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GUIDANCE FOR GROWTH FACTORS, PROJECTIONS, AND CONTROL STRATEGIES FOR THE 15 PERCENT RATE-OF-PROGRESS PLANS

Guidance for Growth Factors, Projections, and Control Strategies for the 15 Percent Rate-of-Progress Plans

Ozone/Carbon Monoxide Programs Branch

U.S. Environmental Protection Agency
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ADDENDUM TO "GUIDANCE FOR GROWTH FACTORS, PROJECTIONS, AND CONTROL STRATEGIES FOR THE 15 PERCENT RATE-OF-PROGRESS PLANS"

The purpose of this addendum is to provide information on the status of issues that have been raised regarding the 15 percent rate-of-progress plans. These issues are divided into three categories: clarification of resolved issues, status of previously identified issues, and identification of new issues.

Clarification of Resolved Issues

Inspection/Maintenance (I/M)

Section 4.2 of the document titled Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 Percent Rate-of-Progress Plans, EPA-452/R-92-005, discussed the credit that can be allowed for improvements to I/M programs. As indicated in that discussion, credit can be allowed for improvements in I/M programs that go beyond EPA's basic I/M requirements or the program that was approved in the SIP at the time of enactment, whichever is more stringent. Therefore, States can not get credit for bringing an I/M program up to the basic I/M standards, even where EPA never issued a pre-enactment SIP call to correct the I/M program and where the I/M program had been approved in the SIP. This interpretation is based on the language in sections 182(b)(1)(D)(iv) and 182(a)(2)(B)(i) of the Act.

Reid Vapor Pressure (RVP)

Several questions have been raised concerning what RVP States should use in developing the 15 percent plan, particularly for areas that had an actual RVP less than 9.0 psi in 1990. The reductions that must be subtracted from the "rate-of-progress base year inventory" are calculated exactly as discussed in Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 Percent Rate-of-Progress Plans, page 13. This means that in determining the reductions that would be achieved by the FMVCP and RVP requirements, all areas, including areas that had an actual RVP less than 9.0 psi in 1990, should use the actual RVP for the 1990 case and the allowable RVP (9.0 or 7.8 psi) for the MOBILE5.0 run that will be used to calculate the 1990 adjusted base year inventory. Although this might at first appear to result in a target that is more difficult to meet, in reality it does not. The reductions that are subtracted to get the adjusted base year inventory are later added to other reductions to get the total required reductions. The effect of subtracting a smaller number from the rate-of-progress inventory is compensated by adding a smaller number to the total reductions.

Nonroad Mobile Source Emissions Factors

A number of States have questioned the accuracy of the nonroad mobile source emissions factors and emissions provided by the Office of Mobile Sources (OMS). Although the factors are higher than previous estimates, OMS believes that they are more accurate. They have indicated that they are willing to work with any State that has identified problems regarding activity factors related to distribution and/or usage of equipment.

Status of Previously Identified Issues

Waivers

Issue: What does "all measures that can feasibly be implemented...in light of technological achievability" include? [Section 182(b)(1)(A)(ii)(III)]

Status: One interpretation of the Act is that "all measures that can feasibly be implemented...in light of technological achievability" includes only those measures that are achieved in practice in nonattainment areas of the next higher classification. The EPA is still considering whether this is the preferred interpretation.

Issue: If a State is granted a waiver, based on the fact that it has submitted a plan that includes all measures that can feasibly be implemented, is the State still required to submit contingency measures? If so, what would be available as contingency measures?

Status: If the interpretation above is used, other measures such as those achieved in areas of even higher classification will be available as contingency measures. For an area classified as severe, there would be no measures readily identifiable since there is only one classification above severe, although these areas are still required to submit contingency measures. If a more stringent interpretation is used, EPA will have to consider whether it is reasonable to require contingency measures.

Issue: In determining the feasibility of I/M for the purposes of a waiver, can a State consider the population of an area?

Status: This issue is still under review by OMS.

RVP

Issue: What RVP should be assumed for projecting 1996 emissions?

Status: This issue is under review by OMS. They are evaluating whether there is justification for allowing States to assume that actual emissions are expected to be less than future allowable emissions.

Federal Measures

Issue: Will EPA approve 15 percent plans that are based on commitments to adopt new CTG RACT rules and/or forthcoming national rules (e.g., auto refinishing)?

Status: The EPA will be providing guidance to the States concerning the credit that can be allowed from these programs.

Vehicle Miles Traveled (VMT) Growth Projections

Issue: Can States use more recent estimates or actual VMT growth rates where available?

Status: The OMS has indicated that areas may be able to show that regionally-specific factors may be more appropriate in some circumstances, and plans to provide clarification of this issue.

Nonroad Mobile Sources

Issue: How much credit can be allowed for the use of reformulated gasoline in nonroad engines?

Status: The OMS plans to provide guidance to the States on how to determine credit for use of reformulated gasoline in nonroad sources.

Issue: How should States project emissions from nonroad mobile sources into the future?

Status: The OMS plans to issue guidance on projections for nonroad mobile sources.

New Issues

The following issues have recently been raised to EPA and we are trying to resolve these as soon as possible:

- To what extent will EPA accept committal SIP's for the measures necessary to achieve the 15 percent reduction?

- Will EPA accept committal SIP's for the contingency measures?

- Can the contingency measures be for NO_x as well as (or instead of) VOC?

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ABBREVIATIONS AND ACRONYMS

Act	Clean Air Act
ACT	Alternative Control Technique
AFS	AIRS Facility Subsystem
AFUE	Annual Fuel Utilization Efficiency
AIRS	Aerometric Information Retrieval System
AMS	Area and Mobile Source Subsystem
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
APCD	Air Pollution Control District
AQMD	Air Quality Management District
ASC	Area Source Category Code
ATM	Atmosphere
BACT	Best Available Control Technology
BEA	Bureau of Economic Analysis
BID	Background Information Document
BTU	British Thermal Units
CAAA	1990 Clean Air Act Amendments
CFR	Code of Federal Regulations
CO	Carbon monoxide
CTC	Control Technology Center
CTG	Control Technique Guidelines
Cu.Ft.	Cubic Foot
DOE	Department of Energy
DOT	Department of Transportation
E-GAS	Economic Growth Analysis System
EKMA	Empirical Kinetic Modeling Analysis
EPA	U.S. Environmental Protection Agency
EPS	Emissions Preprocessor System
FIP	Federal Implementation Plan
FMVCP	Federal Motor Vehicle Control Program
GACT	Generally Available Control Technology
gal	Gallon(s)
HAP	Hazardous Air Pollutant
HON	Hazardous Organic NESHAP
I/M	Inspection and Maintenance
in. hg	Inches of Mercury
IRS	Internal Revenue Service
LADCO	Lake Michigan Air Directors Consortium
LAER	Lowest Achievable Emissions Rate
lb	Pound(s)
lb/day	Pounds per day
lb/hr	Pounds per hour
LDT	Light-duty trucks
LDV	Light-duty vehicles
LEV	Low-emission vehicle
MACT	Maximum Achievable Control Technology
NAAQS	National Ambient Air Quality Standard
NESCAUM	Northeast States for Coordinated Air Use Management

NESHAP	National Emission Standard for Hazardous Air Pollutants
NO_x	Oxides of nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
NTIS	National Technical Information Service
OAQPS	Office of Air Quality Planning and Standards of EPA
ppm	Parts per million
psi	Pounds per square inch
RACT	Reasonably Available Control Technology
RCRA	Resource Conservation and Recovery Act
RE	Rule Effectiveness
RFP	Reasonable Further Progress
rpm	Revolutions per minute
RVP	Reid Vapor Pressure
SAS	Statistical Analysis System
SCAQMD	South Coast Air Quality Management District
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SOCMI	Synthetic Organic Chemicals Manufacturing Industry
SSCD	Stationary Source Compliance Division of EPA's Office of Air Quality Planning and Standards
TCM	Transportation Control Measures
tpy	Tons per year
TSDF	Hazardous Waste Treatment, Storage, and Disposal Facility
UAM	Urban Airshed Model
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

Section 182(b)(1) of the Clean Air Act (Act) requires all ozone nonattainment areas classified as moderate and above to submit a State implementation plan (SIP) revision by November 15, 1993, which describes, in part, how the areas will achieve an actual volatile organic compound (VOC) emissions reduction of at least 15 percent during the first 6 years after enactment of the Clean Air Act Amendments of 1990 (CAAA) (i.e., up to November 15, 1996). In addition, the SIP revision must describe how any growth in emissions from 1990 through 1996 will be fully offset. The portion of the SIP revision that illustrates the plan for the achievement of these emissions reductions is subsequently defined in this document as the "rate-of-progress plan."

It is important to note that section 182(b)(1) also requires the SIP for moderate areas to provide for reductions in VOC and nitrogen oxides (NO_x) emissions "as necessary to attain the national primary ambient air quality standard for ozone" by November 15, 1996. This requirement can be met through the use of EPA-approved modeling techniques and the adoption of any additional control measures beyond those needed to meet the 15 percent emissions reduction requirements. States with intrastate moderate ozone nonattainment areas will generally be required to submit attainment demonstrations with their SIP revisions due by November 15, 1993 [such areas choosing to use the Urban Airshed Model (UAM) to prepare their attainment demonstrations will be allowed to submit attainment demonstrations by November 15, 1994]. States choosing to run UAM for their intrastate moderate areas must submit by November 15, 1993, their rate-of-progress plan and a committal SIP addressing the attainment demonstration. The committal SIP subject to a section 110(k)(4) approval would include, at a minimum, evidence that grid modeling is well under way and a commitment, with schedule, to complete the modeling and submit it as a SIP revision by November 1994. The completed attainment demonstration would include any additional controls needed for attainment.

This guidance document focuses on the procedures for developing 1996 projected emissions inventories and control measures which moderate and above ozone nonattainment areas must include in their rate-of-progress plans. The document provides technical guidance to support the policy presented in the "General Preamble: Implementation of Title I of the CAAA of 1990" (57 FR 13498). States are asked to submit their draft 1996 projected emissions inventories and control measures to EPA by May 1993. States must submit their fully adopted rate-of-progress plans to EPA by November 1993. Moderate ozone nonattainment areas not using UAM must include an attainment demonstration in their fully adopted rate-of-progress plans.

This document provides guidance to the States for calculating the VOC emissions reductions and for developing the control measures necessary to meet the 15 percent VOC emissions reduction requirements, net of growth, by November 1996. Calculation of the 15 percent VOC emissions reduction, net of growth, includes the calculation of the following three components:

- The 15 percent VOC emissions reduction from the 1990 adjusted base year emissions inventory.
- The 1996 target level of emissions.
- Emissions reductions needed to fully offset emissions growth from 1990 through 1996.

In October of 1992, the U.S. Environmental Protection Agency (EPA) issued a document entitled Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 Percent Rate-of-Progress Plans. (See reference 1.) The document provides detailed guidance for calculating the 15 percent VOC emissions reduction from the 1990 adjusted base year emissions inventory, and the 1996 target level of emissions. The guidance provided in the October 1992 document should be reviewed along with the guidance in this document when preparing a rate-of-progress plan.

The rate-of-progress plan must account for the effects of growth experienced in a nonattainment area from 1990 to 1996. One purpose of this document is to provide guidance on the use of equations for projecting 1990 base year emissions to 1996. The document describes how growth factors, emissions reductions associated with regulations, rule effectiveness (RE), and rule penetration should be used in the equations. Guidance is also provided for determining whether projections should be based on actual versus allowable emissions. The information sources for developing growth factors or indicators that could be used as part of the preparation of the 1996 projected emissions inventories are also discussed. Several examples for calculating 15 percent VOC emissions reduction requirements, net of growth, are provided for different ozone nonattainment area classifications.

A key component of the rate-of-progress plan is the control measures that the State plans to adopt and implement to reduce VOC emissions to meet the 15 percent VOC emissions reduction requirements, net of growth, by November 1996. One of the purposes of this document is to provide information concerning the types of control technologies and strategies upon which control measures can be based to control VOC and NO_x emissions from point, area, and mobile sources. This document summarizes past and ongoing work by EPA in preparing Control Technique Guideline (CTG), Alternative Control Technique (ACT), and

background information documents for specific industrial sources or processes. It also presents information on existing and new Federal regulatory programs for VOC and NO_x sources. The broad range of mobile source control strategies, from vapor recovery to transportation control measures (TCM's), is also discussed. A sample checklist is also provided to aid States in a step-by-step review of their rate-of-progress plans to ensure that they contain all of the necessary components required for approval by EPA.

This document also discusses the requirements for an attainment demonstration for marginal and moderate ozone nonattainment areas, and presents the models involved in making this demonstration. Furthermore, this document presents the implications of attainment and milestone failures for marginal and moderate ozone nonattainment areas. In addition, this document describes the requirements for contingency measures that must be included in the rate-of-progress plans for moderate and above ozone nonattainment areas, and provides examples of possible contingency measures.

1.0 INTRODUCTION

Section 182(b)(1) of the Act requires all ozone nonattainment areas classified as moderate and above to submit a SIP revision by November 15, 1993, which describes, in part, how the areas will achieve an actual VOC emissions reduction of at least 15 percent during the first 6 years after enactment of the CAAA (i.e., up to November 15, 1996). In addition, the SIP must describe how any growth in emissions from 1990 through 1996 will be fully offset. Emissions and emissions reductions shall be calculated on a typical weekday basis for the "peak" 3-month ozone period (generally June through August). The 15 percent VOC emissions reduction, net of growth, required by November 15, 1996 is defined within this document as "rate of progress."[1] Furthermore, the portion of the SIP revision that illustrates the plan for the achievement of the emissions reductions is subsequently defined in this document as the "rate-of-progress plan."

It is important to note that section 182(b)(1) also requires the SIP for moderate areas to provide for reductions in VOC and NO_x emissions "as necessary to attain the national primary ambient air quality standard for ozone" by November 15, 1996. This requirement can be met through the use of EPA-approved modeling techniques and the adoption of any additional control measures beyond those needed to meet the 15 percent emissions reduction requirements. States with intrastate moderate ozone nonattainment areas will generally be required to submit attainment demonstrations with their SIP revisions due by November 15, 1993 (such areas choosing to use UAM to prepare their attainment demonstrations will be allowed to submit attainment demonstrations by November 15, 1994). States choosing to run UAM for their intrastate moderate areas must submit by

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[1]The EPA recognizes that the Act terms, for both the 15 percent VOC emissions reduction requirement of section 182(b)(1) and the section 182(c)(2)(B) requirement for 3 percent per year VOC emissions reductions averaged over each consecutive 3-year period from November 15, 1996 until the attainment date, as reasonable further progress (RFP) requirements. However, because the Act requires SIP revisions for the 15 percent reduction to be submitted in 1993 and SIP revisions for the 3 percent per year reductions to be submitted in 1994, EPA believes that it would be clearer, within the context of both the 15 percent rate-of-progress plan and post-1996 rate-of-progress plan guidance documents that EPA is producing, to create distinct labels for these two seemingly similar reductions. The 1994 SIP revisions describing the requirement for 3 percent VOC emissions reductions averaged over each consecutive 3-year period from November 15, 1996 until the attainment date, constitute the "post-1996 rate-of-progress plan."

November 15, 1993, their rate-of-progress plan and a committal SIP addressing the attainment demonstration. The committal SIP subject to a section 110(k)(4) approval would include, at a minimum, evidence that grid modeling is well under way and a commitment, with schedule, to complete the modeling and submit it as a SIP revision by November 1994. The completed attainment demonstration would include any additional controls needed for attainment.

Section 182(c)(2) requires all ozone nonattainment areas classified as serious and above to submit a SIP revision by November 15, 1994 which describes, in part, how each area will achieve additional VOC emissions reductions of 3 percent per year averaged over each consecutive 3-year period from November 15, 1996 until the area's attainment date. It is important to note that section 182(c)(2)(C) allows for actual NO_x emissions reductions (exceeding growth) that occur after the base year of 1990 to be used to meet post-1996 emissions reduction requirements for ozone nonattainment areas classified as serious and above, provided that such NO_x reductions meet the criteria outlined in forthcoming substitution guidance. The portion of the SIP revision (due in 1994) that illustrates the plan for the achievement of these post-1996 reductions in VOC or NO_x is subsequently defined in this document as the "post-1996 rate-of-progress plan." This plan must also contain an attainment demonstration based on photochemical grid modeling. The EPA will distribute a separate guidance document on the development of the post-1996 rate-of-progress plan in early to mid-1993.

Demonstrating achievement of the 15 percent VOC emissions reductions by November 15, 1996, and then subsequently demonstrating achievement of the 3 percent per year VOC emissions reductions averaged over each consecutive 3-year period from November 15, 1996 until the attainment date, are termed milestone demonstrations. Achievement of the milestones must be demonstrated within 90 days of the milestone date (e.g., the 15 percent VOC emissions reductions must be demonstrated by February 13, 1997). The EPA is currently developing a rule which will describe the information and analysis required for the milestone demonstrations. The rule is scheduled for promulgation in the summer of 1994. The rule will also address summary data needs, detailed reporting requirements, and consequences of submitting an inadequate demonstration (in terms of documentation) as well as consequences of failure to demonstrate the 15 percent VOC emissions reduction requirements, net of growth.

Section 182(a)(3)(A) requires the States to submit periodic inventories starting 3 years after submission of the base year inventory required by section 182(a)(1), and every 3 years thereafter until the area is redesignated to attainment. The EPA recommends that States synchronize their schedules for developing

the periodic inventories so that the second periodic inventory (which would be due no later than November 15, 1998) is submitted by February 13, 1997 and addresses emissions in 1996. By accelerating preparation and submittal of the 1996 periodic inventory, the milestone demonstration that is due for serious and above areas by February 13, 1997 can be based on this periodic inventory. If similarly accelerated, future periodic inventories would then also coincide with subsequent milestone demonstrations. The periodic inventory is to be based on actual emissions and will cover VOC, NO_x, and carbon monoxide (CO) emissions sources. Like the base year inventory, the periodic inventory is to be determined using typical peak ozone season weekday emissions.

1.1 Purpose

This document provides guidance on the procedures for developing 1996 projected emissions inventories and control measures which moderate and above ozone nonattainment areas must include in their rate-of-progress plans. These elements of the rate-of-progress plan will be due in draft form to EPA by May 15, 1993. The fully adopted rate-of-progress plan is then due by November 15, 1993. The information provided in this document contains references to additional in-depth information.

The rate-of-progress plan must account for the effects of growth experienced in a nonattainment area from 1990 to 1996. One purpose of this document is to provide guidance on the use of equations for projecting 1990 base year emissions to 1996. The document describes how growth factors, emissions reductions associated with regulations, RE, and rule penetration should be used in the equations. Guidance is also provided for determining whether projections should be based on actual versus allowable emissions. The information sources for developing growth factors or indicators that could be used as part of the preparation of the 1996 projected emissions inventories are also discussed.

A key component of the rate-of-progress plan (due to EPA by November 15, 1993) is the control measures that the State plans to adopt and implement to reduce VOC emissions to meet the 15 percent VOC emissions reductions requirements, net of growth, by November 1996. One of the purposes of this document is to provide information concerning the types of control technologies and strategies upon which control measures can be based to control VOC and NO_x emissions from point, area, and mobile sources. This document summarizes past and ongoing work by EPA in preparing CTG, ACT, and background information documents for specific industrial sources or processes. It also presents information on existing and new Federal regulatory programs for VOC and NO_x sources. The broad range of mobile source control strategies, from vapor recovery to TCM's, is also discussed.

1.2 Background

The rate-of-progress plan must include documentation of base year emissions inventories, growth factors, projected emissions inventories, and control measures and associated emissions reductions to demonstrate how a nonattainment area will achieve a 15 percent VOC emissions reduction, net of growth, by November 1996.[2] Calculation of the 15 percent VOC emissions reduction, net of growth, includes the calculation of the following three components:

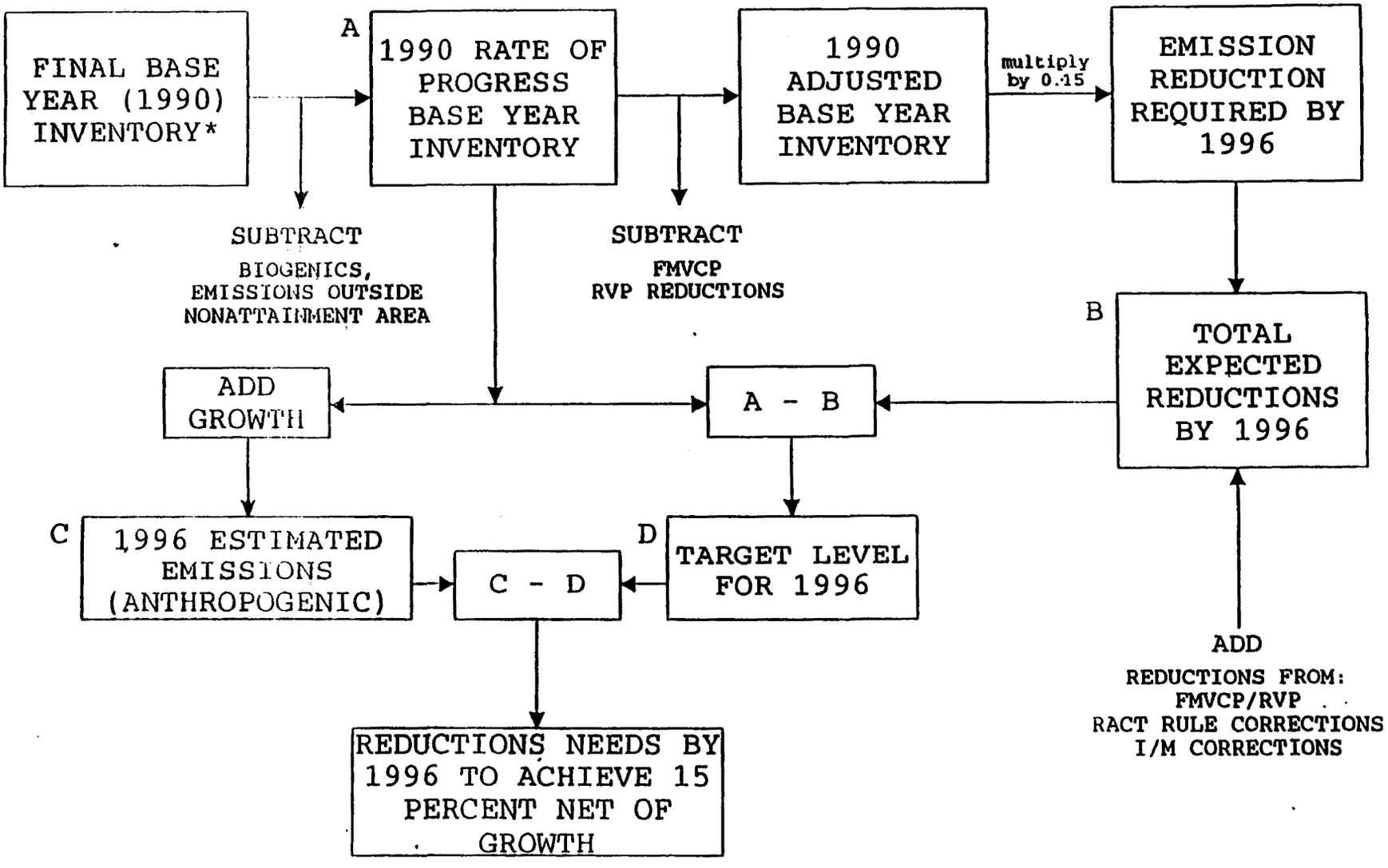
- The 15 percent VOC emissions reduction from the 1990 adjusted base year emissions inventory.
- The 1996 target level of emissions.
- Emissions reductions needed to fully offset emissions growth from 1990 through 1996.

Figure 1 presents a flowchart of the steps involved in calculating the required emissions reductions and the 1996 target level of emissions. The 15 percent VOC emissions reduction must be calculated from the 1990 adjusted base year emissions inventory. The 1990 adjusted base year emissions inventory must exclude the following:

- Biogenic emissions.
- Emissions associated with anthropogenic sources located outside of a nonattainment area's boundaries.
- Emissions reductions that would occur by 1996 as the result of a Federal motor vehicle control program (FMVCP) promulgated by January 1, 1990.
- Emissions reductions that would occur by 1996 as the result of the Reid vapor pressure (RVP) control program (55 FR 23666, June 11, 1990).

Emissions reductions associated with corrections to a nonattainment area's reasonably available control technology (RACT) rules and inspection and maintenance (I/M) program, and post-1990 emissions reductions associated with the FMVCP and RVP controls are added to the 15 percent VOC emissions reduction to calculate total expected reductions by 1996. Total expected reductions by 1996 are then subtracted from the 1990 rate-of-

[2]Section 182(b) has provisions for obtaining less that a 15 percent VOC emissions reduction, if certain stringent requirements are met. See section 8.4 of this document.



DOES NOT INCLUDE PRE-ENACTMENT BANKED EMISSION CREDIT

Figure 1. Flowchart for rate-of-progress calculations.

progress emissions inventory to calculate the 1996 target level of emissions. The 1996 target level of emissions is then subtracted from the 1996 projected emissions inventory to include growth in the total emissions reductions needed to achieve the 1996 target level of emissions. In October of 1992, EPA issued a document entitled Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 Percent Rate-of-Progress Plans. (See reference 1.) The document provides detailed guidance for calculating the 15 percent VOC emissions reduction from the 1990 adjusted base year emissions inventory, and the 1996 target level of emissions. The guidance provided in the October 1992 document should be reviewed along with the guidance in this document when preparing a rate-of-progress plan.

The 1990 base year inventory emissions are reported on an annual and seasonal basis. For determination of the 15 percent VOC emissions reduction, net of growth, emissions are based on typical ozone season weekday emissions. For the base year inventory, these emissions are measured for a typical weekday during the 1990 peak ozone season. The peak ozone season is the contiguous 3-month period for which the highest ozone exceedance days have occurred in the previous 3 to 4 years. The EPA's focus on typical ozone season weekday VOC emissions [an interpretation of the definition in section 182(b)(1)(B) of baseline actual emissions during the "calendar year" of enactment] is consistent with prior EPA guidance. This stems from the fact that the ozone national ambient air quality standard (NAAQS) is an hourly standard that is generally violated during ozone season weekdays when conditions are conducive to ozone formation. These ozone seasons are typically the summer months.

Moderate ozone nonattainment areas must also include in their rate-of-progress plans a demonstration that the ozone NAAQS will be attained by November 1996. Figure 2 presents a flowchart of the components for developing the control measures that form the basis of the rate-of-progress plan for an attainment demonstration. To determine achievement of the 15 percent VOC emissions reduction, net of growth, the 1990 rate-of-progress emissions must be subtracted from the 1996 projection year emissions for VOC. Failure to achieve the 15 percent VOC emissions reduction, net of growth, will require application of additional control measures to the 1996 projection year emissions for VOC. If, however, the 15 percent reduction, net of growth, is confirmed by this calculation, the next step is to add biogenic emissions and emissions in the modeling domain but outside the nonattainment area into the 1996 projection year inventory, and model the inventory using the empirical kinetic modeling analysis (EKMA). In addition, NO_x emissions must also be included in an attainment demonstration modeling analysis. Therefore, States will need to develop a 1990 base year and rate-of-progress emissions inventory for NO_x, and then prepare a projected NO_x emissions inventory for 1996 for modeling. Those

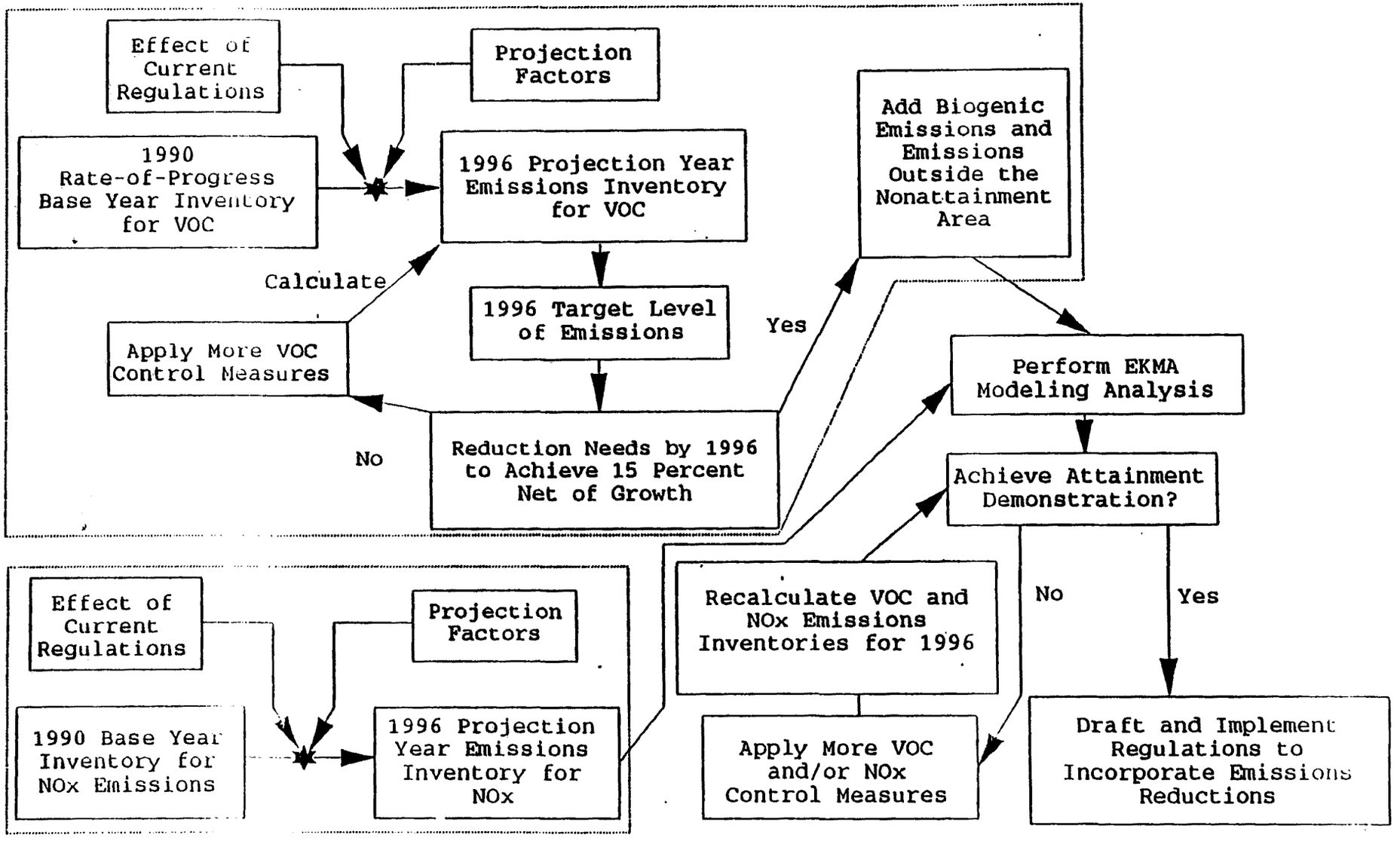


Figure 2. Flowchart for a moderate ozone nonattainment area attainment demonstration.

States that also plan to account for CO emissions in their EKMA modeling should also provide documentation for a projected CO emissions inventory for 1996 in their SIP submittals.

Moderate ozone nonattainment areas are generally expected to be able to demonstrate attainment of the ozone NAAQS by November 1996 if they comply with the 15 percent VOC emissions reduction, net of growth, requirements. If the results of the modeling analysis demonstrate attainment, the State and local agencies should proceed to draft regulations for the control measures needed to achieve the necessary emissions reductions. However, if the results of the modeling analysis do not demonstrate attainment, additional control measures must be applied to the 1996 projection year emissions to achieve the reductions in VOC and/or NO_x needed to demonstrate attainment.

Serious and above ozone nonattainment areas will be required to submit a post-1996 rate-of-progress plan to EPA by November 15, 1994 which describes, in part, how each area will achieve additional VOC emissions reductions of 3 percent per year averaged over each consecutive 3-year period from November 15, 1996 until the area's attainment date. The plan must also contain an attainment demonstration based on photochemical grid modeling. The EPA will distribute a separate guidance document on the development of the post-1996 rate-of-progress plan in early 1993. It is important to note that section 182(c)(2)(C) allows for actual NO_x emissions reductions (exceeding growth) that occur after the base year of 1990 to be used to meet post-1996 emissions reduction requirements, provided that such NO_x reductions meet the criteria outlined in forthcoming substitution guidance. Therefore, it is recommended that States track the actual NO_x emissions reductions occurring between 1990 and 1996. More specific guidance regarding NO_x substitutions is currently under development by EPA. The substitution guidance is planned for release in the fall of 1993.

2.0 GENERAL ASPECTS OF EMISSIONS PROJECTIONS

2.1 Use of Emissions Projections

Emissions projections for sources within an air basin are needed--in conjunction with ambient modeling analyses--to determine if the area will attain the NAAQS by the future attainment date. Emissions projections are also needed to determine if the rate-of-progress requirements in the CAAA will be met. See section 6, "Control Strategy Development Projections" for a discussion of the methods for calculating the 1996 projected inventory.

2.2 Rate-of-Progress Emissions Projections

The following reviews the discussion in Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 Percent Rate-of-Progress Plans. (See reference 1.) The reader should be familiar with that document in order to benefit from the subsequent discussion.

The rate-of-progress plan requires the preparation of several emissions inventories:

- 1990 base year inventory.
- 1990 rate-of-progress base year inventory.
- 1990 adjusted base year inventory.
- 1996 target level of emissions.

A detailed discussion of the calculation of these inventories is provided in the EPA document referenced above. Appendix F of this document expands on the information provided in the above referenced document by describing the projection of emissions growth between 1990 and 1996, and the calculation of the total amount of emissions reductions needed by 1996. Additionally, Appendix F presents examples of hypothetical control strategies.

2.3 Emissions Factor Adjustments

Emissions factors, as well as inventory calculation methodologies, are continually being revised and improved based on field and laboratory measurements. The States should maintain close coordination with the appropriate EPA Regional Office as they prepare the base year and other emissions inventories to insure that these inventories reflect current EPA guidance. If the emissions factors or methodologies change significantly, EPA may advise the States to correct their base year emissions inventories to reflect these changes.

If emissions factors or methodologies change significantly before November 15, 1993--the due date for the 15 percent rate-of-progress plan--EPA may require the States to make corrections to the base year emissions inventory and to the other inventories/targets associated with the rate-of-progress plan process.

The following guidance is from the General Preamble for Title I for emissions factor and methodology changes occurring after November 15, 1993 (which will not affect moderate nonattainment areas, but has the potential to affect serious and above nonattainment areas): If, however, changes occur after the 15 percent demonstration is submitted but before November 15, 1996, then the States would not have to make corrections for purposes of reconciling attainment of the 15 percent milestone. Serious areas should also refer to the General Preamble discussion on the rate-of-progress plan demonstration [section III.A.4(f); 57 FR 13516-8] for guidance on changes that might occur before November 15, 1994, and the impact on the 1990 rate-of-progress plan demonstration.

2.4 Actual and Allowable Emissions

Actual emissions from a source are the emissions based on the source's actual operating hours, production rates, and control equipment for the processes carried out at the source. Actual emissions take into consideration instances when the operations are consistent and when deviations from normal operating conditions occur. Allowable emissions are a regulatory element of the operating permit granted to the source or element of the applicable regulation which represents a regulatory limit on emissions that can be emitted from the source.

By permit provision, the actual emissions cannot exceed the allowable emissions permitted by the regulatory agencies except under very narrow conditions, such as upsets at the source. The value of the allowable emissions for a source is a regulatory element important in the inspection and enforcement programs and, like a speed limit on the highway, is a gauge for the enforcement agencies to determine compliance by the source. Allowable emissions are also an accounting tool for the regulatory agencies in their effort to balance industrial activity within overall emissions targets for a particular air basin to insure compliance with the NAAQS or other statutory requirements. As discussed below, the projections for the rate-of-progress plan will generally be based on allowable emissions limits (the enforceable emissions rate multiplied by the expected activity level) for the sources within a nonattainment area whose allowable emissions will be reduced to meet the progress requirements.

The following examples illustrate how the baseline for future trading should be determined for a chemical manufacturing process under four scenarios.

- Example 1: Source currently uncontrolled that will remain uncontrolled.

In this example, the baseline for future trading is calculated based on actual emissions. For example, if the source is currently emitting 150 pounds per day (lb/day) in 1990 with no controls in the base year and no controls required in the projection year, future baseline emissions are determined by applying the applicable growth factor [Bureau of Economic Analysis (BEA) or Economic Growth Analysis System (E-GAS) growth factors are recommended]. Assuming that the growth factor for 1996 for this chemical manufacturer is 1.2, the baseline for future trading is 180 lb/day.

- Example 2: Source currently uncontrolled that will be controlled.

In this example, the baseline for future trading is calculated based on allowable emissions. If the chemical manufacturer in Example 1 is required to install a control device reducing emissions by 75 percent (with a RE of 80 percent), future baseline emissions for trading are determined by applying the applicable growth factor (1.2) plus the future control efficiency. Future uncontrolled emissions would be 180 lb/day. Future allowable emissions, the baseline for future trading, are calculated by applying the control efficiency to the uncontrolled future level. This results in a baseline of 72 lb/day for future trading.

- Example 3: Source currently controlled that will not be subject to additional control.

In this example, the baseline for future trading is calculated based on actual emissions. For example, if the chemical manufacturer in Example 1 currently has a control device installed reducing emissions by 50 percent (with an 80 percent RE), base year emissions would be 90 lb/day. The baseline for future trading would be calculated by applying the growth factor of 1.2 which results in 108 lb/day as the baseline for future trading.

In this example, the projection based on allowable emissions may be higher than the projection based on actual emissions. For example, if the regulatory or permit requirement for this source mandated an overall reduction of 40 percent (with an 80 percent RE), emissions projected based on allowable conditions would be calculated by

It is important to note that the projections are not full allowable emissions (i.e., the allowable emissions limit multiplied by the maximum theoretical activity level). The purpose for using the allowable emissions limit in the projections is to ensure that the control strategy will meet the rate-of-progress requirement if all sources do start operating at their allowable emissions limit.

The purpose of projecting the emissions inventories into the future is not solely to predict what is likely to happen, but rather to test the ability of the regulations in the control strategy to meet RFP goals and attainment and maintenance of the ozone NAAQS. To adequately test the control strategy, EPA believes it is necessary to project on the basis of what sources are allowed to do and to evaluate the resulting air quality. However, EPA also recognizes that 1) there are time constraints related to assimilating the allowable emissions limit data into a usable format and 2) the assumption that all sources in a nonattainment area will operate at their allowable emissions limit may not be valid.

Therefore, as an alternative to using allowable emissions for projections, EPA believes it is appropriate to use actual emissions in certain circumstances. For sources or source categories that are currently subject to a regulation and the State does not anticipate subjecting the source(s) to additional regulation, the projected emissions may be based on actual emissions. In addition, for sources or source categories that are currently unregulated and are not expected to be subject to future regulations, the projected emissions may be based on actual emissions. For all other sources, i.e., sources that are expected to be subject to additional regulation, the projections should be based on the new allowable emissions (including RE) as defined above. Where a State chooses to project emissions using a different approach than described above, the State should get the approval of the appropriate EPA Regional Office before proceeding. In addition, the State must provide complete documentation of the approach and documentation and technical justification of any assumptions.

It is important to note that, regardless of whether the projected emissions are based on actual or allowable emissions, future emissions trades, including offsets, must be based on assumptions that are consistent with the projected inventory. In other words, if the projected emissions from a source are based on actual emissions, that source must use actual emissions in determining the amount of credit available for offsets or emissions trading. The EPA's Emissions Trading Policy Statement (51 FR 43814, December 4, 1986) provides EPA's policy on emissions trading. Also, the proposed rules for economic incentive programs (58 FR 11110, February 23, 1993) will provide additional guidance in this area.

substituting the required 40 percent efficiency for the 50 percent control device efficiency. Projection year allowable emissions would be 122 lb/day. The baseline for future trading must be based on the actual emissions projection to ensure that the reductions are real.

- Example 4: Sources currently controlled that will be subject to additional control.

In this example, the baseline for future trading is calculated based on allowable emissions. If the chemical manufacturer in Example 3 is required to install additional control with an overall efficiency of 90 percent (with an 80 percent RE), the baseline for future trading is calculated by applying the growth factor (1.2) to the base year emissions and adjusting the control level to reflect the 90 percent required control. In this example, the baseline for future trading would be 50 lb/day.

Because the basis of allowing credit is of major concern to sources in the State, the State must be certain to provide adequate notice (e.g., during the public hearing) to the affected sources as to what the baseline for future emissions trades will be. This is of particular concern where the projected emissions are based on actual rather than allowable emissions.

Using this approach, EPA has made concessions in two ways. First, the projections will be based on expected activity level, not maximum operating capacity. Second, EPA is not requiring that the projections be based on allowable emissions limits for all sources, only sources for which allowable emissions are expected to change.

The States will have the responsibility to adequately document which projection methodology is used so that EPA will have access to the documentation during the SIP review process and for subsequent review of emissions reduction credits.

2.5 Effect of Rule Penetration and Rule Effectiveness

Rule penetration and RE concern the ability to have all sources included in a particular regulatory requirement incorporate and implement that requirement. Penetration is a measure of how many applicable sources are complying; effectiveness is a measure of how well the complying sources apply the required control strategy or technology or how well the required control strategy or technology works to reduce emissions. Assumptions concerning these two elements of a regulatory program can have major impacts on the nature and scope of the program. For example, an underestimation of the penetration and effectiveness of a control strategy can overstate the need for other control strategies to show compliance with

regulatory requirements. On the other hand, an overestimation of these factors can lead to continuing violations of the NAAQS at monitoring stations even though the SIP provides a demonstration of compliance. The purpose of RE is to provide a better estimate of the actual emissions in recognition of the fact that it is impossible to ensure 100 percent effectiveness of the rules (i.e., meeting the rule target with 100 percent of the sources 100 percent of the time). See section 5.6 of this document for a discussion of RE improvements.

3.0 ECONOMIC ACTIVITY AND GROWTH

Economic activity is a factor influencing the level and form of anthropogenic pollution. Economic activity levels are determined by the forces of supply and demand. Emissions are determined by specific production processes (e.g., flexographic printing or rotogravure printing), inputs to those processes (e.g. low solvent inks vs. high solvent inks), and the levels of output [e.g., gallons (gal) of ink used per unit time]. If no change in the utilization of those processes and no additional processes are anticipated, the relationship of output to emissions seen in the past should be projected to occur in the future. If, however, EPA expects utilization rates to change, new processes to be adopted, or input changes to occur, the relationship between output level and emissions seen in the past may not be an appropriate assumption for projecting future emissions.

Note that growth factors are not included in the calculations of the 1990 adjusted base year inventory or the 1996 target. Growth factors are needed, however, for the 15 percent VOC emissions reduction demonstration as part of the rate-of-progress plan that is due on November 15, 1993 for all moderate and above nonattainment areas. Growth factors are also needed for the attainment demonstration due on November 15, 1993 for moderate ozone nonattainment areas using EKMA and on November 15, 1994 for moderate ozone nonattainment areas using UAM and all serious and above ozone nonattainment areas. States should include the draft rate-of-progress growth factors in both computer and written formats to EPA by November 15, 1992. Two sets of growth factors should be provided. One set is used to project the growth between 1990 and 1996 for rate-of-progress plan purposes, and the other set is used to project growth through the year of attainment for the attainment demonstration for modeling purposes. (These sets are basically the same for moderate areas, which must demonstrate attainment by 1996.) The computer format for growth factor submittals is presented in Table 1 of the document entitled Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 Percent Rate-of-Progress Plans. (See reference 1.) The following should also be included with the list of growth factors: State identification (ID), county ID, zone code (if the growth factor is to be used for a specific zone within a county), source category code [either Standard Industrial Classification (SIC), AFS source classification code, or Area and Mobile Source Subsystem (AMS) source category code], growth factor reference [e.g., BEA, plant-supplied], and control information discussed below. Any information not contained in the spreadsheet file (e.g., which agency submitted the growth information and assumptions made in preparing the information) should be submitted on paper accompanying the PC disk.

Sources of information and guidance on economic activity projections include the BEA's Regional Projections to 2040 (see references 2, 3, and 4), and EPA's Procedures for Preparing Emissions Projections. (See reference 5.) This last document discusses the development of regional projections using BEA data and lists the 57 industrial categories for which BEA data are available (pages 17-23). In those cases where a State may have better information than the BEA forecast (e.g., the State has specific information regarding planned expansion at a point source resulting in an emissions increase), States should use their own growth factors.

4.0 GROWTH PROJECTIONS

This section presents information for determining growth factors for use in projecting VOC and NO_x emissions inventories. This section discusses growth and retirement relationships, EPA's Emissions Preprocessor System (EPS), and E-GAS. Moderate ozone nonattainment areas that will rely on EKMA modeling to demonstrate attainment with the ozone NAAQS will need to provide documentation for projected emissions inventories for 1996 for both VOC and NO_x in their SIP submittals. Those States that plan to account for CO emissions in their EKMA modeling should also provide documentation for a projected CO emissions inventory for 1996 in their SIP submittals. Therefore, States that plan to account for VOC, NO_x, and CO emissions in their EKMA modeling will need to develop growth and retirement factors for VOC, NO_x, and CO emissions.

4.1 Growth and Retirement Relationships

Industry growth and the addition of new plants is often accompanied by the retirement of aging facilities. It is important to account for retirement rates when calculating projected emissions and future control levels for two reasons. First, projections can only be made when net growth after retirement is determined. Second, controls are often different for new sources and existing sources of VOC.

There are several sources of retirement rates for segments of industry. One that is generally available is the latest version of the Internal Revenue Service (IRS) Publication 534, Depreciation (used for the preparation of income tax returns). (See reference 6.) In this publication, the IRS develops retirement rates from its depreciation guidelines, in which annual retirement rates are estimated as the reciprocal of the depreciation period in years multiplied by 2. These retirement rates may be combined with growth rates to determine projected emissions. (Note that the BEA projected earnings data are calculated net of plant retirements. That is, retirement of existing sources has been taken into account.) The EPA publication entitled A Projection Methodology for Future State Level Volatile Organic Compound Emissions (VOC) from Stationary Sources Version 2.0 (see reference 7.), also provides IRS retirement rates and discusses their application for projecting VOC emissions. However, the latest version of the IRS Publication 534 should be consulted in case the IRS has changed the basis for depreciation rates from which retirement rates are calculated.

Growth and retirement rates also affect the emissions levels due to different control requirements for new and existing sources. Older facilities will often have less stringent control standards than newer facilities. As older facilities are

retired, any new facilities that come on-line may replace the output, but with substantially lower emissions. Therefore, different retirement rate and control requirement assumptions must be made for new and existing sources. Often, the emissions factor for future years will be substantially different from the base year due to a change in an operating procedure, spurred by growth and retirement, for an industry segment.

4.2 Emissions Preprocessor System (EPS)

The EPA has upgraded the EPS to more effectively incorporate future growth and controls. Projections will be made on the county-level by source category. An accompanying software utility will allow better growth data to be developed from BEA regional projections. Other enhancements have made EPS more flexible and easier to operate.

The revised version of EPS (EPS 2.0, July 1992) is a FORTRAN based system, with a graphics option programmed in the Statistical Analysis System (SAS) language. (See reference 8.)

Projection factors, which represent estimated changes in activity levels between the base and projection years, are assigned based on the first two digits of the SIC code for point sources and the first four digits of the area source category (ASC) code for area and mobile sources. The EPS 2.0 design allows for projections of actual and/or allowable emissions. The system recognizes four types of allowable emissions inventories: (1) allowables based on activity level limits; (2) allowables based on emissions limits; (3) allowables based on emissions factor limit; and (4) allowables based on both activity and emissions factor limits. The EPS 2.0 assumes projection factors apply to all allowable types except those that represent emissions limits. (The user can override this feature if desired.)

The projection factors currently available with EPS 2.0 are generated by the user using a provided BEA earnings and population data base along with an SIC(ASC)/BEA data cross reference data file. This relates the BEA categories to the appropriate SIC or ASC emissions categories. Detailed explanations of this process and data files can be found in the documentation for EPS 2.0. (See reference 8.)

4.3 Economic Growth Analysis System (E-GAS)

A key component of rate-of-progress plan emissions inventories and inventories for use in photochemical grid modeling is the development of credible growth factors for the existing inventories. Credible growth factors will require accurate forecasts of economic variables and associated activities related to ozone precursor emissions. The EPA's Air

and Energy Engineering Research Laboratory is developing E-GAS to forecast growth in economic variables and emission-generating activities. This system includes economic models for each of the ozone nonattainment areas required to use photochemical grid modeling (i.e., serious and above ozone nonattainment areas and moderate interstate areas), and modules for estimating fuel consumption, vehicle miles traveled (VMT), and physical output. The modules translate growth in economic variables to growth in activities associated with emissions of NO_x, VOC, and CO, which are the primary precursors of ozone. The scope of the system is not intended to provide growth factors for moderate intrastate areas because E-GAS will not be available in time to meet the deadline for these areas.

The E-GAS project is being coordinated with a number of groups at the Office of Air Quality Planning and Standards (OAQPS); these are the Technical Support Division/Emission Inventory Branch, the Technical Support Division/Source Receptor Analysis Branch, and the Air Quality Management Division/Ozone/CO Programs Branch. In addition, the current guidance for developing projection inventories (see reference 9), has been reviewed to maintain consistency between it and E-GAS.

The system is being developed for the PC-AT class machine. The anticipated minimum hardware requirements are 80286 CPU (though 80386 CPU is strongly suggested), with math coprocessor, EGA card/monitor, 4 MB RAM, 100 MB hard disk, and DOS 3.3 or higher.

The anticipated schedule for completion of E-GAS has two major milestones: (1) the first milestone, completed in September 1992, is a first generation "beta version" of the system, and (2) the second milestone is the final version of the system scheduled for completion in March 1993.

The EPA is not requiring the use of E-GAS because there may not be enough time to revise control strategies for the rate-of-progress plans and still meet the November 15, 1993 statutory deadline. Nevertheless, States that can adequately incorporate new growth factors generated from the E-GAS into their 1996 projected inventories are encouraged to do so.

5.0 CONTROL STRATEGIES FOR VOC's

This section first presents a summary of generic VOC control measures and then describes the source-specific guidance documentation that has been published to date.

5.1 Stationary Source Controls

Stationary source VOC control techniques can generally be classified into the following two groups (see reference 10):

- Add-on controls that recover or destroy VOC.
- Process modifications, equipment, housekeeping practices, or material substitution which reduce or eliminate VOC emissions.

Add-on VOC Controls

The most widely used add-on controls include combustion, adsorption, absorption, and condensation. The installation of add-on controls often requires inclusion of equipment to capture and route VOC emissions to an add-on control device. The overall efficiency of the add-on control depends on the capture efficiency as well as the control device efficiency. Flares, boilers, and thermal incinerators have been shown to reduce the uncontrolled VOC emissions by at least 98 percent. These controls work equally well on many types of VOC streams. The efficiency of adsorption, catalytic incineration, absorption, and condensers are more dependent on the VOC stream characteristics.

The cost effectiveness of these devices is highly dependent on the process to which they are applied. Overall costs will depend on whether or not a capture system is required, and on the flowrate and organic content of the VOC stream. The OAQPS Control Cost Manual (see reference 11), provides guidance on estimating the cost of incinerators (thermal and catalytic) and carbon adsorbers, the most common add-on controls for reducing VOC emissions.

Combustion

Combustion devices simply burn or destroy VOC emissions. This technique is generally applied if the stream has little or no recovery value. Combustion control devices include flares, thermal incinerators, catalytic incinerators, boilers, and process heaters. Incinerators can achieve control efficiencies of at least 98 percent when properly operated. Additional fuel may be needed if the pollutant streams are not capable of sustaining combustion. Flares are often used when disposing of gas streams do not require supplemental fuel. Flares have been

shown to achieve greater than 98 percent destruction of VOC emissions.

Adsorption

Adsorption uses a solid material, most commonly carbon, to trap the organic vapors. The VOC can then be recovered through steam stripping. Carbon adsorption is often more economical than combustion for stream of low organic concentration, which increases the need for supplemental fuel during combustion. Efficiencies of 95 percent or greater can be achieved through carbon adsorption.

Absorption

Absorption uses a liquid to trap the organic vapors. This process is usually not as economical as combustion or adsorption because the low concentrations of organics require long contact times and large quantities of absorbent.

Condensation

Condensation changes the organics on the exhaust stream from the vapor to the liquid phase. It is often used to reduce VOC concentrations of the exhaust gas prior to routing the stream to other add-on devices.

Process Modifications and Substitution

Process modifications and raw material changes are another class of techniques for reducing VOC emissions. Surface coating emissions in many industries have been reduced by lowering the VOC content of the coatings and solvents used in the process. A common process change in the surface coating industry has been the use of more efficient spray techniques (improved transfer efficiency) which reduces the amount of paint used and thus the VOC emissions.

Material substitution occurs in a case such as substituting waterborne paints for solvent-borne paints in surface coating operations. Some examples of housekeeping practices resulting in VOC reductions are as follows:

- Keeping lids on open tank cold degreasers when not in use.
- Ensuring the connection of the vapor recovery line in gasoline loading and unloading.
- Detecting and repairing leaks at synthetic organic chemicals manufacturing industry (SOCMI) facilities and refineries.

5.2 Motor Vehicles

Motor vehicle controls can be classified into measures reducing the per vehicle emissions or measures reducing VMT, and thus overall emissions. The latter group of measures are commonly classified as TCM's.

The CAAA mandate a mix of national and area-specific motor vehicle control measures to reduce per vehicle emissions. National measures include RVP limits for gasoline (recently revised to conform with the CAAA), evaporative/running loss controls, and tailpipe/extended useful life standards. Area-specific measures include Stage II (service station vehicle refueling) controls, clean fuel fleet programs, the California general clean fuels program, reformulated gasoline, and enhanced I/M.

Federal Motor Vehicle Control Program (FMVCP)

Tailpipe/Extended Useful Life Standards

The EPA has promulgated a final rule for new emissions standards for 1994 and later model year light-duty vehicles (LDV's) and light-duty trucks (LDT's) (56 FR 25724, June 5, 1991). The standards will be phased-in: affecting 40 percent of the model-year 1994 vehicle fleet, 80 percent of the model-year 1995 vehicle fleet, and 100 percent of the model-year 1996 and later vehicle fleets. The MOBILE5.0 model, which was released in December 1992, incorporates the new standards into future year emissions factors.

California has adopted more stringent motor vehicle standards, referred to as the California Low-Emission Vehicle (LEV) program. For information on the cost and effectiveness of the LEV program, contact the California Air Resources Board.

Evaporative/Running Loss Controls

The new Federal evaporative test procedure will account for hot soak and diurnal emissions, running losses, and resting losses. The MOBILE5.0 model contains guidance on estimating the effectiveness of evaporative/running loss controls.

RVP Limits

The gasoline volatility limits (RVP Phase I), effective from 1989 through 1991, set gasoline RVP to 10.5 in American Society for Testing and Materials (ASTM) Class C regions, and the equivalent in other regions. The ASTM volatility class represents the ASTM-recommended limits on the volatility of gasoline sold in that state. There are five volatility classes: A, B, C, D, and E, where Class A is the least volatile and

Class E is the most volatile. The ASTM class varies by season and geographical area. For example, Louisiana is a Class C area in June and a Class B area in August. The ASTM Class is higher (more volatile) in the winter months and less volatile in the summer months.

Phase II limits are mandated in 1992 and subsequent years. The Phase II regulations, which were recently revised to conform with the CAAA, place limits on EPA's authority to require less than 9.0 psi RVP in attainment areas. The MOBILE5.0 model should be used to estimate the effects of Phase II RVP limits.

Stage II[3]

Stage II systems are vapor recovery systems installed at the pumps to reduce vehicle refueling emissions. Section 182(b)(3) of the Act requires that all ozone nonattainment areas classified as moderate or above implement a Stage II vapor recovery program as a control measure. Section 202(a)(6) of the Act provides an exemption from the Stage II requirement for moderate ozone nonattainment areas after EPA promulgates on-board vapor recovery standards. After consulting with the U.S. Department of Transportation, EPA published in the Federal Register its decision against promulgating on-board vapor recovery standards (57 FR 13220, April 15, 1992), removing the possibility of a Stage II exemption for moderate areas. However, on January 22, 1993, the United States Court of Appeals for the District of Columbia Circuit ruled that EPA's decision not to require on-board vapor recovery controls be set aside and on-board vapor recovery standards be promulgated pursuant to section 202(a)(6) of the Act. The EPA is currently studying a schedule for complying with the court's ruling.

States are required to adopt Stage II rules for such areas under sections 182(b)(3). Section 202(a)(6) states that "the requirements of section 182(b)(3) (relating to Stage II gasoline vapor recovery) for areas classified under section 181 as moderate for ozone shall not apply after promulgation of such standards (i.e., on-board controls) ..."

These provisions of the Act indicate that a State's obligation to adopt Stage II rules for moderate areas continues until on-board rules are actually promulgated. When on-board rules are promulgated, a State may withdraw its Stage II rules for moderate areas from the SIP consistent with its obligation under sections 182(b)(3) and 202(a)(6). Further guidance on

[3]Although Stage II vapor recovery control systems for gasoline service stations are discussed under section 5.2 (Motor Vehicles) of this document, the emissions from gasoline service stations are generally inventoried as an area source.

Stage II requirements for moderate nonattainment areas seeking redesignation will be forthcoming.

There are compelling reasons for keeping Stage II requirements even after an on-board rule is promulgated. Vehicles equipped with on-board controls are not required to enter the market until the fourth model year after the requirement is adopted, and it will take several more years for the fleet to turn over to the extent that most cars in use have on-board controls. It could take 10-15 years before on-board controls achieve the same overall degree of VOC emissions reductions as Stage II controls. In the meantime, moderate and above nonattainment areas must achieve under section 182(b)(1)(A) a 15 percent VOC emissions reduction by November 1996. Moderate areas are required to achieve attainment of the ozone NAAQS by November 1996. Stage II is one of the most promising ways to comply with this requirement.

The EPA is further considering how this court ruling affects a State's obligation under section 184(b)(2) regarding Stage II or measures that get equivalent emissions reductions in the Northeast ozone transport region. The section 184(b)(2) requirement applies to all areas in the region regardless of the ozone designation or classification. Guidance concerning the Northeast ozone transport region will be issued at a later date.

In addition, the CAAA mandate a study identifying control measures capable of achieving emissions reductions comparable to those achievable by Stage II controls. All areas within the Northeast Ozone Transport Region [defined in section 184(a) of the Act] must adopt Stage II or comparable measures within 1 year of completion of the study. The study is to be completed in November 1993. Although Stage II is not specifically mandated, controls achieving equivalent reductions must be adopted.

The EPA has published two documents relating to Stage II controls:

- Technical Guidance - Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities. (See reference 12.)

- Enforcement Guidance for Stage II Vehicle Refueling Control Programs. See reference 13.

The EPA has interpreted the Stage II requirement to mean that controls must have a demonstrated efficiency of 95 percent. The EPA believes that this is a realistic requirement because it has been achieved in California. The Stage II program in-use efficiency (accounting for associated wear and tear, malfunctions or system problems that result in reduction of the certified efficiency) depends upon the applicability cut-off of a State's

regulation as well as the level of enforcement performed. For example, as shown on page 4-54 of the Stage II technical guidance, the estimated in-use efficiency for a program where annual inspections are conducted and all facilities dispensing 10,000 gals or more per month are regulated is 84 percent. The Stage II technical guidance also gives the estimated in-use efficiency for other applicability and enforcement scenarios. Inspections identify malfunctioning equipment, which contributes to the reduction from the demonstrated efficiency.

The CAAA establish a size cutoff of 10,000 gals of gasoline dispensed per month with the exception of independent small business marketers. The size cutoff for independent small business marketers is 50,000 gals per month. Independent small business marketers are defined in section 324 of the Act. The 10,000/50,000 gal exemptions will exclude an average of 10 percent of gasoline consumption from regulation. The CAAA do not prohibit States from establishing lower thresholds for independent small business marketers. With the difficulty in determining stations that fall under the definition of independent small business marketer, many areas choose not to have a separate exemption level for this group. A single cutoff of 10,000 gals per month would exclude an average of only 2.8 percent of gasoline consumption.

The emissions inventory guidance document entitled Procedures for Emission Inventory Preparation - Volume IV: Mobile Sources, (see reference 14), recommends the use of MOBILE5.0 emissions factors for modeling the effects of Stage II controls on refueling emissions. Further guidance on the input requirements can be found on pages 43 through 45 of the guidance document.

Clean Fuel Fleet Program

Serious, severe, and extreme ozone nonattainment areas [and CO areas with design values of 16.0 parts per million (ppm) or greater] with 1980 populations of at least 250,000 must adopt the clean fuel fleet program mandated by the CAAA. The phase-in schedule for this program is as follows:

Vehicle Type	Model-Year 1998	Model-Year 1999	Model-Year 2001
LDV's and LDT's	30%	50%	70%
Heavy-duty trucks	50%	50%	50%

Specific standards that must be met are listed in sections 243 and 245 of the Act.

Reformulated Gasoline

Reformulated gasoline is required in the nine largest cities with the most severe ozone pollution. States may opt to have other nonattainment areas included in this program. Reductions in toxic and VOC emissions of at least 15 percent are required in 1995, increasing to at least 20 percent in 2000. The emissions reductions from reformulated gasoline can be calculated using the MOBILE5.0 model.

Inspection and Maintenance

The EPA has promulgated a rule regarding enhanced I/M program requirements (57 FR 52950, November 5, 1992). The final rule includes an I/M option including a biennial centralized program with vehicles tested both in idling mode and at 2500 rpm. In addition, a transient exhaust emissions test, an evaporative canister purge system check, and an evaporative system pressure test would also be required as well as a number of tests for tampering. Benefits of enhanced I/M programs should be modeled using MOBILE5.0.

On-Board Diagnostic Systems

The EPA has proposed a rule that will require on-board diagnostic systems in all LDV's and LDT's beginning in model year 1994 (56 FR 48272, September 24, 1991). On-board diagnostic systems monitor emission-related components for malfunctions or deterioration before such events cause emissions increases. According to the proposed rule, on-board diagnostic systems will be inspected as part of a State's I/M program. Therefore, emissions reductions resulting from the use of on-board diagnostic systems will not be separately creditable toward the 15 percent VOC emissions reduction requirements.

Transportation Control Measures (TCM's)

The EPA has recently developed guidance on an assortment of TCM's. The TCM's attempt to decrease traffic congestion, especially during peak commuting hours, by providing alternatives to using motor vehicles. An EPA document entitled, Transportation Control Measure Information Documents (see reference 15), includes a list of the following TCM's:

- Programs for improved public transit.
- Restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high-occupancy vehicles.
- Employer-based transportation management plans, including incentives.

- Trip-reduction ordinances.
- Traffic flow improvement programs that achieve emissions reductions.
- Fringe and transportation corridor parking facilities serving multiple occupancy vehicle programs or transit service.
- Programs to limit or restrict vehicle use in downtown areas or other areas of emissions concentration, particularly during periods of peak use.
- Programs for the provision of all forms of high-occupancy, shared-ride services.
- Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of nonmotorized vehicles or pedestrian use, both as to time and place.
- Programs for secure bicycle storage and other facilities, including bicycle lanes, for the convenience and protection of bicyclists in both public and private areas.
- Programs to control extended idling of vehicles.
- Programs to reduce motor vehicle emissions, consistent with Title II, which are caused by extreme cold start conditions.
- Employer-sponsored programs to permit flexible work schedules.
- Programs and ordinances to facilitate nonautomobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity.
- Programs for new construction and major reconstructions of paths, tracks, or areas solely for use by pedestrian or other nonmotorized means of transportation when economically feasible and in the public interest.
- Programs to encourage the voluntary removal from use and the marketplace of pre-1980 model light-duty vehicles and trucks.

The TCM implementation guidance for SIP's may be found in an EPA guidance document entitled Transportation Control Measures: State Implementation Plan Guidance. (See reference 16.) This source also contains a list of TCM reference documents. Additional travel demand management measures to relieve congestion may be obtained from a U.S. Department of Transportation (DOT) document entitled Evaluation of Travel Demand Management Measures to Relieve Congestion. (See reference 17.)

The EPA's Office of Policy, Planning & Evaluation is doing significant work in this area. The new tools should be available in the Spring of 1993. Please call Jon Kessler (202-260-3761) or Will Schroeer (202-260-1126) with questions on these tools.

5.3 Other Mobile Sources

Fewer control measures exist for other mobile sources. Most control technology for these sources focuses on emissions reductions from diesel engines. Information will soon be available for controls for railroads, construction equipment, and farm equipment. The EPA's Office of Mobile Sources plans to provide guidance on emissions reductions that may be achieved from off-road sources due to the use of reformulated gasoline.

Controlling emissions from diesel engines can usually be accomplished by tailoring the air induction, fuel injection, fuel-air mixing, and other elements of the combustion process. Additionally, after-treatment of the exhaust gases may be possible in some cases. Diesel engine controls should be adaptable to most off-road sources. (See reference 18.) Although no specific controls have been required to date, EPA has targeted nonroad diesel engines for first-time regulation. Heavy-duty nonroad (farm and construction) equipment is specifically targeted, but recreational boats and small farm and garden equipment may also be affected by future regulations.

5.4 Control Strategy Documentation for Stationary Sources

The EPA has implemented several VOC control programs either through the promulgation of regulations, or by issuing guideline documents for States to use in developing their own regulations. Under section 111 of the Act, EPA has promulgated new source performance standards (NSPS) for several VOC source categories. The NSPS are national standards that affect new, modified, or reconstructed stationary sources. Under section 112 of the Act, EPA has promulgated national emission standards for hazardous air pollutants (NESHAPS). The NESHAPS are national standards that affect existing and new stationary sources. Some of the NESHAPS control VOC emissions from stationary sources because the NESHAPS regulate hazardous air pollutants that are classified as VOC. As a result of the CAAA, section 112 of the Act was amended to

authorize EPA to promulgate maximum achievable control technology (MACT) standards for stationary point and area sources. For area sources, EPA can develop standards based on generally available control technology (GACT) or management practices rather than MACT. The MACT and GACT standards will be issued as national standards that will affect existing and new stationary sources. Information on alternative control technologies and associated costs used to support the technical basis for existing NSPS and NESHAPS is published in background information documents (BID's) for the proposed standards. Information on alternative control technologies and associated costs used to support the technical basis for future NSPS, NESHAPS, MACT, and GACT regulations is also expected to be published in BID's or similar documents.

The EPA has issued CTG documents for several VOC source categories. The CTG documents recommend presumptive levels of RACT that States must use as a guideline in preparing their SIP's. The RACT rules adopted by States affect existing and new sources. The CTG documents issued before the CAAA are classified into Group I, II, and III source categories. The EPA is continuing to develop CTG documents for additional VOC source categories. The EPA also publishes alternative control technique (ACT) documents for VOC source categories. The ACT documents provide technical and cost information on emissions control techniques, but do not recommend presumptive levels of RACT, for stationary sources. States may use the ACT documents to support development of their own regulations.

The purpose of section 5.4 of this document is to provide a brief overview of the regulatory programs that EPA has and will continue to implement, and to provide references for the technical and cost documentation that has or will be published to support the basis for the regulatory programs.

Information on the status of EPA's VOC control programs is available through the Control Technology Center (CTC) at (919) 541-0800. Copies of BID's and CTG and ACT documents can be obtained for a fee from the National Technical Information Service:

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4600.

Information on control technologies is also available through certain State and local air pollution control agencies. The EPA focuses its efforts on controlling VOC emissions from source categories or subcategories that have a larger impact on national VOC emissions. State and local agencies can focus efforts on source categories or subcategories important in their specific areas. California's South Coast Air Quality Management

District (SCAQMD) has developed and adopted a number of stationary (point and area) and mobile source control measures in its 1991 Air Quality Management Plan. A list of the SCAQMD's control measures is provided in Appendix D of this document. The list of stationary source control measures presented in Appendix D is for source categories that are not covered by CTG documents. Copies of the management plan may be obtained from the SCAQMD.

The EPA recognizes that some of the new CTG documents and Federal regulations for other programs (e.g., NSPS, NESHAPS, and MACT) may not be promulgated in time to be used by States to develop and adopt RACT rules or other control measures for their final rate-of-progress plans (due to EPA by November 15, 1993). In general, a State may only credit expected emissions reductions toward meeting the 15 percent VOC emissions reduction requirements, net of growth, if the emissions reductions are associated with control measures that the State has fully developed, adopted, and included in its rate-of-progress plan. In general, a State may not take credit for expected emissions reductions associated with Federal regulations that have not been promulgated. A State may choose to revise its rate-of-progress plan after November 15, 1993, to replace existing control measures with new control measures based on newly promulgated CTG documents or Federal regulations. The EPA is currently investigating whether and under what circumstances a State may be able to take credit for unadopted control measures in its rate-of-progress plan. Further guidance from EPA may be forthcoming.

Group I CTG Documents

Prior to January 1978, EPA published 11 CTG documents for 15 source categories. These Group I CTG documents were summarized in a December 1978 document entitled Summary of Group I Control Technique Guideline Documents for Control of Volatile Organic Compound Emissions from Stationary Sources. (See reference 19.) The summary document provides the main ideas found in the actual CTG documents, including information on affected facilities, VOC emissions, available control technologies, recommended emissions limits, and expected control costs. The information in the summary document is also presented in the EPA document entitled Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations: Clarification to Appendix D of November 24, 1987 Federal Register. (See reference 20.) The VOC source categories covered by the Group I CTG documents are as follows:

- Surface coating of cans.
- Surface coating of metal coils.
- Surface coating of paper products.
- Surface coating of fabrics.
- Surface coating of automobiles and light-duty trucks.

- Surface coating of metal furniture.
- Surface coating for insulation of magnet wire.
- Surface coating of large appliances.
- Tank truck gasoline loading terminals.
- Bulk gasoline plants.
- Design criteria for Stage I vapor control systems at gasoline service stations.
- Storage of petroleum liquids in fixed-roof tanks.
- Refinery vacuum processing systems, wastewater separators, and process unit turnarounds.
- Solvent metal cleaning.
- Use of cutback asphalt.

Appendix B of this document provides the references for each of the Group I CTG documents.

Group II CTG Documents

The EPA published eight CTG documents between January 1978 and January 1979. These Group II CTG documents were summarized in a December 1979 document entitled Summary of Group II Control Technique Guideline Documents for Control of Volatile Organic Compound Emissions from Stationary Sources. (See reference 21.) The summary document provides the main ideas found in the actual CTG documents, including information on affected facilities, VOC emissions, available control technologies, recommended emissions limits, and expected control costs. The information in the summary document is also presented in the EPA document entitled Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations: Clarification to Appendix D of November 24, 1987 Federal Register. (See reference 22.) The VOC source categories covered by the Group II CTG documents are as follows:

- Leaks from petroleum refinery equipment.
- Surface coating of miscellaneous metal parts and products.
- Surface coating of flat wood paneling.
- Manufacture of synthesized pharmaceutical products.
- Manufacture of pneumatic rubber tires.
- Graphic arts - rotogravure and flexography.
- Petroleum liquid storage in external floating roof tanks.
- Leaks from gasoline tank trucks and vapor collection systems.

Appendix B of this document provides the references for each of the Group II CTG documents.

Group III CTG Documents

Since September 1982, EPA has published CTG documents for five additional source categories. No summary document has been prepared for the Group III CTG documents. The EPA document entitled Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations: Clarification to Appendix D of November 24, 1987 Federal Register summarizes the information on affected facilities, VOC emissions, available control technologies, recommended emissions limits, and expected control costs presented in the actual CTG documents. (See reference 22.) The VOC source categories covered by the Group III CTG documents are as follows:

- Manufacture of high-density polyethylene, polypropylene, and polystyrene resins.
- Leaks from synthetic organic chemical and polymer manufacturing equipment.
- Large petroleum dry cleaners.
- Air oxidation processes in synthetic organic chemical manufacturing industry.
- Equipment leaks from natural gas/gasoline processing plants.

Appendix B of this document provides the references for each of the Group III CTG documents.

Model RACT Rules

On June 24, 1992, EPA's Ozone/Carbon Monoxide Programs Branch of OAQPS issued a final set of model RACT rules to the EPA Regional Offices. (See reference 23.) The model RACT rules cover 29 CTG source categories. The model rules are to be used by EPA's Regional Offices as a template for proposing Federal implementation plans (FIP's) under section 110(c)(1) of the Act for areas that fail to submit approvable RACT corrections required under section 182(a)(2)(A) of the Act. States may obtain copies of the model rules from their EPA Regional Office. However, the model rules should not be construed to be operational guidance on the approvability of State rules. States may adopt rules that are different from the model rules that are fully approvable for a SIP. The basis by which State rules are evaluated and findings are made are published in the document entitled Issues Relating to VOC Cutpoints, Deficiencies, and Deviations: Clarification to Appendix D of November 24, 1987 Federal Register. (See reference 24.)

A generic non-CTG RACT rule is also included in the set of model rules. Where insufficient information is available to determine RACT for a source or source category, the generic non-CTG RACT rule may be considered as default RACT. However, it is recommended that those using the guidance seek additional

information to tailor the rule to the affected source or source category because the preferred method of establishing non-CTG RACT is on a case-by-case basis.

Several of the model rules include requirements for measuring capture efficiency. When the model RACT rules were issued, EPA's OAQPS was conducting a year-long study to reevaluate EPA's position on capture efficiency testing. Additional guidance will be forthcoming.

Although the model rules are intended to provide guidance for EPA Regional Offices to use in developing FIP's, States may use the model rules as examples of what EPA generally considers consistent with EPA guidance. Any questions regarding the model rules should be directed to Mr. David Cole, EPA/OAQPS, at (919) 541-3356.

New CTG Documents

Section 183(a) of the Act requires EPA to issue CTG documents for 11 stationary VOC source categories by November 15, 1993. The EPA published the 11 source categories for which it will develop CTG documents in Appendix E of the General Preamble (57 FR 18077). The source categories are as follows:

- SOCMI distillation.
- SOCMI reactors.
- SOCMI batch processing.
- Wood furniture.
- Plastic parts coating (business machines).
- Plastic parts coating (other).
- Web offset lithography.
- Industrial wastewater.
- Autobody refinishing.
- Volatile organic liquid storage in floating and fixed-roof tanks.
- Clean-up solvents.

Draft CTG documents have been prepared for SOCMI batch processing, SOCMI reactors and distillation, autobody refinishing, volatile organic liquid storage in floating and fixed-roof tanks, coating of wood furniture, coating of plastic parts, and web offset lithography. The references for these draft CTG documents are presented in Appendix B of this document. A reference for best available control technology (BACT)/lowest achievable emission rate (LAER) determinations for industrial wastewater processes is also provided in Appendix B of this document.

In addition, section 183(b) of the Act requires EPA to prepare CTG documents for two additional stationary VOC sources by November 15, 1993. Section 183(b)(3) requires EPA to issue a

CTG document to control VOC emissions from aerospace coatings and solvents. Section 183(b)(4) requires EPA to issue a CTG document to control VOC emissions from paints, coatings, and solvents used in ship building and repair operations. A brief summary of the work on the CTG documents for these two source categories is provided in Appendix B of this document. Information on the status of the development of the new CTG documents, as well as copies of the draft and final CTG documents when completed, may be obtained through EPA's CTC.

Section 182(b)(2) of the Act specifies the time schedule for the implementation of RACT rules for moderate and above ozone nonattainment areas. For sources covered by CTG documents issued between the date of enactment of the CAAA (i.e., November 15, 1990) and the attainment date for the nonattainment area, RACT rules must be implemented according to the schedule specified in the CTG document. For sources covered by CTG documents issued prior to enactment of the CAAA and for major stationary sources not covered by a CTG document, RACT rules must be submitted to EPA by November 15, 1992, and implemented by May 31, 1995. The EPA recognizes the potential schedule problem between submitting RACT rules for major stationary sources by November 15, 1992, which may be covered by one of the CTG documents it plans to issue in November 1993. Therefore, EPA has established the following general time table for States to submit their RACT rules for sources that are identified in a November 15, 1992 submittal as being covered by a post-enactment CTG document:

- On November 15, 1992, the State must submit a list of major stationary sources that it anticipates will be subject to one of the CTG documents being prepared for the 13 stationary VOC source categories identified above, which EPA plans to issue by November 15, 1993.

- For those major sources on the list submitted by the State in the 1992 submittal that are not covered by a CTG document that EPA has issued by November 15, 1993, the State must submit a RACT rule by November 15, 1994 that requires implementation of RACT by May 15, 1995.

- For sources covered by a CTG document issued under section 183(a) and for which the State has not, by the date of such issuance, adopted an approvable RACT rule the State must submit a RACT rule in accordance with the time schedule set forth in the relevant CTG document.

- For sources subject to a RACT rule that the State adopted and EPA approved under section 182(b)(2) prior to EPA's issuance of an applicable CTG document, EPA will work with the State to determine whether the

existing rule should be revised once a CTG has been issued that would apply to that source.

For further details on preparing RACT rules to meet the schedule required by section 182(b)(2) of the Act, the reader is referred to Appendix E of the General Preamble (57 FR 18077) and also a memorandum from G.T. Helms dated August 7, 1992 on "Determining Applicability for Sources Subject to Pending New Control Technique Guidelines (CTG's)."

Non-CTG RACT Rules

Prior to enactment of the CAAA, it was EPA's policy to require non-CTG major stationary sources located in ozone nonattainment areas that emit or have the potential to emit 100 tons per year (tpy) or more of VOC to apply RACT. Section 182 of the Act lowered the emissions threshold for the definition of "major stationary source" for many of the ozone nonattainment classifications. The major stationary source thresholds for serious, severe, and extreme ozone nonattainment areas are, respectively, 50, 25, and 10 tpy or more of VOC or NO_x. The major stationary source threshold for marginal and moderate ozone nonattainment areas in an ozone transport region is 50 tpy or more of VOC and 100 tpy or more of NO_x. The major stationary source threshold for attainment areas in an ozone transport region is also 50 tpy or more of VOC and 100 tpy or more of NO_x. The major stationary source threshold for intrastate marginal and moderate areas and all other nonattainment areas (i.e., submarginal, transitional, and incomplete/no data) remains at 100 tpy or more of VOC or NO_x. Lowering the threshold for major stationary sources will increase the number of sources subject to non-CTG RACT rules. Emissions reductions associated with lowering the threshold in non-CTG RACT rules that occur prior to November 15, 1996 in a nonattainment area are creditable toward the 15 percent VOC emissions reduction requirements, net of growth.

ACT Documents

The EPA has published ACT documents for halogenated solvent cleaners, application of traffic markings, automobile refinishing, ethylene oxide sterilization/fumigation operations, and organic waste processes. The references for these ACT documents are presented in Appendix B of this document. The ACT documents are good sources of technical information, including emissions control technologies and expected costs. Unlike CTG documents, ACT documents do not provide recommended RACT limits. The five ACT documents published to date have been briefly summarized in Appendix E of this document. Information on these and new ACT documents that EPA publishes may be obtained from the CTC.

New Source Performance Standards

Under section 111 of the Act, EPA has promulgated NSPS to control VOC emissions from facilities in the following source categories:

- Bulk gasoline terminals.
- Municipal waste combustors.
- On-shore natural gas processing plants: VOC equipment leaks.
- Petroleum dry cleaners.
- Petroleum refineries: equipment leaks.
- Petroleum refinery wastewater systems.
- Polymer manufacturing.
- Publication rotogravure printing.
- Rubber tire manufacturing.
- Storage vessels for petroleum liquids.
- Storage vessels for volatile organic liquids.
- Synthetic fiber production.
- Surface coating operations:
  - Automobiles and light-duty trucks.
  - Beverage cans.
  - Flexible vinyl and urethane coating and printing.
  - Large appliances.
  - Magnet tape.
  - Metal coil.
  - Metal furniture.
  - Plastic parts for business machines.
  - Polymeric coating of supporting substrates.
  - Pressure sensitive tapes and labels.
- SOCMI air oxidation unit processes.
- SOCMI distillation unit operations.
- SOCMI equipment leaks.

Appendix C of this document provides the Code of Federal Regulation (CFR) citations for the NSPS, and EPA publication numbers for the BID's developed to support the technical basis for the NSPS. The BID's contain technical information on the emissions sources and emissions, alternative controls considered during the development of the NSPS, the performance of the alternative controls evaluated, and estimated control costs.

On May 30, 1991, EPA proposed an NSPS to control air emissions from municipal waste landfills (56 FR 24468). The NSPS is expected to be promulgated in the fall of 1993. The proposed NSPS would limit emissions from certain new and modified landfills and would establish guidelines for States to follow in preparing plans to limit emissions from existing landfills. Technical information on emissions estimates and control techniques for municipal solid waste landfills is presented in

the document entitled Air Emissions from Municipal Solid Waste Landfills - Background Information for Proposed Standards and Emission Guidelines. (See reference 25.) The proposed and final regulations should be consulted for the definition of affected facilities and control requirements. For further information on the NSPS, contact EPA's Emission Standards Division of OAQPS.

Section 112 Standards

The EPA has promulgated NESHAPS to control hazardous air pollutants from the following VOC source categories:

- Vinyl chloride production plants.
- Benzene emissions from equipment leaks.
- Benzene emissions from benzene storage vessels.
- Benzene emissions from coke by-product recovery plants.
- Benzene emissions from benzene transfer operations.
- Benzene waste operations.

Appendix C of this document provides the CFR citations for the NESHAPS, and provides EPA publication numbers for the BID's developed to support the technical basis for the NESHAPS. The BID's contain technical information on the emissions sources and emissions, alternative controls considered during the development of the NESHAPS, the performance of the alternative controls evaluated, and estimated control costs.

The EPA will be developing several programs to control hazardous air pollutants under section 112 of the Act. Many of the hazardous air pollutants are covered by the definition of VOC. The document entitled Guidance on the Relationship Between the 15 Percent Rate-of-Progress Plans and Other Provisions of the Clean Air Act (to be released in the spring of 1993) provides a detailed description of the Federal programs that will be developed under Section 112 of the Act. The programs include MACT standards, early reduction programs, major modifications to existing sources, and standards more stringent than MACT to protect the public health. The following documents have been published for early reduction programs:

- Enabling Document for Regulations Governing Compliance Extensions for Early Reductions of Hazardous Air Pollutants. (See reference 26.)

- Questions and Answers about the Early Reductions Program. (See reference 27.)

- Procedures for Establishing Emissions for Early Reduction Compliance Extensions. (See reference 28.)

On July 16, 1992, EPA published in the Federal Register a revised list of 174 categories and subcategories of sources for which it intends to develop MACT standards (57 FR 31576). On September 24, 1992, EPA published in the Federal Register a proposed schedule for developing MACT standards for the 174 categories and subcategories (57 FR 44147). The final schedule for preparing MACT standards is expected to be finalized in September of 1993.

The EPA proposed a rulemaking for an hazardous organic NESHAP (HON) on December 31, 1992 (57 FR 62608). The final rule is expected to be promulgated in late 1993 or early 1994. The proposed rule would regulate the emissions of organic hazardous air pollutants, all of which are classified as VOC's, from SOCMI processes and from equipment leaks in seven non-SOCMI processes. The SOCMI processes include process vents, transfer operations, storage vessels, and wastewater operations. The seven non-SOCMI processes are as follows:

- Styrene/butadiene rubber products.
- Polybutadiene rubber products.
- Chlorine production.
- Pesticide production.
- Chlorinated hydrocarbon use.
- Pharmaceutical production.
- Miscellaneous butadiene use.

Controls must be installed to control SOCMI emissions points other than equipment leaks within 3 years after promulgation of the rule. The compliance schedule for the equipment leaks in SOCMI and the seven non-SOCMI processes is staggered, starting 6 months after promulgation. The reader is referred to the Federal Register notice of proposed rulemaking for further details.

The EPA proposed a NESHAP for coke oven batteries in 1987. On December 4, 1992, EPA withdrew the 1987 proposal (57 FR 57403) and proposed a new NESHAP for coke oven batteries (57 FR 57534). Although the BID for the original proposal (see reference 29) has not been updated, some of the information in the BID is still relevant to the new proposal. Materials prepared to support the new proposal are contained in the docket for the proposed rulemaking. The NESHAP is expected to be promulgated in the spring of 1993.

Other Federal Control Measures

The EPA is planning to prepare VOC control measures for consumer and commercial products, adhesives, application of agricultural pesticides, marine vessel loading operations, architectural and industrial coatings, autobody refinishing, and ship building operations and ship repair. The control measures

for these source categories may be published as future BID's, ACT documents, or possibly as CTG documents. The developmental status of the control measures and the documents EPA anticipates issuing to support the technical basis for the control measures for these source categories is presented in Appendix E of this document.

The EPA is also preparing standards under the Resource Conservation and Recovery Act (RCRA) to control organic air emissions from hazardous waste treatment, storage, and disposal facilities (TSDF's). Phase I standards were promulgated on June 21, 1990 (55 FR 25454). The Phase I standards cover equipment leaks and process vents. Technical information on emissions estimates and control techniques for facilities covered by the Phase I standards are presented in the document entitled Hazardous Waste TSDF's - Technical Guidance Document for RCRA Air Emissions Standards for Process Vents and Equipment Leaks. (See reference 30.) Phase II standards were proposed on July 22, 1991 (56 FR 33490). The Phase II standards have been proposed to cover tanks, surface impoundments, containers, and miscellaneous units. Technical information on emissions estimates and control techniques for facilities covered by the Phase II standards are presented in the document entitled Hazardous Waste TSDF's - Background Information for Proposed RCRA Air Emissions Standards. (See reference 31.) The Phase II standards are expected to be promulgated in the fall of 1993. The Phase I and II regulations should be consulted for the definitions of the affected facilities. For further information on the Phase I and II standards, contact EPA's Emission Standards Division of OAQPS.

5.5 Rule Effectiveness Improvements

Many States with preexisting nonattainment areas have already adopted rules defining RACT for most of the larger sources, including major non-CTG categories. In such cases, there is considerable concern about what additional measures are needed to meet the 15 percent VOC rate-of-progress requirement. One method of achieving creditable emissions reductions from stationary sources in such areas is to improve the implementation of existing regulations. This is referred to as RE improvement. These improvements are subject to the same creditability constraints as are the other emissions reductions.[4] Rule effectiveness improvements must reflect real emissions reductions resulting from specific implementation program improvements. Actual emissions reductions must result from improving RE; simply calculating a higher RE using a different methodology is not creditable.

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[4]For example, some RACT rule corrections that result in improved RE may be creditable; a discussion of this appears in section III.3.a.4 of the General Preamble (57 FR 13509).

Rule effectiveness improvements must be documented at a minimum by conducting a post-implementation (after the implementation of RE improvement programs) source-specific emissions study. Two methods are available for calculating creditable RE improvements; both require that a post-implementation Stationary Source Compliance Division (SSCD) Protocol Study be conducted. The first method involves pre- and post-RE improvement implementation studies as delineated by SSCD. For example, if the RE increases from 50 percent to 75 percent, the emissions reductions associated with this improvement would be creditable. The second approvable method uses the EPA default value of 80 percent for the RE value prior to the rule-effectiveness improvement program. Thus, if the results of a SSCD protocol study show 85 percent RE after implementation, the increase in emissions reductions associated with the improvement from 80 to 85 percent would be creditable toward the 15 percent rate-of-progress requirement. Additional discussion of RE, including provisions for the calculation and use of category-specific RE factors, is available in Guidelines for Estimating and Applying Rule Effectiveness for Ozone/CO State Implementation Plan Base Year Inventories. (See reference 32.)

If a State can show an improvement in the RE of a SIP provision (for further information refer to the December 21, 1992 memorandum from John B. Rasnic, Director SSCD, to Regional Air Division Directors, regarding "Revised Rule Effectiveness National Protocol") above the default value through the use of an EPA protocol test, then the emissions reductions associated with the improvement would be creditable toward meeting the 15 percent VOC emissions reduction requirement. If the EPA protocol test for the effectiveness of a SIP rule indicates that the RE was less than the default value, further reductions would be necessary to meet the statutory requirements.

The EPA plans to issue guidance on the quantification of RE improvements in early Spring 1993. Suggested measures for improving RE are as follows:

Agency Compliance

- Increase number of people in inspection program.
- Increase frequency and nature of inspections.
- Implement and improve recordkeeping requirements (perhaps automated to estimate that they are in compliance over time).
- Improve follow-up program once violations are found.
- Establish a formal documentation and enforcement system.
- Implement an SSCD protocol which is self-monitoring.
- Facilitate communication through publicity.

Source

- Implement internal audits that would routinely review and trigger remedial action--an automatic assessment program.
- Improve adequacy of recordkeeping.
- Assign responsible people.
- Implement a periodic checking system with explicit follow-up to evaluate the on-going system.
- Implement an SSCD protocol which is self-monitoring.

Improvements in Technology

- Implement an operation and maintenance program for control equipment (e.g., monitoring and alarm system for the equipment).

Education

- Increase training of plant operators.
- Require qualified and trained inspectors.
- Implement periodic updating of training programs and periodic training.

Rules

- Revise complex and ambiguous rules.
- Create methodologies to simplify rules.

The following items provide several suggestions for what EPA will accept in a State's SIP to demonstrate adoption and implementation of RE improvements: adoption of a rule, a letter to the Governor, additional staff, or incorporation of the activity in a permit. The RE improvements will be evaluated on a case-by-case basis. Other guidance on evidence of adoption and commitment is found on pages 218-220 in Workshop on Requirements for Nonattainment Area Plans. (See reference 33.)

5.6 Quantification of Rule Effectiveness Improvement Programs

In order to estimate the amount of creditable emissions reductions from RE improvements, States will need to calculate the RE values associated with their improvement programs. These values will be developed using a methodology similar to that for calculating the base year RE values.

The EPA is currently developing a list of specific control measures that will yield real improvements in RE. A group of experienced compliance experts, comprising State and local agencies, EPA Regional Offices, and EPA Headquarters, will assess the relative weights for the groups of measures. Furthermore, some groups of measures will also contain several different

possible levels of activities (e.g., under the group "nature of regulation," one level would be "possible ambiguity or deficiency in rule"). These levels of activities will also be weighted relative to one another. The EPA will employ the use of the Delphi method to reach consensus on the weightings. (The Delphi method involves the solicitation of opinions from experts on a subject, the compilation of the opinions, and the determination of an average opinion based on the averaging of the collected opinions.) The States will determine a weighted value for each group by multiplying the weight of each level of activity by the weight of its group. The values would be summed to provide a raw score, which would be an initial relative indicator of the new RE value.

The table will also include instructions for increasing or decreasing the weight if it is determined that certain groups of activities or conditions performed simultaneously provide enhanced or decreased effect on RE. The grouping of RE improvement measures, the weights that EPA assigns to these measures, and the description of how the scores are to be used to compute the improved RE will be provided in forthcoming EPA guidance expected in Spring 1993.

6.0 CONTROL STRATEGY DEVELOPMENT PROJECTIONS

6.1 Introduction

This section discusses the purpose and elements of emissions projections, the types of emissions projections that must be developed to meet the requirements for the rate-of-progress plans, and several alternative methods or equations that can be used to calculate the 1996 projection year emissions inventories for point, area, and mobile sources. Moderate ozone nonattainment areas that will rely on EKMA modeling to demonstrate attainment with the ozone NAAQS will need to provide documentation for projected emissions inventories for 1996 for both VOC and NO_x in their SIP submittals. Those States that also plan to account for CO emissions in their EKMA modeling should also provide documentation for a projected CO emissions inventory for 1996 in their SIP submittals. The guidance presented in this section is applicable for projecting VOC, NO_x, and CO emissions.

In general, projection year emissions are to be based on allowable ozone season typical weekday emissions. However, as discussed in section 2.4 of this document, EPA recognizes that 1) there are time constraints related to assimilating the allowable emissions limit data into a usable format and 2) the assumption that all sources in a nonattainment area will operate at their allowable emissions limit may not be valid. Therefore, as an alternative to using allowable emissions for projections, EPA believes it is appropriate to use actual emissions in certain circumstances. For sources or source categories that are currently subject to a regulation and the State does not anticipate subjecting the source(s) to additional regulation, the projected emissions may be based on actual emissions. In addition, for sources or source categories that are currently unregulated and are not expected to be subject to future regulations, the projected emissions may be based on actual emissions. For all other sources, i.e., sources that are expected to be subject to additional regulation, the projections should be based on the new allowable emissions (including RE). The reader is referred to section 2.4 of this document for detailed guidance on EPA's policy concerning the use of actual or allowable emissions for emissions projections.

The States will have the responsibility to adequately document which projection methodology is used so that EPA will have access to the documentation during the SIP review process and for subsequent review of emissions reduction credits. The purpose of this section is to describe and illustrate the various projection methodologies which States can use for preparing emissions projections.

6.2 Purpose and Elements of Emissions Projections

The purpose of developing a 1996 projected inventory is to determine the emissions reductions that will be needed to meet reasonable further progress requirements or to attain the ozone NAAQS. After the emissions reductions are determined, States must then prepare, adopt, and implement legally enforceable control measures needed to achieve the emissions reductions. Projection year emissions are to be based on ozone season typical weekday emissions.

Actual emissions, for purposes of projections, are to be based on a source's actual operating hours, production rates, and control equipment for the processes carried out at the source. Actual emissions take into consideration instances when the operations are consistent and when deviations from normal operating conditions occur.

Allowable emissions, for the purposes of projections, are to be based on expected future operating conditions (operating rates or throughput and hours of operation) and maximum emissions limits. Maximum emissions limits may be process-based emissions factors [e.g., pounds of VOC per gallon (lb VOC/gal) of coating applied, lb VOC/ton processed], capture and/or control device efficiencies, or emissions rate limits (e.g., tpy, lb/day). Emissions factor limits and capture and/or control device efficiency limits should take precedence over emissions rate (time-based) limits when both are available. In determining the maximum emissions limit, existing regulations and permits must be considered in addition to future planned regulations and permit modifications.

Emissions rate limits (mass/time) should only be used if there are procedures for demonstrating compliance with these limits. Emissions rate limits may be expressed as annual ton-per-year limits (long-term) or short-term limits on a monthly, daily, or hourly basis (e.g., lb/day). The permit must contain a method for determining compliance with these limits. Long-term (e.g., annual average) limits should be used in the calculation of projection year emissions. Short-term limits [e.g., lb/day or pounds per hour (lb/hr)] may be based on maximum operating conditions to allow for fluctuations in operation. If an emissions rate limit (mass/time) is used, annual long-term limits should be converted to daily limits based on the source's operating schedule. The long-term limits are more representative of expected activity, while the short-term limits are more representative of maximum activity.

The following data elements are also important for projections and have been discussed previously in this document.

- Growth factors.
- Control efficiency.
- RE.
- Rule penetration.

6.3 Types of Emissions Projections

The Current Control Projection estimates projection year allowable emissions, accounting for controls required in the SIP by November 1990 (whether or not they have yet been implemented) and growth. The Control Strategy Projection estimates projection year allowable emissions accounting for future control strategies (those that are not yet in the SIP) and growth. The Current Control Projection incorporates growth between 1990 and 1996 and adjusts the emissions to reflect existing regulatory or permit conditions. The Control Strategy Projection builds on the Current Control Projection by incorporating future control strategies. These future control strategies may take the form of areawide regulations affecting a source category or a specific source.

The Current Control Projection is used to assess the additional reductions needed by an area to meet 1996 rate-of-progress (moderate and above areas must meet the 15 percent VOC emissions reduction requirements, net of growth) and/or attainment date deadlines (November 1993 for marginal areas and November 1996 for moderate areas). The Current Control Projection reflects existing control levels, which are adjusted to reflect the allowable emissions factors or mass emissions rates.

The Control Strategy Projection will reflect the controls mandated by the CAAA, plus additional controls needed to meet rate-of-progress targets. It is anticipated that several iterations of the Control Strategy Projection will be completed to determine the mix of control measures needed to meet the rate-of-progress targets, taking into account the costs of these measures.

6.4 Methods for Calculating Point, Area, and Mobile Source 1996 Projection Year Emissions

The following discussion is divided into separate sections for point, area, and mobile sources, because the methods for calculating the 1996 projection year emissions differ for these three emissions source types. Detailed projection equations are presented for point sources. The equations presented for area and mobile sources parallel those used within AIRS-AMS. The last section is a brief discussion of the projection equations from

EPS, which may also be used by the States to complete emissions projections. The equations presented for point, area, and mobile sources can be used to project either allowable or actual emissions.

The EPA is in the process of developing a PC-based multiple projections computer system to aid States in developing 1996 projected inventories. The equations used in this system will parallel those used in EPS. Unlike EPS, however, the system will be used strictly for preparing emissions projections rather than as a preprocessor for preparing UAM inputs. The system will also produce transaction files for uploading emissions projections to AIRS after the necessary data elements have been added to AFS. States may also complete their projections using the detailed equations presented in the following sections. It is believed that these detailed equations will provide the best emissions projections. However, projection year inventories based on any of these options will be accepted by EPA.

Point Source Emissions Projections

This section presents five equations for calculating the 1996 projection year emissions. The equations presented here assume that the calculations will be on a source-specific basis. The following data are needed to calculate 1996 projection year emissions:

- Base Year (1990) Data:
  - Operating rate (ozone season).
  - Emissions (ozone season).
  - Emissions factor.
  - Control efficiency (capture and control device efficiency).
  - RE.

- Projection Year Data:
  - Growth factor.
  - Allowable limits -- emissions factor.
    control efficiency.
    emissions rate.
  - RE.

All of the base year data may not be appropriate for the projection year emissions calculations. If the base year emissions are calculated by using emissions factors, the projection year emissions can be calculated in the same manner using the operating rate (with consideration of RE) (e.g., emissions factor * operating rate * RE factor * growth factor = emissions for projection year). If other methods were used to estimate base year emissions (e.g., material balance, stack test), the emissions projection calculation will be obtained by

applying RE and growth factors to the 1990 emissions, rather than being based on the operating rate.

The calculation methodology for the 1996 projected emissions depends on the methodology used to calculate base year emissions (emissions factor method or alternative), the data available, and the form of the allowable emissions limits. Five equations are presented below for projecting point source emissions. These are followed by examples illustrating the situations for which the equations are appropriate.

Some of the following equations use emissions factors for coating sources that are expressed in terms of mass of VOC per unit of production (e.g., lb VOC/gal of coating). The regulatory VOC RACT rules should already be expressed in terms of units such as lb VOC/gal of coating minus water and exempt solvents. In calculating base- or future-year emissions, however, one must maintain consistency between the VOC content and the production units. If volume of coating, including water and exempt solvents, is the only form of records kept for historical production, then the VOC content must be adjusted from the regulatory limit to be consistent with the units of production used to calculate base- or future-year emissions.

Equation 1 - Projection calculated from base year operating rate, uncontrolled or precontrol emissions factor, control efficiency, RE, and growth factor

This equation should be applied when the base year emissions are calculated by the emissions factor method and control efficiencies are used to reflect current or future control strategies. In these cases, the base year emissions are calculated from the operating rate, base year emissions factor, control efficiency (current or future), and RE.

The equation for projecting emissions in this case is:

$$EMIS_{PY} = ORATE_{BY,O} * EMF_{PY,pc} * \left[1 - \left(\frac{CE_{PY}}{100}\right)\left(\frac{RE_{PY}}{100}\right)\right] * GF \qquad (1)$$

where:

$EMIS_{PY}$	=	Projection year emissions - ozone season typical weekday (mass of pollutant/day)
$ORATE_{BY,O}$	=	Base year operating rate (activity level) - ozone season daily (production units/day)
$EMF_{PY,pc}$	=	Projection year precontrol emissions factor (mass of pollutant/production unit)
CE_{PY}	=	Projection year control efficiency (percent)

RE_{PY} = Projection year RE (percent)
GF = Growth factor (dimensionless)

The precontrol emissions factor ($EMF_{PY,pc}$) reflects the mass of VOC per production unit emitted before control. In this case, the control is reflected through the control efficiency rather than through a reduced or post-control emissions factor.

If the projection year control efficiency and RE values reflect current regulatory or permit conditions, then the projection year emissions will be the Current Control Projection. If the control efficiency and RE values reflect future control strategies, then the emissions projection will be the Control Strategy Projection.

Equation 2 - Projection calculated from base year operating rate, allowable (post-control) emissions factor, RE, and growth factor

This equation should be applied when the base year emissions are calculated by the emissions factor method and the emissions factor accounts for the control level for the projection year.

The equation for projecting emissions in this case is:

$$EMIS_{PY} = ORATE_{BY,O} * EMF_{PY} * \left[\frac{(200 - RE_{PY})}{100}\right] * GF \qquad (2)$$

where:
$EMIS_{PY}$ = Projection year emissions - ozone season typical weekday (mass of pollutant/day)
$ORATE_{BY,O}$ = Base year operating rate (activity level) - ozone season daily (production units/day)
EMF_{PY} = Projection year (post-control) emissions factor (mass of pollutant/production unit)
RE_{PY} = Projection year RE (percent)
GF = Growth factor (dimensionless)

Current Control Projection emissions in this case are calculated if the projection year emissions factor and RE values represent current regulatory or permit conditions and/or actual conditions where appropriate (see section 2.4 of this document). Control Strategy Projection emissions in this case are calculated if the projection year emissions factor and RE values represent future control strategies or regulations developed to meet rate-of-progress targets.

Equation (2) will be used for emissions factor-based control measures such as solvent content limits on surface coating. These projections must also account for RE. The factor [(200 - RE_{PY})/100] adjusts emissions for RE. With a RE of 80 percent,

emissions will be adjusted by a factor of 1.2. The impact of applying RE in combination with a control efficiency varies as follows:

Uncontrolled Emissions (lb/day)	Control Efficiency (%)	Controlled Emissions (100% RE)	Controlled Emissions (80% RE)	RE Factor
100	99	1	20.8	20.8
100	98	2	21.6	10.8
100	95	5	24.0	4.8
100	90	10	28.0	2.8
100	80	20	36.0	1.8
100	50	50	60.0	1.2
100	30	70	76.0	1.1

The factor [(200 - RE)/100] is equivalent to the impact (on emissions) of applying RE to a 50 percent control efficiency. If, for instance, the allowable (post-control) emissions factor is converted to a percentage reduction from the precontrol emissions factor and used as the projection year control efficiency in equation (1), different results may be produced depending on how much the resulting percentage reduction varies from 50 percent. The [(200 - RE_{PY})/100] factor is not valid for low RE values.

Equation 3 - Projection calculated from base year actual emissions, future control levels, RE, and growth factor

This equation will be used for processes where the base year emissions are calculated by material balance, stack test, or any method other than an emissions factor. This equation can be applied without using the process or operating rate for the source.

The equation for projecting emissions in this case is:

$$EMIS_{PY} = EMIS_{BY,O} * \left[\frac{1 - \left(\frac{CE_{PY}}{100}\right)\left(\frac{RE_{PY}}{100}\right)}{1 - \left(\frac{CE_{BY}}{100}\right)\left(\frac{RE_{BY}}{100}\right)} \right] * GF \qquad (3)$$

where: $EMIS_{PY}$ = Projection year emissions - ozone season typical weekday (mass of pollutant/day)

$EMIS_{BY,O}$ = Base year ozone season actual emissions (mass of pollutant/day)

CE_{PY}	=	Projection year control efficiency (percent)
RE_{PY}	=	Projection year RE (percent)
CE_{BY}	=	Base year control efficiency (percent)
RE_{BY}	=	Base year RE (percent)
GF	=	Growth factor (dimensionless)

Current Control Projection emissions in this case will be calculated if the projection year control efficiency reflects existing regulatory or permit conditions. In this case, the projection year and base year control efficiencies may be equivalent if the base year control efficiency reflects allowable conditions. Since base year emissions reflect actual rather than allowable conditions, the base year control efficiency may be higher than the allowable efficiency or the minimum control mandated by existing regulations/permits.

Control Strategy Projection emissions in this case will be calculated if the projection year control efficiency reflects future control measures.

Equation 4 - Projection calculated from base year actual emissions, emissions factor-based control levels, RE, and growth factor

This equation will be used for processes where the base year emissions are calculated by material balance, stack test, or any method other than emissions factors. Equation (4) must be used for emissions factor-based control measures such as solvent content limits on surface coating if the operating rate is unavailable. This equation differs from equation (3) in that control levels are represented by emissions factors rather than control efficiencies.

The equation for projecting emissions in this case is:

$$EMIS_{PY} = EMIS_{BY,O} * \left[\frac{\left[\frac{(200 - RE_{PY})}{100}\right]}{\left[\frac{(200 - RE_{BY})}{100}\right]}\right] * \left[\frac{EMF_{PY}}{EMF_{BY}}\right] * GF \qquad (4)$$

where:

$EMIS_{PY}$	=	Projection year emissions - ozone season typical weekday (mass of pollutant/day)
$EMIS_{BY,O}$	=	Base year ozone season actual emissions (mass of pollutant/day)
RE_{PY}	=	Base year RE (percent)
RE_{BY}	=	Projection year RE (percent)
EMF_{PY}	=	Projection year emissions factor (mass of pollutant/production unit)

EMF_{BY}	=	Base year actual emissions factor (mass of pollutant/production unit)
GF	=	Growth factor (dimensionless)

Emissions for the Current Control Projection in this case are calculated when the projection year emissions factor and RE values represent existing regulatory or permit conditions. Under the Current Control Projection, the projection year emissions factor may be equivalent to the base year emissions factor if the actual conditions are equivalent to (i.e., not more stringent than) the regulatory or permit conditions.

Control Strategy Projection emissions in this case are calculated by using the future control strategy emissions factor and RE values in equation (4).

These projections must also account for RE. The factor [(200 - RE)/100] adjusts emissions for RE. With a RE of 80 percent, emissions will be adjusted by a factor of 1.2. This is equivalent to the impact (on emissions) of applying an 80 percent RE to a 50 percent control efficiency. If, for instance, the allowable emissions factor is converted to a percentage reduction from the precontrol emissions factor and used as the projection year control efficiency in equation (3), different results may be produced depending on how much the resulting percentage reduction varies from 50 percent. The [(200 - RE)/100] factor is not valid for low RE values.

Equation 5 - Projection calculated from permitted emissions rates

Permits often express limitations in terms of mass emissions rates (hourly, daily, monthly, or annual maximums). These emissions rates will require different processing than the emissions factor limits described for equations (1), (2), and (4). Long-term (e.g., annual) rates should be used as an estimate of the allowable emissions. The long-term limit must be converted to an ozone season typical weekday limit.

The equation for projecting emissions in this case is:

$$EMIS_{PY} = ER_{PY} * \frac{EMIS_{BY,O}}{EMIS_{BY,Annual}} \qquad (5)$$

where:

$EMIS_{PY}$	=	Projection year emissions ozone season typical weekday (mass of pollutant/day)
ER_{PY}	=	Projection year annual emissions cap (mass of pollutant/year)
$EMIS_{BY,O}$	=	Base year ozone season typical weekday emissions (mass of pollutant/day)

$EMIS_{BY,Annual}$ = Base year annual emissions (mass of pollutant/year)

The factor $EMIS_{BY,O}/EMIS_{BY,Annual}$ converts the long-term annual emissions cap to an ozone season typical weekday emissions cap using the ratio of base year ozone season typical weekday to annual emissions. Note that the mass units (i.e., tons, pounds) must be equivalent in both terms.

Emissions for the Current Control Projection are calculated in this case if the annual emissions cap (ER_{PY}) reflects current permit conditions. Emissions for the Control Strategy Projection are calculated if the annual emissions cap reflects the future emissions cap for the source. If future regulatory or permit conditions are in the form of emissions factor limits or control efficiencies, then the Control Strategy Projection emissions should be calculated using either equations (1), (2), (3), or (4).

Special Cases - Use of several equations

Some situations will not fall under a single method identified above, but will require the use of several equations. One situation requiring special processing is for facilities that do not have process-specific limits but do have facility-wide limits. An allocation should be developed to estimate process-specific limits for the facility. The equations above could then be used to calculate projection year emissions.

Emissions Projections Examples for Point Sources

The following examples illustrate the application of the above equations for projecting emissions.

1. **Surface Coating: Solvent Content Based Regulations**

Base Year Ozone Season Operating Conditions:

Operating rate	=	10 gal coating/day
Emissions factor	=	2.6 lb VOC/gal coating

(Base year emissions are calculated from the solvent usage rate and the emissions factor. The emissions factor must be in terms of VOC, excluding water and exempt solvents)

Projection Year Conditions:

Growth factor	=	1.2 (dimensionless)
Current regulatory emissions limit	=	2.8 lb VOC/gal coating
Control efficiency	=	not required for equation
RE	=	80 percent

Since the emissions limit is expressed in terms of an emissions factor, equation (2) would be used to calculate projection year emissions. The variables in equation (2) are:

$ORATE_{BY,O}$	=	10 gal coating/day
EMF_{PY}	=	2.8 lb VOC/gal coating
GF	=	1.2 (dimensionless)
RE_{PY}	=	80 percent

Projection year emissions are calculated as follows:

$$EMIS_{PY} = ORATE_{BY,O} * EMF_{PY} * \left[\frac{(200 - RE_{PY})}{100}\right] * GF \qquad (2)$$

$$EMIS_{PY} = 10 * 2.8 * \left[\frac{200 - 80}{100}\right] * 1.2$$

$$= 40.3 \text{ lb VOC/day}$$

Since the emissions factor represents current regulatory conditions, this projection reflects the Current Control Projection for this case. Rule effectiveness must be accounted for in the emissions projection since not all sources may be complying and future emissions are not calculated by direct determination.

The State may decide to restrict this operation to the 2.6 lb VOC/gal coating emissions level (2.8 lb VOC/gal coating is the requirement) or lower through a new regulation or by permit conditions. The State would use this new emissions factor limit to calculate projection year emissions for the Control Strategy Projection for this case as follows:

$$\text{Control Strategy Emissions Factor} = 2.6 \text{ lb VOC/gal coating}$$

$$EMIS_{PY} = 10 * 2.6 * \left[\frac{200 - 80}{100}\right] * 1.2$$

$$= 37.4 \text{ lb VOC/day}$$

If the throughput is in units incompatible with the emissions factor (VOC content) limit, then one of the parameters must be converted for use in the equation. For example, flatwood coaters may report operating rates in terms of 1,000 square feet coated. These units are compatible with the Federal (AP-42) emissions factors but are incompatible with solvent-based limits. In most cases, the facility should have records on the gallons of

coating used for each process (prime coating, etc.). The average gallons of coating per unit can be multiplied by the VOC limit to yield a limit in terms of lb VOC/unit produced. This could then be used in equation (2).

This example illustrates the use of equation (2) for emissions projections. Equation (2) is used for emissions factor-based controls such as VOC limits. Equation (2) can only be used if the base year operating rate is available. This example also illustrates the difference between the Current Control Projection and the Control Strategy Projection.

2. Surface Coating: No Throughput

If the throughput is unavailable, or is in units incompatible with the base year and allowable emissions factor, equation (4) must be used to calculate allowable emissions. Material balances may be used to calculate base year emissions rather than emissions factor methods which use throughput and emissions factors.

Base Year Operating Conditions:
- Emissions = 40 lb VOC/day
- Emissions factor = 2.6 lb VOC/gal coating

Projection Year Conditions:
- Growth factor = 1.2 (dimensionless)
- Current regulatory/permit emissions limit = 2.8 lb VOC/gal coating

Variables in equation (4) are

$EMIS_{BY,0}$	=	40	GF	=	1.2
RE_{PY}	=	80	RE_{BY}	=	80
EMF_{PY}	=	2.8	EMF_{BY}	=	2.6

$$EMIS_{PY} = EMIS_{BY,0} * \left[\frac{\left[\frac{(200 - RE_{PY})}{100}\right]}{\left[\frac{(200 - RE_{BY})}{100}\right]}\right] * \left[\frac{EMF_{PY}}{EMF_{BY}}\right] * GF \qquad (4)$$

$$EMIS_{PY} = 40 * \left[\frac{(200 - 80)}{100} / \frac{(200 - 80)}{100}\right] * \left[\frac{2.8}{2.6}\right] * 1.2 = 51.7 \ lb\ VOC/day$$

Since the current regulatory or permit conditions are used in the emissions projection calculation, Current Control Projection emissions are calculated.

This example uses equation (4) to project emissions. Equation (4) is used for emissions factor-based control strategies such as VOC limits. Equation (4) must be used if operating rates are unavailable (if the operating rate is available, equation (2) should be used).

3. Surface Coating: Control Device Versus VOC Content Limits

Surface coating regulatory conditions may be met by a control device or by the use of low-solvent coatings. The emissions factor should be converted to a "lb VOC/gal solids applied" basis for calculating emissions. Coatings that vary widely in VOC content will also vary in solids content. More lower-solids coating would be required to coat the same surface area. This factor is accounted for by converting to the lb VOC/gal solids basis. (In example 1, which compared the 2.8 lb VOC/gal coating to the 2.6 lb VOC/gal coating, it was assumed that the solids contents were equivalent. The accuracy of this assumption decreases as the difference in VOC content increases.)

Base Year Operating Conditions:

Operating Rate	=	60 gal solids/day
VOC content	=	3.5 lb VOC/gal coating
Control efficiency	=	0 percent
RE	=	N/A
Solids content	=	52.4 percent
Solvent content	=	47.6 percent

The base year emissions factor is calculated as:

$$3.5\ lb\ VOC/gal\ coating * \frac{gal\ coating}{0.524\ gal\ solids} = 6.68\ lb\ VOC/gal\ solids$$

The base year emissions are calculated as:

$$60\ gal\ solids/day * 6.68\ lb\ VOC/gal\ solids = 400.8\ lb\ VOC/day$$

In the first case, assume the coater meets the regulatory condition of 2.8 lb VOC/gal coating by using low-solvent coating. The projection year emissions would be calculated using equation (2).

Projection Year Conditions:

Growth factor	=	1.2 (dimensionless)
VOC content limit	=	2.8 lb VOC/gal coating
VOC density	=	7.36 lb VOC/gal VOC
RE	=	80 percent

The projection year emissions factor is calculated as:

$$2.8\ lb\ VOC/gal\ coating * \frac{1\ gal\ VOC}{7.36\ lb\ VOC} = 0.380\ gal\ VOC/gal\ coating$$

$$1 - 0.380 = 0.620\ gal\ solids/gal\ coating$$

$$2.8\ lb\ VOC/gal\ coating * \frac{1\ gal\ coating}{0.620\ gal\ solids} = 4.52\ lb\ VOC/gal\ solids$$

Projection year emissions are calculated using equation (2)

$$EMIS_{PY} = ORATE_{BY,O} * EMF_{PY} * \left[\frac{(200 - RE_{PY})}{100}\right] * GF \qquad (2)$$

$$EMIS_{PY} = 60 * 4.52 * \left[\frac{(200 - 80)}{100}\right] * 1.2$$

$$= 390.5\ lb\ VOC/day$$

In the second case, assume the regulatory condition is in the form of a control efficiency.

Projection Year Conditions:

Growth factor	=	1.2 (dimensionless)
Control efficiency	=	50 percent
RE	=	80 percent

Equation (1) is used to calculate projection year emissions as follows:

$$EMIS_{PY} = ORATE_{BY,O} * EMF_{PY,pc} * \left[1 - \left(\frac{CE_{PY}}{100}\right)\left(\frac{RE_{PY}}{100}\right)\right] * GF \qquad (1)$$

$$EMIS_{PY} = 60 * 6.68 * \left[1 - \left(\frac{50}{100}\right)\left(\frac{80}{100}\right)\right] * 1.2$$

$$= 288.6\ lbs\ VOC/day$$

This example illustrates the difference in the calculation of projection year emissions for surface coating when a control efficiency rather than a lower VOC content coating is specified in the control measure.

4. Control Efficiency-Based Regulations/Permits

Some permits and regulations specify a control device and efficiency with which the source must comply. In these cases, equation (1) or equation (3) would be used depending on the availability of the base year operating rate.

In some cases, the regulatory condition or permit may be exceeded by the source. Projection year emissions for the Current Control Projection should be calculated using the permitted rather than actual efficiency.

Base Year Conditions:

Emissions	=	120 lb VOC/day
Control efficiency	=	98 percent
RE	=	80 percent
Operating rate	=	not available

Projection Year Conditions:

Growth factor	=	1.05 (dimensionless)
Permitted efficiency	=	95 percent
RE	=	80 percent

Equation (3) is used to calculate Current Control Projection emissions as follows:

$$EMIS_{PY} = EMIS_{BY,O} * \left[\frac{1 - \left(\frac{CE_{PY}}{100}\right)\left(\frac{RE_{PY}}{100}\right)}{1 - \left(\frac{CE_{BY}}{100}\right)\left(\frac{RE_{BY}}{100}\right)} \right] * GF \qquad (3)$$

$$EMIS_{PY} = 120 * \left[\frac{(1-(0.95)(0.80))}{(1-(0.98)(0.80))} \right] * 1.05 = 140 \; lb/day$$

In order to retain the base year efficiency of 98 percent, a permit modification would have to be made or a new regulation would have to be promulgated changing the legally enforceable efficiency to 98 percent. This would then be reflected in the Control Strategy Projection.

This example illustrates the use of equation (3) for control device/efficiency-based control strategies. Equation (1) or (3) should be used for control efficiency-based strategies. Equation (3) is used if the operating rate is unavailable.

5. Synthetic Fiber Manufacturing - Carbon Adsorber Control

Equation (1) calculates projection year emissions from the base year operating rate and projection year control information. The base year operating rate is grown to the projection year using the growth factor.

The base year operating rate from the process is 30 tons of product per day. The uncontrolled emissions factor is 90 lbs of VOC per ton of product. The future control strategy is to install a carbon adsorber with an estimated overall control efficiency of 60 percent. The variables in equation (1) are as follows:

$ORATE_{BY,O}$	=	30 tons product/day
$EMF_{PY,pc}$	=	90 lb VOC/ton product
CE_{PY}	=	60 percent
RE_{PY}	=	80 percent
GF	=	1.3 (dimensionless)

These are applied to equation (1) as follows:

$$EMIS_{PY} = ORATE_{BY,O} * EMF_{PY,pc} * \left[1 - \left(\frac{CE_{PY}}{100}\right)\left(\frac{RE_{PY}}{100}\right)\right] * GF \qquad (1)$$

$$EMIS_{PY} = 30 * 90 * \left[1 - \left(\frac{60}{100}\right)\left(\frac{80}{100}\right)\right] * 1.3$$

$$= 1,825 \text{ lb VOC/day} = 0.9 \text{ tons VOC/day}$$

Since this reflected a future control strategy, the emissions projection will be the Control Strategy Projection. The Current Control Projection would be calculated using the current control efficiency of zero, as follows:

$$EMIS_{PY} = ORATE_{BY,O} * EMF_{PY,pc} * \left[1 - \left(\frac{CE_{PY}}{100}\right)\left(\frac{RE_{PY}}{100}\right)\right] * GF \qquad (1)$$

$$EMIS_{PY} = 30 * 90 * \left[1 - \left(\frac{0}{100}\right)\left(\frac{80}{100}\right)\right] * 1.3$$

$$= 3,510 \text{ lb VOC/day} = 1.8 \text{ tons VOC/day}$$

This example illustrates the use of equation (1) for emissions projections. Equation (1) is used for control efficiency-based strategies when the operating rate is known. This example also illustrates the difference between the Current Control Projection and the Control Strategy Projection.

6. Mass Emissions Limit-Based Permits

Many permits simply present mass emissions limits for the process. These may be hourly (lb/hr), daily (lb/day), monthly (tons/month), annual (tpy), or any combination of the above. Permits with more than one limit may specify short- and long-term limits that allow for seasonal or other fluctuations in production. Other permits specify the short-term limit as simply the long-term limit divided by the days or hours operated. This type of specification does not allow for large fluctuations in operation.

The long-term annual limits will be used for emissions projections since these are more representative of expected rather than maximum activity. These limits must be converted to reflect ozone season typical weekday conditions. Annual limits are converted using the ratio of base year ozone season emissions to base year annual emissions.

Base Year Operating Conditions
Ozone season emissions = 150 lb/day = 0.075 tons/day
Annual emissions = 23 tpy

Projection Year Conditions
Current permit = 30 tpy

Equation (5) is used to calculate projection year emissions as follows:

$$EMIS_{PY} = ER_{PY} * \frac{EMIS_{BY,O}}{EMIS_{BY,Annual}} \qquad (5)$$

$$EMIS_{PY} = 30 * \left[\frac{0.075}{23}\right] = 0.098\ tons/day = 196\ lb/day$$

Since the limit used above reflects the current permit, the emissions calculated are the Current Control Projection. This example demonstrates the use of equation (5) for mass emissions limit-based permits. If control efficiency or emissions factor limits are available for the source, equations (1), (2), (3), or (4) should be use instead of equation (5).

Under future control strategies, the State may control the source through specified emissions factor limits, control device specifications, or control efficiency limits. In these cases, the State should use the appropriate equation [choosing from equations (1) through (4)] to calculate Control Strategy Projection emissions. These limits would take precedence over mass emissions rate limits. If the State chooses instead to lower the permitted mass emissions rate limits, equation (5) would also be used in the Control Strategy Projection for this source.

Area Source Emissions Projections

The current repository for base year area source emissions inventories is the AMS of AIRS. The AMS has incorporated emissions projections into the system design. The AMS projects emissions using the following data:

- Activity Level (actual and limits).
- Emissions Factor (actual and limits).
- Growth Factor.
- Control Information -- efficiency.
  RE.
  rule penetration.

Emissions can be calculated and projected for annual, period, and interval time periods. Ozone season typical weekday and CO season emissions are included as period emissions. Interval emissions are smaller increments of time.

The basic projection equation for period allowable emissions is:

$$\begin{matrix}\text{PROJ INV PERIOD LIMIT/NEW CTRLS EMISSIONS}\end{matrix} = \begin{matrix}\text{PROJ INV PERIOD ACTIVITY LEVEL LIMIT NEW CONTROLS}\end{matrix} \times \begin{matrix}\text{PERIOD EMISSIONS FACTOR LIMIT NEW CONTROLS}\end{matrix} \times [1 - (\text{CEFF}/100 \times \text{REFF}/100 \times \text{RPEN}/100)] \quad (6)$$

where: PROJ INV PERIOD LIMIT/NEW CTRLS EMISSIONS are the projection year emissions with new controls when ozone season typical weekday emissions are calculated.

PROJ INV PERIOD ACTIVITY LEVEL LIMIT NEW CONTROLS is the projection year activity level limit for the period. This is calculated by converting the annual ACTIVITY LEVEL LIMIT NEW CONTROLS to the period based on operating parameters. The ACTIVITY LEVEL LIMIT NEW CONTROLS is selected according to the following hierarchy:

PROJ ACTIVITY LEVEL LIMIT NEW CONTROLS
PROJ ACTIVITY LEVEL LIMIT
BASE ACTIVITY LEVEL LIMIT

BASE ACTIVITY LEVEL * GROWTH FACTOR NEW CONTROLS
BASE ACTIVITY LEVEL * GROWTH FACTOR

Thus, the State may enter a projection year limit. The activity level for the "new controls" projection may differ from the "base" projection. If activity *limits* are not entered, the system will use actual activity.

PERIOD EMISSIONS FACTOR LIMIT NEW CONTROLS is the period emissions factor limit for the new controls projection. The hierarchy for selecting the emissions factor is:

PERIOD EMISSIONS FACTOR LIMIT NEW CONTROLS
ANNUAL EMISSIONS FACTOR LIMIT NEW CONTROLS
PERIOD EMISSIONS FACTOR LIMIT
ANNUAL EMISSIONS FACTOR LIMIT
PERIOD EMISSIONS FACTOR
ANNUAL EMISSIONS FACTOR

Thus, the State may enter a projection year emissions factor limit (allowable emissions factor). The factor may be ozone season specific, or, if not entered, the annual factor will be applied. The "limit new controls" reflects the control strategy projection whereas the "limit" reflects the baseline projection.

CEFF is the projected control efficiency.

REFF is the projected RE.

RPEN is the projected rule penetration.

The AMS equation also includes ash or sulfur content, the fuel loading factor, the percent reactivity, and unit conversion factors as applicable.

The AMS includes equations for calculating both the Current Control Projection and the Control Strategy Projection. The Control Strategy Projection is reflected in equation (6). The Current Control Projection is similar with the Period Emissions Factor Limit substituted for the Period Emissions Factor Limit New Controls.

The AMS equation can be rewritten using the terminology presented in equations (1) through (5) as follows:

$$EMIS_{PY} = ORATE_{BY,O} * GF * EMF_{PY} * \left[1 - \left(\frac{CE_{PY}}{100}\right)\left(\frac{RE_{PY}}{100}\right)\left(\frac{RP_{PY}}{100}\right)\right] \qquad (7)$$

where:

$EMIS_{PY}$	=	Projection year emissions [ozone season typical weekday allowable emissions (mass of pollutant/day)]
$ORATE_{BY,O}$	=	Base year activity level (operating rate) - ozone season daily (production units/day)
GF	=	Growth factor
EMF_{PY}	=	Projection year emissions factor (mass of pollutant/production unit)
CE_{PY}	=	Projection year control efficiency (percent)
RE_{PY}	=	Projection year RE (percent)
RP_{PY}	=	Projection year rule penetration (percent)

Note that while equation (6) does not include a growth factor, the projection year activity level is used directly in equation (6) and may be entered by the user. (In other words, growth is still considered.) Alternatively, the projection year activity level can be calculated in AMS from the base year activity and a growth factor.

The major difference between the AMS equation and the point source equations is the inclusion of the rule penetration factor. The rule penetration accounts for the percentage of emissions within the area source category that are covered by the regulation. For example, a regulation may only affect sources above 10 tpy. The rule penetration would be equivalent to the percentage of emissions from sources above 10 tpy within the area source category.

The AMS equation also differs in that activity level limits may be entered in addition to actual or expected activity levels. States should not enter activity level limits because emissions projections are to be based on maximum emissions factors and typical or expected actual activity levels.

Refer to the following guidance documents for more information on AMS:

- AMS Coding Manual, draft, under development, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Technical Support Division, Research Triangle Park, NC. Final expected in Winter 1992.

AIRS User's Guide: AMS Data Storage. (See reference 34.)

Mobile Source Emissions Projections

This section is divided into separate discussions on highway vehicles and other mobile sources.

Highway Vehicle Emissions Projections

Highway vehicle emissions are projected by combining base year VMT, VMT growth factors, and MOBILE5.0 emissions factors. The equation for calculating projection year emissions is:

$$EMIS_{PY} = VMT_{BY,O} * GF * EMF_{PY,O} * CONV \quad (8)$$

where:

$EMIS_{PY}$	=	Projection year emissions [ozone season typical weekday allowable emissions (mass of pollutant/day)]
$VMT_{BY,O}$	=	Base year ozone season daily VMT
GF	=	Growth factor
$EMF_{PY,O}$	=	MOBILE5.0 emissions factor, projection year (1996) ozone season
CONV	=	Units conversion factor

The effects of highway vehicle controls (i.e., new vehicle standards, enhanced I/M, reformulated gasoline) will be reflected in the MOBILE5.0 emissions factors. The effects of programs designed to reduce VMT (e.g., TCM's such as employee trip reductions) should be reflected in the growth factor for VMT. It should be noted that these measures may also affect vehicle speeds which, in turn, will affect the motor vehicle emissions factors.

Highway vehicle projections should be completed at a desegregated level represented by vehicle type and roadway class. This is described in more detail in the motor vehicle inventory guidance. (See reference 35.) The VMT growth factors should be developed based on the VMT forecasting guidance developed by EPA's Office of Mobile Sources (57 FR 9549, March 19, 1992).

Highway vehicle emissions projections can be completed within AMS. Period (ozone season) projected emissions for 1996 are equivalent to the projection year emissions. The State should obtain additional information on the data requirements and format for AMS projection inventories and the interaction of MOBILE5.0 and AMS. This information is available in the AMS manuals referenced in the previous section.

Other Mobile Sources

Emissions must also be projected for aircraft, locomotives, and other nonroad mobile equipment and vehicles. No new Federal controls are expected to be in place by 1996 for these sources. The 1990 emissions should be projected to future years based on the expected growth in activity levels. These projections can be completed within AMS following the methods described above for area sources. The EPA's Office of Mobile Sources plans to provide guidance on how to project growth from nonroad mobile equipment and vehicles.

Emissions Preprocessor System (EPS)

The EPS may be used by the States to calculate projection year emissions. The EPS accepts work files from AFS and AMS that contain information on base year emissions, including control equipment, control efficiency, RE, and rule penetration. Ozone season daily emissions should be used in EPS to meet the requirements of the rate-of-progress plan.

The Control Emissions (CNTLEM) module allows the user to simulate the effects of various control strategies on the emissions. The user supplies projection factors reflecting changes in activity levels (operating rates) by 2-digit SIC or the first 4 digits of the ASC. The user also supplies control factors for CTG's, MACT, non-CTG RACT, highway vehicle controls, and other source- or source category-specific controls. The user may also specify allowable emissions limits; however, these limits must be expressed as emissions rate limits (tons per day).

For the Current Controls Projection, the user should supply control information for measures currently in the SIP including CTG's, non-CTG RACT, and existing I/M programs. Motor vehicle control factors (which represent ratios of future year to base year MOBILE4.1 emissions factors) are created with a separate EPS utility (MVADJ). Enhancements to EPS, scheduled for the end of January 1993, will include updating the EPS motor vehicle utility to MOBILE5.0.

For the Control Strategy Projection, the user should add CAAA-mandated control measures and other control measures which the State wishes to test. In general, States will begin with the CAAA-mandated measures and assess progress towards the 15 percent VOC emissions reduction requirement. If shortfalls in necessary reductions exist, additional control measures must be considered.

The EPS applies all controls as replacement technologies. Base year uncontrolled emissions are calculated from base year actual emissions and the control parameters. Emissions are then projected by applying the projection factor (or growth factor) and the projection year control parameters. The end result is

that emissions are projected using an equation similar to equation (3), as shown below.

$$EMIS_{PY} = EMIS_{BY} * \left[\frac{1 - \left(\frac{CE_{PY}}{100}\right)\left(\frac{RE_{PY}}{100}\right)\left(\frac{RP_{PY}}{100}\right)}{1 - \left(\frac{CE_{BY}}{100}\right)\left(\frac{RE_{BY}}{100}\right)\left(\frac{RP_{BY}}{100}\right)} \right] * GF \qquad (9)$$

where:

$EMIS_{PY}$	=	Projection year emissions (mass of pollutant/time)
$EMIS_{BY}$	=	Base year emissions (mass of pollutant/time)
CE_{PY}	=	Projection year control efficiency (percent)
RE_{PY}	=	Projection year RE (percent)
RP_{PY}	=	Projection year rule penetration (percent)
CE_{BY}	=	Base year control efficiency (percent)
RE_{BY}	=	Base year RE (percent)
RP_{BY}	=	Base year rule penetration (percent)
GF	=	Growth factor (dimensionless)

Since the controls are treated as replacement technologies, the projection year control efficiency used may actually be lower than the base year control efficiency. In defining source category-specific controls, the user should be aware of any individual sources within the category that are currently required to achieve a greater reduction. These should be input as source specific controls. The user should also ensure that multiple control strategies (with the exception of CTG, non-CTG RACT, and MACT strategies) are not applied to the same source. This will lead to double-counting of controls. For example, if the user specifies a RACT reduction of 50 percent and a discretionary control of 90 percent, CNTLEM will first apply the 50 percent control and apply an additional 90 percent reduction to the remaining emissions.

Allowable emissions for projection purposes are to be based on emissions factor or control efficiency limits in combination with expected activity. Allowable emissions limits must be input to EPS in terms of mass per unit time (tons per day). The user must convert emissions factor limits to emissions rate limits. Since control efficiency is a valid input, permitted control efficiencies may be input for use in the emissions projections. For sources using emissions factor limits, the emissions limit may be calculated using the detailed equations presented earlier. The projection year emissions can then be input as the allowable emissions limit in EPS. These limits should be specified as

replacement so that CNTLEM replaces the emissions projection for the source with the user-specified limit.

Refer to the following user's guide for more detailed instructions on EPS:

- User's Guide for the Urban Airshed Model - Volume IV: User's Manual for the Emissions Preprocessor System 2.0, Part A: Core FORTRAN System, and Part B: Interface and Emissions Display System, [EPA-450/4-90-007D(R)], U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. June 1992.

6.5 Effects of Equipment Replacement and New Source Requirements

Failure to consider the effects of equipment replacement and NSPS requirements for an affected facility's existing capital stock, may result in development of a SIP which requires more emissions reductions than necessary to meet rate-of-progress milestones or NAAQS attainment dates.

As an existing facility wears out and is replaced with newer equipment, it may become subject to a NSPS. To the extent NSPS requirements are more restrictive than present requirements on the existing (not modified or reconstructed) facility, future emissions will be reduced. The implications of such emissions reductions can be assessed using the following formula:

$$Ert = [(Eb - En) * (1 + r) \exp t]$$

where:

Ert	=	Emissions reductions in year t
Eb	=	Emissions in the base year
En	=	NSPS emissions
r	=	Annual replacement rate for worn out capital stock
t	=	Years from the base year

Consequently, zero net growth emissions need not be the same as baseline; they might actually be less.

Failure to consider the effect of offset requirements may also result in emissions reduction requirements greater than necessary to meet rate-of-progress or NAAQS attainment dates.

As additions to the existing capital stock become subject to offset requirements greater than 1:1, base emissions levels should decrease. Such emissions reduction consequences of offset requirements can be assessed using the following formula:

$$Ert = [(1 - Or) * Eb] * (1 + g) \exp t$$

where:
- Ert = Emissions reductions in year t
- Or = Offset ratio
- Eb = Emissions in the base year
- g = Annual growth rate
- t = Years from the base year

A State may use the foregoing procedures in combination with the previously presented equations to account for emissions reductions that occur due to new major point source growth. The annual replacement rate for worn out capital stock may be calculated using replacement rates for various industrial categories provided by the Internal Revenue Service in the most recent version of their Publication 534, Depreciation, used for preparation of income tax returns. (See reference 36.) The State will have to determine the fraction of growth in a source category that is due to major sources, which would have to meet at least the NSPS limit and which would have to obtain emissions offsets. That fraction should be based on representative recent historical information (ratios of major source growth to total growth) for the source category.

6.6 Submitting Projection Year Inventories and Supporting Data

Submission of the projection year inventory to EPA must include:

- Hardcopy summary of emissions estimates.
- Documentation of methodology/procedures.
- Emissions projections in computerized format.

The level of documentation necessary will depend to some extent on the procedures used in the emissions projections. For example, if growth factors from BEA or E-GAS are used in the projections, required documentation would be limited to simply stating this, since these are EPA-recommended sources for growth factors. If nonrecommended sources of data, procedures, or methodologies are used, documentation must be sufficient for EPA to duplicate calculations and make a judgment as to the acceptability of the submission.

Emissions projections should be summarized in hardcopy form and also submitted in computerized format. The computerized format will depend on whether projections are completed using the detailed equations, EPS, or the new software being developed by EPA. Emissions projections will most likely be required to be submitted through AIRS. More information on the computerized

format for emissions projections will be available within the next few months.

Since the data necessary to complete the inventories may include confidential business information (operating rates) or data that can lead to the calculation of this information (emissions combined with emissions factors), EPA will allow States to submit ratios of emissions factors (projection year to base year) or operating rates, rather than the individual factors/rates. States must have the individual data elements available for EPA to spot-check. In addition, States must save the background historical information in order to reproduce the base year and projection year emissions inventories.

7.0 CONTROL STRATEGIES FOR NO_x

Nitrogen oxide emissions reductions occurring in the period 1990-1996 may not be substituted for VOC emissions reductions for the rate-of-progress requirements. Nitrogen oxide emissions reductions occurring in the period 1990-1996, in excess of growth since 1990, may be considered as substitutes for VOC emissions reductions for the post-1996 rate-of-progress requirements. States may choose to pursue NO_x control strategies to achieve some portion of future VOC emissions reductions through this substitution. The EPA expects to issue guidance for substitution of NO_x for VOC emissions reductions in the fall of 1993 for the post-1996 period.

7.1 Stationary Source Controls

For extreme ozone nonattainment areas, section 183(e)(3) of the Act requires certain boilers to implement clean fuels or advanced control technology by November 15, 1998 (this information should be included in a SIP revision due by November 15, 1993). Affected boilers are individual new, modified, or existing electric utility, industrial, or commercial/institutional boilers that emit more than 25 tpy of NO_x. The Act specifies, for purposes of this section, that clean fuels are "natural gas, methanol, or ethanol (or a comparably low polluting fuel)," advanced control technology generally means "catalytic control technology or other comparably effective control methods," and the clean fuel must be "used 90 percent or more of the operating time." [See General Preamble, section III.A.6.d (57 FR 13523).]

For further information on applicable NO_x controls for stationary sources, States should refer to NO_x RACT rules, as well as NO_x ACT documents (see Appendix J for list of ACT's). In the event that the ACT's are not released soon enough, some control strategies might be found by consulting the BACT/LAER Clearinghouse and/or NSPS (see Appendix J).

Under Title IV of the Act, the acid deposition program requires NO_x emissions reductions from tangentially fired boilers and dry bottom wall-fired boilers (see Proposed Rule 57 FR 55632) and wet bottom wall-fired boilers, cyclones and other utility boiler types (rules due January 1, 1997). A range of control techniques known as "low NO_x burners" are required for the first category of boilers, that is dry bottom wall-fired and tangentially fired boilers (see 57 FR 55632 for discussion of these technologies and techniques). The acid deposition proposed rule also allows for alternative technologies under certain conditions such as reburning, selective catalytic reduction, and selective noncatalytic reduction (none of these alternative technologies should be deemed covered by RACT, however).

The air quality programs in California, specifically for the South Coast, Ventura, San Diego, Santa Barbara, and Kern County may also incorporate additional NO_x stationary source controls. These programs also required nonstationary source controls such as controls on lawn equipment and pleasure boats, and the requirement that all new homes be built with solar water heaters [the specific air quality offices should be contacted for information].

7.2 Area Source Controls

States may also elect to have control measures for area sources even though the CAAA do not specifically require them. For instance, California has adopted rules covering home heaters. Appendix J contains two rules that are part of the California SIP--both are SCAQMD rules. The growth in NO_x emissions due to new housing developments that would use natural gas fired heaters could be particularly offset by such a requirement.

Below is a list of present and future NO_x home heating rules, that either are not currently part of the SIP or are scheduled for adoption in early 1993 or 1994. Contact the appropriate Air Pollution Control District (APCD) or Air Quality Management District (AQMD) for more information.

Ventura APCD	Gas-Fired Water Heaters	Rule 74.11
El Dorado APCD	Residential Wood Combustion	1/93
	Residential Space Heating	2/93
	Residential Water Heating	3/94
Kern County APCD	Residential/Commercial Water Heaters	1/93
Bay Area AQMD	Residential Water Heaters	1993
	Residential Wood Combustion	1993

7.3 Mobile Source Controls

States may take credit for certain NO_x emissions reductions achieved through implementation of TCM's and enhanced I/M programs. Emissions reductions may also occur through control of nonroad engines, but these reductions may not be realized until after 2000 due to the phase-in schedule (note that the CAAA applies to new engines only; the State would have to adopt a separate rule for rebuilt engines).

8.0 ATTAINMENT DEMONSTRATION

This section explains the attainment demonstration requirements for the SIP for moderate and above ozone nonattainment areas, presents the modeling tools that can be used for attainment demonstrations, and discusses several unique air quality situations that can affect the SIP attainment demonstration. It should be noted that both biogenic and anthropogenic emissions are included in the modeling domain and both must also be included in the development of the attainment demonstration.

8.1 Requirements for Moderate and Above Nonattainment Areas

Section 181(a)(1) establishes a schedule for attainment of the NAAQS for ozone for the nonattainment areas classified as marginal and above, based on the design value for the area. Section 182(b)(1)(A) requires a SIP for moderate and above nonattainment areas to provide for VOC and NO_x emissions reductions necessary to attain the standard. This "showing" of attainment by a SIP is the attainment demonstration. For moderate areas (other than multi-State nonattainment areas) this requirement can be met through the application of an EPA-approved model and EPA-approved modeling techniques described in the current version of the Guideline on Air Quality Models. (See reference 37.)

Two models are suggested: UAM or EKMA. The General Preamble should be consulted regarding the attainment demonstration implications of using each model (57 FR 13510). If EKMA is used, the attainment demonstration is due by November 15, 1993. States choosing to run UAM for their intrastate moderate areas must submit their 15 percent rate-of-progress plan and a committal SIP addressing the attainment demonstration. The committal SIP subject to a section 110(k)(4) approval would include, at a minimum, evidence that grid modeling is well under way and a commitment, with schedule, to complete the modeling and submit it as a SIP revision by November 15, 1994. The completed attainment demonstration would include any additional controls needed for attainment. For further discussion of committal SIP's, see July 9, 1992 memorandum from John Calcagni, Director, Air Quality Management Division, OAQPS, to Regional Air Division Directors, concerning "Processing of State Implementation Plan (SIP) Submittals."

States should plan to achieve emissions reductions as early in the process as possible, since section 181(b)(2) requires EPA to make a determination as to whether an area has attained the ozone NAAQS within 6 months following an applicable attainment date. This requirement dictates the use of the most recent 3 years of air quality data, which means EPA will use 1994-1996

data in determining whether a moderate area has attained the ozone NAAQS. [See the General Preamble (57 FR 13509).]

8.2 Requirements for Serious and Above Nonattainment Areas

Serious and above nonattainment areas must, through their SIP's, provide an attainment demonstration by November 15, 1994. The attainment demonstration for these areas must be based on photochemical grid modeling, such as UAM.

8.3 Modeling Considerations

Empirical Kinetic Modeling Analysis (EKMA)

The use of EKMA is described in Guideline for Use of City-Specific EKMA in Preparing Ozone SIP's (see reference 38), as well as the Guideline on Air Quality Models (see reference 39), and should be consulted, along with the appropriate EPA Regional Office, before an analysis is conducted with this modeling approach.

Urban Airshed Model (UAM)

The use of UAM, a photochemical grid model, is recommended or required for modeling applications involving all areas classified serious and above, and for all interstate moderate areas.

The UAM is described in Guideline for Regulatory Application of the Urban Airshed Model (see reference 40), and the User's Guide for the Urban Airshed Model (see reference 41). These documents and the appropriate EPA Regional Office should be consulted before an analysis is conducted with this modeling approach.

8.4 Special Air Quality Situations

Areas Requiring Emissions Reductions in Excess of 15 Percent

There will be circumstances under which a moderate area will be able to show attainment of the NAAQS can be achieved only through VOC emissions reductions in excess of the 15 percent VOC emissions reduction mandated in section 182(b)(1)(A)(i). This condition may exist for an area that has a design value at the top of the range (0.138 to 0.159 ppm) of the moderate nonattainment classification, where there is a heavy concentration of VOC sources in a smaller area of the nonattainment area, or when atmospheric conditions favor the formation of ozone. The underlying requirement of the SIP for these areas is the attainment of the standard by the attainment date, not solely the achievement of the 15 percent VOC emissions reduction.

Areas Requiring Emissions Reductions Less Than 15 Percent

Section 182(b)(1)(A)(ii) allows moderate, serious, and severe ozone nonattainment areas to reduce VOC emissions by less than 15 percent if the following conditions are met. First, the State must demonstrate that the area has a new source review (NSR) program equivalent to the requirements in extreme areas [section 182(e)], except that a "major source" must include any source that emits, or has the potential to emit, 5 tpy. All major sources (down to those with emissions of 5 tpy or greater) in the area must be required to have RACT-level controls. The plan must also include all measures that can be feasibly implemented in the area, in light of technological achievability. To qualify for the lesser percentage, the State must demonstrate that the SIP includes all measures (both stationary and mobile) that are achieved in practice by sources in the same source category in nonattainment areas of the next higher classification.

Rural Nonattainment Areas

Section 182(h) addresses the situation of a rural area downwind of a larger urban area and classified as a nonattainment area due to the transport of ozone and ozone precursors from the larger upwind urban area. A rural area is treated as a transport area if the EPA Administrator finds that sources of VOC and NO_x emissions within the area do not make a significant contribution to the ozone concentrations measured in the area or in other areas. The only requirements for these areas are the requirements specified in section 182(a) for marginal areas, the assumption being that the controls in the upwind area will solve the problem in the rural transport area as well.

Section 185(e) provides a further exemption for small areas unable to attain the ozone standard due to transport of ozone and its precursors from other areas. A small area, defined as an area with a total population under 200,000, is exempt from all sanctions if the area can demonstrate that attainment is prevented because of ozone or ozone precursors transported from other areas. The exemption applies only if the area has met all other applicable requirements of the CAAA.

Multi-State Nonattainment Areas

Section 182(j) defines and establishes requirements for ozone nonattainment areas covering areas in more than one State called multi-State nonattainment areas. Beyond the requirements in section 182 for the classification of the nonattainment areas (marginal, moderate, serious, severe, extreme, transport), section 182(j)(1) requires States in these areas to coordinate the revisions and implementation of the SIP's applicable to the nonattainment areas and to use photochemical grid modeling (or

another method determined by EPA) as part of the SIP-preparation process.

Each State in a multi-State nonattainment area should develop and submit to EPA a joint work plan to demonstrate early cooperation and integration. The work plan should include a schedule for developing the control strategies and the attainment demonstration for the entire multi-State area. The work plans should also reference the applicable modeling protocol. The work plan should be submitted by the State Air Directors to the Regional Air Division Directors no later than May 31, 1993. Each State should write their own letter for their appropriate Regional Office and send a copy to the other States in the nonattainment area for review (see Appendix I for an example model letter). Please note that States should check with their Regional Offices on appropriate schedule dates. For example, some States may negotiate dates through the 105 grants process.

Section 182(j)(2) recognizes that an area in one State within the multi-State nonattainment area may not be able to demonstrate attainment "but for the failure of one or more other States, in which other portions of the area are located, to commit to the implementation of all measures required by section 182...." If the EPA Administrator makes a finding that this situation is occurring, the sanctions of section 179 shall not apply to the petitioning State. Section II.A.9 of the General Preamble provides the primary guidance for these nonattainment area SIP's. Appendix I of this document contains a model letter written by EPA as guidance to multi-State planners.

International Border Areas

Section 179B of the Act applies to nonattainment areas that are affected by emissions emanating from outside the United States. This section provides relief for nonattainment areas along international borders analogous to what is provided to States within multi-State nonattainment areas by section 182(j): EPA shall approve the SIP if it meets all the requirements in the CAAA and if the State establishes that the implementation of the plan would be adequate to attain and maintain the relevant NAAQS "but for emissions emanating from outside the United States." Section 179B (created by Title VIII, section 818 of the CAAA) and section V.C of the General Preamble provide SIP guidance for areas on international borders.

9.0 CONTINGENCY MEASURES

The Act require that States with areas of moderate or higher levels of nonattainment include contingency measures in their SIP's [sections 172(c)(9) and 182(c)(9)]. The contingency measures in these plans describe the additional controls to be implemented in the event of an attainment or milestone failure. Section 172(c)(9) of the Act pertains to nonattainment area failures to demonstrate either attainment or RFP. Section 182(c)(9) requires SIP contingency measures for serious and above area milestone failures.

The SIP's for moderate and above nonattainment areas must include provisions for the implementation of contingency measures without further State or EPA action. Sections 172(c)(9) and 182(c)(9) specify that the contingency measures shall "take effect without further action by the State or the Administrator." The EPA interprets this requirement to mean that no further rulemaking activities by the State or the EPA should be needed to implement the contingency measures. The EPA recognizes that certain actions, such as notification of sources or modification of permits, would probably be needed before a measure could be implemented effectively. States must show that their contingency measures can be implemented with minimal further action on their part and with no additional rulemaking activities such as public hearings or legislative review. In general, EPA will expect all actions needed to affect full implementation of the measures to occur within 60 days after EPA notifies the State of its attainment or milestone failure.

9.1 Marginal Areas

Section 182(a) specifically exempts marginal nonattainment areas from the contingency measures requirement stated in section 172(c)(9).

Although marginal areas are excluded from the requirement for contingency measures in their SIP's, marginal areas should carefully consider contingency measures in case an area does not attain by the 1993 date. This issue arises because of the short planning and implementation time frame (3 years) available between the attainment dates for marginal and moderate areas. If a marginal area fails to attain by its November 15, 1993 date, it will become subject to all of the requirements for moderate areas, specifically the I/M program, RACT, and the 15 percent VOC emissions reduction requirements. The additional moderate nonattainment area requirements would have to be met after reclassification and the standard would have to be attained by November 15, 1996, an extremely tight time frame for these provisions if no prior planning and adoption actions had occurred. If the area then misses the November 15, 1996 attainment date, the area would again be reclassified and,

therefore, subject to the more stringent requirements of serious areas. This is also an important issue for marginal areas. Appendix H describes in more detail the process following the finding of a milestone or attainment failure for marginal and moderate areas.

9.2 Moderate and Above Areas

Ozone nonattainment areas classified as moderate or above must include in their SIP submittals, due by November 15, 1993, contingency measures to be implemented in the event of an attainment or milestone failure. This contingency submittal date is appropriate because States must submit demonstrations on that date that show the 15 percent VOC emissions milestone will be achieved in 1996. Under sections 182(g)(1) and 182(g)(2), demonstrations of milestone compliance are not required when a nonattainment area's milestone and attainment dates are identical and the area is determined to have attained (e.g., a serious area that is found to have attained the standard by November 15, 1999, is not obligated to demonstrate that the 1996-1999 milestone was achieved because November 15, 1999, is also the milestone date for serious areas). It should be remembered that in developing a maintenance plan for an area that is redesignated attainment, the State must show that its SIP was fully implemented.

The CAAA do not specify how many contingency measures are needed or the magnitude of emissions reductions that must be provided by these measures. Assuming that all of the State measures may fail to produce their expected reductions, one interpretation of the CAAA is that a State would have to adopt sufficient contingency measures in the November 15, 1993, SIP submittal to make up for this entire shortfall. The EPA believes that this would be an unreasonable requirement given the difficulty many States already have in identifying and adopting sufficient measures to meet the rate-of-progress and other CAAA requirements.

Contingency measures should, at a minimum, ensure that an appropriate level of emissions reduction progress continues to be made while the State plans additional control measures. Therefore, as stated in section III.A.3.c of the General Preamble (57 FR 13498), EPA interprets the CAAA to require States with moderate and above ozone nonattainment areas to include sufficient contingency measures in the November 15, 1993 submittal so that, upon implementation of such measures, additional emissions reductions of up to 3 percent of the emissions in the adjusted base year inventory would be achieved in the year following that in which the attainment failure has been identified. These emissions reductions are in addition to those that are already scheduled to occur in accordance with the general control strategy for the area. This provision ensures that (1) progress toward attainment occurs at a rate similar to

that specified under the rate-of-progress requirements, and (2) the State will achieve these reductions while developing and implementing additional control measures to correct for the shortfall in emissions reductions or adopting newly required measures resulting from the bump-up to a higher classification. States must identify the order in which the contingency measures will be implemented and the percentage reductions that are projected for each contingency measure.

It is important to note that the EPA only requires that contingency measures be implemented to compensate for the degree of failure. In other words, a shortfall of 2 percent requires implementation of sufficient measures to make up for the 2 percent, not the 3 percent (or possibly more, as discussed below). If EPA determines that a shortfall of less than 3 percent exists in a nonattainment area, EPA will select individual control measures from the initial 3 percent contingency plan as prioritized by the State until the shortfall is covered. For example, four measures equaling a 3 percent VOC reduction from the adjusted base year inventory are included in an area's contingency plan. Contingency measures are listed within the plan in the order that they would be implemented. The first two measures are projected to result in a 1 percent VOC reduction each, while the last two are projected to produce a 0.5 percent reduction each. If a 1 percent shortfall is identified, the first contingency measure would be implemented; if a 2.5 percent shortfall is identified, then the first three contingency measures would be implemented.

Under this approach, the State would have 1 year to modify its SIP and take other corrective action needed to ensure that milestones are achieved and that rate-of-progress towards attainment continues. The EPA believes that 1 year to revise the SIP is appropriate in most cases as this is consistent with the time frame of other rate-of-progress requirements. If a State needs significantly longer than 1 year to revise its SIP (perhaps due to the length of the State's legislative process), then the State is expected to provide for additional contingency measures commensurate with the length of time necessary for the SIP revision. For example, if the State anticipates that it will require 2 years to revise its SIP, then the plan should include contingency measures that will produce 6 percent emissions reductions (3 percent per year).[5] In the case of moderate areas, contingency measures would be needed when an area incurs an attainment failure (or, for serious and above areas, if the area incurs either an attainment or a milestone failure). If, for

[5]Similarly, if the State's SIP revision process is shorter than 1 year, contingency measures providing proportionally less than 3 percent will be acceptable (e.g., 1.5 percent reduction for a 6-month revision time frame).

example, a moderate area fails to attain, it will be bumped-up to a higher classification and become subject to the requirements that apply to this new classification. The contingency measures would be implemented while the State would develop and adopt the new measures associated with its new classification.

One way that States can meet the contingency measures requirement is by providing for early implementation of measures before the dates scheduled in the overall SIP control strategy. That is, a State may include as a contingency measure the requirement that control measures that would be implemented in later years, would instead be implemented earlier if the area either does not meet its milestone or attain the NAAQS by the applicable date. For example, a severe area has control measure A scheduled for implementation in June 1998. Control measure A is also included in its contingency plan. The area fails to meet the 1996 milestone and elects to implement its contingency plan. Control measure A is then implemented in October 1997. Areas that implement control measures from their overall SIP control strategy as a contingency measure must develop new measures to backfill both the control strategy and the contingency plan. Within 1 year of the triggering of a contingency requiring the early implementation of control measures, the State must submit a SIP revision containing whatever additional provisions are needed to backfill the SIP to remedy any eventual shortfall that may occur as the result of the early use of the control measures. The EPA expects any control measures that are implemented early as part of a contingency plan will remain in place (or be superseded by replacement control measures) until the next milestone. At the next milestone, the State can demonstrate whether or not these control measures are needed to stay on track.

The EPA believes that a 3 percent contingency will be adequate for most areas but, in some cases 3 percent may be inadequate, especially if corrective action is not instituted in a timely manner prior to a milestone date. To address the possibility of a greater than 3 percent shortfall, EPA requires moderate and above areas to submit contingency measures providing for a 3 percent reduction as well as an enforceable commitment to submit an annual tracking program describing the degree to which it has achieved its projected annual emissions reduction. Compliance for this requirement will be to participate in EPA's tracking efforts and respond accordingly. Because EPA believes it is necessary to assess the progress of States during the interim periods between plan submittals and milestone compliance determinations, it is developing a computer system to track the States' rate-of-progress plans. It is anticipated that this system will be utilized by EPA to develop tracking reports that estimate the percentage reduction in VOC emissions. States would review these reports and revise them if they do not agree with EPA's tracking assessment. Two options are available to States

when a shortfall is determined by the annual tracking reports. First, the State may describe in its follow-up report what actions it will take before the next milestone to make up for this shortfall [i.e., adopt and implement additional measures (apart from the contingency measures)] to avoid a milestone failure. For example, if annual tracking shows a 2 percent shortfall, the State could include in this follow-up tracking report additional control measures (equaling the 2 percent shortfall) to be implemented before the milestone demonstration. As an alternative to this approach, the State may provide for extra contingency measures sufficient to cover the additional shortfall expected by the milestone demonstration date. Under this approach, the State must submit to EPA within 1 year from the submittal of the follow-up report, the additional measures that will be needed to remedy the shortfall. Thus, more than the 3 percent of contingency measures would be available in reserve, even though EPA would only require that sufficient contingency measures be implemented to compensate for the degree of failure. For example, if annual tracking determines a 2 percent shortfall, the State could include in its next annual tracking report additional contingency measures (equaling the 2 percent shortfall) to be implemented if the milestone demonstration ascertains a shortfall of more than 3 percent.

Sections 172(c)(9), 182(c)(9), and 187(a)(3) of the Act specify that the contingency measures shall "take effect without further action by the State or the Administrator." The EPA interprets this requirement to mean that no further rulemaking activities by the State or EPA would be needed to implement the contingency measures. The EPA recognizes that certain actions, such as notification of sources and modification of permits, would probably be needed before a measure could be implemented effectively. States must show that their contingency measures can be implemented with minimal further action on their part and with no additional rulemaking actions such as public hearings or legislative review. In general, EPA will expect all actions needed to effect full implementation of the measures to occur within 60 days after EPA notifies the State of its failure.

9.3 Serious and Severe Areas

Within 90 days of a serious or severe area milestone failure, the CAAA require that States elect one of three options. If a State elects to implement measures from the applicable contingency plan, then the EPA will review the plan within 90 days and make a determination as to whether further measures are necessary to meet the milestone. The contingency measures could be additional measures not already adopted to meet RFP or other requirements, or the accelerated implementation of measures already planned to meet a future milestone. In this later case, the State would have to adopt additional measures to backfill the SIP with replacement measures to replace those that were

previously used as early-implementation contingency measures, and to assure the continuing adequacy of the contingency program. [See section III.A.4.p of the General Preamble (57 FR 13498).]

States are encouraged to implement measures as soon as a milestone failure is deemed likely. States that wait until the milestone failure occurs will have extremely limited time available to implement and evaluate the measures before the next milestone is met.

9.4 Nonclassifiable Areas

Nonclassifiable areas include transitional, submarginal, and incomplete/no data areas. Section 185A exempts transitional areas from the Subpart 2 rules until December 31, 1991. It is not clear from the CAAA, however, which of the Subpart 1 provisions are required of transitional areas, and in particular, if contingency measures are required. Because these areas have design values that fall below the moderate nonattainment area designation, and because marginal areas are exempt from the contingency measure requirement, the CAAA are interpreted as not requiring contingency measures for nonclassifiable areas. If the transitional areas are reclassified as a moderate or higher nonattainment area, however, they would be subject to the contingency measures requirement of that particular classification (again, marginal areas are exempt from the requirement). [See section III.A.7.a.7 of the General Preamble (57 FR 13498).]

Because submarginal and incomplete/no data areas generally present ozone problems that are less serious than marginal areas, which are expressly exempted from the contingency measures requirement, and contingency measures are not likely to be necessary to ensure attainment for these areas, EPA believes that it is not appropriate to apply the contingency measure requirement for these areas under a de minimis approach. Nevertheless, contingency measures are required as part of the maintenance plan for nonclassifiable or other nonattainment areas that are redesignated attainment by EPA; these contingencies are discussed in a September 4, 1992 memorandum from John Calcagni, Director, Air Quality Management Division, OAQPS, to Regional Air Division Directors, concerning "Procedures for Processing Requests to Redesignate Areas to Attainment."

9.5 Examples

Some examples of contingency measures for these areas include:

- Measures required by the next higher classification.
- Transportation control measures.
- An employer trip reduction program.
- An economic incentive program. The EPA has published a "Notice of Proposed Rulemaking" for economic incentive programs (58 FR 11110, February 23, 1993). The final rule will be codified in 40 CFR Part 51. Appendix W of the proposed rule (58 FR 11130-11132) includes examples of stationary and mobile source control measures for economic incentive programs. Examples of mobile source control measures (discussed on pages 11131 and 11132 of the Federal Register notice) which could be used as contingency measures include, but are not limited to, the following:

  Fee Programs -- Road pricing mechanisms are fee programs that are available to curtail low occupancy vehicle use, fund transportation system improvements and control measures, spatially and temporally shift driving patterns, and attempt to effect land usage changes. Primary examples include increased peak period roadway, bridge, or tunnel tolls (this could also be accomplished with automated vehicle identification systems), and toll discounts for pooling arrangements and zero-emitting/low-emitting vehicles.

  Tax Code Provisions -- Mobile source tax code incentive strategies include waiving or lowering any of the following for zero or low-emitting vehicles: vehicle registration fees, vehicle property tax, sales tax, taxicab license fees, and parking taxes.

  Subsidies -- A State may create incentives for reducing emissions by offering direct subsidies, grants, or low interest loans to encourage purchase of lower-emitting capital equipment or a switch to less-polluting operating practices. Examples of such programs include clean vehicle conversions, starting shuttle bus or van pool programs, and mass transit fare subsidies.

  Preretirement Reduction Program -- An example would include an old car scrappage program.

REFERENCES

1. Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 Percent Rate-of-Progress Plans, EPA-452/R-92-005, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. October 1992.

2. BEA Regional Projections to 2040, Volume I: States, U.S. Department of Commerce, Bureau of Economic Analysis, (Washington, DC: U.S. Government Printing Office). October 1990.

3. BEA Regional Projections to 2040, Volume II: Metropolitan Statistical Areas, U.S. Department of Commerce, Bureau of Economic Analysis, (Washington, DC: U.S. Government Printing Office). October 1990.

4. BEA Regional Projections to 2040, Volume III: BEA Economic Areas, U.S. Department of Commerce, Bureau of Economic Analysis, (Washington, DC: U.S. Government Printing Office). October 1990.

5. Procedures for Preparing Emissions Projections, EPA-450/4-91-019, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. July 1991.

6. Depreciation: for Use in Preparing 1992 Returns, Publication No. 534, Catalog No. 150640, U.S. Department of Treasury, Internal Revenue Service, Washington, DC.

7. A Projection Methodology for Future State Level Volatile Organic Compound (VOC) Emissions from Stationary Sources Version 2.0, EPA-600/8-88-090, U.S. Environmental Protection Agency, Air and Engineering Research Laboratory, Research Triangle Park, NC. July 1988.

8. User's Guide for the Urban Airshed Model, Volume IV: User's Manual for the Emissions Preprocessor System 2.0, Part A: Core FORTRAN System, and Part B: Interface and Emissions Display System, EPA-450/4-90-007D(R), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. June 1992.

9. Reference 5.

10. Control Techniques for Volatile Organic Compound Emissions from Stationary Sources, EPA-453/R-92-018 (Revises EPA-450/2-78-022), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1992.

11. OAQPS Control Cost Manual, EPA-450/3-90-006, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. January 1990.

12. Technical Guidance - Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline dispensing Facilities, EPA-450/3-91-022a, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. November 1991.

13. Enforcement Guidance for Stage II Vehicle Refueling Control Programs, Draft, U.S. Environmental Protection Agency, Office of Mobile Sources, Ann Arbor, MI. December 1991.

14. Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources, EPA-450/4-81-026d (Revised), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1992.

15. Transportation Control Measure Information Documents, draft, U.S. Environmental Protection Agency, Office of Mobile Sources, Ann Arbor, MI. October 1991.

16. Transportation Control Measures: State Implementation Plan Guidance, U.S. Environmental Protection Agency, Office of Mobile Sources, Ann Arbor, MI. September 1990.

17. Evaluation of Travel Demand Management Measures to Relieve Congestion, Report No. FHWA-SA-90-005, U.S. Department of Transportation, Federal Highway Administration, Washington, DC. February 1990.

18. Feasibility and Cost-Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm, and Other Mobile Off-Highway Equipment, U.S. Environmental Protection Agency, Office of Policy Analysis, Washington, DC. February 1988.

19. Summary of Group I Control Technique Guideline Documents for Control of Volatile Organic Emissions from Existing Stationary Sources, EPA-450/3-78-120, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1978.

20. Issues relating to VOC Regulation Cutpoints, Deficiencies, and Deviations: Clarification to Appendix D of November 24, 1987 Federal Register, (no document number issued), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. May 25, 1988 (revised January 11, 1990).

21. Summary of Group II Control Technique Guideline Documents for Control of Volatile Organic Emissions from Existing Stationary Sources, EPA-450/2-80-001, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1980.

22. Reference 20.

23. "Volatile Organic Compounds (VOC) Rules for Reasonably Available Control Technology (RACT)," Memorandum from G.T. Helms, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Ozone and Carbon Monoxide Programs Branch, Research Triangle Park, NC, to Regional Division Directors. June 24, 1992.

24. Reference 20.

25. Air Emissions from Municipal Solid Waste Landfills - Background Information for Proposed Standards and Emission Guidelines, EPA-450/3-90-011(a), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. March 1991.

26. Enabling Document for Regulations Governing Compliance Extensions for Early Reductions of Hazardous Air Pollutants, EPA-450/3-91-013, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. July 1991.

27. Questions and Answers about the Early Reductions Program, EPA-450/3-92-005, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. January 1992.

28. Procedures for Establishing Emissions for Early Reduction Compliance Extensions, EPA-450/3-91-012a, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. February 1992.

29. Coke Oven Emissions from Wet-Coal Charged By-Product Coke Oven Batteries - Background Information for Proposed Standards, EPA-450/3-85-028a, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1987.

30. Hazardous Waste TSDF's - Technical Guidance Document for RCRA Air Emissions for Process Vents and Equipment Leaks, EPA-450/3-89-021, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. July 1990.

31. Hazardous Waste TSDF's - Background Information for Proposed RCRA Air Emissions Standards, EPA-450/3-89-023a,b,&c, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. June 1991. (Note: This reference is three volumes.)

32. Guidelines for Estimating and Applying Rule Effectiveness for Ozone/CO State Implementation Plan Base Year Inventories, EPA-452/R-92-010, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Ozone and Carbon Monoxide Programs Branch, Research Triangle Park, NC. November 1992.

33. Workshop on Requirements for Nonattainment Area Plans, No. 1.2-102, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Revised Edition of April 1978.

34. AIRS User's Guide: AMS Data Storage, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. June 1992.

35. Reference 14.

36. Reference 6.

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

38. Guideline for Use of City-Specific EKMA in Preparing Ozone SIP's, EPA-450/4-80-027, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1980.

39. Reference 37.

40. Guideline for Regulatory Application of the Urban Airshed Model, EPA-450/4-91-01, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1991.

41. User's Guide for the Urban Airshed Model, EPA-450/4-90-007, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1990.

42. Reference 1.

43. Reference 5.

44. Reference 1.

APPENDIX A: DEFINITION OF TERMS

This appendix provides the specific definitions of EPA terms as they are used in this guidance. Different EPA programs sometimes use different definitions of the same term (e.g., major source). This appendix notes where conflicts occur in the definition of a term used in this guidance. These definitions are presented for the purposes of this guidance document only; the reader is advised to refer to specific regulations, policies, and sections of the Act to obtain complete definitions for the program or title of interest.

Area Source Any stationary or nonroad source that is too small and/or too numerous to be included in the stationary point-source emissions inventories.

Attainment Demonstration Moderate and above ozone nonattainment areas must demonstrate that the reductions specified in the revised SIP will result in modeled air quality for the nonattainment area that achieves attainment by the applicable attainment date. This requirement can be met through the application of an EPA-approved model and EPA-approved modeling techniques described in the current version of the Guidance on Air Quality Models,[6] which is currently under revision. Two models are suggested: the UAM or EKMA. The EPA requires the submittal of attainment demonstrations employing UAM for serious and above areas and multi-State moderate areas as part of the SIP revision due by November 15, 1994. Attainment demonstrations based on EKMA for moderate nonattainment areas within a single State (intrastate moderate areas) must be submitted as part of the SIP revision due by November 15, 1993, unless the State chooses to use UAM, in which case the demonstration must be submitted as part of the SIP revision due by November 15, 1994. The use of EKMA is described in Guideline for Use of City-Specific EKMA in Preparing Ozone SIP's,[7] as well as the aforementioned guideline that is under revision. This document, and the appropriate EPA Regional Office, should be consulted before an analysis is conducted with this modeling approach. The

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[6]Guidance on Air Quality Models (Revised), EPA-450/2-78-027R, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. July 1986 (currently under revision).

[7]Guideline for Use of City-Specific EKMA in Preparing Ozone SIP's, EPA-450/4-80-027, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1980.

use of UAM is described in Guideline for Regulatory Application of the Urban Airshed Model.[8]

Attainment Determination The EPA must determine within 6 months after the applicable attainment date whether an area has attained the NAAQS for ozone. The attainment dates are as follows:

- Marginal areas -- November 15, 1993.
- Moderate areas -- November 15, 1996.
- Serious areas -- November 15, 1999.
- Severe areas -- November 15, 2005 (severe areas with a 1986-1988 ozone design value of 0.190 up to, but not including, 0.280 parts per million have until November 15, 2007).
- Extreme areas -- November 15, 2010.

In making the attainment determination, EPA will use the most recently available, quality-assured air quality data covering the 3-year period preceding the attainment date. For ozone, the average number of exceedances per year after adjustment for missing data are used to determine whether the area has attained.

Basic Inspection and Maintenance (I/M) Programs requiring the inspection of vehicles including, but not limited to, measurement of tailpipe emissions, and mandating that vehicles with tailpipe emissions higher than the program cutpoints be repaired to pass a tailpipe emissions retest. Basic I/M programs must be at least as stringent as the requirements set out in section 182(a)(2)(B).

Major Stationary Source The Act has multiple definitions for major stationary sources depending upon the nonattainment classification and the pollutant. Section 302 of the Act defines a major stationary source as one that directly emits, or has the potential to emit, 100 tpy or more of any air pollutant. As exceptions to this rule, major stationary source emissions thresholds, as defined in Part D of Title I of the Act, are listed in Table A-1 for both VOC and NO_x sources.

Milestone Compliance Demonstration For serious and above classified nonattainment areas, demonstrating achievement of the 15 percent VOC emissions reduction over the 1990-1996 period, or demonstrating subsequent 3 percent VOC emissions reductions per year averaged over each consecutive 3-year period from November 15, 1996 until the attainment date. Section 182(g)(2) requires that within 90 days of the date on which an applicable

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[8]Guideline for Regulatory Application of the Urban Airshed Model, EPA-450/4-91-013, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1991.

TABLE A-1. MAJOR SOURCE THRESHOLDS AND MINIMUM EMISSIONS OFFSET RATIO REQUIREMENTS FOR OZONE NONATTAINMENT AREA CLASSIFICATIONS

Ozone Nonattainment Area	VOC (tpy)[9]	NO_x (tpy)[9]	Minimum Emissions Offset Ratio Required
Extreme	10	10	1.5 to 1[10]
Severe	25	25	1.3 to 1[10]
Serious	50	50	1.2 to 1
Moderate	100	100	1.15 to 1
Moderate, in an ozone transport region	50	100	1.15 to 1
Marginal	100	100	1.1 to 1
Marginal, in an ozone transport region	50	100	1.15 to 1
All other nonattainment areas, outside of an ozone transport region[11]	100	100	>1.0 to 1
All other nonattainment areas, in an ozone transport region[11]	100	100	1.15 to 1
Attainment, in an ozone transport region	50	100	1.15 to 1

[9]tpy = tons per year.

[10]The minimum ratio is reduced to 1.2 to 1 if the applicable State implementation plan requires all major sources of VOC and NO_x emissions to use best available control technology.

[11]The other nonattainment areas are submarginal, transitional, and incomplete/no data.

milestone occurs (not including an attainment date on which a milestone occurs in cases where the standard has been attained), States with nonattainment areas must submit a demonstration that the milestone has been met (e.g., the 15 percent VOC emissions reduction is demonstrated by February 13, 1997). The EPA expects to release regulations pertaining to the requirements of the milestone demonstration in the summer of 1993.

1990 Adjusted Base Year Inventory Section 182(b)(1)(B) and (D) describe the inventory (hereafter referred to as the adjusted base year inventory) from which moderate and above ozone nonattainment areas must achieve a 15 percent reduction in VOC emissions by 1996. This inventory is equal "the total amount of actual VOC or NO_x emissions from all anthropogenic (man-made) sources in the area during the calendar year of enactment," excluding the emissions that would be eliminated by Federal Motor Vehicle Control Program (FMVCP) regulations promulgated by January 1, 1990, and Reid vapor pressure (RVP) regulations (55 FR 23666, June 11, 1990), which require specific maximum RVP levels for gasoline in particular nonattainment areas during the peak ozone season. The 1990 rate-of-progress base year inventory (defined below) removes biogenic emissions and emissions from sources listed in the base year inventory that are located outside the nonattainment area. The adjusted base year inventory removes the emissions reductions from the FMVCP and RVP program from the 1990 rate-of-progress base year inventory. The adjusted base year inventory, which is due by November 15, 1992, is used to calculate the required 15 percent reductions.

Adjusted Base Year Emissions Inventory = Base Year Emissions Inventory, minus the following:

- **Biogenic source emissions.**
- **Emissions from sources outside of the nonattainment area boundary.**
- **Emissions reductions from the FMVCP.**
- **Emissions reductions from the RVP rules.**

1990 Base Year Inventory The 1990 base year inventory is an inventory of actual annual and typical weekday peak ozone season emissions that States use in calculating their adjusted and projected inventories, and in developing their control strategy. The base year inventory comprises emissions for the area during the peak ozone season, which is generally the summer months. It includes anthropogenic sources of NO_x and CO emissions, and both anthropogenic and biogenic sources of VOC emissions. Also included in the inventory are emissions from all stationary point sources and area sources as well as highway and nonhighway mobile sources located within the nonattainment area, and stationary sources with emissions of 100 tpy or more of VOC, NO_x, and CO emissions within a 25-mile wide buffer zone of the designated nonattainment area. The base year inventory contains off-shore

sources located within the nonattainment area boundaries and off-shore stationary sources with emissions of 100 tpy or greater of VOC, NO_x, or CO emissions within the 25-mile wide buffer area. For nonattainment areas that will perform photochemical grid modeling (e.g., serious and above areas and multi-State moderate areas), emissions for the entire modeling domain, which is usually larger than the nonattainment area because ozone is an areawide problem, are required in the modeling inventory. This modeling inventory could be submitted with the base year inventory, or the modeling inventory submittal could be in a separate package. It is important to note that the 1990 base year inventory serves as the starting point for all other inventories.

1990 Rate-of-Progress Base Year Inventory The 1990 rate-of-progress base year inventory is an accounting of all anthropogenic VOC, CO, and NO_x emissions in the nonattainment area. This emissions inventory is calculated by removing biogenic emissions and the emissions from sources that are located outside of the nonattainment area from the base year inventory. This inventory is used in developing the adjusted base year inventory. It is also used as the basis from which to calculate the 1996 target level of emissions.

1996 Target Level Of Emissions The 1996 target level of emissions is the maximum amount of ozone season VOC emissions that can been emitted by an ozone nonattainment area in 1996 for that nonattainment area to be in compliance with the 15 percent rate-of-progress requirements. It is calculated by first taking 15 percent of the adjusted base year inventory emissions. This emissions value is then added to the expected emissions reductions due to the FMVCP and RVP program, and from corrections to any deficient RACT rules and I/M programs. The summation of the 15 percent, the expected reductions from deficient I/M and RACT programs, and reductions from the FMVCP and RVP program are then subtracted from the 1990 rate-of-progress base year inventory to arrive at the 1996 target level of emissions. This target is used by States to design their 15 percent VOC emissions reduction control strategies. The projected control strategy inventory used in the rate-of-progress plan must be at or below the 1996 target level of emissions to demonstrate that the 15 percent VOC emissions reduction will be accomplished.

1996 Target Level of Emissions = Rate-of-Progress Base Year Inventory, minus the following:

- 15 percent of the adjusted base year inventory emissions.
- Emissions reductions from corrections to any deficient RACT rules.
- Emissions reductions from corrections to deficient I/M programs.

- Emissions reductions from the pre-1990 FMVCP.
- Emissions reductions from RVP rules.

Peak Ozone Season The contiguous 3-month period of the year during which the highest ozone exceedance days have occurred over the 3 to 4 years prior to the 1990 base year. Most ozone nonattainment areas have a peak ozone season lasting from June through August.

Offset Ratios For the purpose of satisfying the emissions offset reduction requirements of section 173(a)(1)(A), the emissions offset ratio is defined as the ratio of total actual emissions reductions of VOC [and NO_x unless exempted under section 182(f)] obtained as offsets from existing sources to total allowable emissions increases of such pollutant from the new source. (See Table A-1 for a list of offset ratios by nonattainment area.) Additional information on the credibility of offsets toward the 15 percent VOC emissions reduction requirements, net of growth, will be provided in an EPA document entitled Guidance on the Relationship Between the 15 Percent Rate-of-Progress Plans and Other Provisions of the Clean Air Act. This document will be released in the spring of 1993.

Point Source Any stationary source that has the potential to emit more than some specified threshold level of a pollutant or is identified as an individual source in a State's emissions inventory. For base year SIP inventory purposes, point sources are defined as sources emitting 10 tpy or more of VOC emissions or 100 tpy or more of NO_x or CO emissions.

Post-1996 Rate-of-Progress Plan The post-1996 rate-of-progress plan is the portion of the SIP revision due by November 15, 1994, which describes how serious and above areas plan to achieve the post-1996, 3 percent per year VOC emissions reductions averaged over each consecutive 3-year period from November 15, 1996 until the attainment date. This SIP revision also includes the attainment demonstration for moderate interstate nonattainment areas and serious and above nonattainment areas.

RACT "Catch-ups" RACT "catch-up" refers to the application of RACT for all applicable sources as listed in section 182(b)(2), regardless of what was previously required. Each moderate and above ozone nonattainment area (as well as attainment areas within the ozone transport region) are subject to the RACT "catch-up" requirement of section 182(b)(2). The new law requires any of the above areas that had not previously been required to adopt RACT consistent with all of the CTG's to "catch-up" and apply RACT to all sources covered by a pre-enactment or post-enactment CTG document. Many of these areas were not previously required to apply RACT to sources covered by the Group III CTG documents (i.e., CTG documents published after September 1982). In addition, areas previously considered rural

nonattainment, which had to apply RACT only to certain major sources in certain CTG categories under prior policy, will have to revise their SIP's to apply RACT to all sources, including nonmajor sources, that are covered by any CTG. The RACT "catch-up" provision also requires these nonattainment areas to adopt RACT rules for all major sources not covered by a CTG. Additional information on the RACT "catch-up" program will be provided in forthcoming guidance regarding the interaction of RACT rules with emissions inventories.

RACT "Fix-ups" These are corrections States are required to make under section 182(a)(2)(1) to their current RACT rules to make up for deficiencies (e.g., improper exemptions) in preamendment plans. Under RACT "fix-ups," States are required to have RACT rules that comply with section 172(b) of the pre-1990 Act, as interpreted by EPA's preamendment guidance. Since the RACT "fix-up" provisions refer to RACT as required by preamended section 172(b), only areas subject to preamended section 172(b) need to meet the RACT "fix-up" requirement. Therefore, for nonattainment areas that will be expanded to contain regions that were designated attainment prior to enactment, the RACT corrections are only for the original nonattainment area. The RACT "fix-up" provision essentially codifies EPA's SIP calls, issued in May 1988 and November 1989 [as announced in the Federal Register on September 7, 1988 (53 FR 34500) and July 30, 1990 (55 FR 30973)]. The RACT fix-ups were due on May 15, 1991. Between May 24 and June 24, 1991, EPA's Regional Offices mailed letters to several Governors and air agency officials concerning the progress of the States in meeting RACT "fix-up" requirements and listing the deficiencies remaining. Additional information on the RACT "fix-up" program will be provided in forthcoming guidance regarding the interaction of RACT rules with emissions inventories.

Rate-of-Progress Plan The portion of the SIP revision due by November 15, 1993, that describes how moderate and above ozone nonattainment areas plan to achieve the 15 percent VOC emissions reduction. All moderate intrastate areas that choose to utilize the EKMA in their attainment demonstrations, are also required to include their attainment demonstration in this SIP revision.

Rule Effectiveness (RE) For stationary sources, a measure of the extent to which a regulatory program achieves emissions reductions. An RE of 100 percent reflects a regulatory program achieving all the emissions reductions that could be achieved by full compliance with the applicable regulations at all sources at all times. However, regulations typically are not 100 percent effective due to limitations of control techniques or shortcomings in the implementation and enforcement process. The EPA allows the use of several different methods for determining RE including: an 80 percent default value, results from EPA questionnaires, or results from a Stationary Source Compliance Division (SSCD) study.

Volatile Organic Compound Any compound of carbon, excluding CO, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. This includes any organic compound other than those EPA has determined to have negligible photochemical reactivity (57 FR 3945, February 3, 1992).

APPENDIX B: REFERENCES FOR CTG AND ACT DOCUMENTS FOR STATIONARY VOC SOURCES

Group I CTG Documents for Stationary VOC Sources

Control of Volatile Organic Emissions from Existing Stationary Sources - Volume I: Control Methods for Surface Coating Operations, EPA-450/2-76-028, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. November 1976.

Control of Volatile Organic Emissions from Existing Stationary Sources - Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks, EPA-450/2-77-008, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. May 1977.

Control of Volatile Organic Emissions from Existing Stationary Sources - Volume III: Surface Coating of Metal Furniture, EPA-450/2-77-032, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1977.

Control of Volatile Organic Emissions from Existing Stationary Sources - Volume IV: Surface Coating for Insulation of Magnet Wire, EPA-450/2-77-033, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1977.

Control of Volatile Organic Emissions from Existing Stationary Sources - Volume V: Surface Coating of Large Appliances, EPA-450/2-77-034, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1977.

Control of Volatile Organic Emissions from Bulk Gasoline Plants, EPA-450/2-77-035, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1977.

Control of Volatile Organic Emissions from Storage of Petroleum Liquids in Fixed-Roof Tanks, EPA-450/2-77-036, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1977.

Control of Refinery Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds, EPA-450/2-77-025, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. October 1977.

Control of Volatile Organic Compounds from Use of Cutback Asphalt, EPA-450/2-77-037, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1977.

Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals, EPA-450/2-77-026, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. October 1977.

Design Criteria for Stage I Vapor Control Systems - Gasoline Service Stations, (no document number issued), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. November 1975.

Control of Volatile Organic Emissions from Solvent Metal Cleaning, EPA-450/2-77-022, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. November 1977.

Summary of Group I Control Technique Guideline Documents for Control of Volatile Organic Emissions from Existing Stationary Sources, EPA-450/3-78-120, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1978.

Group II CTG Documents for Stationary VOC Sources

Control of Volatile Organic Emissions from Existing Stationary Sources - Volume VI: Surface Coating of Miscellaneous Metal Parts and Products, EPA-450/2-78-015, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. June 1978.

Control of Volatile Organic Emissions from Existing Stationary Sources - Volume VII: Factory Surface Coating of Flat Wood Paneling, EPA-450/2-78-032, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. June 1978.

Control of Volatile Organic Emissions from Existing Stationary Sources - Volume VIII: Graphic Arts - Rotogravure and Flexography, EPA-450/2-78-033, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1978.

Control of Volatile Organic Compound Leaks from Petroleum Refinery Equipment, EPA-450/2-78-036, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. June 1978.

Control of Volatile Organic Emissions from Petroleum Liquid Storage in External Floating Roof Tanks, EPA-450/2-78-047, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1978.

Control of Volatile Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems, EPA-450/2-78-051, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1978.

Control of Volatile Organic Emissions from Manufacture of Synthesized Pharmaceutical Products, EPA-450/2-78-029, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1978.

Control of Volatile Organic Emissions from Manufacture of Pneumatic Rubber Tires, EPA-450/2-78-030, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1978.

Summary of Group II Control Technique Guideline Documents for Control of Volatile Organic Emissions from Existing Stationary Sources, EPA-450/2-80-001, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1979.

Group III CTG Documents for Stationary VOC Sources

Control of Volatile Organic Compound Emissions from Large Petroleum Dry Cleaners, EPA-450/3-82-009, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. September 1982.

Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins, EPA-450/3-83-008, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. November 1983.

Control of Volatile Organic Compound Equipment Leaks from Natural Gas/Gasoline Processing Plants, EPA-450/2-83-007, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1983.

Control of VOC Fugitive Emissions from Synthetic Organic Chemical, Polymer, and Resin Manufacturing Equipment, EPA-450/3-83-006, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. March 1984.

Control of Volatile Organic Compound Emissions from Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industry, EPA-450/3-84-015, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December, 1984.

Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone Volume I: General Guidance for Stationary Sources, Appendix C, EPA-450/4-91-016, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. May 1991.

New CTG Documents for Stationary VOC Sources

Appendix E of the General Preamble (57 FR 18077) discusses EPA's plans for publishing new CTG documents. The EPA must issue 11 CTG documents by November 15, 1993. The 11 source categories for which EPA plans to issue CTG documents are as follows: (1) SOCMI distillation; (2) SOCMI reactors; (3) SOCMI batch processing; (4) wood furniture; (5) plastic parts coating (business machines); (6) plastic parts coating (other); (7) web offset lithography; (8) industrial wastewater; (9) autobody refinishing; (10) volatile organic liquid storage in floating and fixed-roof tanks; and 11) clean-up solvents. In addition, section 183(b) of the Act specifically requires EPA to prepare CTG documents for aerospace coatings and solvents, and for paints, coatings, and solvents used in ship building and repair by November 15, 1993.

As of March 1993, none of the new CTG documents have been finalized. The following discusses the most recent background information or draft CTG document available.

SOCMI Reactor Processes and Distillation Operations

Control of Volatile Organic Compound Emissions from Reactor Processes and Distillation Operations Processes in the Synthetic Organic Chemical Manufacturing Industry, draft CTG, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. This document is expected to be finalized in the spring of 1993.

SOCMI Batch Processes

Control of Volatile Organic Compound Emissions from Batch Processes, draft CTG, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. September 1991.

Coating of Wood Furniture

Control of Volatile Organic Compound Emissions from Wood Furniture Coating Operations, draft CTG (chapters 1-5), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. October 1991.

Coating of Plastic Parts

Surface Coating of Plastic Parts Control Techniques Guideline, draft CTG, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. October 1, 1991.

Web Offset Lithography

Offset Lithographic Printing Control Techniques Guideline, draft CTG, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1991.

Industrial Wastewater

As of March 1993, a draft CTG document for industrial wastewater has not been prepared. The following document for BACT/LAER determinations may be consulted for information on control techniques for industrial wastewater.

Industrial Wastewater Volatile Organic Compound Emissions - Background Information for BACT/LAER Determinations, EPA-450/3-90-004, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. January 1990.

Autobody Refinishing

Automobile Refinishing Control Techniques Guideline, draft CTG, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. September 27, 1991. [Note: The EPA originally intended to issue a CTG document for autobody refinishing. However, EPA has decided to prepare a national rulemaking instead of issuing a CTG document. For further information on the status of the rulemaking, contact Ms. Ellen Ducey of EPA's

Office of Air Quality Planning and Standards [(919) 541-5408)].

Volatile Organic Liquid Storage in Floating and Fixed-Roof Tanks

Control of Volatile Organic Compound Emissions from Volatile Organic Liquid Storage in Floating and Fixed-Roof Tanks, draft CTG, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. September 30, 1991.

Clean-Up Solvents

As of March 1993, a draft CTG document for clean-up solvents has not been prepared.

Aerospace Coatings and Solvents

As of March 1993, a draft CTG document for aerospace coatings and solvents has not been prepared. A background information study of aerospace coating facilities in California has been completed by the EPA Region IX Office in conjunction with several local California air quality control agencies.

Aerospace coatings include radiation coatings, thermocontrol coatings, electrostatic discharge coatings, fuel tank coatings, and all other protective coatings. Emissions may occur during application of the prime coat, during lubricant application, and while topcoating. No emissions limits, costs, or monitoring techniques have been established for controls on this industry.

Ship Building Operations and Ship Repair

The EPA is preparing a CTG document for controlling VOC emissions from ship building operations and ship repair. A draft CTG document is planned for release in the fall of 1993. A final CTG document is planned for release in the fall of 1994. The CTG document will contain information on the VOC emissions sources associated with ship building operations and ship repair, VOC emissions estimates, best available control measures, and control cost estimates.

ACT Documents for Stationary VOC Sources

Halogenated Solvent Cleaners, EPA-450/3-89-030, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. August 1989. [Note: This ACT document discusses five halogenated solvents; four of which are exempted from the definition of VOC. Trichloroethylene is the only solvent discussed in the document which is classified as a VOC. Trichloroethylene emissions reductions may be creditable toward the 15 percent VOC emissions reduction requirements, net of growth. However, emissions reductions for solvents exempted from the definition of VOC are not creditable toward the 15 percent requirements.]

Reduction of Volatile Organic Compound Emissions from Application of Traffic Markings, EPA-450/3-88-007, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. August 1988.

Ethylene Oxide Sterilization/Fumigation Operations, EPA-450/3-89-007, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. March 1989.

Reduction of Volatile Organic Compound Emissions from Automobile Refinishing, EPA-450/3-88-009, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. October 1988.

Organic Waste Process Vents, EPA-450/3-91-007, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1990.

APPENDIX C: BACKGROUND INFORMATION DOCUMENTS FOR STATIONARY VOC SOURCES SUBJECT TO NEW SOURCE PERFORMANCE STANDARDS (NSPS) AND NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

This appendix lists the NSPS and NESHAPS that EPA has promulgated for stationary sources of VOC emissions, and cites the CFR references and BID numbers for the NSPS and NESHAPS. The NSPS are national standards that affect new, modified, or reconstructed stationary sources. The NESHAPS are national standards for controlling HAP's from existing and new stationary sources. Only the NESHAPS that control HAP's that are also classified as VOC are presented in this appendix.

Each of the NSPS and NESHAP regulations define the affected facility or facilities. The reader should consult the relevant CFR reference for details on the definition of the affected facility or facilities; the emissions standards; and recordkeeping, reporting, monitoring, and emissions testing requirements. The BID's contain technical information on the emissions sources and emissions, alternative controls considered during the development of the standards, the performance of the alternative controls evaluated, and estimated control costs.

Subpart A of 40 CFR Part 60 contains the General Provisions for NSPS. Subpart A discusses the applicability of NSPS; provides definitions of terms; and contains general requirements (including but not limited to) that address recordkeeping, performance tests, monitoring, reconstruction, and modification. Subpart B of 40 CFR Part 60 contains requirements for adoption and submittal of SIP's for designated facilities.

Subpart A of 40 CFR Part 61 contains the General Provisions for NESHAPS. Subpart A provides definitions of terms, and contains general requirements (including but not limited to) that address prohibited activities, the determination of construction or modification, application for approval of construction or modification, notification of startup, recordkeeping, reporting, monitoring, and emissions testing.

New Source Performance Standards

Source Category	Reference: 40 CFR Part 60	BID Number(s)
Emissions guidelines and compliance times for municipal waste combustors	Subpart Ca	EPA-450/3-89-027 a,b,c,&e
Municipal waste combustors	Subpart Ea	
Storage vessels for petroleum liquids for which construction, reconstruction, or modification commenced after 6/11/73 and prior to 5/19/78	Subpart K	APTD-1352a&b EPA-450/2-74-003
Storage vessels for petroleum liquids for which construction, reconstruction, or modification commenced after 5/18/78 and prior to 7/23/84	Subpart Ka	
Volatile organic liquid storage vessels (including petroleum liquid) for which construction, reconstruction, or modification commenced after 7/23/84	Subpart Kb	EPA-450/3-81-003a&b
Surface coating of metal furniture	Subpart EE	EPA-450/3-80-007a&b
Automobile and light-duty truck surface coating operations	Subpart MM	EPA-450/3-79-030a&b
Graphic arts industry: publication rotogravure printing	Subpart QQ	EPA-450/3-80-031a&b
Pressure sensitive tape and label surface coating operations	Subpart RR	EPA-450/3-80-003a&b
Industrial surface coating of large appliances	Subpart SS	EPA-450/3-80-037a&b
Metal coil surface coating	Subpart TT	EPA-450/3-80-035a&b
SOCMI equipment leaks	Subpart VV	EPA-450/3-80-033a&b
Beverage can surface coating industry	Subpart WW	EPA-450/3-80-036a&b
Bulk gasoline terminals	Subpart XX	EPA-450/3-80-038a&b

New Source Performance Standards (Continued)

Source Category	Reference: 40 CFR Part 60	BID Number(s)
Rubber tire manufacturing industry	Subpart BBB	EPA-450/3-81-008a&b
Polymer manufacturing industry	Subpart DDD	EPA-450/3-83-019a&b
Flexible vinyl and urethane coating and printing	Subpart FFF	EPA-450/3-81-016a&b
Petroleum refineries: equipment leaks	Subpart GGG	EPA-450/3-81-015a&b
Synthetic fiber production facilities	Subpart HHH	EPA-450/3-82-011a&b
SOCMI air oxidation unit processes	Subpart III	EPA-450/3-82-001a&b
Petroleum dry cleaners	Subpart JJJ	EPA-450/3-82-012a&b
On-shore natural gas processing plants	Subpart KKK	EPA-450/3-82-024a&b
SOCMI distillation operations	Subpart NNN	EPA-450/3-83-005a&b
Petroleum refinery wastewater systems	Subpart QQQ	EPA-450/3-85-001a&b
Magnetic tape coating facilities	Subpart SSS	EPA-450/3-85-029a&b
Surface coating of plastic parts for business machines	Subpart TTT	EPA-450/3-85-019a&b
Polymeric coating of supporting substrates facilities	Subpart VVV	EPA-450/3-85-022a

National Emission Standards for Hazardous Air Pollutants

Source Category	Reference: 40 CFR Part 61	BID Number(s)
Vinyl chloride production plants	Subpart F	EPA-450/2-75-009a&b
Equipment leaks (fugitive emission sources) of benzene	Subpart J	EPA-450/3-80-032a&b
Benzene emissions from coke by-product recovery plants	Subpart L	EPA-450/3-83-016a&b
Equipment leaks (fugitive emission sources) of VOC's	Subpart V	
Benzene emissions from benzene storage vessels	Subpart Y	EPA-450/3-80-034a
Benzene emissions from benzene transfer operations	Subpart BB	EPA-450/3-78-031 EPA-450/5-84-001
Benzene waste operations	Subpart FF	EPA-450/3-80-028b EPA-450/3-87-001a
Benzene emissions from ethylbenzene/ styrene[12]		EPA-450/3-79-035a EPA-450/3-84-003

[12]The proposed NESHAP for this source category was followed by a proposal to withdraw the proposed NESHAP.

APPENDIX D: CONTROL MEASURES FROM THE AIR QUALITY MANAGEMENT PLAN FOR THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT OF CALIFORNIA

The following is a list of control measures for stationary (point and area) and mobile VOC (or reactive organic gases) source categories from the SCAQMD's 1991 Air Quality Management Plan for the South Coast Air Basin. The list of stationary source control measures is for source categories not covered by CTG documents. Additional information on these control measures can be obtained from the Public Information Office of the SCAQMD [(714) 396-2000].

Stationary Source Control Measures - Point Sources (From Appendix IV-A)

Surface Coating and Solvent Use:
- Manufacture of Electronic Components.

Petroleum and Gas Production:
- Outer Continental Shelf Exploration, Development, and Production.
- Petroleum Refinery Flares.

Industrial and Commercial Processes:
- Manufacture of Rubber Products.

Residential and Public Sectors:
- Publicly Owned Treatment Works.

Other Sources:
- Emission Minimization Management Plan.
- Marketable Permit Program.

Stationary Source Control Measures - Area Sources (From Appendix IV-B)

Surface Coating and Solvent Use:
- Architectural Coatings.
- Substitute Solvents for Surface Coating Clean-Up.
- Domestic Products.
- Solvent Waste.

Petroleum and Gas Production:
- Gasoline Transfer: Fail Safe Phase-I Vapor Recovery Systems.
- Gasoline Transfer: Improved Installation and Repair of Phase-II Vapor Recovery Systems.
- Pleasure Boat Fueling Operations.
- Organic Liquid Transfer.
- Gasoline Dispensing Facilities.
- Utility Engine Refueling Operations.
- Over-Filling Vehicle Fuel Tanks.
- Draining of Liquid Products.

Commercial and Industrial Processes:
- Large Commercial Bakeries.
- Commercial Charbroiling.
- Laboratory Fume Hoods.
- Deep Fat Frying.
- Miscellaneous Combustion Sources.
- Internal Combustion Engines.

Residential and Public Sectors:
- Out-of-Basin Transport of Solid Waste.

Agricultural Processes:
- Pesticide Application.
- Livestock Waste.

Others:
- Installation of Best Available Retrofit Control Technology on Miscellaneous Sources.
- Low Emission Methods and Materials for Building Construction.

Mobile and Indirect Source Control Measures (From Appendix IV-C)

On-road Vehicles:
- Zero-emission Urban Bus Implementation.
- Low-emission New Fleet Vehicles.
- Motor-Vehicle Buy-back Program.
- Eliminate Excessive Car Dealership Cold Starts.
- Eliminate Excessive Curb Idling.
- Aerodynamic Devices for Trucks.
- Eliminate Emissions from Advertising Vehicles.
- Inspection and Maintenance Program Enhancements.

Off-road Vehicles:
- Control of Emissions from Jet Aircraft.
- Control of Emissions from Marine Vessel Tanks.
- Lower Emissions from Military Aircraft.
- Eliminate Leaf Blowers.
- Emission Standards for Construction and Farm Equipment.

Indirect Sources:

- Environmental Review Program.
- Trip Reduction for Schools.
- Supplement Development Standards.
- Special Activities Centers.
- Enhanced Regulations.
- Truck Programs.
- Registration Programs.

APPENDIX E: CURRENT ACT DOCUMENTS AND OTHER FEDERAL CONTROL MEASURES

Appendix E of this document provides a summary of the information presented in the ACT documents for halogenated solvent cleaners, application of traffic markings, automobile refinishing, ethylene oxide sterilization/fumigation operations, and organic waste processes. The references for these ACT documents are presented in Appendix B of this document. The EPA has not performed a word-by-word comparison of the information presented in Appendix E of this document to the information presented in the ACT documents. Where discrepancies occur between Appendix E and the ACT documents, the information in the ACT documents takes precedence.

Appendix E of this document also provides a brief status report on the development of other federal control measures for consumer and commercial products, adhesives, application of agricultural pesticides, architectural and industrial coatings, autobody refinishing, marine vessel loading operations, and ship building operations and ship repair.

ACT Documents

Halogenated Solvent Cleaners

Halogenated solvent cleaners commonly employ one of five halogenated solvents: 1,1,1-trichloroethane, perchloroethylene, methylene chloride, trichlorotrifluoroethane, and trichloroethylene. The cleaning apparatuses that use these solvents vary in size from small benchtop models to large industrial size cleaners. Solvent evaporation emissions may come from the air/solvent vapor interface, from the clean parts as they emerge from the cleaner, from equipment and storage leaks, and from transfer losses. Of the five halogenated solvents discussed in the ACT document, four have been exempted from the definition of VOC. Trichloroethylene is the only solvent discussed in the document which is classified as a VOC. Trichloroethylene emissions reductions may be creditable toward the 15 percent VOC emissions reduction requirements, net of growth. However, emissions reductions for solvents exempted from the definition of VOC are not creditable toward the 15 percent requirements.

Emissions reduction techniques will include features which limit losses from diffusion and convection, carryout, leaks, downtime, solvent transfer, water contamination, and waste disposal. Multiple control techniques are examined in the ACT, for interface, in-line emissions, and fugitive emissions. Vapor interface emissions may be reduced by a combination of carbon adsorption, reducing the primary condenser temperature, a

freeboard refrigeration device, and other controls. Workload emissions may be reduced by carbon adsorption. Adequate control will usually be attained through several control technologies, with emissions reductions of approximately 70 percent. Additionally, the ACT document suggests alternative cleaning agents that would further reduce emissions.

Costs vary widely with the respective control technologies. The document presents retrofit cost estimates for three model cleaner sizes and two operating schedules. Cost-effective control strategies are available for all halogenated solvent cleaners.

No monitoring techniques are provided in the document.

Reduction of Volatile Organic Compounds from the Application of Traffic Markings

Traffic marking materials must withstand different types of weather and varying levels of tire wear. Because of the variety of performance requirements for traffic markings, these materials have many different physical and chemical properties. Most emissions occur from solvent-borne paint traffic markings, which are the most widely used.

Five alternatives to solvent-borne paint are discussed in the ACT document. The five alternatives include waterborne paints, thermoplastics, preformed tapes, field-reacted materials, and permanent markers. Each alternative emits less VOC than solvent-borne paints. Use of thermoplastics, preformed tapes without adhesive primer, field-reacted materials, and permanent markers can reduce emissions associated with solvent-borne paints by 100 percent. Preformed tapes with adhesive primer can reduce VOC emissions by 15 percent. Waterborne paints may achieve an 81 percent reduction in VOC emissions. Waterborne paints are latex emulsions which typically contain organic solvents (approximately 80 grams of VOC per liter of coating).

- A cost analysis was performed for solvent-borne paint, waterborne paint, thermoplastic, and field-reacted materials. A cost savings over solvent-borne paint was found for all alternatives except for thermoplastic.

No monitoring techniques are discussed in the document.

Reduction of Volatile Organic Compound Emissions from Automobile Refinishing

Automobile refinishing may be categorized into four processes: vehicle preparation, primer application, topcoat application, and spray equipment cleanup. Emissions occur from solvent evaporation during preparation, cleanup, and directly after coating applications.

Alternative controls were examined for small, medium, and large shops. Emissions reduction techniques include alternative coatings, new spray equipment with improved transfer efficiency, installation of solvent recovery spray equipment cleaning systems, and add-on controls (for volume shops only).

Significant VOC emissions reductions (30 percent to 45 percent) result from replacing conventional air-atomizing spray guns with high-volume, low-pressure spray guns, at a cost savings due to higher transfer efficiency. Volatile organic compound emissions reductions of 15 percent can be attained from using a cleanup solvent recovery system, which also results in savings due to reduced solvent usage. Switching from conventional primers to waterborne primers results in a 20 percent VOC emissions reduction at no additional cost. Add-on controls can achieve emissions reductions up to 60 percent; however, add-on controls are more costly than the other three control techniques discussed in the document.

Applicable monitoring techniques include recordkeeping, testing the VOC content of coatings, inspections, emissions testing, and equipment testing. Recordkeeping is the most universal approach, augmented by inspections and the testing of the VOC content of coatings. Emissions testing and equipment testing are less effective.

Ethylene Oxide Sterilization/Fumigation Operations

Ethylene oxide is used as a sterilant/fumigant in the production of medical equipment supplies, in miscellaneous sterilization and fumigation operations, and at hospitals. Almost all ethylene oxide is emitted from three sources: the sterilizer vents, the vacuum pump drain, and the aeration room or chamber.

Three primary control technologies are available for the control of ethylene oxide. They are acid hydrolysis, acid-water scrubbers, oxidation, and a gas solid reactor system that chemically reacts ethylene oxide and binds it to the solid reactor packing. Acid hydrolysis, which is the most widely used control technology, has been demonstrated as an effective method for controlling ethylene oxide emissions at both small and large facilities.

Control efficiencies range from 98 percent to 99 percent for emissions from sterilizer vents. No control efficiencies have been developed for the low ethylene oxide concentrations from aeration rooms. A cost analysis is developed in the ACT for an acid hydrolysis system with a vacuum pump for recirculation of each sterilizer.

No monitoring techniques are discussed in the document.

Organic Waste Process Vents

The waste management industry is diverse and complex, and covers a broad spectrum of industry types and sizes. Major elements of waste management include generation, transportation, storage, treatment, and disposal. Organic-containing wastes may be emitted from process vents associated with each of the above elements.

Both vapor recovery control devices (condensers, adsorbers, and absorbers) and vapor combustion control devices (incinerators, flares, and industrial boilers) are discussed in the ACT document. Vapor recovery devices are cited as the more attractive option where a significant quantity of usable organics can be recovered. However, these control technologies may not be applicable to certain process vent streams. Expected emissions reductions for all control options range from 95 percent to 98 percent.

Costs are estimated for 71 model process vent streams and are too numerous to be summarized here. Monitoring techniques are described for each control technology in the ACT document. Monitoring may be performed on the emissions streams themselves or on parameters of the control devices. For most control devices described in the ACT document, monitoring variables such as flowrate and temperature are sufficient.

Other Federal Control Measures

Consumer and Commercial Products

Consumer and commercial products include a wide variety of items, including deodorants, spray paints, hair care products, and household cleaners. Although no information on control technologies is available at this time, the final document will consist of 17 different volumes, divided into 6 generic reports and 11 product category studies. The consumer and commercial products study will not be available in its entirety until November 1993.

Adhesives

Control measures for adhesives are no longer under development as a separate document, but limited information is to be included in the guidance on consumer and commercial products. No information is available at this time.

Architectural and Industrial Coatings

The EPA is using regulatory negotiation to prepare a national rulemaking for controlling VOC emissions from architectural and industrial coatings. For further information on the status of the rulemaking, contact Ms. Ellen Ducey of EPA's Office of Air Quality Planning and Standards [(919) 541-5408)].

Autobody Refinishing

The EPA originally intended to issue a CTG document for autobody refinishing. However, EPA has decided to prepare a national rulemaking instead of issuing a CTG document. For further information on the status of the rulemaking, contact Ms. Ellen Ducey of EPA's Office of Air Quality Planning and Standards [(919) 541-5408)].

Application of Agricultural Pesticides

The EPA has prepared a final ACT document which presents information on control techniques for reducing VOC emissions associated with the application of agricultural pesticides. The document also presents nationwide emissions estimates for organic solvents and nationwide usage estimates for active ingredients in agricultural pesticides. The reference for the ACT document is as follows:

> Control of Volatile Organic Compound Emissions from the Application of Agricultural Pesticides, EPA-453/R-92-011, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1993.

Marine Vessel Loading Operations

The EPA has prepared a technical support document which presents information on control techniques for reducing VOC and hazardous air pollutant (HAP) emissions associated with marine vessel loading and unloading operations. Standards for marine vessel loading operations are scheduled to be proposed in 1993. The reference for the technical support document is as follows:

VOC/HAP Emissions from Marine Vessel Loading Operations: Technical Support Document for Proposed Standards, EPA-450/3-93-001a, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. May 1992.

Ship Building Operations and Ship Repair

The EPA is preparing a CTG document for controlling VOC emissions from ship building operations and ship repair. A draft CTG document is planned for release in the fall of 1993. A final CTG document is planned for release in the fall of 1994. The CTG document will contain information on the VOC emissions sources associated with ship building operations and ship repair, VOC emissions estimates, best available control measures, and control cost estimates. In addition, EPA is preparing an NESHAP to control emissions of hazardous air pollutants from ship building operations and ship repair. The NESHAP is planned for promulgation in 1994.

APPENDIX F: PROCEDURES FOR CALCULATING THE 1996 TARGET LEVEL OF EMISSIONS AND DISCUSSION OF CONTROL STRATEGY DEVELOPMENT

This appendix provides an overview of the steps involved in calculating the target level of emissions and total emissions reductions for 1996, and discusses the development of control strategies for achieving the required emissions reductions. A hypothetical example is used to show the steps involved in calculating the target level of emissions and total emissions reductions for 1996. The discussion on the development of control strategies summarizes the control measures required by the CAAA for moderate and serious nonattainment areas. Issues concerning the creditability of emissions reductions toward the 15 percent VOC emissions reduction requirements are also discussed. Examples of five hypothetical nonattainment areas (four moderate and one serious) are presented to illustrate the control strategy development process, development of contingency measures, and to provide suggested formats for reporting control measures and associated emissions reductions in the rate-of-progress plans.

Calculation of the Target Level of Emissions and Total Emissions Reductions for 1996

To determine their control strategies for achieving the required 15 percent VOC emissions reductions, net of growth, States will need to calculate the 1996 target level of emissions -- the maximum amount of emissions allowed in 1996 given the rate-of-progress requirement. This section presents a hypothetical example to describe the calculation of the target level and total emissions reductions for 1996. Figure F-1 presents a flowchart of the steps involved in calculating the target level and the emissions reductions for the hypothetical example.

Calculation of the 1990 Adjusted Base Year Inventory

Section 182(b)(1) of the Act specifies the emissions "baseline" from which the 15 percent VOC emissions reduction is calculated. This baseline value is termed the 1990 adjusted base year inventory. Section 182(b)(1)(B) defines baseline emissions (for purposes of calculating the 15 percent VOC emissions reduction) as "the total amount of actual VOC or NO_x emissions from all anthropogenic sources in the area during the calendar year of enactment." Section 182(b)(1)(D) excludes from the baseline the emissions that would be eliminated by FMVCP regulations promulgated by January 1, 1990, and RVP regulations (55 FR 23666, June [illegible] 1990), which require maximum RVP limits in

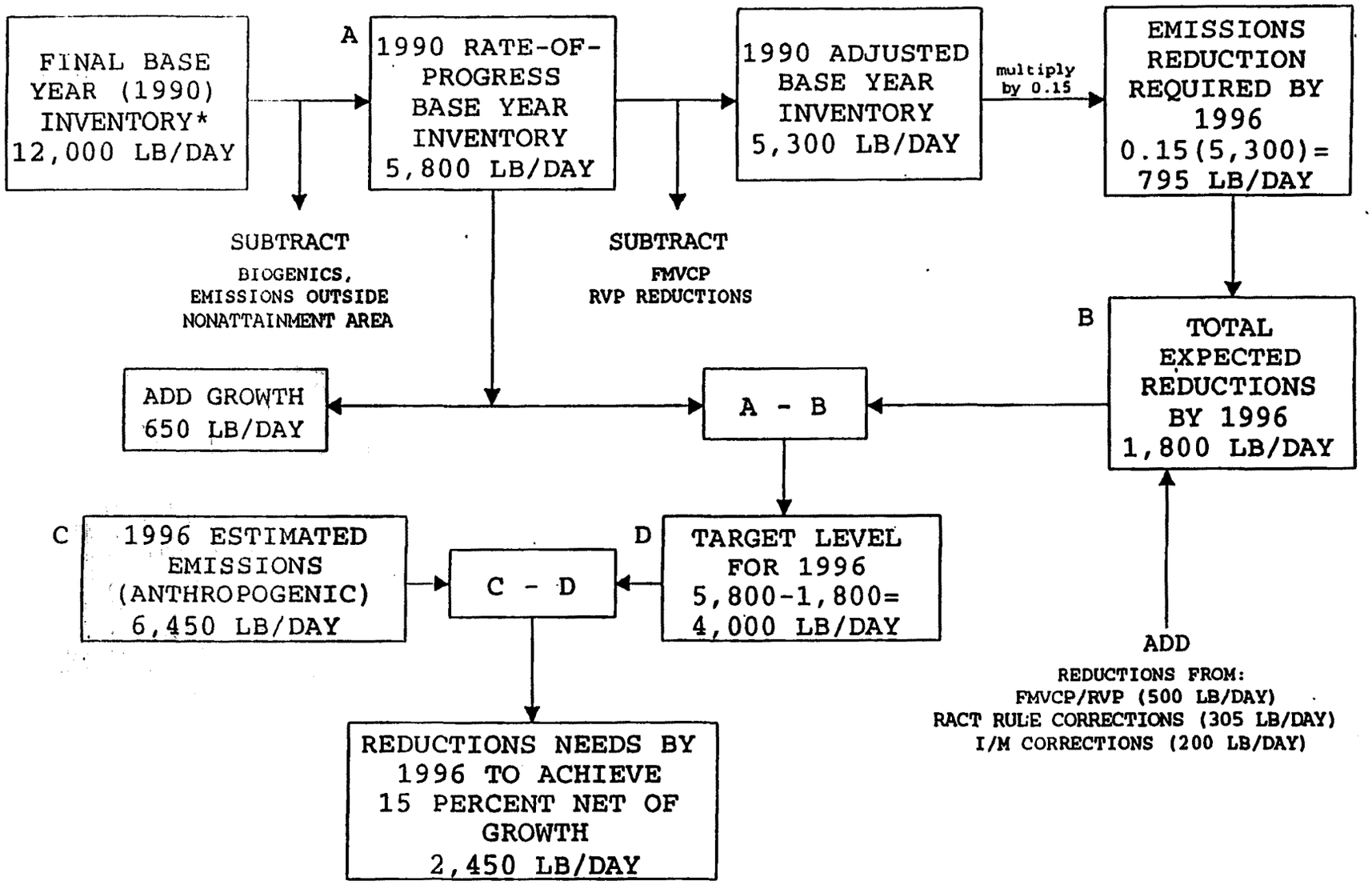

Figure F-1. Flowchart for example rate-of-progress calculations.

nonattainment areas during the peak ozone season. Three steps are followed in calculating the 1990 adjusted base year inventory.

Step 1. Develop the 1990 base year inventory: the total 1990 base year emissions from the four emissions source types (point, area, mobile, and biogenic) are compiled;

Step 2. Develop the 1990 rate-of-progress base year inventory for nonattainment area: biogenic source emissions and other emissions from sources located outside the nonattainment area, but included in step 1, are removed from the 1990 base year inventory; and

Step 3. Develop adjusted base year inventory: remove the expected emissions reductions from the FMVCP and RVP programs from the 1990 rate-of-progress base year inventory.

Additional information on these three steps is available in an EPA document entitled Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 Percent Rate-of-Progress Plans. (See reference 42). Employing the same hypothetical emissions estimates from that document, the adjusted base year inventory in this example is expected to equal 5,300 lb/day of VOC emissions.

Calculation of the 1996 Target Level of Emissions

Steps 4 through 6 are used to calculate the 1996 target level of emissions for planning purposes (additional information on these steps is also available in the aforementioned EPA guidance document).

Step 4. Calculate required (15 percent) creditable reductions: 15 percent = 5,300 x 0.15 = 795 lb/day of VOC.

Step 5. Calculate total expected reductions by 1996: this step involves summing the emissions reductions that are creditable toward the 15 percent requirement (calculated in Step 4) and the total emissions reductions from programs that are required, but are not creditable toward the 15 percent requirement (i.e., RACT rule and I/M program corrections, pre-CAAA FMVCP, and Federal RVP regulations). The estimated total expected reductions are assumed to equal 1,800 lb/day of VOC. The 1996 target level of emissions is then calculated by subtracting the total expected reductions by 1996 from the 1990 rate-of-progress base year inventory.

Step 6. Set target level for 1996:

Target Level	=	Step 2 - Step 5
	=	1990 Rate-of-Progress Base Year Inventory For Nonattainment Area - Total Reductions
	=	5,800 lb/day - 1,800 lb/day
	=	4,000 lb/day

The next major step involved in calculating the extent of the necessary emissions controls for meeting the 15 percent rate-of-progress requirement is to project emissions growth.

Calculation of Total Emissions Reductions Needed by 1996

Step 7. Project emissions growth for the 1990-1996 period:

1990-1996 Projected Emissions Growth (lb/day)

Point Sources		100
Area Sources		250
Mobile Sources		+ 300
	Total	650

The expected emissions growth between 1990 and 1996 is estimated using the 1990 rate-of-progress base year inventory for the nonattainment area and the methods outlined in an EPA document entitled Procedures for Preparing Emissions Projections. (See reference 43.) Section 6 of this document provides detailed guidance on the procedures for projecting VOC emissions. States must be sure to include the amount of preenactment banked emissions reduction credits that they plan to use during the 1990-1996 period in these projections. The use of such credits in the post-CAAA period must be considered emissions growth. For example, assume a State expects to use 50 lb/day of its preenactment banked emissions reduction credits to offset major source growth during the 1990-1996 period. Furthermore, the State expects an additional 50 lb/day of nonmajor point source growth that will not be offset with preenactment banked credits. Therefore, the State should incorporate a total of 100 lb/day of point source growth for this nonattainment area. After aggregating the emissions from each source, it is estimated that the hypothetical example nonattainment area will see increases in VOC emissions of 250 lb/day for area sources and 300 lb/day for mobile sources, in addition to the 100 lb/day for point sources.

Step 8. Add emissions growth to other required reductions for planning purposes (includes offsetting emissions growth):

Required Additional Controlled Emissions in 1996 (lb/day)

Required 15 percent	795
Expected Reductions from FMVCP and RVP (1990-1996)	500
Corrections to RACT Rules (noncreditable)	305
Corrections to I/M Program (noncreditable)	200
Anticipated emissions growth (1990-1996) based on projections	+ 650
Total	2,450

Once the 1996 target emissions level and projected emissions growth are calculated, States must develop a control strategy that meets the target while offsetting the projected growth. The control strategy must take into account the required emissions reductions (15 percent), the noncreditable emissions reductions, and the growth projected to occur between 1990 and 1996 (i.e., 650 lb/day of VOC). The total 1996 VOC emissions reductions for the hypothetical nonattainment area are 2,450 lb/day.

Development Of Control Strategies

Moderate Nonattainment Area Requirements

Under section 182(b) of the Act, moderate ozone nonattainment areas are required to implement the following measures to control VOC emissions:

- RACT rule fix-ups.
- RACT catch-ups with a major stationary source emissions size cut-off of 100 tpy.
- Corrections to I/M programs if they were implemented before enactment of the CAAA and did not comply with EPA's basic I/M program requirements, or, implementation of a basic I/M program if the nonattainment area had not implemented an I/M program prior to enactment of the CAAA.
- Stage II vapor recovery.
- Emissions offsets for new sources [emissions reductions from existing stationary sources offsetting the emissions increases from new major stationary sources

(100 tpy or greater) or major modifications to major stationary sources by a ratio of 1.15:1].

Emissions reductions associated with RACT fix-ups and corrections to I/M programs implemented prior to enactment of the CAAA are not creditable toward the 15 percent VOC emissions reduction requirements. Emissions reductions associated with RACT catch-ups, Stage II vapor recovery programs, and basic I/M programs implemented after enactment of the CAAA are creditable toward the 15 percent VOC emissions reduction requirements to the extent that they are implemented by 1996 and represent emissions reductions that are real, permanent, and enforceable.

Due to the uncertainty inherent in projecting new source growth, and in determining the amount of the emissions reductions from offsets that will be needed to offset minor source growth, EPA is taking a conservative approach to the crediting of emissions reductions from offsets in the rate-of-progress plan. While emissions reductions associated with RACT rule catch-ups, RACT rules based on any new CTG or ACT document, and Stage II vapor recovery required for moderate and above areas are creditable reductions in the 15 percent rate-of-progress plan, emissions offsets are not creditable in the plan. However, any additional, actual, permanent, and enforceable emissions reductions resulting after 1990 from an offset that are not used to offset minor source growth will be creditable in the milestone compliance demonstration due in February 1997 for serious and above areas. The issues related to the interaction of emissions offsets and the 15 percent requirement will be discussed more fully in an EPA document entitled Guidance on the Relationship Between the 15 Percent Rate-of-Progress Plans and Other Provisions of the Clean Air Act. This document will be released in the spring of 1993.

It is important to note that although moderate and above nonattainment areas are required to provide a rate-of-progress plan describing how a 15 percent VOC emissions reduction, net of growth, will be achieved by November 1996, moderate areas are not required to show that they have met the 15 percent requirement in a milestone compliance demonstration due by February 15, 1993, because the 15 percent milestone date falls on the attainment date for moderate areas (November 15, 1996). Instead, they are required to show that they have attained the ozone NAAQS by November 15, 1996.

Moderate areas must, therefore, plan for and implement a control strategy that will result in attainment. If, for example, modeling for the attainment demonstration shows that an 18 percent VOC emissions reduction will be necessary for a moderate area to attain the ozone NAAQS by 1996, then the State should adopt control measures in its rate-of-progress plan that will achieve an 18 percent reduction. The State would need to

track the post-implementation emissions against the modeled attainment percentage rather than the 15 percent rate-of-progress requirement.

States must be aware that the assessment of whether an area has met the 15 percent VOC emissions reduction requirements, net of growth, in 1996 will be based on whether an area is at or below its 1996 target level of emissions, and not whether the area has achieved a particular actual emissions reduction relative to having maintained the control strategy.

Serious Nonattainment Area Requirements

Under section 182(c) of the Act, serious nonattainment areas are subject to the control measures required for moderate areas (except for emissions offset requirements) as well as the following additional control measures:

- Enhanced I/M program.
- Enhanced emissions monitoring.
- A major stationary source emissions cut-off for RACT of 50 tpy.
- Clean-fuel vehicle program in areas with a population greater than or equal to 250,000.
- Emissions offset of 1.2:1.

Emissions reductions associated with the first four control measures are creditable toward the 15 percent VOC emissions reduction requirements to the extent that they are implemented by 1996 and represent emissions reductions that are real, permanent, and enforceable. As discussed previously, EPA will not allow States to take credit in the 15 percent rate-of-progress plan for projected emissions reductions resulting from emissions offsets. Any additional, actual, permanent, and enforceable emissions reductions resulting after 1990 from an offset that is not used to offset minor source growth will be creditable in the milestone compliance demonstration required for serious areas in 1997.

In addition, the Federally implemented program for reformulated gasoline is required in the nine serious areas with the highest ozone design values during the 1987-1989 period and populations over 250,000 (assume that this hypothetical nonattainment area does not meet these criteria). Emissions reductions from the use of reformulated gasoline are also creditable toward the 15 percent requirements. The clean-fuel vehicle program is not expected to be implemented until 1998, and therefore, no creditable emissions reductions (by 1996) are projected for this program.

Nonattainment Area Examples

This section provides hypothetical examples of five nonattainment areas to illustrate how control strategies can be developed to achieve emissions reductions that are creditable toward meeting the 15 percent VOC emissions reduction requirements, net of growth. The nonattainment area examples are as follows:

- A nonattainment that existed prior to enactment of the CAAA that was classified as a moderate nonattainment area upon enactment of the CAAA, without changes to its nonattainment boundaries.

- A nonattainment area that existed prior to enactment of the CAAA that was classified as a moderate nonattainment area upon enactment of the CAAA, with changes to its nonattainment boundaries that added new portions to the nonattainment area.

- An attainment area that existed prior to enactment of the CAAA that was classified as a moderate nonattainment area upon enactment of the CAAA.

- A nonattainment area that existed prior to enactment of the CAAA that was classified as a multi-State nonattainment area upon enactment of the CAAA.

- A nonattainment area that existed prior to enactment of the CAAA that was classified as a serious nonattainment area upon enactment of the CAAA, with its major stationary source emissions cut-off lowered from 100 tpy to 50 tpy.

The first three examples are presented to illustrate differences in how a moderate nonattainment area would develop its control strategy depending on whether it was classified as a nonattainment or an attainment area prior to enactment of the CAAA, or whether its boundaries changed when it was classified as a moderate area. The fourth example is presented to illustrate procedures that a multi-State nonattainment area must follow when developing its control strategy. The fifth example presents a hypothetical serious nonattainment area to highlight the additional controls required for serious nonattainment areas. States must include contingency measures in their rate-of-progress plans. Therefore, contingency measures are also discussed for each example.

For Example 1, the emissions inventory and emissions reduction values presented at the beginning of this appendix (and summarized in Figure 1) are used to illustrate suggested formats for reporting control measures, implementation dates for control

measures, and associated emissions reductions in a rate-of-progress plan. A separate emissions inventory and emissions reduction values are presented under Example 5 for a serious nonattainment area to illustrate suggested reporting formats. Blank forms for the suggested reporting formats are provided at the end of this appendix. Although not required to do so, States are encouraged to copy and use these forms to report the requisite data in their rate-of-progress plans.

Note that these examples are only illustrative of the process and format to be followed and are definitely not intended to reflect relative reductions to be obtained from the listed control measures.

Example 1: Moderate Nonattainment Area without Boundary Changes

For this example, it is assumed that the nonattainment area existed prior to enactment of the CAAA and was classified as a moderate nonattainment area upon enactment of the CAAA. Its boundaries before and after enactment of the CAAA did not change. It is assumed that prior to enactment of the CAAA, the nonattainment area was required to have RACT rules for the Group I and II CTG source categories, but was not required (and did not previously choose) to have RACT rules for the Group III CTG source categories or for major non-CTG stationary sources. It is also assumed that the nonattainment area had implemented an I/M program before enactment of the CAAA. However, its RACT rules and I/M program contain deficiencies which must be corrected to comply with EPA policies and regulations.

The area would be required to prepare RACT rule fix-ups for the Group I and II CTG source categories and corrections to its I/M program. In addition, the area would be required to adopt RACT rule catch-ups for the Group III CTG source categories and RACT rules for major non-CTG stationary sources because it had not adopted RACT rules for the Group III CTG source categories and major non-CTG stationary sources prior to enactment of the CAAA. The area would also be required to implement a Stage II vapor recovery program. Because there are no boundary changes to the nonattainment area, there would be no requirement for the area to implement RACT rules, a basic I/M program, or a Stage II vapor recovery program beyond the original boundaries of the nonattainment area.

In order to calculate the emissions reductions associated with control measures, States will need to apply growth factors, control efficiencies, RE, and rule penetration values that are described in earlier sections of this document. Furthermore States should refer to the procedures described in section 4 of this document, which describes the methods for projecting controlled emissions to 1996.

Implementation of the RACT rule catch-ups is expected to result in creditable emissions reductions of 300 lb/day. The MOBILE5.0 model projects that the implementation of Stage II controls will generate emissions reductions of 250 lb/day in 1996. Total creditable emissions reductions associated with implementation of these two programs would be 550 lb/day.

The document entitled Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 Percent Rate-of-Progress Plans (see reference 44), discusses the particular issues and methods related to calculating the expected noncreditable emissions reductions from FMVCP, RVP, I/M program corrections, and RACT rule fix-ups. For this example, total noncreditable emissions reductions are estimated to be 1,005 lb/day. Total creditable and noncreditable emissions reductions are estimated to be 1,555 lb/day. Because this nonattainment area needs to achieve a total of 2,450 lb/day of VOC emissions reductions to meet the 15 percent requirements, net of growth, additional controls equaling at least 895 lb/day of VOC emissions reductions will need to be developed and adopted by the State.

For this example, it is assumed that additional mobile source controls will achieve the creditable emissions reductions (at the least cost) necessary to meet the 15 percent requirements, net of growth. The following are three mobile source controls that will be adopted in January 1995 to achieve the additional 895 lb/day of VOC emissions reductions needed for this nonattainment area:

- A basic I/M program in areas that surround the nonattainment area that will result in emissions reductions in the nonattainment area.
- A lowering of the permissible maximum RVP value to 7.8 psi (assume that an RVP of 9.0 psi is required for this area).
- An enhanced I/M program that includes pressure testing of vehicles' evaporative systems.

A basic I/M program will be imposed in areas adjacent to the nonattainment area to control emissions from vehicles that commute into the nonattainment area. States should rely primarily on traffic counts to verify the commuter traffic information for the nonattainment area. Data for this nonattainment area show that more than one-third of all highway VOC emissions released in the nonattainment area result from vehicles registered outside of the nonattainment boundaries. An expansion of I/M program boundaries is projected to reduce VOC emissions by 265 lb/day in 1996. The MOBILE5.0 model demonstrates that a lowering of RVP to 7.8 psi will reduce VOC

emissions by 400 lb/day. In order to achieve the additional 230 lb/day of required VOC emissions reductions, the State decides to implement an enhanced I/M program beginning January of 1995. The particular enhanced I/M program to be adopted includes pressure testing of the evaporative system on 1971 and newer vehicles. This is a program component that goes beyond the basic I/M requirements (note that a basic I/M program is required for moderate areas, enhanced I/M is required for serious and above nonattainment areas). The MOBILE5.0 model projects that additional VOC reductions of 235 lb/day will result in 1996 from the enhanced I/M program. These non-CAAA mandated controls result in an additional VOC emissions reduction of 900 lb/day, which is 5 lb/day more than the additional 895 lb/day of VOC emissions reduction required to meet the 1996 target level of emissions.

Table F-1 presents a suggested format for the presentation of the 15 percent rate-of-progress control strategy. When the 1,555 lb/day of VOC emissions reductions from the CAAA mandated controls are added to the projected emissions reductions for the controls not specifically mandated by the CAAA, total reductions of 2,455 lb/day are expected in 1996, 5 lb/day more than required (see Step 8). Similarly, Table F-2 presents EPA's suggested format for documenting the control measures to be used in an attainment demonstration for moderate nonattainment areas. Note that EKMA modeling for this hypothetical nonattainment area demonstrates that 2,805 lb/day of VOC emissions reductions will be needed for the nonattainment area to attain the ozone NAAQS by 1996. This represents 350 lb/day of VOC emissions reductions in addition to the 2,455 lb/day of VOC emissions reductions associated with the control measures needed to meet the 15 percent VOC emissions reduction requirements, net of growth. This nonattainment area decides that it will opt-in to the Federal reformulated gasoline program and will implement a RE improvement program to obtain the additional emissions reductions.

Table F-2 also contains a column for recording expected NO_x emissions reductions associated with control measures implemented from November 1990 to November 1996. This hypothetical example does not present examples of NO_x control measures and associated emissions reductions for the attainment demonstration. However, it is expected that nonattainment areas will rely on some amount of NO_x emissions reductions in addition to VOC emissions reductions to achieve attainment with the NAAQS. Therefore, States with moderate ozone nonattainment areas should report the NO_x control measures, the implementation date of the control measures, and associated NO_x emissions reductions in their rate-of-progress plans.

TABLE F-1: SUGGESTED FORMAT FOR 15 PERCENT RATE-OF-PROGRESS CONTROL STRATEGY SUMMARY SUBMITTAL

Required 15 percent measures:	795 lb/day
Measures to offset growth:	650 lb/day
Noncreditable measures:	1,005 lb/day
Total reductions required:	2,450 lb/day

Control Measure[13]	Creditable/ Noncreditable	Expected Implementation Date	Expected Emissions Reduction (lb/day)
STATIONARY SOURCE CONTROLS:			
RACT fix-ups	Noncreditable	January 1, 1993	305
RACT catch-ups for Group III CTG and major non-CTG sources	Creditable[14]	January 1, 1995	300
TOTAL STATIONARY			605
MOBILE SOURCE CONTROLS:			
I/M fix-up	Noncreditable	January 1, 1992	200
FMVCP and RVP	Noncreditable	June 1, 1992	500
Stage II	Creditable	July 1, 1994	250
I/M program in adjacent attainment areas	Creditable	January 1, 1995	265
RVP lowered beyond Federal mandate (to 7.8)	Creditable	January 1, 1995	400
Enhanced I/M	Creditable	January 1, 1995	235
TOTAL MOBILE:			1,850
TOTAL			2,455

[13]Italicized controls are in addition to the CAAA requirements for moderate nonattainment areas.

[14]Note that RACT catch-ups for Group III CTG and major non-CTG stationary sources are creditable only where the area was never previously required by EPA (and did not previously choose) to adopt RACT rules for Group III CTG and major non-CTG stationary sources.

TABLE F-2: SUGGESTED FORMAT FOR ATTAINMENT CONTROL STRATEGY SUMMARY SUBMITTAL

Reductions needed to achieve attainment (VOC): 2,805 lb/day
Reductions needed to achieve attainment (NO_x): _____ lb/day

Measures	Implementation Date	Expected VOC Emissions Reductions (lb/day)[15]	Expected NO_x Emissions Reductions (lb/day)
STATIONARY SOURCES			
RACT fix-ups	January 1, 1993	305	
CTG/non-CTG RACT catch-ups	January 1, 1995	300	
Rule effectiveness improvements	January 1, 1995	100	
TOTAL STATIONARY		705	
MOBILE SOURCES:			
I/M fix-up	January 1, 1992	200	
FMVCP and RVP	June 1, 1992	500	
Stage II	July 1, 1994	250	
I/M program in adjacent attainment areas	January 1, 1995	265	
RVP lowered beyond Federal mandate (to 7.8)	January 1, 1995	400	
Enhanced I/M	January 1, 1995	235	
Reformulated gasoline (opt-in)	January 1, 1996	250	
TOTAL MOBILE		2,100	
TOTAL		2,805	

[15]The VOC emissions reductions shown in this column are those associated with the control measures implemented in the nonattainment area. If the nonattainment area's modeling domain is larger than its nonattainment area, the VOC emissions reductions may be higher if the control measures affect sources that are located in the modeling domain outside of the nonattainment area.

States must include contingency measures in their rate-of-progress plans that will achieve emissions reductions equivalent to 3 percent per year, calculated from the 1990 adjusted base year inventory. Table F-3 presents a suggested format for the State's contingency measure submittal. This submittal must identify both the absolute and the percentage (i.e., the percentage reduction from the 1990 adjusted base year inventory) emissions reduction projected for each contingency measure, as well as the order in which the contingency measures would be implemented upon a milestone or attainment failure. The total percentage of emissions reduction that a nonattainment area must plan for depends on the expected length of their SIP revision process. In the hypothetical example presented in Table F-3, it is assumed that the State requires 2 years to complete the legislative process and submit a SIP revision. Therefore, contingency measures summing to at least 6 percent of the 1990 adjusted base year inventory are required as part of the contingency measure submittal for this nonattainment area. Section 9 of this document provides further discussion of the contingency measure requirements for each ozone nonattainment area classification.

Table F-4 presents a suggested format for States to use in summarizing emissions reductions for the 15 percent requirements and the attainment demonstration in their rate-of-progress plans. The first two columns in Table F-4 summarize both the total 1996 precontrolled emissions for VOC and NO_x (i.e., the 1990 base year inventory for VOC and NO_x projected out to 1996) as well as the total VOC emissions reductions in 1996 for the attainment demonstration. The last column in Table F-4 represents the proportion of the total VOC emissions associated with achieving the 15 percent VOC emissions reduction requirements, net of growth. For example, the value in the 1996 emissions (pre-new controls) cell represents the 1990 rate-of-progress base year inventory projected out to 1996. Similarly, the value in the 1996 total emissions reductions cell (2,455 lb/day) represents the proportion of the total VOC emissions reductions for the nonattainment area applied to the 15 percent rate-of-progress requirement (see Step 8). Finally, Tables F-5, F-6, and F-7 present suggested formats for documenting RE improvements, stationary source control measures for the rate-of-progress plan, and stationary source control measures for the attainment demonstration, respectively.

Example 2: <u>Existing Nonattainment Area with Newly Designated Portions</u>

For this example, it is assumed that the nonattainment area existed prior to enactment of the CAAA and was classified as a moderate nonattainment area upon enactment of the CAAA. When it was classified as a moderate area, its nonattainment boundaries were expanded to include new areas which were not previously

TABLE F-3: SUGGESTED FORMAT FOR CONTINGENCY MEASURE SUBMITTAL

1990 adjusted base year inventory: 5,300 lb/day

IMPLEMENTATION ORDER	DESCRIPTION OF CONTROL MEASURE	EXPECTED VOC EMISSIONS REDUCTIONS (lb/day)	EMISSIONS REDUCTION AS A PERCENTAGE OF THE 1990 VOC ADJUSTED BASE YEAR INVENTORY
1	High occupancy vehicle lanes (TCM)	15	0.28
2	Major stationary source emissions threshold for RACT lowered to 50 tpy	125	2.36
3	Reformulated gasoline	200	3.77
	TOTAL	340	6.41

TABLE F-4: SUMMARY OF EMISSIONS REDUCTIONS FOR THE 15 PERCENT RATE-OF-PROGRESS PLAN AND THE ATTAINMENT DEMONSTRATION

YEAR/TYPE	TOTAL VOC EMISSIONS (lb/day)	TOTAL NO_x EMISSIONS (lb/day)	VOC EMISSIONS FOR THE 15 PERCENT REQUIREMENT (lb/day)
1996 Emissions (pre-new controls)	13,000[16]	--[17]	6,450[18]
1996 Total emissions reductions	2,805[19]	--[17]	2,455[20]
1996 Post-controlled emissions	10,195	--[17]	3,995

[16]Total emissions in 1996 for the attainment demonstration modeling domain.

[17]Appropriate emissions values would be inserted here to account for the effects of growth, and the effects of emissions reductions associated with NO_x RACT rules and other control measures. They were omitted from this table because they did not contribute to the purpose of this illustration.

[18]Total emissions in 1996 for the nonattainment area excluding biogenic emissions and emissions from anthropogenic sources located in the modeling domain outside of the nonattainment area.

[19]Total emissions reductions in 1996 for the attainment demonstration modeling domain.

[20]Total emissions reductions to meet the 1996 target level of emissions, including those required to offset growth.

TABLE F-5: SUGGESTED FORMAT FOR SUBMITTAL OF RULE EFFECTIVENESS (RE) IMPROVEMENT MEASURES

RE IMPROVEMENT MEASURE	1990 RE (percent)	NEW RE (percent)	IMPLEMENTATION DATE	EXPECTED EMISSIONS REDUCTIONS (lb/day)
			TOTAL:	

TABLE F-6: SUGGESTED FORMAT FOR SUBMITTAL OF STATIONARY SOURCE CONTROL MEASURES FOR THE 15 PERCENT RATE-OF-PROGRESS PLAN

CONTROL MEASURE	IMPLEMENTATION DATE	1990 CONTROL EFFICIENCY (percent)	NEW CONTROL EFFICIENCY (percent)	EXPECTED EMISSIONS REDUCTIONS (lb/day)
			TOTAL:	

TABLE F-7: SUGGESTED FORMAT FOR SUBMITTAL OF STATIONARY SOURCE CONTROL MEASURES FOR THE ATTAINMENT DEMONSTRATION

CONTROL MEASURE	IMPLEMENTATION DATE	1990 CONTROL EFFICIENCY (percent)	NEW CONTROL EFFICIENCY (percent)	EXPECTED EMISSIONS REDUCTIONS (lb/day)
			TOTAL:	

classified as nonattainment. For the original portion of the nonattainment area, it is assumed that prior to enactment of the CAAA, the nonattainment area was required to have RACT rules for the Group I and II CTG source categories but was not required (and did not previously choose) to have RACT rules for the Group III CTG source categories and for major non-CTG stationary sources. It is also assumed that the nonattainment area had implemented an I/M program before enactment of the CAAA. However, its RACT rules and I/M program contain deficiencies which must be corrected to comply with EPA policies and regulations. For the newly designated portion of the nonattainment area, it is assumed that the nonattainment area was not required (and did not previously choose) to have RACT rules or an I/M program.

For the original portion of the nonattainment area, the area would be required to prepare RACT rule fix-ups for the Group I and II CTG source categories, and prepare corrections to its I/M program to meet EPA's requirements for a basic I/M program. Emissions reductions associated with RACT rule fix-ups and I/M program corrections in the original nonattainment area are not creditable toward the 15 percent VOC emissions reduction requirements. However, the area would be required to implement RACT rules for the Groups I and II CTG source categories and the basic I/M program to the newly designated portion of the nonattainment area. Emissions reductions associated with the RACT rules and basic I/M program in the newly designated portion are creditable toward the 15 percent requirements.

For the entire nonattainment area, the area would be required to implement a Stage II vapor recovery program and RACT rules for the Group III CTG source categories and for major non-CTG stationary sources. All VOC emissions reductions resulting from implementing a Stage II vapor recovery program and the RACT rules are creditable toward the 15 percent requirements. If implementation of these programs does not achieve the necessary emissions reduction required for the nonattainment area to meet either the 15 percent requirements or to achieve attainment of the ozone NAAQS, the nonattainment area would have to adopt additional control measures to achieve the necessary emissions reductions.

States have discretion in deciding on the additional control measures to adopt for each particular nonattainment area. For example, a State may prefer a control measure other than the RVP program described in Example 1 to achieve the necessary emissions reductions. For an attainment demonstration, a State may adopt control measures to control NO_x emissions if it relies on NO_x emissions reductions to demonstrate attainment. Ultimately, the control strategy for the nonattainment area must provide for a 15 percent VOC emissions reduction calculated from the adjusted base year emissions inventory, offset emissions growth from

November 1990 through November 1996, as well as achieve any additional emissions reductions in VOC and/or NO_x to demonstrate attainment by November 15, 1996. The State must also include contingency measures in its rate-or-progress plan, and must show that the emissions reductions associated with each control measure are real, permanent, and enforceable.

Example 3: Newly Designated Nonattainment Area

For this example, it is assumed that an attainment area was classified as a moderate nonattainment area upon the enactment of the CAAA. It is also assumed that the area never adopted (and did not previously choose to adopt) RACT rules or an I/M program prior to enactment of the CAAA. Therefore, there would be no noncreditable emissions reductions associated with RACT fix-ups and I/M program corrections for the nonattainment area.

The nonattainment area would be required to implement a basic I/M program; a Stage II vapor recovery program; and RACT rules for Groups I, II, and III CTG source categories and major non-CTG stationary sources. All VOC emissions reductions associated with implementing a basic I/M program, a Stage II vapor recovery program, and RACT rules in the new nonattainment area are creditable toward the 15 percent VOC emissions reduction requirements. If implementation of these programs does not achieve the necessary emissions reduction required for the nonattainment area to meet the 15 percent requirements or to achieve attainment of the ozone NAAQS, the nonattainment area would have to adopt additional control measures to achieve the necessary emissions reductions.

The new nonattainment area has discretion in deciding on the additional control measures that it would adopt and implement to achieve a 15 percent VOC emissions reduction, offset emissions growth from November 1990 through November 1996, and demonstrate attainment by November 15, 1996. For its attainment demonstration, it may adopt control measures to control NO_x emissions if it relies on NO_x emissions reductions to demonstrate attainment. The nonattainment area must include contingency measures in its rate-of-progress plan, and must show that the emissions reductions associated with each control measure are real, permanent, and enforceable.

Example 4: Multi-State Nonattainment Area

This example consists of two or more States that constitute an existing moderate multi-State nonattainment area. In addition to the requirements for a moderate area without boundary or size changes, each State in a multi-State nonattainment area must also do the following:

- Take all reasonable steps with all other States in the multi-State nonattainment area to coordinate the implementation of the required revisions to SIP's for the nonattainment area. Note, however, that each State in the multi-State nonattainment area must include control measures in its rate-of-progress plan to achieve a 15 percent VOC emissions reduction, net of growth, from its 1990 adjusted base year inventory.

- Develop and submit to EPA, pursuant to section 182(j)(1)(A) of the Act, a joint work plan which must include (among other things) a schedule for implementing control measures to achieve the 15 percent VOC emissions reduction requirements, net of growth.

- Use photochemical grid modeling or other equally effective analytical method approved by EPA to demonstrate attainment. Multi-State nonattainment areas will need to include their attainment demonstrations in their post-1996 rate-of-progress plans, which must be submitted to EPA by November 15, 1994.

Also, if one or more States within a multi-State ozone nonattainment area fails to provide an attainment demonstration for that State's portion of the area, the other State(s) are allowed by section 182(j)(2) to petition EPA to determine whether they could have demonstrated attainment but for the failure of the other State(s) in the area to adequately implement the required control measures under section 182 for the given area. If EPA finds that this scenario has taken place, then the sanctions mandated under section 179 will not apply to any State whose failure to make an adequate attainment demonstration was due to failure by other States to implement section 182 control measures.

Finally, additional requirements are imposed for multi-State nonattainment areas designated as part of an ozone transport region. For example, enhanced I/M is required for all areas that are located in an ozone transport region that have a metropolitan statistical area with population of 100,000 or more. All ozone transport region requirements are listed in section 184 of the Act and are discussed in the General Preamble for implementation of Title I of the CAAA of 1990 (57 FR 13498).

It is imperative that all States within a given multi-State nonattainment area coordinate activities related to the inventory, emissions projection, photochemical grid modeling, and control strategy development processes.

Example 5: Serious Nonattainment Area with a Major Stationary Source Emissions Cut-off Lowered from 100 tpy to 50 tpy

For this example, it is assumed that the nonattainment area existed prior to enactment of the CAAA and was classified as a serious nonattainment area upon enactment of the CAAA. Its boundaries before and after enactment of the CAAA did not change. However, section 182(c) of the Act lowered its major stationary source emissions cut-off from 100 tpy to 50 tpy.

The following steps show the calculation of the target level of emissions and total emissions reductions for 1996 for the serious nonattainment area's rate-of-progress plan.

Step 1: Develop 1990 base year inventory
(includes all emissions within the UAM modeling domain)

Final 1990 Base Year VOC Emissions Inventory (lb/day)

Point Sources	1,100
Area Sources	3,000
Mobile Sources	4,500
Biogenic Sources	+ 4,000
Total	12,600

Step 2: Develop 1990 rate-of-progress base year for nonattainment area (NA)

1990 Rate-of-Progress Base Year Inventory (lb/day)

Point Sources (-100 from outside NA)	1,000
Area Sources (-500 from outside NA)	2,500
Mobile Sources (-1,000 outside NA)	+ 3,500
Total	7,000

Step 3: Develop adjusted base year inventory

1990 Adjusted Base Year Inventory (lb/day)

Point Sources	1,000
Area Sources	2,500
Mobile Sources (minus expected FMVCP and RVP reductions)	3,000
Total	6,500

Step 4: Calculate required (15 percent) creditable reductions

15 percent = 6,500 x 0.15 = 975 lb/day

Step 5: Calculate total reductions

Total Reductions from 1990 Rate-of-Progress Base Year Inventory (lb/day)

Required 15 percent	975
Expected Reductions from FMVCP and RVP (1990-1996)	500
Corrections to RACT Rules	65
Corrections to I/M Programs	+ 100
Total	1,640

Step 6: Set target level for 1996

Target level = Step 2 - Step 5
= 1990 Rate-of-Progress Base Year Inventory for Nonattainment Area - Total Reductions
= 7,000 lb/day - 1,640 lb/day
= 5,360 lb/day

Step 7: Project emissions growth for the 1990-1996 period

1990-1996 Projected Emissions Growth (lb/day)

Point Sources	200
Area Sources	300
Mobile Sources	+ 900
Total	1,400

Step 8: Add emissions growth to other required reductions for planning purposes (includes offsetting emissions growth)

Required Additional Emissions Reduction in 1996 (lb/day)

Required 15 percent	975
Expected Reductions from FMVCP and RVP (1990-1996)	500
Corrections to RACT Rules (noncreditable)	65
Corrections to I/M Programs (noncreditable)	100
Reduction to offset anticipated emissions growth (1990-1996) based on projections	-1,400
Total	240

The 1996 emissions reductions expected from the controls required by section 182(c) of the Act are not projected to result in a 15 percent VOC emissions reduction, net of growth. After weighing all of its control options, the State decides to implement the following controls:

- A major stationary source emissions cut-off for RACT of 25 tpy.
- Basic I/M program in areas surrounding the nonattainment area that will result in emissions reductions in the nonattainment area.
- Transportation control measures (specifically, improved public transit and high occupancy vehicle lanes).
- Reformulated gasoline.

The VOC emissions reductions expected from each of these control measures are presented in Table F-8. Reductions of VOC emissions totaling 2,485 lb/day are projected from the CAAA mandated controls; another 690 lb/day of VOC emissions reductions are expected from control measures that are not specifically mandated by the CAAA. When the emissions reductions from both the CAAA mandated and the discretionary controls are summed, 3,175 lb/day of VOC emissions reductions are expected -- 135 lb/day more than are required (see Step 8). Because serious and above ozone nonattainment areas will submit their attainment demonstrations with the post-1996 rate-of-progress plan due by November 15, 1994, these areas will not need to submit attainment demonstration information with the 15 percent rate-of-progress plan. The EPA is currently developing guidance on the attainment demonstration and other components of the post-1996 rate-of-progress plan.

Table F-9 provides the suggested format for the required contingency measure submittal for this example nonattainment area, which is also due with the 15 percent rate-of-progress plan. All ozone nonattainment areas must include contingency measures in their plan that provide emissions reductions of 3 percent per year from their 1990 adjusted base year inventory. The total amount of reductions to be included in the contingency measure submittal depends on the expected length of the State's SIP revision process. For the example presented in Table F-9, it is assumed that the State will be able to revise its SIP within 1 year of a finding of a milestone failure; therefore, the contingency measures provide for a 3 percent emissions reduction from the 1990 adjusted base year inventory.

TABLE F-8: SERIOUS NONATTAINMENT AREA EXAMPLE FOR 15 PERCENT RATE-OF-PROGRESS CONTROL STRATEGY SUMMARY SUBMITTAL

Required 15 percent measures:	975 lb/day
Measures to offset growth:	1,400 lb/day
Noncreditable measures:	665 lb/day
Total reductions required:	3,040 lb/day

Control Measure[21]	Creditable/ Noncreditable	Expected Implementation Date	Expected Emissions Reductions (lb/day)
STATIONARY SOURCE CONTROLS:			
RACT fix-up	Noncreditable	January 1, 1993	65
Enhanced source monitoring (RE)	Creditable	January 1, 1994	150
RACT Catch-ups for Group III CTG and major non-CTG sources	Creditable[22]	January 1, 1995	200
Lowered RACT limit (to 25 tpy)	Creditable	January 1, 1995	220
TOTAL STATIONARY			635
MOBILE SOURCE CONTROLS:			
I/M fix-up	Noncreditable	January 1, 1992	100
FMVCP and RVP	Noncreditable	June 1, 1992	500
Stage II	Creditable	July 1, 1994	370
Enhanced I/M	Creditable	January 1, 1995	1,100
I/M program in adjacent attainment areas	Creditable	January 1, 1995	100
TCM's:			60
(1)Improved public transit	Creditable	January 1, 1995	50
(2)High occupancy vehicle lanes	Creditable	January 1, 1996	10
Reformulated gasoline	Creditable	January 1, 1996	31
TOTAL MOBILE:			2,540
TOTAL			3,175

[21]Italicized controls are in addition to the CAAA requirements for serious nonattainment areas.

[22]Note that RACT catch-ups for Group III CTG and major non-CTG stationary sources are creditable only where the area was never previously required by EPA (and did not previously choose) to adopt Group III CTG and major non-CTG RACT rules.

TABLE F-9: SUGGESTED FORMAT FOR CONTINGENCY MEASURE SUBMITTAL

1990 adjusted base year inventory: 6,500 lb/day

IMPLEMENTATION ORDER	DESCRIPTION OF CONTROL MEASURE	EXPECTED VOC EMISSIONS REDUCTION (lb/day)	EMISSIONS REDUCTION AS A PERCENTAGE OF 1990 VOC ADJUSTED BASE YEAR INVENTORY
1	Major stationary source emissions threshold for RACT lowered to 15 tpy	125	1.92
2	Employer trip reduction program	100	1.54
	TOTAL	225	3.46

15 PERCENT RATE-OF-PROGRESS CONTROL STRATEGY SUMMARY SUBMITTAL

Required 15 percent measures:	_____	lb/day
Required measures to offset growth:	_____	lb/day
Noncreditable measures:		lb/day
Total reductions required:	_____	lb/day

Control Measure	Creditable/ Noncreditable	Expected Implementation Date	Expected Emissions Reductions (lb/day)
STATIONARY SOURCE CONTROLS:			
TOTAL STATIONARY			
MOBILE SOURCE CONTROLS:			
TOTAL MOBILE:			
TOTAL			

CONTINGENCY MEASURE SUBMITTAL

1990 adjusted base year inventory: _____ lb/day

IMPLEMENTATION ORDER	DESCRIPTION OF CONTROL MEASURE	EXPECTED VOC EMISSIONS REDUCTION (lb/day)	EMISSIONS REDUCTIONS AS A PERCENTAGE OF 1990 VOC ADJUSTED BASE YEAR INVENTORY
	TOTAL		

ATTAINMENT DEMONSTRATION CONTROL STRATEGY SUMMARY SUBMITTAL

Reductions needed to achieve attainment (VOC): _____ lb/day
Reductions needed to achieve attainment (NO_x): _____ lb/day

Measures	Implementation Date	Expected VOC Emissions Reductions (lb/day)	Expected NO_x Emissions Reductions (lb/day)
STATIONARY SOURCES TOTAL STATIONARY			
MOBILE SOURCES: TOTAL MOBILE			
TOTAL			

SUMMARY OF EMISSIONS REDUCTIONS FOR THE 15 PERCENT RATE-OF-PROGRESS PLAN AND THE ATTAINMENT DEMONSTRATION

YEAR/TYPE	TOTAL VOC EMISSIONS (lb/day)[23]	TOTAL NO_x EMISSIONS (lb/day)	VOC EMISSIONS FOR THE 15 PERCENT REQUIREMENT (lb/day)

[23]This represents total emissions for the attainment demonstration modeling domain.

RULE EFFECTIVENESS (RE) IMPROVEMENT MEASURES

MEASURE	1990 RE (percent)	NEW RE (percent)	IMPLEMENTATION DATE	EMISSIONS REDUCTIONS (lb/day)
			TOTAL:	

STATIONARY SOURCE CONTROL MEASURES FOR THE 15 PERCENT RATE-OF-PROGRESS PLAN

MEASURE	IMPLEMENTATION DATE	1990 CONTROL EFFICIENCY (percent)	NEW CONTROL EFFICIENCY (percent)	EXPECTED EMISSIONS REDUCTIONS (lb/day)
			TOTAL:	

STATIONARY SOURCE CONTROL MEASURES FOR THE ATTAINMENT DEMONSTRATION

MEASURE	IMPLEMENTATION DATE	1990 CONTROL EFFICIENCY (percent)	NEW CONTROL EFFICIENCY (percent)	EXPECTED EMISSIONS REDUCTIONS (lb/day)
			TOTAL:	

APPENDIX G: CHECKLISTS

The review questions in this checklist are stated in a way such that an affirmative answer to a yes-or-no question requires no further action or comment on behalf of the reviewer. A negative response does not necessarily invalidate the plan but usually will require an explanation by the State or, occasionally, will require a SIP revision.

A separate document entitled, Quality Review Guidelines for 1990 Base Year Emission Inventories has been prepared to assist in the development and review of the 1990 base year emissions inventory.[24]

These checklists are designed to assist States and also to assist EPA in reviewing SIP's for completeness. States should not assume that these checklists are all-inclusive, however.

Reviewing Procedures

This section describes the steps taken by State agencies and Regional Offices for the review of rate-of-progress plans. The completeness criteria established for SIP's (56 FR 42216, August 26, 1991) and the time frames allotted for revisions to the plans are outlined. The basic requirements for SIP's can be found in 40 CFR 51 Requirements for Preparation, Adoption, and Submittal of Implementation Plans. Technical requirements for rate-of-progress plans are contained within this document.

State Agencies

Plan Preparation. State agencies have the responsibility of compiling the rate-of-progress plan and to ensure that the plans meet the minimum completeness criteria (40 CFR 51, Appendix V). Once a plan has been adopted by a State, five copies of the plan shall be submitted by the Governor (or his/her designee) to the Regional Office of the EPA for review.

Draft Plans. A State may submit a draft copy of the rate-of-progress plan to EPA for comments prior to the November 15, 1993 deadline. The EPA will not consider submission of requests for parallel processing of draft plans as official plans in order to meet statutory deadlines. There is currently a parallel processing exception in the completeness criteria which permits submittal of draft plans in order for EPA to expedite the review

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[24]Quality Review Guidelines for 1990 Base Year Emission Inventories, EPA-454/R-92-007 (Revises EPA-450/4-91-022), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. August 1992.

process. The EPA interprets the Act as requiring rules that are acceptable under the approval options of 110(k), however.

The EPA is presently amending the completeness criteria to remove the exception for parallel processing and to add an exception for the submission of commitments as allowed under 110(k)(4).

Regional Offices

Completeness Review. The first step in the review process for Regional Offices will be to determine if the rate-of-progress plan meets the completeness criteria found in 40 CFR Part 51, Appendix V. The completeness criteria require that within 60 days of EPA's receipt of a plan or plan revision, but not later than 6 months after the date by which a State was required to submit the plan or plan revision, the EPA shall determine whether the completeness criteria have been met. If EPA has not made a completeness determination by 6 months after receipt of the submission, that submission shall on that date be considered to meet the minimum completeness criteria. The completeness criteria require that EPA inform the submitting official by letter if the plan meets the requirements of Appendix V. If a submittal is deemed incomplete, EPA shall return the submittal to the State, requesting corrective action and identifying the components absent or insufficient to perform a review.

ADJUSTED BASE YEAR INVENTORY AND 1996 TARGET

1. Was the MOBILE5.0 model used to estimate the expected emissions reductions from FMVCP and RVP?
   __Yes __No
   Comments: _____

2. Does the plan include information on how the MOBILE5.0 model was run to calculate the expected emissions reductions from FMVCP and RVP?
   __Yes __No
   Comments: _____

3. Does the adjusted base year emissions inventory include only emissions emanating from within the designated nonattainment area boundaries?
   __Yes __No
   Comments: _____

4. Does the adjusted base year emissions inventory exclude noncreditable emissions reductions from FMVCP and RVP?
   __Yes __No
   Comments: _____

5. Is the required 15 percent VOC emissions reduction calculated from the adjusted base year emissions inventory?
   __Yes __No
   Comments: _____

6. Are the expected emissions reductions associated with RACT rule fix-ups quantified as discussed in the guidance?
   __Yes __No
   Comments: _____

7. Are the expected emissions reductions associated with I/M program corrections quantified as discussed in the guidance?
   __Yes __No
   Comments: _____

8. Are noncreditable emissions reductions from FMVCP, RVP, RACT rule fix-ups, and I/M program corrections summed and subtracted from the 1990 rate-of-progress base year emissions inventory to calculate the 1996 target level of emissions?

__Yes __No

Comments: _____

_____

CONTROL MEASURES AND CONTROL STRATEGIES

1. Does the plan describe the control measures to be implemented?
__Yes __No
Comments: _____

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2. Are all CAAA-required control measures included in the plan?

Stationary Source Controls:

Marginal and above ozone nonattainment areas:

a) RACT rule fix-ups (for those areas with RACT rule deficiencies): __Yes __No

b) Major stationary source emissions threshold of 100 tpy: __Yes __No

c) New source review offset ratio of 1.1 to 1: __Yes __No

Moderate and above ozone nonattainment areas:

a) RACT rule catch-ups: __Yes __No

b) Major stationary source emissions threshold of 100 tpy: __Yes __No

c) New source review offset ratio of 1.15 to 1: __Yes __No

Serious ozone nonattainment areas:

a) Major stationary source emissions threshold of 50 tpy: __Yes __No

b) New source review offset ratio of 1.2 to 1: __Yes __No

Severe ozone nonattainment areas:

a) Major stationary source emissions threshold of 25 tpy: __Yes __No

b) New source review offset ratio of 1.3 to 1: __Yes __No

Extreme ozone nonattainment areas:

a) Major stationary source emissions threshold of 10 tpy: __Yes __No

b) New source review offset ratio of 1.5 to 1: __Yes __No

Ozone transport region:

a) Major stationary source emissions threshold of 50 tpy for VOC; 100 tpy for NO_x: __Yes __No

b) New source review offset ratio of 1.15 to 1: __Yes __No

c) Additional requirements deemed by the transport commission as appropriate: __Yes __No

Comments: _____

<u>Mobile Source Controls</u>

Marginal and above ozone nonattainment areas:

a) I/M program corrections (for those areas with I/M program deficiencies): __Yes __No

b) FMVCP and RVP program: __Yes __No

Moderate ozone nonattainment areas:

a) Basic I/M program: __Yes __No

b) Stage II vapor recovery program: __Yes __No

Serious and above ozone nonattainment areas:

a) Stage II vapor recovery program: __Yes __No

b) Enhanced I/M program: __Yes __No

c) Clean fuel fleet vehicle program: __Yes __No

d) TCM's: __Yes __No

e) VMT demonstration: __Yes __No

Severe and above ozone nonattainment areas:

a) Measures to offset VMT growth: __Yes __No

b) Submit employer trip reduction program:
__Yes __No

Ozone transport region:

a) Enhanced I/M program for any metropolitan statistical area with a population of 100,000 or more:
__Yes __No

b) Adopt Stage II vapor recovery program or control measures identified as achieving equivalent reductions:
__Yes __No

Comments: _____

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3. Does the plan present a control strategy implementation schedule?
__Yes __No
Comments: _____

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4. Will all control measures that are specified in the rate-of-progress plan be implemented by 1996?
__Yes __No
Comments: _____

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5. Is the implementation schedule consistent with the CAAA requirements?
__Yes __No
Comments: _____

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6. Is the agency that will have enforcement authority specified for each control measure identified?
__Yes __No
Comments: _____

---

7. Does the plan describe the methods used to calculate the emissions reductions attributed to each control measure? At a minimum, the methods should adhere to the four principles described in the General Preamble (57 FR 13567) for documenting emissions reductions. The four principles are as follows: (1) baseline emissions from the source and the control measures must be quantifiable, (2) control measures must be enforceable, (3) interpretation of the control measures must be replicable, and (4) control measures must be accountable. See the General Preamble for further discussion of these principles.
__Yes __No
Comments: _____

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8. Are all major non-CTG stationary sources identified?
__Yes __No
Comments: _____

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9. Does the plan include RACT rules for major stationary VOC sources for which CTG documents are not available?
__Yes __No
Comments: _____

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10. Is the 80 percent default RE value factored into the calculation of expected emissions reductions associated with new control measures?
__Yes __No

If no, are the RE values that were used calculated using EPA-approved procedures?
__Yes __No
Comments: _____

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11. In estimating expected emissions reductions associated with new control measures, is the compliance period factored into the calculation consistent with EPA guidance?
__Yes __No
Comments: _____

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12. Is the EPA guidance followed in calculating the expected emissions reductions from RE improvements?
__Yes __No
Comments: _____

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15 PERCENT VOC EMISSIONS REDUCTION DEMONSTRATION

1. Does the plan demonstrate that it will achieve a 15 percent reduction in VOC emissions calculated from the 1990 adjusted base year emissions inventory?
   __Yes __No
   Comments: _____

2. Does the plan include a summary of projected VOC emissions levels for 1996?
   __Yes __No
   Comments: _____

3. Is the EPA guidance followed in calculating projected emissions?
   __Yes __No
   Comments: _____

4. Does the control strategy contain the necessary control measures to achieve the 1996 target level of emissions (i.e., does the overall control strategy provide for the required 15 percent VOC emissions reductions, provide for the noncreditable emissions reductions, and fully offset growth from November 1990 to November 1996)?
   __Yes __No
   Comments: _____

5. Does the State follow the rate-of-progress plan guidance in showing how the 15 percent VOC emissions reductions, net of growth, will be achieved?
   __Yes __No
   Comments: _____

6. If a State plans to use preenactment banked emissions reduction credits in the 1990 to 1996 period, are the use of such banked emissions reduction credits considered as growth in the rate-of-progress plan?
   __Yes __No
   Comments: _____

STATE IMPLEMENTATION PLAN ATTAINMENT DEMONSTRATION CHECKLIST FOR MODERATE AREAS USING EKMA

1. Was an approved modeling protocol completed and delivered to EPA prior to use of the model?
__Yes __No
Comments: _____

2. Are attainment year emissions estimates projected from an EPA approved 1990 base year inventory?
__Yes __No
Comments: _____

3. Were allowable emissions used as the basis for future year projections?
__Yes __No
Comments: _____

4. Is the MOBILE5.0 model used for projecting mobile source emissions?
__Yes __No
Comments: _____

5. Have all MOBILE5.0 model inputs for the projection emissions inventory been incorporated?
__Yes __No
Comments: _____

6. Have the following MOBILE5.0 model inputs been considered:

Tailpipe and extended useful life standards	__Yes	__No
Evaporative/running loss controls	__Yes	__No
RVP limits	__Yes	__No
Stage II vapor recovery program	__Yes	__No
Reformulated gasoline program	__Yes	__No
Basic I/M program	__Yes	__No
Enhanced I/M program	__Yes	__No
Other measures (e.g., California's LEV program)	__Yes	__No

Comments: _____

7. Was modeling used to estimate the level of control (including the level of control required to fully offset growth) needed to attain the NAAQS?
__Yes __No
Comments: _____

8. Were emissions data preprocessed in accordance with EPA guidelines specified in the document entitled Guideline for Use of City-Specific EKMA in Preparing Ozone SIP's?[25]
__Yes __No
Comments: _____

9. Were the VOC/NO_x ratios based on valid measurements conducted during 1987 to 1989? If not, what was used?
__Yes __No
Comments: _____

10. Were aloft boundary conditions derived from regional oxidant modeling (ROM) in accordance with the document entitled Guideline for Using EKMA Interface?[26] If not, how were aloft conditions derived?
__Yes __No
Comments: _____

11. Was the default VOC speciation profile used? If not, what was the basis assumed for the VOC speciation profile?
__Yes __No
Comments: _____

12. Was a modeling demonstration package prepared containing the required information as documented in EPA guidance?
__Yes __No
Comments: _____

[25]Guideline for Use of City-Specific EKMA in Preparing Ozone SIP's, EPA-450/4-80-027, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1980.

[26]Guideline for Using EKMA Interface, EPA-450/4-92-009, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. May 1992.

MILESTONE AND ATTAINMENT FAILURE CONTINGENCY MEASURES

1. Does the rate-of-progress plan include contingency measures that will achieve an equivalent 3 percent per year VOC emissions reduction in addition to the scheduled emissions reductions?
   __Yes __No
   Comments: _____

2. Will the contingency measures be automatically implemented in the event of a milestone or attainment failure (i.e., does the plan ensure that contingency measures will be implemented with no additional rulemaking actions such as public hearings or legislative review by the State)?
   __Yes __No
   Comments: _____

3. Do the contingency measures meet the minimum requirements for control measures set forth in the General Preamble (57 FR 13511 and 13520)?
   __Yes __No
   Comments: _____

APPENDIX H: MILESTONE AND ATTAINMENT FAILURES FOR MARGINAL AND MODERATE OZONE NONATTAINMENT AREAS

This appendix presents an overview of the implications of milestone and attainment failures for marginal and moderate ozone nonattainment areas. The discussion is a preliminary description of the anticipated process following a finding of milestone or attainment failure.

Marginal Areas

Figure H-1 provides an overview of the marginal area attainment process.

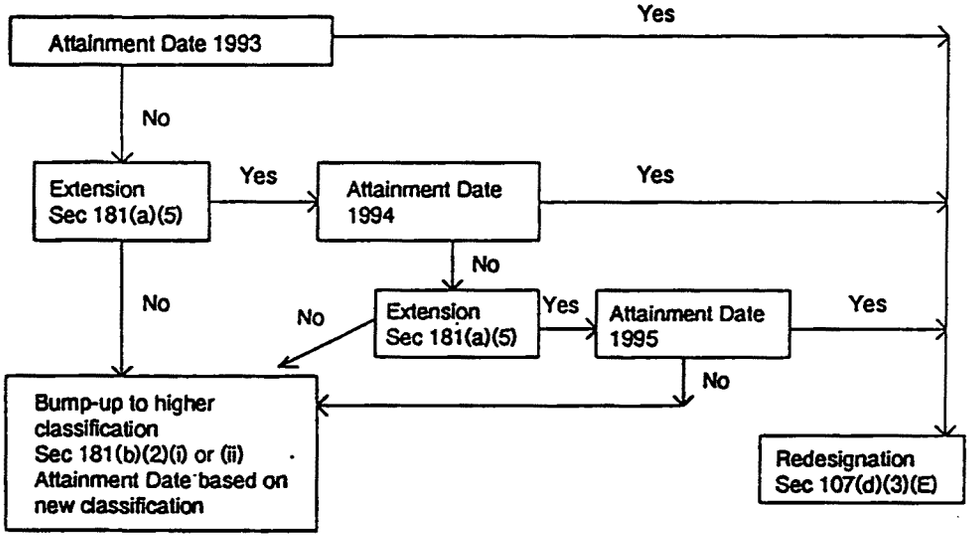

Figure H-1. Marginal area attainment process flowchart.

Marginal areas are required to attain the ozone NAAQS by November 15, 1993, unless they apply for and receive at least one of the two available 1-year attainment date extensions under section 181(a)(5). Marginal areas are exempt from the milestone demonstrations [section 182(g)(1)], and consequently will not be subject to any milestone failure requirements. Under section 181(b)(2), marginal areas that fail to attain the ozone NAAQS by their attainment date (or, if applicable, extended attainment date) will be bumped-up to a higher classification.

Moderate Areas

Figure H-2 provides an overview of the moderate area attainment process.

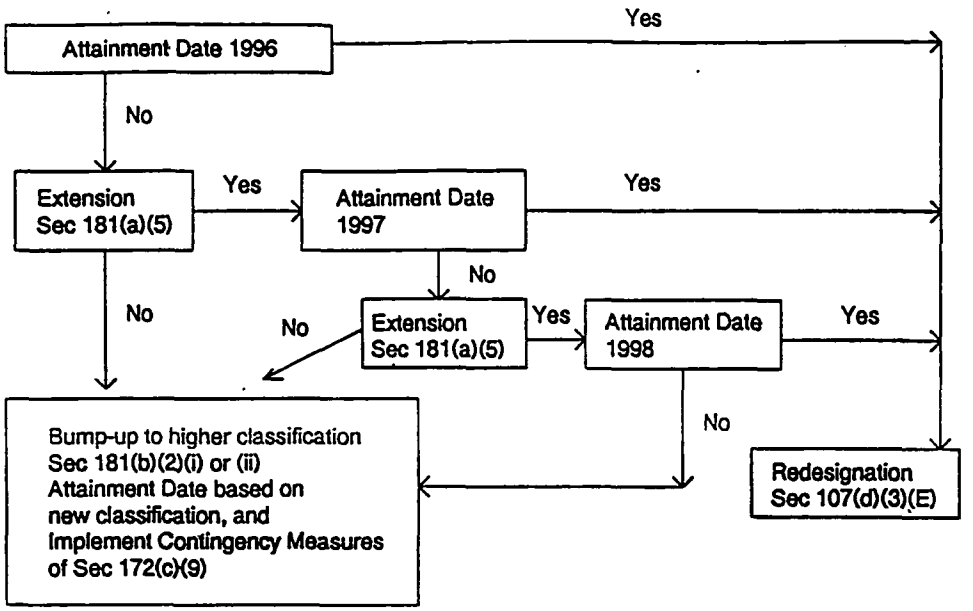

Figure H-2. Moderate area attainment process flowchart.

Moderate areas are required to attain the ozone NAAQS by November 15, 1996, unless they apply for and receive at least one of the two available 1-year attainment date extensions under section 181(a)(5). Moderate areas are exempt from the milestone demonstrations [section 182(g)(1)], and consequently will not be subject to any milestone failure requirements.

As with marginal areas, section 181(b)(2) specifies that moderate areas that fail to attain the ozone NAAQS by their attainment date (or, if applicable, extended attainment date) will be bumped-up to a higher classification. In addition, moderate areas must implement the contingency measures contained in their SIP as required by section 172(c)(9).

Bump-up Requirements

The EPA classifies nonattainment areas for ozone based on the area's calculated design value. These classifications range from marginal to extreme, depending on the severity of nonattainment. The CAAA specify the dates by which each area with a particular nonattainment classification must attain the ozone NAAQS. Within 6 months after the applicable attainment date, the EPA must determine whether an area has succeeded in achieving the required standard. This "attainment determination" will employ the most recent air quality data that has been subject to quality assurance review, covering the preceding 3 years including the attainment date. In the case of ozone, the average number of ozone exceedances per year, after adjustment for missing data, shall be used to determine whether an area has attained the ozone NAAQS.

Under section 181(a)(5) of the Act, a State may apply for a 1-year extension of a nonattainment area's attainment date; up to two 1-year extensions may be awarded. This request can be granted if the State has complied with all requirements and commitments pertaining to the area in the applicable SIP, and no more than one exceedance of the ozone NAAQS has occurred in the area in the year preceding the extension year.

According to section 181(b)(2) of the Act, failure of a marginal, moderate, or serious nonattainment area to attain the NAAQS by the attainment date associated with its specific classification will result in reclassification to the higher of the following:

- The next higher classification for the area.
- The classification associated with the area's design value when EPA makes the determination that attainment was not achieved.

This reclassification procedure does not apply to severe and extreme areas. If a severe or extreme area fails to attain the ozone NAAQS by the applicable date, the area must implement contingency measures required under 172(c)(9) and individual sources must pay the enforcement fees of section 185.

"Bump-up" refers to the reclassification process that a marginal, moderate, or serious area automatically undergoes if it fails to attain the NAAQS. The term bump-up also applies to optional reclassification of a serious or severe nonattainment area as a result of milestone failure. Serious and severe nonattainment areas that fail to meet a milestone are required to make an election, under section 182(g)(3) of the Act, from three given measures. One explicit option is reclassification of the area to the next higher classification.

Upon bump-up, the attainment date specified for the higher classification applies to the area that has been bumped-up. Section 182(i) of the Act allows for some flexibility in establishing due dates for the required submittals associated with the new classification, but does not allow EPA to adjust the attainment date. Areas that are not expected to attain the ozone NAAQS by their attainment date but wait until near their attainment date to voluntarily bump-up, will find it difficult to meet the deadlines for their new classification. An early voluntary bump-up will allow for more flexibility in planning for and achieving the new requirements of the higher classification. Since failure to submit SIP revisions can result in sanctions or Federal implementation plan (FIP) measures, it will be in the best interest of States with nonattainment areas to attempt to assess whether attainment is improbable as soon as possible.

Marginal Areas

Marginal areas must reach the prescribed NAAQS level for ozone by November 15, 1993. In the event that a marginal area fails to attain the NAAQS by 1993, it will be bumped-up to the moderate classification, or higher, depending on the area's air quality data for the attainment year. In addition to the requirements prescribed for marginal areas, these areas will then be expected to meet the additional requirements of the higher classification.

Marginal areas that are bumped-up to moderate nonattainment status must correct existing RACT rules to make up for deficiencies in their current plans. Upon reclassification, RACT must be applied to all sources for which a CTG document has been issued, and to all major non-CTG stationary sources. Also, a basic I/M program must be implemented, regardless of whether an I/M program was in place to begin with (per the pre-CAAA enactment requirements). The EPA's intention is to require such areas to submit a SIP meeting the basic I/M requirements within 1 year of the reclassification. Further guidance will be issued by EPA in the summer of 1993 to address required elements to be included in this SIP revision.

If a marginal area is bumped-up to moderate nonattainment status, planning and rule development schedules can be revised, although the moderate area attainment date will apply to the newly classified area. Assuming none of the section 181(a)(5) extensions are granted, bump-up to a moderate classification may occur up to 6 months after attainment failure in November 1993; this would allow only 2½ years for a marginal area to meet all of the requirements of the higher classification, including ozone attainment by November 1996.[27] If preliminary planning is not initiated early, the likelihood of successfully implementing the necessary control measures within this time frame is small, considering the fact that drafting the required submittals that describe these measures represents a significant effort. If a marginal area that is reclassified as moderate does not attain the NAAQS by the moderate area attainment date of November 15, 1996 (likely if preliminary planning is not initiated), this once marginal area would be reclassified as a serious area. Given this possibility, States with marginal areas that are unlikely to attain the NAAQS by November 15, 1993 are encouraged to begin a planning strategy that will allow for quick enactment of specified measures.

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[27]In the event that one or both of the section 181(a)(5) extensions are granted, an even shorter time frame would be available for a newly classified moderate area to plan for attainment by November 1996.

One of the more important ramifications of a marginal area being bumped-up is that it will be subject to the 15 percent rate-of-progress requirement, which requires the development of a rate-of-progress plan. In addition, a contingency plan must be formulated, specifying additional measures to be taken immediately upon an attainment failure. Normally, these submittals are due in November 1993 for moderate areas, but a marginal area being reclassified will not be able to meet these attainment deadlines. The EPA may establish separate plan and implementation deadlines for a marginal area that fails to attain and is reclassified as moderate. By setting deadlines, an area may be more likely to achieve attainment and avoid further bump-ups. If the determination is made in June 1994 that a marginal area will be bumped-up, then the EPA may, for example, require SIP revisions by June 1995, indicating measures to be implemented in November 1995. Again, it should be stressed that the earlier a determination is made that an area is likely to miss its attainment date and be reclassified, the better the chance the area has of meeting the newly imposed deadlines.

In addition, EPA may require States applying for attainment date extensions to prove that a significant effort has been made to initiate planning activities associated with the moderate classification, and that control measures such as I/M and RACT can be adopted and implemented quickly. Also, States may need to show that steps have been taken to obtain necessary emissions data required for the modeling analysis in the attainment demonstration. These areas may also be required to submit their air quality data on an accelerated time schedule, to enable early detection of the need to develop and implement necessary measures, provided the extensions are not sufficient to ensure attainment.

Moderate Areas

In accordance with section 181(b)(2) of the Act, if a moderate area fails to demonstrate attainment by November 15, 1996, it will be reclassified to the serious classification, or higher, depending on its design value by operation of law. The area will then be subject to the additional requirements of the higher classification.

If a moderate area is reclassified as a serious area, both ambient air quality and emissions monitoring systems will need to be upgraded to meet the specifications outlined in section 182(c)(1). Additional mobile source provisions must be implemented, including the enhanced I/M and clean fuel vehicle programs. The enhanced I/M program stipulates a higher performance standard than the basic I/M program, and must take the place of the existing basic I/M program. The offset ratio for sources subject to NSR increases, and RACT applies to stationary sources emitting 50 tpy or more of VOC or NO_x. In

addition, the boundaries of a moderate area bumped-up to a serious area must reflect the metropolitan statistical area/consolidated metropolitan statistical area, unless EPA and the State decide otherwise.

A moderate nonattainment area reclassified as a serious area will not be required to demonstrate the 15 percent reduction (milestone compliance) in emissions between 1990 and 1996 as section 182(g)(1) specifically excludes marginal and moderate areas from the requirement. Additionally, since the next milestone falls on the serious area's attainment date (if no extension is granted), this former moderate area would also not be required to demonstrate the 3 percent per year reductions averaged over 3 years from 1996-1999. It would need to attain the ozone NAAQS by November 1999. Revisions to SIP's outlining compliance with the requirements of the serious classification will be due 1 year after reclassification. Again, planning should begin early if it seems likely that a moderate area will be reclassified.

Nonclassifiable Areas

Nonclassifiable ozone areas include transitional, submarginal, and incomplete/no data areas. Transitional areas are defined as those areas that were designated nonattainment both before and at the time of enactment, but were not in violation of the primary NAAQS during the period 1987-1989. Submarginal areas are divided into two categories: Category 1 includes areas presently designated nonattainment that are violating the ozone standard, and Category 2 includes areas designated unclassified/attainment that are violating the NAAQS. Incomplete/no data areas describe those regions designated nonattainment at enactment, but without sufficient data to prove a violation of the ozone standard.

A SIP revision including RACT corrections, an emissions inventory, NSR provisions, and monitoring requirements is required for all nonclassifiable areas. This SIP revision is due 3 years from the date that areas are designated nonclassifiable areas, which section 107(d)(1)(C)(i) of the Act clarifies to mean the date of enactment, thereby requiring submittal by November 15, 1993.

On June 30, 1992, an attainment determination will be made for transitional areas based on the area's average number of exceedances during the 3-year period from January 1, 1989 to December 31, 1991. In the event that attainment is achieved, the area will be redesignated attainment, the ramifications of which are described in more detail in a July 9, 1992 memorandum from John Calcagni, Director, Air Quality Management Division, OAQPS, to Regional Air Division Directors, concerning "Processing of State Implementation Plan (SIP) Submittals." If it is determined

that violations have occurred in the specified period, however, it will be classified according to its design value, and will now be newly subject to the requirements associated with the appropriate nonattainment classification. If the area's design value is still below 0.121 ppm, the area will be considered "submarginal."

As with marginal areas, advanced planning should be carried out for transitional areas in anticipation of a possible bump-up. Again, while the dates set up for required SIP revisions can be altered, the corresponding attainment date for the newly reclassified area cannot be changed.

Under section 172(a)(2), the attainment date for submarginal and incomplete/no data areas is specified as no later than November 15, 1995. Specific actions to be taken in the event of attainment failure are still being decided by EPA, but options include mandatory bump-up to a higher classification, or the requirement of additional measures to ensure attainment. In the case of submarginal areas, a violation of the NAAQS and a design value above 0.121 ppm will result in bump-up and classification according to the area's design value. All provisions apply to the newly bumped-up area as if it had been so classified at the time of enactment, yet adjustment of schedule deadlines is permitted. As with other reclassifications, however, the corresponding attainment deadlines cannot be altered.

APPENDIX I: MODEL MULTI-STATE LETTER

DATE

ADDRESS OF
REGIONAL AIR
DIVISION DIRECTOR

Dear Regional Air Division Director,

This letter is being sent to fulfill the requirements established in section 182(j) of the Clean Air Act, as amended 1990. As you know, section 182(j) requires States in multi-State ozone nonattainment areas to coordinate revisions and implementation of State implementation plans (SIP's) with other States in the nonattainment area. In addition, section 182(j) requires the States to use photochemical grid modeling or any other equally effective analytical method approved by EPA for demonstrating attainment. Please consider this letter as **[State's name]** formal notice of your efforts to ensure appropriate coordination between the **[number of States]** States involved in this plan. We expect that **[name other States in nonattainment area]** will prepare similar plans to complement our efforts. Please realize, however, that while this letter fulfills the statutory requirement to submit a work plan, most of the interstate coordination occurs on a person-to-person basis between staff from the **[number of States]** States and the EPA Regional Offices.

For the [State's name] portion of the nonattainment area, our schedule to complete all the necessary portions the attainment demonstration is listed below:

Submit draft to EPA: Date:
[list all plan elements up to 11/94]

Publish Public Notice for Hearing: Date:
[list all plan elements up to 11/94]

Hold Public Hearing: Date:
[list all plan elements up to 11/94]

Submit SIP Revision to EPA: Date:
[list all plan elements up to 11/94]

We expect many of these actions to be occurring at essentially the same time, thus each of the actions listed above could occur on the same date. The development of these items will be coordinated with [name other States in nonattainment area] to ensure that conflicts do not arise in our efforts to

prepare an attainment demonstration for this area. This coordination will occur through mailings and phone contacts with each State. Additionally, air directors and staff have the opportunity to meet and discuss these issues face to face as they arise through regular meetings of [name Regional Consortium e.g., NESCAUM, LADCO, Northeast Ozone Transport Commission]. [Reference modeling protocols required by the Technical Support Division--also may want work on the development of emissions inventories and coordination of somewhat consistent growth factors.]

Beyond this, we look to EPA [list appropriate Regional Offices] to provide additional necessary coordination. To this end, the Regional Offices and States have already participated in meetings and conference calls over the past year. We expect to participate in additional meetings and conference calls on the ozone attainment demonstration as the need arises.

If you or your staff have any questions, please feel free to contact [name State contact] at (000) 000-0000.

Sincerely,

DIRECTOR
STATE AIR DIVISION

cc: States in nonattainment area
Appropriate Regional Offices

APPENDIX J: ALTERNATIVE CONTROL TECHNIQUE (ACT) DOCUMENTS, NEW SOURCE PERFORMANCE STANDARDS (NSPS), AND TWO SCAQMD AREA SOURCE RULES FOR CONTROLLING NITROGEN OXIDE (NO_x) EMISSIONS

Status of and References for ACT Documents for Stationary NO_x Sources

The EPA has issued final ACT documents for controlling NO_x emissions from nitric and adipic acid manufacturing plants and stationary gas turbines. The references for these two documents are as follows:

- Alternative Control Technique Document -- Nitric and Adipic Acid Manufacturing Plants, EPA-450/3-91-026, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1991.

- Alternative Control Technique Document -- NO_x Emissions from Stationary Gas Turbines, EPA-453/R-93-007, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. January 1993.

A final ACT document for controlling NO_x emissions from process heaters is expected to be completed by January or February of 1993. The EPA completed a draft ACT document for stationary internal combustion engines in August 1992. The final ACT document for stationary internal combustion engines is planned for release in the spring of 1993. The EPA is also preparing ACT documents for utility boilers; industrial, commercial, and institutional boilers; cement manufacturing; iron and steel production; and glass manufacturing. Draft ACT documents for these source categories are planned for release in 1993.

The following EPA reports are not ACT documents, but provide information on NO_x emissions sources, controls, and control costs.

- Evaluation and Costing of NO_x Controls for Existing Utility Boilers in the NESCAUM Region, EPA 453/R-92-010, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1992.

- Evaluation and Costing of NO_x Controls for Industrial, Commercial, & Institutional Boilers, draft, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. October 1992. The document is expected to be finalized in 1993.

List of Promulgated NSPS for Stationary NO_x Sources

Source Category	Reference: 40 CFR Part 60
Fossil-Fuel-Fired Steam Generators	Subpart D
Electric Utility Steam Generating Plants	Subpart Da
Industrial-Commercial-Institutional Steam Generating Units	Subpart Db
Small Industrial-Commercial-Institutional Steam Generating Units	Subpart Dc
Gas Turbines	Subpart GG
Municipal Waste Combustors	Subpart Ea
Nitric Acid Plants	Subpart G

The references for the BID's prepared to support the technical basis for the NSPS are as follows:

- Electric Utility Steam Generating Units: Background Information for Proposed NO_x Emission Standards, EPA/450/2-78/005a, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. 1978.

- Standards Support and Environmental Impact Statement. Volume I: Proposed Standards of Performance for Stationary Gas Turbines, EPA/450/2-77/017a, U.S. Environmental Protection Agency, Emission Standard and Engineering Division, Research Triangle Park, NC. 1977.

- Standards Support and Environmental Impact Statement. Volume II: Promulgated Standards of Performance for Stationary Gas Turbines, EPA/450/2-77/017b, U.S. Environmental Protection Agency, Emission Standard and Engineering Division, Research Triangle Park, NC. 1977.

- Municipal Waste Combustors - Background Information for Proposed Standards: Control of NO_x Emissions, Volume 4, EPA/450/3-89/27d, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. August 14, 1989.

- Municipal Waste Combustors - Background Information for Promulgated Standards and Guidelines, Summary of Public Comments and Responses, Appendix A to C, EPA/450/3-89/004a, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 1990.

- Background Information for Proposed New Source Performance Standards: Steam Generators, Incinerators, Portland Cement Plants, Nitric Acid Plants, Sulfuric Acid Plants, No. 0711, U.S. Environmental Protection Agency, Office of Air Programs, Research Triangle Park, NC. (No date available.)

Rule 1121-Control of Nitrogen Oxides from Residential-Type Natural Gas Fired Water Heaters

(a) Definitions

For the purpose of this rule:

(1) Water Heater is defined as a device that heats water at a thermostatically controlled temperature for delivery on demand.

(2) Heat Output is defined as the product obtained by multiplying the recovery efficiency, as defined by Title 20, California Administrative Code, Chapter 2, Subchapter 4, Article 4, Sections 1603 and 1807, by the heating value of the input fuel furnished to the water heater.

(b) Requirements

After December 31, 1982, a person shall not sell or offer for sale within the South Coast Air Quality Management District:

(1) Gas-fired stationary home water heaters that:

(A) Emit nitrogen oxides in excess of 40 nanograms of NO_x (calculated as NO_2) per joule (70 lb per billion BTU) of heat output.

(B) Are not certified in accordance with subparagraph (c).

(2) Gas-fired mobile home water heaters that:

(A) Emit nitrogen oxides in excess of 50 nanograms of NO_x (calculated as NO_2) per joule (88 lb per billion BTU) of heat output.

(B) Are not certified in accordance with subparagraph (c).

(c) Certification

(1) The manufacturer shall have each water heater model tested in accordance with the following:

(A) Each tested water heater shall be operated in accordance with Section 2.4 of American National Standards ANSI Z21.10.1-1975 at normal test pressure, input rates, and with a five-foot exhaust stack installed during the nitrogen oxides emission tests.

(B) The measurement of nitrogen oxides emissions shall be conducted in accordance with United States Environmental Protection Agency test methods or other test methods or other test methods approved by the executive officer.

(2) The following calculation shall be used to determine the nanograms of NO_x per joule of heat output:

$$N = \frac{(4.566 \times 10^{\ }) \ P \ U}{H \ C \ E}$$

Where:

N = nanograms of NO_x emitted per joule of heat output

P = parts per million (volume) NO_x in flue gas

U = volume percentage of CO_2 in water-free flue gas for stoichiometric combustion.

C= volume percentage CO_2 in water free flue gas

H = gross heating value of gas, BTU/Cu.Ft. (60°F, 30 in. hg)

E = recovery efficiency, percentage

(3) The manufacturer shall submit to the Executive Officer the following:

(A) A statement that the model is in compliance with subparagraph (b). The statement shall be signed and dated, and shall attest to the accuracy of all statements.

(B) General Information

(i) Name and address of manufacturer.

(ii) Brand name.

(iii) Model number, as it appears on the water heater rating plate.

(C) Description of each model being certified.

(d) Identification of Complying Water Heaters
The manufacturer shall display the model number of the water heater complying with subparagraph (b) on the shipping-carton and rating plate.

(e) Enforcement

(1) The Executive Officer may require the emission test results be provided when deemed necessary to verify compliance.

(2) The Executive Officer may periodically inspect distributors, retailers and installers of water heaters located in the District and conduct such tests as are deemed necessary to insure compliance with subparagraph (b).

(f) Exemption

The provisions of this rule shall not apply to:

(1) Water heaters with a rated heat input of 75,000 BTU per hour or greater.
(2) Water heaters used in recreation vehicles.

Rule 1111-NO_x Emissions from Natural Gas-Fired Fan Type Central Furnaces

(a) Definitions

(1) Fan Type Furnace is a self-contained space heater providing for circulation of heated air at pressures other than atmospheric through ducts more than 10 inches in length- that have:

(A) an input rate of less than 175,000 BTU/hr; or

(B) for combination heating and cooling unit, a cooling rate of less than 65,000 BTU/hr.

(2) Annual Fuel Utilization Efficiency (AFUE) is defined in Section 4.2.35 of Code of Federal Regulation, Title 10, Part 430, Subpart B, Appendix N.

(3) Useful Heat Delivered to the heated Space is the AFUE (expressed as a fraction) multiplied by the heat input.

(b) Requirements

(1) A manufacturer shall not, after January 1, 1984, manufacture or supply for sale or use in the South Coast Air Quality Management District natural gas-fired fan type central furnaces, unless such furnaces meet the requirements of subparagraph (3).

(2) A person shall not, after April 2, 1984 sell or offer for sale within the South Coast Air Quality Management District natural gas-fired fan type central furnaces unless such furnaces meet the requirements of subparagraph (3).

(3) Natural gas-fired fan type central furnaces shall:

(A) not emit more than 40 nanograms of oxides of nitrogen (calculated as NO_2) per joule of useful heat delivered to the heated space; and

(B) be certified in accordance with paragraph (c) of this rule.

(c) Certification

(1) the manufacturer shall have each appliance model tested in accordance with the following:

(A) Oxides of nitrogen measurements, test equipment, and other required test procedures shall be in accordance with methods approved by the Executive Officer.

(B) Operation of the furnace shall be in accordance with the procedures specified in Section 3.1 of Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.

(2) One of the two formulas shown below shall be used to determine the nanograms of oxides of nitrogen per joule of useful heat delivered to the heated space:

$$N = \frac{4.566 \times 10^4 \times P \times U_c}{H \times C \times E} \qquad N = \frac{3.655 \times 10^{10} \times P}{(20.9-Y) \times Z \times E}$$

Where:

N = nanograms of emitted oxides of nitrogen per joule of useful heat.

P = concentration (ppm volume) of oxides of nitrogen in flue gas as tested.

U = volume percent CO_2 in water-free flue gas for stoichiometric combustion.

H = gross heating value of fuel, BTU/Cu.Ft: (60°F, 30 in. Hg).

C = measured volume percent of CO_2 in water-free flue gas, assuming complete combustion and no CO present.

E = AFUE, percent (calculated using Table 2).

Y = volume percent of O_2 in flue gas.

Z = heating value of gas, joules/Cu. Meter (0.0°C, 1 ATM).

(3) The manufacturer shall submit to the Executive Officer the following:

(A) A statement that the model is in compliance with subsection (b). (The statement shall be signed and dated, and shall attest to the accuracy of all statements).

(B) General Information

(i) Name and address of manufacturer.

(ii) Brand name.

(iii) Model number, as it appears on the furnace rating plate.

(C) A description of the furnace and specifications for each model being certified.

(d) Identification

The manufacturer shall display the model number of the furnace complying with subsection (b) on the shipping carton and rating plate.

(e) Enforcement

(1) The Executive Officer may require the emission test results to be provided when deemed necessary to verify compliance.

(2) The Executive Officer may periodically conduct such tests as are deemed necessary to insure compliance with subsection (b).

(f) Exemptions

(1) The provisions of this rule shall not apply to furnaces to be installed in mobile homes.

(2) The provisions of this rule shall not apply to natural gas-fired fan type central furnaces utilizing three-phase electrical current until January 1, 1986.