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Research Triangle Park, NC 27711

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GUIDANCE ON THE ADJUSTED BASE YEAR EMISSIONS INVENTORY AND THE 1996 TARGET FOR THE 15 PERCENT RATE OF PROGRESS PLANS

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Ozone/Carbon Monoxide Programs Branch

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ACRONYMS AND ABBREVIATIONS

Act	Clean Air Act
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AMS	AIRS Area and Mobile Source Subsystem
BEA	Bureau of Economic Analysis
CAAA	1990 Clean Air Act Amendments
CO	Carbon Monoxide
CTG	Control Technique Guideline
EKMA	Empirical Kinetic Modeling Approach
EPA	U.S. Environmental Protection Agency
FIPS	Federal Information Processing Standards
FMVCP	Federal Motor Vehicle Control Program
FR	Federal Register
gal	gallon(s)
I/M	Inspection and Maintenance
lb	pound(s)
MACT	Maximum Achievable Control Technology
NAAQS	National Ambient Air Quality Standard(s)
NO_x	Nitrogen Oxides
OCS	Outer Continental Shelf
psi	pounds per square inch
RACT	Reasonably Available Control Technology
RFP	Reasonable Further Progress
ROM	Regional Oxidant Modeling
RVP	Reid Vapor Pressure
SIP	State Implementation Plan
SSCD	Stationary Source Compliance Division
tpy	tons per year
UAM	Urban Airshed Model
VMT	vehicle miles traveled
VOC	Volatile Organic Compound(s)

EXECUTIVE SUMMARY

Section 182(b)(1) of the Clean Air Act (Act) Amendments of 1990 (CAAA) 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 emissions reduction of at least 15 percent during the first 6 years after enactment of the CAAA (November 15, 1996). The portion of the SIP revision that illustrates the plan for the achievement of this emissions reduction is subsequently defined in this document as the "rate-of-progress plan."

The focus of this guidance document is on the requirements due November 1992 relative to the rate-of-progress plan, including adjustments that must be made to the base year (1990) emissions inventories. This document clarifies guidance provided in an August 7, 1992 memorandum from Mr. J. David Mobley, Chief, Emissions Inventory Branch, to U.S. Environmental Protection Agency (EPA) Regional Chiefs, regarding "November 15, 1992, Deliverables for RFP and Modeling Emission Inventories."

Section 182(a)(1) of the CAAA requires all nonattainment areas to submit within 2 years of enactment (November 15, 1992), a comprehensive, accurate, and current inventory of ozone season typical weekday emissions from all sources. State agencies are responsible for the development of this "base year inventory." Draft base year inventories were scheduled to be submitted to EPA during the period of January 1 to May 1, 1992. Final base year inventories, which incorporate comments from EPA's review of the draft inventory, and draft adjusted base year inventories, described in this guidance document, are due no later than November 15, 1992.

This document assists States in determining the 1996 target level of emissions under the rate-of-progress plan requirement for moderate and above ozone nonattainment areas. States will use this target emissions level in determining what strategies will be necessary to control emissions so that the nonattainment area will comply with the 15 percent volatile organic compounds (VOC) emissions reduction requirement. This document uses an example 1996 target emissions calculation to describe the procedures that States should follow to calculate the 1996 target level. It also describes EPA's documentation requirements for the November 1992 submittals relative to the rate-of-progress plan. The schedule for rate-of-progress plan deliverables is listed below:

November 1992:

- Final 1990 base year inventory.[1]
- 1990 rate-of-progress base year inventory (limited to nonattainment area and excluding biogenic emissions).[2]
- Initial 1990 adjusted base year inventory.[3]
- Required 15 percent reductions.[3]
- Total expected reductions by 1996.[3]
- Target level for 1996.[3]
- Growth factors for developing projected rate-of-progress and attainment modeling inventories.[3]
- CAAA mandated control measures and their associated control efficiencies.[3]

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[1]States must allow for public review of the base year inventories if they are to be used in a regulatory exercise such as rate-of-progress plans, attainment demonstrations, or maintenance plans. While 1990 base year inventories must be submitted to EPA by November 15, 1992, EPA will allow the public review process to occur after this date (because of the length of time generally required for scheduling and completing the public review process). If public review is held after the November 15 submittal, then prior to November 15, 1993, and prior to application in any regulatory activities, the inventory must be revised to reflect responses to public review comments.

[2]The rate-of-progress inventory is a subset of the final 1990 base year inventory and should be identified within the base year inventory documentation. This means that within the base year inventory submittal, emissions from anthropogenic sources (i.e., excluding biogenics) within the nonattainment area (excluding sources within the 25-mile buffer zone and sources in a model domain but outside of the nonattainment area) should be identified. This can be accomplished by summarizing emissions in the inventory for nonattainment area anthropogenic sources and then summarizing emissions for all other sources. Thus, the rate-of-progress inventory should be submitted as part of the 1990 base year inventory package due by November 15, 1992.

[3]The EPA stated in an August 7, 1992 memorandum from Mr. J. David Mobley, Chief, Emission Inventory Branch, to EPA Regional Office Chiefs, regarding "November 15, 1992, Deliverables for RFP and Modeling Emission Inventories," that these items (initial 1990 adjusted base year inventory through remaining items under November 1992) are required by November 15, 1992. If, however, a State will be submitting a full draft 15 percent rate-of-progress plan for public review in early 1993 (i.e., no later than March 1993), they may wait and submit the draft plan to EPA at the beginning of the public review period rather than submitting these items in November 1992. Please note, however, that for areas involved in regional oxidant modeling (ROM) exercises, growth and control factors need to be submitted to EPA by November 15, 1992.

May 1993:

- Draft 1996 projected emissions inventory with controls.

November 1993:

- Fully adopted rate-of-progress plan, including attainment demonstration for moderate areas not using the urban airshed model (UAM).

Various reductions will result from implementation of the 1990 CAAA. Some of these reductions are creditable toward the 15 percent VOC emissions reduction requirements while others are not creditable. This document incorporates a review of the creditability of emissions control programs mentioned in the CAAA. This discussion assists States in planning a control strategy to meet the 1996 target emissions level. All real, permanent, and enforceable post-1990 VOC emissions reductions are creditable toward the 15 percent requirement except for reductions resulting from the following:

1. The Federal motor vehicle control program (FMVCP) tailpipe or evaporative standards promulgated prior to 1990.

2. Federal regulations specifying Reid vapor pressure (RVP) limits for nonattainment areas (55 FR 23666, June 11, 1990).

3. State regulations required under section 182(a)(2)(A) to correct deficiencies in existing reasonably available control technology (RACT) rules.

4. State regulations required under section 182(a)(2)(B) to establish an inspection and maintenance (I/M) program or correct deficiencies in existing I/M programs.

Finally, this document provides a brief preview of the development of emissions projections and control strategies, along with a discussion of the 1996 milestone compliance demonstration. The EPA is not requiring that a complete draft control strategy be included in the rate-of-progress plan until May 1993. However, CAAA mandated control measures and their associated control efficiencies are required in November 1992; additional control measures to meet the 15 percent emissions reduction requirement are encouraged, but not required for the November 1992 submittal. Guidance for the May and November 1993 submittals will be released in the fall of 1992.

The EPA may require States to make corrections to the final 1990 base year, 1990 rate-of-progress base year, initial 1990 adjusted base year inventories, as well as the 1996 target level of emissions. These corrections will only be required if emissions factors or methodologies change significantly, and these changes occur before such time that it is impossible for

States to make adjustments to their 15 percent emissions reduction calculations and associated control strategies. For example, a revised MOBILE model (MOBILE5.0) is due for release this fall. Its use will not be required in the November 1992 submittal, but will be required in the November 1993 submittal.

1.0 INTRODUCTION

Section 182(b)(1) of the CAAA 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 emissions reduction of at least 15 percent during the first 6 years after enactment of the CAAA (November 15, 1996). 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 required by November 15, 1996 is defined within this document as "rate of progress."[4] Furthermore, the portion of the SIP revision that illustrates the plan for the achievement of the emissions reduction is subsequently defined in this document as the "rate-of-progress plan."

Additionally, 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 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 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 1994. The completed attainment demonstration would include any additional controls needed for attainment.

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 oxide (NO_x) emissions "as necessary to attain the national primary ambient air quality standard for ozone" by

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[4]The EPA recognizes that the CAAA term, 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 requirements. However, because the CAAA require 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 the 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, 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.

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 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 (i.e., the 15 percent VOC emissions reductions must be demonstrated by February 13, 1997). Rules regarding the development of the milestone demonstrations will be promulgated in the summer of 1993 and will address the timing problem of developing a full emissions inventory to meet the milestone demonstration requirement.

1.1 Purpose

The purpose of this document is to provide guidance on the calculation and presentation of the adjusted base year inventory and the 1996 target level of emissions. The 1996 target emissions level facilitates planning for the 15 percent VOC emissions reduction requirement. This guidance document alerts the reader to special circumstances regarding emissions inventories and emissions estimates that should be considered during the development of the rate-of-progress plan, including the procedures to follow in adjusting the 1990 base year inventory to calculate the 1996 target level of emissions. It also provides information on the creditability of emissions reductions for various control programs. This document assists States in preparing the required information in the proper

States in preparing the required information in the proper format. Finally, this guidance presents an example 1996 target emissions calculation.

It is important to note that the scope of this document comprises the preparation of the November 1992 rate-of-progress plan deliverables. Therefore, it does not discuss the May and November 1993 submittals that involve the calculation of the projected 1996 inventory and development of the control strategy. A separate guidance document entitled, "Growth Factors, Projections, and Control Strategies," will discuss these topics as they relate to the 1993 submittals. The EPA will publish the requirements for the 1996 milestone demonstration in a rulemaking expected in the summer of 1993.

This document addresses many programs and procedures that are more fully addressed in other guidance documents. This guidance does not supersede these other guidance documents; rather, it intends to pull together the relative material pertaining to the development of the rate-of-progress plan.

1.2 Background

Facilities, States, and the EPA currently estimate emissions for various purposes. Under the CAAA, facilities have new requirements in terms of permits, annual emissions statements, and compliance certifications. State agencies are currently responsible for the production of a base year emissions inventory, periodic inventories, and annual aerometric information retrieval system (AIRS) facility subsystem (AFS) inventories. The EPA develops and utilizes emissions estimates and emissions inventories in virtually all of their air programs. The focal point for this guidance document is adjusting the 1990 base year inventory for the rate-of-progress SIP revision.

The 1990 base year inventory emissions are reported on an annual and seasonal basis. For determination of the 15 percent VOC emissions reduction, 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 for ozone formation. These ozone seasons are typically the summer months.

With the 15 percent VOC emissions reduction, moderate nonattainment areas are generally expected to be able to attain the ozone NAAQS within the applicable timeframe. Therefore, the

base program that all areas classified as moderate and above nonattainment must meet is the 15 percent rate-of-progress reduction. In cases where modeling shows VOC emissions reductions greater than 15 percent and/or NO_x reductions are necessary to attain the standard, additional emissions reductions will be required on a schedule that is sufficient to meet the attainment deadline. 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. Therefore, it is recommended that State agencies track the actual NO_x emissions reductions occurring between 1990 and 1996. More specific guidance regarding NO_x substitutions is currently under development within the EPA.

1.3 Organization of Report

The organization of this report is as follows. Section 2 of this document provides a sample calculation of the 1996 target level of emissions. Section 3 of this document presents the rate-of-progress plan elements. This section highlights information on documenting the adjustments to the 1990 base year inventory for calculation of the 1996 target level of emissions. Section 4 of this document discusses the creditability of emissions reductions from various programs to the 15 percent requirement. The final section of this document provides a preview of the development of emissions projections, the control strategy, and the milestone demonstration that is due in 1997. Appendix A of this document provides a list of definitions for EPA terms used throughout this document. Appendix B describes the calculation of emissions reductions from RACT rule corrections, and Appendix C outlines this procedure for I/M program corrections.

2.0 CALCULATION OF THE 1996 TARGET

To determine their control strategies for achieving the required VOC emissions reductions, 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. Figure 1 provides an overview of how this target level is derived. Sections 2.1 and 2.2 of this document detail the calculation of this target using a hypothetical example.

2.1 Calculation of the 1990 Adjusted Base Year Inventory

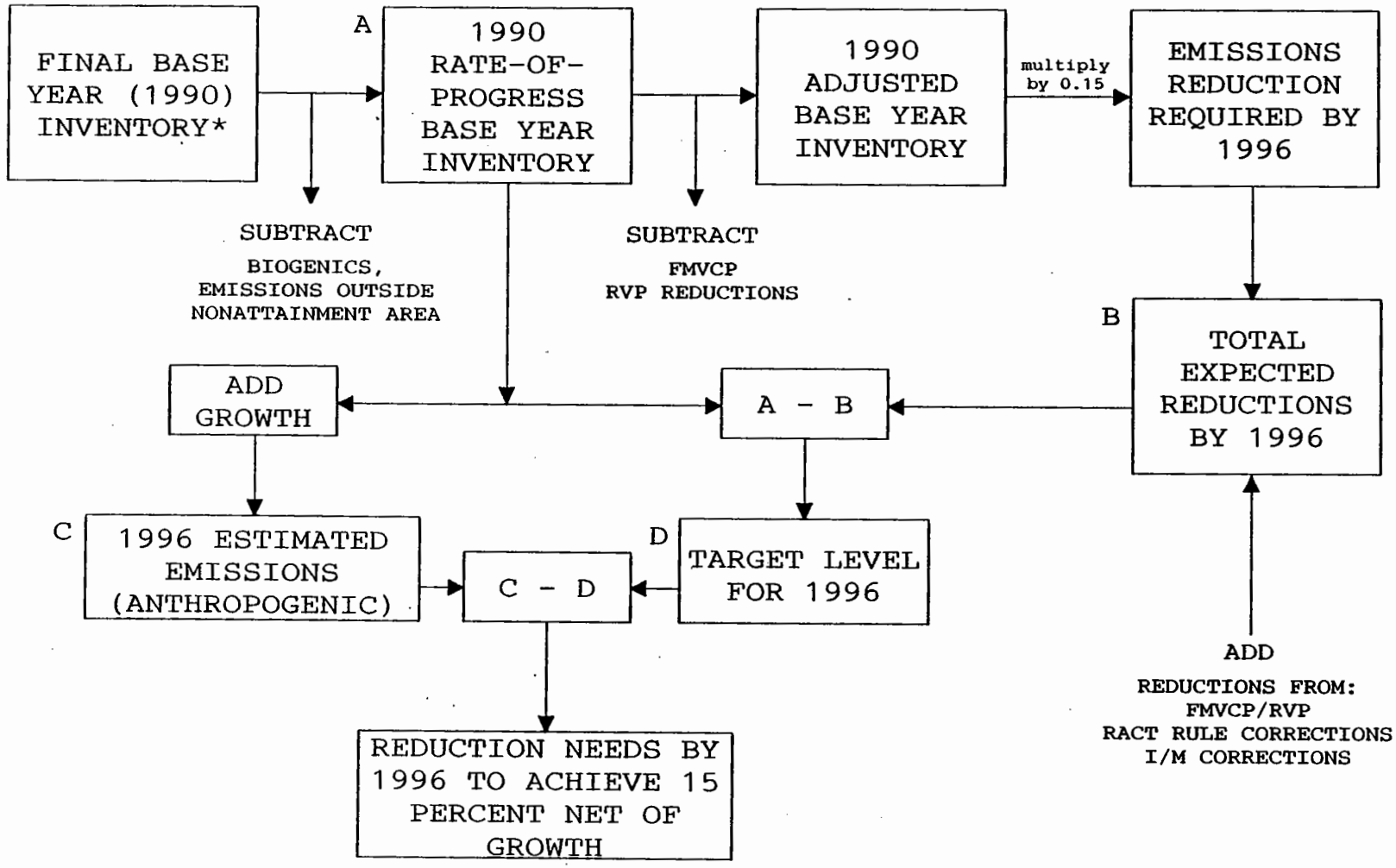
The CAAA specify the emissions "baseline" from which the 15 percent reduction is calculated. This baseline value is termed the 1990 adjusted base year inventory.
Section 182(b)(1)(B) defines baseline emissions (for purposes of calculating the 15 percent VOC emissions reduction) as "the total amount of 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 11, 1990), which require maximum RVP limits in nonattainment areas during the peak ozone season.

The 1990 base year inventory is first adjusted by removing all biogenic emissions as well as emissions from sources located outside of the designated nonattainment boundary (e.g., within the modeling domain). This inventory, which contains only actual anthropogenic emissions occurring within the designated nonattainment boundaries during the base year, is termed the rate-of-progress base year inventory. The adjusted base year inventory is derived from the rate-of-progress base year inventory by removing the expected FMVCP and RVP reductions from the rate-of-progress base year inventory. Preenactment banked emissions credits should not be included in any of these inventories because they do not represent actual emissions in 1990. The following illustrates the general procedure for determining the 1990 adjusted base year inventory.

Step 1: Develop the 1990 Base Year Inventory
(includes all emissions within the UAM modeling domain)

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

Point Sources	1,000
Area Sources	2,500
Mobile Sources	3,500
Biogenic Sources	+ 5,000
Total	12,000



** DOES NOT INCLUDE PREENACTMENT BANKED EMISSIONS CREDITS*

Figure 1. Flow chart for rate-of-progress calculations.

As shown, the first step records the total 1990 base year inventory emissions from the four emissions source types: point, area, mobile, and biogenic. The EPA required that the 1990 base year inventory be submitted by the States in draft form by May 1992, and in final form by November 15, 1992. However, EPA is allowing additional time for States to complete the public hearing process. In the example presented above, the modeling domain is larger than the nonattainment area boundaries so the emissions for the modeling domain are presented. Here, the total point-source inventory is 1,000 lb/day. Area sources account for 2,500 lb/day. The 1990 base year mobile source inventory is 3,500 lb/day. In documenting the base year inventory, States must also specify which sources and emissions are located within the nonattainment area and which are not. This is an important requirement for documenting the inventory, as ozone inventories will include either point sources outside of the nonattainment area (in the 25-mile buffer zone) or all sources in the UAM modeling domain (if UAM modeling is to be performed).

Step 2: Develop 1990 Rate-of-Progress Base Year Inventory for Nonattainment Area

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

Point Sources (-200 from outside nonattainment area)	800
Area Sources (-500 from outside nonattainment area)	2,000
Mobile Sources (-500 from outside nonattainment area)	+ 3,000
Total	5,800

The second step develops the 1990 rate-of-progress base year inventory for the nonattainment area. This inventory comprises the anthropogenic stationary (point and area) and mobile sources in the nonattainment area; all biogenic emissions are removed from the base year inventory. In the example presented above, 200 lb/day, 500 lb/day, and 500 lb/day were contributed from VOC point, area, and mobile sources, respectively, that are located in the modeling domain but outside of the nonattainment area boundary. In this example, there were no outer continental shelf (OCS) sources (any OCS sources that were not located within the designated nonattainment area would also be removed from the base year inventory).

Step 3: Develop Adjusted Base Year Inventory

1990 Adjusted Base Year Inventory (lb/day)

Point Sources	800
Area Sources	2,000
Mobile Sources (-FMVCP and RVP -- 500)	+ 2,500
Total	5,300

The third step consists of developing the 1990 adjusted base year inventory from which the 15 percent reduction is calculated.

First, the mobile source portion of the 1990 rate-of-progress base year inventory calculated in Step 2 must be adjusted as required by section 182(b)(1)(B) and (D) of the CAAA. This adjustment excludes emissions reductions that would occur by 1996 as a result of the FMVCP promulgated prior to the CAAA. In other words, the adjusted base year inventory excludes the emissions reductions that would occur as a result of fleet turnover between 1990 and 1996 even without the CAAA.

The 1990 adjusted base year inventory must also exclude emissions reductions that would result in 1996 from RVP regulations promulgated by November 15, 1990, or required under section 211(h) of the Act. The pertinent regulations (55 FR 23666, June 11, 1990) specify maximum RVP's of 9.0 or 7.8 pounds per square inch (psi) for each State during the summer months, beginning in 1992. In other words, the 1990 adjusted base year inventory must also exclude the emissions reductions that would occur as a result of the difference between the actual RVP in place in 1990 and the required 9.0 or 7.8 psi RVP in 1996. Deleting these mobile source emissions reductions from the adjusted inventory decreases the adjusted inventory and thus, also the 15 percent emissions reductions required. However, these mobile source emissions reductions are fully included in the total emissions reductions and thus, serve to reduce the total emissions allowed (as determined by calculating the target level of emissions).

The net effect of these adjustments is that States are not able to take credit for emissions reductions that would result from fleet turnover of current standard cars and trucks, or from already existing Federal fuel regulations. However, the SIP can take full credit for the benefits of any new vehicle emissions standards, as well as any other new Federal or State motor vehicle or fuel program that will be implemented in the nonattainment area, including Tier 1 exhaust standards, new evaporative emissions standards, reformulated gasoline, enhanced I/M, California low emissions vehicle program, transportation control measures, etc.

Mobile Source Adjustments

The mobile source portion of the adjusted base year inventory is calculated using the MOBILE emissions factor model. States may use MOBILE4.1 to come up with initial estimates of the adjusted base year inventory. However, as soon as MOBILE5 becomes available, States should switch to MOBILE5. MOBILE4.1 or MOBILE5 must be run in calendar year 1990, and again for calendar year 1996 (the 1996 run must not include any new CAAA measures). Since MOBILE4.1 does not include new CAAA measures, no change in modeling assumptions other than RVP is needed for the 1996 run. MOBILE5 will have a flag that will run the model using the FMVCP that was in place in 1990 for any calendar year. This flag will be documented in the MOBILE5 User's Guide.

The following description uses MOBILE4.1 for reference. The method for calculating the expected reductions from the FMVCP and RVP is the same using MOBILE5 except that the flag described above must be set to achieve the projected emissions in 1996 in the absence of any new CAAA measures. Users must still set the appropriate RVP as described below.

Actual 1990 emissions =
[1990 vehicle miles traveled (VMT)](MOBILE4.1 emissions factors from A); and

Adjusted 1990 emissions =
(1990 VMT)(MOBILE4.1 emissions factors from B).

(A) MOBILE4.1 run from the 1990 base year inventory. Emissions factors from this run will be used with actual 1990 VMT to calculate actual 1990 emissions; and

(B) MOBILE4.1 run as in the 1990 base year inventory run except that: 1) 1996 will be used as the evaluation year (this will change the vehicle mix to account for fleet turnover); and 2) the RVP is set to 9.0 or 7.8 as appropriate for the area. Emissions factors from this run and 1990 VMT will be used to calculate the adjusted 1990 emissions.

Expected Reductions from FMVCP and RVP (1990-1996) =
Actual 1990 emissions - Adjusted 1990 emissions

This is the amount that is subtracted from the mobile source portion in the "rate-of-progress base year inventory" to get the mobile source portion of the adjusted base year inventory (step 3). For Step 5, this amount will be added to the required 15 percent reductions and other required reductions to calculate the total reductions from the 1990 baseline that must occur to comply with CAAA requirements.

In the hypothetical example presented in step 3, the FMVCP and RVP regulations represent a decrease in emissions of 500 lb/day. This reduction reflects what the 1990 emissions would be if the same fleet that is projected to be operating in 1996 were operating in 1990. In addition, the effects of RVP regulations, which will result in lower evaporative losses, are factored out, even though the regulations were not necessarily in force in 1990.

The 1990 motor vehicle baseline emissions, after factoring out the reductions from the effects of the FMVCP and RVP program, are then added to the 1990 inventory of nonmotor vehicle anthropogenic VOC emissions to calculate the 1990 adjusted base year inventory. This composite emissions inventory, an aggregated total, is the inventory used to calculate the required 15 percent emissions reductions. In the example presented above, emissions for the 1990 adjusted base year inventory total 5,300 lb/day.

Step 4: Calculate required (15 percent) creditable reductions

15 percent = 5,300 x 0.15 = 795 lb/day

For Step 4, the adjusted base year inventory is multiplied by 0.15 to calculate the amount of the required 15 percent emissions reduction.

Step 5: Calculate total expected reductions by 1996

Total Expected Reductions by 1996 (lb/day)

Required 15 percent	795
Expected Reductions from FMVCP and RVP (1990-1996)	500
Corrections to RACT Rules	305
Corrections to I/M Programs	+ 200
Total	1,800

In the fifth step, the total required reductions from the 1990 rate-of-progress base year inventory are calculated. The total reductions comprise the reductions necessary to meet the 15 percent requirement and the expected reductions from the noncreditable programs (RVP, pre-CAAA FMVCP, RACT rule corrections, and I/M program corrections). Corrections to RACT rules and I/M programs are discussed below. In the above example, the emissions reductions expected to result from the corrections to RACT rules are 305 lb/day, and the emissions reductions expected to result from corrections to the I/M program are 200 lb/day. The total expected reductions by 1996 from the nonattainment area (i.e., prior to growth) are 1,800 lb/day (step 5).

RACT Rule Corrections

Section 4.1 of this document discusses cases where RACT rule corrections do not directly result in quantifiable emissions reductions. Any incidental reductions that occur in these instances may be handled as part of a rule effectiveness improvement. Corrections to RACT rules that may result in additional, enforceable, and quantifiable emissions reductions include situations where either:

- A rule was missing (i.e., a State committed to develop a rule as part of its 1977 SIP, or post-1982 SIP, but never carried through on the commitment prior to the CAAA).
- The limit was wrong.
- A capture system is now required.

Reductions from these types of RACT rule corrections are not creditable toward the 15 percent VOC emissions reduction

requirement. However, the amount of emissions reductions from these corrections should be calculated, as they are part of the total reductions from the 1990 rate-of-progress base year inventory that are required by the CAAA. Appendix B describes the methods for estimating the amount of these noncreditable emissions reductions.

I/M Program Corrections

Corrections to I/M programs are necessary when either: (1) the area's I/M program does not meet the reductions achieved by EPA's minimum requirements, or (2) an area's program does not meet the standards of its current SIP. The calculation of the emissions reductions associated with I/M program corrections requires two MOBILE4.1 runs (or MOBILE5 when it becomes available). Appendix C presents the methods for calculating the emissions reductions from I/M program corrections.

2.2 1996 Target Level of Emissions

The final step is to calculate the 1996 target level of emissions for planning purposes.

Step 6: Set target level for 1996

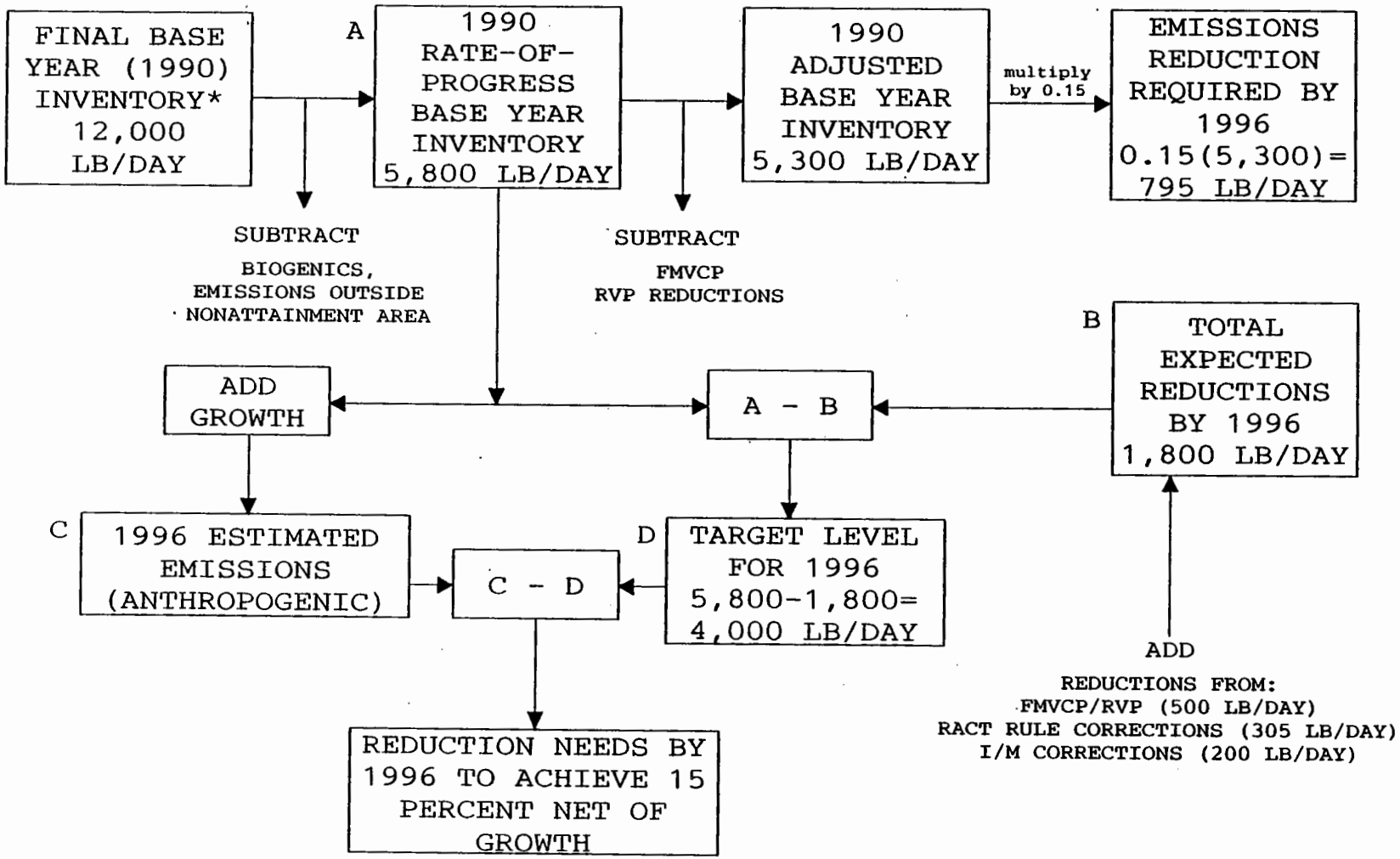
To calculate the 1996 target emissions level, the total reductions from Step 5 are subtracted from the 1990 rate-of-progress base year inventory for the nonattainment area. The 1996 target level of emissions is 4,000 lb/day as shown below.

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

Figure 2 provides an overview of the steps followed in calculating the example 1996 target level of emissions.

It is important to note that although moderate and higher nonattainment area classifications are required to provide a rate-of-progress plan describing how a 15 percent VOC emissions reduction will be achieved between 1990 and 1996, moderate areas are not required to show that they have met the 15 percent emissions reduction requirement. Instead, they are required to show that they have attained the NAAQS as of 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 particular moderate area to attain by 1996, then the State should plan for and include control measures in their SIP submittal to



** DOES NOT INCLUDE PREENACTMENT BANKED EMISSIONS CREDITS*

Figure 2. Flow chart for example rate-of-progress calculations.

reach this 18 percent reduction. These States need to track the post-implementation emissions using the modeled attainment percentage rather than the 15 percent rate-of-progress requirement.

2.3 Requirements of Section 182(b)(1)(A)(ii)

Nonattainment areas can achieve less than the 15 percent required reductions under the following restrictive circumstances. The State must demonstrate that the area has a new source review program equivalent to the requirements in extreme areas [section 182(e)], except that "major source" must include any source that emits, or has the potential to emit, 5 tons per year (tpy) of VOC or NO_x. Additionally, all major sources of VOC and NO_x (down to 5 tpy) in the area must be required to have RACT-level controls. In light of technological achievability, the State's plan must also include all mobile and stationary source control measures that can be feasibly implemented in the area. In addition, the State must demonstrate that the area's plan includes the measures that are achieved by sources in the same source category in nonattainment areas of the next higher classification. More detailed guidance on this showing will be provided in forthcoming EPA guidance expected in the fall of 1992 regarding the development of control strategies for the rate-of-progress demonstration plan.

2.4 Emissions Factor Adjustments

Emissions factors, as well as inventory calculation methodologies, are continually being improved. If emissions factors or methodologies change significantly, the EPA may advise the States to correct the base year emissions inventory to reflect such changes. The release of a revised MOBILE model (MOBILE5.0) is pending. The use of MOBILE5.0 is not required for the SIP submittal due in November 1992. Any emissions values calculated using MOBILE4.1 will have to be recalculated before submittal of the final rate-of-progress plan in November 1993. If other significant changes occur in emissions factors or methodologies before which time it is impossible for States to make adjustments to their 15 percent calculations and associated control strategies, then EPA may require States to make corrections to the base year emissions inventory, as well as to the adjusted base year inventory and the 1996 target level of emissions. Such corrections would be made prior to the submittal of any subsequent rate-of-progress demonstration.

3.0 RATE-OF-PROGRESS PLAN ELEMENTS

Required submittals for the rate-of-progress plan will be staggered to allow additional time for the control strategy development process. The dates and specific elements that are required for these submittals are listed below:

November 1992:

- Final 1990 base year inventory.[5]
- 1990 rate-of-progress base year inventory (limited to nonattainment area and excluding biogenic emissions).[6]
- Initial 1990 adjusted base year inventory.[7]
- Required 15 percent reductions.[7]

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[5]States must allow for public review of the base year inventories if they are to be used in a regulatory exercise such as rate-of-progress plans, attainment demonstrations, or maintenance plans. While 1990 base year inventories must be submitted to EPA by November 15, 1992, EPA will allow the public review process to occur after this date (because of the length of time generally required for scheduling and completing the public review process). If public review is held after the November 15 submittal, then prior to November 15, 1993, and prior to application in any regulatory activities, the inventory must be revised to reflect responses to public review comments.

[6]The rate-of-progress inventory is a subset of the final 1990 base year inventory and should be identified within the base year inventory documentation. This means that within the base year inventory submittal, emissions from anthropogenic sources (i.e., excluding biogenics) within the nonattainment area (excluding sources within the 25-mile buffer zone and sources in a model domain but outside of the nonattainment area) should be identified. This can be accomplished by summarizing emissions in the inventory for nonattainment area anthropogenic sources and then summarizing emissions for all other sources. Thus, the rate-of-progress inventory should be submitted as part of the 1990 base year inventory package due by November 15, 1992.

[7]The EPA stated in an August 7, 1992 memorandum from Mr. J. David Mobley, Chief, Emission Inventory Branch, to EPA Regional Office Chiefs, regarding "November 15, 1992, Deliverables for RFP and Modeling Emission Inventories," that these items (initial 1990 adjusted base year inventory through remaining items under November 1992) are required by November 15, 1992. If, however, a State will be submitting a full draft 15 percent rate-of-progress plan for public review in early 1993 (i.e., no later than March 1993), they may wait and submit the draft plan to EPA at the beginning of the public review period rather than submitting these items in November 1992. Please note, however, that for areas involved in ROM exercises, growth and control factors need to be submitted to EPA by November 15, 1992.

- Total expected reductions by 1996.[7]
- Target level for 1996.[7]
- Growth factors for developing projected rate-of-progress and attainment modeling inventories.[7]
- CAAA mandated control measures and their associated control efficiencies.[7]

May 1993:

- Draft 1996 projected emissions inventory with controls.

November 1993:

- Fully adopted rate-of-progress plan, including attainment demonstration for moderate areas not using the UAM.

Each of the items required for the November 1992 submittal are described in this section. Subsequent rate-of-progress plan submittals are discussed briefly in section 5.0 of this document. Further details on these elements will be provided in the document entitled, "Growth Factors, Projections, and Control Strategies," to be issued in the fall of 1992.

3.1 Base Year Inventory

Section 182(a)(1) requires all nonattainment areas to submit a comprehensive, accurate, and current inventory of actual emissions from all sources by November 15, 1992. This inventory is for calendar year 1990 and is identified as the base year inventory. It includes anthropogenic sources of NO_x and carbon monoxide (CO) emissions, as well as anthropogenic and biogenic sources of VOC. The base year inventory includes actual VOC, NO_x, and CO emissions for the area on both an annual basis (except for on-road mobile sources and biogenics) and a typical weekday basis during the peak ozone season, which is generally the summer months. All stationary and mobile sources within the nonattainment area, and stationary sources with emissions of 100 tpy or greater of VOC, NO_x, and CO emissions within a 25-mile wide buffer of the designated nonattainment area, must be included in the compilation. Including sources within a 25-mile buffer is necessary to ensure that all sources capable of affecting air quality within the nonattainment area are adequately accounted for in modeling demonstrations and strategy development. 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 are required in the base year inventory.

<u>Guidance Documents for Preparing Base Year Inventory</u>

Guidance documents are available from EPA that specifically pertain to the calculation and presentation of the 1990 base year inventory for the purpose of ozone nonattainment area SIP

development. Guidance related to the requirements for the 1990 base year inventory is available in the following document:

- Emission Inventory Requirements for Ozone State Implementation Plans. (See reference 1.)

Guidance specific to inventorying stationary sources is available in:

- Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone. Volume I: General Guidance for Stationary Sources. (See reference 2.)

For mobile sources the primary guidance documents include:

- Procedures for Emission Inventory Preparation. Volume IV: Mobile Sources. (See reference 3.)
- User's Guide to MOBILE4.1. (See reference 4.)
- VMT Forecasting and Tracking Guidance. (See reference 5.)

Guidance specific to inventorying biogenic sources is available in:

- Personal Computer Version of the Biogenic Emissions Inventory System (PC-BEIS) And User's Guide. (See reference 6.)

Other guidance documents related to the 1990 inventory are:

- Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone. Volume II: Emission Inventory Requirements for Photochemical Air Quality Simulation Models. (See reference 7.)
- Guidance for the Preparation of Quality Assurance Plans for O_3/CO SIP Emission Inventories. (See reference 8.)
- Quality Review Guidelines for 1990 Base Year Emission Inventories. (See reference 9.)
- Example Documentation Report for 1990 Base Year Ozone and Carbon Monoxide State Implementation Plan Emission Inventories. (See reference 10.)
- Guidelines for Estimating and Applying Rule Effectiveness for Ozone/CO State Implementation Plans. (See reference 11.)

Documentation Requirements of Base Year Inventory

States must provide their base year inventory information in both written and computerized formats. Adequate documentation on the source of the emissions estimates is required in the submission of the final base year inventory. This documentation will facilitate the milestone compliance determination and any necessary emissions estimate recalculations during the implementation of the SIP. Requirements and guidance for documentation of the base year inventory are presented in Emission Inventory Requirements for Ozone State Implementation Plans (EPA-450/4-91-010) and Example Documentation Report for 1990 Base Year Ozone and Carbon Monoxide State Implementation Plan Emission Inventories (EPA 450/4-92-007).

The written presentation of emissions inventory information has to be extensive enough for EPA to reproduce the emissions inventory elements that are submitted. The EPA's primary concern is that all inventory elements address the crucial elements inherent in a good inventory and provide summary data and documentation that allow the quality of the inventory effort to be effectively judged. Therefore, the emphasis is on the types of data that need to be reported and not the specific format in which they are reported. Inventories not meeting the minimum data reporting and documentation standards established in these documents will be deemed unacceptable and returned to the States for modification before any further technical quality review will be performed.

Adequate documentation includes all of the information that is necessary to understand how an emissions estimate was made. This level of documentation will allow EPA and the States to determine what the effects would be if some of the data were revised. For example, to understand the effect of changes in emissions factors, the State needs to document where the factors were employed and the supporting data (such as activity data) that were used in the emissions estimation process.

Some activity data may be revised during the period between submission of the rate-of-progress plan and the milestone demonstration (this could include preliminary population data obtained before the 1990 census data were finalized or VMT estimates that were later revised using a more sophisticated model). Therefore, States must document the source of the data as well as the date or version of the data (and whether the data are draft or final estimates).

3.2 Additional Rate-of-Progress Plan Elements

Rate-of-progress plan requirements under the CAAA result in the need to develop two inventories in addition to the base year inventory: the rate-of-progress base year inventory and the adjusted base year inventory. The rate-of-progress base year inventory is an inventory of actual anthropogenic 1990 emissions for the nonattainment area that is used to track the progress of

the 15 percent reduction plan. The 1990 adjusted base year inventory, which is also developed for the rate-of-progress plan, does not contain the expected emissions reductions from the FMVCP and RVP program from the 1990 rate-of-progress base year inventory. The required 15 percent reductions are calculated from this adjusted base year inventory and not the rate-of-progress base year inventory, thus lowering the States' emissions reduction burden.

1990 Rate-of-Progress Base Year Inventory

The 1990 rate-of-progress base year inventory accounts for the total anthropogenic VOC, CO, and NO_x emissions in the nonattainment area. The rate-of-progress base year inventory differs from the 1990 base year inventory in that the rate-of-progress base year inventory does not include biogenic source emissions nor emissions from sources located outside of the nonattainment area, while the base year inventory includes these emissions (e.g., for point, area, and mobile sources outside of the nonattainment area but within the UAM domain). States should document which sources and emissions are located within the nonattainment area as well as which are located outside of the nonattainment area. Also, the total biogenic emissions, which are also removed from the base year inventory, should be listed. Emissions for anthropogenic sources within the nonattainment area can be distinguished in the AIRS data set by using the appropriate retrieval criteria. The rate-of-progress base year inventory facilitates the calculation of the adjusted base year inventory.

1990 Adjusted Base Year Inventory

The 1990 adjusted base year inventory is the starting point for calculating the required 15 percent reductions, and also the first step in calculating the total expected reductions by 1996 and the 1996 target level of emissions. The 1990 adjusted base year inventory does not contain the expected FMVCP (in effect as of November 15, 1990) and RVP program emissions reductions from the 1990 rate-of-progress base year inventory. This adjustment lessens the States' emissions reduction burden, because the baseline emissions total from which the required 15 percent reduction is calculated has been lowered.

Documentation of the adjusted base year inventory will take two distinct forms. The written documentation must include the expected emissions reductions from the FMVCP and RVP program, as well as both the actual 1990 motor vehicle emissions using 1990 VMT and MOBILE emissions factors, and the adjusted emissions using 1990 VMT and the MOBILE emissions factors in calendar year 1996 with the appropriate RVP for the nonattainment area as mandated by EPA. (See reference 12.) States must provide EPA with information on how the MOBILE model was run in calculating the expected emissions reductions from the FMVCP and RVP program. Section 2.1 of this document provides a description of how the reductions from these programs are calculated.

For purposes of the AIRS Area and Mobile Source Subsystem (AMS) adjusted base year submittal, States must provide the RVP inputs as required under the CAAA for the nonattainment area, and run the MOBILE model with a 1996 vehicle mix (the 1990 base year inventory submittal will contain the actual 1990 motor vehicle emissions). Because the calculation of the FMVCP and RVP program emissions reductions requires two separate runs of the MOBILE model (see section 2.1 of this document for details), States will not submit the emissions reductions from these programs directly into AIRS.

Other requirements for documentation and submittal of the adjusted base year inventory to AIRS are the same as those for the 1990 base year inventory. States should realize that there will be no submittal of an "adjusted" point-source inventory for AFS because the point-source emissions are not altered in the calculation of the adjusted inventory from the rate-of-progress base year inventory. The point-source emissions for both the rate-of-progress and adjusted base year inventories can, therefore, be directly retrieved from the 1990 base year inventory. Stationary area-source emissions are not altered either. All adjustments apply to mobile source emissions. Base year and adjusted base year point and stationary emissions are different because of the different geographic coverage. The AIRS has a flag to indicate that the emissions are within the designated nonattainment area boundaries and, therefore, can separate the point and stationary area-source portions to develop portions of these two different inventories.

Required 15 Percent Reductions

The required 15 percent reductions represent the amount of creditable emissions reductions that must be demonstrated in the rate-of-progress plan. The amount of these required emissions reductions is calculated by multiplying the adjusted base year inventory by 0.15. The results of the 15 percent emissions reduction calculation can be documented on a single sheet of paper as the "required 15 percent reductions."

Total Expected Reductions

In addition to the creditable 15 percent reductions, there are other emissions reductions that are required under the CAAA. The "total expected reductions" are the sum of the following:

- 15 percent reductions.
- Expected reductions from the FMVCP (in effect as of November 15, 1990) and RVP program (1990-1996).
- Reductions from corrections to RACT rules.
- Reductions from corrections to I/M programs.

The expected reductions from the FMVCP and RVP program and any required corrections to RACT rules and I/M programs, which are calculated based on the methods described in section 2.1 of this document, should be documented on paper showing each step,

discussing any assumptions made, and stating the origin of the numbers used in the calculations.

Target Level for 1996

The target level of emissions for 1996 is the maximum amount of 1996 anthropogenic emissions within the nonattainment area that are permitted to occur while complying with the rate-of-progress requirements. The emissions level is determined by subtracting the total expected reductions from the 1990 rate-of-progress base year inventory. The EPA expects the States to document the target emissions level for 1996 as well as the calculations made in determining the target. In order to develop control measures in time to meet the required reductions by 1996, States should submit their 1996 target level of emissions to EPA by November 1992.

The following section provides background on growth factors and discusses how the growth factors that are required with the November 1992 SIP submittal should be determined and documented.

Economic Activity and Growth: Determinants and Indicators

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. But emissions are determined by specific production processes (e.g., xx printing or yy printing), inputs to those processes (e.g., low solvent versus ...), and the levels of output. With no change in the utilization of those processes, no additional processes, and no change in quality or quantity of inputs to those processes, the relationship of output to emissions seen in the past should be projected to occur in the future. However, if utilization rates change, new processes are adopted, or there are input changes, 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 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 that is due on November 15, 1993 for moderate ozone nonattainment areas using empirical kinetic modeling approach (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 up 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 the growth factor submittal is presented in Table 1. Other information that should be included with the list of growth factors includes: State ID, county ID, zone code (if the growth factor is to be used for a specific zone within a county), source category code (either SIC, AFS source classification code, or AMS source category code), growth factor reference (e.g., Bureau of Economic Analysis (BEA), plant-supplied, etc.), 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).

Well known sources of information and guidance on economic activity projections include the BEA's Regional Projections to 2040 (see references 13, 14, and 15) and Procedures for Preparing Emissions Projections (EPA-450/4-91-019). (See reference 16.) There will be more information forthcoming regarding economic activity and growth in a separate volume of the rate-of-progress plan guidance, entitled "Growth Factors, Projections, and Control Strategies," to be issued in the fall of 1992.

Control Measures/Factors

The CAAA mandated controls and their associated control efficiencies and rule effectiveness factors for both the rate-of-progress plan and the attainment demonstration are required in written and computer diskette (see Table 1) formats by November 15, 1992. The additional controls required to meet the 15 percent and/or attainment demonstration requirements are encouraged, but not required for this submittal.

The control measure information consists primarily of a list of control measures and associated control efficiencies on a computer diskette file formatted as depicted in Table 1. For control measures that will be applied during modeling of attainment, control information must be reported for the entire modeling domain, unless measures are specifically limited to the nonattainment area. Supplied control information for attainment year strategies will be used as input to the upcoming ROM exercises to improve consistency between ROM and urban area modeling results.

Also included should be the rule penetration (percentage of rule coverage) associated with new area-source control measures and any expected changes in rule effectiveness for point or area sources. In addition to the data on spreadsheet, paper documentation should be provided describing the control measures, assumptions made, and any further explanation needed for the information listed on the spreadsheet.

TABLE 1. PROJECTION AND CONTROL FACTOR FORMATS

PROJECTION YEAR 1996

STATE FIPS[8]	COUNTY FIPS[8]	ZONE	PLANT ID	POINT ID	SIC[9]	AFS/AMS SCC[10,11]	GROWTH FACTOR	GROWTH FACTOR REFERENCE	CONTROL EFFICIENCY VOC	CONTROL EFFICIENCY NO_x	CONTROL EFFICIENCY CO	RULE EFFECTIVENESS VOC	RULE EFFECTIVENESS NO_x	RULE EFFECTIVENESS CO	RULE PENETRATION VOC	RULE PENETRATION NO_x	RULE PENETRATION CO	CONTROL DESCRIPTION	YEAR[12]
Growth without new controls(existing RACT categories,etc.)																			
51	087	xxxx	0017	01	49	10100701	1.30	BEA[13]	0.00	68.10	0.00	xx.xx	80.00	xx.xx	xxx.xx	100.00	xxx.xx		90
51	087	xxxx	0017	02	49	10100701	1.30	BEA	0.00	68.10	0.00	xx.xx	80.00	xx.xx	xxx.xx	100.00	xxx.xx		90
51	087	xxxx	0132	01	49	20100202	1.45	BEA	0.00	88.00	0.00	xx.xx	80.00	xx.xx	xxx.xx	100.00	xxx.xx		90
CAAA mandated controls																			
51	031	xxxx	0005	27	25	40201901	1.32	BEA	72.00	0.00	0.00	80.00	xx.xx	xx.xx	100.00	xxx.xx	xxx.xx		95
51	059	xxxx	0024	21	25	40201901	1.32	BEA	72.00	0.00	0.00	80.00	xx.xx	xx.xx	100.00	xxx.xx	xxx.xx		95
51	710	xxxx	0009	24	37	40201699	1.38	BEA	88.00	0.00	0.00	80.00	xx.xx	xx.xx	100.00	xxx.xx	xxx.xx		95
51	087	xxxx	xxxx	xx	xx	2501060050	2.01	BEA	95.00	0.00	0.00	80.00	xx.xx	xx.xx	91.00	xxx.xx	xxx.xx		95
Additional controls to meet 15 percent rate-of-progress reduction																			
51	087	xxxx	0012	02	28	30120680	1.12	BEA	88.00	0.00	0.00	90.00	xx.xx	xx.xx	100.00	xxx.xx	xxx.xx		94
51	087	xxxx	0137	01	25	40202001	1.67	BEA	95.00	0.00	0.00	80.00	xx.xx	xx.xx	100.00	xxx.xx	xxx.xx		95
51	087	xxxx	xxxx	xx	xx	2401030000	1.19	BEA	94.00	0.00	0.00	80.00	xx.xx	xx.xx	100.00	xxx.xx	xxx.xx		95

[8] FIPS = Federal information processing standards.
[9] SIC = Standard industrial classification.
[10] SCC = Source classification code for AIRS facility subsystem (AFS) reporting.
[11] SCC = Source category code for AIRS area and mobile subsystem (AMS) reporting.
[12] Year that new control takes effect (e.g., regulation is enacted in 1994, but takes effect in 1995).
[13] Bureau of Economic Analysis.

3.3 Attainment Demonstration

States that do not intend to use UAM must submit their attainment demonstrations as part of the rate-of-progress SIP revision that is due in November 1993. Moderate areas are expected to attain the NAAQS for ozone by November 15, 1996. These moderate areas may either use UAM or EKMA in their modeling demonstrations. Serious and above areas are required to use UAM in their modeling demonstrations. Moderate interstate nonattainment areas are required to use UAM; moderate intrastate areas have the option of using UAM. Those moderate areas electing to use EKMA must submit a SIP revision by November 1993 incorporating a modeling demonstration which shows that the identified control measures will be sufficient to attain the NAAQS by November 15, 1996. If an area elects to use the UAM for its modeling demonstration, it may apply for a 1-year extension (to November 1994) for submitting a SIP revision reflecting an attainment demonstration. Both UAM and EKMA require emissions inventories for VOC, NO_x, and CO.

4.0 CREDITABILITY OF EMISSIONS REDUCTIONS

This section discusses the creditability of emissions reductions from selected control programs to the 15 percent VOC emissions reduction requirement. This presentation is not intended to be comprehensive in scope; instead, it is included to provide preliminary guidance while States begin developing their control strategies. A future document in this guidance series, "Growth Factors, Projections, and Control Strategies," will describe details on emissions reductions creditability for additional control measures.

States can credit emissions reductions toward the 15 percent VOC emissions reduction requirement only if the CAAA do not specify that such emissions reductions are not creditable, and the reductions meet the following requirements. All emissions reductions must be real, permanent, and enforceable. States must keep careful records of all emissions reductions to ensure that the same reductions are not "double-counted" or, more simply, used more than one time. In all circumstances, any real emissions reductions that contribute to attainment of the standard are creditable in the attainment demonstration.

Section 182(b)(1)(C) and section 182(b)(1)(D) explicitly disallow certain reductions from counting toward the fulfillment of the 15 percent reduction in emissions requirement. All real, permanent, and enforceable post-1990 VOC emissions reductions are creditable toward the 15 percent requirement except for reductions resulting from the following:

1. The FMVCP tailpipe or evaporative standards promulgated prior to 1990.

2. Federal regulations on RVP (55 FR 23666, June 11, 1990).

3. State regulations required under section 182(a)(2)(A) submitted to correct deficiencies in existing RACT rules.

4. State regulations required under section 182(a)(2)(B) to establish an I/M program or correct deficiencies in existing I/M programs.

Remember that the noncreditables identified in numbers 1 and 2 above are not contained in the 1990 adjusted base year inventory that is used to calculate the 15 percent emissions reduction. The 1990 adjusted base year inventory, in effect, decreases the target level of emissions (i.e., the total level of emissions allowed to be produced). Also, these programs cannot be used to achieve the 15 percent VOC emissions reductions.

The following paragraphs provide a brief discussion of programs that are creditable toward the 15 percent emissions reduction requirement. Also briefly discussed are examples where

reductions are not creditable to the 15 percent reduction (i.e., RACT rule and I/M fix-ups). Not discussed in this section are the noncreditable emissions reductions from the FMVCP and RVP program; section 2.1 of this document discusses these programs and how the emissions reductions from these programs are calculated and treated for rate-of-progress purposes.

The programs described here do not constitute an exhaustive list of all potential creditable programs. Any other new requirements which generate reductions within a nonattainment area, such as the marine vessel loading regulations, are creditable toward the 15 percent.

4.1 RACT Programs

Emissions reductions resulting from required corrections to VOC RACT rules ("RACT fix-ups") are not creditable toward the required 15 percent VOC emissions reduction; any future reductions resulting from measures not associated with the required corrections would be creditable. For example, RACT rule corrections involving revision to applicability thresholds and emissions limits, or additions of missing regulations that were required preenactment are not creditable toward the 15 percent VOC emissions reduction requirements (or offsets). If the State revises the emissions limit or changes the applicability threshold beyond the level required in EPA guidance (see reference 17), and these modifications result in further emissions reductions, these additional reductions are creditable. In this case, the State would need to differentiate, through documentation submitted in the rate-of-progress plan, between emissions reductions that occurred through a correction to the RACT rule and the additional reductions that resulted from extension of the rule to sources of a lower threshold than recommended in EPA's model RACT rule guidance.

RACT Fix-Ups

Section 182(b)(1)(D)(iii) specifies that emissions reductions generated from corrections to RACT rules (RACT fix-ups) required under section 182(a)(2)(A) are not creditable toward meeting the rate-of-progress requirements. These corrections can be described in two ways: (1) where the emissions reductions from the corrections are difficult to attribute directly to the fix-up (any emissions reductions associated with these types of corrections may generally be considered rule effectiveness improvements), and (2) where the resultant decrease in emissions is more clearly attributable to RACT fix-ups.

In the first case, emissions reductions associated with such fix-ups are difficult to sort-out from those achieved from rule effectiveness and, therefore, EPA believes that it is appropriate to allow such corrections, in combination with improved compliance programs that result in additional, quantifiable, and enforceable emissions reductions, to count towards meeting the rate-of-progress requirements as part of a rule effectiveness

improvement effort. For example, RACT rule corrections that add the appropriate recordkeeping requirements or test methods do not directly result in additional emissions reductions. However, the resulting RACT rules are more enforceable, and the corrections make determining compliance an easier task. The EPA believes that in such situations, credit is given to the States for improving the compliance programs, not for correcting the RACT rules, although the RACT fix-up program was essential to creating more enforceable rules.

In the second case, however, corrections do result in additional, enforceable, and quantifiable emissions reductions. These corrections, which are not creditable toward the 15 percent requirement, include situations where:

- A rule was missing (i.e., a State committed to develop a rule as part of its 1977 SIP, or post-1982 SIP, but never carried through on the commitment prior to the CAAA).
- The limit was wrong.
- A capture system is now required to ensure meeting the RACT limit.

Appendix B provides example emissions reduction calculations for each of these three examples. These examples are not intended to be fully inclusive. States should evaluate all RACT rule corrections to determine if such corrections result in real, enforceable, and permanent emissions reductions. If so, such reductions must be quantified and considered noncreditable in the SIP development process.

RACT Catch-Ups

Emissions reductions resulting from RACT catch-ups are creditable. One example of a RACT catch-up occurs when applying the RACT rules to the newly designated portions of a preenactment nonattainment area not previously subject to the rules. For example, if an area is extended to include three counties that were not previously part of the nonattainment area, application of RACT rules to sources in those counties will result in creditable emissions reductions.[14] However, States that employed statewide RACT rule implementation to avoid the new source preconstruction monitoring requirements will not necessarily receive credit. Such States will only receive credit for the emissions reductions resulting from the enhancement of RACT rule requirements brought about by the CAAA, extending beyond RACT rule requirements already on the books, and implemented after the 1990 base year.

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[14]In addition, if the counties were not part of an existing I/M program, extension of the I/M program to the counties will result in creditable reductions.

Reductions achieved through rules adopted pursuant to any new control technique guideline (CTG) are creditable only to the extent that the reductions were not required by a SIP or Federal implementation plan developed under the pre-amended Act. For example, if a non-CTG rule in a SIP prior to enactment (or required to be included in such a SIP) required an 81 percent reduction in VOC emissions and a new CTG for the same source category recommends a 90 percent reduction, to the extent that a specific source achieves the 90 percent reduction, only up to 9 percent would be creditable. In addition, if a State was required to adopt a RACT rule for a particular source under the pre-amended Act but failed to do so, adoption of a rule for that source would be considered part of the RACT fix-ups. Therefore, any reductions achieved by such a rule would not be creditable.

4.2 Inspection and Maintenance Programs

The I/M Section of the Emission Planning and Strategies Division of the EPA's Office of Mobile Sources has published a draft technical support document that discusses I/M program performance standards for VOC emissions. (See reference 18.) Emissions reductions that result from corrections to I/M programs that failed to meet this performance standard, or from corrections to programs that failed to meet a more stringent standard previously included in the SIP, are not creditable toward the 15 percent emissions reduction requirement. Any other improvements in I/M programs required by the CAAA (such as enhanced I/M) or any improvements that a State chooses to make in a new SIP are creditable. In the case where a State has both made corrections to its SIP according to the EPA's minimum performance standard, and included additional provisions that go beyond that standard, the State will model two I/M programs in the MOBILE model to calculate the creditable reductions; one representing the program up to the EPA's minimum standard, and the other with the State's full I/M program. The difference between the two programs' emissions reductions represents the portion of the total emissions reduction that is creditable toward the 15 percent emissions reduction requirement. Appendix C provides details on calculating the emissions reductions from I/M program corrections.

4.3 Preenactment Banked Emissions Reduction Credits

If the State has an emissions credit bank that meets the EPA's requirements under an earlier policy statement (see reference 19), the State is allowed to use its preenactment banked emissions reduction credits to facilitate the location of new sources in nonattainment areas during the 1990-1996 period. However, because these reduction credits represent emissions that are not included in the 1990 base year inventory, any additional emissions that result from the use of banked credits must be treated as growth in order to ensure that the 15 percent VOC emissions reduction requirement is achieved. Also, it is important to note that the use of preenactment banked emissions

credits must be in accordance with the offset ratios prescribed in the CAAA (e.g., 1.3 to 1 in severe areas.)

Figure 3 presents an example of the use of preenactment banked emissions credits during the 1990-1996 period. In this example, a new 30 tpy source of VOC emissions wishes to locate in a severe nonattainment area, and the State allows the source to use available preenactment banked emissions credits. Because the source wants to locate in a severe nonattainment area, 39 tpy of VOC emissions must be removed from the bank (i.e., 30 tpy x 1.3 = 39 tpy). Although the bank has been reduced by 39 tpy, there has been a 30 tpy increase in emissions in the nonattainment area due to the new source. To assure that new source growth will not interfere with the 15 percent VOC emissions reduction requirement when preenactment banked credits are used, existing sources must eventually, by time of reconciliation, reduce their emissions at least as much as the emissions growth:

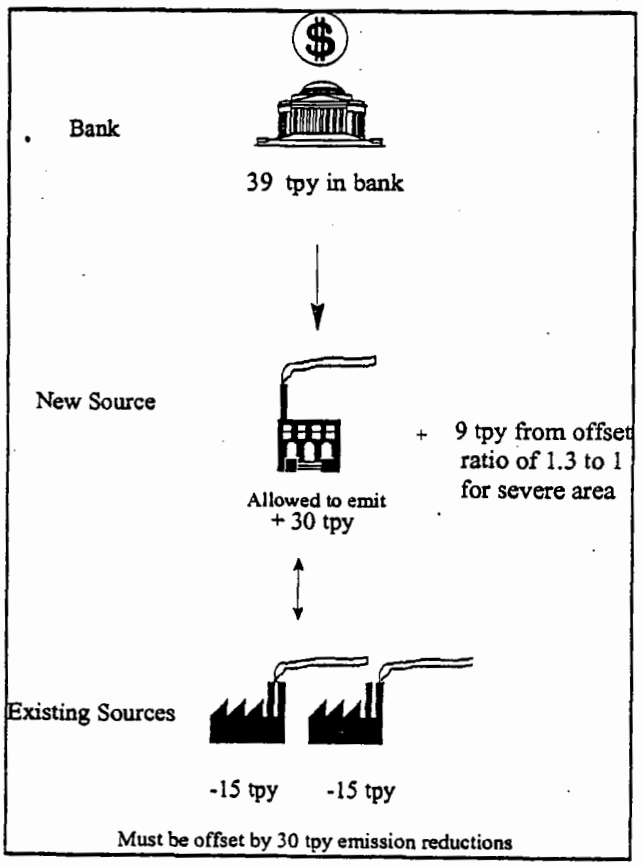

Figure 3. Example of use of preenactment banked emissions credits.

4.4 Maximum Achievable Control Technology (MACT) Standards

General Requirements

Many of the 189 hazardous air pollutants listed under section 112(b)(1) of the Act are VOC's. Any emissions reductions of a hazardous VOC resulting from the application of a MACT standard is creditable toward the 15 percent VOC emissions reduction requirement for ozone nonattainment areas. Any incidental emissions reduction of a non-hazardous VOC resulting from the application of a MACT standard is also creditable toward the 15 percent VOC emissions reduction requirement. It is important to note that some sources will be subject to both MACT standards and RACT rules. Because only the more stringent of the two standards will apply in these cases, States should be aware that double counting of the VOC emissions reductions from these two programs is not permitted.

States should recognize that reductions resulting from MACT standards must occur prior to November 15, 1996, to be creditable toward the 15 percent VOC emissions reduction requirements. Most MACT standards will not be promulgated until after the post-1996 emissions reduction requirements take effect. Guidance regarding the creditability of MACT reductions toward the post-1996 reduction requirements is presently under development within EPA.

Section 112(d)(1) of the CAAA requires the promulgation of regulations establishing emissions standards for categories and subcategories of major sources and area sources of the 189 hazardous air pollutants. The emissions standard for a particular hazardous air pollutant emitted from a new or existing source must be based on the maximum degree of reduction that the Administrator determines is achievable through the application of emissions control technologies. The determination of MACT considers the cost of achieving such emissions reductions and any non-air quality health and environmental impacts and energy requirements.

Early Reductions Program

As a temporary alternative to complying with an applicable MACT standard, an existing source may elect to comply with the early reduction requirements of section 112(i)(5). By electing to achieve early reductions, an existing source may, under certain conditions, meet an alternative emissions limit in lieu of meeting an otherwise applicable MACT standard. The alternative emissions limit expires 6 years after the otherwise applicable MACT standard compliance date, at which time the source must comply with the MACT requirement. Except as follows, to obtain the MACT compliance extension the reduction must be achieved before the otherwise applicable MACT standard is first proposed. A source may also obtain an extension if it commits to make the 90 percent reduction prior to proposal of the MACT standard and actually achieves the 90 percent reduction prior to January 1, 1994.

The early reduction program requires a source to achieve hazardous air pollutant emissions reductions of at least 90 percent (at least 95 percent in the case of particulates). The emissions reduction must be determined from a comparison of the actual post-control emissions with the actual and verifiable emissions in a base year not earlier than 1987. A base year of 1985 or 1986 can be used by a source if its emissions data are based on information received by the Administrator prior to November 15, 1990, pursuant to an information request issued under section 114 of the Act.

Hazardous VOC emissions reductions under the early reduction program are creditable toward the 15 percent VOC emissions reduction requirements to the extent that reductions were taken after the 1990 base year inventory applicable to the 15 percent VOC emissions reduction requirements. Because a source can credit reductions that took place prior to 1990 toward the early reduction program, the entire 90 percent early reduction may not be creditable toward the rate-of-progress requirement.

States should be aware that EPA is developing a policy regarding potential conflicts between the early reduction program and the RACT requirements. (See reference 20.) The interaction between the early reduction program and RACT requirements causes concern because the prospect of applying RACT requirements to sources that already made early reductions would effectively limit the attractiveness of, and therefore participation in, the early reductions program. Additionally, States should also be aware that early reductions must be taken prior to November 15, 1996, to be credited toward the 15 percent VOC emissions reduction requirements. Guidance regarding the creditability of section 112(i)(5) early reductions toward the post-1996 reduction requirements is presently under development within EPA. Readers interested in further details regarding the section 112(i)(5) early reductions program are referred to the proposed regulations published in the Federal Register. (See reference 21.) Final rules are anticipated by early 1993.

4.5 Rule Effectiveness Improvements

Many States with preexisting nonattainment areas have already adopted rules defining RACT for most of the larger sources, including non-CTG categories. In such cases, there is considerable concern about what additional measures are needed to meet the 15 percent VOC emissions reduction requirement. One method of achieving creditable reductions from stationary sources in such areas is to improve the implementation of existing regulations. This is referred to as rule effectiveness improvement. These improvements are subject to the same creditability constraints as are the other emissions

reductions.[15] Rule effectiveness improvements must reflect real emissions reductions resulting from specific implementation program improvements. Actual emissions reductions must result from improving rule effectiveness; simply calculating a higher rule effectiveness using a different methodology is not creditable.

Rule effectiveness improvements must be documented at a minimum by conducting a post-implementation (after the implementation of rule effectiveness improvement programs) source-specific emissions study. Two methods are available for calculating creditable rule effectiveness improvements; both require that a post-implementation Stationary Source Compliance Division (SSCD) protocol study be conducted. The first method involves pre- and post-rule effectiveness improvement implementation studies as delineated by SSCD. For example, if the rule effectiveness increases from 50 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 pre-rule effectiveness improvement rule effectiveness value. Thus, if the results of a SSCD protocol study show 85 percent rule effectiveness 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 rule effectiveness, including provisions for the calculation and use of category-specific rule effectiveness factors, is available in Guidelines for Estimating and Applying Rule Effectiveness for Ozone/CO State Implementation Plans. (See reference 22.) The document "Growth Factors, Projections, and Control Strategies," to be released in the fall of 1992, will provide a list of control measures that involve rule effectiveness improvements. Future guidance is under development for the quantification of rule effectiveness improvements. The EPA plans to issue the quantification guidance by late fall of 1992.

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[15]For example, some RACT rule corrections that result in improved rule effectiveness may be creditable; a discussion of this appears in section 4.1 of this document.

5.0 PREVIEW OF THE DEVELOPMENT OF EMISSIONS PROJECTIONS, CONTROL STRATEGY, AND 1996 MILESTONE COMPLIANCE DEMONSTRATION

This document focuses on the development and submittal of the elements of the rate-of-progress plan due by November 15, 1992. While EPA review of this submittal is underway, States should undertake the calculation of emissions projections for the year 1996 and the development of full control strategies. 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. A separate guidance document is being developed by EPA on these other elements of the rate-of-progress plan, which will include hypothetical nonattainment area examples in describing the development of the required elements for these submittals. This guidance is expected to be available in the fall of 1992.

The first milestone demonstration must illustrate that the area has reached the 1996 target level of emissions as defined in the 15 percent VOC emissions reduction demonstration plan. Actual annual and typical ozone season weekday emissions for point sources should be listed by facility. Area and off-highway source emissions for each county by source category should also be listed. Finally, the highway vehicle emissions should be listed. Once the emissions from all of the known anthropogenic sources are listed, the total emissions for the nonattainment area should be computed and compared to the 1996 target.

Section 182(a)(3)(A) requires the States to submit periodic inventories starting the third year 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 CO emissions sources. Like the base year inventory, the periodic inventory is to be determined using typical peak ozone season weekday emissions.

The specific reporting requirements for the 15 percent VOC emissions reduction milestone demonstration will be addressed in an EPA regulation to be promulgated in the summer of 1993. This regulation will address summary data needs as well as detailed reporting requirements. The rule will also address consequences of submitting an inadequate demonstration (in terms of documentation) as well as consequences of failure to demonstrate the 15 percent VOC emissions reduction.

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20. "Early Reductions Program/Title I Interface," Memorandum from John S. Seitz, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. December 20, 1991.

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22. Reference 11.

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 non-road 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[16] (EPA-450/2-78-027R), 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 (EPA-450/4-80-027) as well as the aforementioned guideline that is under revision. This document, and the appropriate Regional Office, should be consulted before an analysis is conducted with this modeling approach. The use of UAM is described in Guideline for Regulatory Application of the Urban Airshed Model (EPA-450/4-91-013).[17]

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[16] Guidance on Air Quality Models (Revised), EPA-450/2-78-027R, July 1986 (currently under revision).

[17] 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.

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 CAAA have multiple definitions for major stationary sources depending upon the nonattainment classification and the pollutant. Section 302 of the CAAA 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 CAAA, 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 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) describes 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

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

Ozone Nonattainment Area	VOC (tpy)	NO_x (tpy)	Minimum Emissions Offset Ratio Required
Extreme	10	10	1.5 to 1[18]
Severe	25	25	1.3 to 1[18]
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[19]	100	100	>1.0 to 1
All other nonattainment areas, in an ozone transport region[19]	100	100	1.15 to 1
Attainment, in an ozone transport region	50	100	1.15 to 1

[18]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.

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

emissions by 1996. This inventory is equal to "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 FMVCP regulations promulgated by January 1, 1990, and 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 of 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.**[20]

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 greater 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 area-wide 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

[20]See figures 1 and 2 in section 2.0 of this document for a further description of the relationship of the adjusted base year inventory to the 1990 rate-of-progress base year inventory.

year inventory serves as the starting point for all other inventories.

1990 Rate-of-Progress Base Year Inventory 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 offsets will be provided in forthcoming guidance regarding the interaction of the 15 percent VOC emissions reduction requirements of Title I with the emissions reduction requirements of other Titles (i.e., New Source Review, Title II reductions, etc.).

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 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" 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 adopted RACT consistent with all of the CTG's to "catch-up" and apply RACT to all sources covered by a preenactment or post-enactment CTG document. Many of these areas were not previously required to apply RACT to sources covered by Group III CTG's (CTG's 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" 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 pre-amendment 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 pre-amendment guidance. Since the RACT "fix-up" provisions refer to RACT as required by pre-amended section 172(b), only areas subject to pre-amended 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 outstanding deficiencies that still had not been corrected. 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 demonstration, 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 three different methods for determining RE: 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.[21]

[21] 57 Federal Register 3945, February 3, 1992.

APPENDIX B:
CALCULATION OF EMISSIONS REDUCTIONS FROM RACT RULE CORRECTIONS

Section 4.1 of this document discusses cases where RACT rule corrections do not directly result in quantifiable emissions reductions. Any incidental reductions that occur in these cases may be handled as part of a rule effectiveness improvement. Corrections to RACT rules that may result in additional, enforceable, and quantifiable emissions reductions include situations where:

- A rule was missing (i.e., a State committed to develop a rule as part of its 1977 SIP, or post-1982 SIP, but never carried through on the commitment prior to the CAAA).
- The limit was wrong.
- A capture system is now required to ensure meeting a RACT limit.

For the case where a rule was missing, the State should first calculate the uncontrolled emissions in 1990 and multiply the 1990 uncontrolled emissions by the appropriate growth factor. Next, the State must evaluate the expected emissions reduction in 1996 by calculating 1996 emissions (including growth and controls) and subtracting this number from 1990 emissions. This total expected emissions reduction should be added to the total reductions in step 5 in the example in section 2.1 of this document. These reductions are not creditable toward the 15 percent VOC emissions reduction requirement.

For the second case, the State should first evaluate the pound (lb) VOC/gallon (gal) solids for each limit.

1990 limit = 3.5 lb VOC/gal coating

1) 1990 lb VOC/gal solids =

$$3.5 \frac{\text{lb VOC}}{\text{gal coating}} \times \frac{1 \text{ gal coating}}{7.36 \text{ lb VOC}} = 0.476 \frac{\text{gal VOC}}{\text{gal coating}}$$

2) Calculate solids in 1 gal coating:
   1 - 0.476 = 0.524 gal solids

3) Calculate gallons of coating needed to get gallon of solids:

$$\frac{1 \text{ gal coating}}{0.524 \text{ gal solids}} = \frac{1.908 \text{ gal coating}}{\text{gal solids}}$$

4) Convert 3.5 lb/gal coating to lb VOC/gal solids:

$$\frac{3.5 \text{ lb VOC}}{\text{gal coating}} \times \frac{1.908 \text{ gal coating}}{\text{gal solids}} = 6.678 \frac{\text{lb VOC}}{\text{gal solids}}$$

The 1996 limit will be 2.9 lb/gal.

Similarly, convert 2.9 lb VOC/gal coating to lb VOC/gal solids.

5) $\frac{2.9 \text{ lb VOC}}{\text{gal coating}} \times \frac{1 \text{ gal VOC}}{7.36 \text{ lb VOC}} = 0.394 \frac{\text{gal VOC}}{\text{gal coating}}$

6) Volume of solids in 1 gal coating:
$1 - 0.394 = 0.606$ gal solids

7) Calculate gallons of coating needed to get 1 gallon of solids:
$\frac{1 \text{ gal coating}}{0.606 \text{ gal solids}} = 1.650 \frac{\text{gal coating}}{\text{gal solids}}$

8) Convert 2.9 lb VOC gal coating to lb VOC/gal solids:
$\frac{2.9 \text{ lb VOC}}{\text{gal coating}} \times \frac{1.650 \text{ gal coating}}{\text{gal solids}} = 4.785 \frac{\text{lb VOC}}{\text{gal solids}}$

The facility uses 100 $\frac{\text{gal solids}}{\text{day}}$ in 1990

9) Compare 1990 and 1996 Emissions:

$1990 = 6.678 \frac{\text{lbs VOC}}{\text{gal solids}} \times 100 \text{ gal } \frac{\text{solids}}{\text{day}} = 667.8 \frac{\text{lbs VOC}}{\text{day}}$

$1996 = 4.785 \frac{\text{lb VOC}}{\text{gal solids}} \times 100 \text{ gal } \frac{\text{solids}}{\text{day}} \times \text{growth factor}(1.2)$
$= 574.2 \frac{\text{lb VOC}}{\text{day}}$

1990 Emissions - 1996 Emissions = $667.8 - 574.2 = 93.6 \frac{\text{lb VOC}}{\text{day}}$

Therefore, 93.6 lb VOC/day are noncreditable.

For the third case where a capture system is required, expected emissions reductions should be calculated in the following way. First, uncontrolled emissions should be determined.

1990 Paper Coaters:

- 80 percent of emissions coming out of the oven and vented to an incinerator of 98 percent demonstrated destruction efficiency.
- 20 percent of emissions are fugitive from uncontrolled flash-off area.

Total uncontrolled emissions in 1990 =

1,000 lb/day if total is uncontrolled, however, when system is controlled, 80 percent of this is captured, and 98 percent of captured emissions are destroyed.

So, emissions from the incinerator after control are 1,000 lb/day x (1-(0.80)) x (1-(0.98)) =

(1,000 lb/day) x (0.20) x (0.02) = 4 lb/day controlled. Total Emissions from incinerator + fugitives = 4 lb/day + (1,000 lb/day x (0.20)) = 204 lb/day

1996 Emissions:

New State rule now requires permanent total enclosure, so the controlled emissions are:

1,000 lb day (1.0) (0.02) = 20 lb/day

Noncreditable Emissions Reductions =
1990 Emissions - 1996 Emissions = 204 lb/day - 20 lb/day
184 lb/day

The preceding examples are not intended to be fully inclusive. States should evaluate all RACT rule corrections to determine if such measures result in real, enforceable, and permanent emissions reductions. If so, such reductions must be quantified and considered in the SIP development process when preparing the 1996 target level of emissions. If a State is unclear on how to calculate such reductions, then the State should consult with the Regional Office and Headquarters for guidance.

APPENDIX C:
CALCULATION OF EMISSIONS REDUCTIONS FROM I/M PROGRAM CORRECTIONS

Corrections to I/M programs occur when either (1) the area's I/M program does not meet the reductions achieved by EPA's minimum requirements, or (2) an area's program does not meet the standards of their current SIP. I/M program corrections are calculated by modeling two separate I/M programs in MOBILE4.1: the area's current I/M program, and the stricter of: the I/M program described in the area's SIP, or the minimum I/M program as specified by EPA. MOBILE4.1 (or MOBILE5 with the flag set to turn off new CAAA measures) should be run for calendar year 1996 using I/M input that describes the program before and after corrections are made. The difference between the resulting emissions factors is then multiplied by 1990 VMT to get the emissions reduction associated with the I/M program correction.

In case 1, the motor vehicle emissions factor is calculated for 1996 with the area's current program and with EPA's model program. In each case, the MOBILE model is run with the pre-CAAA FMVCP and phase II RVP. No additional CAAA requirements are modeled. Sample MOBILE4.1 inputs for EPA's model program are shown in Table C-1.

TABLE C-1. INSPECTION AND MAINTENANCE (I/M) PROGRAM INPUTS

I/M Program Characteristics	Input
Start year (January 1)	1983
Pre-1981 model stringency rate	20%
First model year covered	1968
Last model year covered	2020
Waiver rate (pre-1981)	0%
Waiver rate (1981 and newer)	0%
Compliance rate	100%
Inspection type	Centralized
Inspection frequency	Annual
Vehicle types covered	LDGV

The difference in motor vehicle emissions with the current program and the model program is the I/M program correction. This correction should only be calculated for areas within the nonattainment area which were required to have an I/M program under the Act.

The following describes an example I/M program correction calculation. It is important for States to realize that these reductions are not creditable toward the 15 percent VOC emissions reduction requirement.

SAMPLE I/M CORRECTION CALCULATION:[22]

1990 VMT: 101.6 million miles per day

1996 MOBILE4.1 emissions factor with area's current program: 1.291 grams/mile

1996 MOBILE4.1 emissions factor with EPA's minimum model program: 1.248 grams/mile

Calculate motor vehicle emissions:

current program:

$$\frac{101.6 \times 10^6 \text{ miles}}{\text{day}} \times \frac{1.291 \text{ grams}}{\text{mile}} = 288{,}911 \text{ lbs/day}$$

model program:

$$\frac{101.6 \times 10^6 \text{ miles}}{\text{day}} \times \frac{1.248 \text{ grams}}{\text{mile}} = 279{,}288 \text{ lbs/day}$$

Calculate I/M correction:

I/M correction = Emissions with current I/M - Emissions with model I/M

= 288,911 - 279,288

= 9,623 lb/day of noncreditable emissions.

In case 2, motor vehicle emissions are calculated with the area's current program as implemented and with the program required under the area's SIP. Again, MOBILE4.1 input files should model the FMVCP and phase II RVP but no additional CAAA controls. The difference between these two estimates is the I/M correction.

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[22]This calculation uses total VMT and a total speed/vehicle type weighted emissions factor. Alternatively, VMT and emissions factors by vehicle type/roadway class could be used to calculate total emissions under the current program and EPA's model program.