(3) as paragraphs (d)(3) and (d)(4) respectively and, in paragraph (d)(4), by revising the words ''or CAIR SO_2 Trading Program,'' to read '', CAIR SO_2 Trading Program, or Hg Budget Trading Program,'' and by revising the words ''subparts F through H'' to read ''subparts F through I'' and revising to read as follows:

§ 96.374 Recordkeeping and reporting.

* * * * *

(d) * * *

(1) * * *

(iii) Notwithstanding paragraphs (d)(1)(i) and (ii) of this section, for a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart IIII of this part, the calendar quarter corresponding to the date specified in § 96.384(b); and

(iv) Notwithstanding paragraphs (d)(1)(i) and (ii) of this section, for a CAIR NO_X Ozone Season opt-in unit under subpart IIII of this part, the calendar quarter corresponding to the date on which the CAIR NO_X Ozone Season opt-in unit enters the CAIR NO_X

Ozone Season Trading Program as provided in § 96.384(g).

(2) * * *

(ii) * * *

(C) Notwithstanding paragraphs (d)(2)(ii)(A) and (2)(ii)(B) of this section, for a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart IIII of this part, the calendar quarter corresponding to the date specified in § 96.384(b); and

(D) Notwithstanding paragraphs (d)(2)(ii)(A) and (2)(ii)(B) of this section, for a CAIR NO_X Ozone Season opt-in unit under subpart IIII of this part, the calendar quarter corresponding to the date on which the CAIR NO_X Ozone Season opt-in unit enters the CAIR NO_X Ozone Season Trading Program as provided in § 96.384(g).

* * * * *

§ 96.376 [Removed]

■ 83. Section 96.376 is removed.

■ 84. Section 96.383 is amended as follows:

■ a. By revising paragraph (a)(5); and

■ b. In paragraph (b)(2), by revising the words ''CAIR opt-in unit'' to read ''CAIR NO_X Ozone Season opt-in unit'', by revising the words ''Annual Trading Program'' to read ''Ozone Season Trading Program'', by revising the words ''CAIR NO_X unit'' to read ''CAIR NO_X Ozone Season unit'', and by revising the words ''CAIR NO_X opt-in unit'' to read ''CAIR NO_X Ozone Season opt-in unit'' whenever they appear and revising to read as follows:

§ 96.383 Applying for CAIR opt-in permit.

(a) * * *

(5) A statement, in a format specified by the permitting authority, whether the CAIR designated representative requests that the unit be allocated CAIR NO_X Ozone Season allowances under § 96.388(b) or § 96.388(c) (subject to the conditions in §§ 96.384(h) and 96.386(g)). If allocation under § 96.388(c) is requested, this statement shall include a statement that the owners and operators of the unit intend to repower the unit before January 1, 2015 and that they will provide, upon request, documentation demonstrating such intent.

* * * * *

§ 96.384 [Amended]

■ 85. Section 96.384 is amended as follows:

■ a. In paragraph (b), by revising the words ''heat input of the unit emissions rate and the heat input of the unit'' to read ''heat input of the unit'';

■ b. In paragraph (c)(2), by revising the words ''for the control period under paragraph (b)(1)(ii) of this section and for the control periods under paragraph (b)(2) of this section'' to read ''for the control periods under paragraphs (b)(1)(ii) and (2) of this section'';

■ c. In paragraph (d)(2), by revising the words ''for the control period under paragraph (b)(1)(ii) of this section and the control periods under paragraph (b)(2) of this section'' to read ''for the control periods under paragraphs (b)(1)(ii) and (2) of this section'';

■ d. In paragraph (d)(3), by revising the words ''for such control period'' to read ''for such control periods'';

■ e. In paragraph (h)(2), revising the words ''a CAIR opt-in unit'' to read ''a CAIR NO_X Ozone Season opt-in unit.''

■ 86. Section 96.385 is amended as follows:

■ a. In paragraph (a)(5), by revising the words ''under § 96.388(c)'' to read ''§ 96.388(b) or § 96.388(c)''; and

■ b. By adding a new paragraph (c) to read as follows:

§ 96.385 CAIR opt-in permit contents.

* * * * *

(c) The CAIR opt-in permit shall be included, in a format specified by the permitting authority, in the CAIR permit for the source where the CAIR NO_X Ozone Season opt-in unit is located and in a title V operating permit or other federally enforceable permit for the source.

§ 96.386 [Amended]

■ 87. Section 96.386 is amended as follows:

■ a. In paragraph (a), by revising the words ''CAIR opt-in unit'' to read ''CAIR NO_X Ozone Season opt-on unit'';

■ b. In paragraph (b)(2), by replacing the words ''equal in number to'' to read ''equal in amount to''; and

■ c. In paragraphs (c)(2) and (g), by revising the words ''CAIR NO_X opt-in unit'' to read ''CAIR NO_X Ozone Season opt-in unit''.

■ 88. Section 96.387 is amended as follows:

■ a. In paragraph (b)(1), by revising the words ''under § 96.323'' to read ''under § 96.323, and remove the CAIR opt-in permit provisions,'';

■ b. In paragraph (b)(2)(i), by revising the words ''equal in number to'' to read ''equal in amount to'';

■ c. By revising paragraph (b)(3)(i);

■ d. In paragraph (b)(3)(ii), by revising the words ''Notwithstanding paragraph (b)(3)(i) of this section if,'' to read ''If'', by revising the words ''May 1'' to read ''September 30'', and by revising the words ''number of CAIR NO_X Ozone Season allowances'' to read ''amount of CAIR NO_X Ozone Season allowances''; and

■ e. In paragraph (b)(3)(ii)(A), by revising the words ''number of CAIR NO_X Ozone Season allowances'' to read ''amount of CAIR NO_X Ozone Season allowances'' and revising to read as follows:

§ 96.387 Change in regulatory status.

* * * * *

(b) * * *

(3)(i) For every control period after the date on which the CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under § 96.304, the CAIR NO_X Ozone Season opt-in unit will be allocated CAIR NO_X Ozone Season allowances under § 96.342.

* * * * *

§ 96.388 CAIR NO_X Ozone Season allowance allocations to CAIR NO_X Ozone Season opt-in units.

■ 89. Section 96.388 is amended as follows:

■ a. By revising the heading of the section as set forth above;

■ b. In paragraph (a)(2), by revising the words ''of the control period in which'' to read ''of the control period after the control period in which'', by revising the words ''CAIR opt-in unit'' to read ''CAIR NO_X Ozone Season opt-in unit'', and by revising the words ''CAIR NO_X opt-in unit'' to read ''CAIR NO_X Ozone Season opt-in unit'';

■ c. In paragraph (c), by revising the words ''issues a CAIR opt-in permit'' to read ''issues a CAIR opt-in permit'' (based on a demonstration of the intent to repower stated under § 96.383(a)(5)); and

■ d. In paragraph (d)(2), by revising the words ''CAIR opt-in unit'' to read ''CAIR NO_X Ozone Season opt-in unit.''

PART 97—FEDERAL NO_X BUDGET TRADING PROGRAM AND CAIR NO_X AND SO_2 TRADING PROGRAMS

■ 1. The heading of part 97 is revised to read as set forth above.

■ 2. The authority citation for part 97 is revised to read as follows:

Authority: 42 U.S.C. 7401, 7403, 7410, 7426, 7601, and 7651, *et seq.*

■ 3. Part 97 is amended by adding subparts AA through II, to read as follows:

Subpart AA—CAIR NO_X Annual Trading Program General Provisions

Sec.

Subpart AA—CAIR NO_X Annual Trading Program General Provisions

§ 97.101 Purpose.

This subpart and subparts BB through II set forth the general provisions and the designated representative, permitting, allowance, monitoring, and opt-in provisions for the Federal Clean Air Interstate Rule (CAIR) NO_X Annual Trading Program, under section 110 of the Clean Air Act and § 52.35 of this chapter, as a means of mitigating interstate transport of fine particulates and nitrogen oxides.

§ 97.102 Definitions.

The terms used in this subpart and subparts BB through II shall have the meanings set forth in this section as follows:

Account number means the identification number given by the Administrator to each CAIR NO_X Allowance Tracking System account.

Acid Rain emissions limitation means a limitation on emissions of sulfur dioxide or nitrogen oxides under the Acid Rain Program.

Acid Rain Program means a multi-state sulfur dioxide and nitrogen oxides air pollution control and emission reduction program established by the Administrator under title IV of the CAA and parts 72 through 78 of this chapter.

Actual weighted average NO_X emission rate means, for a NO_X averaging plan under § 76.11 of this chapter and for a year:

(1) The sum of the products of the actual annual average NO_X emission rate and actual annual heat input (as determined in accordance with part 75 of this chapter) for all units in the NO_X averaging plan for the year; divided by

(2) The sum of the actual annual heat input (as determined in accordance with part 75 of this chapter) for all units in the NO_X averaging plan for the year.

Administrator means the Administrator of the United States Environmental Protection Agency or the Administrator's duly authorized representative.

Allocate or *allocation* means, with regard to CAIR NO_X allowances, the determination by a permitting authority or the Administrator of the amount of such CAIR NO_X allowances to be initially credited to a CAIR NO_X unit, a new unit set-aside, or other entity.

Allowance transfer deadline means, for a control period, midnight of March 1 (if it is a business day), or midnight of the first business day thereafter (if March 1 is not a business day), immediately following the control period and is the deadline by which a CAIR NO_X allowance transfer must be submitted for recordation in a CAIR NO_X source's compliance account in order to be used to meet the source's CAIR NO_X emissions limitation for such control period in accordance with § 97.154.

Alternate CAIR designated representative means, for a CAIR NO_X source and each CAIR NO_X unit at the source, the natural person who is authorized by the owners and operators of the source and all such units at the source in accordance with subparts BB and II of this part, to act on behalf of the CAIR designated representative in matters pertaining to the CAIR NO_X Annual Trading Program. If the CAIR NO_X source is also a CAIR SO_2 source, then this natural person shall be the same person as the alternate CAIR designated representative under the CAIR SO_2 Trading Program. If the CAIR NO_X source is also a CAIR NO_X Ozone Season source, then this natural person shall be the same person as the alternate CAIR designated representative under the CAIR NO_X Ozone Season Trading Program. If the CAIR NO_X source is also subject to the Acid Rain Program, then this natural person shall be the same person as the alternate designated representative under the Acid Rain Program. If the CAIR NO_X source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the alternate Hg designated representative under the Hg Budget Trading Program.

Automated data acquisition and handling system or *DAHS* means that component of the continuous emission monitoring system, or other emissions monitoring system approved for use under subpart HH of this part, designed to interpret and convert individual output signals from pollutant concentration monitors, flow monitors, diluent gas monitors, and other component parts of the monitoring system to produce a continuous record of the measured parameters in the measurement units required by subpart HH of this part.

Boiler means an enclosed fossil- or other-fuel-fired combustion device used to produce heat and to transfer heat to recirculating water, steam, or other medium.

Bottoming-cycle cogeneration unit means a cogeneration unit in which the energy input to the unit is first used to produce useful thermal energy and at least some of the reject heat from the useful thermal energy application or process is then used for electricity production.

CAIR authorized account representative means, with regard to a general account, a responsible natural person who is authorized, in accordance with subparts BB, FF, and II of this part, to transfer and otherwise dispose of CAIR NO_X allowances held in the general account and, with regard to a compliance account, the CAIR designated representative of the source.

CAIR designated representative means, for a CAIR NO_X source and each CAIR NO_X unit at the source, the natural person who is authorized by the owners and operators of the source and all such units at the source, in accordance with subparts BB and II of this part, to represent and legally bind each owner and operator in matters pertaining to the CAIR NO_X Annual Trading Program. If the CAIR NO_X source is also a CAIR SO_2 source, then this natural person shall be the same person as the CAIR designated representative under the CAIR SO_2 Trading Program. If the CAIR NO_X source is also a CAIR NO_X Ozone Season source, then this natural person shall be the same person as the CAIR designated representative under the CAIR NO_X Ozone Season Trading Program. If the CAIR NO_X source is also subject to the Acid Rain Program, then this natural person shall be the same person as the designated representative under the Acid Rain Program. If the CAIR NO_X source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the Hg designated representative under the Hg Budget Trading Program.

CAIR NO_X allowance means a limited authorization issued by a permitting authority or the Administrator under subpart EE of this part or § 97.188, or under provisions of a State implementation plan that are approved under § 51.123(o)(1) or (2) or (p) of this chapter, to emit one ton of nitrogen oxides during a control period of the specified calendar year for which the authorization is allocated or of any calendar year thereafter under the CAIR NO_X Program. An authorization to emit nitrogen oxides that is not issued under subpart EE of this part, § 97.188, or provisions of a State implementation plan that are approved under § 51.123(o)(1) or (2) or (p) of this chapter shall not be a CAIR NO_X allowance.

CAIR NO_X allowance deduction or deduct CAIR NO_X allowances means the permanent withdrawal of CAIR NO_X allowances by the Administrator from a compliance account, *e.g.,* in order to account for a specified number of tons of total nitrogen oxides emissions from all CAIR NO_X units at a CAIR NO_X source for a control period, determined in accordance with subpart HH of this part, or to account for excess emissions.

CAIR NO_X Allowance Tracking System means the system by which the Administrator records allocations, deductions, and transfers of CAIR NO_X allowances under the CAIR NO_X Annual Trading Program. Such allowances will be allocated, held, deducted, or transferred only as whole allowances.

CAIR NO_X Allowance Tracking System account means an account in the CAIR NO_X Allowance Tracking System established by the Administrator for purposes of recording the allocation, holding, transferring, or deducting of CAIR NO_X allowances.

CAIR NO_X allowances held or *hold CAIR NO_X allowances* means the CAIR NO_X allowances recorded by the Administrator, or submitted to the Administrator for recordation, in accordance with subparts FF, GG, and II of this part, in a CAIR NO_X Allowance Tracking System account.

CAIR NO_X Annual Trading Program means a multi-state nitrogen oxides air pollution control and emission reduction program established by the Administrator in accordance with subparts AA through II of this part and §§ 51.123(p) and 52.35 of this chapter or approved and administered by the Administrator in accordance with subparts AA through II of part 96 of this chapter and § 51.123(o)(1) or (2) of this chapter, as a means of mitigating interstate transport of fine particulates and nitrogen oxides.

CAIR NO_X emissions limitation means, for a CAIR NO_X source, the tonnage equivalent, in NO_X emissions in a control period, of the CAIR NO_X allowances available for deduction for the source under § 97.154(a) and (b) for the control period.

CAIR NO_X Ozone Season source means a source that is subject to the CAIR NO_X Ozone Season Trading Program.

CAIR NO_X Ozone Season Trading Program means a multi-state nitrogen oxides air pollution control and emission reduction program established by the Administrator in accordance with subparts AAAA through IIII of this part and §§ 51.123(ee) and 52.35 of this chapter or approved and administered by the Administrator in accordance with under subparts AAAA through IIII and § 51.123(aa)(1) or (2) (and (bb)(1)), (bb)(2), or (dd) of this chapter, as a means of mitigating interstate transport of ozone and nitrogen oxides.

CAIR NO_X source means a source that includes one or more CAIR NO_X units.

CAIR NO_X unit means a unit that is subject to the CAIR NO_X Annual Trading Program under § 97.104 and, except for purposes of § 97.105 and subpart EE of this part, a CAIR NO_X opt-in unit under subpart II of this part.

CAIR permit means the legally binding and federally enforceable written document, or portion of such document, issued by the permitting authority under subpart CC of this part, including any permit revisions, specifying the CAIR NO_X Annual Trading Program requirements applicable to a CAIR NO_X source, to each CAIR NO_X unit at the source, and to the owners and operators and the CAIR designated representative of the source and each such unit.

CAIR SO_2 source means a source that is subject to the CAIR SO_2 Trading Program.

CAIR SO_2 Trading Program means a multi-state sulfur dioxide air pollution control and emission reduction program established by the Administrator in accordance with subparts AAA through III of this part and §§ 51.124(r) and 52.36 of this chapter or approved and administered by the Administrator in accordance with subparts AAA through III of part 96 of this chapter and § 51.124(o)(1) or (2) of this chapter, as a means of mitigating interstate transport of fine particulates and sulfur dioxide.

Certifying official means:

(1) For a corporation, a president, secretary, treasurer, or vice-president or the corporation in charge of a principal business function or any other person who performs similar policy or decision-making functions for the corporation;

(2) For a partnership or sole proprietorship, a general partner or the proprietor respectively; or

(3) For a local government entity or State, Federal, or other public agency, a principal executive officer or ranking elected official.

Clean Air Act or *CAA* means the Clean Air Act, 42 U.S.C. 7401, *et seq.*

Coal means any solid fuel classified as anthracite, bituminous, subbituminous, or lignite.

Coal-derived fuel means any fuel (whether in a solid, liquid, or gaseous state) produced by the mechanical, thermal, or chemical processing of coal.

Coal-fired means:

(1) Except for purposes of subpart EE of this part, combusting any amount of coal or coal-derived fuel, alone or in combination with any amount of any other fuel, during any year; or

(2) For purposes of subpart EE of this part, combusting any amount of coal or coal-derived fuel, alone or in combination with any amount of any other fuel, during a specified year.

Cogeneration unit means a stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine:

(1) Having equipment used to produce electricity and useful thermal energy for industrial, commercial, heating, or cooling purposes through the sequential use of energy; and

(2) Producing during the 12-month period starting on the date the unit first produces electricity and during any calendar year after the calendar year in which the unit first produces electricity—

(i) For a topping-cycle cogeneration unit, (A) Useful thermal energy not less than 5 percent of total energy output; and

(B) Useful power that, when added to one-half of useful thermal energy produced, is not less then 42.5 percent of total energy input, if useful thermal energy produced is 15 percent or more of total energy output, or not less than 45 percent of total energy input, if useful thermal energy produced is less than 15 percent of total energy output.

(ii) For a bottoming-cycle cogeneration unit, useful power not less than 45 percent of total energy input.

Combustion turbine means:

(1) An enclosed device comprising a compressor, a combustor, and a turbine and in which the flue gas resulting from the combustion of fuel in the combustor passes through the turbine, rotating the turbine; and

(2) If the enclosed device under paragraph (1) of this definition is combined cycle, any associated duct burner, heat recovery steam generator, and steam turbine.

Commence commercial operation means, with regard to a unit:

(1) To have begun to produce steam, gas, or other heated medium used to generate electricity for sale or use, including test generation, except as provided in § 97.105 and § 97.184(h).

(i) For a unit that is a CAIR NO_X unit under § 97.104 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit that is a CAIR NO_X unit under § 97.104 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1) or (2) of this definition as appropriate.

(2) Notwithstanding paragraph (1) of this definition and except as provided in § 97.105, for a unit that is not a CAIR NO_X unit under § 97.104 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition, the unit's date for commencement of commercial operation shall be the date on which the unit becomes a CAIR NO_X unit under § 97.104.

(i) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1) or (2) of this definition as appropriate.

Commence operation means:

(1) To have begun any mechanical, chemical, or electronic process, including, with regard to a unit, start-up of a unit's combustion chamber, except as provided in § 97.184(h).

(2) For a unit that undergoes a physical change (other than replacement of the unit by a unit at the same source) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the date of commencement of operation of the unit, which shall continue to be treated as the same unit.

(3) For a unit that is replaced by a unit at the same source (*e.g.,* repowered) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the replaced unit's date of commencement of operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of operation as defined in paragraph (1), (2), or (3) of this definition as appropriate, except as provided in § 97.184(h).

Common stack means a single flue through which emissions from 2 or more units are exhausted.

Compliance account means a CAIR NO_X Allowance Tracking System account, established by the Administrator for a CAIR NO_X source under subpart FF or II of this part, in which any CAIR NO_X allowance allocations for the CAIR NO_X units at the source are initially recorded and in which are held any CAIR NO_X allowances available for use for a control period in order to meet the source's CAIR NO_X emissions limitation in accordance with § 97.154.

Continuous emission monitoring system or *CEMS* means the equipment required under subpart HH of this part to sample, analyze, measure, and provide, by means of readings recorded at least once every 15 minutes (using an automated data acquisition and handling system (DAHS)), a permanent record of nitrogen oxides emissions, stack gas volumetric flow rate, stack gas moisture content, and oxygen or carbon dioxide concentration (as applicable), in a manner consistent with part 75 of this chapter. The following systems are the principal types of continuous emission monitoring systems required under subpart HH of this part:

(1) A flow monitoring system, consisting of a stack flow rate monitor and an automated data acquisition and handling system and providing a permanent, continuous record of stack gas volumetric flow rate, in standard cubic feet per hour (scfh);

(2) A nitrogen oxides concentration monitoring system, consisting of a NO_X pollutant concentration monitor and an automated data acquisition and handling system and providing a permanent, continuous record of NO_X emissions, in parts per million (ppm);

(3) A nitrogen oxides emission rate (or NO_X-diluent) monitoring system, consisting of a NO_X pollutant concentration monitor, a diluent gas (CO_2 or O_2) monitor, and an automated data acquisition and handling system and providing a permanent, continuous record of NO_X concentration, in parts per million (ppm), diluent gas

concentration, in percent CO_2 or O_2, and NO_X emission rate, in pounds per million British thermal units (lb/mmBtu);

(4) A moisture monitoring system, as defined in § 75.11(b)(2) of this chapter and providing a permanent, continuous record of the stack gas moisture content, in percent H_2O;

(5) A carbon dioxide monitoring system, consisting of a CO_2 pollutant concentration monitor (or an oxygen monitor plus suitable mathematical equations from which the CO_2 concentration is derived) and an automated data acquisition and handling system and providing a permanent, continuous record of CO_2 emissions, in percent CO_2; and

(6) An oxygen monitoring system, consisting of an O_2 concentration monitor and an automated data acquisition and handling system and providing a permanent, continuous record of O_2, in percent O_2.

Control period means the period beginning January 1 of a calendar year, except as provided in § 97.106(c)(2), and ending on December 31 of the same year, inclusive.

Emissions means air pollutants exhausted from a unit or source into the atmosphere, as measured, recorded, and reported to the Administrator by the CAIR designated representative and as determined by the Administrator in accordance with subpart HH of this part.

Excess emissions means any ton of nitrogen oxides emitted by the CAIR NO_X units at a CAIR NO_X source during a control period that exceeds the CAIR NO_X emissions limitation for the source.

Fossil fuel means natural gas, petroleum, coal, or any form of solid, liquid, or gaseous fuel derived from such material.

Fossil-fuel-fired means, with regard to a unit, combusting any amount of fossil fuel in any calendar year.

Fuel oil means any petroleum-based fuel (including diesel fuel or petroleum derivatives such as oil tar) and any recycled or blended petroleum products or petroleum by-products used as a fuel whether in a liquid, solid, or gaseous state.

General account means a CAIR NO_X Allowance Tracking System account, established under subpart FF of this part, that is not a compliance account.

Generator means a device that produces electricity.

Gross electrical output means, with regard to a cogeneration unit, electricity made available for use, including any such electricity used in the power production process (which process includes, but is not limited to, any on-site processing or treatment of fuel combusted at the unit and any on-site emission controls).

Heat input means, with regard to a specified period of time, the product (in mmBtu/time) of the gross calorific value of the fuel (in Btu/lb) divided by 1,000,000 Btu/mmBtu and multiplied by the fuel feed rate into a combustion device (in lb of fuel/time), as measured, recorded, and reported to the Administrator by the CAIR designated representative and determined by the Administrator in accordance with subpart HH of this part and excluding the heat derived from preheated combustion air, recirculated flue gases, or exhaust from other sources.

Heat input rate means the amount of heat input (in mmBtu) divided by unit operating time (in hr) or, with regard to a specific fuel, the amount of heat input attributed to the fuel (in mmBtu) divided by the unit operating time (in hr) during which the unit combusts the fuel.

Hg Budget Trading Program means a multi-state Hg air pollution control and emission reduction program approved and administered by the Administrator in accordance subpart HHHH of part 60 of this chapter and § 60.24(h)(6), or established by the Administrator under section 111 of the Clean Air Act, as a means of reducing national Hg emissions.

Life-of-the-unit, firm power contractual arrangement means a unit participation power sales agreement under which a utility or industrial customer reserves, or is entitled to receive, a specified amount or percentage of nameplate capacity and associated energy generated by any specified unit and pays its proportional amount of such unit's total costs, pursuant to a contract:

(1) For the life of the unit;

(2) For a cumulative term of no less than 30 years, including contracts that permit an election for early termination; or

(3) For a period no less than 25 years or 70 percent of the economic useful life of the unit determined as of the time the unit is built, with option rights to purchase or release some portion of the nameplate capacity and associated energy generated by the unit at the end of the period.

Maximum design heat input means the maximum amount of fuel per hour (in Btu/hr) that a unit is capable of combusting on a steady state basis as of the initial installation of the unit as specified by the manufacturer of the unit.

Monitoring system means any monitoring system that meets the requirements of subpart HH of this part, including a continuous emissions monitoring system, an alternative monitoring system, or an excepted monitoring system under part 75 of this chapter.

Most stringent State or Federal NO_X emissions limitation means, with regard to a unit, the lowest NO_X emissions limitation (in terms of lb/mmBtu) that is applicable to the unit under State or Federal law, regardless of the averaging period to which the emissions limitation applies.

Nameplate capacity means, starting from the initial installation of a generator, the maximum electrical generating output (in MWe) that the generator is capable of producing on a steady state basis and during continuous operation (when not restricted by seasonal or other deratings) as of such installation as specified by the manufacturer of the generator or, starting from the completion of any subsequent physical change in the generator resulting in an increase in the maximum electrical generating output (in MWe) that the generator is capable of producing on a steady state basis and during continuous operation (when not restricted by seasonal or other deratings), such increased maximum amount as of such completion as specified by the person conducting the physical change.

Oil-fired means, for purposes of subpart EE of this part, combusting fuel oil for more than 15.0 percent of the annual heat input in a specified year and not qualifying as coal-fired.

Operator means any person who operates, controls, or supervises a CAIR NO_X unit or a CAIR NO_X source and shall include, but not be limited to, any holding company, utility system, or plant manager of such a unit or source.

Owner means any of the following persons:

(1) With regard to a CAIR NO_X source or a CAIR NO_X unit at a source, respectively:

(i) Any holder of any portion of the legal or equitable title in a CAIR NO_X unit at the source or the CAIR NO_X unit;

(ii) Any holder of a leasehold interest in a CAIR NO_X unit at the source or the CAIR NO_X unit; or

(iii) Any purchaser of power from a CAIR NO_X unit at the source or the CAIR NO_X unit under a life-of-the-unit, firm power contractual arrangement; provided that, unless expressly provided for in a leasehold agreement, owner shall not include a passive lessor, or a person who has an equitable interest through such lessor, whose rental payments are not based (either directly or indirectly) on the revenues or income from such CAIR NO_X unit; or

(2) With regard to any general account, any person who has an ownership interest with respect to the CAIR NO_X allowances held in the general account and who is subject to the binding agreement for the CAIR authorized account representative to represent the person's ownership interest with respect to CAIR NO_X allowances.

Permitting authority means the State air pollution control agency, local agency, other State agency, or other agency authorized by the Administrator to issue or revise permits to meet the requirements of the CAIR NO_X Annual Trading Program in accordance with subpart CC of this part or, if no such agency has been so authorized, the Administrator.

Potential electrical output capacity means 33 percent of a unit's maximum design heat input, divided by 3,413 Btu/kWh, divided by 1,000 kWh/MWh, and multiplied by 8,760 hr/yr.

Receive or receipt of means, when referring to the permitting authority or the Administrator, to come into possession of a document, information, or correspondence (whether sent in hard copy or by authorized electronic transmission), as indicated in an official log, or by a notation made on the document, information, or correspondence, by the permitting authority or the Administrator in the regular course of business.

Recordation, record, or *recorded* means, with regard to CAIR NO_X allowances, the movement of CAIR NO_X allowances by the Administrator into or between CAIR NO_X Allowance Tracking System accounts, for purposes of allocation, transfer, or deduction.

Reference method means any direct test method of sampling and analyzing for an air pollutant as specified in § 75.22 of this chapter.

Replacement, replace, or *replaced* means, with regard to a unit, the demolishing of a unit, or the permanent shutdown and permanent disabling of a unit, and the construction of another unit (the replacement unit) to be used instead of the demolished or shutdown unit (the replaced unit).

Repowered means, with regard to a unit, replacement of a coal-fired boiler with one of the following coal-fired technologies at the same source as the coal-fired boiler:

(1) Atmospheric or pressurized fluidized bed combustion;

(2) Integrated gasification combined cycle;

(3) Magnetohydrodynamics;

(4) Direct and indirect coal-fired turbines;

(5) Integrated gasification fuel cells; or

(6) As determined by the Administrator in consultation with the Secretary of Energy, a derivative of one or more of the technologies under paragraphs (1) through (5) of this definition and any other coal-fired technology capable of controlling multiple combustion emissions simultaneously with improved boiler or generation efficiency and with significantly greater waste reduction relative to the performance of technology in widespread commercial use as of January 1, 2005.

Sequential use of energy means:

(1) For a topping-cycle cogeneration unit, the use of reject heat from electricity production in a useful thermal energy application or process; or

(2) For a bottoming-cycle cogeneration unit, the use of reject heat from useful thermal energy application or process in electricity production.

Serial number means, for a CAIR NO_X allowance, the unique identification number assigned to each CAIR NO_X allowance by the Administrator.

Solid waste incineration unit means a stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine that is a ''solid waste incineration unit'' as defined in section 129(g)(1) of the Clean Air Act.

Source means all buildings, structures, or installations located in one or more contiguous or adjacent properties under common control of the same person or persons. For purposes of section 502(c) of the Clean Air Act, a ''source,'' including a ''source'' with multiple units, shall be considered a single ''facility.''

State means one of the States or the District of Columbia that is subject to the CAIR NO_X Annual Trading Program pursuant to § 52.35 of this chapter.

Submit or serve means to send or transmit a document, information, or correspondence to the person specified in accordance with the applicable regulation:

(1) In person;

(2) By United States Postal Service; or

(3) By other means of dispatch or transmission and delivery. Compliance with any ''submission'' or ''service'' deadline shall be determined by the date of dispatch, transmission, or mailing and not the date of receipt.

Title V operating permit means a permit issued under title V of the Clean Air Act and part 70 or part 71 of this chapter.

Title V operating permit regulations means the regulations that the Administrator has approved or issued as meeting the requirements of title V of the Clean Air Act and part 70 or 71 of this chapter.

Ton means 2,000 pounds. For the purpose of determining compliance with the CAIR NO_X emissions limitation, total tons of nitrogen oxides emissions for a control period shall be calculated as the sum of all recorded hourly emissions (or the mass equivalent of the recorded hourly emission rates) in accordance with subpart HH of this part, but with any remaining fraction of a ton equal to or greater than 0.50 tons deemed to equal one ton and any remaining fraction of a ton less than 0.50 tons deemed to equal zero tons.

Topping-cycle cogeneration unit means a cogeneration unit in which the energy input to the unit is first used to produce useful power, including electricity, and at least some of the reject heat from the electricity production is then used to provide useful thermal energy.

Total energy input means, with regard to a cogeneration unit, total energy of all forms supplied to the cogeneration unit, excluding energy produced by the cogeneration unit itself.

Total energy output means, with regard to a cogeneration unit, the sum of useful power and useful thermal energy produced by the cogeneration unit.

Unit means a stationary, fossil-fuel-fired boiler or combustion turbine or other stationary, fossil-fuel-fired combustion device.

Unit operating day means a calendar day in which a unit combusts any fuel.

Unit operating hour or *hour of unit operation* means an hour in which a unit combusts any fuel.

Useful power means, with regard to a cogeneration unit, electricity or mechanical energy made available for use, excluding any such energy used in the power production process (which process includes, but is not limited to, any on-site processing or treatment of fuel combusted at the unit and any on-site emission controls).

Useful thermal energy means, with regard to a cogeneration unit, thermal energy that is:

(1) Made available to an industrial or commercial process (not a power production process), excluding any heat contained in condensate return or makeup water;

(2) Used in a heating application (*e.g.,* space heating or domestic hot water heating); or

(3) Used in a space cooling application (*i.e.,* thermal energy used by an absorption chiller).

Utility power distribution system means the portion of an electricity grid owned or operated by a utility and dedicated to delivering electricity to customers.

§ 97.103 Measurements, abbreviations, and acronyms.

Measurements, abbreviations, and acronyms used in this subpart and subparts BB through II are defined as follows:

Btu—British thermal unit
CO_2—carbon dioxide
H_2O—water
Hg—mercury
hr—hour
kW—kilowatt electrical
kWh—kilowatt hour
lb—pound
mmBtu—million Btu
MWe—megawatt electrical
MWh—megawatt hour
NO_X—nitrogen oxides
O_2—oxygen
ppm—parts per million
scfh—standard cubic feet per hour
SO_2—sulfur dioxide
yr—year

§ 97.104 Applicability

(a) Except as provided in paragraph (b) of this section:

(1) The following units in a State shall be CAIR NO_X units, and any source that includes one or more such units shall be a CAIR NO_X source, subject to the requirements of this subpart and subparts BB through HH of this part: any stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale.

(2) If a stationary boiler or stationary combustion turbine that, under paragraph (a)(1) of this section, is not a CAIR NO_X unit begins to combust fossil fuel or to serve a generator with nameplate capacity of more than 25 MWe producing electricity for sale, the unit shall become a CAIR NO_X unit as provided in paragraph (a)(1) of this section on the first date on which it both combusts fossil fuel and serves such generator.

(b) The units in a State that meet the requirements set forth in paragraph (b)(1)(i), (b)(2)(i), or (b)(2)(ii) of this section shall not be CAIR NO_X units:

(1)(i) Any unit that is a CAIR NO_X unit under paragraph (a)(1) or (2) of this section:

(A) Qualifying as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and continuing to qualify as a cogeneration unit; and

(B) Not serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe supplying in any calendar year more than one-third of the unit's potential electric output capacity or 219,000 MWh, whichever is greater, to any utility power distribution system for sale.

(ii) If a unit qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and meets the requirements of paragraphs (b)(1)(i) of this section for at least one calendar year, but subsequently no longer meets all such requirements, the unit shall become a CAIR NO_X unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of paragraph (b)(1)(i)(B) of this section.

(2)(i) Any unit that is a CAIR NO_X unit under paragraph (a)(1) or (2) of this section commencing operation before January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for 1985–1987 exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(ii) Any unit that is a CAIR NO_X unit under paragraph (a)(1) or (2) of this section commencing operation on or after January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for the first 3 calendar years of operation exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(iii) If a unit qualifies as a solid waste incineration unit and meets the requirements of paragraph (b)(2)(i) or (ii) of this section for at least 3 consecutive calendar years, but subsequently no longer meets all such requirements, the unit shall become a CAIR NO_X unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a solid waste incineration unit or January 1 after the first 3 consecutive calendar years after 1990 for which the unit has an average annual fuel consumption of fossil fuel of 20 percent or more.

(c) A certifying official of an owner or operator of any unit may petition the Administrator at any time for a determination concerning the applicability, under paragraphs (a) and (b) of this section, of the CAIR NO_X Annual Trading Program to the unit.

(1) *Petition content.* The petition shall be in writing and include the identification of the unit and the relevant facts about the unit. The petition and any other documents provided to the Administrator in connection with the petition shall include the following certification statement, signed by the certifying official: ''I am authorized to make this submission on behalf of the owners and operators of the unit for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.''

(2) *Submission.* The petition and any other documents provided in connection with the petition shall be submitted to the Director of the Clean Air Markets Division (or its successor), U.S. Environmental Protection Agency, who will act on the petition as the Administrator's duly authorized representative.

(3) *Response.* The Administrator will issue a written response to the petition and may request supplemental information relevant to such petition. The Administrator's determination concerning the applicability, under paragraphs (a) and (b) of this section, of the CAIR NO_X Annual Trading Program to the unit shall be binding on the permitting authority unless the petition or other information or documents provided in connection with the petition are found to have contained significant, relevant errors or omissions.

§ 97.105 Retired unit exemption.

(a)(1) Any CAIR NO_X unit that is permanently retired and is not a CAIR NO_X opt-in unit under subpart II of this part shall be exempt from the CAIR NO_X Annual Trading Program, except for the provisions of this section, §§ 97.102, 97.103, 97.104, 97.106(c)(4) through (7), 97.107, 97.108, and subparts BB and EE through GG of this part.

(2) The exemption under paragraph (a)(1) of this section shall become effective the day on which the CAIR NO_X unit is permanently retired. Within 30 days of the unit's permanent retirement, the CAIR designated representative shall submit a statement to the permitting authority otherwise responsible for administering any CAIR permit for the unit and shall submit a copy of the statement to the Administrator. The statement shall state, in a format prescribed by the permitting authority, that the unit was permanently retired on a specific date and will comply with the requirements of paragraph (b) of this section.

(3) After receipt of the statement under paragraph (a)(2) of this section, the permitting authority will amend any permit under subpart CC of this part covering the source at which the unit is located to add the provisions and requirements of the exemption under paragraphs (a)(1) and (b) of this section.

(b) *Special provisions.* (1) A unit exempt under paragraph (a) of this section shall not emit any nitrogen oxides, starting on the date that the exemption takes effect.

(2) The Administrator or the permitting authority will allocate CAIR NO_X allowances under subpart EE of this part to a unit exempt under paragraph (a) of this section.

(3) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under paragraph (a) of this section shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time before the end of the period, in writing by the permitting authority or the Administrator. The owners and operators bear the burden of proof that the unit is permanently retired.

(4) The owners and operators and, to the extent applicable, the CAIR designated representative of a unit exempt under paragraph (a) of this section shall comply with the requirements of the CAIR NO_X Annual Trading Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.

(5) A unit exempt under paragraph (a) of this section and located at a source that is required, or but for this exemption would be required, to have a title V operating permit shall not resume operation unless the CAIR designated representative of the source submits a complete CAIR permit application under § 97.122 for the unit not less than 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2009 or the date on which the unit resumes operation.

(6) On the earlier of the following dates, a unit exempt under paragraph (a) of this section shall lose its exemption:

(i) The date on which the CAIR designated representative submits a CAIR permit application for the unit under paragraph (b)(5) of this section;

(ii) The date on which the CAIR designated representative is required under paragraph (b)(5) of this section to submit a CAIR permit application for the unit; or

(iii) The date on which the unit resumes operation, if the CAIR designated representative is not required to submit a CAIR permit application for the unit.

(7) For the purpose of applying monitoring, reporting, and recordkeeping requirements under subpart HH of this part, a unit that loses its exemption under paragraph (a) of this section shall be treated as a unit that commences commercial operation on the first date on which the unit resumes operation.

§ 97.106 Standard requirements.

(a) *Permit requirements.* (1) The CAIR designated representative of each CAIR NO_X source required to have a title V operating permit and each CAIR NO_X unit required to have a title V operating permit at the source shall:

(i) Submit to the permitting authority a complete CAIR permit application under § 97.122 in accordance with the deadlines specified in § 97.121; and

(ii) Submit in a timely manner any supplemental information that the permitting authority determines is necessary in order to review a CAIR permit application and issue or deny a CAIR permit.

(2) The owners and operators of each CAIR NO_X source required to have a title V operating permit and each CAIR NO_X unit required to have a title V operating permit at the source shall have a CAIR permit issued by the permitting authority under subpart CC of this part for the source and operate the source and the unit in compliance with such CAIR permit.

(3) Except as provided in subpart II of this part, the owners and operators of a CAIR NO_X source that is not otherwise required to have a title V operating permit and each CAIR NO_X unit that is not otherwise required to have a title V operating permit are not required to submit a CAIR permit application, and to have a CAIR permit, under subpart CC of this part for such CAIR NO_X source and such CAIR NO_X unit.

(b) *Monitoring, reporting, and recordkeeping requirements.* (1) The owners and operators, and the CAIR designated representative, of each CAIR NO_X source and each CAIR NO_X unit at the source shall comply with the monitoring, reporting, and recordkeeping requirements of subpart HH of this part.

(2) The emissions measurements recorded and reported in accordance with subpart HH of this part shall be used to determine compliance by each CAIR NO_X source with the CAIR NO_X emissions limitation under paragraph (c) of this section.

(c) *Nitrogen oxides emission requirements.* (1) As of the allowance transfer deadline for a control period, the owners and operators of each CAIR NO_X source and each CAIR NO_X unit at the source shall hold, in the source's compliance account, CAIR NO_X allowances available for compliance deductions for the control period under § 97.154(a) in an amount not less than the tons of total nitrogen oxides emissions for the control period from all CAIR NO_X units at the source, as determined in accordance with subpart HH of this part.

(2) A CAIR NO_X unit shall be subject to the requirements under paragraph (c)(1) of this section for the control period starting on the later of January 1, 2009 or the deadline for meeting the unit's monitor certification requirements under § 97.170(b)(1), (2), or (5) and for each control period thereafter.

(3) A CAIR NO_X allowance shall not be deducted, for compliance with the requirements under paragraph (c)(1) of this section, for a control period in a calendar year before the year for which the CAIR NO_X allowance was allocated.

(4) CAIR NO_X allowances shall be held in, deducted from, or transferred into or among CAIR NO_X Allowance Tracking System accounts in accordance with subparts EE, FF, GG, and II of this part.

(5) A CAIR NO_X allowance is a limited authorization to emit one ton of nitrogen oxides in accordance with the CAIR NO_X Annual Trading Program. No provision of the CAIR NO_X Annual Trading Program, the CAIR permit application, the CAIR permit, or an exemption under § 97.105 and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization.

(6) A CAIR NO_X allowance does not constitute a property right.

(7) Upon recordation by the Administrator under subpart EE, FF,

GG, or II of this part, every allocation, transfer, or deduction of a CAIR NO_X allowance to or from a CAIR NO_X source's compliance account is incorporated automatically in any CAIR permit of the source.

(d) *Excess emissions requirements.* If a CAIR NO_X source emits nitrogen oxides during any control period in excess of the CAIR NO_X emissions limitation, then:

(1) The owners and operators of the source and each CAIR NO_X unit at the source shall surrender the CAIR NO_X allowances required for deduction under § 97.154(d)(1) and pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, under the Clean Air Act or applicable State law; and

(2) Each ton of such excess emissions and each day of such control period shall constitute a separate violation of this subpart, the Clean Air Act, and applicable State law.

(e) *Recordkeeping and reporting requirements.* (1) Unless otherwise provided, the owners and operators of the CAIR NO_X source and each CAIR NO_X unit at the source shall keep on site at the source each of the following documents for a period of 5 years from the date the document is created. This period may be extended for cause, at any time before the end of 5 years, in writing by the permitting authority or the Administrator.

(i) The certificate of representation under § 97.113 for the CAIR designated representative for the source and each CAIR NO_X unit at the source and all documents that demonstrate the truth of the statements in the certificate of representation; provided that the certificate and documents shall be retained on site at the source beyond such 5-year period until such documents are superseded because of the submission of a new certificate of representation under § 97.113 changing the CAIR designated representative.

(ii) All emissions monitoring information, in accordance with subpart HH of this part, provided that to the extent that subpart HH of this part provides for a 3-year period for recordkeeping, the 3-year period shall apply.

(iii) Copies of all reports, compliance certifications, and other submissions and all records made or required under the CAIR NO_X Annual Trading Program.

(iv) Copies of all documents used to complete a CAIR permit application and any other submission under the CAIR NO_X Annual Trading Program or to demonstrate compliance with the requirements of the CAIR NO_X Annual Trading Program.

(2) The CAIR designated representative of a CAIR NO_X source and each CAIR NO_X unit at the source shall submit the reports required under the CAIR NO_X Annual Trading Program, including those under subpart HH of this part.

(f) *Liability.* (1) Each CAIR NO_X source and each CAIR NO_X unit shall meet the requirements of the CAIR NO_X Annual Trading Program.

(2) Any provision of the CAIR NO_X Annual Trading Program that applies to a CAIR NO_X source or the CAIR designated representative of a CAIR NO_X source shall also apply to the owners and operators of such source and of the CAIR NO_X units at the source.

(3) Any provision of the CAIR NO_X Annual Trading Program that applies to a CAIR NO_X unit or the CAIR designated representative of a CAIR NO_X unit shall also apply to the owners and operators of such unit.

(g) *Effect on other authorities.* No provision of the CAIR NO_X Annual Trading Program, a CAIR permit application, a CAIR permit, or an exemption under § 97.105 shall be construed as exempting or excluding the owners and operators, and the CAIR designated representative, of a CAIR NO_X source or CAIR NO_X unit from compliance with any other provision of the applicable, approved State implementation plan, a federally enforceable permit, or the Clean Air Act.

§ 97.107 Computation of time.

(a) Unless otherwise stated, any time period scheduled, under the CAIR NO_X Annual Trading Program, to begin on the occurrence of an act or event shall begin on the day the act or event occurs.

(b) Unless otherwise stated, any time period scheduled, under the CAIR NO_X Annual Trading Program, to begin before the occurrence of an act or event shall be computed so that the period ends the day before the act or event occurs.

(c) Unless otherwise stated, if the final day of any time period, under the CAIR NO_X Annual Trading Program, falls on a weekend or a State or Federal holiday, the time period shall be extended to the next business day.

§ 97.108 Appeal procedures.

The appeal procedures for decisions of the Administrator under the CAIR NO_X Annual Trading Program are set forth in part 78 of this chapter.

Subpart BB—CAIR Designated Representative for CAIR NO_X Sources

§ 97.110 Authorization and responsibilities of CAIR designated representative.

(a) Except as provided under § 97.111, each CAIR NO_X source, including all CAIR NO_X units at the source, shall have one and only one CAIR designated representative, with regard to all matters under the CAIR NO_X Annual Trading Program concerning the source or any CAIR NO_X unit at the source.

(b) The CAIR designated representative of the CAIR NO_X source shall be selected by an agreement binding on the owners and operators of the source and all CAIR NO_X units at the source and shall act in accordance with the certification statement in § 97.113(a)(4)(iv).

(c) Upon receipt by the Administrator of a complete certificate of representation under § 97.113, the CAIR designated representative of the source shall represent and, by his or her representations, actions, inactions, or submissions, legally bind each owner and operator of the CAIR NO_X source represented and each CAIR NO_X unit at the source in all matters pertaining to the CAIR NO_X Annual Trading Program, notwithstanding any agreement between the CAIR designated representative and such owners and operators. The owners and operators shall be bound by any decision or order issued to the CAIR designated representative by the permitting authority, the Administrator, or a court regarding the source or unit.

(d) No CAIR permit will be issued, no emissions data reports will be accepted, and no CAIR NO_X Allowance Tracking System account will be established for a CAIR NO_X unit at a source, until the Administrator has received a complete certificate of representation under § 97.113 for a CAIR designated representative of the source and the CAIR NO_X units at the source.

(e)(1) Each submission under the CAIR NO_X Annual Trading Program shall be submitted, signed, and certified by the CAIR designated representative for each CAIR NO_X source on behalf of which the submission is made. Each such submission shall include the following certification statement by the CAIR designated representative: ''I am authorized to make this submission on behalf of the owners and operators of the source or units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.''

(2) The permitting authority and the Administrator will accept or act on a submission made on behalf of owner or operators of a CAIR NO_X source or a CAIR NO_X unit only if the submission has been made, signed, and certified in accordance with paragraph (e)(1) of this section.

§ 97.111 Alternate CAIR designated representative.

(a) A certificate of representation under § 97.113 may designate one and only one alternate CAIR designated representative, who may act on behalf of the CAIR designated representative. The agreement by which the alternate CAIR designated representative is selected shall include a procedure for authorizing the alternate CAIR designated representative to act in lieu of the CAIR designated representative.

(b) Upon receipt by the Administrator of a complete certificate of representation under § 97.113, any representation, action, inaction, or submission by the alternate CAIR designated representative shall be deemed to be a representation, action, inaction, or submission by the CAIR designated representative.

(c) Except in this section and §§ 97.102, 97.110(a) and (d), 97.112, 97.113, 97.115, 97.151 and 97.182, whenever the term ''CAIR designated representative'' is used in subparts AA through II of this part, the term shall be construed to include the CAIR designated representative or any alternate CAIR designated representative.

§ 97.112 Changing CAIR designated representative and alternate CAIR designated representative; changes in owners and operators.

(a) *Changing CAIR designated representative.* The CAIR designated representative may be changed at any time upon receipt by the Administrator of a superseding complete certificate of representation under § 97.113. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous CAIR designated representative before the time and date when the Administrator receives the superseding certificate of representation shall be binding on the new CAIR designated representative and the owners and operators of the CAIR NO_X source and the CAIR NO_X units at the source.

(b) *Changing alternate CAIR designated representative.* The alternate CAIR designated representative may be changed at any time upon receipt by the Administrator of a superseding complete certificate of representation under § 97.113. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous alternate CAIR designated representative before the time and date when the Administrator receives the superseding certificate of representation shall be binding on the new alternate CAIR designated representative and the owners and operators of the CAIR NO_X source and the CAIR NO_X units at the source.

(c) *Changes in owners and operators.* (1) In the event an owner or operator of a CAIR NO_X source or a CAIR NO_X unit is not included in the list of owners and operators in the certificate of representation under § 97.113, such owner or operator shall be deemed to be subject to and bound by the certificate of representation, the representations, actions, inactions, and submissions of the CAIR designated representative and any alternate CAIR designated representative of the source or unit, and the decisions and orders of the permitting authority, the Administrator, or a court, as if the owner or operator were included in such list.

(2) Within 30 days following any change in the owners and operators of a CAIR NO_X source or a CAIR NO_X unit, including the addition of a new owner or operator, the CAIR designated representative or any alternate CAIR designated representative shall submit a revision to the certificate of representation under § 97.113 amending the list of owners and operators to include the change.

§ 97.113 Certificate of representation.

(a) A complete certificate of representation for a CAIR designated representative or an alternate CAIR designated representative shall include the following elements in a format prescribed by the Administrator:

(1) Identification of the CAIR NO_X source, and each CAIR NO_X unit at the source, for which the certificate of representation is submitted, including identification and nameplate capacity of each generator served by each such unit.

(2) The name, address, e-mail address (if any), telephone number, and facsimile transmission number (if any) of the CAIR designated representative and any alternate CAIR designated representative.

(3) A list of the owners and operators of the CAIR NO_X source and of each CAIR NO_X unit at the source.

(4) The following certification statements by the CAIR designated representative and any alternate CAIR designated representative—

(i) ''I certify that I was selected as the CAIR designated representative or alternate CAIR designated representative, as applicable, by an agreement binding on the owners and operators of the source and each CAIR NO_X unit at the source.''

(ii) ''I certify that I have all the necessary authority to carry out my duties and responsibilities under the CAIR NO_X Annual Trading Program on behalf of the owners and operators of the source and of each CAIR NO_X unit at the source and that each such owner and operator shall be fully bound by my representations, actions, inactions, or submissions.''

(iii) ''I certify that the owners and operators of the source and of each CAIR NO_X unit at the source shall be bound by any order issued to me by the Administrator, the permitting authority, or a court regarding the source or unit.''

(iv) (Where there are multiple holders of a legal or equitable title to, or a leasehold interest in, a CAIR NO_X unit, or where a utility or industrial customer purchases power from a CAIR NO_X unit under a life-of-the-unit, firm power contractual arrangement, I certify that: I have given a written notice of my selection as the 'CAIR designated representative' or 'alternate CAIR designated representative', as applicable, and of the agreement by which I was selected to each owner and operator of the source and of each CAIR NO_X unit at the source; and CAIR NO_X allowances and proceeds of transactions involving CAIR NO_X allowances will be deemed to be held or distributed in proportion to each holder's legal, equitable, leasehold, or contractual reservation or entitlement, except that, if such multiple holders have expressly provided for a different distribution of CAIR NO_X allowances by contract, CAIR NO_X allowances and proceeds of transactions involving CAIR NO_X allowances will be deemed to be held or distributed in accordance with the contract.''

(5) The signature of the CAIR designated representative and any alternate CAIR designated representative and the dates signed.

(b) Unless otherwise required by the permitting authority or the Administrator, documents of agreement referred to in the certificate of representation shall not be submitted to the permitting authority or the Administrator. Neither the permitting authority nor the Administrator shall be under any obligation to review or evaluate the sufficiency of such documents, if submitted.

§ 97.114 Objections concerning CAIR designated representative.

(a) Once a complete certificate of representation under § 97.113 has been submitted and received, the permitting authority and the Administrator will rely on the certificate of representation unless and until a superseding complete certificate of representation under § 97.113 is received by the Administrator.

(b) Except as provided in § 97.112(a) or (b), no objection or other communication submitted to the permitting authority or the Administrator concerning the authorization, or any representation, action, inaction, or submission, of the CAIR designated representative shall affect any representation, action, inaction, or submission of the CAIR designated representative or the finality of any decision or order by the permitting authority or the Administrator under the CAIR NO_X Annual Trading Program.

(c) Neither the permitting authority nor the Administrator will adjudicate any private legal dispute concerning the authorization or any representation, action, inaction, or submission of any CAIR designated representative, including private legal disputes concerning the proceeds of CAIR NO_X allowance transfers.

§ 97.115 Delegation by CAIR designated representative and alternate CAIR designated representative.

(a) A CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(b) An alternate CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(c) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (a) or (b) of this section, the CAIR designated representative or alternate CAIR designated representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(1) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR designated representative or alternate CAIR designated representative;

(2) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(3) For each such natural person, a list of the type or types of electronic submissions under paragraph (a) or (b) of this section for which authority is delegated to him or her; and

(4) The following certification statements by such CAIR designated representative or alternate CAIR designated representative:

(i) ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR designated representative or alternate CAIR designated representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 97.115(d) shall be deemed to be an electronic submission by me.''

(ii) ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 97.115(d), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 97.115 is terminated.''.

(d) A notice of delegation submitted under paragraph (c) of this section shall be effective, with regard to the CAIR designated representative or alternate CAIR designated representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR designated representative or alternate CAIR designated representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(e) Any electronic submission covered by the certification in paragraph (c)(4)(i) of this section and made in accordance with a notice of delegation effective under paragraph (d) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

Subpart CC—Permits

§ 97.120 General CAIR NO_X Annual Trading Program permit requirements.

(a) For each CAIR NO_X source required to have a title V operating permit or required, under subpart II of this part, to have a title V operating permit or other federally enforceable permit, such permit shall include a CAIR permit administered by the permitting authority for the title V operating permit or the federally enforceable permit as applicable. The CAIR portion of the title V permit or other federally enforceable permit as applicable shall be administered in accordance with the permitting authority's title V operating permits regulations promulgated under part 70 or 71 of this chapter or the permitting authority's regulations for other federally enforceable permits as applicable, except as provided otherwise by § 97.105, this subpart, and subpart II of this part.

(b) Each CAIR permit shall contain, with regard to the CAIR NO_X source and the CAIR NO_X units at the source covered by the CAIR permit, all applicable CAIR NO_X Annual Trading Program, CAIR NO_X Ozone Season Trading Program, and CAIR SO_2 Trading Program requirements and shall be a complete and separable portion of the title V operating permit or other federally enforceable permit under paragraph (a) of this section.

§ 97.121 Submission of CAIR permit applications.

(a) *Duty to apply.* The CAIR designated representative of any CAIR NO_X source required to have a title V operating permit shall submit to the permitting authority a complete CAIR permit application under § 97.122 for the source covering each CAIR NO_X unit at the source at least 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2009 or the date on which the CAIR NO_X unit commences commercial operation, except as provided in § 97.183(a).

(b) *Duty to reapply.* For a CAIR NO_X source required to have a title V operating permit, the CAIR designated representative shall submit a complete CAIR permit application under § 97.122 for the source covering each CAIR NO_X unit at the source to renew the CAIR permit in accordance with the permitting authority's title V operating permits regulations addressing permit renewal, except as provided in § 97.183(b).

§ 97.122 Information requirements for CAIR permit applications.

A complete CAIR permit application shall include the following elements concerning the CAIR NO_X source for which the application is submitted, in a format prescribed by the permitting authority:

(a) Identification of the CAIR NO_X source;

(b) Identification of each CAIR NO_X unit at the CAIR NO_X source; and

(c) The standard requirements under § 97.106.

§ 97.123 CAIR permit contents and term.

(a) Each CAIR permit will contain, in a format prescribed by the permitting authority, all elements required for a complete CAIR permit application under § 97.122.

(b) Each CAIR permit is deemed to incorporate automatically the definitions of terms under § 97.102 and, upon recordation by the Administrator under subpart EE, FF, GG, or II of this part, every allocation, transfer, or deduction of a CAIR NO_X allowance to or from the compliance account of the CAIR NO_X source covered by the permit.

(c) The term of the CAIR permit will be set by the permitting authority, as necessary to facilitate coordination of the renewal of the CAIR permit with issuance, revision, or renewal of the CAIR NO_X source's title V operating permit or other federally enforceable permit as applicable.

§ 97.124 CAIR permit revisions.

Except as provided in § 97.123(b), the permitting authority will revise the CAIR permit, as necessary, in accordance with the permitting authority's title V operating permits regulations or the permitting authority's regulations for other federally enforceable permits as applicable addressing permit revisions.

Subpart DD—[Reserved]

Subpart EE—CAIR NO_X Allowance Allocations

§ 97.140 State trading budgets.

The State trading budgets for annual allocations of CAIR NO_X allowances for the control periods in 2009 through 2014 and in 2015 and thereafter are respectively as follows:

State	State trading budget for 2009–2014 (tons)	State trading budget for 2015 and thereafter (tons)
Alabama	69,020	57,517
Delaware	4,166	3,472
District of Columbia	144	120
Florida	99,445	82,871
Georgia	66,321	55,268
Illinois	76,230	63,525
Indiana	108,935	90,779
Iowa	32,692	27,243
Kentucky	83,205	69,337
Louisiana	35,512	29,593
Maryland	27,724	23,104
Michigan	65,304	54,420
Minnesota	31,443	26,203
Mississippi	17,807	14,839
Missouri	59,871	49,892
New Jersey	12,670	10,558
New York	45,617	38,014
North Carolina	62,183	51,819
Ohio	108,667	90,556
Pennsylvania	99,049	82,541
South Carolina	32,662	27,219
Tennessee	50,973	42,478
Texas	181,014	150,845
Virginia	36,074	30,062
West Virginia	74,220	61,850
Wisconsin	40,759	33,966
Total	1,521,707	1,268,091

§ 97.141 Timing requirements for CAIR NO_X allowance allocations.

(a) The Administrator will determine by order the CAIR NO_X allowance allocations, in accordance with § 97.142(a) and (b), for the control periods in 2009, 2010, 2011, 2012, 2013, and 2014.

(b) By July 31, 2011 and July 31 of each year thereafter, the Administrator will determine by order the CAIR NO_X allowance allocations, in accordance with § 97.142(a) and (b), for the control period in the fourth year after the year of the applicable deadline for determination under this paragraph.

(c) By July 31, 2009 and July 31 of each year thereafter, the Administrator will determine by order the CAIR NO_X allowance allocations, in accordance with § 97.142(a),(c), and (d), for the control period in the year of the applicable deadline for determination under this paragraph.

(d) The Administrator will make available to the public each determination of CAIR NO_X allowances under paragraph (a), (b), or (c) of this section and will provide an opportunity for submission of objections to the determination. Objections shall be limited to addressing whether the determination is in accordance with § 97.142. Based on any such objections, the Administrator will adjust each determination to the extent necessary to ensure that it is in accordance with § 97.142.

§ 97.142 CAIR NO_X allowance allocations.

(a)(1) The baseline heat input (in mmBtu) used with respect to CAIR NO_X allowance allocations under paragraph (b) of this section for each CAIR NO_X unit will be:

(i) For units commencing operation before January 1, 2001 the average of the 3 highest amounts of the unit's adjusted control period heat input for 2000 through 2004, with the adjusted control period heat input for each year calculated as follows:

(A) If the unit is coal-fired during the year, the unit's control period heat input for such year is multiplied by 100 percent;

(B) If the unit is oil-fired during the year, the unit's control period heat input for such year is multiplied by 60 percent; and

(C) If the unit is not subject to paragraph (a)(1)(i)(A) or (B) of this section, the unit's control period heat input for such year is multiplied by 40 percent.

(ii) For units commencing operation on or after January 1, 2001 and operating each calendar year during a period of 5 or more consecutive calendar years, the average of the 3 highest amounts of the unit's total converted control period heat input over the first such 5 years.

(2)(i) A unit's control period heat input, and a unit's status as coal-fired or oil-fired, for a calendar year under paragraph (a)(1)(i) of this section, and a unit's total tons of NO_X emissions during a calendar year under paragraph (c)(3) of this section, will be determined in accordance with part 75 of this chapter, to the extent the unit was otherwise subject to the requirements of part 75 of this chapter for the year, or will be based on the best available data reported to the Administrator for the unit (in a format prescribed by the Administrator), to the extent the unit was not otherwise subject to the requirements of part 75 of this chapter for the year.

(ii) A unit's converted control period heat input for a calendar year specified under paragraph (a)(1)(ii) of this section equals:

(A) Except as provided in paragraph (a)(2)(ii)(B) or (C) of this section, the control period gross electrical output of the generator or generators served by the unit multiplied by 7,900 Btu/kWh, if the unit is coal-fired for the year, or 6,675 Btu/kWh, if the unit is not coal-fired for the year, and divided by 1,000,000 Btu/mmBtu, provided that if a generator is served by 2 or more units, then the gross electrical output of the generator will be attributed to each unit in proportion to the unit's share of the total control period heat input of such units for the year;

(B) For a unit that is a boiler and has equipment used to produce electricity and useful thermal energy for industrial, commercial, heating, or cooling purposes through the sequential use of energy, the total heat energy (in Btu) of the steam produced by the boiler during the control period, divided by 0.8 and by 1,000,000 Btu/mmBtu; or

(C) For a unit that is a combustion turbine and has equipment used to produce electricity and useful thermal energy for industrial, commercial, heating, or cooling purposes through the sequential use of energy, the control period gross electrical output of the enclosed device comprising the compressor, combustor, and turbine multiplied by 3,413 Btu/kWh, plus the total heat energy (in Btu) of the steam produced by any associated heat recovery steam generator during the control period divided by 0.8, and with the sum divided by 1,000,000 Btu/mmBtu.

(iii) Gross electrical output and total heat energy under paragraph (a)(2)(ii) of this section will be determined based on the best available data reported to the Administrator for the unit (in a format prescribed by the Administrator).

(3) The Administrator will determine what data are the best available data under paragraph (a)(2) of this section by weighing the likelihood that data are accurate and reliable and giving greater weight to data submitted to a governmental entity in compliance with legal requirements or substantiated by an independent entity.

(b)(1) For each control period in 2009 and thereafter, the Administrator will allocate to all CAIR NO_X units in a State that have a baseline heat input (as determined under paragraph (a) of this section) a total amount of CAIR NO_X allowances equal to 95 percent for a control period during 2009 through 2014, and 97 percent for a control period during 2015 and thereafter, of the tons of NO_X emissions in the applicable State trading budget under § 97.140 (except as provided in paragraphs (d) and (e) of this section).

(2) The Administrator will allocate CAIR NO_X allowances to each CAIR NO_X unit under paragraph (b)(1) of this section in an amount determined by multiplying the total amount of CAIR NO_X allowances allocated under paragraph (b)(1) of this section by the ratio of the baseline heat input of such CAIR NO_X unit to the total amount of baseline heat input of all such CAIR NO_X units in the State and rounding to the nearest whole allowance as appropriate.

(c) For each control period in 2009 and thereafter, the Administrator will allocate CAIR NO_X allowances to CAIR NO_X units in a State that are not allocated CAIR NO_X allowances under paragraph (b) of this section because the units do not yet have a baseline heat input under paragraph (a) of this section or because the units have a baseline heat input but all CAIR NO_X allowances available under paragraph (b) of this section for the control period are already allocated, in accordance with the following procedures:

(1) The Administrator will establish a separate new unit set-aside for each control period. Each new unit set-aside will be allocated CAIR NO_X allowances equal to 5 percent for a control period in 2009 through 2014, and 3 percent for a control period in 2015 and thereafter, of the amount of tons of NO_X emissions in the applicable State trading budget under § 97.140.

(2) The CAIR designated representative of such a CAIR NO_X unit may submit to the Administrator a request, in a format specified by the Administrator, to be allocated CAIR NO_X allowances, starting with the later of the control period in 2009 or the first control period after the control period in which the CAIR NO_X unit commences commercial operation and until the first control period for which the unit is allocated CAIR NO_X allowances under paragraph (b) of this section. A separate CAIR NO_X allowance allocation request for each control period for which CAIR NO_X allowances are sought must be submitted on or before May 1 of such control period and after the date on which the CAIR NO_X unit commences commercial operation.

(3) In a CAIR NO_X allowance allocation request under paragraph (c)(2) of this section, the CAIR designated representative may request for a control period CAIR NO_X allowances in an amount not exceeding the CAIR NO_X unit's total tons of NO_X emissions during the calendar year immediately before such control period.

(4) The Administrator will review each CAIR NO_X allowance allocation request under paragraph (c)(2) of this section and will allocate CAIR NO_X allowances for each control period pursuant to such request as follows:

(i) The Administrator will accept an allowance allocation request only if the request meets, or is adjusted by the Administrator as necessary to meet, the requirements of paragraphs (c)(2) and (3) of this section.

(ii) On or after May 1 of the control period, the Administrator will determine the sum of the CAIR NO_X allowances requested (as adjusted under paragraph (c)(4)(i) of this section) in all allowance allocation requests accepted under paragraph (c)(4)(i) of this section for the control period.

(iii) If the amount of CAIR NO_X allowances in the new unit set-aside for the control period is greater than or equal to the sum under paragraph (c)(4)(ii) of this section, then the Administrator will allocate the amount of CAIR NO_X allowances requested (as adjusted under paragraph (c)(4)(i) of this section) to each CAIR NO_X unit covered by an allowance allocation request accepted under paragraph (c)(4)(i) of this section.

(iv) If the amount of CAIR NO_X allowances in the new unit set-aside for the control period is less than the sum under paragraph (c)(4)(ii) of this section, then the Administrator will allocate to each CAIR NO_X unit covered by an allowance allocation request accepted under paragraph (c)(4)(i) of this section the amount of the CAIR NO_X allowances requested (as adjusted under paragraph (c)(4)(i) of this section), multiplied by the amount of CAIR NO_X allowances in the new unit set-aside for the control period, divided by the sum determined under paragraph (c)(4)(ii) of this section, and rounded to the nearest whole allowance as appropriate.

(v) The Administrator will notify each CAIR designated representative that submitted an allowance allocation request of the amount of CAIR NO_X allowances (if any) allocated for the control period to the CAIR NO_X unit covered by the request.

(d) If, after completion of the procedures under paragraph (c)(4) of this section for a control period, any unallocated CAIR NO_X allowances remain in the new unit set-aside under paragraph (c) of this section for a State for the control period, the Administrator will allocate to each CAIR NO_X unit that was allocated CAIR NO_X allowances under paragraph (b) of this section in the State an amount of CAIR NO_X allowances equal to the total amount of such remaining unallocated CAIR NO_X allowances, multiplied by the unit's allocation under paragraph (b) of this section, divided by 95 percent for a control period during 2009 through 2014, and 97 percent for a control period during 2015 and thereafter, of the amount of tons of NO_X emissions in the applicable State trading budget under § 97.140, and rounded to the nearest whole allowance as appropriate.

(e) If the Administrator determines that CAIR NO_X allowances were allocated under paragraphs (a) and (b) of this section, paragraphs (a) and (c) of this section, or paragraph (d) of this section for a control period and that the recipient of the allocation is not actually a CAIR NO_X unit under § 97.104 in such control period, then the Administrator will notify the CAIR designated representative and will act in accordance with the following procedures:

(1) Except as provided in paragraph (e)(2) or (3) of this section, the Administrator will not record such CAIR NO_X allowances under § 97.153.

(2) If the Administrator already recorded such CAIR NO_X allowances under § 97.153 and if the Administrator makes such determination before making deductions for the source that includes such recipient under § 97.154(b) for the control period, then the Administrator will deduct from the account in which such CAIR NO_X allowances were recorded under § 97.153 an amount of CAIR NO_X allowances allocated for the same or a prior control period equal to the amount of such already recorded CAIR NO_X allowances. The CAIR designated representative shall ensure that there are sufficient CAIR NO_X allowances in such account for completion of the deduction.

(3) If the Administrator already recorded such CAIR NO_X allowances under § 97.153 and if the Administrator makes such determination after making deductions for the source that includes such recipient under § 97.154(b) for the control period, then the Administrator will apply paragraph (e)(1) or (2) of this section, as appropriate, to any subsequent control period for which CAIR NO_X allowances were allocated to such recipient.

(4) The Administrator will transfer the CAIR NO_X allowances that are not recorded, or that are deducted, in accordance with paragraphs (e)(1), (2), and (3) of this section to a new unit set-aside for the State in which such recipient is located.

§ 97.143 Compliance supplement pool.

(a) In addition to the CAIR NO_X allowances allocated under § 97.142, the Administrator may allocate for the control period in 2009 up to the following amount of CAIR NO_X allowances to CAIR NO_X units in the respective State:

State	Compliance supplement pool
Alabama	10,166
Delaware	843
District of Columbia	0
Florida	8,335
Georgia	12,397
Illinois	11,299
Indiana	20,155
Iowa	6,978
Kentucky	14,935
Louisiana	2,251
Maryland	4,670
Michigan	8,347
Minnesota	6,528
Mississippi	3,066
Missouri	9,044
New Jersey	660
New York	0
North Carolina	0
Ohio	25,037
Pennsylvania	16,009
South Carolina	2,600
Tennessee	8,944
Texas	772
Virginia	5,134
West Virginia	16,929
Wisconsin	4,898
Total	199,997

(b) For any CAIR NO_X unit in a State, if the unit's average annual NO_X emission rate for 2007 or 2008 is less than 0.25 lb/mmBtu and, where such unit is included in a NO_X averaging plan under § 76.11 of this chapter under the Acid Rain Program for such year, the unit's NO_X averaging plan has an actual weighted average NO_X emission rate for such year equal to or less than the actual weighted average NO_X emission rate for the year before such year and if the unit achieves NO_X emission reductions in 2007 and 2008, the CAIR designated representative of the unit may request early reduction credits, and allocation of CAIR NO_X allowances from the compliance supplement pool under paragraph (a) of this section for such early reduction credits, in accordance with the following:

(1) The owners and operators of such CAIR NO_X unit shall monitor and report the NO_X emissions rate and the heat input of the unit in accordance with subpart HH of this part in each control period for which early reduction credit is requested.

(2) The CAIR designated representative of such CAIR NO_X unit shall submit to the Administrator by May 1, 2009 a request, in a format specified by the Administrator, for allocation of an amount of CAIR NO_X allowances from the compliance supplement pool not exceeding the sum of the unit's heat input for the control period in 2007 multiplied by the difference (if any greater than zero) between 0.25 lb/mmBtu and the unit's NO_X emission rate for the control period in 2007 plus the unit's heat input for the control period in 2008 multiplied by the difference (if any greater than zero) between 0.25 lb/mmBtu and the unit's

NO_X emission rate for the control period in 2008, determined in accordance with subpart HH of this part and with the sum divided by 2,000 lb/ton and rounded to the nearest whole number of tons as appropriate.

(c) For any CAIR NO_X unit in a State whose compliance with CAIR NO_X emissions limitation for the control period in 2009 would create an undue risk to the reliability of electricity supply during such control period, the CAIR designated representative of the unit may request the allocation of CAIR NO_X allowances from the compliance supplement pool under paragraph (a) of this section, in accordance with the following:

(1) The CAIR designated representative of such CAIR NO_X unit shall submit to the Administrator by May 1, 2009 a request, in a format specified by the Administrator, for allocation of an amount of CAIR NO_X allowances from the compliance supplement pool not exceeding the minimum amount of CAIR NO_X allowances necessary to remove such undue risk to the reliability of electricity supply.

(2) In the request under paragraph (c)(1) of this section, the CAIR designated representative of such CAIR NO_X unit shall demonstrate that, in the absence of allocation to the unit of the amount of CAIR NO_X allowances requested, the unit's compliance with CAIR NO_X emissions limitation for the control period in 2009 would create an undue risk to the reliability of electricity supply during such control period. This demonstration must include a showing that it would not be feasible for the owners and operators of the unit to:

(i) Obtain a sufficient amount of electricity from other electricity generation facilities, during the installation of control technology at the unit for compliance with the CAIR NO_X emissions limitation, to prevent such undue risk; or

(ii) Obtain under paragraphs (b) and (d) of this section, or otherwise obtain, a sufficient amount of CAIR NO_X allowances to prevent such undue risk.

(d) The Administrator will review each request under paragraph (b) or (c) of this section submitted by May 1, 2009 and will allocate CAIR NO_X allowances for the control period in 2009 to CAIR NO_X units in a State and covered by such request as follows:

(1) Upon receipt of each such request, the Administrator will make any necessary adjustments to the request to ensure that the amount of the CAIR NO_X allowances requested meets the requirements of paragraph (b) or (c) of this section.

(2) If the State's compliance supplement pool under paragraph (a) of this section has an amount of CAIR NO_X allowances not less than the total amount of CAIR NO_X allowances in all such requests (as adjusted under paragraph (d)(1) of this section), the Administrator will allocate to each CAIR NO_X unit covered by such requests the amount of CAIR NO_X allowances requested (as adjusted under paragraph (d)(1) of this section).

(3) If the State's compliance supplement pool under paragraph (a) of this section has a smaller amount of CAIR NO_X allowances than the total amount of CAIR NO_X allowances in all such requests (as adjusted under paragraph (d)(1) of this section), the Administrator will allocate CAIR NO_X allowances to each CAIR NO_X unit covered by such requests according to the following formula and rounding to the nearest whole allowance as appropriate:

Unit's allocation = Unit's adjusted allocation × (State's compliance supplement pool ÷ Total adjusted allocations for all units)

Where:

''Unit's allocation'' is the amount of CAIR NO_X allowances allocated to the unit from the State's compliance supplement pool.

''Unit's adjusted allocation'' is the amount of CAIR NO_X allowances requested for the unit under paragraph (b) or (c) of this section, as adjusted under paragraph (d)(1) of this section.

''State's compliance supplement pool'' is the amount of CAIR NO_X allowances in the State's compliance supplement pool.

''Total adjusted allocations for all units'' is the sum of the amounts of allocations requested for all units under paragraph (b) or (c) of this section, as adjusted under paragraph (d)(1) of this section.

(4) By July 31, 2009, the Administrator will determine by order the allocations under paragraph (d)(2) or (3) of this section. The Administrator will make available to the public each determination of CAIR NO_X allowances under such paragraph and will provide an opportunity for submission of objections to the determination. Objections shall be limited to addressing whether the determination is in accordance with paragraph (b) or (c) of this section and paragraph (d)(2) or (3) of this section, as appropriate. Based on any such objections, the Administrator will adjust each determination to the extent necessary to ensure that it is in accordance with such paragraphs.

(5) By January 1, 2010, the Administrator will record the allocations under paragraph (d)(4) of this section.

§ 97.144 Alternative of allocation of CAIR NO_X allowances and compliance supplement pool by permitting authority.

(a) Notwithstanding §§ 97.141, 97.142, and 97.153 if a State submits, and the Administrator approves, a State implementation plan revision in accordance with § 51.123(p)(1) of this chapter providing for allocation of CAIR NO_X allowances by the permitting authority, then the permitting authority shall make such allocations in accordance with such approved State implementation plan revision, the Administrator will not make allocations under §§ 97.141 and 97.142 for the CAIR NO_X units in the State, and under § 97.153, the Administrator will record the allocations made under such approved State implementation plan revision instead of allocations made under §§ 97.141 and 97.142.

(b) Notwithstanding § 97.143, if a State submits, and the Administrator approves, a State implementation plan revision in accordance with § 51.123(p)(2) of this chapter providing for allocation of the State's compliance supplement pool by the permitting authority, then the permitting authority shall make such allocations in accordance with such approved State implementation plan revision, the Administrator will not make allocations under § 97.143(d)(4) for the CAIR NO_X units in the State, and under § 97.143(d)(5), the Administrator will record the allocations of the State's compliance supplement pool made under such approved State implementation plan revision instead of allocations made under § 97.143(d)(4).

(c)(1) In implementing paragraph (a) of this section and §§ 97.141, 97.142, and 97.153, the Administrator will ensure that the total amount of CAIR NO_X allowances allocated, under such provisions and under a State's State implementation plan revision approved in accordance with § 51.123(p)(1) of this chapter, for a control period for CAIR NO_X sources in the State or for other entities specified by the permitting authority will not exceed the State's State trading budget for the year of the control period.

(2) In implementing paragraph (b) of this section and § 97.143, the Administrator will ensure that the total amount of CAIR NO_X allowances allocated, under such provisions and under a State's State implementation plan revision approved in accordance with § 51.123(p)(2), for CAIR NO_X sources in the State will not exceed the State(s compliance supplement pool.

Appendix A to Subpart EE of Part 97—States With Approved State Implementation Plan Revisions Concerning Allocations

1. The following States have State Implementation Plan revisions under § 51.123(p)(1) of this chapter approved by the Administrator and providing for allocation of CAIR NO_X allowances by the permitting authority under § 97.144(a):

[Reserved]

2. The following States have State Implementation Plan revisions under § 51.123(p)(2) of this chapter approved by the Administrator and providing for allocation of the Compliance Supplement Pool by the permitting authority under § 97.144(b):

[Reserved]

Subpart FF—CAIR NO_X Allowance Tracking System

§ 97.150 [Reserved]

§ 97.151 Establishment of accounts.

(a) *Compliance accounts.* Except as provided in § 97.184(e), upon receipt of a complete certificate of representation under § 97.113, the Administrator will establish a compliance account for the CAIR NO_X source for which the certificate of representation was submitted, unless the source already has a compliance account.

(b) *General accounts*—(1) *Application for general account.* (i) Any person may apply to open a general account for the purpose of holding and transferring CAIR NO_X allowances. An application for a general account may designate one and only one CAIR authorized account representative and one and only one alternate CAIR authorized account representative who may act on behalf of the CAIR authorized account representative. The agreement by which the alternate CAIR authorized account representative is selected shall include a procedure for authorizing the alternate CAIR authorized account representative to act in lieu of the CAIR authorized account representative.

(ii) A complete application for a general account shall be submitted to the Administrator and shall include the following elements in a format prescribed by the Administrator:

(A) Name, mailing address, e-mail address (if any), telephone number, and facsimile transmission number (if any) of the CAIR authorized account representative and any alternate CAIR authorized account representative;

(B) Organization name and type of organization, if applicable;

(C) A list of all persons subject to a binding agreement for the CAIR authorized account representative and any alternate CAIR authorized account representative to represent their ownership interest with respect to the CAIR NO_X allowances held in the general account;

(D) The following certification statement by the CAIR authorized account representative and any alternate CAIR authorized account representative: ''I certify that I was selected as the CAIR authorized account representative or the alternate CAIR authorized account representative, as applicable, by an agreement that is binding on all persons who have an ownership interest with respect to CAIR NO_X allowances held in the general account. I certify that I have all the necessary authority to carry out my duties and responsibilities under the CAIR NO_X Annual Trading Program on behalf of such persons and that each such person shall be fully bound by my representations, actions, inactions, or submissions and by any order or decision issued to me by the Administrator or a court regarding the general account.''

(E) The signature of the CAIR authorized account representative and any alternate CAIR authorized account representative and the dates signed.

(iii) Unless otherwise required by the permitting authority or the Administrator, documents of agreement referred to in the application for a general account shall not be submitted to the permitting authority or the Administrator. Neither the permitting authority nor the Administrator shall be under any obligation to review or evaluate the sufficiency of such documents, if submitted.

(2) *Authorization of CAIR authorized account representative and alternate CAIR authorized account representative.* (i) Upon receipt by the Administrator of a complete application for a general account under paragraph (b)(1) of this section:

(A) The Administrator will establish a general account for the person or persons for whom the application is submitted.

(B) The CAIR authorized account representative and any alternate CAIR authorized account representative for the general account shall represent and, by his or her representations, actions, inactions, or submissions, legally bind each person who has an ownership interest with respect to CAIR NO_X allowances held in the general account in all matters pertaining to the CAIR NO_X Annual Trading Program, notwithstanding any agreement between the CAIR authorized account representative or any alternate CAIR authorized account representative and such person. Any such person shall be bound by any order or decision issued to the CAIR authorized account representative or any alternate CAIR authorized account representative by the Administrator or a court regarding the general account.

(C) Any representation, action, inaction, or submission by any alternate CAIR authorized account representative shall be deemed to be a representation, action, inaction, or submission by the CAIR authorized account representative.

(ii) Each submission concerning the general account shall be submitted, signed, and certified by the CAIR authorized account representative or any alternate CAIR authorized account representative for the persons having an ownership interest with respect to CAIR NO_X allowances held in the general account. Each such submission shall include the following certification statement by the CAIR authorized account representative or any alternate CAIR authorized account representative: ''I am authorized to make this submission on behalf of the persons having an ownership interest with respect to the CAIR NO_X allowances held in the general account. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.''

(iii) The Administrator will accept or act on a submission concerning the general account only if the submission has been made, signed, and certified in accordance with paragraph (b)(2)(ii) of this section.

(3) *Changing CAIR authorized account representative and alternate CAIR authorized account representative; changes in persons with ownership interest.* (i) The CAIR authorized account representative for a general account may be changed at any time upon receipt by the Administrator of a superseding complete application for a general account under paragraph (b)(1) of this section. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous CAIR authorized account representative before the time and date when the Administrator receives the superseding application for a general account shall be binding on the new CAIR authorized account representative

and the persons with an ownership interest with respect to the CAIR NO_X allowances in the general account.

(ii) The alternate CAIR authorized account representative for a general account may be changed at any time upon receipt by the Administrator of a superseding complete application for a general account under paragraph (b)(1) of this section. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous alternate CAIR authorized account representative before the time and date when the Administrator receives the superseding application for a general account shall be binding on the new alternate CAIR authorized account representative and the persons with an ownership interest with respect to the CAIR NO_X allowances in the general account.

(iii)(A) In the event a person having an ownership interest with respect to CAIR NO_X allowances in the general account is not included in the list of such persons in the application for a general account, such person shall be deemed to be subject to and bound by the application for a general account, the representation, actions, inactions, and submissions of the CAIR authorized account representative and any alternate CAIR authorized account representative of the account, and the decisions and orders of the Administrator or a court, as if the person were included in such list.

(B) Within 30 days following any change in the persons having an ownership interest with respect to CAIR NO_X allowances in the general account, including the addition of a new person, the CAIR authorized account representative or any alternate CAIR authorized account representative shall submit a revision to the application for a general account amending the list of persons having an ownership interest with respect to the CAIR NO_X allowances in the general account to include the change.

(4) *Objections concerning CAIR authorized account representative and alternate CAIR authorized account representative.* (i) Once a complete application for a general account under paragraph (b)(1) of this section has been submitted and received, the Administrator will rely on the application unless and until a superseding complete application for a general account under paragraph (b)(1) of this section is received by the Administrator.

(ii) Except as provided in paragraph (b)(3)(i) or (ii) of this section, no objection or other communication submitted to the Administrator concerning the authorization, or any representation, action, inaction, or submission of the CAIR authorized account representative or any alternate CAIR authorized account representative for a general account shall affect any representation, action, inaction, or submission of the CAIR authorized account representative or any alternate CAIR authorized account representative or the finality of any decision or order by the Administrator under the CAIR NO_X Annual Trading Program.

(iii) The Administrator will not adjudicate any private legal dispute concerning the authorization or any representation, action, inaction, or submission of the CAIR authorized account representative or any alternate CAIR authorized account representative for a general account, including private legal disputes concerning the proceeds of CAIR NO_X allowance transfers.

(5) *Delegation by CAIR authorized account representative and alternate CAIR authorized account representative.* (i) A CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FF and GG of this part.

(ii) An alternate CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FF and GG of this part.

(iii) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (b)(5)(i) or (ii) of this section, the CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(A) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR authorized account representative or alternate CAIR authorized account representative;

(B) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(C) For each such natural person, a list of the type or types of electronic submissions under paragraph (b)(5)(i) or (ii) of this section for which authority is delegated to him or her;

(D) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR authorized account representative or alternate CAIR authorized representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 97.151(b)(5)(iv) shall be deemed to be an electronic submission by me.''; and

(E) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 97.151(b)(5)(iv), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 97.151(b)(5) is terminated.''.

(iv) A notice of delegation submitted under paragraph (b)(5)(iii) of this section shall be effective, with regard to the CAIR authorized account representative or alternate CAIR authorized account representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(v) Any electronic submission covered by the certification in paragraph (b)(5)(iii)(D) of this section and made in accordance with a notice of delegation effective under paragraph (b)(5)(iv) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

(c) *Account identification.* The Administrator will assign a unique identifying number to each account established under paragraph (a) or (b) of this section.

§ 97.152 Responsibilities of CAIR authorized account representative.

Following the establishment of a CAIR NO_X Allowance Tracking System account, all submissions to the

Administrator pertaining to the account, including, but not limited to, submissions concerning the deduction or transfer of CAIR NO_X allowances in the account, shall be made only by the CAIR authorized account representative for the account.

§ 97.153 Recordation of CAIR NO_X allowance allocations.

(a) By September 30, 2007, the Administrator will record in the CAIR NO_X source's compliance account the CAIR NO_X allowances allocated for the CAIR NO_X units at the source in accordance with § 97.142(a) and (b) for the control period in 2009.

(b) By September 30, 2008, the Administrator will record in the CAIR NO_X source's compliance account the CAIR NO_X allowances allocated for the CAIR NO_X units at the source in accordance with § 97.142(a) and (b) for the control period in 2010.

(c) By September 30, 2009, the Administrator will record in the CAIR NO_X source's compliance account the CAIR NO_X allowances allocated for the CAIR NO_X units at the source in accordance with § 97.142(a) and (b) for the control periods in 2011, 2012, and 2013.

(d) By December 1, 2010 and December 1 of each year thereafter, the Administrator will record in the CAIR NO_X source's compliance account the CAIR NO_X allowances allocated for the CAIR NO_X units at the source in accordance with § 97.142(a) and (b) for the control period in the fourth year after the year of the applicable deadline for recordation under this paragraph.

(e) By December 1, 2009 and December 1 of each year thereafter, the Administrator will record in the CAIR NO_X source's compliance account the CAIR NO_X allowances allocated for the CAIR NO_X units at the source in accordance with § 97.142(a) and (c) for the control period in the year of the applicable deadline for recordation under this paragraph.

(f) *Serial numbers for allocated CAIR NO_X allowances.* When recording the allocation of CAIR NO_X allowances for a CAIR NO_X unit in a compliance account, the Administrator will assign each CAIR NO_X allowance a unique identification number that will include digits identifying the year of the control period for which the CAIR NO_X allowance is allocated.

§ 97.154 Compliance with CAIR NO_X emissions limitation.

(a) *Allowance transfer deadline.* The CAIR NO_X allowances are available to be deducted for compliance with a source's CAIR NO_X emissions limitation for a control period in a given calendar year only if the CAIR NO_X allowances:

(1) Were allocated for the control period in the year or a prior year; and

(2) Are held in the compliance account as of the allowance transfer deadline for the control period or are transferred into the compliance account by a CAIR NO_X allowance transfer correctly submitted for recordation under §§ 97.160 and 97.161 by the allowance transfer deadline for the control period.

(b) *Deductions for compliance.* Following the recordation, in accordance with § 97.161, of CAIR NO_X allowance transfers submitted for recordation in a source's compliance account by the allowance transfer deadline for a control period, the Administrator will deduct from the compliance account CAIR NO_X allowances available under paragraph (a) of this section in order to determine whether the source meets the CAIR NO_X emissions limitation for the control period, as follows:

(1) Until the amount of CAIR NO_X allowances deducted equals the number of tons of total nitrogen oxides emissions, determined in accordance with subpart HH of this part, from all CAIR NO_X units at the source for the control period; or

(2) If there are insufficient CAIR NO_X allowances to complete the deductions in paragraph (b)(1) of this section, until no more CAIR NO_X allowances available under paragraph (a) of this section remain in the compliance account.

(c)(1) *Identification of CAIR NO_X allowances by serial number.* The CAIR authorized account representative for a source's compliance account may request that specific CAIR NO_X allowances, identified by serial number, in the compliance account be deducted for emissions or excess emissions for a control period in accordance with paragraph (b) or (d) of this section. Such request shall be submitted to the Administrator by the allowance transfer deadline for the control period and include, in a format prescribed by the Administrator, the identification of the CAIR NO_X source and the appropriate serial numbers.

(2) *First-in, first-out.* The Administrator will deduct CAIR NO_X allowances under paragraph (b) or (d) of this section from the source's compliance account, in the absence of an identification or in the case of a partial identification of CAIR NO_X allowances by serial number under paragraph (c)(1) of this section, on a first-in, first-out (FIFO) accounting basis in the following order:

(i) Any CAIR NO_X allowances that were allocated to the units at the source, in the order of recordation; and then

(ii) Any CAIR NO_X allowances that were allocated to any entity and transferred and recorded in the compliance account pursuant to subpart GG of this part, in the order of recordation.

(d) *Deductions for excess emissions.* (1) After making the deductions for compliance under paragraph (b) of this section for a control period in a calendar year in which the CAIR NO_X source has excess emissions, the Administrator will deduct from the source's compliance account an amount of CAIR NO_X allowances, allocated for the control period in the immediately following calendar year, equal to 3 times the number of tons of the source's excess emissions.

(2) Any allowance deduction required under paragraph (d)(1) of this section shall not affect the liability of the owners and operators of the CAIR NO_X source or the CAIR NO_X units at the source for any fine, penalty, or assessment, or their obligation to comply with any other remedy, for the same violations, as ordered under the Clean Air Act or applicable State law.

(e) *Recordation of deductions.* The Administrator will record in the appropriate compliance account all deductions from such an account under paragraphs (b) and (d) of this section and subpart II.

(f) *Administrator's action on submissions.* (1) The Administrator may review and conduct independent audits concerning any submission under the CAIR NO_X Annual Trading Program and make appropriate adjustments of the information in the submissions.

(2) The Administrator may deduct CAIR NO_X allowances from or transfer CAIR NO_X allowances to a source's compliance account based on the information in the submissions, as adjusted under paragraph (f)(1) of this section, and record such deductions and transfers.

§ 97.155 Banking.

(a) CAIR NO_X allowances may be banked for future use or transfer in a compliance account or a general account in accordance with paragraph (b) of this section.

(b) Any CAIR NO_X allowance that is held in a compliance account or a general account will remain in such account unless and until the CAIR NO_X allowance is deducted or transferred under § 97.142, § 97.154, § 97.156, or subpart GG or II of this part.

§ 97.156 Account error.

The Administrator may, at his or her sole discretion and on his or her own motion, correct any error in any CAIR NO_X Allowance Tracking System account. Within 10 business days of making such correction, the Administrator will notify the CAIR authorized account representative for the account.

§ 97.157 Closing of general accounts.

(a) The CAIR authorized account representative of a general account may submit to the Administrator a request to close the account, which shall include a correctly submitted allowance transfer under §§ 97.160 and 97.161 for any CAIR NO_X allowances in the account to one or more other CAIR NO_X Allowance Tracking System accounts.

(b) If a general account has no allowance transfers in or out of the account for a 12-month period or longer and does not contain any CAIR NO_X allowances, the Administrator may notify the CAIR authorized account representative for the account that the account will be closed following 20 business days after the notice is sent. The account will be closed after the 20-day period unless, before the end of the 20-day period, the Administrator receives a correctly submitted transfer of CAIR NO_X allowances into the account under §§ 97.160 and 97.161 or a statement submitted by the CAIR authorized account representative demonstrating to the satisfaction of the Administrator good cause as to why the account should not be closed.

Subpart GG—CAIR NO_X Allowance Transfers

§ 97.160 Submission of CAIR NO_X allowance transfers.

A CAIR authorized account representative seeking recordation of a CAIR NO_X allowance transfer shall submit the transfer to the Administrator. To be considered correctly submitted, the CAIR NO_X allowance transfer shall include the following elements, in a format specified by the Administrator:

(a) The account numbers for both the transferor and transferee accounts;

(b) The serial number of each CAIR NO_X allowance that is in the transferor account and is to be transferred; and

(c) The name and signature of the CAIR authorized account representative of the transferor account and the date signed.

§ 97.161 EPA recordation.

(a) Within 5 business days (except as provided in paragraph (b) of this section) of receiving a CAIR NO_X allowance transfer, the Administrator will record a CAIR NO_X allowance transfer by moving each CAIR NO_X allowance from the transferor account to the transferee account as specified by the request, provided that:

(1) The transfer is correctly submitted under § 97.160; and

(2) The transferor account includes each CAIR NO_X allowance identified by serial number in the transfer.

(b) A CAIR NO_X allowance transfer that is submitted for recordation after the allowance transfer deadline for a control period and that includes any CAIR NO_X allowances allocated for any control period before such allowance transfer deadline will not be recorded until after the Administrator completes the deductions under § 97.154 for the control period immediately before such allowance transfer deadline.

(c) Where a CAIR NO_X allowance transfer submitted for recordation fails to meet the requirements of paragraph (a) of this section, the Administrator will not record such transfer.

§ 97.162 Notification.

(a) *Notification of recordation.* Within 5 business days of recordation of a CAIR NO_X allowance transfer under § 97.161, the Administrator will notify the CAIR authorized account representatives of both the transferor and transferee accounts.

(b) *Notification of non-recordation.* Within 10 business days of receipt of a CAIR NO_X allowance transfer that fails to meet the requirements of § 97.161(a), the Administrator will notify the CAIR authorized account representatives of both accounts subject to the transfer of:

(1) A decision not to record the transfer, and

(2) The reasons for such non-recordation.

(c) Nothing in this section shall preclude the submission of a CAIR NO_X allowance transfer for recordation following notification of non-recordation.

Subpart HH—Monitoring and Reporting

§ 97.170 General requirements.

The owners and operators, and to the extent applicable, the CAIR designated representative, of a CAIR NO_X unit, shall comply with the monitoring, recordkeeping, and reporting requirements as provided in this subpart and in subpart H of part 75 of this chapter. For purposes of complying with such requirements, the definitions in § 97.102 and in § 72.2 of this chapter shall apply, and the terms ''affected unit,'' ''designated representative,'' and ''continuous emission monitoring system'' or ''CEMS'') in part 75 of this chapter shall be deemed to refer to the terms ''CAIR NO_X unit,'' ''CAIR designated representative,'' and ''continuous emission monitoring system'' (or ''CEMS'') respectively, as defined in § 97.102. The owner or operator of a unit that is not a CAIR NO_X unit but that is monitored under § 75.72(b)(2)(ii) of this chapter shall comply with the same monitoring, recordkeeping, and reporting requirements as a CAIR NO_X unit.

(a) *Requirements for installation, certification, and data accounting.* The owner or operator of each CAIR NO_X unit shall:

(1) Install all monitoring systems required under this subpart for monitoring NO_X mass emissions and individual unit heat input (including all systems required to monitor NO_X emission rate, NO_X concentration, stack gas moisture content, stack gas flow rate, CO_2 or O_2 concentration, and fuel flow rate, as applicable, in accordance with (§§ 75.71 and 75.72 of this chapter);

(2) Successfully complete all certification tests required under § 97.171 and meet all other requirements of this subpart and part 75 of this chapter applicable to the monitoring systems under paragraph (a)(1) of this section; and

(3) Record, report, and quality-assure the data from the monitoring systems under paragraph (a)(1) of this section.

(b) *Compliance deadlines.* Except as provided in paragraph (e) of this section, the owner or operator shall meet the monitoring system certification and other requirements of paragraphs (a)(1) and (2) of this section on or before the following dates. The owner or operator shall record, report, and quality-assure the data from the monitoring systems under paragraph (a)(1) of this section on and after the following dates.

(1) For the owner or operator of a CAIR NO_X unit that commences commercial operation before July 1, 2007, by January 1, 2008.

(2) For the owner or operator of a CAIR NO_X unit that commences commercial operation on or after July 1, 2007, by the later of the following dates:

(i) January 1, 2008; or

(ii) 90 unit operating days or 180 calendar days, whichever occurs first, after the date on which the unit commences commercial operation.

(3) For the owner or operator of a CAIR NO_X unit for which construction of a new stack or flue or installation of add-on NO_X emission controls is completed after the applicable deadline

under paragraph (b)(1), (2), (4), or (5) of this section, by 90 unit operating days or 180 calendar days, whichever occurs first, after the date on which emissions first exit to the atmosphere through the new stack or flue or add-on NO_X emissions controls.

(4) Notwithstanding the dates in paragraphs (b)(1) and (2) of this section, for the owner or operator of a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart II of this part, by the date specified in § 97.184(b).

(5) Notwithstanding the dates in paragraphs (b)(1) and (2) of this section, for the owner or operator of a CAIR NO_X opt-in unit under subpart II of this part, by the date on which the CAIR NO_X opt-in unit enters the CAIR NO_X Annual Trading Program as provided in § 97.184(g).

(c) *Reporting data.* The owner or operator of a CAIR NO_X unit that does not meet the applicable compliance date set forth in paragraph (b) of this section for any monitoring system under paragraph (a)(1) of this section shall, for each such monitoring system, determine, record, and report maximum potential (or, as appropriate, minimum potential) values for NO_X concentration, NO_X emission rate, stack gas flow rate, stack gas moisture content, fuel flow rate, and any other parameters required to determine NO_X mass emissions and heat input in accordance with § 75.31(b)(2) or (c)(3) of this chapter, section 2.4 of appendix D to part 75 of this chapter, or section 2.5 of appendix E to part 75 of this chapter, as applicable.

(d) *Prohibitions.* (1) No owner or operator of a CAIR NO_X unit shall use any alternative monitoring system, alternative reference method, or any other alternative to any requirement of this subpart without having obtained prior written approval in accordance with § 97.175.

(2) No owner or operator of a CAIR NO_X unit shall operate the unit so as to discharge, or allow to be discharged, NO_X emissions to the atmosphere without accounting for all such emissions in accordance with the applicable provisions of this subpart and part 75 of this chapter.

(3) No owner or operator of a CAIR NO_X unit shall disrupt the continuous emission monitoring system, any portion thereof, or any other approved emission monitoring method, and thereby avoid monitoring and recording NO_X mass emissions discharged into the atmosphere or heat input, except for periods of recertification or periods when calibration, quality assurance testing, or maintenance is performed in accordance with the applicable provisions of this subpart and part 75 of this chapter.

(4) No owner or operator of a CAIR NO_X unit shall retire or permanently discontinue use of the continuous emission monitoring system, any component thereof, or any other approved monitoring system under this subpart, except under any one of the following circumstances:

(i) During the period that the unit is covered by an exemption under § 97.105 that is in effect;

(ii) The owner or operator is monitoring emissions from the unit with another certified monitoring system approved, in accordance with the applicable provisions of this subpart and part 75 of this chapter, by the Administrator for use at that unit that provides emission data for the same pollutant or parameter as the retired or discontinued monitoring system; or

(iii) The CAIR designated representative submits notification of the date of certification testing of a replacement monitoring system for the retired or discontinued monitoring system in accordance with § 97.171(d)(3)(i).

(e) *Long-term cold storage.* The owner or operator of a CAIR NO_X unit is subject to the applicable provisions of part 75 of this chapter concerning units in long-term cold storage.

§ 97.171 Initial certification and recertification procedures.

(a) The owner or operator of a CAIR NO_X unit shall be exempt from the initial certification requirements of this section for a monitoring system under § 97.170(a)(1) if the following conditions are met:

(1) The monitoring system has been previously certified in accordance with part 75 of this chapter; and

(2) The applicable quality-assurance and quality-control requirements of § 75.21 of this chapter and appendix B, appendix D, and appendix E to part 75 of this chapter are fully met for the certified monitoring system described in paragraph (a)(1) of this section.

(b) The recertification provisions of this section shall apply to a monitoring system under § 97.170(a)(1) exempt from initial certification requirements under paragraph (a) of this section.

(c) If the Administrator has previously approved a petition under § 75.17(a) or (b) of this chapter for apportioning the NO_X emission rate measured in a common stack or a petition under § 75.66 of this chapter for an alternative to a requirement in § 75.12 or § 75.17 of this chapter, the CAIR designated representative shall resubmit the petition to the Administrator under § 97.175 to determine whether the approval applies under the CAIR NO_X Annual Trading Program.

(d) Except as provided in paragraph (a) of this section, the owner or operator of a CAIR NO_X unit shall comply with the following initial certification and recertification procedures for a continuous monitoring system (*i.e.,* a continuous emission monitoring system and an excepted monitoring system under appendices D and E to part 75 of this chapter) under § 97.170(a)(1). The owner or operator of a unit that qualifies to use the low mass emissions excepted monitoring methodology under § 75.19 of this chapter or that qualifies to use an alternative monitoring system under subpart E of part 75 of this chapter shall comply with the procedures in paragraph (e) or (f) of this section respectively.

(1) *Requirements for initial certification.* The owner or operator shall ensure that each continuous monitoring system under § 97.170(a)(1) (including the automated data acquisition and handling system) successfully completes all of the initial certification testing required under § 75.20 of this chapter by the applicable deadline in § 97.170(b). In addition, whenever the owner or operator installs a monitoring system to meet the requirements of this subpart in a location where no such monitoring system was previously installed, initial certification in accordance with § 75.20 of this chapter is required.

(2) *Requirements for recertification.* Whenever the owner or operator makes a replacement, modification, or change in any certified continuous emission monitoring system under § 97.170(a)(1) that may significantly affect the ability of the system to accurately measure or record NO_X mass emissions or heat input rate or to meet the quality-assurance and quality-control requirements of § 75.21 of this chapter or appendix B to part 75 of this chapter, the owner or operator shall recertify the monitoring system in accordance with § 75.20(b) of this chapter. Furthermore, whenever the owner or operator makes a replacement, modification, or change to the flue gas handling system or the unit's operation that may significantly change the stack flow or concentration profile, the owner or operator shall recertify each continuous emission monitoring system whose accuracy is potentially affected by the change, in accordance with § 75.20(b) of this chapter. Examples of changes to a continuous emission monitoring system that require recertification include

replacement of the analyzer, complete replacement of an existing continuous emission monitoring system, or change in location or orientation of the sampling probe or site. Any fuel flowmeter system, and any excepted NO_X monitoring system under appendix E to part 75 of this chapter, under § 97.170(a)(1) are subject to the recertification requirements in § 75.20(g)(6) of this chapter.

(3) *Approval process for initial certification and recertification.* Paragraphs (d)(3)(i) through (iv) of this section apply to both initial certification and recertification of a continuous monitoring system under § 97.170(a)(1). For recertifications, replace the words ''certification'' and ''initial certification'' with the word ''recertification'', replace the word ''certified'' with the word ''recertified'', and follow the procedures in §§ 75.20(b)(5) and (g)(7) of this chapter in lieu of the procedures in paragraph (d)(3)(v) of this section.

(i) *Notification of certification.* The CAIR designated representative shall submit to the appropriate EPA Regional Office and the Administrator written notice of the dates of certification testing, in accordance with § 97.173.

(ii) *Certification application.* The CAIR designated representative shall submit to the Administrator a certification application for each monitoring system. A complete certification application shall include the information specified in § 75.63 of this chapter.

(iii) *Provisional certification date.* The provisional certification date for a monitoring system shall be determined in accordance with § 75.20(a)(3) of this chapter. A provisionally certified monitoring system may be used under the CAIR NO_X Annual Trading Program for a period not to exceed 120 days after receipt by the Administrator of the complete certification application for the monitoring system under paragraph (d)(3)(ii) of this section. Data measured and recorded by the provisionally certified monitoring system, in accordance with the requirements of part 75 of this chapter, will be considered valid quality-assured data (retroactive to the date and time of provisional certification), provided that the Administrator does not invalidate the provisional certification by issuing a notice of disapproval within 120 days of the date of receipt of the complete certification application by the Administrator.

(iv) *Certification application approval process.* The Administrator will issue a written notice of approval or disapproval of the certification application to the owner or operator within 120 days of receipt of the complete certification application under paragraph (d)(3)(ii) of this section. In the event the Administrator does not issue such a notice within such 120-day period, each monitoring system that meets the applicable performance requirements of part 75 of this chapter and is included in the certification application will be deemed certified for use under the CAIR NO_X Annual Trading Program.

(A) *Approval notice.* If the certification application is complete and shows that each monitoring system meets the applicable performance requirements of part 75 of this chapter, then the Administrator will issue a written notice of approval of the certification application within 120 days of receipt.

(B) *Incomplete application notice.* If the certification application is not complete, then the Administrator will issue a written notice of incompleteness that sets a reasonable date by which the CAIR designated representative must submit the additional information required to complete the certification application. If the CAIR designated representative does not comply with the notice of incompleteness by the specified date, then the Administrator may issue a notice of disapproval under paragraph (d)(3)(iv)(C) of this section. The 120-day review period shall not begin before receipt of a complete certification application.

(C) *Disapproval notice.* If the certification application shows that any monitoring system does not meet the performance requirements of part 75 of this chapter or if the certification application is incomplete and the requirement for disapproval under paragraph (d)(3)(iv)(B) of this section is met, then the Administrator will issue a written notice of disapproval of the certification application. Upon issuance of such notice of disapproval, the provisional certification is invalidated by the Administrator and the data measured and recorded by each uncertified monitoring system shall not be considered valid quality-assured data beginning with the date and hour of provisional certification (as defined under § 75.20(a)(3) of this chapter). The owner or operator shall follow the procedures for loss of certification in paragraph (d)(3)(v) of this section for each monitoring system that is disapproved for initial certification.

(D) *Audit decertification.* The Administrator may issue a notice of disapproval of the certification status of a monitor in accordance with § 97.172(b).

(v) *Procedures for loss of certification.* If the Administrator issues a notice of disapproval of a certification application under paragraph (d)(3)(iv)(C) of this section or a notice of disapproval of certification status under paragraph (d)(3)(iv)(D) of this section, then:

(A) The owner or operator shall substitute the following values, for each disapproved monitoring system, for each hour of unit operation during the period of invalid data specified under § 75.20(a)(4)(iii), § 75.20(g)(7), or § 75.21(e) of this chapter and continuing until the applicable date and hour specified under § 75.20(a)(5)(i) or (g)(7) of this chapter:

(*1*) For a disapproved NO_X emission rate (*i.e.,*, NO_X-diluent) system, the maximum potential NO_X emission rate, as defined in § 72.2 of this chapter.

(*2*) For a disapproved NO_X pollutant concentration monitor and disapproved flow monitor, respectively, the maximum potential concentration of NO_X and the maximum potential flow rate, as defined in sections 2.1.2.1 and 2.1.4.1 of appendix A to part 75 of this chapter.

(*3*) For a disapproved moisture monitoring system and disapproved diluent gas monitoring system, respectively, the minimum potential moisture percentage and either the maximum potential CO_2 concentration or the minimum potential O_2 concentration (as applicable), as defined in sections 2.1.5, 2.1.3.1, and 2.1.3.2 of appendix A to part 75 of this chapter.

(*4*) For a disapproved fuel flowmeter system, the maximum potential fuel flow rate, as defined in section 2.4.2.1 of appendix D to part 75 of this chapter.

(*5*) For a disapproved excepted NO_X monitoring system under appendix E to part 75 of this chapter, the fuel-specific maximum potential NO_X emission rate, as defined in § 72.2 of this chapter.

(B) The CAIR designated representative shall submit a notification of certification retest dates and a new certification application in accordance with paragraphs (d)(3)(i) and (ii) of this section.

(C) The owner or operator shall repeat all certification tests or other requirements that were failed by the monitoring system, as indicated in the Administrator's notice of disapproval, no later than 30 unit operating days after the date of issuance of the notice of disapproval.

(e) *Initial certification and recertification procedures for units using the low mass emission excepted methodology under § 75.19 of this chapter.* The owner or operator of a unit qualified to use the low mass emissions

(LME) excepted methodology under § 75.19 of this chapter shall meet the applicable certification and recertification requirements in §§ 75.19(a)(2) and 75.20(h) of this chapter. If the owner or operator of such a unit elects to certify a fuel flowmeter system for heat input determination, the owner or operator shall also meet the certification and recertification requirements in § 75.20(g) of this chapter.

(f) *Certification/recertification procedures for alternative monitoring systems.* The CAIR designated representative of each unit for which the owner or operator intends to use an alternative monitoring system approved by the Administrator under subpart E of part 75 of this chapter shall comply with the applicable notification and application procedures of § 75.20(f) of this chapter.

§ 97.172 Out of control periods.

(a) Whenever any monitoring system fails to meet the quality-assurance and quality-control requirements or data validation requirements of part 75 of this chapter, data shall be substituted using the applicable missing data procedures in subpart D or subpart H of, or appendix D or appendix E to, part 75 of this chapter.

(b) *Audit decertification.* Whenever both an audit of a monitoring system and a review of the initial certification or recertification application reveal that any monitoring system should not have been certified or recertified because it did not meet a particular performance specification or other requirement under § 97.171 or the applicable provisions of part 75 of this chapter, both at the time of the initial certification or recertification application submission and at the time of the audit, the Administrator will issue a notice of disapproval of the certification status of such monitoring system. For the purposes of this paragraph, an audit shall be either a field audit or an audit of any information submitted to the permitting authority or the Administrator. By issuing the notice of disapproval, the Administrator revokes prospectively the certification status of the monitoring system. The data measured and recorded by the monitoring system shall not be considered valid quality-assured data from the date of issuance of the notification of the revoked certification status until the date and time that the owner or operator completes subsequently approved initial certification or recertification tests for the monitoring system. The owner or operator shall follow the applicable initial certification or recertification procedures in § 97.171 for each disapproved monitoring system.

§ 97.173 Notifications.

The CAIR designated representative for a CAIR NO_X unit shall submit written notice to the Administrator in accordance with § 75.61 of this chapter.

§ 97.174 Recordkeeping and reporting.

(a) *General provisions.* The CAIR designated representative shall comply with all recordkeeping and reporting requirements in this section, the applicable recordkeeping and reporting requirements under § 75.73 of this chapter, and the requirements of § 97.110(e)(1).

(b) *Monitoring plans.* The owner or operator of a CAIR NO_X unit shall comply with requirements of § 75.73(c) and (e) of this chapter and, for a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart II of this part, §§ 97.183 and 97.184(a).

(c) *Certification applications.* The CAIR designated representative shall submit an application to the Administrator within 45 days after completing all initial certification or recertification tests required under § 97.171, including the information required under § 75.63 of this chapter.

(d) *Quarterly reports.* The CAIR designated representative shall submit quarterly reports, as follows:

(1) The CAIR designated representative shall report the NO_X mass emissions data and heat input data for the CAIR NO_X unit, in an electronic quarterly report in a format prescribed by the Administrator, for each calendar quarter beginning with:

(i) For a unit that commences commercial operation before July 1, 2007, the calendar quarter covering January 1, 2008 through March 31, 2008;

(ii) For a unit that commences commercial operation on or after July 1, 2007, the calendar quarter corresponding to the earlier of the date of provisional certification or the applicable deadline for initial certification under § 97.170(b), unless that quarter is the third or fourth quarter of 2007, in which case reporting shall commence in the quarter covering January 1, 2008 through March 31, 2008;

(iii) Notwithstanding paragraphs (d)(1)(i) and (ii) of this section, for a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart II of this part, the calendar quarter corresponding to the date specified in § 97.184(b); and

(iv) Notwithstanding paragraphs (d)(1)(i) and (ii) of this section, for a CAIR NO_X opt-in unit under subpart II of this part, the calendar quarter corresponding to the date on which the CAIR NO_X opt-in unit enters the CAIR NO_X Annual Trading Program as provided in § 97.184(g).

(2) The CAIR designated representative shall submit each quarterly report to the Administrator within 30 days following the end of the calendar quarter covered by the report. Quarterly reports shall be submitted in the manner specified in § 75.73(f) of this chapter.

(3) For CAIR NO_X units that are also subject to an Acid Rain emissions limitation or the CAIR NO_X Ozone Season Trading Program, CAIR SO_2 Trading Program, or Hg Budget Trading Program, quarterly reports shall include the applicable data and information required by subparts F through I of part 75 of this chapter as applicable, in addition to the NO_X mass emission data, heat input data, and other information required by this subpart.

(e) *Compliance certification.* The CAIR designated representative shall submit to the Administrator a compliance certification (in a format prescribed by the Administrator) in support of each quarterly report based on reasonable inquiry of those persons with primary responsibility for ensuring that all of the unit's emissions are correctly and fully monitored. The certification shall state that:

(1) The monitoring data submitted were recorded in accordance with the applicable requirements of this subpart and part 75 of this chapter, including the quality assurance procedures and specifications; and

(2) For a unit with add-on NO_X emission controls and for all hours where NO_X data are substituted in accordance with § 75.34(a)(1) of this chapter, the add-on emission controls were operating within the range of parameters listed in the quality assurance/quality control program under appendix B to part 75 of this chapter and the substitute data values do not systematically underestimate NO_X emissions.

§ 97.175 Petitions.

The CAIR designated representative of a CAIR NO_X unit may submit a petition under § 75.66 of this chapter to the Administrator requesting approval to apply an alternative to any requirement of this subpart. Application of an alternative to any requirement of this subpart is in accordance with this subpart only to the extent that the petition is approved in writing by the Administrator, in consultation with the permitting authority.

Subpart II—CAIR NO_X Opt-In Units

§ 97.180 Applicability.

A CAIR NO_X opt-in unit must be a unit that:

(a) Is located in a State that submits, and for which the Administrator approves, a State implementation plan revision in accordance with § 51.123(p)(3)(i), (ii), or (iii) of this chapter establishing procedures concerning CAIR opt-in units;

(b) Is not a CAIR NO_X unit under § 97.104 and is not covered by a retired unit exemption under § 97.105 that is in effect;

(c) Is not covered by a retired unit exemption under § 72.8 of this chapter that is in effect;

(d) Has or is required or qualified to have a title V operating permit or other federally enforceable permit; and

(e) Vents all of its emissions to a stack and can meet the monitoring, recordkeeping, and reporting requirements of subpart HH of this part.

§ 97.181 General.

(a) Except as otherwise provided in §§ 97.101 through 97.104, §§ 97.106 through 97.108, and subparts BB and CC and subparts FF through HH of this part, a CAIR NO_X opt-in unit shall be treated as a CAIR NO_X unit for purposes of applying such sections and subparts of this part.

(b) Solely for purposes of applying, as provided in this subpart, the requirements of subpart HH of this part to a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under this subpart, such unit shall be treated as a CAIR NO_X unit before issuance of a CAIR opt-in permit for such unit.

§ 97.182 CAIR designated representative.

Any CAIR NO_X opt-in unit, and any unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under this subpart, located at the same source as one or more CAIR NO_X units shall have the same CAIR designated representative and alternate CAIR designated representative as such CAIR NO_X units.

§ 97.183 Applying for CAIR opt-in permit.

(a) *Applying for initial CAIR opt-in permit.* The CAIR designated representative of a unit meeting the requirements for a CAIR NO_X opt-in unit in § 97.180 may apply for an initial CAIR opt-in permit at any time, except as provided under § 97.186(f) and (g), and, in order to apply, must submit the following:

(1) A complete CAIR permit application under § 97.122;

(2) A certification, in a format specified by the permitting authority, that the unit:

(i) Is not a CAIR NO_X unit under § 97.104 and is not covered by a retired unit exemption under § 97.105 that is in effect;

(ii) Is not covered by a retired unit exemption under § 72.8 of this chapter that is in effect;

(iii) Vents all of its emissions to a stack; and

(iv) Has documented heat input for more than 876 hours during the 6 months immediately preceding submission of the CAIR permit application under § 97.122;

(3) A monitoring plan in accordance with subpart HH of this part;

(4) A complete certificate of representation under § 97.113 consistent with § 97.182, if no CAIR designated representative has been previously designated for the source that includes the unit; and

(5) A statement, in a format specified by the permitting authority, whether the CAIR designated representative requests that the unit be allocated CAIR NO_X allowances under § 97.188(b) or § 97.188(c) (subject to the conditions in §§ 97.184(h) and 97.186(g)), to the extent such allocation is provided in a State implementation plan revision submitted in accordance with § 51.123(p)(3)(i), (ii), or (iii) of this chapter and approved by the Administrator. If allocation under § 97.188(c) is requested, this statement shall include a statement that the owners and operators of the unit intend to repower the unit before January 1, 2015 and that they will provide, upon request, documentation demonstrating such intent.

(b) *Duty to reapply.* (1) The CAIR designated representative of a CAIR NO_X opt-in unit shall submit a complete CAIR permit application under § 97.122 to renew the CAIR opt-in unit permit in accordance with the permitting authority's regulations for title V operating permits, or the permitting authority's regulations for other federally enforceable permits if applicable, addressing permit renewal.

(2) Unless the permitting authority issues a notification of acceptance of withdrawal of the CAIR NO_X opt-in unit from the CAIR NO_X Annual Trading Program in accordance with § 97.186 or the unit becomes a CAIR NO_X unit under § 97.104, the CAIR NO_X opt-in unit shall remain subject to the requirements for a CAIR NO_X opt-in unit, even if the CAIR designated representative for the CAIR NO_X opt-in unit fails to submit a CAIR permit application that is required for renewal of the CAIR opt-in permit under paragraph (b)(1) of this section.

§ 97.184 Opt-in process.

The permitting authority will issue or deny a CAIR opt-in permit for a unit for which an initial application for a CAIR opt-in permit under § 97.183 is submitted in accordance with the following, to the extent provided in a State implementation plan revision submitted in accordance with § 51.123(p)(3)(i), (ii), or (iii) of this chapter and approved by the Administrator:

(a) *Interim review of monitoring plan.* The permitting authority and the Administrator will determine, on an interim basis, the sufficiency of the monitoring plan accompanying the initial application for a CAIR opt-in permit under § 97.183. A monitoring plan is sufficient, for purposes of interim review, if the plan appears to contain information demonstrating that the NO_X emissions rate and heat input of the unit and all other applicable parameters are monitored and reported in accordance with subpart HH of this part. A determination of sufficiency shall not be construed as acceptance or approval of the monitoring plan.

(b) *Monitoring and reporting.* (1)(i) If the permitting authority and the Administrator determine that the monitoring plan is sufficient under paragraph (a) of this section, the owner or operator shall monitor and report the NO_X emissions rate and the heat input of the unit and all other applicable parameters, in accordance with subpart HH of this part, starting on the date of certification of the appropriate monitoring systems under subpart HH of this part and continuing until a CAIR opt-in permit is denied under § 97.184(f) or, if a CAIR opt-in permit is issued, the date and time when the unit is withdrawn from the CAIR NO_X Annual Trading Program in accordance with § 97.186.

(ii) The monitoring and reporting under paragraph (b)(1)(i) of this section shall include the entire control period immediately before the date on which the unit enters the CAIR NO_X Annual Trading Program under § 97.184(g), during which period monitoring system availability must not be less than 90 percent under subpart HH of this part and the unit must be in full compliance with any applicable State or Federal emissions or emissions-related requirements.

(2) To the extent the NO_X emissions rate and the heat input of the unit are monitored and reported in accordance with subpart HH of this part for one or more control periods, in addition to the control period under paragraph (b)(1)(ii) of this section, during which control periods monitoring system availability is not less than 90 percent under subpart HH of this part and the unit is in full compliance with any applicable State or Federal emissions or emissions-related requirements and which control periods begin not more than 3 years before the unit enters the CAIR NO_X Annual Trading Program under § 97.184(g), such information shall be used as provided in paragraphs (c) and (d) of this section.

(c) *Baseline heat input.* The unit's baseline heat rate shall equal:

(1) If the unit's NO_X emissions rate and heat input are monitored and reported for only one control period, in accordance with paragraph (b)(1) of this section, the unit's total heat input (in mmBtu) for the control period; or

(2) If the unit's NO_X emissions rate and heat input are monitored and reported for more than one control period, in accordance with paragraphs (b)(1) and (2) of this section, the average of the amounts of the unit's total heat input (in mmBtu) for the control periods under paragraphs (b)(1)(ii) and (2) of this section.

(d) *Baseline* NO_X *emission rate.* The unit's baseline NO_X emission rate shall equal:

(1) If the unit's NO_X emissions rate and heat input are monitored and reported for only one control period, in accordance with paragraph (b)(1) of this section, the unit's NO_X emissions rate (in lb/mmBtu) for the control period;

(2) If the unit's NO_X emissions rate and heat input are monitored and reported for more than one control period, in accordance with paragraphs (b)(1) and (2) of this section, and the unit does not have add-on NO_X emission controls during any such control periods, the average of the amounts of the unit's NO_X emissions rate (in lb/mmBtu) for the control periods under paragraphs (b)(1)(ii) and (2) of this section; or

(3) If the unit's NO_X emissions rate and heat input are monitored and reported for more than one control period, in accordance with paragraphs (b)(1) and (2) of this section, and the unit has add-on NO_X emission controls during any such control periods, the average of the amounts of the unit's NO_X emissions rate (in lb/mmBtu) for such control periods during which the unit has add-on NO_X emission controls.

(e) *Issuance of CAIR opt-in permit.* After calculating the baseline heat input and the baseline NO_X emissions rate for the unit under paragraphs (c) and (d) of this section and if the permitting authority determines that the CAIR designated representative shows that the unit meets the requirements for a CAIR NO_X opt-in unit in § 97.180 and meets the elements certified in § 97.183(a)(2), the permitting authority will issue a CAIR opt-in permit. The permitting authority will provide a copy of the CAIR opt-in permit to the Administrator, who will then establish a compliance account for the source that includes the CAIR NO_X opt-in unit unless the source already has a compliance account.

(f) *Issuance of denial of CAIR opt-in permit.* Notwithstanding paragraphs (a) through (e) of this section, if at any time before issuance of a CAIR opt-in permit for the unit, the permitting authority determines that the CAIR designated representative fails to show that the unit meets the requirements for a CAIR NO_X opt-in unit in § 97.180 or meets the elements certified in § 97.183(a)(2), the permitting authority will issue a denial of a CAIR opt-in permit for the unit.

(g) *Date of entry into CAIR* NO_X *Annual Trading Program.* A unit for which an initial CAIR opt-in permit is issued by the permitting authority shall become a CAIR NO_X opt-in unit, and a CAIR NO_X unit, as of the later of January 1, 2009 or January 1 of the first control period during which such CAIR opt-in permit is issued.

(h) *Repowered CAIR* NO_X *opt-in unit.* (1) If CAIR designated representative requests, and the permitting authority issues a CAIR opt-in permit providing for, allocation to a CAIR NO_X opt-in unit of CAIR NO_X allowances under § 97.188(c) and such unit is repowered after its date of entry into the CAIR NO_X Annual Trading Program under paragraph (g) of this section, the repowered unit shall be treated as a CAIR NO_X opt-in unit replacing the original CAIR NO_X opt-in unit, as of the date of start-up of the repowered unit's combustion chamber.

(2) Notwithstanding paragraphs (c) and (d) of this section, as of the date of start-up under paragraph (h)(1) of this section, the repowered unit shall be deemed to have the same date of commencement of operation, date of commencement of commercial operation, baseline heat input, and baseline NO_X emission rate as the original CAIR NO_X opt-in unit, and the original CAIR NO_X opt-in unit shall no longer be treated as a CAIR NO_X opt-in unit or a CAIR NO_X unit.

§ 97.185 CAIR opt-in permit contents.

(a) Each CAIR opt-in permit will contain:

(1) All elements required for a complete CAIR permit application under § 97.122;

(2) The certification in § 97.183(a)(2);

(3) The unit's baseline heat input under § 97.184(c);

(4) The unit's baseline NO_X emission rate under § 97.184(d);

(5) A statement whether the unit is to be allocated CAIR NO_X allowances under § 97.188(b) or § 97.188(c) (subject to the conditions in §§ 97.184(h) and 97.186(g));

(6) A statement that the unit may withdraw from the CAIR NO_X Annual Trading Program only in accordance with § 97.186; and

(7) A statement that the unit is subject to, and the owners and operators of the unit must comply with, the requirements of § 97.187.

(b) Each CAIR opt-in permit is deemed to incorporate automatically the definitions of terms under § 97.102 and, upon recordation by the Administrator under subpart FF or GG of this part or this subpart, every allocation, transfer, or deduction of CAIR NO_X allowances to or from the compliance account of the source that includes a CAIR NO_X opt-in unit covered by the CAIR opt-in permit.

(c) The CAIR opt-in permit shall be included, in a format specified by the permitting authority, in the CAIR permit for the source where the CAIR NO_X opt-in unit is located and in a title V operating permit or other federally enforceable permit for the source.

§ 97.186 Withdrawal from CAIR NO_X Annual Trading Program.

Except as provided under paragraph (g) of this section, a CAIR NO_X opt-in unit may withdraw from the CAIR NO_X Annual Trading Program, but only if the permitting authority issues a notification to the CAIR designated representative of the CAIR NO_X opt-in unit of the acceptance of the withdrawal of the CAIR NO_X opt-in unit in accordance with paragraph (d) of this section.

(a) *Requesting withdrawal.* In order to withdraw a CAIR NO_X opt-in unit from the CAIR NO_X Annual Trading Program, the CAIR designated representative of the CAIR NO_X opt-in unit shall submit to the permitting authority a request to withdraw effective as of midnight of December 31 of a specified calendar year, which date must be at least 4 years after December 31 of the year of entry into the CAIR NO_X Annual Trading

Program under § 97.184(g). The request must be submitted no later than 90 days before the requested effective date of withdrawal.

(b) *Conditions for withdrawal.* Before a CAIR NO_X opt-in unit covered by a request under paragraph (a) of this section may withdraw from the CAIR NO_X Annual Trading Program and the CAIR opt-in permit may be terminated under paragraph (e) of this section, the following conditions must be met:

(1) For the control period ending on the date on which the withdrawal is to be effective, the source that includes the CAIR NO_X opt-in unit must meet the requirement to hold CAIR NO_X allowances under § 97.106(c) and cannot have any excess emissions.

(2) After the requirement for withdrawal under paragraph (b)(1) of this section is met, the Administrator will deduct from the compliance account of the source that includes the CAIR NO_X opt-in unit CAIR NO_X allowances equal in amount to and allocated for the same or a prior control period as any CAIR NO_X allowances allocated to the CAIR NO_X opt-in unit under § 97.188 for any control period for which the withdrawal is to be effective. If there are no remaining CAIR NO_X units at the source, the Administrator will close the compliance account, and the owners and operators of the CAIR NO_X opt-in unit may submit a CAIR NO_X allowance transfer for any remaining CAIR NO_X allowances to another CAIR NO_X Allowance Tracking System in accordance with subpart GG of this part.

(c) *Notification.* (1) After the requirements for withdrawal under paragraphs (a) and (b) of this section are met (including deduction of the full amount of CAIR NO_X allowances required), the permitting authority will issue a notification to the CAIR designated representative of the CAIR NO_X opt-in unit of the acceptance of the withdrawal of the CAIR NO_X opt-in unit as of midnight on December 31 of the calendar year for which the withdrawal was requested.

(2) If the requirements for withdrawal under paragraphs (a) and (b) of this section are not met, the permitting authority will issue a notification to the CAIR designated representative of the CAIR NO_X opt-in unit that the CAIR NO_X opt-in unit's request to withdraw is denied. Such CAIR NO_X opt-in unit shall continue to be a CAIR NO_X opt-in unit.

(d) *Permit amendment.* After the permitting authority issues a notification under paragraph (c)(1) of this section that the requirements for withdrawal have been met, the permitting authority will revise the CAIR permit covering the CAIR NO_X opt-in unit to terminate the CAIR opt-in permit for such unit as of the effective date specified under paragraph (c)(1) of this section. The unit shall continue to be a CAIR NO_X opt-in unit until the effective date of the termination and shall comply with all requirements under the CAIR NO_X Annual Trading Program concerning any control periods for which the unit is a CAIR NO_X opt-in unit, even if such requirements arise or must be complied with after the withdrawal takes effect.

(e) *Reapplication upon failure to meet conditions of withdrawal.* If the permitting authority denies the CAIR NO_X opt-in unit's request to withdraw, the CAIR designated representative may submit another request to withdraw in accordance with paragraphs (a) and (b) of this section.

(f) *Ability to reapply to the CAIR NO_X Annual Trading Program.* Once a CAIR NO_X opt-in unit withdraws from the CAIR NO_X Annual Trading Program and its CAIR opt-in permit is terminated under this section, the CAIR designated representative may not submit another application for a CAIR opt-in permit under § 97.183 for such CAIR NO_X opt-in unit before the date that is 4 years after the date on which the withdrawal became effective. Such new application for a CAIR opt-in permit will be treated as an initial application for a CAIR opt-in permit under § 97.184.

(g) *Inability to withdraw.* Notwithstanding paragraphs (a) through (f) of this section, a CAIR NO_X opt-in unit shall not be eligible to withdraw from the CAIR NO_X Annual Trading Program if the CAIR designated representative of the CAIR NO_X opt-in unit requests, and the permitting authority issues a CAIR NO_X opt-in permit providing for, allocation to the CAIR NO_X opt-in unit of CAIR NO_X allowances under § 97.188(c).

§ 97.187 Change in regulatory status.

(a) *Notification.* If a CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 97.104, then the CAIR designated representative shall notify in writing the permitting authority and the Administrator of such change in the CAIR NO_X opt-in unit's regulatory status, within 30 days of such change.

(b) *Permitting authority's and Administrator's actions.* (1) If a CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 97.104, the permitting authority will revise the CAIR NO_X opt-in unit's CAIR opt-in permit to meet the requirements of a CAIR permit under § 97.123, and remove the CAIR opt-in permit provisions, as of the date on which the CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 97.104.

(2)(i) The Administrator will deduct from the compliance account of the source that includes the CAIR NO_X opt-in unit that becomes a CAIR NO_X unit under § 97.104, CAIR NO_X allowances equal in amount to and allocated for the same or a prior control period as:

(A) Any CAIR NO_X allowances allocated to the CAIR NO_X opt-in unit under § 97.188 for any control period after the date on which the CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 97.104; and

(B) If the date on which the CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 97.104 is not December 31, the CAIR NO_X allowances allocated to the CAIR NO_X opt-in unit under § 97.188 for the control period that includes the date on which the CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 97.104, multiplied by the ratio of the number of days, in the control period, starting with the date on which the CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 97.104 divided by the total number of days in the control period and rounded to the nearest whole allowance as appropriate.

(ii) The CAIR designated representative shall ensure that the compliance account of the source that includes the CAIR NO_X unit that becomes a CAIR NO_X unit under § 97.104 contains the CAIR NO_X allowances necessary for completion of the deduction under paragraph (b)(2)(i) of this section.

(3)(i) For every control period after the date on which the CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 97.104, the CAIR NO_X opt-in unit will be allocated CAIR NO_X allowances under § 97.142.

(ii) If the date on which the CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 97.104 is not December 31, the following amount of CAIR NO_X allowances will be allocated to the CAIR NO_X opt-in unit (as a CAIR NO_X unit) under (97.142 for the control period that includes the date on which the CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 97.104:

(A) The amount of CAIR NO_X allowances otherwise allocated to the CAIR NO_X opt-in unit (as a CAIR NO_X unit) under § 97.142 for the control period multiplied by;

(B) The ratio of the number of days, in the control period, starting with the date on which the CAIR NO_X opt-in unit becomes a CAIR NO_X unit under § 97.104, divided by the total number of days in the control period; and

(C) Rounded to the nearest whole allowance as appropriate.

§ 97.188 CAIR NO_X allowance allocations to CAIR NO_X opt-in units.

(a) *Timing requirements.* (1) When the CAIR opt-in permit is issued under § 97.184(e), the permitting authority will allocate CAIR NO_X allowances to the CAIR NO_X opt-in unit, and submit to the Administrator the allocation for the control period in which a CAIR NO_X opt-in unit enters the CAIR NO_X Annual Trading Program under § 97.184(g), in accordance with paragraph (b) or (c) of this section.

(2) By no later than October 31 of the control period after the control period in which a CAIR NO_X opt-in unit enters the CAIR NO_X Annual Trading Program under § 97.184(g) and October 31 of each year thereafter, the permitting authority will allocate CAIR NO_X allowances to the CAIR NO_X opt-in unit, and submit to the Administrator the allocation for the control period that includes such submission deadline and in which the unit is a CAIR NO_X opt-in unit, in accordance with paragraph (b) or (c) of this section.

(b) *Calculation of allocation.* For each control period for which a CAIR NO_X opt-in unit is to be allocated CAIR NO_X allowances, the permitting authority will allocate in accordance with the following procedures, if provided in a State implementation plan revision submitted in accordance with § 51.123(p)(3)(i), (ii), or (iii) of this chapter and approved by the Administrator:

(1) The heat input (in mmBtu) used for calculating the CAIR NO_X allowance allocation will be the lesser of:

(i) The CAIR NO_X opt-in unit's baseline heat input determined under § 97.184(c); or

(ii) The CAIR NO_X opt-in unit's heat input, as determined in accordance with subpart HH of this part, for the immediately prior control period, except when the allocation is being calculated for the control period in which the CAIR NO_X opt-in unit enters the CAIR NO_X Annual Trading Program under § 97.184(g).

(2) The NO_X emission rate (in lb/mmBtu) used for calculating CAIR NO_X allowance allocations will be the lesser of:

(i) The CAIR NO_X opt-in unit's baseline NO_X emissions rate (in lb/mmBtu) determined under § 97.184(d) and multiplied by 70 percent; or

(ii) The most stringent State or Federal NO_X emissions limitation applicable to the CAIR NO_X opt-in unit at any time during the control period for which CAIR NO_X allowances are to be allocated.

(3) The permitting authority will allocate CAIR NO_X allowances to the CAIR NO_X opt-in unit in an amount equaling the heat input under paragraph (b)(1) of this section, multiplied by the NO_X emission rate under paragraph (b)(2) of this section, divided by 2,000 lb/ton, and rounded to the nearest whole allowance as appropriate.

(c) Notwithstanding paragraph (b) of this section and if the CAIR designated representative requests, and the permitting authority issues a CAIR opt-in permit (based on a demonstration of the intent to repower stated under § 97.183(a)(5)) providing for, allocation to a CAIR NO_X opt-in unit of CAIR NO_X allowances under this paragraph (subject to the conditions in §§ 97.184(h) and 97.186(g)), the permitting authority will allocate to the CAIR NO_X opt-in unit as follows, if provided in a State implementation plan revision submitted in accordance with (51.123(p)(3)(i), (ii), or (iii) of this chapter and approved by the Administrator:

(1) For each control period in 2009 through 2014 for which the CAIR NO_X opt-in unit is to be allocated CAIR NO_X allowances,

(i) The heat input (in mmBtu) used for calculating CAIR NO_X allowance allocations will be determined as described in paragraph (b)(1) of this section.

(ii) The NO_X emission rate (in lb/mmBtu) used for calculating CAIR NO_X allowance allocations will be the lesser of:

(A) The CAIR NO_X opt-in unit's baseline NO_X emissions rate (in lb/mmBtu) determined under § 97.184(d); or

(B) The most stringent State or Federal NO_X emissions limitation applicable to the CAIR NO_X opt-in unit at any time during the control period in which the CAIR NO_X opt-in unit enters the CAIR NO_X Annual Trading Program under § 97.184(g).

(iii) The permitting authority will allocate CAIR NO_X allowances to the CAIR NO_X opt-in unit in an amount equaling the heat input under paragraph (c)(1)(i) of this section, multiplied by the NO_X emission rate under paragraph (c)(1)(ii) of this section, divided by 2,000 lb/ton, and rounded to the nearest whole allowance as appropriate.

(2) For each control period in 2015 and thereafter for which the CAIR NO_X opt-in unit is to be allocated CAIR NO_X allowances,

(i) The heat input (in mmBtu) used for calculating the CAIR NO_X allowance allocations will be determined as described in paragraph (b)(1) of this section.

(ii) The NO_X emission rate (in lb/mmBtu) used for calculating the CAIR NO_X allowance allocation will be the lesser of:

(A) 0.15 lb/mmBtu;

(B) The CAIR NO_X opt-in unit's baseline NO_X emissions rate (in lb/mmBtu) determined under § 97.184(d); or

(C) The most stringent State or Federal NO_X emissions limitation applicable to the CAIR NO_X opt-in unit at any time during the control period for which CAIR NO_X allowances are to be allocated.

(iii) The permitting authority will allocate CAIR NO_X allowances to the CAIR NO_X opt-in unit in an amount equaling the heat input under paragraph (c)(2)(i) of this section, multiplied by the NO_X emission rate under paragraph (c)(2)(ii) of this section, divided by 2,000 lb/ton, and rounded to the nearest whole allowance as appropriate.

(d) *Recordation.* If provided in a State implementation plan revision submitted in accordance with § 51.123(p)(3)(i), (ii), or (iii) of this chapter and approved by the Administrator:

(1) The Administrator will record, in the compliance account of the source that includes the CAIR NO_X opt-in unit, the CAIR NO_X allowances allocated by the permitting authority to the CAIR NO_X opt-in unit under paragraph (a)(1) of this section.

(2) By December 1 of the control period in which a CAIR NO_X opt-in unit enters the CAIR NO_X Annual Trading Program under § 97.184(g) and December 1 of each year thereafter, the Administrator will record, in the compliance account of the source that includes the CAIR NO_X opt-in unit, the CAIR NO_X allowances allocated by the permitting authority to the CAIR NO_X opt-in unit under paragraph (a)(2) of this section.

Appendix A to Subpart II of Part 97—States With Approved State Implementation Plan Revisions Concerning CAIR NO_X Opt-In Units

1. The following States have State Implementation Plan revisions under § 51.123(p)(3) of this chapter approved by the Administrator and establishing procedures providing for CAIR NO_X opt-in units under subpart II of this part and allocation of CAIR NO_X allowances to such units under § 97.188(b):

[Reserved]

2. The following States have State Implementation Plan revisions under § 51.123(p)(3) of this chapter approved by the Administrator and establishing procedures providing for CAIR NO_X opt-in units under subpart II of this part and allocation of CAIR

NO_X allowances to such units under § 97.188(c):

[Reserved]

■ 4. Part 97 is amended by adding subparts AAA through CCC, adding and reserving subparts DDD and EEE and adding subparts FFF through III to read as follows:

Subpart AAA—CAIR SO_2 Trading Program General Provisions

§ 97.201 Purpose.

This subpart and subparts BBB through III set forth the general provisions and the designated representative, permitting, allowance, monitoring, and opt-in provisions for the Federal Clean Air Interstate Rule (CAIR) SO_2 Trading Program, under section 110 of the Clean Air Act and § 52.36 of this chapter, as a means of mitigating interstate transport of fine particulates and sulfur dioxide.

§ 97.202 Definitions.

The terms used in this subpart and subparts BBB through III shall have the meanings set forth in this section as follows:

Account number means the identification number given by the Administrator to each CAIR SO_2 Allowance Tracking System account.

Acid Rain emissions limitation means a limitation on emissions of sulfur dioxide or nitrogen oxides under the Acid Rain Program.

Acid Rain Program means a multi-state sulfur dioxide and nitrogen oxides air pollution control and emission reduction program established by the Administrator under title IV of the CAA and parts 72 through 78 of this chapter.

Administrator means the Administrator of the United States Environmental Protection Agency or the Administrator's duly authorized representative.

Allocate or *allocation* means, with regard to CAIR SO_2 allowances issued under the Acid Rain Program, the determination by the Administrator of the amount of such CAIR SO_2 allowances to be initially credited to a CAIR SO_2 unit or other entity and, with regard to CAIR SO_2 allowances issued under § 97.288 or provisions of a State implementation plan that are approved under § 51.124(o)(1) or (2) or (r) of this chapter, the determination by a permitting authority of the amount of such CAIR SO_2 allowances to be initially credited to a CAIR SO_2 unit or other entity.

Allowance transfer deadline means, for a control period, midnight of March 1 (if it is a business day), or midnight of the first business day thereafter (if March 1 is not a business day), immediately following the control period and is the deadline by which a CAIR SO_2 allowance transfer must be submitted for recordation in a CAIR SO_2 source's compliance account in order to be used to meet the source's CAIR SO_2 emissions limitation for such control period in accordance with § 97.254.

Alternate CAIR designated representative means, for a CAIR SO_2 source and each CAIR SO_2 unit at the source, the natural person who is authorized by the owners and operators of the source and all such units at the source in accordance with subparts BBB and III of this part, to act on behalf of the CAIR designated representative in matters pertaining to the CAIR SO_2 Trading Program. If the CAIR SO_2 source is also a CAIR NO_X source, then this natural person shall be the same person as the alternate CAIR designated representative under the CAIR NO_X Annual Trading Program. If the CAIR SO_2 source is also a CAIR NO_X Ozone Season source, then this natural person shall be the same person as the alternate CAIR designated representative under the CAIR NO_X Ozone Season Trading Program. If the CAIR SO_2 source is also subject to the Acid Rain Program, then this natural person shall be the same person as the alternate designated representative under the Acid Rain Program. If the CAIR SO_2 source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the alternate Hg designated representative under the Hg Budget Trading Program.

Automated data acquisition and handling system or *DAHS* means that component of the continuous emission monitoring system, or other emissions monitoring system approved for use under subpart HHH of this part, designed to interpret and convert individual output signals from pollutant concentration monitors, flow monitors, diluent gas monitors, and other component parts of the monitoring system to produce a continuous record of the measured parameters in the measurement units required by subpart HHH of this part.

Boiler means an enclosed fossil- or other-fuel-fired combustion device used to produce heat and to transfer heat to recirculating water, steam, or other medium.

Bottoming-cycle cogeneration unit means a cogeneration unit in which the energy input to the unit is first used to produce useful thermal energy and at least some of the reject heat from the useful thermal energy application or process is then used for electricity production.

CAIR authorized account representative means, with regard to a general account, a responsible natural person who is authorized, in accordance with subparts BBB, FFF, and III of this part, to transfer and otherwise dispose of CAIR SO_2 allowances held in the general account and, with regard to a compliance account, the CAIR designated representative of the source.

CAIR designated representative means, for a CAIR SO_2 source and each CAIR SO_2 unit at the source, the natural person who is authorized by the owners and operators of the source and all such units at the source, in accordance with subparts BBB and III of this part, to represent and legally bind each owner and operator in matters pertaining to the CAIR SO_2 Trading Program. If the CAIR SO_2 source is also a CAIR NO_X source, then this natural person shall be the same person as the CAIR designated representative under the CAIR NO_X Annual Trading Program. If the CAIR SO_2 source is also a CAIR NO_X Ozone Season source, then this natural person shall be the same person as the CAIR designated representative under the CAIR NO_X Ozone Season Trading Program. If the CAIR SO_2 source is also subject to the Acid Rain Program, then this natural person shall be the same person as the designated representative under the Acid Rain Program. If the CAIR SO_2 source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the Hg designated representative under the Hg Budget Trading Program.

CAIR NO_X Annual Trading Program means a multi-state nitrogen oxides air pollution control and emission reduction program established by the Administrator in accordance with subparts AA through II of this part and (§ 51.123(p) and 52.35 of this chapter or approved and administered by the Administrator in accordance with subparts AA through II of part 96 of this chapter and § 51.123(o)(1) or (2) of this chapter, as a means of mitigating interstate transport of fine particulates and nitrogen oxides.

CAIR NO_X Ozone Season source means a source that is subject to the CAIR NO_X Ozone Season Trading Program.

CAIR NO_X Ozone Season Trading Program means a multi-state nitrogen oxides air pollution control and emission reduction program established by the Administrator in accordance with subparts AAAA through IIII of this part and (§ 51.123(ee) and 52.35 of this chapter or approved and administered by the Administrator in accordance with under subparts AAAA through IIII and § 51.123(aa)(1) or (2) (and (bb)(1)), (bb)(2), or (dd) of this chapter, as a means of mitigating interstate transport of ozone and nitrogen oxides.

CAIR NO_X source means a source that is subject to the CAIR NO_X Annual Trading Program.

CAIR permit means the legally binding and federally enforceable written document, or portion of such document, issued by the permitting authority under subpart CCC of this part, including any permit revisions, specifying the CAIR SO_2 Trading Program requirements applicable to a CAIR SO_2 source, to each CAIR SO_2 unit at the source, and to the owners and operators and the CAIR designated representative of the source and each such unit.

CAIR SO_2 allowance means a limited authorization issued by the Administrator under the Acid Rain Program, by a permitting authority under § 97.288, or by a permitting authority under provisions of a State implementation plan that are approved under § 51.124(o)(1) or (2) or (r) of this chapter, to emit sulfur dioxide during the control period of the specified calendar year for which the authorization is allocated or of any calendar year thereafter under the CAIR SO_2 Trading Program as follows:

(1) For one CAIR SO_2 allowance allocated for a control period in a year before 2010, one ton of sulfur dioxide, except as provided in § 97.254(b);

(2) For one CAIR SO_2 allowance allocated for a control period in 2010 through 2014, 0.50 ton of sulfur dioxide, except as provided in § 97.254(b); and

(3) For one CAIR SO_2 allowance allocated for a control period in 2015 or later, 0.35 ton of sulfur dioxide, except as provided in § 97.254(b).

(4) An authorization to emit sulfur dioxide that is not issued under the Acid Rain Program, § 97.288, or provisions of a State implementation plan that are approved under § 51.124(o)(1) or (2) or (r) of this chapter shall not be a CAIR SO_2 allowance.

CAIR SO_2 allowance deduction or *deduct CAIR SO_2 allowances* means the permanent withdrawal of CAIR SO_2 allowances by the Administrator from a compliance account, *e.g.,* in order to account for a specified number of tons of total sulfur dioxide emissions from all CAIR SO_2 units at a CAIR SO_2 source for a control period, determined in accordance with subpart HHH of this part, or to account for excess emissions.

CAIR SO_2 Allowance Tracking System means the system by which the Administrator records allocations, deductions, and transfers of CAIR SO_2 allowances under the CAIR SO_2 Trading Program. This is the same system as the Allowance Tracking System under § 72.2 of this chapter by which the Administrator records allocations, deduction, and transfers of Acid Rain SO_2 allowances under the Acid Rain Program.

CAIR SO_2 Allowance Tracking System account means an account in the CAIR SO_2 Allowance Tracking System established by the Administrator for purposes of recording the allocation, holding, transferring, or deducting of CAIR SO_2 allowances. Such allowances will be allocated, held, deducted, or transferred only as whole allowances.

CAIR SO_2 allowances held or *hold CAIR SO_2 allowances* means the CAIR SO_2 allowances recorded by the Administrator, or submitted to the Administrator for recordation, in accordance with subparts FFF, GGG, and III of this part or part 73 of this chapter, in a CAIR SO_2 Allowance Tracking System account.

CAIR SO_2 emissions limitation means, for a CAIR SO_2 source, the tonnage equivalent, in SO_2 emissions in a control period, of the CAIR SO_2 allowances available for deduction for the source under § 97.254(a) and (b) for the control period.

CAIR SO_2 source means a source that includes one or more CAIR SO_2 units.

CAIR SO_2 Trading Program means a multi-state sulfur dioxide air pollution control and emission reduction program established by the Administrator in accordance with subparts AAA through III of this part and §§ 51.124(r) and 52.36 of this chapter or approved and administered by the Administrator in accordance with subparts AAA through III of part 96 of this chapter and § 51.124(o) (1) or (2) of this chapter, as a means of mitigating interstate transport of fine particulates and sulfur dioxide.

CAIR SO_2 unit means a unit that is subject to the CAIR SO_2 Trading Program under § 97.204 and, except for purposes of § 97.205, a CAIR SO_2 opt-in unit under subpart III of this part.

Certifying official means:

(1) For a corporation, a president, secretary, treasurer, or vice-president or the corporation in charge of a principal business function or any other person who performs similar policy or

decision-making functions for the corporation;

(2) For a partnership or sole proprietorship, a general partner or the proprietor respectively; or

(3) For a local government entity or State, Federal, or other public agency, a principal executive officer or ranking elected official.

Clean Air Act or *CAA* means the Clean Air Act, 42 U.S.C. 7401, *et seq.*

Coal means any solid fuel classified as anthracite, bituminous, subbituminous, or lignite.

Coal-derived fuel means any fuel (whether in a solid, liquid, or gaseous state) produced by the mechanical, thermal, or chemical processing of coal.

Coal-fired means combusting any amount of coal or coal-derived fuel, alone, or in combination with any amount of any other fuel.

Cogeneration unit means a stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine:

(1) Having equipment used to produce electricity and useful thermal energy for industrial, commercial, heating, or cooling purposes through the sequential use of energy; and

(2) Producing during the 12-month period starting on the date the unit first produces electricity and during any calendar year after the calendar year in which the unit first produces electricity—

(i) For a topping-cycle cogeneration unit,

(A) Useful thermal energy not less than 5 percent of total energy output; and

(B) Useful power that, when added to one-half of useful thermal energy produced, is not less then 42.5 percent of total energy input, if useful thermal energy produced is 15 percent or more of total energy output, or not less than 45 percent of total energy input, if useful thermal energy produced is less than 15 percent of total energy output.

(ii) For a bottoming-cycle cogeneration unit, useful power not less than 45 percent of total energy input.

Combustion turbine means:

(1) An enclosed device comprising a compressor, a combustor, and a turbine and in which the flue gas resulting from the combustion of fuel in the combustor passes through the turbine, rotating the turbine; and

(2) If the enclosed device under paragraph (1) of this definition is combined cycle, any associated duct burner, heat recovery steam generator, and steam turbine.

Commence commercial operation means, with regard to a unit:

(1) To have begun to produce steam, gas, or other heated medium used to generate electricity for sale or use, including test generation, except as provided in § 97.205 and § 97.284(h).

(i) For a unit that is a CAIR SO_2 unit under § 97.204 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit that is a CAIR SO_2 unit under § 97.204 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1) or (2) of this definition as appropriate.

(2) Notwithstanding paragraph (1) of this definition and except as provided in § 97.205, for a unit that is not a CAIR SO_2 unit under § 97.204 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition, the unit's date for commencement of commercial operation shall be the date on which the unit becomes a CAIR SO_2 unit under § 97.204.

(i) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1) or (2) of this definition as appropriate.

Commence operation means:

(1) To have begun any mechanical, chemical, or electronic process, including, with regard to a unit, start-up of a unit's combustion chamber, except as provided in § 97.284(h).

(2) For a unit that undergoes a physical change (other than replacement of the unit by a unit at the same source) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the date of commencement of operation of the unit, which shall continue to be treated as the same unit.

(3) For a unit that is replaced by a unit at the same source (*e.g.,* repowered) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the replaced unit's date of commencement of operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of operation as defined in paragraph (1), (2), or (3) of this definition as appropriate, except as provided in § 97.284(h).

Common stack means a single flue through which emissions from 2 or more units are exhausted.

Compliance account means a CAIR SO_2 Allowance Tracking System account, established by the Administrator for a CAIR SO_2 source subject to an Acid Rain emissions limitations under § 73.31(a) or (b) of this chapter or for any other CAIR SO_2 source under subpart FFF or III of this part, in which any CAIR SO_2 allowance allocations for the CAIR SO_2 units at the source are initially recorded and in which are held any CAIR SO_2 allowances available for use for a control period in order to meet the source's CAIR SO_2 emissions limitation in accordance with § 97.254.

Continuous emission monitoring system or *CEMS* means the equipment required under subpart HHH of this part to sample, analyze, measure, and provide, by means of readings recorded at least once every 15 minutes (using an automated data acquisition and handling system (DAHS)), a permanent record of sulfur dioxide emissions, stack gas volumetric flow rate, stack gas moisture content, and oxygen or carbon dioxide concentration (as applicable), in a manner consistent with part 75 of this chapter. The following systems are the principal types of continuous emission monitoring systems required under subpart HHH of this part:

(1) A flow monitoring system, consisting of a stack flow rate monitor and an automated data acquisition and handling system and providing a permanent, continuous record of stack gas volumetric flow rate, in standard cubic feet per hour (scfh);

(2) A sulfur dioxide monitoring system, consisting of a SO_2 pollutant concentration monitor and an automated data acquisition and handling system and providing a permanent, continuous record of SO_2 emissions, in parts per million (ppm);

(3) A moisture monitoring system, as defined in § 75.11(b)(2) of this chapter and providing a permanent, continuous record of the stack gas moisture content, in percent H_2O;

(4) A carbon dioxide monitoring system, consisting of a CO_2 pollutant concentration monitor (or an oxygen monitor plus suitable mathematical equations from which the CO_2 concentration is derived) and an automated data acquisition and handling system and providing a permanent, continuous record of CO_2 emissions, in percent CO_2; and

(5) An oxygen monitoring system, consisting of an O_2 concentration monitor and an automated data acquisition and handling system and providing a permanent, continuous record of O_2 in percent O_2.

Control period means the period beginning January 1 of a calendar year, except as provided in § 97.206(c)(2), and ending on December 31 of the same year, inclusive.

Emissions means air pollutants exhausted from a unit or source into the atmosphere, as measured, recorded, and reported to the Administrator by the CAIR designated representative and as determined by the Administrator in accordance with subpart HHH of this part.

Excess emissions means any ton, or portion of a ton, of sulfur dioxide emitted by the CAIR SO_2 units at a CAIR SO_2 source during a control period that exceeds the CAIR SO_2 emissions limitation for the source, provided that any portion of a ton of excess emissions shall be treated as one ton of excess emissions.

Fossil fuel means natural gas, petroleum, coal, or any form of solid, liquid, or gaseous fuel derived from such material.

Fossil-fuel-fired means, with regard to a unit, combusting any amount of fossil fuel in any calendar year.

General account means a CAIR SO_2 Allowance Tracking System account, established under subpart FFF of this part, that is not a compliance account.

Generator means a device that produces electricity.

Heat input means, with regard to a specified period of time, the product (in mmBtu/time) of the gross calorific value of the fuel (in Btu/lb) divided by 1,000,000 Btu/mmBtu and multiplied by the fuel feed rate into a combustion device (in lb of fuel/time), as measured, recorded, and reported to the Administrator by the CAIR designated representative and determined by the Administrator in accordance with subpart HHH of this part and excluding the heat derived from preheated combustion air, recirculated flue gases, or exhaust from other sources.

Heat input rate means the amount of heat input (in mmBtu) divided by unit operating time (in hr) or, with regard to a specific fuel, the amount of heat input attributed to the fuel (in mmBtu) divided by the unit operating time (in hr) during which the unit combusts the fuel.

Hg Budget Trading Program means a multi-state Hg air pollution control and emission reduction program approved and administered by the Administrator in accordance subpart HHHH of part 60 of this chapter and § 60.24(h)(6), or established by the Administrator under section 111 of the Clean Air Act, as a means of reducing national Hg emissions.

Life-of-the-unit, firm power contractual arrangement means a unit participation power sales agreement under which a utility or industrial customer reserves, or is entitled to receive, a specified amount or percentage of nameplate capacity and associated energy generated by any specified unit and pays its proportional amount of such unit's total costs, pursuant to a contract:

(1) For the life of the unit;

(2) For a cumulative term of no less than 30 years, including contracts that permit an election for early termination; or

(3) For a period no less than 25 years or 70 percent of the economic useful life of the unit determined as of the time the unit is built, with option rights to purchase or release some portion of the nameplate capacity and associated energy generated by the unit at the end of the period.

Maximum design heat input means the maximum amount of fuel per hour (in Btu/hr) that a unit is capable of combusting on a steady state basis as of the initial installation of the unit as specified by the manufacturer of the unit.

Monitoring system means any monitoring system that meets the requirements of subpart HHH of this part, including a continuous emissions monitoring system, an alternative monitoring system, or an excepted monitoring system under part 75 of this chapter.

Most stringent State or Federal SO^2 emissions limitation means, with regard to a unit, the lowest SO_2 emissions limitation (in terms of lb/mmBtu) that is applicable to the unit under State or Federal law, regardless of the averaging period to which the emissions limitation applies.

Nameplate capacity means, starting from the initial installation of a generator, the maximum electrical generating output (in MWe) that the generator is capable of producing on a steady state basis and during continuous operation (when not restricted by seasonal or other deratings) as of such installation as specified by the manufacturer of the generator or, starting from the completion of any subsequent physical change in the generator resulting in an increase in the maximum electrical generating output (in MWe) that the generator is capable of producing on a steady state basis and during continuous operation (when not restricted by seasonal or other deratings), such increased maximum amount as of such completion as specified by the person conducting the physical change.

Operator means any person who operates, controls, or supervises a CAIR SO_2 unit or a CAIR SO_2 source and shall include, but not be limited to, any holding company, utility system, or plant manager of such a unit or source.

Owner means any of the following persons:

(1) With regard to a CAIR SO_2 source or a CAIR SO_2 unit at a source, respectively:

(i) Any holder of any portion of the legal or equitable title in a CAIR SO_2 unit at the source or the CAIR SO_2 unit;

(ii) Any holder of a leasehold interest in a CAIR SO_2 unit at the source or the CAIR SO_2 unit; or

(iii) Any purchaser of power from a CAIR SO_2 unit at the source or the CAIR SO_2 unit under a life-of-the-unit, firm power contractual arrangement; provided that, unless expressly provided for in a leasehold agreement, owner shall not include a passive lessor, or a person who has an equitable interest through such lessor, whose rental payments are not based (either directly or indirectly) on the revenues or income from such CAIR SO_2 unit; or

(2) With regard to any general account, any person who has an ownership interest with respect to the CAIR SO_2 allowances held in the general account and who is subject to the binding agreement for the CAIR authorized account representative to represent the person's ownership interest with respect to CAIR SO_2 allowances.

Permitting authority means the State air pollution control agency, local agency, other State agency, or other agency authorized by the Administrator to issue or revise permits to meet the requirements of the CAIR SO_2 Trading Program in accordance with subpart CCC of this part or, if no such agency has been so authorized, the Administrator.

Potential electrical output capacity means 33 percent of a unit's maximum design heat input, divided by 3,413 Btu/kWh, divided by 1,000 kWh/MWh, and multiplied by 8,760 hr/yr.

Receive or receipt of means, when referring to the permitting authority or the Administrator, to come into possession of a document, information, or correspondence (whether sent in hard copy or by authorized electronic transmission), as indicated in an official log, or by a notation made on the document, information, or correspondence, by the permitting authority or the Administrator in the regular course of business.

Recordation, *record*, or *recorded* means, with regard to CAIR SO_2 allowances, the movement of CAIR SO_2 allowances by the Administrator into or between CAIR SO_2 Allowance Tracking System accounts, for purposes of allocation, transfer, or deduction.

Reference method means any direct test method of sampling and analyzing for an air pollutant as specified in § 75.22 of this chapter.

Replacement, *replace*, or *replaced* means, with regard to a unit, the demolishing of a unit, or the permanent shutdown and permanent disabling of a unit, and the construction of another unit (the replacement unit) to be used instead of the demolished or shutdown unit (the replaced unit).

Repowered means, with regard to a unit, replacement of a coal-fired boiler with one of the following coal-fired technologies at the same source as the coal-fired boiler:

(1) Atmospheric or pressurized fluidized bed combustion;

(2) Integrated gasification combined cycle;

(3) Magnetohydrodynamics;

(4) Direct and indirect coal-fired turbines;

(5) Integrated gasification fuel cells; or

(6) As determined by the Administrator in consultation with the Secretary of Energy, a derivative of one or more of the technologies under paragraphs (1) through (5) of this definition and any other coal-fired technology capable of controlling multiple combustion emissions simultaneously with improved boiler or generation efficiency and with significantly greater waste reduction relative to the performance of technology in widespread commercial use as of January 1, 2005.

Sequential use of energy means:

(1) For a topping-cycle cogeneration unit, the use of reject heat from electricity production in a useful thermal energy application or process; or

(2) For a bottoming-cycle cogeneration unit, the use of reject heat from useful thermal energy application or process in electricity production.

Serial number means, for a CAIR SO_2 allowance, the unique identification number assigned to each CAIR SO_2 allowance by the Administrator.

Solid waste incineration unit means a stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine that is a ''solid waste incineration unit'' as defined in section 129(g)(1) of the Clean Air Act.

Source means all buildings, structures, or installations located in one or more contiguous or adjacent properties under common control of the same person or persons. For purposes of section 502(c) of the Clean Air Act, a ''source,'' including a ''source'' with multiple units, shall be considered a single ''facility.''

State means one of the States or the District of Columbia that is subject to the CAIR SO_2 Trading Program pursuant to § 52.35 of this chapter.

Submit or serve means to send or transmit a document, information, or correspondence to the person specified in accordance with the applicable regulation:

(1) In person;

(2) By United States Postal Service; or

(3) By other means of dispatch or transmission and delivery. Compliance with any ''submission'' or ''service'' deadline shall be determined by the date of dispatch, transmission, or mailing and not the date of receipt.

Title V operating permit means a permit issued under title V of the Clean Air Act and part 70 or part 71 of this chapter.

Title V operating permit regulations means the regulations that the Administrator has approved or issued as meeting the requirements of title V of the Clean Air Act and part 70 or 71 of this chapter.

Ton means 2,000 pounds. For the purpose of determining compliance with the CAIR SO_2 emissions limitation, total tons of sulfur dioxide emissions for a control period shall be calculated as the sum of all recorded hourly emissions (or the mass equivalent of the recorded hourly emission rates) in accordance with subpart HHH of this part, but with any remaining fraction of a ton equal to or greater than 0.50 tons deemed to equal one ton and any remaining fraction of a ton less than 0.50 tons deemed to equal zero tons.

Topping-cycle cogeneration unit means a cogeneration unit in which the energy input to the unit is first used to produce useful power, including electricity, and at least some of the reject heat from the electricity production is then used to provide useful thermal energy.

Total energy input means, with regard to a cogeneration unit, total energy of all forms supplied to the cogeneration unit, excluding energy produced by the cogeneration unit itself.

Total energy output means, with regard to a cogeneration unit, the sum of useful power and useful thermal energy produced by the cogeneration unit.

Unit means a stationary, fossil-fuel-fired boiler or combustion turbine or other stationary, fossil-fuel-fired combustion device. *Unit operating day* means a calendar day in which a unit combusts any fuel.

Unit operating hour or *hour of unit operation* means an hour in which a unit combusts any fuel.

Useful power means, with regard to a cogeneration unit, electricity or mechanical energy made available for use, excluding any such energy used in the power production process (which process includes, but is not limited to, any on-site processing or treatment of fuel combusted at the unit and any on-site emission controls).

Useful thermal energy means, with regard to a cogeneration unit, thermal energy that is:

(1) Made available to an industrial or commercial process (not a power production process), excluding any heat contained in condensate return or makeup water;

(2) Used in a heating application (*e.g.,* space heating or domestic hot water heating); or

(3) Used in a space cooling application (*i.e.,* thermal energy used by an absorption chiller).

Utility power distribution system means the portion of an electricity grid owned or operated by a utility and dedicated to delivering electricity to customers.

§ 97.203 Measurements, abbreviations, and acronyms.

Measurements, abbreviations, and acronyms used in this subpart and subparts BBB through III are defined as follows:

Btu—British thermal unit.
CO_2—carbon dioxide.
H_2O—water.
Hg—mercury.

hr—hour.
kW—kilowatt electrical.
kWh—kilowatt hour.
lb—pound.
mmBtu—million Btu.
MWe—megawatt electrical.
MWh—megawatt hour.
NO_X—nitrogen oxides.
O_2—oxygen.
ppm—parts per million.
scfh—standard cubic feet per hour.
SO_2—sulfur dioxide.
yr—year.

§ 97.204 Applicability.

(a) Except as provided in paragraph (b) of this section:

(1) The following units in a State shall be CAIR SO_2 units, and any source that includes one or more such units shall be a CAIR SO_2 source, subject to the requirements of this subpart and subparts BBB through HHH of this part: any stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale.

(2) If a stationary boiler or stationary combustion turbine that, under paragraph (a)(1) of this section, is not a CAIR SO_2 unit begins to combust fossil fuel or to serve a generator with nameplate capacity of more than 25 MWe producing electricity for sale, the unit shall become a CAIR SO_2 unit as provided in paragraph (a)(1) of this section on the first date on which it both combusts fossil fuel and serves such generator.

(b) The units in a State that meet the requirements set forth in paragraph (b)(1)(i), (b)(2)(i), or (b)(2)(ii) of this section shall not be CAIR SO_2 units:

(1)(i) Any unit that is a CAIR SO_2 unit under paragraph (a)(1) or (2) of this section:

(A) Qualifying as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and continuing to qualify as a cogeneration unit; and

(B) Not serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe supplying in any calendar year more than one-third of the unit's potential electric output capacity or 219,000 MWh, whichever is greater, to any utility power distribution system for sale.

(ii) If a unit qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and meets the requirements of paragraphs (b)(1)(i) of this section for at least one calendar year, but subsequently no longer meets all such requirements, the unit shall become a CAIR SO_2 unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of paragraph (b)(1)(i)(B) of this section.

(2)(i) Any unit that is a CAIR SO_2 unit under paragraph (a)(1) or (2) of this section commencing operation before January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for 1985–1987 exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(ii) Any unit that is a CAIR SO_2 unit under paragraph (a)(1) or (2) of this section commencing operation on or after January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for the first 3 calendar years of operation exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(iii) If a unit qualifies as a solid waste incineration unit and meets the requirements of paragraph (b)(2)(i) or (ii) of this section for at least 3 consecutive calendar years, but subsequently no longer meets all such requirements, the unit shall become a CAIR SO_2 unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a solid waste incineration unit or January 1 after the first 3 consecutive calendar years after 1990 for which the unit has an average annual fuel consumption of fossil fuel of 20 percent or more.

(c) A certifying official of an owner or operator of any unit may petition the Administrator at any time for a determination concerning the applicability, under paragraphs (a) and (b) of this section, of the CAIR SO_2 Trading Program to the unit.

(1) *Petition content.* The petition shall be in writing and include the identification of the unit and the relevant facts about the unit. The petition and any other documents provided to the Administrator in connection with the petition shall include the following certification statement, signed by the certifying official: ''I am authorized to make this submission on behalf of the owners and operators of the unit for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.''

(2) *Submission.* The petition and any other documents provided in connection with the petition shall be submitted to the Director of the Clean Air Markets Division (or its successor), U.S. Environmental Protection Agency, who will act on the petition as the Administrator's duly authorized representative.

(3) *Response.* The Administrator will issue a written response to the petition and may request supplemental information relevant to such petition. The Administrator's determination concerning the applicability, under paragraphs (a) and (b) of this section, of the CAIR SO_2 Trading Program to the unit shall be binding on the permitting authority unless the petition or other information or documents provided in connection with the petition are found to have contained significant, relevant errors or omissions.

§ 97.205 Retired unit exemption.

(a)(1) Any CAIR SO_2 unit that is permanently retired and is not a CAIR SO_2 opt-in unit under subpart III of this part shall be exempt from the CAIR SO_2 Trading Program, except for the provisions of this section, §§ 97.202, 97.203, 97.204, 97.206(c)(4) through (7), 97.207, 97.208, and subparts BBB, FFF, and GGG of this part.

(2) The exemption under paragraph (a)(1) of this section shall become effective the day on which the CAIR SO_2 unit is permanently retired. Within 30 days of the unit's permanent retirement, the CAIR designated representative shall submit a statement to the permitting authority otherwise responsible for administering any CAIR permit for the unit and shall submit a copy of the statement to the Administrator. The statement shall state, in a format prescribed by the permitting authority, that the unit was permanently retired on

a specific date and will comply with the requirements of paragraph (b) of this section.

(3) After receipt of the statement under paragraph (a)(2) of this section, the permitting authority will amend any permit under subpart CCC of this part covering the source at which the unit is located to add the provisions and requirements of the exemption under paragraphs (a)(1) and (b) of this section.

(b) *Special provisions.* (1) A unit exempt under paragraph (a) of this section shall not emit any sulfur dioxide, starting on the date that the exemption takes effect.

(2) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under paragraph (a) of this section shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time before the end of the period, in writing by the permitting authority or the Administrator. The owners and operators bear the burden of proof that the unit is permanently retired.

(3) The owners and operators and, to the extent applicable, the CAIR designated representative of a unit exempt under paragraph (a) of this section shall comply with the requirements of the CAIR SO_2 Trading Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.

(4) A unit exempt under paragraph (a) of this section and located at a source that is required, or but for this exemption would be required, to have a title V operating permit shall not resume operation unless the CAIR designated representative of the source submits a complete CAIR permit application under § 97.222 for the unit not less than 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2010 or the date on which the unit resumes operation.

(5) On the earlier of the following dates, a unit exempt under paragraph (a) of this section shall lose its exemption:

(i) The date on which the CAIR designated representative submits a CAIR permit application for the unit under paragraph (b)(4) of this section;

(ii) The date on which the CAIR designated representative is required under paragraph (b)(4) of this section to submit a CAIR permit application for the unit; or

(iii) The date on which the unit resumes operation, if the CAIR designated representative is not required to submit a CAIR permit application for the unit.

(6) For the purpose of applying monitoring, reporting, and recordkeeping requirements under subpart HHH of this part, a unit that loses its exemption under paragraph (a) of this section shall be treated as a unit that commences commercial operation on the first date on which the unit resumes operation.

§ 97.206 Standard requirements.

(a) *Permit requirements.* (1) The CAIR designated representative of each CAIR SO_2 source required to have a title V operating permit and each CAIR SO_2 unit required to have a title V operating permit at the source shall:

(i) Submit to the permitting authority a complete CAIR permit application under § 97.222 in accordance with the deadlines specified in § 97.221; and

(ii) Submit in a timely manner any supplemental information that the permitting authority determines is necessary in order to review a CAIR permit application and issue or deny a CAIR permit.

(2) The owners and operators of each CAIR SO_2 source required to have a title V operating permit and each CAIR SO_2 unit required to have a title V operating permit at the source shall have a CAIR permit issued by the permitting authority under subpart CCC of this part for the source and operate the source and the unit in compliance with such CAIR permit.

(3) Except as provided in subpart III of this part, the owners and operators of a CAIR SO_2 source that is not otherwise required to have a title V operating permit and each CAIR SO_2 unit that is not otherwise required to have a title V operating permit are not required to submit a CAIR permit application, and to have a CAIR permit, under subpart CCC of this part for such CAIR SO_2 source and such CAIR SO_2 unit.

(b) *Monitoring, reporting, and recordkeeping requirements.* (1) The owners and operators, and the CAIR designated representative, of each CAIR SO_2 source and each CAIR SO_2 unit at the source shall comply with the monitoring, reporting, and recordkeeping requirements of subpart HHH of this part.

(2) The emissions measurements recorded and reported in accordance with subpart HHH of this part shall be used to determine compliance by each CAIR SO_2 source with the CAIR SO_2 emissions limitation under paragraph (c) of this section.

(c) *Sulfur dioxide emission requirements.* (1) As of the allowance transfer deadline for a control period, the owners and operators of each CAIR SO_2 source and each CAIR SO_2 unit at the source shall hold, in the source's compliance account, a tonnage equivalent in CAIR SO_2 allowances available for compliance deductions for the control period, as determined in accordance with § 97.254(a) and (b), not less than the tons of total sulfur dioxide emissions for the control period from all CAIR SO_2 units at the source, as determined in accordance with subpart HHH of this part.

(2) A CAIR SO_2 unit shall be subject to the requirements under paragraph (c)(1) of this section for the control period starting on the later of January 1, 2010 or the deadline for meeting the unit(s monitor certification requirements under § 97.270(b)(1),(2), or (5) and for each control period thereafter.

(3) A CAIR SO_2 allowance shall not be deducted, for compliance with the requirements under paragraph (c)(1) of this section, for a control period in a calendar year before the year for which the CAIR SO_2 allowance was allocated.

(4) CAIR SO_2 allowances shall be held in, deducted from, or transferred into or among CAIR SO_2 Allowance Tracking System accounts in accordance with subparts FFF, GGG, and III of this part.

(5) A CAIR SO_2 allowance is a limited authorization to emit sulfur dioxide in accordance with the CAIR SO_2 Trading Program. No provision of the CAIR SO_2 Trading Program, the CAIR permit application, the CAIR permit, or an exemption under § 97.205 and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization.

(6) A CAIR SO_2 allowance does not constitute a property right.

(7) Upon recordation by the Administrator under subpart FFF, GGG, or III of this part, every allocation, transfer, or deduction of a CAIR SO_2 allowance to or from a CAIR SO_2 source's compliance account is incorporated automatically in any CAIR permit of the source.

(d) *Excess emissions requirements.* If a CAIR SO_2 source emits sulfur dioxide during any control period in excess of the CAIR SO_2 emissions limitation, then:

(1) The owners and operators of the source and each CAIR SO_2 unit at the source shall surrender the CAIR SO_2 allowances required for deduction under § 97.254(d)(1) and pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, under the Clean Air Act or applicable State law; and

(2) Each ton of such excess emissions and each day of such control period

shall constitute a separate violation of this subpart, the Clean Air Act, and applicable State law.

(e) *Recordkeeping and reporting requirements.* (1) Unless otherwise provided, the owners and operators of the CAIR SO_2 source and each CAIR SO_2 unit at the source shall keep on site at the source each of the following documents for a period of 5 years from the date the document is created. This period may be extended for cause, at any time before the end of 5 years, in writing by the permitting authority or the Administrator.

(i) The certificate of representation under § 97.213 for the CAIR designated representative for the source and each CAIR SO_2 unit at the source and all documents that demonstrate the truth of the statements in the certificate of representation; provided that the certificate and documents shall be retained on site at the source beyond such 5-year period until such documents are superseded because of the submission of a new certificate of representation under § 97.213 changing the CAIR designated representative.

(ii) All emissions monitoring information, in accordance with subpart HHH of this part, provided that to the extent that subpart HHH of this part provides for a 3-year period for recordkeeping, the 3-year period shall apply.

(iii) Copies of all reports, compliance certifications, and other submissions and all records made or required under the CAIR SO_2 Trading Program.

(iv) Copies of all documents used to complete a CAIR permit application and any other submission under the CAIR SO_2 Trading Program or to demonstrate compliance with the requirements of the CAIR SO_2 Trading Program.

(2) The CAIR designated representative of a CAIR SO_2 source and each CAIR SO_2 unit at the source shall submit the reports required under the CAIR SO_2 Trading Program, including those under subpart HHH of this part.

(f) *Liability.* (1) Each CAIR SO_2 source and each CAIR SO_2 unit shall meet the requirements of the CAIR SO_2 Trading Program.

(2) Any provision of the CAIR SO_2 Trading Program that applies to a CAIR SO_2 source or the CAIR designated representative of a CAIR SO_2 source shall also apply to the owners and operators of such source and of the CAIR SO_2 units at the source.

(3) Any provision of the CAIR SO_2 Trading Program that applies to a CAIR SO_2 unit or the CAIR designated representative of a CAIR SO_2 unit shall also apply to the owners and operators of such unit.

(g) *Effect on other authorities.* No provision of the CAIR SO_2 Trading Program, a CAIR permit application, a CAIR permit, or an exemption under § 97.205 shall be construed as exempting or excluding the owners and operators, and the CAIR designated representative, of a CAIR SO_2 source or CAIR SO_2 unit from compliance with any other provision of the applicable, approved State implementation plan, a federally enforceable permit, or the Clean Air Act.

§ 97.207 Computation of time.

(a) Unless otherwise stated, any time period scheduled, under the CAIR SO_2 Trading Program, to begin on the occurrence of an act or event shall begin on the day the act or event occurs.

(b) Unless otherwise stated, any time period scheduled, under the CAIR SO_2 Trading Program, to begin before the occurrence of an act or event shall be computed so that the period ends the day before the act or event occurs.

(c) Unless otherwise stated, if the final day of any time period, under the CAIR SO_2 Trading Program, falls on a weekend or a State or Federal holiday, the time period shall be extended to the next business day.

§ 97.208 Appeal procedures.

The appeal procedures for decisions of the Administrator under the CAIR SO_2 Trading Program are set forth in part 78 of this chapter.

Subpart BBB—CAIR Designated Representative for CAIR SO_2 Sources

§ 97.210 Authorization and responsibilities of CAIR designated representative.

(a) Except as provided under § 97.211, each CAIR SO_2 source, including all CAIR SO_2 units at the source, shall have one and only one CAIR designated representative, with regard to all matters under the CAIR SO_2 Trading Program concerning the source or any CAIR SO_2 unit at the source.

(b) The CAIR designated representative of the CAIR SO_2 source shall be selected by an agreement binding on the owners and operators of the source and all CAIR SO_2 units at the source and shall act in accordance with the certification statement in § 97.213(a)(4)(iv).

(c) Upon receipt by the Administrator of a complete certificate of representation under § 97.213, the CAIR designated representative of the source shall represent and, by his or her representations, actions, inactions, or submissions, legally bind each owner and operator of the CAIR SO_2 source represented and each CAIR SO_2 unit at the source in all matters pertaining to the CAIR SO_2 Trading Program, notwithstanding any agreement between the CAIR designated representative and such owners and operators. The owners and operators shall be bound by any decision or order issued to the CAIR designated representative by the permitting authority, the Administrator, or a court regarding the source or unit.

(d) No CAIR permit will be issued, no emissions data reports will be accepted, and no CAIR SO_2 Allowance Tracking System account will be established for a CAIR SO_2 unit at a source, until the Administrator has received a complete certificate of representation under § 97.213 for a CAIR designated representative of the source and the CAIR SO_2 units at the source.

(e)(1) Each submission under the CAIR SO_2 Trading Program shall be submitted, signed, and certified by the CAIR designated representative for each CAIR SO_2 source on behalf of which the submission is made. Each such submission shall include the following certification statement by the CAIR designated representative: ''I am authorized to make this submission on behalf of the owners and operators of the source or units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.''

(2) The permitting authority and the Administrator will accept or act on a submission made on behalf of owner or operators of a CAIR SO_2 source or a CAIR SO_2 unit only if the submission has been made, signed, and certified in accordance with paragraph (e)(1) of this section.

§ 97.211 Alternate CAIR designated representative.

(a) A certificate of representation under § 97.213 may designate one and only one alternate CAIR designated representative, who may act on behalf of the CAIR designated representative. The agreement by which the alternate CAIR designated representative is selected shall include a procedure for authorizing the alternate CAIR designated representative to act in lieu of the CAIR designated representative.

(b) Upon receipt by the Administrator of a complete certificate of representation under § 97.213, any representation, action, inaction, or submission by the alternate CAIR designated representative shall be deemed to be a representation, action, inaction, or submission by the CAIR designated representative.

(c) Except in this section and §§ 97.202, 97.210(a) and (d), 97.212, 97.213, 97.215, 97.251 and 97.282, whenever the term ''CAIR designated representative'' is used in subparts AAA through III of this part, the term shall be construed to include the CAIR designated representative or any alternate CAIR designated representative.

§ 97.212 Changing CAIR designated representative and alternate CAIR designated representative; changes in owners and operators.

(a) *Changing CAIR designated representative.* The CAIR designated representative may be changed at any time upon receipt by the Administrator of a superseding complete certificate of representation under § 97.213. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous CAIR designated representative before the time and date when the Administrator receives the superseding certificate of representation shall be binding on the new CAIR designated representative and the owners and operators of the CAIR SO_2 source and the CAIR SO_2 units at the source.

(b) *Changing alternate CAIR designated representative.* The alternate CAIR designated representative may be changed at any time upon receipt by the Administrator of a superseding complete certificate of representation under § 97.213. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous alternate CAIR designated representative before the time and date when the Administrator receives the superseding certificate of representation shall be binding on the new alternate CAIR designated representative and the owners and operators of the CAIR SO_2 source and the CAIR SO_2 units at the source.

(c) *Changes in owners and operators.* (1) In the event an owner or operator of a CAIR SO_2 source or a CAIR SO_2 unit is not included in the list of owners and operators in the certificate of representation under § 97.213, such owner or operator shall be deemed to be subject to and bound by the certificate of representation, the representations, actions, inactions, and submissions of the CAIR designated representative and any alternate CAIR designated representative of the source or unit, and the decisions and orders of the permitting authority, the Administrator, or a court, as if the owner or operator were included in such list.

(2) Within 30 days following any change in the owners and operators of a CAIR SO_2 source or a CAIR SO_2 unit, including the addition of a new owner or operator, the CAIR designated representative or any alternate CAIR designated representative shall submit a revision to the certificate of representation under § 97.213 amending the list of owners and operators to include the change.

§ 97.213 Certificate of representation.

(a) A complete certificate of representation for a CAIR designated representative or an alternate CAIR designated representative shall include the following elements in a format prescribed by the Administrator:

(1) Identification of the CAIR SO_2 source, and each CAIR SO_2 unit at the source, for which the certificate of representation is submitted, including identification and nameplate capacity of each generator served by each such unit.

(2) The name, address, e-mail address (if any), telephone number, and facsimile transmission number (if any) of the CAIR designated representative and any alternate CAIR designated representative.

(3) A list of the owners and operators of the CAIR SO_2 source and of each CAIR SO_2 unit at the source.

(4) The following certification statements by the CAIR designated representative and any alternate CAIR designated representative—

(i) ''I certify that I was selected as the CAIR designated representative or alternate CAIR designated representative, as applicable, by an agreement binding on the owners and operators of the source and each CAIR SO_2 unit at the source.''

(ii) ''I certify that I have all the necessary authority to carry out my duties and responsibilities under the CAIR SO_2 Trading Program on behalf of the owners and operators of the source and of each CAIR SO_2 unit at the source and that each such owner and operator shall be fully bound by my representations, actions, inactions, or submissions.''

(iii) ''I certify that the owners and operators of the source and of each CAIR SO_2 unit at the source shall be bound by any order issued to me by the Administrator, the permitting authority, or a court regarding the source or unit.''

(iv) ''Where there are multiple holders of a legal or equitable title to, or a leasehold interest in, a CAIR SO_2 unit, or where a utility or industrial customer purchases power from a CAIR SO_2 unit under a life-of-the-unit, firm power contractual arrangement, I certify that: I have given a written notice of my selection as the 'CAIR designated representative' or 'alternate CAIR designated representative', as applicable, and of the agreement by which I was selected to each owner and operator of the source and of each CAIR SO_2 unit at the source; and CAIR SO_2 allowances and proceeds of transactions involving CAIR SO_2 allowances will be deemed to be held or distributed in proportion to each holder's legal, equitable, leasehold, or contractual reservation or entitlement, except that, if such multiple holders have expressly provided for a different distribution of CAIR SO_2 allowances by contract, CAIR SO_2 allowances and proceeds of transactions involving CAIR SO_2 allowances will be deemed to be held or distributed in accordance with the contract.''

(5) The signature of the CAIR designated representative and any alternate CAIR designated representative and the dates signed.

(b) Unless otherwise required by the permitting authority or the Administrator, documents of agreement referred to in the certificate of representation shall not be submitted to the permitting authority or the Administrator. Neither the permitting authority nor the Administrator shall be under any obligation to review or evaluate the sufficiency of such documents, if submitted.

§ 97.214 Objections concerning CAIR designated representative.

(a) Once a complete certificate of representation under § 97.213 has been submitted and received, the permitting authority and the Administrator will rely on the certificate of representation unless and until a superseding complete certificate of representation under § 97.213 is received by the Administrator.

(b) Except as provided in § 97.212(a) or (b), no objection or other communication submitted to the permitting authority or the Administrator concerning the authorization, or any representation, action, inaction, or submission, of the CAIR designated representative shall affect any representation, action, inaction, or submission of the CAIR designated representative or the finality of any decision or order by the permitting authority or the Administrator under the CAIR SO_2 Trading Program.

(c) Neither the permitting authority nor the Administrator will adjudicate any private legal dispute concerning the authorization or any representation, action, inaction, or submission of any CAIR designated representative, including private legal disputes concerning the proceeds of CAIR SO_2 allowance transfers.

§ 97.215 Delegation by CAIR designated representative and alternate CAIR designated representative.

(a) A CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(b) An alternate CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(c) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (a) or (b) of this section, the CAIR designated representative or alternate CAIR designated representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(1) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR designated representative or alternate CAIR designated representative;

(2) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(3) For each such natural person, a list of the type or types of electronic submissions under paragraph (a) or (b) of this section for which authority is delegated to him or her; and

(4) The following certification statements by such CAIR designated representative or alternate CAIR designated representative:

(i) ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR designated representative or alternate CAIR designated representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 97.215(d) shall be deemed to be an electronic submission by me.''

(ii) ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 97.215(d), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 97.215 is terminated.''.

(d) A notice of delegation submitted under paragraph (c) of this section shall be effective, with regard to the CAIR designated representative or alternate CAIR designated representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR designated representative or alternate CAIR designated representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(e) Any electronic submission covered by the certification in paragraph (c)(4)(i) of this section and made in accordance with a notice of delegation effective under paragraph (d) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

Subpart CCC—Permits

§ 97.220 General CAIR SO_2 Trading Program permit requirements.

(a) For each CAIR SO_2 source required to have a title V operating permit or required, under subpart III of this part, to have a title V operating permit or other federally enforceable permit, such permit shall include a CAIR permit administered by the permitting authority for the title V operating permit or the federally enforceable permit as applicable. The CAIR portion of the title V permit or other federally enforceable permit as applicable shall be administered in accordance with the permitting authority's title V operating permits regulations promulgated under part 70 or 71 of this chapter or the permitting authority's regulations for other federally enforceable permits as applicable, except as provided otherwise by § 97.205, this subpart, and subpart III of this part.

(b) Each CAIR permit shall contain, with regard to the CAIR SO_2 source and the CAIR SO_2 units at the source covered by the CAIR permit, all applicable CAIR SO_2 Trading Program, CAIR NO_X Annual Trading Program, and CAIR NO_X Ozone Season Trading Program requirements and shall be a complete and separable portion of the title V operating permit or other federally enforceable permit under paragraph (a) of this section.

§ 97.221 Submission of CAIR permit applications.

(a) *Duty to apply.* The CAIR designated representative of any CAIR SO_2 source required to have a title V operating permit shall submit to the permitting authority a complete CAIR permit application under § 97.222 for the source covering each CAIR SO_2 unit at the source at least 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2010 or the date on which the CAIR SO_2 unit commences commercial operation, except as provided in § 97.283(a).

(b) *Duty to reapply.* For a CAIR SO_2 source required to have a title V operating permit, the CAIR designated representative shall submit a complete CAIR permit application under § 97.222 for the source covering each CAIR SO_2 unit at the source to renew the CAIR permit in accordance with the permitting authority's title V operating permits regulations addressing permit renewal, except as provided in § 97.283(b).

§ 97.222 Information requirements for CAIR permit applications.

A complete CAIR permit application shall include the following elements concerning the CAIR SO_2 source for which the application is submitted, in a format prescribed by the permitting authority:

(a) Identification of the CAIR SO_2 source;

(b) Identification of each CAIR SO_2 unit at the CAIR SO_2 source; and

(c) The standard requirements under § 97.206.

§ 97.223 CAIR permit contents and term.

(a) Each CAIR permit will contain, in a format prescribed by the permitting authority, all lements required for a complete CAIR permit application under § 97.222.

(b) Each CAIR permit is deemed to incorporate automatically the definitions of terms under § 97.202 and, upon recordation by the Administrator under subpart FFF, GGG, or III of this part, every allocation, transfer, or deduction of a CAIR SO_2 allowance to or from the compliance account of the CAIR SO_2 source covered by the permit.

(c) The term of the CAIR permit will be set by the permitting authority, as necessary to facilitate coordination of the renewal of the CAIR permit with issuance, revision, or renewal of the CAIR SO_2 source's title V operating permit or other federally enforceable permit as applicable.

§ 97.224 CAIR permit revisions.

Except as provided in § 97.223(b), the permitting authority will revise the CAIR permit, as necessary, in accordance with the permitting authority's title V operating permits regulations or the permitting authority's regulations for other federally enforceable permits as applicable addressing permit revisions.

Subpart DDD—[Reserved]

Subpart EEE—[Reserved]

Subpart FFF—CAIR SO_2 Allowance Tracking System

§ 97.250 [Reserved]

§ 97.251 Establishment of accounts.

(a) *Compliance accounts.* Except as provided in § 97.284(e), upon receipt of a complete certificate of representation under § 97.213, the Administrator will establish a compliance account for the CAIR SO_2 source for which the certificate of representation was submitted, unless the source already has a compliance account.

(b) *General accounts*—(1) *Application for general account.* (i) Any person may apply to open a general account for the purpose of holding and transferring CAIR SO_2 allowances. An application for a general account may designate one and only one CAIR authorized account representative and one and only one alternate CAIR authorized account representative who may act on behalf of the CAIR authorized account representative. The agreement by which the alternate CAIR authorized account representative is selected shall include a procedure for authorizing the alternate CAIR authorized account representative to act in lieu of the CAIR authorized account representative.

(ii) A complete application for a general account shall be submitted to the Administrator and shall include the following elements in a format prescribed by the Administrator:

(A) Name, mailing address, e-mail address (if any), telephone number, and facsimile transmission number (if any) of the CAIR authorized account representative and any alternate CAIR authorized account representative;

(B) Organization name and type of organization, if applicable;

(C) A list of all persons subject to a binding agreement for the CAIR authorized account representative and any alternate CAIR authorized account representative to represent their ownership interest with respect to the CAIR SO_2 allowances held in the general account;

(D) The following certification statement by the CAIR authorized account representative and any alternate CAIR authorized account representative: ''I certify that I was selected as the CAIR authorized account representative or the alternate CAIR authorized account representative, as applicable, by an agreement that is binding on all persons who have an ownership interest with respect to CAIR SO_2 allowances held in the general account. I certify that I have all the necessary authority to carry out my duties and responsibilities under the CAIR SO_2 Trading Program on behalf of such persons and that each such person shall be fully bound by my representations, actions, inactions, or submissions and by any order or decision issued to me by the Administrator or a court regarding the general account.''

(E) The signature of the CAIR authorized account representative and any alternate CAIR authorized account representative and the dates signed.

(iii) Unless otherwise required by the permitting authority or the Administrator, documents of agreement referred to in the application for a general account shall not be submitted to the permitting authority or the Administrator. Neither the permitting authority nor the Administrator shall be under any obligation to review or evaluate the sufficiency of such documents, if submitted.

(2) *Authorization of CAIR authorized account representative and alternate CAIR authorized account representative.* (i) Upon receipt by the Administrator of a complete application for a general account under paragraph (b)(1) of this section:

(A) The Administrator will establish a general account for the person or persons for whom the application is submitted.

(B) The CAIR authorized account representative and any alternate CAIR authorized account representative for the general account shall represent and, by his or her representations, actions, inactions, or submissions, legally bind each person who has an ownership interest with respect to CAIR SO_2 allowances held in the general account in all matters pertaining to the CAIR SO_2 Trading Program, notwithstanding any agreement between the CAIR authorized account representative or any alternate CAIR authorized account representative and such person. Any such person shall be bound by any order or decision issued to the CAIR authorized account representative or any alternate CAIR authorized account representative by the Administrator or a court regarding the general account.

(C) Any representation, action, inaction, or submission by any alternate CAIR authorized account representative shall be deemed to be a representation, action, inaction, or submission by the CAIR authorized account representative.

(ii) Each submission concerning the general account shall be submitted, signed, and certified by the CAIR authorized account representative or any alternate CAIR authorized account representative for the persons having an ownership interest with respect to CAIR SO_2 allowances held in the general account. Each such submission shall include the following certification statement by the CAIR authorized account representative or any alternate CAIR authorized account representative: ''I am authorized to make this submission on behalf of the persons having an ownership interest with respect to the CAIR SO_2 *allowances held in the general account.* I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.''

(iii) The Administrator will accept or act on a submission concerning the general account only if the submission has been made, signed, and certified in accordance with paragraph (b)(2)(ii) of this section.

(3) *Changing CAIR authorized account representative and alternate CAIR authorized account representative; changes in persons with ownership interest.* (i) The CAIR authorized account representative for a general account may be changed at any time upon receipt by the Administrator of a superseding complete application for a general account under paragraph (b)(1) of this section. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous CAIR authorized account representative before the time and date when the Administrator receives the superseding application for a general

account shall be binding on the new CAIR authorized account representative and the persons with an ownership interest with respect to the CAIR SO_2 allowances in the general account.

(ii) The alternate CAIR authorized account representative for a general account may be changed at any time upon receipt by the Administrator of a superseding complete application for a general account under paragraph (b)(1) of this section. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous alternate CAIR authorized account representative before the time and date when the Administrator receives the superseding application for a general account shall be binding on the new alternate CAIR authorized account representative and the persons with an ownership interest with respect to the CAIR SO_2 allowances in the general account.

(iii)(A) In the event a person having an ownership interest with respect to CAIR SO_2 allowances in the general account is not included in the list of such persons in the application for a general account, such person shall be deemed to be subject to and bound by the application for a general account, the representation, actions, inactions, and submissions of the CAIR authorized account representative and any alternate CAIR authorized account representative of the account, and the decisions and orders of the Administrator or a court, as if the person were included in such list.

(B) Within 30 days following any change in the persons having an ownership interest with respect to CAIR SO_2 allowances in the general account, including the addition of a new person, the CAIR authorized account representative or any alternate CAIR authorized account representative shall submit a revision to the application for a general account amending the list of persons having an ownership interest with respect to the CAIR SO_2 allowances in the general account to include the change.

(4) *Objections concerning CAIR authorized account representative and alternate CAIR authorized account representative.* (i) Once a complete application for a general account under paragraph (b)(1) of this section has been submitted and received, the Administrator will rely on the application unless and until a superseding complete application for a general account under paragraph (b)(1) of this section is received by the Administrator.

(ii) Except as provided in paragraph (b)(3)(i) or (ii) of this section, no objection or other communication submitted to the Administrator concerning the authorization, or any representation, action, inaction, or submission of the CAIR authorized account representative or any alternate CAIR authorized account representative for a general account shall affect any representation, action, inaction, or submission of the CAIR authorized account representative or any alternate CAIR authorized account representative or the finality of any decision or order by the Administrator under the CAIR SO_2 Trading Program.

(iii) The Administrator will not adjudicate any private legal dispute concerning the authorization or any representation, action, inaction, or submission of the CAIR authorized account representative or any alternate CAIR authorized account representative for a general account, including private legal disputes concerning the proceeds of CAIR SO_2 allowance transfers.

(5) *Delegation by CAIR authorized account representative and alternate CAIR authorized account representative.* (i) A CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FFF and GGG of this part.

(ii) An alternate CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FFF and GGG of this part.

(iii) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (b)(5)(i) or (ii) of this section, the CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(A) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR authorized account representative or alternate CAIR authorized account representative;

(B) The name, address, e-mail address, telephone number, and, facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(C) For each such natural person, a list of the type or types of electronic submissions under paragraph (b)(5)(i) or (ii) of this section for which authority is delegated to him or her;

(D) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR authorized account representative or alternate CAIR authorized representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 97.251(b)(5)(iv) shall be deemed to be an electronic submission by me.''; and

(E) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 97.251 (b)(5)(iv), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address, unless all delegation of authority by me under 40 CFR 97.251 (b)(5) is terminated.''.

(iv) A notice of delegation submitted under paragraph (b)(5)(iii) of this section shall be effective, with regard to the CAIR authorized account representative or alternate CAIR authorized account representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(v) Any electronic submission covered by the certification in paragraph (b)(5)(iii)(D) of this section and made in accordance with a notice of delegation effective under paragraph (b)(5)(iv) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

(c) *Account identification.* The Administrator will assign a unique identifying number to each account established under paragraph (a) or (b) of this section.

§ 97.252 Responsibilities of CAIR authorized account representative.

Following the establishment of a CAIR SO_2 Allowance Tracking System account, all submissions to the Administrator pertaining to the account, including, but not limited to, submissions concerning the deduction or transfer of CAIR SO_2 allowances in the account, shall be made only by the CAIR authorized account representative for the account.

§ 97.253 Recordation of CAIR SO_2 allowances.

(a)(1) After a compliance account is established under § 97.251(a) or § 73.31(a) or (b) of this chapter, the Administrator will record in the compliance account any CAIR SO_2 allowance allocated to any CAIR SO_2 unit at the source for each of the 30 years starting the later of 2010 or the year in which the compliance account is established and any CAIR SO_2 allowance allocated for each of the 30 years starting the later of 2010 or the year in which the compliance account is established and transferred to the source in accordance with subpart GGG of this part or subpart D of part 73 of this chapter.

(2) In 2011 and each year thereafter, after Administrator has completed all deductions under § 97.254(b), the Administrator will record in the compliance account any CAIR SO_2 allowance allocated to any CAIR SO_2 unit at the source for the new 30th year (*i.e.,* the year that is 30 years after the calendar year for which such deductions are or could be made) and any CAIR SO_2 allowance allocated for the new 30th year and transferred to the source in accordance with subpart GGG of this part or subpart D of part 73 of this chapter.

(b)(1) After a general account is established under § 97.251(b) or § 73.31(c) of this chapter, the Administrator will record in the general account any CAIR SO_2 allowance allocated for each of the 30 years starting the later of 2010 or the year in which the general account is established and transferred to the general account in accordance with subpart GGG of this part or subpart D of part 73 of this chapter.

(2) In 2011 and each year thereafter, after Administrator has completed all deductions under § 97.254(b), the Administrator will record in the general account any CAIR SO_2 allowance allocated for the new 30th year (*i.e.,* the year that is 30 years after the calendar year for which such deductions are or could be made) and transferred to the general account in accordance with subpart GGG of this part or subpart D of part 73 of this chapter.

(c) *Serial numbers for allocated CAIR SO_2 allowances.* When recording the allocation of CAIR SO_2 allowances issued by a permitting authority under § 97.288, the Administrator will assign each such CAIR SO_2 allowance a unique identification number that will include digits identifying the year of the control period for which the CAIR SO_2 allowance is allocated.

§ 97.254 Compliance with CAIR SO_2 emissions limitation.

(a) *Allowance transfer deadline.* The CAIR SO_2 allowances are available to be deducted for compliance with a source's CAIR SO_2 emissions limitation for a control period in a given calendar year only if the CAIR SO_2 allowances:

(1) Were allocated for the control period in the year or a prior year; and

(2) Are held in the compliance account as of the allowance transfer deadline for the control period or are transferred into the compliance account by a CAIR SO_2 allowance transfer correctly submitted for recordation under §§ 97.260 and 97.261 by the allowance transfer deadline for the control period.

(b) *Deductions for compliance.* Following the recordation, in accordance with § 97.261, of CAIR SO_2 allowance transfers submitted for recordation in a source's compliance account by the allowance transfer deadline for a control period, the Administrator will deduct from the compliance account CAIR SO_2 allowances available under paragraph (a) of this section in order to determine whether the source meets the CAIR SO_2 emissions limitation for the control period as follows:

(1) For a CAIR SO_2 source subject to an Acid Rain emissions limitation, the Administrator will, in the following order:

(i) Deduct the amount of CAIR SO_2 allowances, available under paragraph (a) of this section and not issued by a permitting authority under § 97.288, that is required under §§ 73.35(b) and (c) of this part. If there are sufficient CAIR SO_2 allowances to complete this deduction, the deduction will be treated as satisfying the requirements of §§ 73.35(b) and (c) of this chapter.

(ii) Deduct the amount of CAIR SO_2 allowances, not issued by a permitting authority under § 97.288, that is required under §§ 73.35(d) and 77.5 of this part. If there are sufficient CAIR SO_2 allowances to complete this deduction, the deduction will be treated as satisfying the requirements of §§ 73.35(d) and 77.5 of this chapter.

(iii) Treating the CAIR SO_2 allowances deducted under paragraph (b)(1)(i) of this section as also being deducted under this paragraph (b)(1)(iii), deduct CAIR SO_2 allowances available under paragraph (a) of this section (including any issued by a permitting authority under § 97.288) in order to determine whether the source meets the CAIR SO_2 emissions limitation for the control period, as follows:

(A) Until the tonnage equivalent of the CAIR SO_2 allowances deducted equals, or exceeds in accordance with paragraphs (c)(1) and (2) of this section, the number of tons of total sulfur dioxide emissions, determined in accordance with subpart HHH of this part, from all CAIR SO_2 units at the source for the control period; or

(B) If there are insufficient CAIR SO_2 allowances to complete the deductions in paragraph (b)(1)(iii)(A) of this section, until no more CAIR SO_2 allowances available under paragraph (a) of this section (including any issued by a permitting authority under § 97.288) remain in the compliance account.

(2) For a CAIR SO_2 source not subject to an Acid Rain emissions limitation, the Administrator will deduct CAIR SO_2 allowances available under paragraph (a) of this section (including any issued by a permitting authority under § 97.288) in order to determine whether the source meets the CAIR SO_2 emissions limitation for the control period, as follows:

(i) Until the tonnage equivalent of the CAIR SO_2 allowances deducted equals, or exceeds in accordance with paragraphs (c)(1) and (2) of this section, the number of tons of total sulfur dioxide emissions, determined in accordance with subpart HHH of this part, from all CAIR SO_2 units at the source for the control period; or

(ii) If there are insufficient CAIR SO_2 allowances to complete the deductions in paragraph (b)(2)(i) of this section, until no more CAIR SO_2 allowances available under paragraph (a) of this section (including any issued by a permitting authority under § 97.288) remain in the compliance account.

(c)(1) *Identification of CAIR SO_2 allowances by serial number.* The CAIR authorized account representative for a source's compliance account may request that specific CAIR SO_2 allowances, identified by serial number, in the compliance account be deducted for emissions or excess emissions for a control period in accordance with paragraph (b) or (d) of this section. Such request shall be submitted to the Administrator by the allowance transfer deadline for the control period and include, in a format prescribed by the

Administrator, the identification of the CAIR SO_2 source and the appropriate serial numbers.

(2) *First-in, first-out.* The Administrator will deduct CAIR SO_2 allowances under paragraph (b) or (d) of this section from the source's compliance account, in the absence of an identification or in the case of a partial identification of CAIR SO_2 allowances by serial number under paragraph (c)(1) of this section, on a first-in, first-out (FIFO) accounting basis in the following order:

(i) Any CAIR SO_2 allowances that were allocated to the units at the source for a control period before 2010, in the order of recordation;

(ii) Any CAIR SO_2 allowances that were allocated to any entity for a control period before 2010 and transferred and recorded in the compliance account pursuant to subpart GGG of this part or subpart D of part 73 of this chapter, in the order of recordation;

(iii) Any CAIR SO_2 allowances that were allocated to the units at the source for a control period during 2010 through 2014, in the order of recordation;

(iv) Any CAIR SO_2 allowances that were allocated to any entity for a control period during 2010 through 2014 and transferred and recorded in the compliance account pursuant to subpart GGG of this part or subpart D of part 73 of this chapter, in the order of recordation;

(v) Any CAIR SO_2 allowances that were allocated to the units at the source for a control period in 2015 or later, in the order of recordation; and

(vi) Any CAIR SO_2 allowances that were allocated to any entity for a control period in 2015 or later and transferred and recorded in the compliance account pursuant to subpart GGG of this part or subpart D of part 73 of this chapter, in the order of recordation.

(d) *Deductions for excess emissions.* (1) After making the deductions for compliance under paragraph (b) of this section for a control period in a calendar year in which the CAIR SO_2 source has excess emissions, the Administrator will deduct from the source's compliance account the tonnage equivalent in CAIR SO_2 allowances, allocated for the control period in the immediately following calendar year (including any issued by a permitting authority under § 97.288), equal to, or exceeding in accordance with paragraphs (c)(1) and (2) of this section 3 times the following amount: the number of tons of the source's excess emissions minus, if the source is subject to an Acid Rain emissions limitation, the amount of the CAIR SO_2 allowances required to be deducted under paragraph (b)(1)(ii) of this section.

(2) Any allowance deduction required under paragraph (d)(1) of this section shall not affect the liability of the owners and operators of the CAIR SO_2 source or the CAIR SO_2 units at the source for any fine, penalty, or assessment, or their obligation to comply with any other remedy, for the same violations, as ordered under the Clean Air Act or applicable State law.

(e) *Recordation of deductions.* The Administrator will record in the appropriate compliance account all deductions from such an account under paragraphs (b) and (d) of this section and subpart III.

(f) *Administrator's action on submissions.* (1) The Administrator may review and conduct independent audits concerning any submission under the CAIR SO_2 Trading Program and make appropriate adjustments of the information in the submissions.

(2) The Administrator may deduct CAIR SO_2 allowances from or transfer CAIR SO_2 allowances to a source's compliance account based on the information in the submissions, as adjusted under paragraph (f)(1) of this section, and record such deductions and transfers.

§ 97.255 Banking.

(a) CAIR SO_2 allowances may be banked for future use or transfer in a compliance account or a general account in accordance with paragraph (b) of this section.

(b) Any CAIR SO_2 allowance that is held in a compliance account or a general account will remain in such account unless and until the CAIR SO_2 allowance is deducted or transferred under § 97.254, § 97.256, or subpart GGG or III of this part.

§ 97.256 Account error.

The Administrator may, at his or her sole discretion and on his or her own motion, correct any error in any CAIR SO_2 Allowance Tracking System account. Within 10 business days of making such correction, the Administrator will notify the CAIR authorized account representative for the account.

§ 97.257 Closing of general accounts.

(a) The CAIR authorized account representative of a general account may submit to the Administrator a request to close the account, which shall include a correctly submitted allowance transfer under §§ 97.260 and 97.261 for any CAIR SO_2 allowances in the account to one or more other CAIR SO_2 Allowance Tracking System accounts.

(b) If a general account has no allowance transfers in or out of the account for a 12-month period or longer and does not contain any CAIR SO_2 allowances, the Administrator may notify the CAIR authorized account representative for the account that the account will be closed following 20 business days after the notice is sent. The account will be closed after the 20-day period unless, before the end of the 20-day period, the Administrator receives a correctly submitted transfer of CAIR SO_2 allowances into the account under §§ 97.260 and 97.261 or a statement submitted by the CAIR authorized account representative demonstrating to the satisfaction of the Administrator good cause as to why the account should not be closed.

Subpart GGG—CAIR SO_2 Allowance Transfers

§ 97.260 Submission of CAIR SO_2 allowance transfers.

(a) A CAIR authorized account representative seeking recordation of a CAIR SO_2 allowance transfer shall submit the transfer to the Administrator. To be considered correctly submitted, the CAIR SO_2 allowance transfer shall include the following elements, in a format specified by the Administrator:

(1) The account numbers of both the transferor and transferee accounts;

(2) The serial number of each CAIR SO_2 allowance that is in the transferor account and is to be transferred; and

(3) The name and signature of the CAIR authorized account representatives of the transferor and transferee accounts and the dates signed.

(b)(1) The CAIR authorized account representative for the transferee account can meet the requirements in paragraph (a)(3) of this section by submitting, in a format prescribed by the Administrator, a statement signed by the CAIR authorized account representative and identifying each account into which any transfer of allowances, submitted on or after the date on which the Administrator receives such statement, is authorized. Such authorization shall be binding on any CAIR authorized account representative for such account and shall apply to all transfers into the account that are submitted on or after such date of receipt, unless and until the Administrator receives a statement signed by the CAIR authorized account representative retracting the authorization for the account.

(2) The statement under paragraph (b)(1) of this section shall include the following: ''By this signature I authorize any transfer of allowances into each

account listed herein, except that I do not waive any remedies under State or Federal law to obtain correction of any erroneous transfers into such accounts. This authorization shall be binding on any CAIR authorized account representative for such account unless and until a statement signed by the CAIR authorized account representative retracting this authorization for the account is received by the Administrator.''

§ 97.261 EPA recordation.

(a) Within 5 business days (except as necessary to perform a transfer in perpetuity of CAIR SO_2 allowances allocated to a CAIR SO_2 unit or as provided in paragraph (b) of this section) of receiving a CAIR SO_2 allowance transfer, the Administrator will record a CAIR SO_2 allowance transfer by moving each CAIR SO_2 allowance from the transferor account to the transferee account as specified by the request, provided that:

(1) The transfer is correctly submitted under § 97.260;

(2) The transferor account includes each CAIR SO_2 allowance identified by serial number in the transfer; and

(3) The transfer is in accordance with the limitation on transfer under § 74.42 of this chapter and § 74.47(c) of this chapter, as applicable.

(b) A CAIR SO_2 allowance transfer that is submitted for recordation after the allowance transfer deadline for a control period and that includes any CAIR SO_2 allowances allocated for any control period before such allowance transfer deadline will not be recorded until after the Administrator completes the deductions under § 97.254 for the control period immediately before such allowance transfer deadline.

(c) Where a CAIR SO_2 allowance transfer submitted for recordation fails to meet the requirements of paragraph (a) of this section, the Administrator will not record such transfer.

§ 97.262 Notification.

(a) *Notification of recordation.* Within 5 business days of recordation of a CAIR SO_2 allowance transfer under § 97.261, the Administrator will notify the CAIR authorized account representatives of both the transferor and transferee accounts.

(b) *Notification of non-recordation.* Within 10 business days of receipt of a CAIR SO_2 allowance transfer that fails to meet the requirements of § 97.261(a), the Administrator will notify the CAIR authorized account representatives of both accounts subject to the transfer of:

(1) A decision not to record the transfer, and

(2) The reasons for such non-recordation.

(c) Nothing in this section shall preclude the submission of a CAIR SO_2 allowance transfer for recordation following notification of non-recordation.

Subpart HHH—Monitoring and Reporting

§ 97.270 General requirements.

The owners and operators, and to the extent applicable, the CAIR designated representative, of a CAIR SO_2 unit, shall comply with the monitoring, recordkeeping, and reporting requirements as provided in this subpart and in subparts F and G of part 75 of this chapter. For purposes of complying with such requirements, the definitions in § 97.202 and in § 72.2 of this chapter shall apply, and the terms ''affected unit,'' ''designated representative,'' and ''continuous emission monitoring system'' (or ''CEMS'') in part 75 of this chapter shall be deemed to refer to the terms ''CAIR SO_2 unit,'' ''CAIR designated representative,'' and ''continuous emission monitoring system'' or (''CEMS'') respectively, as defined in § 97.202. The owner or operator of a unit that is not a CAIR SO_2 unit but that is monitored under § 75.16(b)(2) of this chapter shall comply with the same monitoring, recordkeeping, and reporting requirements as a CAIR SO_2 unit.

(a) *Requirements for installation, certification, and data accounting.* The owner or operator of each CAIR SO_2 unit shall:

(1) Install all monitoring systems required under this subpart for monitoring SO_2 mass emissions and individual unit heat input (including all systems required to monitor SO_2 concentration, stack gas moisture content, stack gas flow rate, CO_2 or O_2 concentration, and fuel flow rate, as applicable, in accordance with §§ 75.11 and 75.16 of this chapter);

(2) Successfully complete all certification tests required under § 97.271 and meet all other requirements of this subpart and part 75 of this chapter applicable to the monitoring systems under paragraph (a)(1) of this section; and

(3) Record, report, and quality-assure the data from the monitoring systems under paragraph (a)(1) of this section.

(b) *Compliance deadlines.* Except as provided in paragraph (e) of this section, the owner or operator shall meet the monitoring system certification and other requirements of paragraphs (a)(1) and (2) of this section on or before the following dates. The owner or operator shall record, report, and quality-assure the data from the monitoring systems under paragraph (a)(1) of this section on and after the following dates.

(1) For the owner or operator of a CAIR SO_2 unit that commences commercial operation before July 1, 2008, by January 1, 2009.

(2) For the owner or operator of a CAIR SO_2 unit that commences commercial operation on or after July 1, 2008, by the later of the following dates:

(i) January 1, 2009; or

(ii) 90 unit operating days or 180 calendar days, whichever occurs first, after the date on which the unit commences commercial operation.

(3) For the owner or operator of a CAIR SO_2 unit for which construction of a new stack or flue or installation of add-on SO_2 emission controls is completed after the applicable deadline under paragraph (b)(1), (2), (4), or (5) of this section, by 90 unit operating days or 180 calendar days, whichever occurs first, after the date on which emissions first exit to the atmosphere through the new stack or flue or add-on SO_2 emissions controls.

(4) Notwithstanding the dates in paragraphs (b)(1) and (2) of this section, for the owner or operator of a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart III of this part, by the date specified in § 97.284(b).

(5) Notwithstanding the dates in paragraphs (b)(1) and (2) of this section, for the owner or operator of a CAIR SO_2 opt-in unit under subpart III of this part, by the date on which the CAIR SO_2 opt-in unit enters the CAIR SO_2 Trading Program as provided in § 97.284(g).

(c) *Reporting data.* The owner or operator of a CAIR SO_2 unit that does not meet the applicable compliance date set forth in paragraph (b) of this section for any monitoring system under paragraph (a)(1) of this section shall, for each such monitoring system, determine, record, and report maximum potential (or, as appropriate, minimum potential) values for SO_2 concentration, stack gas flow rate, stack gas moisture content, fuel flow rate, and any other parameters required to determine SO_2 mass emissions and heat input in accordance with § 75.31(b)(2) or (c)(3) of this chapter or section 2.4 of appendix D to part 75 of this chapter, as applicable.

(d) *Prohibitions.* (1) No owner or operator of a CAIR SO_2 unit shall use any alternative monitoring system, alternative reference method, or any other alternative to any requirement of this subpart without having obtained prior written approval in accordance with § 97.275.

(2) No owner or operator of a CAIR SO_2 unit shall operate the unit so as to discharge, or allow to be discharged, SO_2 emissions to the atmosphere without accounting for all such emissions in accordance with the applicable provisions of this subpart and part 75 of this chapter.

(3) No owner or operator of a CAIR SO_2 unit shall disrupt the continuous emission monitoring system, any portion thereof, or any other approved emission monitoring method, and thereby avoid monitoring and recording SO_2 mass emissions discharged into the atmosphere or heat input, except for periods of recertification or periods when calibration, quality assurance testing, or maintenance is performed in accordance with the applicable provisions of this subpart and part 75 of this chapter.

(4) No owner or operator of a CAIR SO_2 unit shall retire or permanently discontinue use of the continuous emission monitoring system, any component thereof, or any other approved monitoring system under this subpart, except under any one of the following circumstances:

(i) During the period that the unit is covered by an exemption under § 97.205 that is in effect;

(ii) The owner or operator is monitoring emissions from the unit with another certified monitoring system approved, in accordance with the applicable provisions of this subpart and part 75 of this chapter, by the Administrator for use at that unit that provides emission data for the same pollutant or parameter as the retired or discontinued monitoring system; or

(iii) The CAIR designated representative submits notification of the date of certification testing of a replacement monitoring system for the retired or discontinued monitoring system in accordance with § 97.271(d)(3)(i).

(e) *Long-term cold storage.* The owner or operator of a CAIR SO_2 unit is subject to the applicable provisions of part 75 of this chapter concerning units in long-term cold storage.

§ 97.271 Initial certification and recertification procedures.

(a) The owner or operator of a CAIR SO_2 unit shall be exempt from the initial certification requirements of this section for a monitoring system under § 97.270(a)(1) if the following conditions are met:

(1) The monitoring system has been previously certified in accordance with part 75 of this chapter; and

(2) The applicable quality-assurance and quality-control requirements of § 75.21 of this chapter and appendix B and appendix D to part 75 of this chapter are fully met for the certified monitoring system described in paragraph (a)(1) of this section.

(b) The recertification provisions of this section shall apply to a monitoring system under § 97.270(a)(1) exempt from initial certification requirements under paragraph (a) of this section.

(c) [Reserved]

(d) Except as provided in paragraph (a) of this section, the owner or operator of a CAIR SO_2 unit shall comply with the following initial certification and recertification procedures, for a continuous monitoring system (*i.e.,* a continuous emission monitoring system and an excepted monitoring system under appendix D to part 75 of this chapter) under § 97.270(a)(1). The owner or operator of a unit that qualifies to use the low mass emissions excepted monitoring methodology under § 75.19 of this chapter or that qualifies to use an alternative monitoring system under subpart E of part 75 of this chapter shall comply with the procedures in paragraph (e) or (f) of this section respectively.

(1) *Requirements for initial certification.* The owner or operator shall ensure that each continuous monitoring system under § 97.270(a)(1) (including the automated data acquisition and handling system) successfully completes all of the initial certification testing required under § 75.20 of this chapter by the applicable deadline in § 97.270(b). In addition, whenever the owner or operator installs a monitoring system to meet the requirements of this subpart in a location where no such monitoring system was previously installed, initial certification in accordance with § 75.20 of this chapter is required.

(2) *Requirements for recertification.* Whenever the owner or operator makes a replacement, modification, or change in any certified continuous emission monitoring system under § 97.270(a)(1) that may significantly affect the ability of the system to accurately measure or record SO_2 mass emissions or heat input rate or to meet the quality-assurance and quality-control requirements of § 75.21 of this chapter or appendix B to part 75 of this chapter, the owner or operator shall recertify the monitoring system in accordance with § 75.20(b) of this chapter. Furthermore, whenever the owner or operator makes a replacement, modification, or change to the flue gas handling system or the unit's operation that may significantly change the stack flow or concentration profile, the owner or operator shall recertify each continuous emission monitoring system whose accuracy is potentially affected by the change, in accordance with § 75.20(b) of this chapter. Examples of changes to a continuous emission monitoring system that require recertification include: replacement of the analyzer, complete replacement of an existing continuous emission monitoring system, or change in location or orientation of the sampling probe or site. Any fuel flowmeter system under § 97.270(a)(1) is subject to the recertification requirements in § 75.20(g)(6) of this chapter.

(3) *Approval process for initial certification and recertification.* Paragraphs (d)(3)(i) through (iv) of this section apply to both initial certification and recertification of a continuous monitoring system under § 97.270(a)(1). For recertifications, replace the words "certification" and "initial certification" with the word "recertification", replace the word "certified" with the word "recertified," and follow the procedures in §§ 75.20(b)(5) and (g)(7) of this chapter in lieu of the procedures in paragraph (d)(3)(v) of this section.

(i) *Notification of certification.* The CAIR designated representative shall submit to the appropriate EPA Regional Office and the Administrator written notice of the dates of certification testing, in accordance with § 97.273.

(ii) *Certification application.* The CAIR designated representative shall submit to the Administrator a certification application for each monitoring system. A complete certification application shall include the information specified in § 75.63 of this chapter.

(iii) *Provisional certification date.* The provisional certification date for a monitoring system shall be determined in accordance with § 75.20(a)(3) of this chapter. A provisionally certified monitoring system may be used under the CAIR SO_2 Trading Program for a period not to exceed 120 days after receipt by the Administrator of the complete certification application for the monitoring system under paragraph (d)(3)(ii) of this section. Data measured and recorded by the provisionally certified monitoring system, in accordance with the requirements of part 75 of this chapter, will be considered valid quality-assured data (retroactive to the date and time of provisional certification), provided that the Administrator does not invalidate the provisional certification by issuing a notice of disapproval within 120 days of the date of receipt of the complete certification application by the Administrator.

(iv) *Certification application approval process.* The Administrator will issue a written notice of approval or disapproval of the certification application to the owner or operator within 120 days of receipt of the complete certification application under paragraph (d)(3)(ii) of this section. In the event the Administrator does not issue such a notice within such 120-day period, each monitoring system that meets the applicable performance requirements of part 75 of this chapter and is included in the certification application will be deemed certified for use under the CAIR SO_2 Trading Program.

(A) *Approval notice.* If the certification application is complete and shows that each monitoring system meets the applicable performance requirements of part 75 of this chapter, then the Administrator will issue a written notice of approval of the certification application within 120 days of receipt.

(B) *Incomplete application notice.* If the certification application is not complete, then the Administrator will issue a written notice of incompleteness that sets a reasonable date by which the CAIR designated representative must submit the additional information required to complete the certification application. If the CAIR designated representative does not comply with the notice of incompleteness by the specified date, then the Administrator may issue a notice of disapproval under paragraph (d)(3)(iv)(C) of this section. The 120-day review period shall not begin before receipt of a complete certification application.

(C) *Disapproval notice.* If the certification application shows that any monitoring system does not meet the performance requirements of part 75 of this chapter or if the certification application is incomplete and the requirement for disapproval under paragraph (d)(3)(iv)(B) of this section is met, then the Administrator will issue a written notice of disapproval of the certification application. Upon issuance of such notice of disapproval, the provisional certification is invalidated by the Administrator and the data measured and recorded by each uncertified monitoring system shall not be considered valid quality-assured data beginning with the date and hour of provisional certification (as defined under § 75.20(a)(3) of this chapter). The owner or operator shall follow the procedures for loss of certification in paragraph (d)(3)(v) of this section for each monitoring system that is disapproved for initial certification.

(D) *Audit decertification.* The Administrator may issue a notice of disapproval of the certification status of a monitor in accordance with § 97.272(b).

(v) *Procedures for loss of certification.* If the Administrator issues a notice of disapproval of a certification application under paragraph (d)(3)(iv)(C) of this section or a notice of disapproval of certification status under paragraph (d)(3)(iv)(D) of this section, then:

(A) The owner or operator shall substitute the following values, for each disapproved monitoring system, for each hour of unit operation during the period of invalid data specified under § 75.20(a)(4)(iii), § 75.20(g)(7), or § 75.21(e) of this chapter and continuing until the applicable date and hour specified under § 75.20(a)(5)(i) or (g)(7) of this chapter:

(*1*) For a disapproved SO_2 pollutant concentration monitor and disapproved flow monitor, respectively, the maximum potential concentration of SO_2 and the maximum potential flow rate, as defined in sections 2.1.1.1 and 2.1.4.1 of appendix A to part 75 of this chapter.

(*2*) For a disapproved moisture monitoring system and disapproved diluent gas monitoring system, respectively, the minimum potential moisture percentage and either the maximum potential CO_2 concentration or the minimum potential O_2 concentration (as applicable), as defined in sections 2.1.5, 2.1.3.1, and 2.1.3.2 of appendix A to part 75 of this chapter.

(*3*) For a disapproved fuel flowmeter system, the maximum potential fuel flow rate, as defined in section 2.4.2.1 of appendix D to part 75 of this chapter.

(B) The CAIR designated representative shall submit a notification of certification retest dates and a new certification application in accordance with paragraphs (d)(3)(i) and (ii) of this section.

(C) The owner or operator shall repeat all certification tests or other requirements that were failed by the monitoring system, as indicated in the Administrator's notice of disapproval, no later than 30 unit operating days after the date of issuance of the notice of disapproval.

(e) *Initial certification and recertification procedures for units using the low mass emission excepted methodology under § 75.19 of this chapter.* The owner or operator of a unit qualified to use the low mass emissions (LME) excepted methodology under § 75.19 of this chapter shall meet the applicable certification and recertification requirements in §§ 75.19(a)(2) and 75.20(h) of this chapter. If the owner or operator of such a unit elects to certify a fuel flowmeter system for heat input determination, the owner or operator shall also meet the certification and recertification requirements in § 75.20(g) of this chapter.

(f) *Certification/recertification procedures for alternative monitoring systems.* The CAIR designated representative of each unit for which the owner or operator intends to use an alternative monitoring system approved by the Administrator under subpart E of part 75 of this chapter shall comply with the applicable notification and application procedures of § 75.20(f) of this chapter.

§ 97.272 Out of control periods.

(a) Whenever any monitoring system fails to meet the quality-assurance and quality-control requirements or data validation requirements of part 75 of this chapter, data shall be substituted using the applicable missing data procedures in subpart D of appendix D to part 75 of this chapter.

(b) *Audit decertification.* Whenever both an audit of a monitoring system and a review of the initial certification or recertification application reveal that any monitoring system should not have been certified or recertified because it did not meet a particular performance specification or other requirement under § 97.271 or the applicable provisions of part 75 of this chapter, both at the time of the initial certification or recertification application submission and at the time of the audit, the Administrator will issue a notice of disapproval of the certification status of such monitoring system. For the purposes of this paragraph, an audit shall be either a field audit or an audit of any information submitted to the permitting authority or the Administrator. By issuing the notice of disapproval, the Administrator revokes prospectively the certification status of the monitoring system. The data measured and recorded by the monitoring system shall not be considered valid quality-assured data from the date of issuance of the notification of the revoked certification status until the date and time that the owner or operator completes subsequently approved initial certification or recertification tests for the monitoring system. The owner or operator shall follow the applicable initial certification or recertification procedures in § 97.271 for each disapproved monitoring system.

§ 97.273 Notifications.

The CAIR designated representative for a CAIR SO_2 unit shall submit written notice to the Administrator in accordance with § 75.61 of this chapter.

§ 97.274 Recordkeeping and reporting.

(a) *General provisions.* The CAIR designated representative shall comply with all recordkeeping and reporting requirements in this section, the applicable recordkeeping and reporting requirements in subparts F and G of part 75 of this chapter, and the requirements of § 97.210(e)(1).

(b) *Monitoring Plans.* The owner or operator of a CAIR SO_2 unit shall comply with requirements of § 75.62 of this chapter and, for a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart III of this part, §§ 97.283 and 97.284(a).

(c) *Certification Applications.* The CAIR designated representative shall submit an application to the Administrator within 45 days after completing all initial certification or recertification tests required under § 97.271, including the information required under § 75.63 of this chapter.

(d) *Quarterly reports.* The CAIR designated representative shall submit quarterly reports, as follows:

(1) The CAIR designated representative shall report the SO_2 mass emissions data and heat input data for the CAIR SO_2 unit, in an electronic quarterly report in a format prescribed by the Administrator, for each calendar quarter beginning with:

(i) For a unit that commences commercial operation before July 1, 2008, the calendar quarter covering January 1, 2009 through March 31, 2009;

(ii) For a unit that commences commercial operation on or after July 1, 2008, the calendar quarter corresponding to the earlier of the date of provisional certification or the applicable deadline for initial certification under § 97.270(b), unless that quarter is the third or fourth quarter of 2008, in which case reporting shall commence in the quarter covering January 1, 2009 through March 31, 2009;

(iii) Notwithstanding paragraphs (d)(1)(i) and (ii) of this section, for a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart III of this part, the calendar quarter corresponding to the date specified in § 97.284(b); and

(iv) Notwithstanding paragraphs (d)(1)(i) and (ii) of this section, for a CAIR SO_2 opt-in unit under subpart III of this part, the calendar quarter corresponding to the date on which the CAIR SO_2 opt-in unit enters the CAIR SO_2 Trading Program as provided in § 97.284(g).

(2) The CAIR designated representative shall submit each quarterly report to the Administrator within 30 days following the end of the calendar quarter covered by the report. Quarterly reports shall be submitted in the manner specified in § 75.64 of this chapter.

(3) For CAIR SO_2 units that are also subject to an Acid Rain emissions limitation or the CAIR NO_X Annual Trading Program, CAIR NO_X Ozone Season Trading Program, or Hg Budget Trading Program, quarterly reports shall include the applicable data and information required by subparts F through I of part 75 of this chapter as applicable, in addition to the SO_2 mass emission data, heat input data, and other information required by this subpart.

(e) *Compliance certification.* The CAIR designated representative shall submit to the Administrator a compliance certification (in a format prescribed by the Administrator) in support of each quarterly report based on reasonable inquiry of those persons with primary responsibility for ensuring that all of the unit's emissions are correctly and fully monitored. The certification shall state that:

(1) The monitoring data submitted were recorded in accordance with the applicable requirements of this subpart and part 75 of this chapter, including the quality assurance procedures and specifications; and

(2) For a unit with add-on SO_2 emission controls and for all hours where SO_2 data are substituted in accordance with § 75.34(a)(1) of this chapter, the add-on emission controls were operating within the range of parameters listed in the quality assurance/quality control program under appendix B to part 75 of this chapter and the substitute data values do not systematically underestimate SO_2 emissions.

§ 97.275 Petitions.

The CAIR designated representative of a CAIR SO_2 unit may submit a petition under § 75.66 of this chapter to the Administrator requesting approval to apply an alternative to any requirement of this subpart. Application of an alternative to any requirement of this subpart is in accordance with this subpart only to the extent that the petition is approved in writing by the Administrator, in consultation with the permitting authority.

Subpart III—CAIR SO_2 Opt-in Units

§ 97.280 Applicability.

A CAIR SO_2 opt-in unit must be a unit that:

(a) Is located in a State that submits, and for which the Administrator approves, a State implementation plan revision in accordance with § 51.124(r)(1), (2), or (3) of this chapter establishing procedures concerning CAIR opt-in units;

(b) Is not a CAIR SO_2 unit under § 97.204 and is not covered by a retired unit exemption under § 97.205 that is in effect;

(c) Is not covered by a retired unit exemption under § 72.8 of this chapter that is in effect and is not an opt-in source under part 74 of this chapter;

(d) Has or is required or qualified to have a title V operating permit or other federally enforceable permit; and

(e) Vents all of its emissions to a stack and can meet the monitoring, recordkeeping, and reporting requirements of subpart HH of this part.

§ 97.281 General.

(a) Except as otherwise provided in §§ 97.201 through 97.204, §§ 97.206 through 97.208, and subparts BBB and CCC and subparts FFF through HHH of this part, a CAIR SO_2 opt-in unit shall be treated as a CAIR SO_2 unit for purposes of applying such sections and subparts of this part.

(b) Solely for purposes of applying, as provided in this subpart, the requirements of subpart HHH of this part to a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under this subpart, such unit shall be treated as a CAIR SO_2 unit before issuance of a CAIR opt-in permit for such unit.

§ 97.282 CAIR designated representative.

Any CAIR SO_2 opt-in unit, and any unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under this subpart, located at the same source as one or more CAIR SO_2 units shall have the same CAIR designated representative and alternate CAIR designated representative as such CAIR SO_2 units.

§ 97.283 Applying for CAIR opt-in permit.

(a) *Applying for initial CAIR opt-in permit.* The CAIR designated representative of a unit meeting the requirements for a CAIR SO_2 opt-in unit in § 97.280 may apply for an initial CAIR opt-in permit at any time, except as provided under § 97.286(f) and (g), and, in order to apply, must submit the following:

(1) A complete CAIR permit application under § 97.222;

(2) A certification, in a format specified by the permitting authority, that the unit:

(i) Is not a CAIR SO_2 unit under § 97.204 and is not covered by a retired unit exemption under § 97.205 that is in effect;

(ii) Is not covered by a retired unit exemption under § 72.8 of this chapter that is in effect;

(iii) Is not, and so long as the unit is a CAIR SO_2 opt-in unit, will not become, an opt-in source under part 74 of this chapter;

(iv) Vents all of its emissions to a stack, and

(v) Has documented heat input for more than 876 hours during the 6 months immediately preceding submission of the CAIR permit application under § 97.222;

(3) A monitoring plan in accordance with subpart HHH of this part;

(4) A complete certificate of representation under § 97.213 consistent with § 97.282, if no CAIR designated representative has been previously designated for the source that includes the unit; and

(5) A statement, in a format specified by the permitting authority, whether the CAIR designated representative requests that the unit be allocated CAIR SO_2 allowances under § 97.288(b) or § 97.288(c) (subject to the conditions in §§ 97.284(h) and 97.286(g)), to the extent such allocation is provided in a State implementation plan revision submitted in accordance with § 51.124(r)(1), (2), or (3) of this chapter and approved by the Administrator. If allocation under § 97.288(c) is requested, this statement shall include a statement that the owners and operators of the unit intend to repower the unit before January 1, 2015 and that they will provide, upon request, documentation demonstrating such intent.

(b) *Duty to reapply.* (1) The CAIR designated representative of a CAIR SO_2 opt-in unit shall submit a complete CAIR permit application under § 97.222 to renew the CAIR opt-in unit permit in accordance with the permitting authority's regulations for title V operating permits, or the permitting authority's regulations for other federally enforceable permits if applicable, addressing permit renewal.

(2) Unless the permitting authority issues a notification of acceptance of withdrawal of the CAIR SO_2 opt-in unit from the CAIR SO_2 Trading Program in accordance with § 97.286 or the unit becomes a CAIR SO_2 unit under § 97.204, the CAIR SO_2 opt-in unit shall remain subject to the requirements for a CAIR SO_2 opt-in unit, even if the CAIR designated representative for the CAIR SO_2 opt-in unit fails to submit a CAIR permit application that is required for renewal of the CAIR opt-in permit under paragraph (b)(1) of this section.

§ 97.284 Opt-in process.

The permitting authority will issue or deny a CAIR opt-in permit for a unit for which an initial application for a CAIR opt-in permit under § 97.183 is submitted in accordance with the following, to the extent provided in a State implementation plan revision submitted in accordance with § 51.124(r)(1), (2), or (3) of this chapter and approved by the Administrator:

(a) *Interim review of monitoring plan.* The permitting authority and the Administrator will determine, on an interim basis, the sufficiency of the monitoring plan accompanying the initial application for a CAIR opt-in permit under § 97.283. A monitoring plan is sufficient, for purposes of interim review, if the plan appears to contain information demonstrating that the SO_2 emissions rate and heat input of the unit and all other applicable parameters are monitored and reported in accordance with subpart HHH of this part. A determination of sufficiency shall not be construed as acceptance or approval of the monitoring plan.

(b) *Monitoring and reporting.* (1)(i) If the permitting authority and the Administrator determine that the monitoring plan is sufficient under paragraph (a) of this section, the owner or operator shall monitor and report the SO_2 emissions rate and the heat input of the unit and all other applicable parameters, in accordance with subpart HHH of this part, starting on the date of certification of the appropriate monitoring systems under subpart HHH of this part and continuing until a CAIR opt-in permit is denied under § 97.284(f) or, if a CAIR opt-in permit is issued, the date and time when the unit is withdrawn from the CAIR SO_2 Trading Program in accordance with § 97.286.

(ii) The monitoring and reporting under paragraph (b)(1)(i) of this section shall include the entire control period immediately before the date on which the unit enters the CAIR SO_2 Trading Program under § 97.284(g), during which period monitoring system availability must not be less than 90 percent under subpart HHH of this part and the unit must be in full compliance with any applicable State or Federal emissions or emissions-related requirements.

(2) To the extent the SO_2 emissions rate and the heat input of the unit are monitored and reported in accordance with subpart HHH of this part for one or more control periods, in addition to the control period under paragraph (b)(1)(ii) of this section, during which control periods monitoring system availability is not less than 90 percent under subpart HHH of this part and the unit is in full compliance with any applicable State or Federal emissions or emissions-related requirements and which control periods begin not more than 3 years before the unit enters the CAIR SO_2 Trading Program under § 97.284(g), such information shall be used as provided in paragraphs (c) and (d) of this section.

(c) *Baseline heat input.* The unit's baseline heat rate shall equal:

(1) If the unit's SO_2 emissions rate and heat input are monitored and reported for only one control period, in accordance with paragraph (b)(1) of this section, the unit's total heat input (in mmBtu) for the control period; or

(2) If the unit's SO_2 emissions rate and heat input are monitored and reported for more than one control period, in accordance with paragraphs (b)(1) and (2) of this section, the average of the amounts of the unit(s total heat input (in mmBtu) for the control periods under paragraphs (b)(1)(ii) and (2) of this section.

(d) *Baseline SO_2 emission rate.* The unit's baseline SO_2 emission rate shall equal:

(1) If the unit's SO_2 emissions rate and heat input are monitored and reported for only one control period, in accordance with paragraph (b)(1) of this section, the unit's SO_2 emissions rate (in lb/mmBtu) for the control period;

(2) If the unit's SO_2 emissions rate and heat input are monitored and reported for more than one control period, in accordance with paragraphs (b)(1) and (2) of this section, and the unit does not have add-on SO_2 emission controls during any such control periods, the average of the amounts of the unit's SO_2 emissions rate (in lb/mmBtu) for the control periods under paragraphs (b)(1)(ii) and (b)(2) of this section; or

(3) If the unit's SO_2 emissions rate and heat input are monitored and reported for more than one control period, in accordance with paragraphs (b)(1) and (2) of this section, and the unit has add-on SO_2 emission controls during any such control periods, the average of the amounts of the unit's SO_2 emissions rate (in lb/mmBtu) for such control periods during which the unit has add-on SO_2 emission controls.

(e) *Issuance of CAIR opt-in permit.* After calculating the baseline heat input and the baseline SO_2 emissions rate for the unit under paragraphs (c) and (d) of this section and if the permitting authority determines that the CAIR designated representative shows that the unit meets the requirements for a CAIR SO_2 opt-in unit in § 97.280 and meets the elements certified in § 97.283(a)(2), the permitting authority will issue a CAIR opt-in permit. The permitting authority will provide a copy of the CAIR opt-in permit to the Administrator, who will then establish a compliance account for the source that includes the CAIR SO_2 opt-in unit unless the source already has a compliance account.

(f) *Issuance of denial of CAIR opt-in permit.* Notwithstanding paragraphs (a) through (e) of this section, if at any time before issuance of a CAIR opt-in permit for the unit, the permitting authority determines that the CAIR designated representative fails to show that the unit meets the requirements for a CAIR SO_2 opt-in unit in § 97.280 or meets the elements certified in § 97.283(a)(2), the permitting authority will issue a denial of a CAIR opt-in permit for the unit.

(g) *Date of entry into CAIR SO_2 Trading Program.* A unit for which an initial CAIR opt-in permit is issued by the permitting authority shall become a CAIR SO_2 opt-in unit, and a CAIR SO_2 unit, as of the later of January 1, 2010 or January 1 of the first control period during which such CAIR opt-in permit is issued.

(h) *Repowered CAIR SO_2 opt-in unit.* (1) If CAIR designated representative requests, and the permitting authority issues a CAIR opt-in permit providing for, allocation to a CAIR SO_2 opt-in unit of CAIR SO_2 allowances under § 97.288(c) and such unit is repowered after its date of entry into the CAIR SO_2 Trading Program under paragraph (g) of this section, the repowered unit shall be treated as a CAIR SO_2 opt-in unit replacing the original CAIR SO_2 opt-in unit, as of the date of start-up of the repowered unit's combustion chamber.

(2) Notwithstanding paragraphs (c) and (d) of this section, as of the date of start-up under paragraph (h)(1) of this section, the repowered unit shall be deemed to have the same date of commencement of operation, date of commencement of commercial operation, baseline heat input, and baseline SO_2 emission rate as the original CAIR SO_2 opt-in unit, and the original CAIR SO_2 opt-in unit shall no longer be treated as a CAIR SO_2 opt-in unit or a CAIR SO_2 unit.

§ 97.285 CAIR opt-in permit contents.

(a) Each CAIR opt-in permit will contain:

(1) All elements required for a complete CAIR permit application under § 97.222;

(2) The certification in § 97.283(a)(2);

(3) The unit's baseline heat input under § 97.284(c);

(4) The unit's baseline SO_2 emission rate under § 97.284(d);

(5) A statement whether the unit is to be allocated CAIR SO_2 allowances under § 97.288(b) or § 97.288(c) (subject to the conditions in §§ 97.284(h) and 97.286(g));

(6) A statement that the unit may withdraw from the CAIR SO_2 Trading Program only in accordance with § 97.286; and

(7) A statement that the unit is subject to, and the owners and operators of the unit must comply with, the requirements of § 97.287.

(b) Each CAIR opt-in permit is deemed to incorporate automatically the definitions of terms under § 97.202 and, upon recordation by the Administrator under subpart FFF or GGG of this part or this subpart, every allocation, transfer, or deduction of CAIR SO_2 allowances to or from the compliance account of the source that includes a CAIR SO_2 opt-in unit covered by the CAIR opt-in permit.

(c) The CAIR opt-in permit shall be included, in a format specified by the permitting authority, in the CAIR permit for the source where the CAIR SO_2 opt-in unit is located and in a title V operating permit or other federally enforceable permit for the source.

§ 97.286 Withdrawal from CAIR SO_2 Trading Program.

Except as provided under paragraph (g) of this section, a CAIR SO_2 opt-in unit may withdraw from the CAIR SO_2 Trading Program, but only if the permitting authority issues a notification to the CAIR designated representative of the CAIR SO_2 opt-in unit of the acceptance of the withdrawal of the CAIR SO_2 opt-in unit in accordance with paragraph (d) of this section.

(a) *Requesting withdrawal.* In order to withdraw a CAIR SO_2 opt-in unit from the CAIR SO_2 Trading Program, the CAIR designated representative of the CAIR SO_2 opt-in unit shall submit to the permitting authority a request to withdraw effective as of midnight of December 31 of a specified calendar year, which date must be at least 4 years after December 31 of the year of entry into the CAIR SO_2 Trading Program under § 97.284(g). The request must be submitted no later than 90 days before the requested effective date of withdrawal.

(b) *Conditions for withdrawal.* Before a CAIR SO_2 opt-in unit covered by a request under paragraph (a) of this section may withdraw from the CAIR SO_2 Trading Program and the CAIR opt-in permit may be terminated under paragraph (e) of this section, the following conditions must be met:

(1) For the control period ending on the date on which the withdrawal is to be effective, the source that includes the CAIR SO_2 opt-in unit must meet the requirement to hold CAIR SO_2 allowances under § 97.206(c) and cannot have any excess emissions.

(2) After the requirement for withdrawal under paragraph (b)(1) of this section is met, the Administrator will deduct from the compliance account of the source that includes the CAIR SO_2 opt-in unit CAIR SO_2 allowances equal in amount to and allocated for the same or a prior control period as any CAIR SO_2 allowances allocated to the CAIR SO_2 opt-in unit under § 97.288 for any control period for which the withdrawal is to be effective. If there are no remaining CAIR SO_2 units at the source, the Administrator will close the compliance account, and the owners and operators of the CAIR SO_2 opt-in unit may submit a CAIR SO_2 allowance transfer for any remaining CAIR SO_2 allowances to another CAIR SO_2 Allowance Tracking System in accordance with subpart GGG of this part.

(c) *Notification.* (1) After the requirements for withdrawal under paragraphs (a) and (b) of this section are met (including deduction of the full amount of CAIR SO_2 allowances required), the permitting authority will issue a notification to the CAIR designated representative of the CAIR SO_2 opt-in unit of the acceptance of the withdrawal of the CAIR SO_2 opt-in unit as of midnight on December 31 of the calendar year for which the withdrawal was requested.

(2) If the requirements for withdrawal under paragraphs (a) and (b) of this section are not met, the permitting authority will issue a notification to the CAIR designated representative of the CAIR SO_2 opt-in unit that the CAIR SO_2 opt-in unit's request to withdraw is denied. Such CAIR SO_2 opt-in unit shall continue to be a CAIR SO_2 opt-in unit.

(d) *Permit amendment.* After the permitting authority issues a notification under paragraph (c)(1) of this section that the requirements for withdrawal have been met, the permitting authority will revise the CAIR permit covering the CAIR SO_2 opt-in unit to terminate the CAIR opt-in permit for such unit as of the effective date specified under paragraph (c)(1) of this section. The unit shall continue to be a CAIR SO_2 opt-in unit until the effective date of the termination and shall comply with all requirements under the CAIR SO_2 Trading Program concerning any control periods for which the unit is a CAIR SO_2 opt-in unit, even if such requirements arise or must be complied with after the withdrawal takes effect.

(e) *Reapplication upon failure to meet conditions of withdrawal.* If the permitting authority denies the CAIR SO_2 opt-in unit's request to withdraw, the CAIR designated representative may submit another request to withdraw in accordance with paragraphs (a) and (b) of this section.

(f) *Ability to reapply to the CAIR SO_2 Trading Program.* Once a CAIR SO_2 opt-in unit withdraws from the CAIR SO_2 Trading Program and its CAIR opt-in permit is terminated under this section, the CAIR designated representative may not submit another application for a CAIR opt-in permit under § 97.283 for such CAIR SO_2 opt-in unit before the date that is 4 years after the date on which the withdrawal became effective. Such new application for a CAIR opt-in permit will be treated as an initial application for a CAIR opt-in permit under § 97.284.

(g) *Inability to withdraw.* Notwithstanding paragraphs (a) through (f) of this section, a CAIR SO_2 opt-in unit shall not be eligible to withdraw from the CAIR SO_2 Trading Program if the CAIR designated representative of the CAIR SO_2 opt-in unit requests, and the permitting authority issues a CAIR opt-in permit providing for, allocation to the CAIR SO_2 opt-in unit of CAIR SO_2 allowances under § 97.288(c).

§ 97.287 Change in regulatory status.

(a) *Notification.* If a CAIR SO_2 opt-in unit becomes a CAIR SO_2 unit under § 97.204, then the CAIR designated representative shall notify in writing the permitting authority and the Administrator of such change in the CAIR SO_2 opt-in unit's regulatory status, within 30 days of such change.

(b) *Permitting authority's and Administrator's actions.* (1) If a CAIR SO_2 opt-in unit becomes a CAIR SO_2 unit under § 97.204, the permitting authority will revise the CAIR SO_2 opt-in unit's CAIR opt-in permit to meet the requirements of a CAIR permit under § 97.223, and remove the CAIR opt-in permit provisions, as of the date on which the CAIR SO_2 opt-in unit becomes a CAIR SO_2 unit under § 97.204.

(2)(i) The Administrator will deduct from the compliance account of the source that includes the CAIR SO_2 opt-in unit that becomes a CAIR SO_2 unit under § 97.204, CAIR SO_2 allowances equal in amount to and allocated for the same or a prior control period as:

(A) Any CAIR SO_2 allowances allocated to the CAIR SO_2 opt-in unit under § 97.288 for any control period after the date on which the CAIR SO_2 opt-in unit becomes a CAIR SO_2 unit under § 97.204; and

(B) If the date on which the CAIR SO_2 opt-in unit becomes a CAIR SO_2 unit under § 97.204 is not December 31, the CAIR SO_2 allowances allocated to the CAIR SO_2 opt-in unit under § 97.288 for the control period that includes the date on which the CAIR SO_2 opt-in unit becomes a CAIR SO_2 unit under § 97.204, multiplied by the ratio of the number of days, in the control period, starting with the date on which the CAIR SO_2 opt-in unit becomes a CAIR SO_2 unit under § 97.204 divided by the total number of days in the control period and rounded to the nearest whole allowance as appropriate.

(ii) The CAIR designated representative shall ensure that the compliance account of the source that includes the CAIR SO_2 unit that becomes a CAIR SO_2 unit under § 97.204 contains the CAIR SO_2 allowances necessary for completion of the deduction under paragraph (b)(2)(i) of this section.

§ 97.288 CAIR SO_2 allowance allocations to CAIR SO_2 opt-in units.

(a) *Timing requirements.* (1) When the CAIR opt-in permit is issued under § 97.284(e), the permitting authority will allocate CAIR SO_2 allowances to the CAIR SO_2 opt-in unit, and submit to the Administrator the allocation for the control period in which a CAIR SO_2 opt-in unit enters the CAIR SO_2 Trading Program under § 97.284(g), in accordance with paragraph (b) or (c) of this section.

(2) By no later than October 31 of the control period after the control period in which a CAIR SO_2 opt-in unit enters the CAIR SO_2 Trading Program under § 97.284(g) and October 31 of each year thereafter, the permitting authority will allocate CAIR SO_2 allowances to the CAIR SO_2 opt-in unit, and submit to the Administrator the allocation for the control period that includes such submission deadline and in which the unit is a CAIR SO_2 opt-in unit, in accordance with paragraph (b) or (c) of this section.

(b) *Calculation of allocation.* For each control period for which a CAIR SO_2 opt-in unit is to be allocated CAIR SO_2 allowances, the permitting authority will allocate in accordance with the following procedures, if provided in a State implementation plan revision submitted in accordance with § 51.124(r)(1), (2), or (3) of this chapter and approved by the Administrator:

(1) The heat input (in mmBtu) used for calculating the CAIR SO_2 allowance allocation will be the lesser of:

(i) The CAIR SO_2 opt-in unit's baseline heat input determined under § 97.284(c); or

(ii) The CAIR SO_2 opt-in unit's heat input, as determined in accordance with subpart HHH of this part, for the immediately prior control period, except when the allocation is being calculated for the control period in which the CAIR SO_2 opt-in unit enters the CAIR SO_2 Trading Program under § 97.284(g).

(2) The SO_2 emission rate (in lb/mmBtu) used for calculating CAIR SO_2 allowance allocations will be the lesser of:

(i) The CAIR SO_2 opt-in unit's baseline SO_2 emissions rate (in lb/mmBtu) determined under § 97.284(d) and multiplied by 70 percent; or

(ii) The most stringent State or Federal SO_2 emissions limitation applicable to the CAIR SO_2 opt-in unit at any time during the control period for which CAIR SO_2 allowances are to be allocated.

(3) The permitting authority will allocate CAIR SO_2 allowances to the CAIR SO_2 opt-in unit with a tonnage equivalent equal to, or less than by the smallest possible amount, the heat input under paragraph (b)(1) of this section, multiplied by the SO_2 emission rate under paragraph (b)(2) of this section, and divided by 2,000 lb/ton.

(c) Notwithstanding paragraph (b) of this section and if the CAIR designated representative requests, and the permitting authority issues a CAIR opt-in permit (based on a demonstration of the intent to repower stated under § 97.283(a)(5)) providing for, allocation to a CAIR SO_2 opt-in unit of CAIR SO_2 allowances under this paragraph (subject to the conditions in §§ 97.284(h) and 97.286(g)), the permitting authority will allocate to the CAIR SO_2 opt-in unit as follows, if provided in a State implementation plan revision submitted in accordance with § 51.124(r)(1), (2), or (3) of this chapter and approved by the Administrator:

(1) For each control period in 2010 through 2014 for which the CAIR SO_2 opt-in unit is to be allocated CAIR SO_2 allowances,

(i) The heat input (in mmBtu) used for calculating CAIR SO_2 allowance allocations will be determined as described in paragraph (b)(1) of this section.

(ii) The SO_2 emission rate (in lb/mmBtu) used for calculating CAIR SO_2 allowance allocations will be the lesser of:

(A) The CAIR SO_2 opt-in unit's baseline SO_2 emissions rate (in lb/mmBtu) determined under § 97.284(d); or

(B) The most stringent State or Federal SO_2 emissions limitation applicable to the CAIR SO_2 opt-in unit at any time during the control period in which the CAIR SO_2 opt-in unit enters the CAIR SO_2 Trading Program under § 97.284(g).

(iii) The permitting authority will allocate CAIR SO_2 allowances to the CAIR SO_2 opt-in unit with a tonnage equivalent equal to, or less than by the smallest possible amount, the heat input under paragraph (c)(1)(i) of this section, multiplied by the SO_2 emission rate under paragraph (c)(1)(ii) of this section, and divided by 2,000 lb/ton.

(2) For each control period in 2015 and thereafter for which the CAIR SO_2 opt-in unit is to be allocated CAIR SO_2 allowances,

(i) The heat input (in mmBtu) used for calculating the CAIR SO_2 allowance allocations will be determined as described in paragraph (b)(1) of this section.

(ii) The SO_2 emission rate (in lb/mmBtu) used for calculating the CAIR SO_2 allowance allocation will be the lesser of:

(A) The CAIR SO_2 opt-in unit's baseline SO_2 emissions rate (in lb/mmBtu) determined under § 97.284(d) multiplied by 10 percent; or

(B) The most stringent State or Federal SO_2 emissions limitation applicable to the CAIR SO_2 opt-in unit at any time during the control period for which CAIR SO_2 allowances are to be allocated.

(iii) The permitting authority will allocate CAIR SO_2 allowances to the CAIR SO_2 opt-in unit with a tonnage equivalent equal to, or less than by the smallest possible amount, the heat input under paragraph (c)(2)(i) of this section, multiplied by the SO_2 emission rate under paragraph (c)(2)(ii) of this section, and divided by 2,000 lb/ton.

(d) *Recordation.* If provided in a State implementation plan revision submitted in accordance with § 51.124(r)(1), (2), or (3) of this chapter and approved by the Administrator:

(1) The Administrator will record, in the compliance account of the source that includes the CAIR SO_2 opt-in unit, the CAIR SO_2 allowances allocated by the permitting authority to the CAIR SO_2 opt-in unit under paragraph (a)(1) of this section.

(2) By December 1 of the control period in which a CAIR SO_2 opt-in unit enters the CAIR SO_2 Trading Program under § 97.284(g) and December 1 of each year thereafter, the Administrator will record, in the compliance account of the source that includes the CAIR SO_2 opt-in unit, the CAIR SO_2 allowances allocated by the permitting authority to the CAIR SO_2 opt-in unit under paragraph (a)(2) of this section.

Appendix A to Subpart III of Part 97—States With Approved State Implementation Plan Revisions Concerning CAIR SO_2 Opt-In Units

1. The following States have State Implementation Plan revisions under § 51.124(r) of this chapter approved by the Administrator and establishing procedures providing for CAIR SO_2 opt-in units under subpart III of this part and allocation of CAIR SO_2 allowances to such units under § 97.288(b):

[Reserved]

2. The following States have State Implementation Plan revisions under § 51.124(r) of this chapter approved by the Administrator and establishing procedures providing for CAIR SO_2 opt-in units under subpart III of this part and allocation of CAIR SO_2 allowances to such units under § 97.288(c):

[Reserved]

■ 5. Part 97 is amended by adding subparts AAAA through IIII to read as follows:

Appendix A to Subpart IIII of Part 97—States With Approved State Implementation Plan Revisions Concerning CAIR NO_X Ozone Season Opt-In Units

Subpart AAAA—CAIR NO_X Ozone Season Trading Program General Provisions

§ 97.301 Purpose.

This subpart and subparts BBBB through IIII set forth the general provisions and the designated representative, permitting, allowance, monitoring, and opt-in provisions for the Federal Clean Air Interstate Rule (CAIR) NO_X Ozone Season Trading Program, under section 110 of the Clean Air Act and § 52.35 of this chapter, as a means of mitigating interstate transport of ozone and nitrogen oxides.

§ 97.302 Definitions.

The terms used in this subpart and subparts BBBB through IIII shall have the meanings set forth in this section as follows:

Account number means the identification number given by the Administrator to each CAIR NO_X Ozone Season Allowance Tracking System account.

Acid Rain emissions limitation means a limitation on emissions of sulfur dioxide or nitrogen oxides under the Acid Rain Program.

Acid Rain Program means a multi-state sulfur dioxide and nitrogen oxides air pollution control and emission reduction program established by the Administrator under title IV of the CAA and parts 72 through 78 of this chapter.

Administrator means the Administrator of the United States Environmental Protection Agency or the Administrator's duly authorized representative.

Allocate or *allocation* means, with regard to CAIR NO_X Ozone Season allowances, the determination by a permitting authority or the Administrator of the amount of such CAIR NO_X Ozone Season allowances to be initially credited to a CAIR NO_X Ozone Season unit, a new unit set-aside, or other entity.

Allowance transfer deadline means, for a control period, midnight of November 30 (if it is a business day), or midnight of the first business day thereafter (if November 30 is not a business day), immediately following the control period and is the deadline by which a CAIR NO_X Ozone Season allowance transfer must be submitted for recordation in a CAIR NO_X Ozone Season source's compliance account in order to be used to meet the source's CAIR NO_X Ozone Season emissions limitation for such control period in accordance with § 97.354.

Alternate CAIR designated representative means, for a CAIR NO_X Ozone Season source and each CAIR NO_X Ozone Season unit at the source, the natural person who is authorized by the owners and operators of the source and all such units at the source in accordance with subparts BBBB and IIII of this part, to act on behalf of the CAIR designated representative in matters pertaining to the CAIR NO_X Ozone Season Trading Program. If the CAIR NO_X Ozone Season source is also a CAIR NO_X source, then this natural person shall be the same person as the alternate CAIR designated representative under the CAIR NO_X Annual Trading Program. If the CAIR NO_X Ozone Season source is also a CAIR SO_2 source, then this natural person shall be the same person as the alternate CAIR designated representative under the CAIR SO_2 Trading Program. If the CAIR NO_X Ozone Season source is also subject to the Acid Rain Program, then this natural person shall be the same person as the alternate designated representative under the Acid Rain Program. If the CAIR NO_X Ozone Season source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the alternate Hg designated representative under the Hg Budget Trading Program.

Automated data acquisition and handling system or *DAHS* means that component of the continuous emission monitoring system, or other emissions monitoring system approved for use under subpart HHHH of this part, designed to interpret and convert individual output signals from pollutant concentration monitors, flow monitors, diluent gas monitors, and other component parts of the monitoring system to produce a continuous record of the measured parameters in the measurement units required by subpart HHHH of this part.

Boiler means an enclosed fossil-or other-fuel-fired combustion device used to produce heat and to transfer heat to recirculating water, steam, or other medium.

Bottoming-cycle cogeneration unit means a cogeneration unit in which the energy input to the unit is first used to produce useful thermal energy and at least some of the reject heat from the useful thermal energy application or process is then used for electricity production.

CAIR authorized account representative means, with regard to a general account, a responsible natural person who is authorized, in accordance with subparts BBBB, FFFF, and IIII of this part, to transfer and otherwise dispose of CAIR NO_X Ozone Season allowances held in the general account and, with regard to a compliance account, the CAIR designated representative of the source.

CAIR designated representative means, for a CAIR NO_X Ozone Season source and each CAIR NO_X Ozone Season unit at the source, the natural person who is authorized by the owners and operators of the source and all such units at the source, in accordance with subparts BBBB and IIII of this part, to represent and legally bind each owner and operator in matters pertaining to the CAIR NO_X Ozone Season Trading Program. If the CAIR NO_X Ozone Season source is also a CAIR NO_X source, then this natural person shall be the same person as the CAIR designated representative under the CAIR NO_X Annual Trading Program. If the CAIR NO_X Ozone Season source is also a CAIR SO_2 source, then this natural person shall be the same person as the CAIR designated representative under the CAIR SO_2 Trading Program. If the CAIR NO_X Ozone Season source is also subject to the Acid Rain Program, then this natural person shall be the same person as the designated representative under the Acid Rain Program. If the CAIR NO_X Ozone Season source is also subject to the Hg Budget Trading Program, then this natural person shall be the same person as the Hg designated representative under the Hg Budget Trading Program.

CAIR NO_X Annual Trading Program means a multi-state nitrogen oxides air pollution control and emission reduction program established by the Administrator in accordance with subparts AA through II of this part and §§ 51.123(p) and 52.35 of this chapter or approved and administered by the Administrator in accordance with subparts AA through II of part 96 of this chapter and § 51.123(o)(1) or (2) of this chapter, as a means of mitigating interstate transport of fine particulates and nitrogen oxides.

CAIR NO_X Ozone Season allowance means a limited authorization issued by a permitting authority or the Administrator under subpart EEEE of this part, § 97.388, or provisions of a State implementation plan that are approved under § 51.123(aa)(1) or (2) (and (bb)(1)), (bb)(2), (dd), or (ee) of this chapter, to emit one ton of nitrogen oxides during a control period of the specified calendar year for which the authorization is allocated or of any calendar year thereafter under the CAIR NO_X Ozone Season Trading Program or a limited authorization issued by a permitting authority for a control period during 2003 through 2008 under the NO_X Budget Trading Program in accordance with § 51.121(p) of this chapter to emit one ton of nitrogen oxides during a control period, provided that the provision in § 51.121(b)(2)(ii)(E) of this chapter shall not be used in applying this definition and the limited authorization shall not have been used to meet the allowance-holding requirement under the NO_X Budget Trading Program. An authorization to emit nitrogen oxides that is not issued under subpart EEEE of this part, § 97.388, or provisions of a State implementation plan that are approved under § 51.123(aa)(1) or (2) (and (bb)(1)), (bb)(2), (dd), or (ee) of this chapter or under the NO_X Budget Trading Program as described in the prior sentence shall not be a CAIR NO_X Ozone Season allowance.

CAIR NO_X Ozone Season allowance deduction or *deduct CAIR NO_X Ozone Season allowances* means the permanent withdrawal of CAIR NO_X Ozone Season allowances by the Administrator from a compliance account, *e.g.,* in order to account for a specified number of tons of total nitrogen oxides emissions from all CAIR NO_X Ozone Season units at a CAIR NO_X Ozone Season source for a control period, determined in accordance with subpart HHHH of this part, or to account for excess emissions.

CAIR NO_X Ozone Season Allowance Tracking System means the system by which the Administrator records allocations, deductions, and transfers of CAIR NO_X Ozone Season allowances under the CAIR NO_X Ozone Season Trading Program. Such allowances will be allocated, held, deducted, or transferred only as whole allowances.

CAIR NO_X Ozone Season Allowance Tracking System account means an account in the CAIR NO_X Ozone Season Allowance Tracking System established by the Administrator for purposes of recording the allocation, holding, transferring, or deducting of CAIR NO_X Ozone Season allowances.

CAIR NO_X Ozone Season allowances held or *hold CAIR NO_X Ozone Season allowances* means the CAIR NO_X Ozone Season allowances recorded by the Administrator, or submitted to the Administrator for recordation, in accordance with subparts FFFF, GGGG, and IIII of this part, in a CAIR NO_X Ozone Season Allowance Tracking System account.

CAIR NO_X Ozone Season emissions limitation means, for a CAIR NO_X Ozone Season source, the tonnage equivalent, in NO_X emissions in a control period, of the CAIR NO_X Ozone Season allowances available for deduction for the source under § 97.354(a) and (b) for the control period.

CAIR NO_X Ozone Season source means a source that includes one or more CAIR NO_X Ozone Season units.

CAIR NO_X Ozone Season Trading Program means a multi-state nitrogen oxides air pollution control and emission reduction program established by the Administrator in accordance with subparts AAAA through IIII of this part and §§ 51.123(ee) and 52.35 of this chapter or approved and administered by the Administrator in accordance with under subparts AAAA through IIII and § 51.123(aa)(1) or (2) (and (bb)(1)), (bb)(2), or (dd) of this chapter, as a means of mitigating interstate transport of ozone and nitrogen oxides.

CAIR NO_X Ozone Season unit means a unit that is subject to the CAIR NO_X Ozone Season Trading Program under § 97.304 and, except for purposes of § 97.305 and subpart EEEE of this part, a CAIR NO_X Ozone Season opt-in unit under subpart IIII of this part.

CAIR NO_X source means a source that is subject to the CAIR NO_X Annual Trading Program.

CAIR permit means the legally binding and federally enforceable written document, or portion of such document, issued by the permitting authority under subpart CCCC of this part, including any permit revisions, specifying the CAIR NO_X Ozone Season Trading Program requirements applicable to a CAIR NO_X Ozone Season source, to each CAIR NO_X Ozone Season unit at the source, and to the owners and operators and the CAIR designated representative of the source and each such unit.

CAIR SO_2 source means a source that is subject to the CAIR SO_2 Trading Program.

CAIR SO_2 Trading Program means a multi-state sulfur dioxide air pollution control and emission reduction program established by the Administrator in accordance with subparts AAA through III of this part and §§ 51.124(r) and 52.36 of this chapter or approved and administered by the Administrator in accordance with subparts AAA through III of part 96 of this chapter and § 51.124(o)(1) or (2) of this chapter, as a means of mitigating interstate transport of fine particulates and sulfur dioxide.

Certifying official means:

(1) For a corporation, a president, secretary, treasurer, or vice-president or the corporation in charge of a principal business function or any other person who performs similar policy or decision-making functions for the corporation;

(2) For a partnership or sole proprietorship, a general partner or the proprietor respectively; or

(3) For a local government entity or State, Federal, or other public agency, a principal executive officer or ranking elected official.

Clean Air Act or *CAA* means the Clean Air Act, 42 U.S.C. 7401, *et seq.*

Coal means any solid fuel classified as anthracite, bituminous, subbituminous, or lignite.

Coal-derived fuel means any fuel (whether in a solid, liquid, or gaseous state) produced by the mechanical, thermal, or chemical processing of coal.

Coal-fired means:

(1) Except for purposes of subpart EEEE of this part, combusting any amount of coal or coal-derived fuel, alone or in combination with any amount of any other fuel, during any year; or

(2) For purposes of subpart EEEE of this part, combusting any amount of coal or coal-derived fuel, alone or in combination with any amount of any other fuel, during a specified year.

Cogeneration unit means a stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine:

(1) Having equipment used to produce electricity and useful thermal energy for industrial, commercial, heating, or cooling purposes through the sequential use of energy; and

(2) Producing during the 12-month period starting on the date the unit first produces electricity and during any calendar year after the calendar year in which the unit first produces electricity—

(i) For a topping-cycle cogeneration unit,

(A) Useful thermal energy not less than 5 percent of total energy output; and

(B) Useful power that, when added to one-half of useful thermal energy produced, is not less then 42.5 percent of total energy input, if useful thermal energy produced is 15 percent or more of total energy output, or not less than 45 percent of total energy input, if useful thermal energy produced is less than 15 percent of total energy output.

(ii) For a bottoming-cycle cogeneration unit, useful power not less than 45 percent of total energy input.

Combustion turbine means:

(1) An enclosed device comprising a compressor, a combustor, and a turbine and in which the flue gas resulting from the combustion of fuel in the combustor passes through the turbine, rotating the turbine; and

(2) If the enclosed device under paragraph (1) of this definition is combined cycle, any associated duct

burner, heat recovery steam generator, and steam turbine.

Commence commercial operation means, with regard to a unit:

(1) To have begun to produce steam, gas, or other heated medium used to generate electricity for sale or use, including test generation, except as provided in § 97.305 and § 97.384(h).

(i) For a unit that is a CAIR NO_X Ozone Season unit under § 97.304 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit that is a CAIR NO_X Ozone Season unit under § 97.304 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1), (2), or (3) of this definition as appropriate.

(2) Notwithstanding paragraph (1) of this definition and except as provided in § 97.305, for a unit that is not a CAIR NO_X Ozone Season unit under § 97.304 on the later of November 15, 1990 or the date the unit commences commercial operation as defined in paragraph (1) of this definition, the unit's date for commencement of commercial operation shall be the date on which the unit becomes a CAIR NO_X Ozone Season unit under § 97.304.

(i) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of commercial operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit with a date for commencement of commercial operation as defined in paragraph (2) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of commercial operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of commercial operation as defined in paragraph (1), (2), or (3) of this definition as appropriate.

(3) Notwithstanding paragraphs (1) and (2) of this definition, for a unit not serving a generator producing electricity for sale, the unit's date of commencement of operation shall also be the unit's date of commencement of commercial operation.

Commence operation means:

(1) To have begun any mechanical, chemical, or electronic process, including, with regard to a unit, start-up of a unit's combustion chamber, except as provided in § 97.384(h).

(i) For a unit that undergoes a physical change (other than replacement of the unit by a unit at the same source) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the date of commencement of operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit that is replaced by a unit at the same source (*e.g.,* repowered) after the date the unit commences operation as defined in paragraph (1) of this definition, such date shall remain the replaced unit's date of commencement of operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of operation as defined in paragraph (1) or (2) of this definition as appropriate, except as provided in § 97.384(h).

(2) Notwithstanding paragraph (1) of this definition and solely for purposes of subpart HHHH of this part, for a unit that is not a CAIR NO_X Ozone Season unit under § 97.304(d) on the later of November 15, 1990 or the date the unit commences operation as defined in paragraph (1) of this definition and subsequently becomes such a CAIR NO_X Ozone Season unit, the unit's date for commencement of operation shall be the date on which the unit becomes a CAIR NO_X Ozone Season unit under § 97.304(d).

(i) For a unit with a date for commencement of operation as defined in paragraph (2) of this definition and that subsequently undergoes a physical change (other than replacement of the unit by a unit at the same source), such date shall remain the date of commencement of operation of the unit, which shall continue to be treated as the same unit.

(ii) For a unit with a date for commencement of operation as defined in paragraph (2) of this definition and that is subsequently replaced by a unit at the same source (*e.g.,* repowered), such date shall remain the replaced unit's date of commencement of operation, and the replacement unit shall be treated as a separate unit with a separate date for commencement of operation as defined in paragraph (1) or (2) of this definition as appropriate.

Common stack means a single flue through which emissions from 2 or more units are exhausted.

Compliance account means a CAIR NO_X Ozone Season Allowance Tracking System account, established by the Administrator for a CAIR NO_X Ozone Season source under subpart FFFF or IIII of this part, in which any CAIR NO_X Ozone Season allowance allocations for the CAIR NO_X Ozone Season units at the source are initially recorded and in which are held any CAIR NO_X Ozone Season allowances available for use for a control period in order to meet the source's CAIR NO_X Ozone Season emissions limitation in accordance with § 97.354.

Continuous emission monitoring system or *CEMS* means the equipment required under subpart HHHH of this part to sample, analyze, measure, and provide, by means of readings recorded at least once every 15 minutes (using an automated data acquisition and handling system (DAHS)), a permanent record of nitrogen oxides emissions, stack gas volumetric flow rate, stack gas moisture content, and oxygen or carbon dioxide concentration (as applicable), in a manner consistent with part 75 of this chapter. The following systems are the principal types of continuous emission monitoring systems required under subpart HHHH of this part:

(1) A flow monitoring system, consisting of a stack flow rate monitor and an automated data acquisition and handling system and providing a permanent, continuous record of stack gas volumetric flow rate, in standard cubic feet per hour (scfh);

(2) A nitrogen oxides concentration monitoring system, consisting of a NO_X pollutant concentration monitor and an automated data acquisition and handling system and providing a permanent, continuous record of NO_X emissions, in parts per million (ppm);

(3) A nitrogen oxides emission rate (or NO_X-diluent) monitoring system, consisting of a NO_X pollutant concentration monitor, a diluent gas (CO_2 or O_2) monitor, and an automated data acquisition and handling system and providing a permanent, continuous record of NO_X concentration, in parts per million (ppm), diluent gas concentration, in percent CO_2 or O_2, and NO_X emission rate, in pounds per million British thermal units (lb/mmBtu);

(4) A moisture monitoring system, as defined in § 75.11(b)(2) of this chapter and providing a permanent, continuous record of the stack gas moisture content, in percent H_2O;

(5) A carbon dioxide monitoring system, consisting of a CO_2 pollutant concentration monitor (or an oxygen monitor plus suitable mathematical equations from which the CO_2 concentration is derived) and an automated data acquisition and handling system and providing a permanent, continuous record of CO_2 emissions, in percent CO_2; and

(6) An oxygen monitoring system, consisting of an O_2 concentration monitor and an automated data acquisition and handling system and providing a permanent, continuous record of O_2, in percent O_2.

Control period or *ozone season* means the period beginning May 1 of a calendar year, except as provided in § 97.306(c)(2) and ending on September 30 of the same year, inclusive.

Emissions means air pollutants exhausted from a unit or source into the atmosphere, as measured, recorded, and reported to the Administrator by the CAIR designated representative and as determined by the Administrator in accordance with subpart HHHH of this part.

Excess emissions means any ton of nitrogen oxides emitted by the CAIR NO_X Ozone Season units at a CAIR NO_X Ozone Season source during a control period that exceeds the CAIR NO_X Ozone Season emissions limitation for the source.

Fossil fuel means natural gas, petroleum, coal, or any form of solid, liquid, or gaseous fuel derived from such material.

Fossil-fuel-fired means, with regard to a unit, combusting any amount of fossil fuel in any calendar year.

Fuel oil means any petroleum-based fuel (including diesel fuel or petroleum derivatives such as oil tar) and any recycled or blended petroleum products or petroleum by-products used as a fuel whether in a liquid, solid, or gaseous state.

General account means a CAIR NO_X Ozone Season Allowance Tracking System account, established under subpart FFFF of this part, that is not a compliance account.

Generator means a device that produces electricity.

Gross electrical output means, with regard to a cogeneration unit, electricity made available for use, including any such electricity used in the power production process (which process includes, but is not limited to, any on-site processing or treatment of fuel combusted at the unit and any on-site emission controls).

Heat input means, with regard to a specified period of time, the product (in mmBtu/time) of the gross calorific value of the fuel (in Btu/lb) divided by 1,000,000 Btu/mmBtu and multiplied by the fuel feed rate into a combustion device (in lb of fuel/time), as measured, recorded, and reported to the Administrator by the CAIR designated representative and determined by the Administrator in accordance with subpart HHHH of this part and excluding the heat derived from preheated combustion air, recirculated flue gases, or exhaust from other sources.

Heat input rate means the amount of heat input (in mmBtu) divided by unit operating time (in hr) or, with regard to a specific fuel, the amount of heat input attributed to the fuel (in mmBtu) divided by the unit operating time (in hr) during which the unit combusts the fuel.

Hg Budget Trading Program means a multi-state Hg air pollution control and emission reduction program approved and administered by the Administrator in accordance subpart HHHH of part 60 of this chapter and § 60.24(h)(6), or established by the Administrator under section 111 of the Clean Air Act, as a means of reducing national Hg emissions.

Life-of-the-unit, firm power contractual arrangement means a unit participation power sales agreement under which a utility or industrial customer reserves, or is entitled to receive, a specified amount or percentage of nameplate capacity and associated energy generated by any specified unit and pays its proportional amount of such unit's total costs, pursuant to a contract:

(1) For the life of the unit;

(2) For a cumulative term of no less than 30 years, including contracts that permit an election for early termination; or

(3) For a period no less than 25 years or 70 percent of the economic useful life of the unit determined as of the time the unit is built, with option rights to purchase or release some portion of the nameplate capacity and associated energy generated by the unit at the end of the period.

Maximum design heat input means the maximum amount of fuel per hour (in Btu/hr) that a unit is capable of combusting on a steady state basis as of the initial installation of the unit as specified by the manufacturer of the unit.

Monitoring system means any monitoring system that meets the requirements of subpart HHHH of this part, including a continuous emissions monitoring system, an alternative monitoring system, or an excepted monitoring system under part 75 of this chapter.

Most stringent State or Federal NO_X emissions limitation means, with regard to a unit, the lowest NO_X emissions limitation (in terms of lb/mmBtu) that is applicable to the unit under State or Federal law, regardless of the averaging period to which the emissions limitation applies.

Nameplate capacity means, starting from the initial installation of a generator, the maximum electrical generating output (in MWe) that the generator is capable of producing on a steady state basis and during continuous operation (when not restricted by seasonal or other deratings) as of such installation as specified by the manufacturer of the generator or, starting from the completion of any subsequent physical change in the generator resulting in an increase in the maximum electrical generating output (in MWe) that the generator is capable of producing on a steady state basis and during continuous operation (when not restricted by seasonal or other deratings), such increased maximum amount as of such completion as specified by the person conducting the physical change.

Oil-fired means, for purposes of subpart EEEE of this part, combusting fuel oil for more than 15.0 percent of the annual heat input in a specified year and not qualifying as coal-fired.

Operator means any person who operates, controls, or supervises a CAIR NO_X Ozone Season unit or a CAIR NO_X Ozone Season source and shall include, but not be limited to, any holding company, utility system, or plant manager of such a unit or source.

Owner means any of the following persons:

(1) With regard to a CAIR NO_X Ozone Season source or a CAIR NO_X Ozone Season unit at a source, respectively:

(i) Any holder of any portion of the legal or equitable title in a CAIR NO_X Ozone Season unit at the source or the CAIR NO_X Ozone Season unit;

(ii) Any holder of a leasehold interest in a CAIR NO_X Ozone Season unit at the source or the CAIR NO_X Ozone Season unit; or

(iii) Any purchaser of power from a CAIR NO_X Ozone Season unit at the source or the CAIR NO_X Ozone Season unit under a life-of-the-unit, firm power contractual arrangement; provided that, unless expressly provided for in a leasehold agreement, owner shall not include a passive lessor, or a person who has an equitable interest through such lessor, whose rental payments are not based (either directly or indirectly) on the revenues or income from such CAIR NO_X Ozone Season unit; or

(2) With regard to any general account, any person who has an ownership interest with respect to the CAIR NO_X Ozone Season allowances held in the general account and who is subject to the binding agreement for the CAIR authorized account representative to represent the person's ownership interest with respect to CAIR NO_X Ozone Season allowances.

Permitting authority means the State air pollution control agency, local agency, other State agency, or other agency authorized by the Administrator to issue or revise permits to meet the requirements of the CAIR NO_X Ozone Season Trading Program in accordance with subpart CCCC of this part or, if no such agency has been so authorized, the Administrator.

Potential electrical output capacity means 33 percent of a unit(s maximum design heat input, divided by 3,413 Btu/kWh, divided by 1,000 kWh/MWh, and multiplied by 8,760 hr/yr.

Receive or receipt of means, when referring to the permitting authority or the Administrator, to come into possession of a document, information, or correspondence (whether sent in hard copy or by authorized electronic transmission), as indicated in an official log, or by a notation made on the document, information, or correspondence, by the permitting authority or the Administrator in the regular course of business.

Recordation, *record*, or *recorded* means, with regard to CAIR NO_X Ozone Season allowances, the movement of CAIR NO_X Ozone Season allowances by the Administrator into or between CAIR NO_X Ozone Season Allowance Tracking System accounts, for purposes of allocation, transfer, or deduction.

Reference method means any direct test method of sampling and analyzing for an air pollutant as specified in (75.22 of this chapter.

Replacement, *replace*, or *replaced* means, with regard to a unit, the demolishing of a unit, or the permanent shutdown and permanent disabling of a unit, and the construction of another unit (the replacement unit) to be used instead of the demolished or shutdown unit (the replaced unit).

Repowered means, with regard to a unit, replacement of a coal-fired boiler with one of the following coal-fired technologies at the same source as the coal-fired boiler:

(1) Atmospheric or pressurized fluidized bed combustion;

(2) Integrated gasification combined cycle;

(3) Magnetohydrodynamics;

(4) Direct and indirect coal-fired turbines;

(5) Integrated gasification fuel cells; or

(6) As determined by the Administrator in consultation with the Secretary of Energy, a derivative of one or more of the technologies under paragraphs (1) through (5) of this definition and any other coal-fired technology capable of controlling multiple combustion emissions simultaneously with improved boiler or generation efficiency and with significantly greater waste reduction relative to the performance of technology in widespread commercial use as of January 1, 2005.

Sequential use of energy means:

(1) For a topping-cycle cogeneration unit, the use of reject heat from electricity production in a useful thermal energy application or process; or

(2) For a bottoming-cycle cogeneration unit, the use of reject heat from useful thermal energy application or process in electricity production.

Serial number means, for a CAIR NO_X Ozone Season allowance, the unique identification number assigned to each CAIR NO_X Ozone Season allowance by the Administrator.

Solid waste incineration unit means a stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine that is a ''solid waste incineration unit'' as defined in section 129(g)(1) of the Clean Air Act.

Source means all buildings, structures, or installations located in one or more contiguous or adjacent properties under common control of the same person or persons. For purposes of section 502(c) of the Clean Air Act, a ''source,'' including a ''source'' with multiple units, shall be considered a single ''facility.''

State means one of the States or the District of Columbia that is subject to the CAIR NO_X Ozone Season Trading Program pursuant to (52.35 of this chapter.

Submit or serve means to send or transmit a document, information, or correspondence to the person specified in accordance with the applicable regulation:

(1) In person;

(2) By United States Postal Service; or

(3) By other means of dispatch or transmission and delivery. Compliance with any ''submission'' or ''service'' deadline shall be determined by the date of dispatch, transmission, or mailing and not the date of receipt.

Title V operating permit means a permit issued under title V of the Clean Air Act and part 70 or part 71 of this chapter.

Title V operating permit regulations means the regulations that the Administrator has approved or issued as meeting the requirements of title V of the Clean Air Act and part 70 or 71 of this chapter.

Ton means 2,000 pounds. For the purpose of determining compliance with the CAIR NO_X Ozone Season emissions limitation, total tons of nitrogen oxides emissions for a control period shall be calculated as the sum of all recorded hourly emissions (or the mass equivalent of the recorded hourly emission rates) in accordance with subpart HHHH of this part, but with any remaining fraction of a ton equal to or greater than 0.50 tons deemed to equal one ton and any remaining fraction of a ton less than 0.50 tons deemed to equal zero tons.

Topping-cycle cogeneration unit means a cogeneration unit in which the energy input to the unit is first used to produce useful power, including electricity, and at least some of the reject heat from the electricity production is then used to provide useful thermal energy.

Total energy input means, with regard to a cogeneration unit, total energy of all forms supplied to the cogeneration unit, excluding energy produced by the cogeneration unit itself.

Total energy output means, with regard to a cogeneration unit, the sum of useful power and useful thermal energy produced by the cogeneration unit.

Unit means a stationary, fossil-fuel-fired boiler or combustion turbine or other stationary, fossil-fuel-fired combustion device.

Unit operating day means a calendar day in which a unit combusts any fuel.

Unit operating hour or *hour of unit operation* means an hour in which a unit combusts any fuel.

Useful power means, with regard to a cogeneration unit, electricity or mechanical energy made available for use, excluding any such energy used in the power production process (which process includes, but is not limited to, any on-site processing or treatment of fuel combusted at the unit and any on-site emission controls).

Useful thermal energy means, with regard to a cogeneration unit, thermal energy that is:

(1) Made available to an industrial or commercial process (not a power production process), excluding any heat contained in condensate return or makeup water;

(2) Used in a heating application (*e.g.,* space heating or domestic hot water heating); or

(3) Used in a space cooling application (*i.e.,* thermal energy used by an absorption chiller).

Utility power distribution system means the portion of an electricity grid owned or operated by a utility and dedicated to delivering electricity to customers.

§ 97.303 Measurements, abbreviations, and acronyms.

Measurements, abbreviations, and acronyms used in this subpart and subparts BBBB through IIII are defined as follows:

Btu—British thermal unit.
CO_2—carbon dioxide.
H_2O—water.
Hg—mercury.
hr—hour.
kW—kilowatt electrical.
kWh—kilowatt hour.
lb—pound.
mmBtu—million Btu.
MWe—megawatt electrical.
MWh—megawatt hour.
NO_X—nitrogen oxides.
O_2—oxygen.
ppm—parts per million.
scfh—standard cubic feet per hour.
SO_2—sulfur dioxide.
yr—year.

§ 97.304 Applicability.

(a) Except as provided in paragraph (b) of this section:

(1) The following units in a State shall be CAIR NO_X Ozone Season units, and any source that includes one or more such units shall be a CAIR NO_X Ozone Season source, subject to the requirements of this subpart and subparts BBBB through HHHH of this part: any stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine serving at any time, since the later of November 15, 1990 or the start-up of the unit(s combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale.

(2) If a stationary boiler or stationary combustion turbine that, under paragraph (a)(1) of this section, is not a CAIR NO_X Ozone Season unit begins to combust fossil fuel or to serve a generator with nameplate capacity of more than 25 MWe producing electricity for sale, the unit shall become a CAIR NO_X Ozone Season unit as provided in paragraph (a)(1) of this section on the first date on which it both combusts fossil fuel and serves such generator.

(b) The units in a State that meet the requirements set forth in paragraph (b)(1)(i), (b)(2)(i), or (b)(2)(ii) of this section shall not be CAIR NO_X Ozone Season units:

(1)(i) Any unit that is a CAIR NO_X Ozone Season unit under paragraph (a)(1) or (2) of this section:

(A) Qualifying as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and continuing to qualify as a cogeneration unit; and

(B) Not serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe supplying in any calendar year more than one-third of the unit(s potential electric output capacity or 219,000 MWh, whichever is greater, to any utility power distribution system for sale.

(ii) If a unit qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and meets the requirements of paragraphs (b)(1)(i) of this section for at least one calendar year, but subsequently no longer meets all such requirements, the unit shall become a CAIR NO_X Ozone Season unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of paragraph (b)(1)(i)(B) of this section.

(2)(i) Any unit that is a CAIR NO_X Ozone Season unit under paragraph (a)(1) or (2) of this section commencing operation before January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for 1985–1987 exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(ii) Any unit that is a CAIR NO_X Ozone Season unit under paragraph (a)(1) or (2) of this section commencing operation on or after January 1, 1985:

(A) Qualifying as a solid waste incineration unit; and

(B) With an average annual fuel consumption of non-fossil fuel for the first 3 calendar years of operation exceeding 80 percent (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any 3 consecutive calendar years after 1990 exceeding 80 percent (on a Btu basis).

(iii) If a unit qualifies as a solid waste incineration unit and meets the requirements of paragraph (b)(2)(i) or (ii) of this section for at least 3 consecutive calendar years, but subsequently no longer meets all such requirements, the unit shall become a CAIR NO_X Ozone Season unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a solid waste incineration unit or January 1 after the first 3 consecutive calendar years after 1990 for which the unit has an average annual fuel consumption of fossil fuel of 20 percent or more.

(c) A certifying official of an owner or operator of any unit may petition the Administrator at any time for a determination concerning the applicability, under paragraphs (a) and (b) of this section, of the CAIR NO_X Ozone Season Trading Program to the unit.

(1) *Petition content.* The petition shall be in writing and include the identification of the unit and the relevant facts about the unit. The petition and any other documents provided to the Administrator in connection with the petition shall include the following certification statement, signed by the certifying official: ''I am authorized to make this submission on behalf of the owners and operators of the unit for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.''

(2) *Submission.* The petition and any other documents provided in connection with the petition shall be submitted to the Director of the Clean Air Markets Division (or its successor), U.S. Environmental Protection Agency, who will act on the petition as the Administrator's duly authorized representative.

(3) *Response.* The Administrator will issue a written response to the petition and may request supplemental information relevant to such petition. The Administrator's determination concerning the applicability, under paragraphs (a) and (b) of this section, of the CAIR NO_X Ozone Season Trading Program to the unit shall be binding on the permitting authority unless the petition or other information or documents provided in connection with

the petition are found to have contained significant, relevant errors or omissions.

(d) Notwithstanding paragraphs (a) and (b) of this section, if a State submits, and the Administrator approves, a State implementation plan revision in accordance with § 51.123(ee)(1) of this chapter providing for the inclusion in the CAIR NO_X Ozone Season Trading Program of all units that are not otherwise CAIR NO_X Ozone Season units under paragraphs (a) and (b) of this section and that are NO_X Budget units covered by the State's emissions trading program approved under § 51.121(p) of this chapter, such units shall be CAIR NO_X Ozone Season units as of the first date that they are NO_X Budget units under the NO_X Budget Trading Program under § 51.121(p) of this chapter.

§ 97.305 Retired unit exemption.

(a)(1) Any CAIR NO_X Ozone Season unit that is permanently retired and is not a CAIR NO_X Ozone Season opt-in unit under subpart IIII of this part shall be exempt from the CAIR NO_X Ozone Season Trading Program, except for the provisions of this section, §§ 97.302, 97.303, 97.304, 97.306(c)(4) through (7), 97.307, 97.308, and subparts BBBB and EEEE through GGGG of this part.

(2) The exemption under paragraph (a)(1) of this section shall become effective the day on which the CAIR NO_X Ozone Season unit is permanently retired. Within 30 days of the unit's permanent retirement, the CAIR designated representative shall submit a statement to the permitting authority otherwise responsible for administering any CAIR permit for the unit and shall submit a copy of the statement to the Administrator. The statement shall state, in a format prescribed by the permitting authority, that the unit was permanently retired on a specific date and will comply with the requirements of paragraph (b) of this section.

(3) After receipt of the statement under paragraph (a)(2) of this section, the permitting authority will amend any permit under subpart CCCC of this part covering the source at which the unit is located to add the provisions and requirements of the exemption under paragraphs (a)(1) and (b) of this section.

(b) *Special provisions.* (1) A unit exempt under paragraph (a) of this section shall not emit any nitrogen oxides, starting on the date that the exemption takes effect.

(2) The Administrator or the permitting authority will allocate CAIR NO_X Ozone Season allowances under subpart EEEE of this part to a unit exempt under paragraph (a) of this section.

(3) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under paragraph (a) of this section shall retain at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time before the end of the period, in writing by the permitting authority or the Administrator. The owners and operators bear the burden of proof that the unit is permanently retired.

(4) The owners and operators and, to the extent applicable, the CAIR designated representative of a unit exempt under paragraph (a) of this section shall comply with the requirements of the CAIR NO_X Ozone Season Trading Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.

(5) A unit exempt under paragraph (a) of this section and located at a source that is required, or but for this exemption would be required, to have a title V operating permit shall not resume operation unless the CAIR designated representative of the source submits a complete CAIR permit application under § 97.322 for the unit not less than 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2009 or the date on which the unit resumes operation.

(6) On the earlier of the following dates, a unit exempt under paragraph (a) of this section shall lose its exemption:

(i) The date on which the CAIR designated representative submits a CAIR permit application for the unit under paragraph (b)(5) of this section;

(ii) The date on which the CAIR designated representative is required under paragraph (b)(5) of this section to submit a CAIR permit application for the unit; or

(iii) The date on which the unit resumes operation, if the CAIR designated representative is not required to submit a CAIR permit application for the unit.

(7) For the purpose of applying monitoring, reporting, and recordkeeping requirements under subpart HHHH of this part, a unit that loses its exemption under paragraph (a) of this section shall be treated as a unit that commences commercial operation on the first date on which the unit resumes operation.

§ 97.306 Standard requirements.

(a) *Permit requirements.* (1) The CAIR designated representative of each CAIR NO_X Ozone Season source required to have a title V operating permit and each CAIR NO_X Ozone Season unit required to have a title V operating permit at the source shall:

(i) Submit to the permitting authority a complete CAIR permit application under § 97.322 in accordance with the deadlines specified in § 97.321; and

(ii) Submit in a timely manner any supplemental information that the permitting authority determines is necessary in order to review a CAIR permit application and issue or deny a CAIR permit.

(2) The owners and operators of each CAIR NO_X Ozone Season source required to have a title V operating permit and each CAIR NO_X Ozone Season unit required to have a title V operating permit at the source shall have a CAIR permit issued by the permitting authority under subpart CCCC of this part for the source and operate the source and the unit in compliance with such CAIR permit.

(3) Except as provided in subpart IIII of this part, the owners and operators of a CAIR NO_X Ozone Season source that is not otherwise required to have a title V operating permit and each CAIR NO_X Ozone Season unit that is not otherwise required to have a title V operating permit are not required to submit a CAIR permit application, and to have a CAIR permit, under subpart CCCC of this part for such CAIR NO_X Ozone Season source and such CAIR NO_X Ozone Season unit.

(b) *Monitoring, reporting, and recordkeeping requirements.* (1) The owners and operators, and the CAIR designated representative, of each CAIR NO_X Ozone Season source and each CAIR NO_X Ozone Season unit at the source shall comply with the monitoring, reporting, and recordkeeping requirements of subpart HHHH of this part.

(2) The emissions measurements recorded and reported in accordance with subpart HHHH of this part shall be used to determine compliance by each CAIR NO_X Ozone Season source with the CAIR NO_X Ozone Season emissions limitation under paragraph (c) of this section.

(c) *Nitrogen oxides ozone season emission requirements.* (1) As of the allowance transfer deadline for a control period, the owners and operators of each CAIR NO_X Ozone Season source and each CAIR NO_X Ozone Season unit at the source shall hold, in the source's compliance account, CAIR NO_X Ozone Season allowances available for compliance deductions for the control period under § 97.354(a) in an amount not less than the tons of total nitrogen oxides emissions for the control period from all CAIR NO_X Ozone Season units at the source, as determined in accordance with subpart HHHH of this part.

(2) A CAIR NO_X Ozone Season unit shall be subject to the requirements under paragraph (c)(1) of this section for the control period starting on the later of May 1, 2009 or the deadline for meeting the unit's monitor certification requirements under § 97.370(b)(1), (2), (3), or (7) and for each control period thereafter.

(3) A CAIR NO_X Ozone Season allowance shall not be deducted, for compliance with the requirements under paragraph (c)(1) of this section, for a control period in a calendar year before the year for which the CAIR NO_X Ozone Season allowance was allocated.

(4) CAIR NO_X Ozone Season allowances shall be held in, deducted from, or transferred into or among CAIR NO_X Ozone Season Allowance Tracking System accounts in accordance with subparts EEEE, FFFF, GGGG, and IIII of this part.

(5) A CAIR NO_X Ozone Season allowance is a limited authorization to emit one ton of nitrogen oxides in accordance with the CAIR NO_X Ozone Season Trading Program. No provision of the CAIR NO_X Ozone Season Trading Program, the CAIR permit application, the CAIR permit, or an exemption under § 97.305 and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization.

(6) A CAIR NO_X Ozone Season allowance does not constitute a property right.

(7) Upon recordation by the Administrator under subpart EEEE, FFFF, GGGG, or IIII of this part, every allocation, transfer, or deduction of a CAIR NO_X Ozone Season allowance to or from a CAIR NO_X Ozone Season source's compliance account is incorporated automatically in any CAIR permit of the source.

(d) *Excess emissions requirements.* If a CAIR NO_X Ozone Season source emits nitrogen oxides during any control period in excess of the CAIR NO_X Ozone Season emissions limitation, then:

(1) The owners and operators of the source and each CAIR NO_X Ozone Season unit at the source shall surrender the CAIR NO_X Ozone Season allowances required for deduction under § 97.354(d)(1) and pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, under the Clean Air Act or applicable State law; and

(2) Each ton of such excess emissions and each day of such control period shall constitute a separate violation of this subpart, the Clean Air Act, and applicable State law.

(e) *Recordkeeping and reporting requirements.* (1) Unless otherwise provided, the owners and operators of the CAIR NO_X Ozone Season source and each CAIR NO_X Ozone Season unit at the source shall keep on site at the source each of the following documents for a period of 5 years from the date the document is created. This period may be extended for cause, at any time before the end of 5 years, in writing by the permitting authority or the Administrator.

(i) The certificate of representation under § 97.313 for the CAIR designated representative for the source and each CAIR NO_X Ozone Season unit at the source and all documents that demonstrate the truth of the statements in the certificate of representation; provided that the certificate and documents shall be retained on site at the source beyond such 5-year period until such documents are superseded because of the submission of a new certificate of representation under § 97.313 changing the CAIR designated representative.

(ii) All emissions monitoring information, in accordance with subpart HHHH of this part, provided that to the extent that subpart HHHH of this part provides for a 3-year period for recordkeeping, the 3-year period shall apply.

(iii) Copies of all reports, compliance certifications, and other submissions and all records made or required under the CAIR NO_X Ozone Season Trading Program.

(iv) Copies of all documents used to complete a CAIR permit application and any other submission under the CAIR NO_X Ozone Season Trading Program or to demonstrate compliance with the requirements of the CAIR NO_X Ozone Season Trading Program.

(2) The CAIR designated representative of a CAIR NO_X Ozone Season source and each CAIR NO_X Ozone Season unit at the source shall submit the reports required under the CAIR NO_X Ozone Season Trading Program, including those under subpart HHHH of this part.

(f) *Liability.* (1) Each CAIR NO_X Ozone Season source and each CAIR NO_X Ozone Season unit shall meet the requirements of the CAIR NO_X Ozone Season Trading Program.

(2) Any provision of the CAIR NO_X Ozone Season Trading Program that applies to a CAIR NO_X Ozone Season source or the CAIR designated representative of a CAIR NO_X Ozone Season source shall also apply to the owners and operators of such source and of the CAIR NO_X Ozone Season units at the source.

(3) Any provision of the CAIR NO_X Ozone Season Trading Program that applies to a CAIR NO_X Ozone Season unit or the CAIR designated representative of a CAIR NO_X Ozone Season unit shall also apply to the owners and operators of such unit.

(g) *Effect on other authorities.* No provision of the CAIR NO_X Ozone Season Trading Program, a CAIR permit application, a CAIR permit, or an exemption under § 97.305 shall be construed as exempting or excluding the owners and operators, and the CAIR designated representative, of a CAIR NO_X Ozone Season source or CAIR NO_X Ozone Season unit from compliance with any other provision of the applicable, approved State implementation plan, a federally enforceable permit, or the Clean Air Act.

§ 97.307 Computation of time.

(a) Unless otherwise stated, any time period scheduled, under the CAIR NO_X Ozone Season Trading Program, to begin on the occurrence of an act or event shall begin on the day the act or event occurs.

(b) Unless otherwise stated, any time period scheduled, under the CAIR NO_X Ozone Season Trading Program, to begin before the occurrence of an act or event shall be computed so that the period ends the day before the act or event occurs.

(c) Unless otherwise stated, if the final day of any time period, under the CAIR NO_X Ozone Season Trading Program, falls on a weekend or a State or Federal holiday, the time period shall be extended to the next business day.

§ 97.308 Appeal procedures.

The appeal procedures for decisions of the Administrator under the CAIR NO_X Ozone Season Trading Program are set forth in part 78 of this chapter.

Appendix A to Subpart AAAA of Part 97—States With Approved State Implementation Plan Revisions Concerning Applicability

The following States have State Implementation Plan revisions under § 51.123(ee)(1) of this chapter approved by the Administrator and providing for expansion of the applicability provisions to include all non-EGUs subject to the respective State's emission trading program approved under § 51.121(p) of this chapter:

[Reserved]

Subpart BBBB—CAIR Designated Representative for CAIR NO_X Ozone Season Sources

§ 97.310 Authorization and responsibilities of CAIR designated representative.

(a) Except as provided under § 97.311, each CAIR NO_X Ozone Season source, including all CAIR NO_X Ozone Season units at the source, shall have one and only one CAIR designated representative, with regard to all matters under the CAIR NO_X Ozone Season Trading Program concerning the source or any CAIR NO_X Ozone Season unit at the source.

(b) The CAIR designated representative of the CAIR NO_X Ozone Season source shall be selected by an agreement binding on the owners and operators of the source and all CAIR NO_X Ozone Season units at the source and shall act in accordance with the certification statement in § 97.313(a)(4)(iv).

(c) Upon receipt by the Administrator of a complete certificate of representation under § 97.313, the CAIR designated representative of the source shall represent and, by his or her representations, actions, inactions, or submissions, legally bind each owner and operator of the CAIR NO_X Ozone Season source represented and each CAIR NO_X Ozone Season unit at the source in all matters pertaining to the CAIR NO_X Ozone Season Trading Program, notwithstanding any agreement between the CAIR designated representative and such owners and operators. The owners and operators shall be bound by any decision or order issued to the CAIR designated representative by the permitting authority, the Administrator, or a court regarding the source or unit.

(d) No CAIR permit will be issued, no emissions data reports will be accepted, and no CAIR NO_X Ozone Season Allowance Tracking System account will be established for a CAIR NO_X Ozone Season unit at a source, until the Administrator has received a complete certificate of representation under § 97.313 for a CAIR designated representative of the source and the CAIR NO_X Ozone Season units at the source.

(e)(1) Each submission under the CAIR NO_X Ozone Season Trading Program shall be submitted, signed, and certified by the CAIR designated representative for each CAIR NO_X Ozone Season source on behalf of which the submission is made. Each such submission shall include the following certification statement by the CAIR designated representative: ''I am authorized to make this submission on behalf of the owners and operators of the source or units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.''

(2) The permitting authority and the Administrator will accept or act on a submission made on behalf of owner or operators of a CAIR NO_X Ozone Season source or a CAIR NO_X Ozone Season unit only if the submission has been made, signed, and certified in accordance with paragraph (e)(1) of this section.

§ 97.311 Alternate CAIR designated representative.

(a) A certificate of representation under § 97.313 may designate one and only one alternate CAIR designated representative, who may act on behalf of the CAIR designated representative. The agreement by which the alternate CAIR designated representative is selected shall include a procedure for authorizing the alternate CAIR designated representative to act in lieu of the CAIR designated representative.

(b) Upon receipt by the Administrator of a complete certificate of representation under § 97.313, any representation, action, inaction, or submission by the alternate CAIR designated representative shall be deemed to be a representation, action, inaction, or submission by the CAIR designated representative.

(c) Except in this section and §§ 97.302, 97.310(a) and (d), 97.312, 97.313, 97.315, 97.351, and 97.382, whenever the term ''CAIR designated representative'' is used in subparts AAAA through IIII of this part, the term shall be construed to include the CAIR designated representative or any alternate CAIR designated representative.

§ 97.312 Changing CAIR designated representative and alternate CAIR designated representative; changes in owners and operators.

(a) *Changing CAIR designated representative.* The CAIR designated representative may be changed at any time upon receipt by the Administrator of a superseding complete certificate of representation under § 97.313. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous CAIR designated representative before the time and date when the Administrator receives the superseding certificate of representation shall be binding on the new CAIR designated representative and the owners and operators of the CAIR NO_X Ozone Season source and the CAIR NO_X Ozone Season units at the source.

(b) *Changing alternate CAIR designated representative.* The alternate CAIR designated representative may be changed at any time upon receipt by the Administrator of a superseding complete certificate of representation under § 97.313. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous alternate CAIR designated representative before the time and date when the Administrator receives the superseding certificate of representation shall be binding on the new alternate CAIR designated representative and the owners and operators of the CAIR NO_X Ozone Season source and the CAIR NO_X Ozone Season units at the source.

(c) *Changes in owners and operators.* (1) In the event an owner or operator of a CAIR NO_X Ozone Season source or a CAIR NO_X Ozone Season unit is not included in the list of owners and operators in the certificate of representation under § 97.313, such owner or operator shall be deemed to be subject to and bound by the certificate of representation, the representations, actions, inactions, and submissions of the CAIR designated representative and any alternate CAIR designated representative of the source or unit, and the decisions and orders of the permitting authority, the Administrator, or a court, as if the owner or operator were included in such list.

(2) Within 30 days following any change in the owners and operators of a CAIR NO_X Ozone Season source or a CAIR NO_X Ozone Season unit, including the addition of a new owner or operator, the CAIR designated representative or any alternate CAIR designated representative shall submit a revision to the certificate of representation under § 97.313 amending the list of owners and operators to include the change.

§ 97.313 Certificate of representation.

(a) A complete certificate of representation for a CAIR designated representative or an alternate CAIR designated representative shall include the following elements in a format prescribed by the Administrator:

(1) Identification of the CAIR NO_X Ozone Season source, and each CAIR NO_X Ozone Season unit at the source, for which the certificate of representation is submitted, including identification and nameplate capacity of each generator served by each such unit.

(2) The name, address, e-mail address (if any), telephone number, and facsimile transmission number (if any) of the CAIR designated representative and any alternate CAIR designated representative.

(3) A list of the owners and operators of the CAIR NO_X Ozone Season source and of each CAIR NO_X Ozone Season unit at the source.

(4) The following certification statements by the CAIR designated representative and any alternate CAIR designated representative—

(i) ''I certify that I was selected as the CAIR designated representative or alternate CAIR designated representative, as applicable, by an agreement binding on the owners and operators of the source and each CAIR NO_X Ozone Season unit at the source.''

(ii) ''I certify that I have all the necessary authority to carry out my duties and responsibilities under the CAIR NO_X Ozone Season Trading Program on behalf of the owners and operators of the source and of each CAIR NO_X Ozone Season unit at the source and that each such owner and operator shall be fully bound by my representations, actions, inactions, or submissions.''

(iii) ''I certify that the owners and operators of the source and of each CAIR NO_X Ozone Season unit at the source shall be bound by any order issued to me by the Administrator, the permitting authority, or a court regarding the source or unit.''

(iv) ''Where there are multiple holders of a legal or equitable title to, or a leasehold interest in, a CAIR NO_X Ozone Season unit, or where a utility or industrial customer purchases power from a CAIR NO_X Ozone Season unit under a life-of-the-unit, firm power contractual arrangement, I certify that: I have given a written notice of my selection as the 'CAIR designated representative' or 'alternate CAIR designated representative', as applicable, and of the agreement by which I was selected to each owner and operator of the source and of each CAIR NO_X Ozone Season unit at the source; and CAIR NO_X Ozone Season allowances and proceeds of transactions involving CAIR NO_X Ozone Season allowances will be deemed to be held or distributed in proportion to each holder's legal, equitable, leasehold, or contractual reservation or entitlement, except that, if such multiple holders have expressly provided for a different distribution of CAIR NO_X Ozone Season allowances by contract, CAIR NO_X Ozone Season allowances and proceeds of transactions involving CAIR NO_X Ozone Season allowances will be deemed to be held or distributed in accordance with the contract.''

(5) The signature of the CAIR designated representative and any alternate CAIR designated representative and the dates signed.

(b) Unless otherwise required by the permitting authority or the Administrator, documents of agreement referred to in the certificate of representation shall not be submitted to the permitting authority or the Administrator. Neither the permitting authority nor the Administrator shall be under any obligation to review or evaluate the sufficiency of such documents, if submitted.

§ 97.314 Objections concerning CAIR designated representative.

(a) Once a complete certificate of representation under § 97.313 has been submitted and received, the permitting authority and the Administrator will rely on the certificate of representation unless and until a superseding complete certificate of representation under § 97.313 is received by the Administrator.

(b) Except as provided in § 97.312(a) or (b), no objection or other communication submitted to the permitting authority or the Administrator concerning the authorization, or any representation, action, inaction, or submission, of the CAIR designated representative shall affect any representation, action, inaction, or submission of the CAIR designated representative or the finality of any decision or order by the permitting authority or the Administrator under the CAIR NO_X Ozone Season Trading Program.

(c) Neither the permitting authority nor the Administrator will adjudicate any private legal dispute concerning the authorization or any representation, action, inaction, or submission of any CAIR designated representative, including private legal disputes concerning the proceeds of CAIR NO_X Ozone Season allowance transfers.

§ 97.315 Delegation by CAIR designated representative and alternate CAIR designated representative.

(a) A CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(b) An alternate CAIR designated representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under this part.

(c) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (a) or (b) of this section, the CAIR designated representative or alternate CAIR designated representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(1) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR designated representative or alternate CAIR designated representative;

(2) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(3) For each such natural person, a list of the type or types of electronic submissions under paragraph (a) or (b) of this section for which authority is delegated to him or her; and

(4) The following certification statements by such CAIR designated representative or alternate CAIR designated representative:

(i) ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR designated representative or alternate CAIR designated representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 97.315(d) shall be deemed to be an electronic submission by me.''

(ii) ''Until this notice of delegation is superseded by another notice of delegation under 40 CFR 97.315(d), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 97.315 is terminated.''.

(d) A notice of delegation submitted under paragraph (c) of this section shall be effective, with regard to the CAIR designated representative or alternate CAIR designated representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR designated representative or alternate CAIR designated representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(e) Any electronic submission covered by the certification in paragraph (c)(4)(i) of this section and made in accordance with a notice of delegation effective under paragraph (d) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

Subpart CCCC—Permits

§ 97.320 General CAIR NO_X Ozone Season Trading Program permit requirements.

(a) For each CAIR NO_X Ozone Season source required to have a title V operating permit or required, under subpart IIII of this part, to have a title V operating permit or other federally enforceable permit, such permit shall include a CAIR permit administered by the permitting authority for the title V operating permit or the federally enforceable permit as applicable. The CAIR portion of the title V permit or other federally enforceable permit as applicable shall be administered in accordance with the permitting authority's title V operating permits regulations promulgated under part 70 or 71 of this chapter or the permitting authority's regulations for other federally enforceable permits as applicable, except as provided otherwise by § 97.305, this subpart, and subpart IIII of this part.

(b) Each CAIR permit shall contain, with regard to the CAIR NO_X Ozone Season source and the CAIR NO_X Ozone Season units at the source covered by the CAIR permit, all applicable CAIR NO_X Ozone Season Trading Program, CAIR NO_X Annual Trading Program, and CAIR SO_2 Trading Program requirements and shall be a complete and separable portion of the title V operating permit or other federally enforceable permit under paragraph (a) of this section.

§ 97.321 Submission of CAIR permit applications.

(a) *Duty to apply.* The CAIR designated representative of any CAIR NO_X Ozone Season source required to have a title V operating permit shall submit to the permitting authority a complete CAIR permit application under § 97.322 for the source covering each CAIR NO_X Ozone Season unit at the source at least 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2009 or the date on which the CAIR NO_X Ozone Season unit commences commercial operation, except as provided in § 97.383(a).

(b) *Duty to reapply.* For a CAIR NO_X Ozone Season source required to have a title V operating permit, the CAIR designated representative shall submit a complete CAIR permit application under § 97.322 for the source covering each CAIR NO_X Ozone Season unit at the source to renew the CAIR permit in accordance with the permitting authority's title V operating permits regulations addressing permit renewal, except as provided in § 97.383(b).

§ 97.322 Information requirements for CAIR permit applications.

A complete CAIR permit application shall include the following elements concerning the CAIR NO_X Ozone Season source for which the application is submitted, in a format prescribed by the permitting authority:

(a) Identification of the CAIR NO_X Ozone Season source;

(b) Identification of each CAIR NO_X Ozone Season unit at the CAIR NO_X Ozone Season source; and

(c) The standard requirements under § 97.306.

§ 97.323 CAIR permit contents and term.

(a) Each CAIR permit will contain, in a format prescribed by the permitting authority, all elements required for a complete CAIR permit application under § 97.322.

(b) Each CAIR permit is deemed to incorporate automatically the definitions of terms under § 97.302 and, upon recordation by the Administrator under subpart EEEE, FFFF, GGGG, or IIII of this part, every allocation, transfer, or deduction of a CAIR NO_X Ozone Season allowance to or from the compliance account of the CAIR NO_X Ozone Season source covered by the permit.

(c) The term of the CAIR permit will be set by the permitting authority, as necessary to facilitate coordination of the renewal of the CAIR permit with issuance, revision, or renewal of the CAIR NO_X Ozone Season source's title V operating permit or other federally enforceable permit as applicable.

§ 97.324 CAIR permit revisions.

Except as provided in § 97.323(b), the permitting authority will revise the CAIR permit, as necessary, in accordance with the permitting authority's title V operating permits regulations or the permitting authority's regulations for other federally enforceable permits as applicable addressing permit revisions.

Subpart DDDD—[Reserved]

Subpart EEEE—CAIR NO_X Ozone Season Allowance Allocations

§ 97.340 State trading budgets.

(a) Except as provided in paragraph (b) of this section, the State trading budgets for annual allocations of CAIR NO_X Ozone Season allowances for the control periods in 2009 through 2014 and in 2015 and thereafter are respectively as follows:

State	State trading budget for 2009–2014 (tons)	State trading budget for 2015 and thereafter (tons)
Alabama	32,182	26,818
Arkansas	11,515	9,597
Connecticut	2,559	2,559
Delaware	2,226	1,855
District of Columbia	112	94
Florida	47,912	39,926
Illinois	30,701	28,981
Indiana	45,952	39,273
Iowa	14,263	11,886
Kentucky	36,045	30,587
Louisiana	17,085	14,238
Maryland	12,834	10,695

State	State trading budget for 2009–2014 (tons)	State trading budget for 2015 and thereafter (tons)
Massachusetts	7,551	6,293
Michigan	28,971	24,142
Mississippi	8,714	7,262
Missouri	26,678	22,231
New Jersey	6,654	5,545
New York	20,632	17,193
North Carolina	28,392	23,660
Ohio	45,664	39,945
Pennsylvania	42,171	35,143
South Carolina	15,249	12,707
Tennessee	22,842	19,035
Virginia	15,994	13,328
West Virginia	26,859	26,525
Wisconsin	17,987	14,989

(b) Upon approval by the Administrator of a State's State implementation plan revision under § 51.123(ee)(1) of this chapter providing for the inclusion in the CAIR NO_X Ozone Season Trading Program of all units that are not otherwise CAIR NO_X Ozone Season units under § 97.304(a) and (b) and that are NO_X Budget units covered by the State's emissions trading program approved under § 51.121(p), the amount in the State trading budget for a control period in a calendar year will be the sum of the amount set forth for the State and for the year in paragraph (a) of this section and the amount of additional CAIR NO_X Ozone Season allowance allocations issued under § 51.123(ee)(1)(ii)(A) of this chapter for the year.

§ 97.341 Timing requirements for CAIR NO_X Ozone Season allowance allocations.

(a) The Administrator will determine by order the CAIR NO_X Ozone Season allowance allocations, in accordance with § 97.342(a) and (b), for the control periods in 2009, 2010, 2011, 2012, 2013, and 2014.

(b) By July 31, 2011 and July 31 of each year thereafter, the Administrator will determine by order the CAIR NO_X Ozone Season allowance allocations, in accordance with § 97.342(a) and (b), for the control period in the fourth year after the year of the applicable deadline for determination under this paragraph.

(c) By April 30, 2009 and April 30 of each year thereafter, the Administrator will determine by order the CAIR NO_X Ozone Season allowance allocations, in accordance with § 97.342(a), (c), and (d), for the control period in the year of the applicable deadline for determination under this paragraph.

(d) The Administrator will make available to the public each determination of CAIR NO_X Ozone Season allowances under paragraph (a), (b), or (c) of this section and will provide an opportunity for submission of objections to the determination. Objections shall be limited to addressing whether the determination is in accordance with § 97.342. Based on any such objections, the Administrator will adjust each determination to the extent necessary to ensure that it is in accordance with § 97.342.

§ 97.342 CAIR NO_X Ozone Season allowance allocations.

(a)(1) The baseline heat input (in mmBtu) used with respect to CAIR NO_X Ozone Season allowance allocations under paragraph (b) of this section for each CAIR NO_X Ozone Season unit will be:

(i) For units commencing operation before January 1, 2001 the average of the 3 highest amounts of the unit's adjusted control period heat input for 2000 through 2004, with the adjusted control period heat input for each year calculated as follows:

(A) If the unit is coal-fired during the year, the unit's control period heat input for such year is multiplied by 100 percent;

(B) If the unit is oil-fired during the year, the unit's control period heat input for such year is multiplied by 60 percent; and

(C) If the unit is not subject to paragraph (a)(1)(i)(A) or (B) of this section, the unit's control period heat input for such year is multiplied by 40 percent.

(ii) For units commencing operation on or after January 1, 2001 and operating each calendar year during a period of 5 or more consecutive calendar years, the average of the 3 highest amounts of the unit's total converted control period heat input over the first such 5 years.

(2)(i) A unit's control period heat input, and a unit's status as coal-fired or oil-fired, for a calendar year under paragraph (a)(1)(i) of this section, and a unit's total tons of NO_X emissions during a control period in a calendar year under paragraph (c)(3) of this section, will be determined in accordance with part 75 of this chapter, to the extent the unit was otherwise subject to the requirements of part 75 of this chapter for the year, or will be based on the best available data reported to the Administrator for the unit (in a format prescribed by the Administrator), to the extent the unit was not otherwise subject to the requirements of part 75 of this chapter for the year.

(ii) A unit's converted control period heat input for a calendar year specified under paragraph (a)(1)(ii) of this section equals:

(A) Except as provided in paragraph (a)(2)(ii)(B) or (C) of this section, the control period gross electrical output of the generator or generators served by the unit multiplied by 7,900 Btu/kWh, if the unit is coal-fired for the year, or 6,675 Btu/kWh, if the unit is not coal-fired for the year, and divided by 1,000,000 Btu/mmBtu, provided that if a generator is served by 2 or more units, then the gross electrical output of the generator will be attributed to each unit in proportion to the unit's share of the total control period heat input of such units for the year;

(B) For a unit that is a boiler and has equipment used to produce electricity and useful thermal energy for industrial, commercial, heating, or cooling purposes through the sequential use of energy, the total heat energy (in Btu) of the steam produced by the boiler during the control period, divided by 0.8 and by 1,000,000 Btu/mmBtu; or

(C) For a unit that is a combustion turbine and has equipment used to produce electricity and useful thermal energy for industrial, commercial, heating, or cooling purposes through the sequential use of energy, the control period gross electrical output of the enclosed device comprising the compressor, combustor, and turbine multiplied by 3,413 Btu/kWh, plus the total heat energy (in Btu) of the steam produced by any associated heat recovery steam generator during the control period divided by 0.8, and with the sum divided by 1,000,000 Btu/mmBtu.

(iii) Gross electrical output and total heat energy under paragraph (a)(2)(ii) of this section will be determined based on the best available data reported to the Administrator for the unit (in a format prescribed by the Administrator).

(3) The Administrator will determine what data are the best available data under paragraph (a)(2) of this section by weighing the likelihood that data are accurate and reliable and giving greater weight to data submitted to a governmental entity in compliance with legal requirements or substantiated by an independent entity.

(b)(1) For each control period in 2009 and thereafter, the Administrator will allocate to all CAIR NO_X Ozone Season units in a State that have a baseline heat input (as determined under paragraph (a) of this section) a total amount of CAIR NO_X Ozone Season allowances equal to 95 percent for a control period during 2009 through 2014, and 97 percent for a control period during 2015 and thereafter, of the tons of NO_X emissions in the applicable State trading budget under § 97.340 (except as provided in paragraphs (d) and (e) of this section).

(2) The Administrator will allocate CAIR NO_X Ozone Season allowances to each CAIR NO_X Ozone Season unit under paragraph (b)(1) of this section in an amount determined by multiplying the total amount of CAIR NO_X Ozone Season allowances allocated under paragraph (b)(1) of this section by the ratio of the baseline heat input of such CAIR NO_X Ozone Season unit to the total amount of baseline heat input of all such CAIR NO_X Ozone Season units in the State and rounding to the nearest whole allowance as appropriate.

(c) For each control period in 2009 and thereafter, the Administrator will allocate CAIR NO_X Ozone Season allowances to CAIR NO_X Ozone Season units in a State that are not allocated CAIR NO_X Ozone Season allowances under paragraph (b) of this section because the units do not yet have a baseline heat input under paragraph (a) of this section or because the units have a baseline heat input but all CAIR NO_X Ozone Season allowances available under paragraph (b) of this section for the control period are already allocated, in accordance with the following procedures:

(1) The Administrator will establish a separate new unit set-aside for each control period. Each new unit set-aside will be allocated CAIR NO_X Ozone Season allowances equal to 5 percent for a control period in 2009 through 2014, and 3 percent for a control period in 2015 and thereafter, of the amount of tons of NO_X emissions in the applicable State trading budget under § 97.340.

(2) The CAIR designated representative of such a CAIR NO_X Ozone Season unit may submit to the Administrator a request, in a format specified by the Administrator, to be allocated CAIR NO_X Ozone Season allowances, starting with the later of the control period in 2009 or the first control period after the control period in which the CAIR NO_X Ozone Season unit commences commercial operation and until the first control period for which the unit is allocated CAIR NO_X Ozone Season allowances under paragraph (b) of this section. A separate CAIR NO_X Ozone Season allowance allocation request for each control period for which CAIR NO_X Ozone Season allowances are sought must be submitted on or before February 1 before such control period and after the date on which the CAIR NO_X Ozone Season unit commences commercial operation.

(3) In a CAIR NO_X Ozone Season allowance allocation request under paragraph (c)(2) of this section, the CAIR designated representative may request for a control period CAIR NO_X Ozone Season allowances in an amount not exceeding the CAIR NO_X Ozone Season unit(s total tons of NO_X emissions during the control period immediately before such control period.

(4) The Administrator will review each CAIR NO_X Ozone Season allowance allocation request under paragraph (c)(2) of this section and will allocate CAIR NO_X Ozone Season allowances for each control period pursuant to such request as follows:

(i) The Administrator will accept an allowance allocation request only if the request meets, or is adjusted by the Administrator as necessary to meet, the requirements of paragraphs (c)(2) and (3) of this section.

(ii) On or after February 1 before the control period, the Administrator will determine the sum of the CAIR NO_X Ozone Season allowances requested (as adjusted under paragraph (c)(4)(i) of this section) in all allowance allocation requests accepted under paragraph (c)(4)(i) of this section for the control period.

(iii) If the amount of CAIR NO_X Ozone Season allowances in the new unit set-aside for the control period is greater than or equal to the sum under paragraph (c)(4)(ii) of this section, then the Administrator will allocate the amount of CAIR NO_X Ozone Season allowances requested (as adjusted under paragraph (c)(4)(i) of this section) to each CAIR NO_X Ozone Season unit covered by an allowance allocation request accepted under paragraph (c)(4)(i) of this section.

(iv) If the amount of CAIR NO_X Ozone Season allowances in the new unit set-aside for the control period is less than the sum under paragraph (c)(4)(ii) of this section, then the Administrator will allocate to each CAIR NO_X Ozone Season unit covered by an allowance allocation request accepted under paragraph (c)(4)(i) of this section the amount of the CAIR NO_X Ozone Season allowances requested (as adjusted under paragraph (c)(4)(i) of this section), multiplied by the amount of CAIR NO_X Ozone Season allowances in the new unit set-aside for the control period, divided by the sum determined under paragraph (c)(4)(ii) of this section, and rounded to the nearest whole allowance as appropriate.

(v) The Administrator will notify each CAIR designated representative that submitted an allowance allocation request of the amount of CAIR NO_X Ozone Season allowances (if any) allocated for the control period to the CAIR NO_X Ozone Season unit covered by the request.

(d) If, after completion of the procedures under paragraph (c)(4) of this section for a control period, any unallocated CAIR NO_X Ozone Season allowances remain in the new unit set-aside under paragraph (c) of this section for a State for the control period, the Administrator will allocate to each CAIR NO_X Ozone Season unit that was allocated CAIR NO_X Ozone Season allowances under paragraph (b) of this section in the State an amount of CAIR NO_X Ozone Season allowances equal to the total amount of such remaining unallocated CAIR NO_X Ozone Season allowances, multiplied by the unit's allocation under paragraph (b) of this section, divided by 95 percent for a control period during 2009 through 2014, and 97 percent for a control period during 2015 and thereafter, of the amount of tons of NO_X emissions in the applicable State trading budget under § 97.340, and rounded to the nearest whole allowance as appropriate.

(e) If the Administrator determines that CAIR NO_X Ozone Season allowances were allocated under paragraphs (a) and (b) of this section, paragraphs (a) and (c) of this section, or paragraph (d) of this section for a control period and that the recipient of the allocation is not actually a CAIR NO_X Ozone Season unit under § 97.304 in such control period, then the Administrator will notify the CAIR designated representative and will act in accordance with the following procedures:

(1) Except as provided in paragraph (e)(2) or (3) of this section, the Administrator will not record such CAIR NO_X Ozone Season allowances under § 97.353.

(2) If the Administrator already recorded such CAIR NO_X Ozone Season allowances under § 97.353 and if the Administrator makes such determinations before making deductions for the source that includes such recipient under § 97.354(b) for the control period, then the Administrator will deduct from the account in which such CAIR NO_X Ozone Season allowances were recorded under § 97.353 an amount of CAIR NO_X Ozone Season allowances allocated for the same or a prior control period equal to the amount of such already recorded CAIR NO_X Ozone Season allowances. The CAIR designated representative shall ensure that there are sufficient CAIR NO_X Ozone Season allowances in such account for completion of the deduction.

(3) If the Administrator already recorded such CAIR NO_X Ozone Season allowances under § 97.353 and if the Administrator makes such determinations after making deductions for the source that includes such recipient under § 97.354(b) for the control period, then the Administrator will apply paragraph (e)(1) or (2) of this section, as appropriate, to any subsequent control period for which CAIR NO_X Ozone Season allowances were allocated to such recipient.

(4) The Administrator will transfer the CAIR NO_X Ozone Season allowances that are not recorded, or that are deducted, in accordance with paragraphs (e)(1), (2), and (3) of this section to a new unit set-aside for the State in which such recipient is located.

§ 97.343 Alternative of allocation of CAIR NO_X Ozone Season allowances by permitting authority.

(a) Notwithstanding §§ 97.341, 97.342, and 97.353 if a State submits, and the Administrator approves, a State implementation plan revision in accordance with § 51.123(ee)(2) of this chapter providing for allocation of CAIR NO_X Ozone Season allowances by the permitting authority, then the permitting authority shall make such allocations in accordance with such approved State implementation plan revision, the Administrator will not make allocations under §§ 97.341 and 97.342 for the CAIR NO_X Ozone Season units in the State, and under § 97.353, the Administrator will record allocations made under such approved State implementation plan revision instead of allocations under §§ 97.341 and 97.342.

(b) In implementing paragraph(a) of this section and §§ 97.341, 97.342, and 97.353, the Administrator will ensure that the total amount of CAIR NO_X Ozone Season allowances allocated, under such provisions and under a State's State implementation plan revision approved in accordance with § 51.123(ee)(2) of this chapter, for a control period for CAIR NO_X Ozone Season sources in the State or for other entities specified by the permitting authority will not exceed the State's State trading budget for the year of the control period.

Appendix A to Subpart EEEE of Part 97—States With Approved State Implementation Plan Revisions Concerning Allocations

The following States have State Implementation Plan revisions under § 51.123(ee)(2) of this chapter approved by the Administrator and providing for allocation of CAIR NO_X Ozone Season allowances by the permitting authority under § 97.344(a):

[Reserved]

Subpart FFFF—CAIR NO_X Ozone Season Allowance Tracking System

§ 97.350 [Reserved]

§ 97.351 Establishment of accounts.

(a) *Compliance accounts.* Except as provided in § 97.384(e), upon receipt of a complete certificate of representation under § 97.313, the Administrator will establish a compliance account for the CAIR NO_X Ozone Season source for which the certificate of representation was submitted, unless the source already has a compliance account.

(b) *General accounts*—(1) *Application for general account.* (i) Any person may apply to open a general account for the purpose of holding and transferring CAIR NO_X Ozone Season allowances. An application for a general account may designate one and only one CAIR authorized account representative and one and only one alternate CAIR authorized account representative who may act on behalf of the CAIR authorized account representative. The agreement by which the alternate CAIR authorized account representative is selected shall include a procedure for authorizing the alternate CAIR authorized account representative to act in lieu of the CAIR authorized account representative.

(ii) A complete application for a general account shall be submitted to the Administrator and shall include the following elements in a format prescribed by the Administrator:

(A) Name, mailing address, e-mail address (if any), telephone number, and facsimile transmission number (if any) of the CAIR authorized account representative and any alternate CAIR authorized account representative;

(B) Organization name and type of organization, if applicable;

(C) A list of all persons subject to a binding agreement for the CAIR authorized account representative and any alternate CAIR authorized account representative to represent their ownership interest with respect to the CAIR NO_X Ozone Season allowances held in the general account;

(D) The following certification statement by the CAIR authorized account representative and any alternate CAIR authorized account representative: ''I certify that I was selected as the CAIR authorized account representative or the alternate CAIR authorized account representative, as applicable, by an agreement that is binding on all persons who have an ownership interest with respect to CAIR NO_X Ozone Season allowances held in the general account. I certify that I have all the necessary authority to carry out my duties and responsibilities under the CAIR NO_X Ozone Season Trading Program on behalf of such persons and that each such person shall be fully bound by my representations, actions, inactions, or submissions and by any order or decision issued to me by the Administrator or a court regarding the general account.''

(E) The signature of the CAIR authorized account representative and any alternate CAIR authorized account representative and the dates signed.

(iii) Unless otherwise required by the permitting authority or the Administrator, documents of agreement referred to in the application for a general account shall not be submitted to the permitting authority or the Administrator. Neither the permitting authority nor the Administrator shall be under any obligation to review or evaluate the sufficiency of such documents, if submitted.

(2) *Authorization of CAIR authorized account representative and alternate CAIR authorized account representative.* (i) Upon receipt by the Administrator of a complete application

for a general account under paragraph (b)(1) of this section:

(A) The Administrator will establish a general account for the person or persons for whom the application is submitted.

(B) The CAIR authorized account representative and any alternate CAIR authorized account representative for the general account shall represent and, by his or her representations, actions, inactions, or submissions, legally bind each person who has an ownership interest with respect to CAIR NO_X Ozone Season allowances held in the general account in all matters pertaining to the CAIR NO_X Ozone Season Trading Program, notwithstanding any agreement between the CAIR authorized account representative or any alternate CAIR authorized account representative and such person. Any such person shall be bound by any order or decision issued to the CAIR authorized account representative or any alternate CAIR authorized account representative by the Administrator or a court regarding the general account.

(C) Any representation, action, inaction, or submission by any alternate CAIR authorized account representative shall be deemed to be a representation, action, inaction, or submission by the CAIR authorized account representative.

(ii) Each submission concerning the general account shall be submitted, signed, and certified by the CAIR authorized account representative or any alternate CAIR authorized account representative for the persons having an ownership interest with respect to CAIR NO_X Ozone Season allowances held in the general account. Each such submission shall include the following certification statement by the CAIR authorized account representative or any alternate CAIR authorized account representative: ''I am authorized to make this submission on behalf of the persons having an ownership interest with respect to the CAIR NO_X Ozone Season allowances held in the general account. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.''

(iii) The Administrator will accept or act on a submission concerning the general account only if the submission has been made, signed, and certified in accordance with paragraph (b)(2)(ii) of this section.

(3) *Changing CAIR authorized account representative and alternate CAIR authorized account representative; changes in persons with ownership interest.* (i) The CAIR authorized account representative for a general account may be changed at any time upon receipt by the Administrator of a superseding complete application for a general account under paragraph (b)(1) of this section. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous CAIR authorized account representative before the time and date when the Administrator receives the superseding application for a general account shall be binding on the new CAIR authorized account representative and the persons with an ownership interest with respect to the CAIR NO_X Ozone Season allowances in the general account.

(ii) The alternate CAIR authorized account representative for a general account may be changed at any time upon receipt by the Administrator of a superseding complete application for a general account under paragraph (b)(1) of this section. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous alternate CAIR authorized account representative before the time and date when the Administrator receives the superseding application for a general account shall be binding on the new alternate CAIR authorized account representative and the persons with an ownership interest with respect to the CAIR NO_X Ozone Season allowances in the general account.

(iii)(A) In the event a person having an ownership interest with respect to CAIR NO_X Ozone Season allowances in the general account is not included in the list of such persons in the application for a general account, such person shall be deemed to be subject to and bound by the application for a general account, the representation, actions, inactions, and submissions of the CAIR authorized account representative and any alternate CAIR authorized account representative of the account, and the decisions and orders of the Administrator or a court, as if the person were included in such list.

(B) Within 30 days following any change in the persons having an ownership interest with respect to CAIR NO_X Ozone Season allowances in the general account, including the addition of a new person, the CAIR authorized account representative or any alternate CAIR authorized account representative shall submit a revision to the application for a general account amending the list of persons having an ownership interest with respect to the CAIR NO_X Ozone Season allowances in the general account to include the change.

(4) *Objections concerning CAIR authorized account representative and alternate CAIR authorized account representative.* (i) Once a complete application for a general account under paragraph (b)(1) of this section has been submitted and received, the Administrator will rely on the application unless and until a superseding complete application for a general account under paragraph (b)(1) of this section is received by the Administrator.

(ii) Except as provided in paragraph (b)(3)(i) or (ii) of this section, no objection or other communication submitted to the Administrator concerning the authorization, or any representation, action, inaction, or submission of the CAIR authorized account representative or any alternate CAIR authorized account representative for a general account shall affect any representation, action, inaction, or submission of the CAIR authorized account representative or any alternate CAIR authorized account representative or the finality of any decision or order by the Administrator under the CAIR NO_X Ozone Season Trading Program.

(iii) The Administrator will not adjudicate any private legal dispute concerning the authorization or any representation, action, inaction, or submission of the CAIR authorized account representative or any alternate CAIR authorized account representative for a general account, including private legal disputes concerning the proceeds of CAIR NO_X Ozone Season allowance transfers.

(5) *Delegation by CAIR authorized account representative and alternate CAIR authorized account representative.* (i) A CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FFFF and GGGG of this part.

(ii) An alternate CAIR authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the Administrator provided for or required under subparts FFFF and GGGG of this part.

(iii) In order to delegate authority to make an electronic submission to the Administrator in accordance with paragraph (b)(5)(i) or (ii) of this section, the CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate, must submit to the Administrator a notice of delegation, in a format prescribed by the Administrator, that includes the following elements:

(A) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of such CAIR authorized account representative or alternate CAIR authorized account representative;

(B) The name, address, e-mail address, telephone number, and facsimile transmission number (if any) of each such natural person (referred to as an ''agent'');

(C) For each such natural person, a list of the type or types of electronic submissions under paragraph (b)(5)(i) or (ii) of this section for which authority is delegated to him or her;

(D) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: ''I agree that any electronic submission to the Administrator that is by an agent identified in this notice of delegation and of a type listed for such agent in this notice of delegation and that is made when I am a CAIR authorized account representative or alternate CAIR authorized representative, as appropriate, and before this notice of delegation is superseded by another notice of delegation under 40 CFR 97.351(b)(5)(iv) shall be deemed to be an electronic submission by me.''; and

(E) The following certification statement by such CAIR authorized account representative or alternate CAIR authorized account representative: Until this notice of delegation is superseded by another notice of delegation under 40 CFR 97.351(b)(5)(iv), I agree to maintain an e-mail account and to notify the Administrator immediately of any change in my e-mail address unless all delegation of authority by me under 40 CFR 97.351(b)(5) is terminated.''.

(iv) A notice of delegation submitted under paragraph (b)(5)(iii) of this section shall be effective, with regard to the CAIR authorized account representative or alternate CAIR authorized account representative identified in such notice, upon receipt of such notice by the Administrator and until receipt by the Administrator of a superseding notice of delegation submitted by such CAIR authorized account representative or alternate CAIR authorized account representative, as appropriate. The superseding notice of delegation may replace any previously identified agent, add a new agent, or eliminate entirely any delegation of authority.

(v) Any electronic submission covered by the certification in paragraph (b)(5)(iii)(D) of this section and made in accordance with a notice of delegation effective under paragraph (b)(5)(iv) of this section shall be deemed to be an electronic submission by the CAIR designated representative or alternate CAIR designated representative submitting such notice of delegation.

(c) *Account identification.* The Administrator will assign a unique identifying number to each account established under paragraph (a) or (b) of this section.

§ 97.352 Responsibilities of CAIR authorized account representative.

Following the establishment of a CAIR NO_X Ozone Season Allowance Tracking System account, all submissions to the Administrator pertaining to the account, including, but not limited to, submissions concerning the deduction or transfer of CAIR NO_X Ozone Season allowances in the account, shall be made only by the CAIR authorized account representative for the account.

§ 97.353 Recordation of CAIR NO_X Ozone Season allowance allocations.

(a) By September 30, 2007, the Administrator will record in the CAIR NO_X Ozone Season sources compliance account the CAIR NO_X Ozone Season allowances allocated for the CAIR NO_X Ozone Season units at the source in accordance with § 97.342(a) and (b) for the control period in 2009.

(b) By September 30, 2008, the Administrator will record in the CAIR NO_X Ozone Season source's compliance account the CAIR NO_X Ozone Season allowances allocated for the CAIR NO_X Ozone Season units at the source in accordance with § 97.342(a) and (b) for the control period in 2010.

(c) By September 30, 2009, the Administrator will record in the CAIR NO_X Ozone Season source's compliance account the CAIR Ozone Season NO_X allowances allocated for the CAIR NO_X Ozone Season units at the source in accordance with § 97.342(a) and (b) for the control periods in 2011, 2012, and 2013.

(d) By December 1, 2010 and December 1 of each year thereafter, the Administrator will record in the CAIR NO_X Ozone Season source's compliance account the CAIR NO_X Ozone Season allowances allocated for the CAIR NO_X Ozone Season units at the source in accordance with § 97.342(a) and (b) for the control period in the fourth year after the year of the applicable deadline for recordation under this paragraph.

(e) By September 1, 2009 and September 1 of each year thereafter, the Administrator will record in the CAIR NO_X Ozone Season source's compliance account the CAIR NO_X Ozone Season allowances allocated for the CAIR NO_X Ozone Season units at the source in accordance with § 97.342(a) and (c) for the control period in the year of the applicable deadline for recordation under this paragraph.

(f) *Serial numbers for allocated CAIR NO_X Ozone Season allowances.* When recording the allocation of CAIR NO_X Ozone Season allowances for a CAIR NO_X Ozone Season unit in a compliance account, the Administrator will assign each CAIR NO_X Ozone Season allowance a unique identification number that will include digits identifying the year of the control period for which the CAIR NO_X Ozone Season allowance is allocated.

§ 97.354 Compliance with CAIR NO_X emissions limitation.

(a) *Allowance transfer deadline.* The CAIR NO_X Ozone Season allowances are available to be deducted for compliance with a source's CAIR NO_X Ozone Season emissions limitation for a control period in a given calendar year only if the CAIR NO_X Ozone Season allowances:

(1) Were allocated for the control period in the year or a prior year; and

(2) Are held in the compliance account as of the allowance transfer deadline for the control period or are transferred into the compliance account by a CAIR NO_X Ozone Season allowance transfer correctly submitted for recordation under 97.360 and 97.361 by the allowance transfer deadline for the control period.

(b) *Deductions for compliance.* Following the recordation, in accordance with § 97.361, of CAIR NO_X Ozone Season allowance transfers submitted for recordation in a source's compliance account by the allowance transfer deadline for a control period, the Administrator will deduct from the compliance account CAIR NO_X Ozone Season allowances available under paragraph (a) of this section in order to determine whether the source meets the CAIR NO_X Ozone Season emissions limitation for the control period, as follows:

(1) Until the amount of CAIR NO_X Ozone Season allowances deducted equals the number of tons of total nitrogen oxides emissions, determined

in accordance with subpart HHHH of this part, from all CAIR NO_X Ozone Season units at the source for the control period; or

(2) If there are insufficient CAIR NO_X Ozone Season allowances to complete the deductions in paragraph (b)(1) of this section, until no more CAIR NO_X Ozone Season allowances available under paragraph (a) of this section remain in the compliance account.

(c)(1) *Identification of CAIR NO_X Ozone Season allowances by serial number.* The CAIR authorized account representative for a source's compliance account may request that specific CAIR NO_X Ozone Season allowances, identified by serial number, in the compliance account be deducted for emissions or excess emissions for a control period in accordance with paragraph (b) or (d) of this section. Such request shall be submitted to the Administrator by the allowance transfer deadline for the control period and include, in a format prescribed by the Administrator, the identification of the CAIR NO_X Ozone Season source and the appropriate serial numbers.

(2) *First-in, first-out.* The Administrator will deduct CAIR NO_X Ozone Season allowances under paragraph (b) or (d) of this section from the source's compliance account, in the absence of an identification or in the case of a partial identification of CAIR NO_X Ozone Season allowances by serial number under paragraph (c)(1) of this section, on a first-in, first-out (FIFO) accounting basis in the following order:

(i) Any CAIR NO_X Ozone Season allowances that were allocated to the units at the source, in the order of recordation; and then

(ii) Any CAIR NO_X Ozone Season allowances that were allocated to any entity and transferred and recorded in the compliance account pursuant to subpart GGGG of this part, in the order of recordation.

(d) *Deductions for excess emissions.* (1) After making the deductions for compliance under paragraph (b) of this section for a control period in a calendar year in which the CAIR NO_X Ozone Season source has excess emissions, the Administrator will deduct from the source's compliance account an amount of CAIR NO_X Ozone Season allowances, allocated for the control period in the immediately following calendar year, equal to 3 times the number of tons of the source's excess emissions.

(2) Any allowance deduction required under paragraph (d)(1) of this section shall not affect the liability of the owners and operators of the CAIR NO_X Ozone Season source or the CAIR NO_X Ozone Season units at the source for any fine, penalty, or assessment, or their obligation to comply with any other remedy, for the same violations, as ordered under the Clean Air Act or applicable State law.

(e) *Recordation of deductions.* The Administrator will record in the appropriate compliance account all deductions from such an account under paragraphs (b) and (d) of this section and subpart IIII.

(f) *Administrator(s action on submissions.* (1) The Administrator may review and conduct independent audits concerning any submission under the CAIR NO_X Ozone Season Trading Program and make appropriate adjustments of the information in the submissions.

(2) The Administrator may deduct CAIR NO_X Ozone Season allowances from or transfer CAIR NO_X Ozone Season allowances to a source's compliance account based on the information in the submissions, as adjusted under paragraph (f)(1) of this section, and record such deductions and transfers.

§ 97.355 Banking.

(a) CAIR NO_X Ozone Season allowances may be banked for future use or transfer in a compliance account or a general account in accordance with paragraph (b) of this section.

(b) Any CAIR NO_X Ozone Season allowance that is held in a compliance account or a general account will remain in such account unless and until the CAIR NO_X Ozone Season allowance is deducted or transferred under § 97.342, § 97.354, § 97.356, or subpart GGGG or IIII of this part.

§ 97.356 Account error.

The Administrator may, at his or her sole discretion and on his or her own motion, correct any error in any CAIR NO_X Ozone Season Allowance Tracking System account. Within 10 business days of making such correction, the Administrator will notify the CAIR authorized account representative for the account.

§ 97.357 Closing of general accounts.

(a) The CAIR authorized account representative of a general account may submit to the Administrator a request to close the account, which shall include a correctly submitted allowance transfer under §§ 97.360 and 97.361 for any CAIR NO_X Ozone Season allowances in the account to one or more other CAIR NO_X Ozone Season Allowance Tracking System accounts.

(b) If a general account has no allowance transfers in or out of the account for a 12-month period or longer and does not contain any CAIR NO_X Ozone Season allowances, the Administrator may notify the CAIR authorized account representative for the account that the account will be closed following 20 business days after the notice is sent. The account will be closed after the 20-day period unless, before the end of the 20-day period, the Administrator receives a correctly submitted transfer of CAIR NO_X Ozone Season allowances into the account under §§ 97.360 and 97.361 or a statement submitted by the CAIR authorized account representative demonstrating to the satisfaction of the Administrator good cause as to why the account should not be closed.

Subpart GGGG—CAIR NO_X Ozone Season Allowance Transfers

§ 97.360 Submission of CAIR NO_X Ozone Season allowance transfers.

A CAIR authorized account representative seeking recordation of a CAIR NO_X Ozone Season allowance transfer shall submit the transfer to the Administrator. To be considered correctly submitted, the CAIR NO_X Ozone Season allowance transfer shall include the following elements, in a format specified by the Administrator:

(a) The account numbers for both the transferor and transferee accounts;

(b) The serial number of each CAIR NO_X Ozone Season allowance that is in the transferor account and is to be transferred; and

(c) The name and signature of the CAIR authorized account representative of the transferor account and the date signed.

§ 97.361 EPA recordation.

(a) Within 5 business days (except as provided in paragraph (b) of this section) of receiving a CAIR NO_X Ozone Season allowance transfer, the Administrator will record a CAIR NO_X Ozone Season allowance transfer by moving each CAIR NO_X Ozone Season allowance from the transferor account to the transferee account as specified by the request, provided that:

(1) The transfer is correctly submitted under § 97.360; and

(2) The transferor account includes each CAIR NO_X Ozone Season allowance identified by serial number in the transfer.

(b) A CAIR NO_X Ozone Season allowance transfer that is submitted for recordation after the allowance transfer deadline for a control period and that includes any CAIR NO_X Ozone Season allowances allocated for any control period before such allowance transfer deadline will not be recorded until after the Administrator completes the deductions under § 97.354 for the control period immediately before such allowance transfer deadline.

(c) Where a CAIR NO_X Ozone Season allowance transfer submitted for recordation fails to meet the requirements of paragraph (a) of this section, the Administrator will not record such transfer.

§ 97.362 Notification.

(a) *Notification of recordation.* Within 5 business days of recordation of a CAIR NO_X Ozone Season allowance transfer under § 97.361, the Administrator will notify the CAIR authorized account representatives of both the transferor and transferee accounts.

(b) *Notification of non-recordation.* Within 10 business days of receipt of a CAIR NO_X Ozone Season allowance transfer that fails to meet the requirements of § 97.361(a), the Administrator will notify the CAIR authorized account representatives of both accounts subject to the transfer of:

(1) A decision not to record the transfer, and

(2) The reasons for such non-recordation.

(c) Nothing in this section shall preclude the submission of a CAIR NO_X Ozone Season allowance transfer for recordation following notification of non-recordation.

Subpart HHHH—Monitoring and Reporting

§ 97.370 General requirements.

The owners and operators, and to the extent applicable, the CAIR designated representative, of a CAIR NO_X Ozone Season unit, shall comply with the monitoring, recordkeeping, and reporting requirements as provided in this subpart and in subpart H of part 75 of this chapter. For purposes of complying with such requirements, the definitions in § 97.302 and in § 72.2 of this chapter shall apply, and the terms ''affected unit,'' ''designated representative,'' and ''continuous emission monitoring system'' (or ''CEMS'') in part 75 of this chapter shall be deemed to refer to the terms ''CAIR NO_X Ozone Season unit,'' ''CAIR designated representative,'' and ''continuous emission monitoring system'' (or ''CEMS'') respectively, as defined in § 97.302. The owner or operator of a unit that is not a CAIR NO_X Ozone Season unit but that is monitored under § 75.72(b)(2)(ii) of this chapter shall comply with the same monitoring, recordkeeping, and reporting requirements as a CAIR NO_X Ozone Season unit.

(a) *Requirements for installation, certification, and data accounting.* The owner or operator of each CAIR NO_X Ozone Season unit shall:

(1) Install all monitoring systems required under this subpart for monitoring NO_X mass emissions and individual unit heat input (including all systems required to monitor NO_X emission rate, NO_X concentration, stack gas moisture content, stack gas flow rate, CO_2 or O_2 concentration, and fuel flow rate, as applicable, in accordance with §§ 75.71 and 75.72 of this chapter);

(2) Successfully complete all certification tests required under § 97.371 and meet all other requirements of this subpart and part 75 of this chapter applicable to the monitoring systems under paragraph (a)(1) of this section; and

(3) Record, report, and quality-assure the data from the monitoring systems under paragraph (a)(1) of this section.

(b) *Compliance deadlines.* Except as provided in paragraph (e) of this section, the owner or operator shall meet the monitoring system certification and other requirements of paragraphs (a)(1) and (2) of this section on or before the following dates. The owner or operator shall record, report, and quality-assure the data from the monitoring systems under paragraph (a)(1) of this section on and after the following dates.

(1) For the owner or operator of a CAIR NO_X Ozone Season unit that commences commercial operation before July 1, 2007, by May 1, 2008.

(2) For the owner or operator of a CAIR NO_X Ozone Season unit that commences commercial operation on or after July 1, 2007 and that reports on an annual basis under § 97.374(d), by the later of the following dates:

(i) 90 unit operating days or 180 calendar days, whichever occurs first, after the date on which the unit commences commercial operation; or

(ii) May 1, 2008.

(3) For the owner or operator of a CAIR NO_X Ozone Season unit that commences commercial operation on or after July 1, 2007 and that reports on a control period basis under § 97.374(d)(2)(ii), by the later of the following dates:

(i) 90 unit operating days or 180 calendar days, whichever occurs first, after the date on which the unit commences commercial operation; or

(ii) If the compliance date under paragraph (b)(3)(i) of this section is not during a control period, May 1 immediately following the compliance date under paragraph (b)(3)(i) of this section.

(4) For the owner or operator of a CAIR NO_X Ozone Season unit for which construction of a new stack or flue or installation of add-on NO_X emission controls is completed after the applicable deadline under paragraph (b)(1), (2), (6), or (7) of this section and that reports on an annual basis under § 97.374(d), by 90 unit operating days or 180 calendar days, whichever occurs first, after the date on which emissions first exit to the atmosphere through the new stack or flue or add-on NO_X emissions controls.

(5) For the owner or operator of a CAIR NO_X Ozone Season unit for which construction of a new stack or flue or installation of add-on NO_X emission controls is completed after the applicable deadline under paragraph (b)(1), (3), (6), or (7) of this section and that reports on a control period basis under § 97.374(d)(2)(ii), by the later of the following dates:

(i) 90 unit operating days or 180 calendar days, whichever occurs first, after the date on which emissions first exit to the atmosphere through the new stack or flue or add-on NO_X emissions controls; or

(ii) If the compliance date under paragraph (b)(5)(i) of this section is not during a control period, May 1 immediately following the compliance date under paragraph (b)(5)(i) of this section.

(6) Notwithstanding the dates in paragraphs (b)(1), (2), and (3) of this section, for the owner or operator of a unit for which a CAIR NO_X Ozone Season opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart IIII of this part, by the date specified in § 97.384(b).

(7) Notwithstanding the dates in paragraphs (b)(1), (2), and (3) of this section, for the owner or operator of a CAIR NO_X Ozone Season opt-in unit under subpart IIII of this part, by the date on which the CAIR NO_X Ozone Season opt-in unit enters the CAIR NO_X Ozone Season Trading Program as provided in § 97.384(g).

(c) *Reporting data.* The owner or operator of a CAIR NO_X Ozone Season unit that does not meet the applicable compliance date set forth in paragraph (b) of this section for any monitoring system under paragraph (a)(1) of this section shall, for each such monitoring system, determine, record, and report maximum potential (or, as appropriate, minimum potential) values for NO_X concentration, NO_X emission rate, stack gas flow rate, stack gas moisture content, fuel flow rate, and any other parameters required to determine NO_X mass emissions and heat input in accordance with § 75.31(b)(2) or (c)(3) of this chapter, section 2.4 of appendix D to part 75 of this chapter, or section 2.5 of appendix E to part 75 of this chapter, as applicable.

(d) *Prohibitions.* (1) No owner or operator of a CAIR NO_X Ozone Season unit shall use any alternative monitoring system, alternative reference method, or any other alternative to any requirement of this subpart without having obtained prior written approval in accordance with § 97.375.

(2) No owner or operator of a CAIR NO_X Ozone Season unit shall operate the unit so as to discharge, or allow to be discharged, NO_X emissions to the atmosphere without accounting for all such emissions in accordance with the applicable provisions of this subpart and part 75 of this chapter.

(3) No owner or operator of a CAIR NO_X Ozone Season unit shall disrupt the continuous emission monitoring system, any portion thereof, or any other approved emission monitoring method, and thereby avoid monitoring and recording NO_X mass emissions discharged into the atmosphere or heat input, except for periods of recertification or periods when calibration, quality assurance testing, or maintenance is performed in accordance with the applicable provisions of this subpart and part 75 of this chapter.

(4) No owner or operator of a CAIR NO_X Ozone Season unit shall retire or permanently discontinue use of the continuous emission monitoring system, any component thereof, or any other approved monitoring system under this subpart, except under any one of the following circumstances:

(i) During the period that the unit is covered by an exemption under § 97.305 that is in effect;

(ii) The owner or operator is monitoring emissions from the unit with another certified monitoring system approved, in accordance with the applicable provisions of this subpart and part 75 of this chapter, by the Administrator for use at that unit that provides emission data for the same pollutant or parameter as the retired or discontinued monitoring system; or

(iii) The CAIR designated representative submits notification of the date of certification testing of a replacement monitoring system for the retired or discontinued monitoring system in accordance with § 97.371(d)(3)(i).

(e) *Long-term cold storage.* The owner or operator of a CAIR NO_X Ozone Season unit is subject to the applicable provisions of part 75 of this chapter concerning units in long-term cold storage.

§ 97.371 Initial certification and recertification procedures.

(a) The owner or operator of a CAIR NO_X Ozone Season unit shall be exempt from the initial certification requirements of this section for a monitoring system under § 97.370(a)(1) if the following conditions are met:

(1) The monitoring system has been previously certified in accordance with part 75 of this chapter; and

(2) The applicable quality-assurance and quality-control requirements of § 75.21 of this chapter and appendix B, appendix D, and appendix E to part 75 of this chapter are fully met for the certified monitoring system described in paragraph (a)(1) of this section.

(b) The recertification provisions of this section shall apply to a monitoring system under § 97.370(a)(1) exempt from initial certification requirements under paragraph (a) of this section.

(c) If the Administrator has previously approved a petition under § 75.17(a) or (b) of this chapter for apportioning the NO_X emission rate measured in a common stack or a petition under § 75.66 of this chapter for an alternative to a requirement in § 75.12 or § 75.17 of this chapter, the CAIR designated representative shall resubmit the petition to the Administrator under § 97.375 to determine whether the approval applies under the CAIR NO_X Ozone Season Trading Program.

(d) Except as provided in paragraph (a) of this section, the owner or operator of a CAIR NO_X Ozone Season unit shall comply with the following initial certification and recertification procedures for a continuous monitoring system (*i.e.,* a continuous emission monitoring system and an excepted monitoring system under appendices D and E to part 75 of this chapter) under § 97.370(a)(1). The owner or operator of a unit that qualifies to use the low mass emissions excepted monitoring methodology under § 75.19 of this chapter or that qualifies to use an alternative monitoring system under subpart E of part 75 of this chapter shall comply with the procedures in paragraph (e) or (f) of this section respectively.

(1) *Requirements for initial certification.* The owner or operator shall ensure that each continuous monitoring system under § 97.370(a)(1) (including the automated data acquisition and handling system) successfully completes all of the initial certification testing required under § 75.20 of this chapter by the applicable deadline in § 97.370(b). In addition, whenever the owner or operator installs a monitoring system to meet the requirements of this subpart in a location where no such monitoring system was previously installed, initial certification in accordance with § 75.20 of this chapter is required.

(2) *Requirements for recertification.* Whenever the owner or operator makes a replacement, modification, or change in any certified continuous emission monitoring system under § 97.370(a)(1) that may significantly affect the ability of the system to accurately measure or record NO_X mass emissions or heat input rate or to meet the quality-assurance and quality-control requirements of § 75.21 of this chapter or appendix B to part 75 of this chapter, the owner or operator shall recertify the monitoring system in accordance with § 75.20(b) of this chapter. Furthermore, whenever the owner or operator makes a replacement, modification, or change to the flue gas handling system or the unit's operation that may significantly change the stack flow or concentration profile, the owner or operator shall recertify each continuous emission monitoring system whose accuracy is potentially affected by the change, in accordance with § 75.20(b) of this chapter. Examples of changes to a continuous emission monitoring system that require recertification include: Replacement of the analyzer, complete replacement of an existing continuous emission monitoring system, or change in location or orientation of the sampling probe or site. Any fuel flowmeter systems, and any excepted NO_X monitoring system under appendix E to part 75 of this chapter, under § 97.370(a)(1) are subject to the recertification requirements in § 75.20(g)(6) of this chapter.

(3) *Approval process for initial certification and recertification.* Paragraphs (d)(3)(i) through (iv) of this section apply to both initial certification and recertification of a continuous monitoring system under § 97.370(a)(1). For recertifications, replace the words ''certification'' and ''initial certification'' with the word ''recertification'', replace the word ''certified'' with the word ''recertified,'' and follow the procedures in §§ 75.20(b)(5) and (g)(7) of this chapter in lieu of the procedures in paragraph (d)(3)(v) of this section.

(i) *Notification of certification.* The CAIR designated representative shall submit to the appropriate EPA Regional Office and the Administrator written notice of the dates of certification testing, in accordance with § 97.373.

(ii) *Certification application.* The CAIR designated representative shall submit to the Administrator a certification application for each monitoring system. A complete certification application shall include the information specified in § 75.63 of this chapter.

(iii) *Provisional certification date.* The provisional certification date for a monitoring system shall be determined in accordance with § 75.20(a)(3) of this chapter. A provisionally certified monitoring system may be used under the CAIR NO_X Ozone Season Trading Program for a period not to exceed 120 days after receipt by the Administrator of the complete certification application for the monitoring system under paragraph (d)(3)(ii) of this section. Data measured and recorded by the provisionally certified monitoring system, in accordance with the requirements of part 75 of this chapter, will be considered valid quality-assured data (retroactive to the date and time of provisional certification), provided that the Administrator does not invalidate the provisional certification by issuing a notice of disapproval within 120 days of the date of receipt of the complete certification application by the Administrator.

(iv) *Certification application approval process.* The Administrator will issue a written notice of approval or disapproval of the certification application to the owner or operator within 120 days of receipt of the complete certification application under paragraph (d)(3)(ii) of this section. In the event the Administrator does not issue such a notice within such 120-day period, each monitoring system that meets the applicable performance requirements of part 75 of this chapter and is included in the certification application will be deemed certified for use under the CAIR NO_X Ozone Season Trading Program.

(A) *Approval notice.* If the certification application is complete and shows that each monitoring system meets the applicable performance requirements of part 75 of this chapter, then the Administrator will issue a written notice of approval of the certification application within 120 days of receipt.

(B) *Incomplete application notice.* If the certification application is not complete, then the Administrator will issue a written notice of incompleteness that sets a reasonable date by which the CAIR designated representative must submit the additional information required to complete the certification application. If the CAIR designated representative does not comply with the notice of incompleteness by the specified date, then the Administrator may issue a notice of disapproval under paragraph (d)(3)(iv)(C) of this section. The 120-day review period shall not begin before receipt of a complete certification application.

(C) *Disapproval notice.* If the certification application shows that any monitoring system does not meet the performance requirements of part 75 of this chapter or if the certification application is incomplete and the requirement for disapproval under paragraph (d)(3)(iv)(B) of this section is met, then the Administrator will issue a written notice of disapproval of the certification application. Upon issuance of such notice of disapproval, the provisional certification is invalidated by the Administrator and the data measured and recorded by each uncertified monitoring system shall not be considered valid quality-assured data beginning with the date and hour of provisional certification (as defined under § 75.20(a)(3) of this chapter). The owner or operator shall follow the procedures for loss of certification in paragraph (d)(3)(v) of this section for each monitoring system that is disapproved for initial certification.

(D) *Audit decertification.* The Administrator may issue a notice of disapproval of the certification status of a monitor in accordance with § 97.372(b).

(v) *Procedures for loss of certification.* If the Administrator issues a notice of disapproval of a certification application under paragraph (d)(3)(iv)(C) of this section or a notice of disapproval of certification status under paragraph (d)(3)(iv)(D) of this section, then:

(A) The owner or operator shall substitute the following values, for each disapproved monitoring system, for each hour of unit operation during the period of invalid data specified under § 75.20(a)(4)(iii), § 75.20(g)(7), or § 75.21(e) of this chapter and continuing until the applicable date and hour specified under § 75.20(a)(5)(i) or (g)(7) of this chapter:

(*1*) For a disapproved NO_X emission rate (*i.e.,* NO_X-diluent) system, the maximum potential NO_X emission rate, as defined in (72.2 of this chapter.

(*2*) For a disapproved NO_X pollutant concentration monitor and disapproved flow monitor, respectively, the maximum potential concentration of NO_X and the maximum potential flow rate, as defined in sections 2.1.2.1 and 2.1.4.1 of appendix A to part 75 of this chapter.

(*3*) For a disapproved moisture monitoring system and disapproved diluent gas monitoring system, respectively, the minimum potential moisture percentage and either the maximum potential CO_2 concentration or the minimum potential O_2 concentration (as applicable), as defined in sections 2.1.5, 2.1.3.1, and 2.1.3.2 of appendix A to part 75 of this chapter.

(*4*) For a disapproved fuel flowmeter system, the maximum potential fuel flow rate, as defined in section 2.4.2.1 of appendix D to part 75 of this chapter.

(*5*) For a disapproved excepted NO_X monitoring system under appendix E to part 75 of this chapter, the fuel-specific maximum potential NO_X emission rate, as defined in (72.2 of this chapter.

(B) The CAIR designated representative shall submit a notification of certification retest dates and a new certification application in accordance with paragraphs (d)(3)(i) and (ii) of this section.

(C) The owner or operator shall repeat all certification tests or other requirements that were failed by the monitoring system, as indicated in the Administrator's notice of disapproval, no later than 30 unit operating days after the date of issuance of the notice of disapproval.

(e) *Initial certification and recertification procedures for units using the low mass emission excepted methodology under § 75.19 of this chapter.* The owner or operator of a unit qualified to use the low mass emissions (LME) excepted methodology under § 75.19 of this chapter shall meet the applicable certification and recertification requirements in §§ 75.19(a)(2) and 75.20(h) of this chapter. If the owner or operator of such a unit elects to certify a fuel flowmeter system for heat input determination, the owner or operator shall also meet the certification and recertification requirements in § 75.20(g) of this chapter.

(f) *Certification/recertification procedures for alternative monitoring systems.* The CAIR designated representative of each unit for which the owner or operator intends to use an alternative monitoring system approved by the Administrator under subpart E of part 75 of this chapter shall comply with the applicable notification and application procedures of § 75.20(f) of this chapter.

§ 97.372 Out of control periods.

(a) Whenever any monitoring system fails to meet the quality-assurance and quality-control requirements or data validation requirements of part 75 of this chapter, data shall be substituted using the applicable missing data procedures in subpart D or subpart H of, or appendix D or appendix E to, part 75 of this chapter.

(b) *Audit decertification.* Whenever both an audit of a monitoring system and a review of the initial certification or recertification application reveal that any monitoring system should not have been certified or recertified because it did not meet a particular performance specification or other requirement under § 97.371 or the applicable provisions of part 75 of this chapter, both at the time of the initial certification or recertification application submission and at the time of the audit, the Administrator will issue a notice of disapproval of the certification status of such monitoring system. For the purposes of this paragraph, an audit shall be either a field audit or an audit of any information submitted to the permitting authority or the Administrator. By issuing the notice of disapproval, the Administrator revokes prospectively the certification status of the monitoring system. The data measured and recorded by the monitoring system shall not be considered valid quality-assured data from the date of issuance of the notification of the revoked certification status until the date and time that the owner or operator completes subsequently approved initial certification or recertification tests for the monitoring system. The owner or operator shall follow the applicable initial certification or recertification procedures in § 97.371 for each disapproved monitoring system.

§ 97.373 Notifications.

The CAIR designated representative for a CAIR NO_X Ozone Season unit shall submit written notice to the Administrator in accordance with § 75.61 of this chapter.

§ 97.374 Recordkeeping and reporting.

(a) *General provisions.* The CAIR designated representative shall comply with all recordkeeping and reporting requirements in this section, the applicable recordkeeping and reporting requirements under § 75.73 of this chapter, and the requirements of § 97.310(e)(1).

(b) *Monitoring Plans.* The owner or operator of a CAIR NO_X Ozone Season unit shall comply with requirements of § 75.73 (c) and (e) of this chapter and, for a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart IIII of this part, §§ 97.383 and 97.384(a).

(c) *Certification Applications.* The CAIR designated representative shall submit an application to the Administrator within 45 days after completing all initial certification or recertification tests required under § 97.371, including the information required under § 75.63 of this chapter.

(d) *Quarterly reports.* The CAIR designated representative shall submit quarterly reports, as follows:

(1) If the CAIR NO_X Ozone Season unit is subject to an Acid Rain emissions limitation or a CAIR NO_X emissions limitation or if the owner or operator of such unit chooses to report on an annual basis under this subpart, the CAIR designated representative shall meet the requirements of subpart H of part 75 of this chapter (concerning monitoring of NO_X mass emissions) for such unit for the entire year and shall report the NO_X mass emissions data and heat input data for such unit, in an electronic quarterly report in a format prescribed by the Administrator, for each calendar quarter beginning with:

(i) For a unit that commences commercial operation before July 1, 2007, the calendar quarter covering May 1, 2008 through June 30, 2008;

(ii) For a unit that commences commercial operation on or after July 1, 2007, the calendar quarter corresponding to the earlier of the date of provisional certification or the applicable deadline for initial certification under § 97.370(b), unless that quarter is the third or fourth quarter of 2007 or the first quarter of 2008, in which case reporting shall commence in the quarter covering May 1, 2008 through June 30, 2008;

(iii) Notwithstanding paragraphs (d)(1) (i) and (ii) of this section, for a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart IIII of this part, the calendar quarter corresponding to the date specified in § 97.384(b); and

(iv) Notwithstanding paragraphs (d)(1) (i) and (ii) of this section, for a CAIR NO_X Ozone Season opt-in unit under subpart IIII of this part, the calendar quarter corresponding to the date on which the CAIR NO_X Ozone Season opt-in unit enters the CAIR NO_X Ozone Season Trading Program as provided in § 97.384(g).

(2) If the CAIR NO_X Ozone Season unit is not subject to an Acid Rain emissions limitation or a CAIR NO_X emissions limitation, then the CAIR designated representative shall either:

(i) Meet the requirements of subpart H of part 75 (concerning monitoring of NO_X mass emissions) for such unit for the entire year and report the NO_X mass emissions data and heat input data for such unit in accordance with paragraph (d)(1) of this section; or

(ii) Meet the requirements of subpart H of part 75 for the control period (including the requirements in § 75.74(c) of this chapter) and report NO_X mass emissions data and heat input data (including the data described in § 75.74(c)(6) of this chapter) for such unit only for the control period of each year and report, in an electronic quarterly report in a format prescribed by the Administrator, for each calendar quarter beginning with:

(A) For a unit that commences commercial operation before July 1, 2007, the calendar quarter covering May 1, 2008 through June 30, 2008;

(B) For a unit that commences commercial operation on or after July 1, 2007, the calendar quarter corresponding to the earlier of the date of provisional certification or the applicable deadline for initial certification under § 97.370(b), unless that date is not during a control period, in which case reporting shall commence in the quarter that includes May 1 through June 30 of the first control period after such date;

(C) Notwithstanding paragraphs (d)(2)(ii)(A) and (2)(ii)(B) of this section, for a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under subpart IIII of this part, the calendar quarter corresponding to the date specified in § 97.384(b); and

(D) Notwithstanding paragraphs (d)(2)(ii)(A) and (2)(ii)(B) of this section, for a CAIR NO_X Ozone Season opt-in unit under subpart IIII of this part, the calendar quarter corresponding to the date on which the CAIR NO_X Ozone Season opt-in unit enters the CAIR NO_X Ozone Season Trading Program as provided in § 97.384(g).

(3) The CAIR designated representative shall submit each quarterly report to the Administrator within 30 days following the end of the calendar quarter covered by the report. Quarterly reports shall be submitted in the manner specified in § 75.73(f) of this chapter.

(4) For CAIR NO_X Ozone Season units that are also subject to an Acid Rain emissions limitation or the CAIR NO_X Annual Trading Program, CAIR SO_2 Trading Program, or Hg Budget Trading Program, quarterly reports shall include the applicable data and information required by subparts F through I of part 75 of this chapter as applicable, in addition to the NO_X mass emission data, heat input data, and other information required by this subpart.

(e) *Compliance certification.* The CAIR designated representative shall submit to the Administrator a compliance certification (in a format prescribed by the Administrator) in support of each quarterly report based on reasonable inquiry of those persons with primary responsibility for ensuring that all of the unit's emissions are correctly and fully monitored. The certification shall state that:

(1) The monitoring data submitted were recorded in accordance with the applicable requirements of this subpart and part 75 of this chapter, including the quality assurance procedures and specifications;

(2) For a unit with add-on NO_X emission controls and for all hours where NO_X data are substituted in accordance with § 75.34(a)(1) of this chapter, the add-on emission controls were operating within the range of parameters listed in the quality assurance/quality control program under appendix B to part 75 of this chapter and the substitute data values do not systematically underestimate NO_X emissions; and

(3) For a unit that is reporting on a control period basis under paragraph (d)(2)(ii) of this section, the NO_X emission rate and NO_X concentration values substituted for missing data under subpart D of part 75 of this chapter are calculated using only values from a control period and do not systematically underestimate NO_X emissions.

§ 97.375 Petitions.

The CAIR designated representative of a CAIR NO_X Ozone Season unit may submit a petition under § 75.66 of this chapter to the Administrator requesting approval to apply an alternative to any requirement of this subpart. Application of an alternative to any requirement of this subpart is in accordance with this subpart only to the extent that the petition is approved in writing by the Administrator, in consultation with the permitting authority.

Subpart IIII—CAIR NO_X Ozone Season Opt-in Units

§ 97.380 Applicability.

A CAIR NO_X Ozone Season opt-in unit must be a unit that:

(a) Is located in a State that submits, and for which the Administrator approves, a State implementation plan revision in accordance with § 51.123(ee)(3) (i), (ii), or (iii) of this chapter establishing procedures concerning CAIR Ozone Season opt-in units;

(b) Is not a CAIR NO_X Ozone Season unit under § 97.304 and is not covered by a retired unit exemption under § 97.305 that is in effect;

(c) Is not covered by a retired unit exemption under § 72.8 of this chapter that is in effect;

(d) Has or is required or qualified to have a title V operating permit or other federally enforceable permit; and

(e) Vents all of its emissions to a stack and can meet the monitoring, recordkeeping, and reporting requirements of subpart HHHH of this part.

§ 97.381 General.

(a) Except as otherwise provided in §§ 97.301 through 97.304, §§ 97.306 through 97.308, and subparts BBBB and CCCC and subparts FFFF through HHHH of this part, a CAIR NO_X Ozone Season opt-in unit shall be treated as a CAIR NO_X Ozone Season unit for purposes of applying such sections and subparts of this part.

(b) Solely for purposes of applying, as provided in this subpart, the requirements of subpart HHHH of this part to a unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under this subpart, such unit shall be treated as a CAIR NO_X Ozone Season unit before issuance of a CAIR opt-in permit for such unit.

§ 97.382 CAIR designated representative.

Any CAIR NO_X Ozone Season opt-in unit, and any unit for which a CAIR opt-in permit application is submitted and not withdrawn and a CAIR opt-in permit is not yet issued or denied under this subpart, located at the same source as one or more CAIR NO_X Ozone Season units shall have the same CAIR designated representative and alternate CAIR designated representative as such CAIR NO_X Ozone Season units.

§ 97.383 Applying for CAIR opt-in permit.

(a) *Applying for initial CAIR opt-in permit.* The CAIR designated representative of a unit meeting the requirements for a CAIR NO_X Ozone Season opt-in unit in § 97.380 may apply for an initial CAIR opt-in permit at any time, except as provided under § 97.386 (f) and (g), and, in order to apply, must submit the following:

(1) A complete CAIR permit application under § 97.322;

(2) A certification, in a format specified by the permitting authority, that the unit:

(i) Is not a CAIR NO_X Ozone Season unit under § 97.304 and is not covered by a retired unit exemption under § 97.305 that is in effect;

(ii) Is not covered by a retired unit exemption under § 72.8 of this chapter that is in effect;

(iii) Vents all of its emissions to a stack; and

(iv) Has documented heat input for more than 876 hours during the 6 months immediately preceding submission of the CAIR permit application under § 97.322;

(3) A monitoring plan in accordance with subpart HHHH of this part;

(4) A complete certificate of representation under § 97.313 consistent with § 97.382, if no CAIR designated representative has been previously designated for the source that includes the unit; and

(5) A statement, in a format specified by the permitting authority, whether the CAIR designated representative requests that the unit be allocated CAIR NO_X Ozone Season allowances under § 97.380(b) or § 97.388(c) (subject to the conditions in §§ 97.384(h) and 97.386(g)), to the extent such allocation is provided in a State implementation plan revision submitted in accordance with § 51.123(ee)(3)(i), (ii), or (iii) of this chapter and approved by the Administrator. If allocation under § 97.388(c) is requested, this statement shall include a statement that the owners and operators intend to repower the unit before January 1, 2015 and that they will provide, upon request, documentation demonstrating such intent.

(b) *Duty to reapply.* (1) The CAIR designated representative of a CAIR NO_X Ozone Season opt-in unit shall submit a complete CAIR permit application under § 97.322 to renew the CAIR opt-in unit permit in accordance with the permitting authority's regulations for title V operating permits, or the permitting authority's regulations for other federally enforceable permits if applicable, addressing permit renewal.

(2) Unless the permitting authority issues a notification of acceptance of withdrawal of the CAIR NO_X Ozone Season opt-in unit from the CAIR NO_X Ozone Season Trading Program in accordance with § 97.386 or the unit becomes a CAIR NO_X Ozone Season unit under § 97.304, the CAIR NO_X Ozone Season opt-in unit shall remain subject to the requirements for a CAIR NO_X Ozone Season opt-in unit, even if the CAIR designated representative for the CAIR NO_X Ozone Season opt-in unit fails to submit a CAIR permit application that is required for renewal of the CAIR opt-in permit under paragraph (b)(1) of this section.

§ 97.384 Opt-in process.

The permitting authority will issue or deny a CAIR opt-in permit for a unit for which an initial application for a CAIR opt-in permit under § 97.383 is submitted in accordance with the following, to the extent provided in a State implementation plan revision submitted in accordance with

§ 51.123(ee)(3)(i), (ii), or (iii) of this chapter and approved by the Administrator:

(a) *Interim review of monitoring plan.* The permitting authority and the Administrator will determine, on an interim basis, the sufficiency of the monitoring plan accompanying the initial application for a CAIR opt-in permit under § 97.383. A monitoring plan is sufficient, for purposes of interim review, if the plan appears to contain information demonstrating that the NO_X emissions rate and heat input of the unit and all other applicable parameters are monitored and reported in accordance with subpart HHHH of this part. A determination of sufficiency shall not be construed as acceptance or approval of the monitoring plan.

(b) *Monitoring and reporting.* (1)(i) If the permitting authority and the Administrator determine that the monitoring plan is sufficient under paragraph (a) of this section, the owner or operator shall monitor and report the NO_X emissions rate and the heat input of the unit and all other applicable parameters, in accordance with subpart HHHH of this part, starting on the date of certification of the appropriate monitoring systems under subpart HHHH of this part and continuing until a CAIR opt-in permit is denied under § 97.384(f) or, if a CAIR opt-in permit is issued, the date and time when the unit is withdrawn from the CAIR NO_X Ozone Season Trading Program in accordance with § 97.386.

(ii) The monitoring and reporting under paragraph (b)(1)(i) of this section shall include the entire control period immediately before the date on which the unit enters the CAIR NO_X Ozone Season Trading Program under § 97.384(g), during which period monitoring system availability must not be less than 90 percent under subpart HHHH of this part and the unit must be in full compliance with any applicable State or Federal emissions or emissions-related requirements.

(2) To the extent the NO_X emissions rate and the heat input of the unit are monitored and reported in accordance with subpart HHHH of this part for one or more control periods, in addition to the control period under paragraph (b)(1)(ii) of this section, during which control periods monitoring system availability is not less than 90 percent under subpart HHHH of this part and the unit is in full compliance with any applicable State or Federal emissions or emissions-related requirements and which control periods begin not more than 3 years before the unit enters the CAIR NO_X Ozone Season Trading Program under § 97.384(g), such information shall be used as provided in paragraphs (c) and (d) of this section.

(c) *Baseline heat input.* The unit's baseline heat rate shall equal:

(1) If the unit's NO_X emissions rate and heat input are monitored and reported for only one control period, in accordance with paragraph (b)(1) of this section, the unit's total heat input (in mmBtu) for the control period; or

(2) If the unit's NO_X emissions rate and heat input are monitored and reported for more than one control period, in accordance with paragraphs (b)(1) and (2) of this section, the average of the amounts of the unit's total heat input (in mmBtu) for the control periods under paragraphs (b)(1)(ii) and (2) of this section.

(d) *Baseline NO_X emission rate.* The unit's baseline NO_X emission rate shall equal:

(1) If the unit's NO_X emissions rate and heat input are monitored and reported for only one control period, in accordance with paragraph (b)(1) of this section, the unit's NO_X emissions rate (in lb/mmBtu) for the control period;

(2) If the unit's NO_X emissions rate and heat input are monitored and reported for more than one control period, in accordance with paragraphs (b)(1) and (2) of this section, and the unit does not have add-on NO_X emission controls during any such control periods, the average of the amounts of the unit's NO_X emissions rate (in lb/mmBtu) for the control periods under paragraphs (b)(1)(ii) and (2) of this section; or

(3) If the unit's NO_X emissions rate and heat input are monitored and reported for more than one control period, in accordance with paragraphs (b)(1) and (2) of this section, and the unit has add-on NO_X emission controls during any such control periods, the average of the amounts of the unit's NO_X emissions rate (in lb/mmBtu) for such control periods during which the unit has add-on NO_X emission controls.

(e) *Issuance of CAIR opt-in permit.* After calculating the baseline heat input and the baseline NO_X emissions rate for the unit under paragraphs (c) and (d) of this section and if the permitting authority determines that the CAIR designated representative shows that the unit meets the requirements for a CAIR NO_X Ozone Season opt-in unit in § 97.380 and meets the elements certified in § 97.383(a)(2), the permitting authority will issue a CAIR opt-in permit. The permitting authority will provide a copy of the CAIR opt-in permit to the Administrator, who will then establish a compliance account for the source that includes the CAIR NO_X Ozone Season opt-in unit unless the source already has a compliance account.

(f) *Issuance of denial of CAIR opt-in permit.* Notwithstanding paragraphs (a) through (e) of this section, if at any time before issuance of a CAIR opt-in permit for the unit, the permitting authority determines that the CAIR designated representative fails to show that the unit meets the requirements for a CAIR NO_X Ozone Season opt-in unit in § 97.380 or meets the elements certified in § 97.383(a)(2), the permitting authority will issue a denial of a CAIR opt-in permit for the unit.

(g) *Date of entry into CAIR NO_X* Ozone Season Trading Program. A unit for which an initial CAIR opt-in permit is issued by the permitting authority shall become a CAIR NO_X Ozone Season opt-in unit, and a CAIR NO_X Ozone Season unit, as of the later of May 1, 2009 or May 1 of the first control period during which such CAIR opt-in permit is issued.

(h) *Repowered CAIR NO_X* Ozone Season opt-in unit. (1) If CAIR designated representative requests, and the permitting authority issues a CAIR opt-in permit providing for, allocation to a CAIR NO_X Ozone Season opt-in unit of CAIR NO_X Ozone Season allowances under § 97.388(c) and such unit is repowered after its date of entry into the CAIR NO_X Ozone Season Trading Program under paragraph (g) of this section, the repowered unit shall be treated as a CAIR NO_X Ozone Season opt-in unit replacing the original CAIR NO_X Ozone Season opt-in unit, as of the date of start-up of the repowered unit's combustion chamber.

(2) Notwithstanding paragraphs (c) and (d) of this section, as of the date of start-up under paragraph (h)(1) of this section, the repowered unit shall be deemed to have the same date of commencement of operation, date of commencement of commercial operation, baseline heat input, and baseline NO_X emission rate as the original CAIR NO_X Ozone Season opt-in unit, and the original CAIR NO_X Ozone Season opt-in unit shall no longer be treated as a CAIR NO_X Ozone Season opt-in unit or a CAIR NO_X Ozone Season unit.

§ 97.385 CAIR opt-in permit contents.

(a) Each CAIR opt-in permit will contain:

(1) All elements required for a complete CAIR permit application under § 97.322;

(2) The certification in § 97.383(a)(2);

(3) The unit's baseline heat input under § 97.384(c);

(4) The unit's baseline NO_X emission rate under § 97.384(d);

(5) A statement whether the unit is to be allocated CAIR NO_X Ozone Season allowances under § 97.388(b) or § 97.388(c) (subject to the conditions in §§ 97.384(h) and 97.386(g));

(6) A statement that the unit may withdraw from the CAIR NO_X Ozone Season Trading Program only in accordance with § 97.386; and

(7) A statement that the unit is subject to, and the owners and operators of the unit must comply with, the requirements of § 97.387.

(b) Each CAIR opt-in permit is deemed to incorporate automatically the definitions of terms under § 97.302 and, upon recordation by the Administrator under subpart FFFF or GGGG of this part or this subpart, every allocation, transfer, or deduction of CAIR NO_X Ozone Season allowances to or from the compliance account of the source that includes a CAIR NO_X Ozone Season opt-in unit covered by the CAIR opt-in permit.

(c) The CAIR opt-in permit shall be included, in a format specified by the permitting authority, in the CAIR permit for the source where the CAIR NO_X Ozone Season opt-in unit is located and in a title V operating permit or other federally enforceable permit for the source.

§ 97.386 Withdrawal from CAIR NO_X Ozone Season Trading Program.

Except as provided under paragraph (g) of this section, a CAIR NO_X Ozone Season opt-in unit may withdraw from the CAIR NO_X Ozone Season Trading Program, but only if the permitting authority issues a notification to the CAIR designated representative of the CAIR NO_X Ozone Season opt-in unit of the acceptance of the withdrawal of the CAIR NO_X Ozone Season opt-in unit in accordance with paragraph (d) of this section.

(a) *Requesting withdrawal.* In order to withdraw a CAIR NO_X Ozone Season opt-in unit from the CAIR NO_X Ozone Season Trading Program, the CAIR designated representative of the CAIR NO_X Ozone Season opt-in unit shall submit to the permitting authority a request to withdraw effective as of midnight of September 30 of a specified calendar year, which date must be at least 4 years after September 30 of the year of entry into the CAIR NO_X Ozone Season Trading Program under § 97.384(g). The request must be submitted no later than 90 days before the requested effective date of withdrawal.

(b) *Conditions for withdrawal.* Before a CAIR NO_X Ozone Season opt-in unit covered by a request under paragraph (a) of this section may withdraw from the CAIR NO_X Ozone Season Trading Program and the CAIR opt-in permit may be terminated under paragraph (e) of this section, the following conditions must be met:

(1) For the control period ending on the date on which the withdrawal is to be effective, the source that includes the CAIR NO_X Ozone Season opt-in unit must meet the requirement to hold CAIR NO_X Ozone Season allowances under § 97.306(c) and cannot have any excess emissions.

(2) After the requirement for withdrawal under paragraph (b)(1) of this section is met, the Administrator will deduct from the compliance account of the source that includes the CAIR NO_X Ozone Season opt-in unit CAIR NO_X Ozone Season allowances equal in amount to and allocated for the same or a prior control period as any CAIR NO_X Ozone Season allowances allocated to the CAIR NO_X Ozone Season opt-in unit under § 97.388 for any control period for which the withdrawal is to be effective. If there are no remaining CAIR NO_X Ozone Season units at the source, the Administrator will close the compliance account, and the owners and operators of the CAIR NO_X Ozone Season opt-in unit may submit a CAIR NO_X Ozone Season allowance transfer for any remaining CAIR NO_X Ozone Season allowances to another CAIR NO_X Ozone Season Allowance Tracking System in accordance with subpart GGGG of this part.

(c) *Notification.* (1) After the requirements for withdrawal under paragraphs (a) and (b) of this section are met (including deduction of the full amount of CAIR NO_X Ozone Season allowances required), the permitting authority will issue a notification to the CAIR designated representative of the CAIR NO_X Ozone Season opt-in unit of the acceptance of the withdrawal of the CAIR NO_X Ozone Season opt-in unit as of midnight on September 30 of the calendar year for which the withdrawal was requested.

(2) If the requirements for withdrawal under paragraphs (a) and (b) of this section are not met, the permitting authority will issue a notification to the CAIR designated representative of the CAIR NO_X Ozone Season opt-in unit that the CAIR NO_X Ozone Season opt-in unit's request to withdraw is denied. Such CAIR NO_X Ozone Season opt-in unit shall continue to be a CAIR NO_X Ozone Season opt-in unit.

(d) *Permit amendment.* After the permitting authority issues a notification under paragraph (c)(1) of this section that the requirements for withdrawal have been met, the permitting authority will revise the CAIR permit covering the CAIR NO_X Ozone Season opt-in unit to terminate the CAIR opt-in permit for such unit as of the effective date specified under paragraph (c)(1) of this section. The unit shall continue to be a CAIR NO_X Ozone Season opt-in unit until the effective date of the termination and shall comply with all requirements under the CAIR NO_X Ozone Season Trading Program concerning any control periods for which the unit is a CAIR NO_X Ozone Season opt-in unit, even if such requirements arise or must be complied with after the withdrawal takes effect.

(e) *Reapplication upon failure to meet conditions of withdrawal.* If the permitting authority denies the CAIR NO_X Ozone Season opt-in unit's request to withdraw, the CAIR designated representative may submit another request to withdraw in accordance with paragraphs (a) and (b) of this section.

(f) *Ability to reapply to the CAIR NO_X Ozone Season Trading Program.* Once a CAIR NO_X Ozone Season opt-in unit withdraws from the CAIR NO_X Ozone Season Trading Program and its CAIR opt-in permit is terminated under this section, the CAIR designated representative may not submit another application for a CAIR opt-in permit under § 97.383 for such CAIR NO_X Ozone Season opt-in unit before the date that is 4 years after the date on which the withdrawal became effective. Such new application for a CAIR opt-in permit will be treated as an initial application for a CAIR opt-in permit under § 97.384.

(g) *Inability to withdraw.* Notwithstanding paragraphs (a) through (f) of this section, a CAIR NO_X Ozone Season opt-in unit shall not be eligible to withdraw from the CAIR NO_X Ozone Season Trading Program if the CAIR designated representative of the CAIR NO_X Ozone Season opt-in unit requests, and the permitting authority issues a CAIR opt-in permit providing for, allocation to the CAIR NO_X Ozone Season opt-in unit of CAIR NO_X Ozone Season allowances under § 97.388(c).

§ 97.387 Change in regulatory status.

(a) *Notification.* If a CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under § 97.304, then the CAIR designated representative shall notify in writing the permitting authority and the Administrator of such change in the CAIR NO_X Ozone Season opt-in unit's regulatory status, within 30 days of such change.

(b) *Permitting authority's and Administrator's actions.* (1) If a CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under

§ 97.304, the permitting authority will revise the CAIR NO_X Ozone Season opt-in unit's CAIR opt-in permit to meet the requirements of a CAIR permit under § 97.323, and remove the CAIR opt-in permit provisions, as of the date on which the CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under § 97.304.

(2)(i) The Administrator will deduct from the compliance account of the source that includes the CAIR NO_X Ozone Season opt-in unit that becomes a CAIR NO_X Ozone Season unit under § 97.304, CAIR NO_X Ozone Season allowances equal in amount to and allocated for the same or a prior control period as:

(A) Any CAIR NO_X Ozone Season allowances allocated to the CAIR NO_X Ozone Season opt-in unit under § 97.388 for any control period after the date on which the CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under § 97.304; and

(B) If the date on which the CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under § 97.304 is not September 30, the CAIR NO_X Ozone Season allowances allocated to the CAIR NO_X Ozone Season opt-in unit under § 97.388 for the control period that includes the date on which the CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under § 97.304, multiplied by the ratio of the number of days, in the control period, starting with the date on which the CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under § 97.304 divided by the total number of days in the control period and rounded to the nearest whole allowance as appropriate.

(ii) The CAIR designated representative shall ensure that the compliance account of the source that includes the CAIR NO_X Ozone Season unit that becomes a CAIR NO_X Ozone Season unit under (97.304 contains the CAIR NO_X Ozone Season allowances necessary for completion of the deduction under paragraph (b)(2)(i) of this section.

(3)(i) For every control period after the date on which the CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under § 97.304, the CAIR NO_X Ozone Season opt-in unit will be allocated CAIR NO_X Ozone Season allowances under § 97.342.

(ii) If the date on which the CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under § 97.304 is not September 30, the following amount of CAIR NO_X Ozone Season allowances will be allocated to the CAIR NO_X Ozone Season opt-in unit (as a CAIR NO_X Ozone Season unit) under § 97.342 for the control period that includes the date on which the CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under § 97.304:

(A) The amount of CAIR NO_X Ozone Season allowances otherwise allocated to the CAIR NO_X Ozone Season opt-in unit (as a CAIR NO_X Ozone Season unit) under § 97.342 for the control period multiplied by;

(B) The ratio of the number of days, in the control period, starting with the date on which the CAIR NO_X Ozone Season opt-in unit becomes a CAIR NO_X Ozone Season unit under § 97.304, divided by the total number of days in the control period; and

(C) Rounded to the nearest whole allowance as appropriate.

§ 97.388 CAIR NO_X Ozone Season allowance allocations to CAIR NO_X Ozone Season opt-in units.

(a) *Timing requirements.* (1) When the CAIR opt-in permit is issued under § 97.384(e), the permitting authority will allocate CAIR NO_X Ozone Season allowances to the CAIR NO_X Ozone Season opt-in unit, and submit to the Administrator the allocation for the control period in which a CAIR NO_X Ozone Season opt-in unit enters the CAIR NO_X Ozone Season Trading Program under § 97.384(g), in accordance with paragraph (b) or (c) of this section.

(2) By no later than July 31 of the control period after the control period in which a CAIR NO_X Ozone Season opt-in unit enters the CAIR NO_X Ozone Season Trading Program under § 97.384(g) and July 31 of each year thereafter, the permitting authority will allocate CAIR NO_X Ozone Season allowances to the CAIR NO_X Ozone Season opt-in unit, and submit to the Administrator the allocation for the control period that includes such submission deadline and in which the unit is a CAIR NO_X Ozone Season opt-in unit, in accordance with paragraph (b) or (c) of this section.

(b) *Calculation of allocation.* For each control period for which a CAIR NO_X Ozone Season opt-in unit is to be allocated CAIR NO_X Ozone Season allowances, the permitting authority will allocate in accordance with the following procedures, if provided in a State implementation plan revision submitted in accordance with § 51.123(ee)(3)(i), (ii), or (iii) of this chapter and approved by the Administrator:

(1) The heat input (in mmBtu) used for calculating the CAIR NO_X Ozone Season allowance allocation will be the lesser of:

(i) The CAIR NO_X Ozone Season opt-in unit's baseline heat input determined under § 97.384(c); or

(ii) The CAIR NO_X Ozone Season opt-in unit's heat input, as determined in accordance with subpart HHHH of this part, for the immediately prior control period, except when the allocation is being calculated for the control period in which the CAIR NO_X Ozone Season opt-in unit enters the CAIR NO_X Ozone Season Trading Program under § 97.384(g).

(2) The NO_X emission rate (in lb/mmBtu) used for calculating CAIR NO_X Ozone Season allowance allocations will be the lesser of:

(i) The CAIR NO_X Ozone Season opt-in unit's baseline NO_X emissions rate (in lb/mmBtu) determined under § 97.384(d) and multiplied by 70 percent; or

(ii) The most stringent State or Federal NO_X emissions limitation applicable to the CAIR NO_X Ozone Season opt-in unit at any time during the control period for which CAIR NO_X Ozone Season allowances are to be allocated.

(3) The permitting authority will allocate CAIR NO_X Ozone Season allowances to the CAIR NO_X Ozone Season opt-in unit in an amount equaling the heat input under paragraph (b)(1) of this section, multiplied by the NO_X emission rate under paragraph (b)(2) of this section, divided by 2,000 lb/ton, and rounded to the nearest whole allowance as appropriate.

(c) Notwithstanding paragraph (b) of this section and if the CAIR designated representative requests, and the permitting authority issues a CAIR opt-in permit (based on a demonstration of the intent to repower stated under § 97.383 (a)(5)) providing for, allocation to a CAIR NO_X Ozone Season opt-in unit of CAIR NO_X Ozone Season allowances under this paragraph (subject to the conditions in §§ 97.384(h) and 97.386(g)), the permitting authority will allocate to the CAIR NO_X Ozone Season opt-in unit as follows, if provided in a State implementation plan revision submitted in accordance with § 51.123(ee)(3)(i), (ii), or (iii) of this chapter and approved by the Administrator:

(1) For each control period in 2009 through 2014 for which the CAIR NO_X Ozone Season opt-in unit is to be allocated CAIR NO_X Ozone Season allowances,

(i) The heat input (in mmBtu) used for calculating CAIR NO_X Ozone Season allowance allocations will be determined as described in paragraph (b)(1) of this section.

(ii) The NO_X emission rate (in lb/mmBtu) used for calculating CAIR NO_X Ozone Season allowance allocations will be the lesser of:

(A) The CAIR NO_X Ozone Season opt-in unit's baseline NO_X emissions rate (in lb/mmBtu) determined under § 97.384(d); or

(B) The most stringent State or Federal NO_X emissions limitation applicable to the CAIR NO_X Ozone Season opt-in unit at any time during the control period in which the CAIR NO_X Ozone Season opt-in unit enters the CAIR NO_X Ozone Season Trading Program under § 97.384(g).

(iii) The permitting authority will allocate CAIR NO_X Ozone Season allowances to the CAIR NO_X Ozone Season opt-in unit in an amount equaling the heat input under paragraph (c)(1)(i) of this section, multiplied by the NO_X emission rate under paragraph (c)(1)(ii) of this section, divided by 2,000 lb/ton, and rounded to the nearest whole allowance as appropriate.

(2) For each control period in 2015 and thereafter for which the CAIR NO_X Ozone Season opt-in unit is to be allocated CAIR NO_X Ozone Season allowances,

(i) The heat input (in mmBtu) used for calculating the CAIR NO_X Ozone Season allowance allocations will be determined as described in paragraph (b)(1) of this section.

(ii) The NO_X emission rate (in lb/mmBtu) used for calculating the CAIR NO_X Ozone Season allowance allocation will be the lesser of:

(A) 0.15 lb/mmBtu;

(B) The CAIR NO_X Ozone Season opt-in unit's baseline NO_X emissions rate (in lb/mmBtu) determined under § 97.384(d); or

(C) The most stringent State or Federal NO_X emissions limitation applicable to the CAIR NO_X Ozone Season opt-in unit at any time during the control period for which CAIR NO_X Ozone Season allowances are to be allocated.

(iii) The permitting authority will allocate CAIR NO_X Ozone Season allowances to the CAIR NO_X Ozone Season opt-in unit in an amount equaling the heat input under paragraph (c)(2)(i) of this section, multiplied by the NO_X emission rate under paragraph (c)(2)(ii) of this section, divided by 2,000 lb/ton, and rounded to the nearest whole allowance as appropriate.

(d) *Recordation.* If provided in a State implementation plan revision submitted in accordance with § 51.123(ee)(3)(i), (ii), or (iii) of this chapter and approved by the Administrator:

(1) The Administrator will record, in the compliance account of the source that includes the CAIR NO_X Ozone Season opt-in unit, the CAIR NO_X Ozone Season allowances allocated by the permitting authority to the CAIR NO_X Ozone Season opt-in unit under paragraph (a)(1) of this section.

(2) By September 1 of the control period in which a CAIR NO_X Ozone Season opt-in unit enters the CAIR NO_X Ozone Season Trading Program under § 97.384(g) and September 1 of each year thereafter, the Administrator will record, in the compliance account of the source that includes the CAIR NO_X Ozone Season opt-in unit, the CAIR NO_X Ozone Season allowances allocated by the permitting authority to the CAIR NO_X Ozone Season opt-in unit under paragraph (a)(2) of this section.

Appendix A to Subpart IIII of Part 97—States With Approved State Implementation Plan Revisions Concerning CAIR NO_X Ozone Season Opt-in Units

1. The following States have State Implementation Plan revisions under § 51.123(ee)(3) of this chapter approved by the Administrator and establishing procedures providing for CAIR NO_X Ozone Season opt-in units under subpart IIII of this part and allocation of CAIR NO_X Ozone Season allowances to such units under § 97.388(b):

[Reserved]

2. The following States have State Implementation Plan revisions under § 51.123(ee)(3) of this chapter approved by the Administrator and establishing procedures providing for CAIR NO_X Ozone Season opt-in units under subpart IIII of this part and allocation of CAIR NO_X Ozone Season allowances to such units under § 97.388(c):

[Reserved]

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