PRELIMINARY DRAFT OF PM REDESIGNATION REQUEST AND MAINTENANCE PLAN (DRAFT 9/7/11)

PART 1. REDESIGNATION REQUEST

This part of the document is a Request for Redesignation of the Washington, DC/MD/VA area to attainment with the 1997 PM2.5 annual NAAQS of 15 ug/m3. The area is currently designated as nonattainment with the NAAQS, and is currently under a Clean Data Determination. [provide specific dates and references]

1.1 Introduction

Fine particulate matter

Fine particulate matter, also known as fine particles and $PM_{2.5}$, is defined as any airborne particle of solid or liquid matter which is less than or equal to 2.5 micrometers in diameter. Fine particulate matter does not consist of just one single pollutant, but is a sum of all pollutants which have diameters less than 2.5 micrometers, which is 1/30 the diameter of a human hair.

Sources of fine particulate matter and their precursors include, most significantly, coal-fired power plants and other combustion sources, fires, emissions from motor vehicles, windblown dust, and natural emissions from trees and the oceans. These sources can be divided up into two types of sources, primary and secondary. Primary sources directly emit fine particulate matter into the atmosphere without any chemical change occurring to the pollutant. Secondary sources are sources from which precursor chemical species are released into the atmosphere and then react with other chemical species in the atmosphere to create fine particulate matter. Some species which comprise fine particulate matter are SO_4^{2-}, NH_4NO_3, H^+, soot, sea salt, VOCs, and metals (crustal metals, transitional metals, and K).

The gas-phase precursors SO_2, NO_x, VOCs, and NH_3, which are emissions from motor vehicles and power plants, are all parts of chemical reactions in the atmosphere which lead to the formation of secondary fine particulate matter. These chemical reactions are dependent upon many factors, including the concentrations of the precursors themselves; the concentrations of other reactive gaseous species; atmospheric conditions such as relative humidity, insolation, and temperature; and the interactions of precursors with preexisting particles, cloud droplets, and fog droplets.

Health effects

Human exposure to fine particulate matter adversely affects health. The main impacts of fine particulate matter on human health are on the respiratory system and the cardiovascular system. When fine particulate matter is inhaled, much of it can bypass the nose and throat. The fine particulate matter would then enter the lungs, where the fine particulate matter can lodge itself in the alveoli, the small sacs in the lungs which pass oxygen onto the blood stream, thus affecting breathing effectiveness and oxygen concentration in the bloodstream.

Children, the elderly, and individuals with pre-existing pulmonary or cardiac disease are the most susceptible to fine particulate matter pollution. The complications that can arise from over exposure to fine particulate matter are decreased lung function; the development of chronic bronchitis;

increased respiratory symptoms such as fits of coughing, higher instances and severity of asthma attacks, and difficulty breathing; nonfatal heart attacks; irregular heartbeat; and premature death in those individuals with pulmonary or cardiac disease.

1.2 Criteria for Redesignation

EPA Requirements

The Act also provides a process whereby a state may petition EPA to redesignate a nonattainment area as attainment. The criteria for redesignating a nonattainment area to attainment are as follows:

- A determination that the NAAQS have been attained.
- The applicable implementation plan must be fully approved by EPA under Section 110(k) of the Act.
- A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions.
- A determination that the state meets all applicable requirements for the area under Section 110 and Part D of the Act.
- A fully approve a maintenance plan, including contingency measures, for the area under Section 175A of the Act.

1.3 Evidence of NAAQS Compliance (DV analysis)

Compliance with $PM_{2.5}$ NAAQS

To determine whether or not a site is in compliance with the annual National Ambient Air Quality Standard for $PM_{2.5}$, the three-year average of annual average fine particulate matter concentration is calculated, otherwise known as the annual design value. The standard for this design value is currently 15.0 $\mu g/m^3$. There is also a second standard for $PM_{2.5}$. This standard is for the 24-hour average of $PM_{2.5}$. The 24-hour National Ambient Air Quality Standard for $PM_{2.5}$ is the three year average of the 98^{th} percentile of each individual year's 24-hour concentrations. This design value is currently 35 $\mu g/m^3$. For an *area* to be in compliance with the annual National Ambient Air Quality Standard, all sites within that area have to be in compliance with the annual and/or 24-hour National Ambient Air Quality Standard for $PM_{2.5}$. Even if there is only one station that is not in compliance, that one station makes the entire area a nonattainment area for that standard.

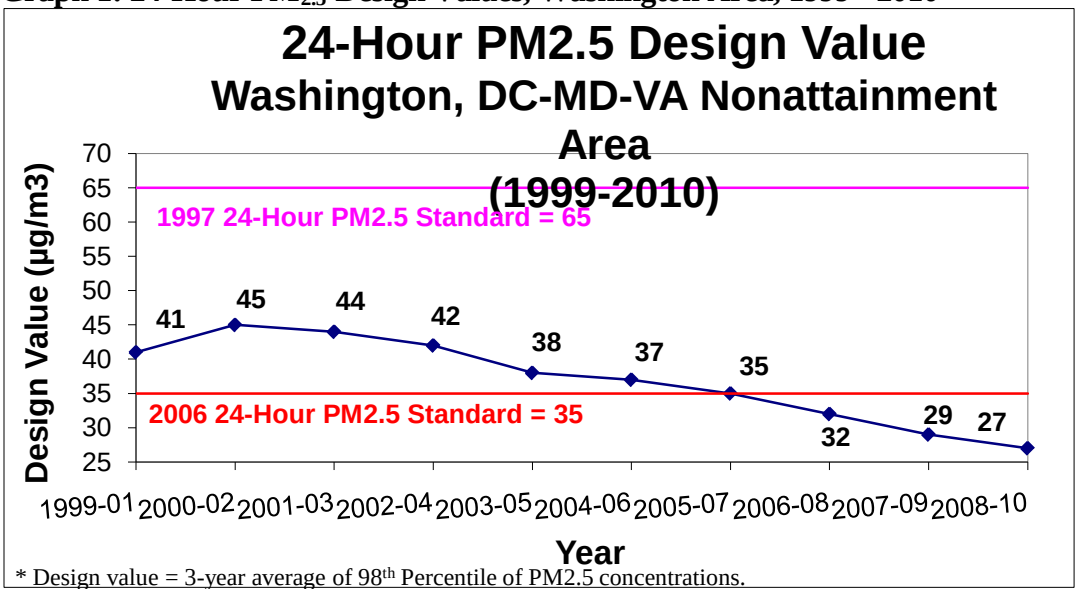
The Metropolitan Washington region's Federal Reference Monitors demonstrate compliance with the annual $PM_{2.5}$ National Ambient Air Quality Standard since 2005. All sites are in compliance with both standards for $PM_{2.5}$. Compliance with the 24-hour National Ambient Air Quality Standard for the 1997 standard (65 $\mu g/m^3$) is demonstrated for all years and also demonstrated compliance with the 2006 standard (35 $\mu g/m^3$) from 2007 up to the present day. The design value for the 24-hour standard in 2010 was 27 $\mu g/m^3$, which is much below the 2006 standard of 35 $\mu g/m^3$. The design value for the annual standard in 2010 was 11.5 $\mu g/m^3$, again much below the 1997 standard of 15.0 $\mu g/m^3$.

Graph 1 shows a steady decrease in the design value for the 24-hour $PM_{2.5}$ design value. Since 2006, the $PM_{2.5}$ design value for the Washington, DC nonattainment area has decreased an average

of 2.5 µg/m^3 per year. This equates to a 27% drop in the 24-hour $PM_{2.5}$ design value over the last four years. Looking at the interval from 2002 to 2010, the 24 hour $PM_{2.5}$ design value decreased 18 µg/m^3 over the eight year period, which comes out to a 40% decrease in the $PM_{2.5}$ design value since it peaked in the 2002 at 45 µg/m^3.

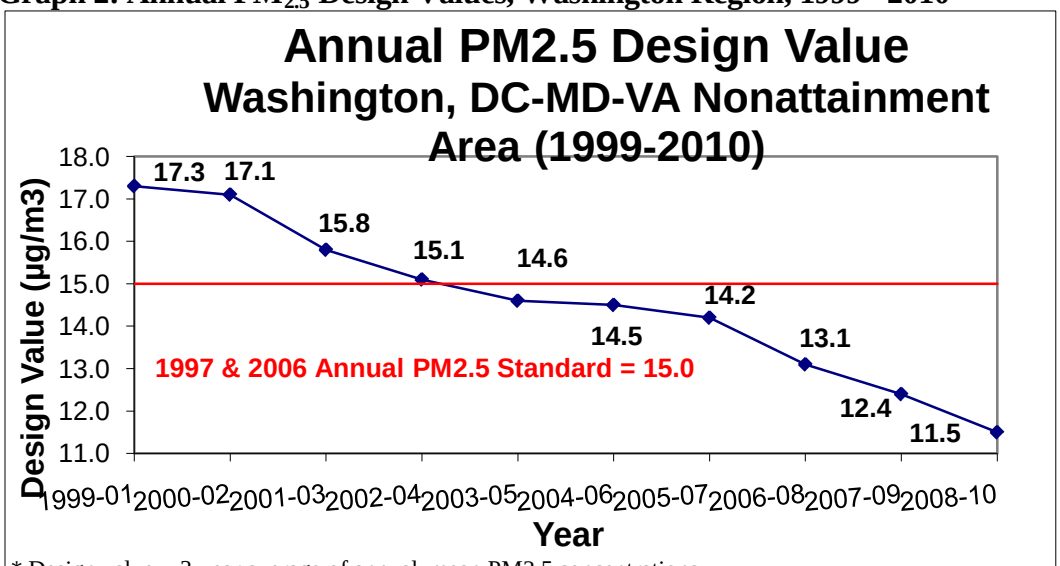
Graph 2 shows a decreasing trend in the annual $PM_{2.5}$ design value as well. For each year throughout the entire time period from 2001-2010, the annual $PM_{2.5}$ design value decreased for the Washington, DC nonattainment area. For the time period 2001-2010, the annual $PM_{2.5}$ design value has decreased 5.8 µg/m^3, a decrease of 33.5% since 2001. Since 2007, the annual $PM_{2.5}$ design value has decreased 2.7 µg/m^3 over three years, and average decrease of 0.9 µg/m^3 per year.

Graph 1: 24-Hour $PM_{2.5}$ Design Values, Washington Area, 1999 - 2010



* Design value = 3-year average of 98th Percentile of PM2.5 concentrations.

Graph 2: Annual $PM_{2.5}$ Design Values, Washington Region, 1999 - 2010



* Design value = 3-year average of annual mean PM2.5 concentrations.

1.4 Demonstration of Full SIP Approval

[Request sent to states for assistance in compiling administrative record of relevant SIP submittals. Initial information from VA and DC has been received]

The states and the District of Columbia are taking action to implement regional measures to reduce emissions of $PM_{2.5}$ and $PM_{2.5}$ precursors. Tables xx through zz provide information on the implementation of each measure by Maryland, Virginia, and the District of Columbia.

Commitments for regulations required by the 40 CFR Part 51 are shown in Table xxyyzz.

Table xx
District of Columbia Schedule of Adopted Control Measures
Washington Nonattainment Area

Ref. No.	Control Measure	Mandate	Regulation Number	Effective Date
	Point Source Controls			
5.1.1	RACT and Regional Transport Requirements	Federal Regulation	20 DCMR[a] Sec. 805 20 DCMR Chapter 10 20 DCMR Chapter 11	11/19/93 1/20/2000 No later than 1/1/2009
5.1.2	Opacity Regulations	Federal Regulation	20 DCMR Sec. 606	3/15/85
	Area Source Controls			
5.2.1	Seasonal Open Burning Restrictions	State Regulation	20 DCMR Sec. 604	2/1/85
	Nonroad Source Controls			
5.3.1	EPA Nonroad Gasoline Engines Rule	Federal Regulation	40 CFR Parts 90, 91	12/3/96
5.3.2	EPA Nonroad Diesel Engines Rule	Federal Regulation	40 CFR Part 9 et al.	Model Year 2000-2008 depending on engine size
5.3.3	EPA Nonroad Spark-Ignition Marine Engine Rule	Federal Regulation	40 CFR Parts 89, 90, 91	Model Year 1998

Ref. No.	Control Measure	Mandate	Regulation Number	Effective Date
5.3.4	EPA Large Spark-Ignition Engines Rule	Federal Regulation	40 CFR Parts 89, 90, 91, 94, 1048, 1051, 1065, 1068	11/8/2002
5.3.5	Emissions Controls for Locomotives	Federal Regulation	63 FR 18998	6/15/98
	On-Road Measures			
5.4.1	High-Tech Inspections and Maintenance	Federal Regulation	18 DCMR Chapters 4, 6, 7, 10, 11; 26 DCMR Chapter 26	4/30/99
5.4.2	Federal Tier I Vehicle Standards and new Car Evaporative Standards	Federal Regulation	40 CFR Part 86	Model Year 1994-1996; Evap Stds. 1996
5.4.3	National Low Emissions Vehicle Program	Federal Regulation	20 DCMR, Sec. 915	1/20/2000
5.4.4	Tier 2 Motor Vehicle Emission Standards	Federal Regulation	65 FR 6698	2/10/2000
5.4.5	Heavy-Duty Diesel Engine Rule	Federal Regulation	62 FR 54694	12/22/97

[a]District of Columbia Municipal Regulations.

Table yy
Maryland Schedule of Adopted Control Measures
Washington Nonattainment Area

Ref. No.	Control Measure	Mandate	Regulation Number	Effective Date
	Point Source Controls			
5.1.1	NO_x Phase II Controls	Federal Regulation	26.11.27 & .28 26.11.29 & 30	10/18/99
5.1.1	Regional Transport Requirements	Federal Regulation	26.11.29.08 26.11.27	5/10/93 No later than 1/1/2009
5.1.2	Opacity Regulations	Federal Regulation	26.11.01.10 26.11.01.11 26.11.06.02 26.11.07.05 26.11.08.04 26.11.08.08 26.11.08.08-1 26.11.09.05 26.11.10.03 26.11.10.04 26.11.12.04 26.11.18.03 26.11.18.06 26.11.20.01 26.11.25.03	7/22/91 7/22/91 7/18/80 1/2/80 5/28/68 11/9/90 4/17/2000 5/28/68 5/28/68 5/28/68 6/8/81 5/28/68 2/10/84 11/19/83 9/24/84
	Area Source Controls			
5.2.1	Seasonal Open Burning Restrictions	State Regulation	26.11.07	5/22/95
	Nonroad Source Controls			
5.3.1	EPA Nonroad Gasoline Engines Rule	Federal Regulation	40 CFR parts 90, 91	12/3/96
5.3.2	EPA Nonroad Diesel Engines Rule	Federal Regulation	40 CFR Part 9 et al.	Model Year 2000-2008 depending on engine size
5.3.3	EPA Nonroad Spark-Ignition Marine Engine Rule	Federal Regulation	40 CFR Parts 89, 90, 91	Model Year 1998

Ref. No.	Control Measure	Mandate	Regulation Number	Effective Date
5.3.4	EPA Large Spark-Ignition Engines Rule	Federal Regulation	40 CFR Parts 89, 90, 91, 94, 1048, 1051, 1065, 1068	11/8/2002
5.3.5	Emissions Controls for Locomotives	Federal Regulation	63 FR 18998	6/15/98
	On-Road Source Controls			
5.4.1	High-Tech Inspections and Maintenance	Federal Regulation	11.14.08	1/2/95, 1/1/2000
5.4.2	Federal Tier I Vehicle Standards and new Car Evaporative Standards	Federal Regulation	40 CFR part 86	Model Year 1994-1996; Evap Stds. 1996
5.4.3	National Low Emissions Vehicle Program	Federal Regulation	26.11.20.04	3/22/99
5.4.4	Tier 2 Motor Vehicle Emission Standards	Federal Regulation	65 FR 6698	2/10/2000
5.4.5	Heavy-Duty Diesel Engine Rule	Federal Regulation	63 FR 54694	12/22/97

Table zz
Virginia Schedule of Adopted Control Measures
Washington Nonattainment Area

Ref. No.	Control Measure	Mandate	Regulation Number	Effective Date
	Point Source Controls			
5.1.1	State NO_x RACT Requirements	Federal Regulation	9 VAC 5-40-310, 9 VAC 5-40-311	1/1/93
5.1.1	RACT and Regional Transport Requirements	Federal Regulation	By permit or compliance agreement 9 VAC 5 Chapter 130	6/25/98 No later than 1/1/ 2009
5.1.2	Existing Stationary Sources, Part II "Emission Standards" Article 1 "Visible Emissions and Fugitive Dust/Emissions (Rule 4-1)"	Federal Regulation	9 VAC 5 Chapter 40	3/17/72 Amended: 2/1/2003
5.1.2	New and Modified Stationary Sources Part II "Emission Standards" Article 1 "Visible Emissions and Fugitive Dust/Emissions (Rule 5-1)"	Federal Regulation	9 VAC 5 Chapter 50	8/9/75 Amended: 2/1/2003
	Area Source Controls			
5.2.1	Seasonal Open Burning Restrictions	State Regulation	9 VAC 5-40-5630	4/1/96
	Nonroad Source Controls			
5.3.1	EPA Nonroad Gasoline Engines Rule	Federal Regulation	40 CFR parts 90, 91	12/3/96
5.3.2	EPA Nonroad Diesel Engines Rule	Federal Regulation	40 CFR part 9 et al.	Model Year 2000-2008 depending on engine size
5.3.3	EPA Nonroad Spark-Ignition Marine Engine Rule	Federal Regulation	40 CFR Parts 89, 90, 91	Model Year 1998
5.3.4	EPA Large Spark-Ignition	Federal	40 CFR Parts 89,	11/8/2002

Ref. No.	Control Measure	Mandate	Regulation Number	Effective Date
	Engines Rule	Regulation	90, 91, 94, 1048, 1051, 1065, 1068	
5.3.5	Emissions Controls for Locomotives	Federal Regulation	63 FR 18998	6/15/98
	On-Road Measures			
5.4.1	High-Tech Inspection and Maintenance	Federal Regulation	9 VAC 5 Chapter 91	4/2/97
5.4.2	Federal Tier I Vehicle Standards and new Car Evaporative Standards	Federal Regulation	40 CFR Part 86	Model Year 1994-1996; Evap Stds. 1996
5.4.3	National Low Emissions Vehicle Program	Federal Regulation	9 VAC 5-200	4/14/99
5.4.4	Tier 2 Motor Vehicle Emission Standards	Federal Regulation	65 FR 6698	2/10/2000
5.4.5	Heavy-Duty Diesel Engine Rule	Federal Regulation	63 FR 54694	12/22/97

1.5 Permanent and Enforceable Emission Reductions -- Demonstration for Redesignation Request

EPA Requirements

The state must be able to reasonably attribute its air quality improvements to emission reductions which are permanent and enforceable. Attainment resulting from temporary reductions in emission rates (such as reduced production or shutdown due to temporary adverse economic conditions) or unusually favorable meteorological conditions does not qualify.

In making this showing, the state should estimate the percent reduction (from the year that was used to determine the design value for designation and classification) achieved from federal and state measures. Estimates should consider factors such as emission rates and production capacities in order to show that the improvements are the result of implemented controls. The analysis should assume that sources are operating at permitted levels (or historic peak levels), unless evidence is presented that such an assumption is unrealistic.

Controls and Regulations

1) A U.S. EPA-approved SIP control strategy that includes Reasonably Available Control Technology (RACT) requirements for existing stationary sources covered by Control Technology Guidelines (CTG) and non-CTG RACT for all major sources.
2) Evidence that control measures required in past SIP revisions have been fully implemented.

3) Acceptable provisions to provide for new source review.
4) Assurances that existing controls will remain in effect after redesignation, unless the state demonstrates through photochemical modeling that the standard can be maintained without one or more controls.
5) If appropriate, a commitment to adopt a requirement that all transportation plans conform with and are consistent with the SIP.

Response
Permanent and enforceable reductions of NOx and SO2 have contributed to the attainment of the standard for fine particles. Some of these reductions were due to the implementation of the NOx SIP Call and some were due to the application of tighter federal standards on motor vehicles and fuels. Section yyyy identifies the emission control measures specific to the region, as well as the implementation status of each measure.

There are many state and federal measures that have been adopted that are resulting in permanent emission reductions.

The control strategy programs will remain enforceable and are hereby submitted as a plan to maintain air quality which meets the NAAQS for the annual PM2.5 standard. Sources are prohibited from reducing emission controls following the redesignation of the area.

Reductions from the control measures presented in this section are summarized in Table A.

[Prepare a short summary of the Maintenance Plan section on Control Programs below]

[Insert Emission Reduction from Control Measures Table here]

1.6 Section 110(a)(2) and Part D Requirements

For purposes of redesignation, a state must meet all requirements of Section 110 and Part D of the CAA that were applicable prior to submittal of the complete redesignation request. Subpart 1 of Part D consists of general requirements applicable to all areas which are designated nonattainment based on a violation of the NAAQS. Subpart 4 of Part D consists of more specific requirements applicable to particulate matter (specifically to address PM10). However, for the purpose of implementing the 1997 PM2.5 standard, the U.S. EPA's Implementation Rule stated Subpart 1, rather than Subpart 4, is appropriate for the purpose of implementing PM2.5 (72 FR 20589).

SECTION 110(A) REQUIREMENTS
Section 110(a) of Title I of the CAA contains the general requirements for a SIP. Section 110(a)(2) provides that the implementation plan submitted by a state must have been adopted by the state after reasonable public notice and hearing, and that, among other things, it must include:
enforceable emission limitations and other control measures, means or techniques necessary to meet the requirements of the CAA; provide for establishment and operation of appropriate devices, methods, systems and procedures necessary to monitor ambient air quality; provide for implementation of a source permit program to regulate the modification and construction of any stationary source within the areas covered by the plan; include provisions for the implementation of

Part C, prevention of significant deterioration (PSD) and Part D, NSR permit programs; include criteria for stationary source emission control measures, monitoring, and reporting; include provisions for air quality modeling; and provide for public and local agency participation in planning and emission control rule development.

In Maryland/DC/Virginia [dates], infrastructure SIP submissions (*Appendix xxxx)*, Maryland/DC/Virginia verified that the State fulfills the requirements of Section 110(a)(2) of the Act. [Information on infrastructure SIPs has been received from VA]

Section 110(a)(2)(D) also requires State plans to prohibit emissions from within the State which contribute significantly to nonattainment or maintenance areas in any other State, or which interfere with programs under Part C to prevent significant deterioration of air quality or to achieve reasonable progress toward the national visibility goal for Federal class I areas (national parks and wilderness areas). In order to assist States in addressing their obligations regarding regionally transported pollution, the U.S. EPA finalized CAIR to reduce SO2 and NOx emissions from large EGUs. Maryland/DC/Virginia have met the requirements of the federal CAIR to reduce NOx and SO2 emissions contributing to downwind states. On [dates], the U.S. EPA published approval of Maryland/Virginia's CAIR program, which can be found at [site]. The District of Columbia is under the requirements of a Federal Implementation Plan (FIP).

On July 6, 2010, the U.S. EPA proposed a replacement to the CAIR program with the Transport Rule in 75 FR 45210. On July 6, 2011, the US Environmental Protection Agency (EPA) finalized the Transport Rule. The final rule, known as the Cross-State Air Pollution Rule (CSAPR), requires 27 states to significantly improve air quality by reducing power plant emissions that contribute to ozone and/or fine particle pollution in other states. This rule replaces EPA's 2005 Clean Air Interstate Rule (CAIR). A December 2008 court decision kept the requirements of CAIR in place temporarily but directed EPA to issue a new rule to implement Clean Air Act requirements concerning the transport of air pollution across state boundaries. The Transport Rule will continue to provide the reductions, and likely even greater reductions, that will be necessary for maintenance of the annual PM2.5 standard to occur.

1.7 Refer to Maintenance Plan

[Prepare section that refers to maintenance plan]