

PLAN TO IMPROVE AIR QUALITY IN THE WASHINGTON, DC-MD-VA REGION

EXECUTIVE SUMMARY

State Implementation Plan (SIP) "Severe Area SIP"

**Demonstrating Rate of Progress for 2002 and 2005;
Revision to 1990 Base Year Emissions; and
Severe Area Attainment Demonstration
for the
WASHINGTON DC-MD-VA
NONATTAINMENT AREA**

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for the

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on behalf of the Metropolitan Washington Air Quality Committee

August 4, 2003

1.0 EXECUTIVE SUMMARY

The Clean Air Act Amendments of 1990 (CAAA or Act) represent an unprecedented commitment to protecting public health and the environment. Title I of the Act classifies areas that exceed national health-based air quality standards based upon the severity of their pollution problem (marginal, moderate, serious, severe, and extreme) and, accordingly, prescribes increasingly stringent measures that must be implemented and sets new deadlines for achieving the standards. The Act also establishes specific emissions reduction requirements to ensure that continual progress toward attainment is made.

High levels of ozone are a health problem. When it is breathed into the lungs, ozone reacts with lung tissue. It can harm breathing passages, decrease the lungs' working ability and cause coughing and chest pains; eye and throat irritation; breathing difficulties even for healthy individuals, but especially for those with respiratory problems such as allergies, asthma, bronchitis and emphysema; and greater susceptibility to respiratory infection.

Not only does ozone pose a threat to human health, but also it poses a threat to the health of natural ecosystems. Scientific evidence suggests that air pollution weakens the immune systems of many types of vegetation and can cause significant crop damage. In addition, rain and snow wash air pollution deposited on vegetation and architectural surfaces into the streams and rivers of the region and finally into the Chesapeake Bay.

This document, the Severe Area Attainment Plan for the Metropolitan Washington Nonattainment Area, is a plan to improve air quality in the Washington region to meet the national air quality standard for ozone (one-hour ozone standard). The Plan consists of two Rate of Progress demonstrations, for the period 1999-2002 and for the 2002-2005; and an attainment demonstration for 2005.

Additionally, the plan includes commitments by the states to meet requirements for severe nonattainment areas, commitments by the states to meet additional EPA requirements for the Washington region including a contingency plan for 1999 rate of progress, contingency plans for the 2002 and 2005 rates of progress, and an analysis of Reasonably Available Control Measures. The plan presents revised emissions inventories for 1990, 2002 and 2005 based on the MOBILE6 mobile emissions model, the revised travel demand model Version 2, and includes technical corrections to the inventories.

The Severe Area Attainment Plan is intended to show the progress being made to improve air quality in the Washington nonattainment area and the efforts underway to assure that all necessary steps are taken to reach the federal health standard for ground-level ozone by 2005. The plan has been prepared by the Metropolitan Washington Air Quality Committee to comply with the Clean Air Act Amendments of 1990 and with EPA requirements for the Washington region as stated in EPA's reclassification of the Washington region (January 2003) and in EPA's conditional approval of the Metropolitan Washington region's State Implementation Plan (April 2003).

TABLE A
SUMMARY OF CONTROL STRATEGIES
VOC and NOx Benefits of Control Measures
(1990-2005)

Reductions		VOC Reductions		NOx	
		tons/day		tons/day	
Ref No.	Control Measure	2002	2005	2002	2005
POINT SOURCE MEASURES					
7.2.5	Non-CTG VOC RACT to 25 tpy	1.2	1.2	0	0
7.2.9	State NOx RACT and Regional NOx Transport Requirement	0	0	203.8	280.0
7.4.7	Expanded State Point Source Regulations to 25 tons/yr	1.7	1.8	0	0
SUBTOTAL		2.9	3.0	203.8	280.0
AREA SOURCE MEASURES					
7.2.2	Stage II Vapor Recovery Nozzles	15.2	15.0	0	0
7.2.6	Phase II Gasoline Volatility Controls	2.6	2.3	0	0
7.3.1	Reformulated Surface Coatings	16.4	17.1	0	0
7.3.2	Reformulated Consumer Products	4.0	4.1	0	0
7.3.4	Reformulated Industrial Cleaning Solvents	0.94	0.99	0	0
7.3.5	Standards for Locomotive	0.0	0.0	2.7	2.9
7.4.3	Surface Cleaning/Degreasing for Machinery/Automotive Repair	4.1	4.4	0	0
7.4.4	Landfill Regulations	2.3	2.5	0	0
7.4.5	Seasonal Open Burning Restrictions	7.1	7.1	1.5	1.5
7.4.6	Stage I Expansion (Tank Truck Unloading)	1.5	1.6	0	0
7.4.8	Graphic Arts Controls	3.7	3.9	0	0
7.4.9	Auto body Refinishing	9.3	9.8	0	0
7.4.10	Ozone Transport Commission (OTC) Consumer Products	2.1	2.1	0	0
7.4.11	Ozone Transport Commission (OTC) Portable Fuel	1.3	1.3	0	0
7.4.12	Ozone Transport Commission (OTC) Architectural and Industrial Maintenance Coatings Rule	12.3	12.3	0	0
7.4.13	Ozone Transport Commission (OTC) Mobile Repair and Refinishing Rule	2.6	2.6	0	0
7.4.14	Ozone Transport Commission (OTC) Solvent Cleaning Operations Rule	11.7	11.7	0	0
SUBTOTAL		97.1	98.8	4.2	4.4
ON-ROAD MEASURES					
7.2.1	High-Tech Inspection/Maintenance	TBD	TBD	TBD	TBD
7.4.1	Reformulated Gasoline (on-road)	TBD	TBD	TBD	TBD
7.2.3	Federal "Tier I" Vehicle Standards and New Car Evaporative Standards	TBD	TBD	TBD	TBD
7.2.4	Tier 2 Motor Vehicle Emission Standards	TBD	TBD	TBD	TBD
7.3.3	National Low Emission Vehicle Program	TBD	TBD	TBD	TBD
7.3.6	Heavy-duty Diesel Engine Rule	TBD	TBD	TBD	TBD
7.5	Transportation Control Measures	0.3	0.3	0.7	0.7
SUBTOTAL		55.6	80.0	46.0	85.0
NON-ROAD MEASURES					
7.2.7	EPA Non-Road Gasoline Engines Rule	21.9	25.9	0	0

7.2.8	EPA Non-Road Diesel Engines Rule	0	0	14.8	21.8
7.2.10	Emissions standards for spark ignition marine engines	1.2	3.0	0	0
7.2.11	Emissions standards for large spark ignition engines	0	0.7	0	0.4
7.4.2	Reformulated Gasoline (off-road)	2.7	2.8	0	0
SUBTOTAL		25.8	32.4	14.8	22.2
TOTAL REDUCTIONS		181.4	214.2	268.8	391.6

1.2 Background

In 1990 the Environmental Protection Agency (EPA) classified the Metropolitan Washington region as “serious” for ozone nonattainment and required the region to submit to the U.S. Environmental Protection Agency (EPA) revisions to the State Implementation Plans (SIPs) demonstrating how emissions that contribute to the formation of ozone will be reduced by 15% from 1990-1996 and by 3% per year until the area reaches attainment of the standards. The attainment date for the Washington region was November 15, 1999. The Washington region was also required to submit a demonstration, based upon an urban air quality model, to show that ozone concentrations would be reduced to levels below the federal standard by 1999.

The region did not meet the Clean Air Act Amendments deadline of November 15, 1999. Analysis suggests this was due to transported pollution from outside the region. The region’s photochemical modeling results demonstrated the effect of transported pollution, which contributed from 20-30% of the pollution on the worst days of summer. EPA issued guidance in 1997 dealing with transported pollution based on photochemical modeling of 23-state region including the northeast, mid-Atlantic and Midwestern states conducted through the Ozone Transport Assessment Group. In January 2001 EPA granted the Washington region an extension of its attainment deadline to November 2005. On July 2, 2002, The U.S. Circuit Court of Appeals for the District of Columbia vacated EPA’s extension and remanded the action to EPA in a ruling in *Sierra Club v. EPA*. The Court decided that EPA had a non-discretionary duty under the Clean Air Act to reclassify the region when it failed to attain the standard in November 1999.

In January 2003 EPA reclassified the Washington, DC-MD-VA nonattainment area as a “severe” nonattainment area.ⁱ As a severe nonattainment area for one-hour ozone National Ambient Air Quality Standard (NAAQS), the Washington region is required to meet the requirements defined in the Clean Air Act, Section 182 (d) and to attain the standard by November 15, 2005. April 17, 2003, EPA published a final rule to conditionally approve the Washington region’s severe area SIP if the three states meet nine commitments to EPA.ⁱⁱ The commitments include adopting state regulations to meet CAA Section 182 (d) requirements for severe nonattainment areas and, in addition, to adopt a contingency plan for 1999 Rate of Progress, revise and submit an updated attainment demonstration that reflects revised MOBILE6-based motor vehicle emissions budgets, demonstrate 3 % per year rate of progress from 1999-2002 and from 2002-2005; adopt contingency measures for failure to make rate of progress in those periods, and submit an analysis of Reasonably Available Control Measures for the region.

The Severe Area Attainment Plan for the Washington nonattainment areas has been developed by the Metropolitan Washington Air Quality Committee (MWAQC) in cooperation with Maryland, Virginia and the District of Columbia. Table A identifies the Washington region’s control measures to achieve the 18% additional emissions reduction, as required by the CAAA, which demonstrates steady progress in improving air quality by 2005.

Overall, the 2005 rate of progress plan for the Metropolitan Washington region may be summarized as follows:

- 280 tons per day of oxides of nitrogen (NO_x) reductions and 3 tons per day of volatile organic compound (VOC) reductions through the regulation of point sources of pollution, such as factories and power plants;
- 98.9 tons per day of VOC reductions and 4.4 tons per day of NO_x reductions from regulating area sources of pollution such as gasoline refueling, automobile repair, consumer products and printing operations;
- 80 tons per day of VOC reductions and 85.0 tons per day of NO_x reductions from initiatives relating to cars and trucks, the “on-road” or “mobile” sources of pollution; and
- 32.4 tons per day of VOC reductions and 22.2 tons per day of NO_x reductions from non-road sources such as lawn and garden equipment, heavy construction equipment and marine engines.

1.2 The Ozone Problem

Of the six major air pollutants for which ambient air quality standards have been established under the Clean Air Act, the pollutant that has posed the most prevalent and perplexing problem for the Washington metropolitan area, and for many other American urban areas, is ozone, a principal component of “smog.”

Why has the ozone problem been so difficult to solve? First, ozone is not discharged directly. It is formed in, and downwind of, urban areas when sunlight and high temperatures cause complex photochemical reactions to occur between emissions of volatile organic compounds (VOCs) and emissions of oxides of nitrogen (NO_x). A number of diverse sources emit these ozone precursors. Major sources of VOC emissions include, but are not limited to, gasoline storage facilities, bakeries, gasoline refueling stations, printing facilities, motor vehicles, lawnmowers, consumer products, and boats. In addition, many species of plants emit VOCs. Principal sources of NO_x, which is produced by combustion, include motor vehicles, construction equipment, fossil fuel-fired power plants, and open burning.

Second, the ozone problem is further complicated by the fact that weather conditions play a major role in the formation of ozone and in the severity of the problem. Solar energy drives the reactions that create ozone. When a warm air mass stays in one spot, and winds are calm, smog may stay in place for several days at a time creating severe ozone conditions. While it is not always possible to predict weather conditions that create severe ozone problems, more severe and prolonged episodes can be forecast.

Third, scientists are only beginning to understand how weather conditions, topography, and ozone precursors interact to create ozone. Originally, ozone control strategies focused on reducing VOCs. However, new evidence shows that NO_x control is also necessary and, in fact, achieving attainment of the standards may be impossible without it. The complexity of the reactions that cause ozone requires reliance upon computer models of ozone formation to guide the region to the correct mix of VOC and NO_x controls.

Fourth, given that smog travels across county and state lines, the ozone problem is regional. Therefore, solving the problem requires considerable coordination and consensus building on the part of local and state governments to develop regional emission control strategies. On the East Coast, governments from Maine to Washington, D.C. and Virginia are required under the Act to form the Ozone Transport Commission (OTC) in order to develop ozone control strategies on a regional basis. The OTC has developed additional point source NO_x standards and low-emissions vehicle standards, which are intended to reduce ozone levels from Virginia to Maine.

The Ozone Transport Assessment Group (OTAG) worked to quantify and reduce the amount of ozone and its precursors, which move from one state to the next within the 37 eastern states. The work of OTAG led EPA to issue proposed rules, which require many of the eastern states to reduce those pollution emissions most likely to contribute to ozone transport.

1.3 SIP Process

The Act requires states to develop and implement ozone reduction strategies in the form of a State Implementation Plan (SIP). The SIP is the state's "master plan" for attaining and maintaining the National Ambient Air Quality Standards (NAAQS).

Once the Administrator of the EPA approves a state plan, the plan is enforceable as a state law and as federal law under Section 113 of the Act. If the SIP is found to be inadequate in EPA's judgment to attain the NAAQS in all or any region of the state, and if the state fails to make the requisite amendments, under Section 110(c)(1), the EPA Administrator may issue amendments to the SIP that are binding.

EPA is required to impose severe sanctions on the states under three circumstances: the state's failure to submit a SIP revision; on the finding of the inadequacy of the SIP to meet prescribed air quality requirements; and the state's failure to enforce the control strategies that are contained in the SIP.

Sanctions include: withholding federal funds for highway projects other than those for safety, mass transit, or transportation improvement projects related to air quality improvement or maintenance beginning 24 months after EPA announcement. No federal agency or department will be able to award a grant or fund, license, or permit any transportation activity that does not conform to the most recently approved SIP.

1.4 Rate of Progress Demonstrated in Previous SIPs

The Clean Air Act requires that serious nonattainment areas ensure progress toward the attainment goal by achieving a 15% reduction in volatile organic chemicals (VOCs) by 1996, and an additional 9% by 1999. To demonstrate attainment, the Act requires the region to demonstrate, through the use of photochemical air quality computer models, that ozone will reach the level of the standard.

MWAQC approved several State Implementation Plans to meet the requirements for serious nonattainment areas: the 15 % Plan, the Phase I Plan and the Phase II Plan. MWAQC

approved the "15% Plan" in January 1994.ⁱⁱⁱ MWAQC approved revisions to this plan in February 1998.^{iv} MWAQC approved the Phase I Attainment Plan, which includes the 9% rate of progress requirements, in October 1997 and revised it in April 1999.^v This plan outlined how the region would reduce pollutants by the additional 9% requirement from 1996–1999 and discussed efforts to identify attainment requirements.

MWAQC approved the Attainment Plan (Phase II) in April 1998 and revised it in January 2000.^{vi} The Phase II plan summarized the results of photochemical air quality modeling and provided information on trends in actual measured ozone levels. The plan showed that the Washington metropolitan region is likely to attain the federal one-hour standard for ozone in 2005 when the emission control measures currently proposed are fully implemented and after 'ozone transport' is reduced. In July 1998, EPA provided the States and MWAQC with additional modeling analysis performed as part of their efforts in support of the NOx SIP Call. This analysis evaluated the likelihood that the Washington Nonattainment area would reach the one-hour ozone standard after ozone transport is reduced. This evidence has been used to supplement the findings of the local modeling project and strengthens the conclusions of the original Phase II Plan approved by MWAQC.

Due to the use of MOBILE6, EPA's newest approved model for estimating mobile emissions in the Severe Area SIP, the Severe Area SIP inventories are not comparable to those of previous SIPs. The Severe Area SIP builds on previous SIPs by using the attainment demonstration results and the control measures adopted in the previous SIPs. The Severe Area SIP missions inventories and rate of progress calculations differ from previous plans' emissions inventories and target inventories for rate of progress because the mobile inventory portion is modeled differently. For a detailed explanation of the differences in the modeled mobile inventories, see chapters 3 and 4.

1.5 1999-2002 Rate of Progress Plan

The Washington region provided for a 0% reduction in VOC emissions and a 9% reduction in NOx emissions to satisfy the 9% rate of progress requirement for 1999-2002. Growth in VOC that might otherwise occur from 1999-2002 was more than offset by reductions attributable to adopted control measures. Total reductions achieved from 1990-2002 will total at least 178.1 tons per day of VOC and 269.8 tons per day of NOx. These reductions will enable the region to meet its emissions targets of 347.8 tons per day of VOC and 626.3 tons per day of NOx. Table 1-1 summarizes the emission reductions that will be achieved as part of the 2002 rate of progress.

Table 1-1
Washington Nonattainment Area
Control Strategy for the 1999-2002 Rate of Progress
Ozone Season Daily Emissions (tons per day)

Description	VOC	NOx
2002 Uncontrolled Emissions, Including Growth Adjustment	525.2	880.4
2002 Controlled Emissions, Including Round 6.3 Growth	347.1	611.6
Emission Reductions from Control Measures	178.1	268.8

1.6 2002-2005 Rate of Progress Plan

The Washington region provided for a 0% reduction in VOC emissions and a 9% reduction in NOx emissions to satisfy the 9% rate of progress requirement for 2002-2005. Growth in VOC that might otherwise occur from 2002-2005 was more than offset by reductions attributable to adopted control measures. Total reductions achieved from 1990-2005 will total at least 210.7 tons per day of VOC and 391.1 tons per day of NOx. These reductions will enable the region to meet its emissions targets of 339.4 tons per day of VOC and 539.0 tons per day of NOx. Table 1-2 summarizes the emission reductions that will be achieved as part of the 2005 rate of progress.

Table 1-2
Washington Nonattainment Area
Control Strategy for the 2002-2005 Rate of Progress
Ozone Season Daily Emissions (tons per day)

Description	VOC	NOx
2005 Uncontrolled Emissions, Including Growth Adjustment	539.3	884.1
2005 Controlled Emissions, Including Round 6.3 Growth	328.6	493.0
Emission Reductions from Control Measures	210.7	391.1

1.7 Establishment of a Budget for Transportation Mobile Emissions

As part of the development of the plan, MWAQC in consultation with the Transportation Planning Board (TPB) will establish a mobile source emissions budget or maximum allowable levels of VOC and NOx. This budget will be the benchmark used to determine if the region's long range transportation plan (CLRP) and six year transportation improvements program (TIP) conform with the Clean Air Act Amendments of 1990. Under EPA

regulations the projected mobile source emissions for 2005 becomes the mobile emissions budget for the region unless MWAQC takes actions to set another budget level.

The 2005 mobile emissions inventory reflects the most recent models available, MOBILE6 and the Travel Demand Model Version 2.1, used by COG's Transportation Planning Department, and the most recent data available, namely 2002 vehicle registration data. The methodology used to project the 2005 attainment year mobile inventory and to recalculate mobile inventories for milestone years is discussed in detail in Chapter 3.2.3 and Chapter 4.1.3.
VOC = 98.1 tons/day NOx = 237.4 tons/day

Additional Commitments

1.8 Attainment Demonstration

The 2005 attainment demonstration analyzes the progress of the region towards attainment of the one-hour ozone standard. The states in the Metropolitan Washington region performed photochemical modeling in 1997 using the Urban Airshed Model (UAM-IV) to demonstrate attainment of the one-hour ozone standard. The modeling runs were performed for two episodes in 1991. Modeling future year scenarios, the results of the modeling demonstrated that the region would attain but for transported pollution from outside the region.^{vii}

In 1999 EPA undertook a photochemical modeling study to estimate Tier 2 benefits for the year 2007 in major cities including Washington region. This study showed that the design value in Washington region in that year would come down to 116 ppb. Therefore, it seems plausible that the 2005 design value will be lower than the one-hour ozone standard (125 ppb).

Urban Airshed model (UAM-IV) has inherent uncertainties. Over or under prediction may result from uncertainties associated with emission inventories, meteorological data, and representation of ozone photochemistry in the model. Previous photochemical modeling performed for the Washington region using UAM-IV model over predicted ozone levels. Therefore, EPA guidance provides for other evidence (Weight of Evidence) to address these model uncertainties so that proper assessment of the probability to attain one-hour ozone standard can be made.

Based on EPA's guidance, a number of Weight of Evidence analyses were undertaken to find out if the Washington region has the potential to attain in 2005. One of these analyses included an estimation of the projected attainment year design value. Based on this analysis which is described in Chapter 11, the 2005 design value was estimated to be about 116 ppb, providing further evidence that the region will attain in 2005.

Following EPA guidance, additional analyses were done comparing the rate of emissions reductions between the two mobile models, MOBILE5b and MOBILE6. A comparison of the

rates of reduction in mobile source emissions between 1990 and 2005 calculated using the two mobile models, MOBILE5b and MOBILE6, indicates the rate of emissions reductions from the 1990 baseline emissions is greater with MOBILE6 than with MOBILE5b calculations. This is further evidence that the region will attain in 2005.

Another comparison was performed for the rates of reduction in total emissions including mobile source emissions for the Severe Area and Phase II SIPs between 1990 and 2005. It was found that the rate of emissions reductions from the 1990 baseline emissions is greater in case of Severe Area SIP emissions (contained MOBILE6 emissions) than the Phase II SIP (contained MOBILE5b emissions). This analysis supports the conclusion that the region will attain in 2005.

In addition, the Rate-of-Progress inventories for the attainment year 2005 are lower than the modeled attainment inventories. This means that the projected attainment year emissions are lower than the limit set for maximum emissions to attain the one-hour standard for ozone. This is further evidence supporting the conclusion that the region will attain in 2005.

1.9 Analysis of Reasonably Available Control Measures (RACM)

An extensive list of potential control measures was analyzed and evaluated against criteria used for potential RACM measures. Individual measures must meet the following criteria: will reduce emissions by the beginning of the Washington region's 2004 ozone season (May 1, 2004); are enforceable; are technically feasible; are economically feasible, defined as a cost of \$10,000 to \$20,000 per ton or less; would not create substantial or widespread adverse impacts within the region; and do the emissions from the source being controlled exceed a *de minimis* threshold, defined as 0.1 tons per day. A final short list of RACM measures that met most of the criteria was evaluated against two remaining criteria, the ability to reduce the region's ozone levels to 124 parts per billion by 2004 and the potential for intensive and costly implementation.

Because it is unclear to what extent the NO_x SIP Call, a significant NO_x control measure, will be implemented by the beginning of the 2004 ozone season, it is extremely difficult to determine how many additional tons the region would need to reduce in order to ensure that 124 ppb is consistently achieved. As a result, the region is taking a conservative approach and estimating that any group of measures that would collectively reduce ozone by 1 ppb or more could enable the region to meet the 124 ppb standard in 2004. In order to reduce 1 ppb of ozone, any RACM measures would need to collectively reduce 8.8 tpd NO_x or 34.0 tpd VOC.

If implemented collectively, the short list of RACM measures would reduce 5.1 tons per day VOC and 3.4 tons per day NO_x. This does not meet the 34.0 tons per day VOC or 8.8 NO_x required to reduce regional ozone levels to 124 parts per billion by May 1, 2004. Chapter 8 contains further details.

1.10 Contingency Measures

In the event that the reductions anticipated in the 2002 or 2005 rate of progress demonstrations or the 2005 attainment demonstration are not realized within the timeframes specified, contingency measures must be implemented. EPA issued guidance says that contingency measures must provide for a 3% reduction in baseline emissions. The Washington region has adopted measures to satisfy the requirement for contingency measures keyed to the 1996-1999 rate of progress and 1999 attainment demonstrations. The Phase II Reformulated Gasoline (RFG) program provides VOC reductions in excess of the 13.0 tons per day necessary to meet this requirement. The District of Columbia, Maryland and Virginia have committed to identify contingency measures for the 2002 and 2005 rate of progress demonstrations and the 2005 attainment demonstration. The states will identify these measures by March 1, 2004. Chapter 12 contains additional detail on the contingency measure requirements.

1.11 Document Contents

- Chapter 2 presents a detailed overview of the Clean Air Act, the region's reclassification to severe nonattainment area, the requirements for severe nonattainment areas, additional commitments by the states to EPA, the region's air quality planning process, the role of the states and the proposed plan.
- Chapter 3 presents revisions to the 1990 base year inventory using MOBILE6 and Travel Demand Model Version 2.1 to revise base year mobile emissions inventories and including corrections to nonroad, area and stationary source emissions.
- Chapter 4 presents the 2002 and 2005 projected inventories using MOBILE6 and Travel Demand Model Version 2.1 to revise 2002 and 2005 projected and a discussion of the growth projection methodology.
- Chapter 5 presents 2002 rate of progress requirements. These are MWAQC's Calculations of how many tons per day of emissions must be reduced in the Washington region in order to meet the rate of progress requirements and also describes the control strategy and associated target emissions levels for the 9% reduction requirement.
- Chapter 6 presents 2005 rate of progress requirements. These are MWAQC's calculations of how many tons per day of emissions must be reduced in the Washington region in order to meet the rate of progress requirements and also describes the control strategy and associated target emissions levels for the additional 9% reduction requirement.

- Chapter 7 outlines the strategies that the states will implement to achieve the 3% per year reductions in VOC and NO_x.
- Chapter 8 discusses the analysis of Reasonable Available Control Measures (RACM).
- Chapter 9 discusses mobile source conformity issues and establishes the mobile emissions budgets for the Metropolitan Washington region.
- Chapter 10 presents the states' schedules and adoption of regulations to meet requirements for severe nonattainment areas and presents the states' April 2003 commitments to EPA.
- Chapter 11 presents the Metropolitan Washington region's demonstration of attainment based on UAMIV modeling and weight of evidence.
- Chapter 12 presents a commitment to adopt contingency measures for 1999 rate of progress, contingency measures for the 2002 rate of progress demonstration and contingency measures for the 2005 rate of progress demonstration.

ⁱ EPA 40 CFR Part 81, *Federal Register*, Vol.68, No. 16, , January 24, 2003, pp. 3410-3425.

ⁱⁱ EPA 40 CFR Part 52, *Federal Register*, Vol.68, No. 75, April 17, 2003, pp.19106-19133.

ⁱⁱⁱ *Plan to Achieve A Fifteen Percent Reduction in Volatile Organic Compound Emissions for the Washington, DC-MD-VA Nonattainment Area*, MWAQC, January 14, 1994.

^{iv} *Revision to the SIP to Achieve a Fifteen Percent Reduction In VOC Emissions and Revision to the 1990 Base Year Emissions Inventory for Stationary, Anthropogenic, Biogenic Sources and Highway Vehicle Emissions of Ozone Precursors for the Washington DC-MD-VA Nonattainment Area*, MWAQC, February 17, 1998.

^v *Revised State Implementation Plan (SIP) Revision, Phase I Attainment Plan, for the Washington DC-MD-VA Nonattainment Area*, MWAQC, April 16, 1999.

^{vi} *State Implementation Plan (SIP) Revision Phase II Attainment Plan, for the Washington, DC-MD-VA Nonattainment Area*, MWAQC, February 3, 2000 and *Revision to State Implementation Plan (SIP) Revision, Phase II Attainment Plan, for the Washington DC-MD-VA Nonattainment Area, Establishing Out-Year Mobile Emissions Budgets for Transportation Conformity*, MWAQC, January 19, 2000.

^{vii} MWAQC, *State Implementation (SIP) Revision, Phase II Attainment Plan for the Washington DC-MD-VA Nonattainment Area*, Appendices, Appendix B