Washington DC-MD-VA 1997 $PM_{2.5}$ Maintenance Plan

DRAFT 12-6-11

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1. Introduction

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia are submitting this maintenance plan for the Washington DC-MD-VA 1997 $PM_{2.5}$ area to the United States Environmental Protection Agency (U.S. EPA) in support of the Washington DC-MD-VA redesignation request for that standard. This document demonstrates that fine particulate ($PM_{2.5}$) air quality in the Washington DC-MD-VA area will remain compliant with the 1997 $PM_{2.5}$ NAAQS, as measured by a monitoring network that meets all federal requirements. This plan includes mobile vehicle emissions budgets for the interim year of 2017 and the out year of 2025. It also contains contingency measures that will be implemented in the unlikely event that the area experiences an exceedance of the 1997 $PM_{2.5}$ NAAQS.

2. Background

In 1997, U.S. EPA established two new $PM_{2.5}$ standards: an annual standard of 15.0 $\mu g/m^3$ and a 24-hour standard of 65 $\mu g/m^3$. On January 5, 2005, U.S. EPA designated the Washington DC-MD-VA area as a nonattainment for the 1997 $PM_{2.5}$ NAAQS with an effective date of April 5, 2008 (70 FR 943). Table 2-1 provides the jurisdictions within the Washington DC-MD-VA 1997 $PM_{2.5}$ nonattainment area; Figure 2-1 depicts the map of the area.

Table 2-1: Washington DC-MD-VA Nonattainment Area Jurisdiction Listing with FIPS Codes

Maryland Jurisdictions	**Virginia Jurisdictions**
Charles County (24-017)	Fairfax County (51-059)
Frederick County (24-021)	Prince William County (51-153)
Montgomery County (24-031)	Arlington County (51-013)
Prince Georges County (24-033)	Loudon County (51-107)
	City of Fairfax (51-600)
	City of Falls Church (51-610)
Washington D.C. (11-001)	City of Manassas (51-683)
	City of Manassas Park (51-685)
	City of Alexandria (51-510)

(Nice Map Here)

Figure 2-1: Washington DC-MD-VA 1997 $PM_{2.5}$ NAAQS Nonattainment Area

Since these designations were made, $PM_{2.5}$ air quality in the Washington DC-MD-VA area has improved such that the air quality is significantly better than required by the 1997 $PM_{2.5}$ NAAQS. The Washington DC-MD-VA region's federal reference monitors have demonstrated compliance with the 65 $\mu g/m^3$ daily standard since the inception of the $PM_{2.5}$ monitoring programs within each state. The federal reference monitors have demonstrated compliance with the 15.0 $\mu g/m^3$ annual standard since 2005. The most recent design value for the 24-hour

standard, based on 2008-2010 data, is 27 µg/m^3, and the most recent design value for the annual standard, based on 2008-2010 data, is 11.5 µg/m^3.

These improvements in air quality are due to permanent and enforceable emissions reductions of sulfur dioxide (SO_2) and nitrogen oxides (NO_X), the precursors to $PM_{2.5}$, and also in reductions of primary $PM_{2.5}$ emissions. This document provides a maintenance plan, as required under Section 175A of the federal Clean Air Act (CAA), to ensure that the citizens of the Washington DC-MD-VA area enjoy the benefits of healthy air quality that complies with the 1997 $PM_{2.5}$ NAAQS for a minimum of 10 years, through 2025. This maintenance plan supports the redesignation request that the District of Columbia, the State of Maryland, and the Commonwealth of Virginia have submitted to U.S. EPA concurrently with this document.

3. EPA Maintenance Plan Requirements

The redesignation process provides that a state may petition U.S. EPA to redesignate a nonattainment area as attainment and that U.S. EPA may approve the redesignation subject to certain criteria being met. Section 107(d)(3)(E) stipulates one of these criteria, that EPA must fully approve a maintenance plan that meets the requirements of § 175A. A state may submit both the redesignation request and the maintenance plan at the same time, and rulemaking on both may proceed on a parallel track. All applicable nonattainment area requirements must remain in place. The maintenance plan constitutes a SIP revision and must provide for maintenance of the relevant NAAQS in the area for at least 10 years after redesignation, including additional measures to ensure prompt correction of any violation of the NAAQS. The state must also submit a SIP revision 8 years after the original redesignation request is approved to provide for maintenance of the NAAQS for an additional 10 years following the first 10-year period. U.S. EPA provided guidance dated September 4, 1992 on the redesignation request and maintenance plan process in the memorandum from John Calcagni, Director, Air Quality Management Division to Regional Air Directions entitled *Procedures for Processing Requests to Redesignate Areas to Attainment* (redesignation guidance). Other requirements are provided in 40 CFR 51 Subpart Z, entitled *Provisions for Implementation of $PM_{2.5}$ National Ambient Air Quality Standards* ($PM_{2.5}$ implementation rule). Additional guidance was received in the development of this maintenance plan from U.S. EPA regional staff.

U.S. EPA requires the following provisions to ensure maintenance of the NAAQS:

- States must develop an attainment emissions inventory to identify the level of emissions in the area that is sufficient to attain the NAAQS.

- States may generally demonstrate maintenance by showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory over the 10-year period following redesignation.

- Once an area has been redesignated, states must continue to operate an appropriate air quality monitoring network in order to verify the area's attainment status.

- State must ensure that each has the legal authority to implement and enforce all measures

necessary to attain and maintain the NAAQS. States must verify continued attainment by indicating how maintenance plan progress will be tracked.

- Contingency measures must be available to promptly correct any NAAQS violation.

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia have developed a maintenance plan that meets all of U.S. EPA requirements and demonstrates that because of permanent and enforceable measures, emissions over the 10 years following redesignation approval will remain below the 2007 attainment year levels while allowing for growth in population and vehicle miles traveled. The period covered by this maintenance plan is 2007 through 2025.

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia have developed an emissions inventory in accordance with U.S. EPA guidance that identifies the level of emissions sufficient to achieve the 1997 $PM_{2.5}$ NAAQS. This attainment inventory consists of the actual emissions for a year during the three-year period associated with the monitoring data showing attainment of the 1997 $PM_{2.5}$ NAAQS, that is, 2007. The plan includes a demonstration that emissions will remain beneath the 2007 levels for a 10-year period by keeping in place key elements of the current federal and state regulatory programs and putting in place additional controls.

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia will continue to operate and maintain its air quality monitoring network. The jurisdictions have the legal authority to implement and enforce specified measures necessary to attain and maintain the NAAQS.

In addition to maintaining key elements of its regulatory program, the District of Columbia, the State of Maryland, and the Commonwealth of Virginia will acquire air quality and source emissions data to track attainment and maintenance. The maintenance plan includes contingency measures, as necessary, to promptly correct any NAAQS violation that occurs after redesignation of the area.

The following sections provide detail on each of the above requirements, and the Washington DC-MD-VA area's approach to meeting each requirement.

4. Attainment Inventory

4.1 U.S. EPA Requirements

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia must develop an attainment year emissions inventory to identify the level of emissions sufficient to achieve the NAAQS. This inventory should be consistent with U.S. EPA's most recent guidance on emission inventories for nonattainment areas available at the time, and should include emissions during the time period associated with the monitoring data showing attainment of the 1997 $PM_{2.5}$ NAAQS. Where a state has made an adequate demonstration that air quality has improved as a result of the SIP, the attainment inventory will generally be the actual inventory during the time period the area attained the standard. The inventory must be based on annual

emissions of SO_2, NO_X, and, primary $PM_{2.5}$ in units of tons per year (tpy) during the attainment year. VOC and NH3 must also be included if they are determined to be significant for the PM2.5 NAAQS.

4.2 Washington DC-MD-VA Approach

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia have developed an attainment year emissions inventory that identifies the level of emissions sufficient to achieve the 1997 $PM_{2.5}$ NAAQS. The attainment inventory consists of the actual emissions for the year during the three-year period associated with the monitoring data showing attainment of the ozone standard, that is, 2007. The 2007 inventory is appropriate to use because it represents the typical inventory for the three-year period demonstrating attainment of the standard. The 2007 inventory is consistent with EPA guidance; is based on annual emissions of SO_2, NO_X, and primary $PM_{2.5}$ during 2007; and contains a list of sources and emissions in tpy. VOC and NH3 were determined to be insignificant for the PM2.5 NAAQS for the Washington, DC-MD-VA PM2.5 nonattainment area and for this reason they are not included in the attainment inventory. This determination was based on EPA's policy regarding VOC and NH3 as they relate to fine particle formation in the atmosphere in its fine particle implementation rule (FR Vol.72, No. 79, 4/25/2007, section IIA (precursors and pollutants contributing to fine particle formation), pp.20591-20593). A detailed description of the procedures used to develop the attainment year inventory is contained in the Technical Support Document.

Table 4-1: 2007 Attainment Year Inventory

Pollutant	Point	Area	NonRoad	Mobile	Total
District of Columbia, Emissions in tpy					
SO_2	612	1,241	231		2,084
NO_X	789	1,547	3,271		5,607
$PM_{2.5}$	53	1,061	248		1,362
Maryland, Emissions in tpy					
SO_2	176,880	1,078	550		178,508
NO_X	30,365	3,222,	10,414		44,001
$PM_{2.5}$	5,048	4,353	905		10,306
Virginia, Emissions in tpy					
SO_2	5,956	5,412	865		12,233
NO_X	6,701	4,652	13,196		24,549
$PM_{2.5}$	446	3,849	1,051		5,346
Washington DC-MD-VA 1997 $PM_{2.5}$ Nonattainment Area, Emissions in tpy					
SO_2	183,449	7,731	1,646		192,826
NO_X	37,855	9,422	26,881		74,158
$PM_{2.5}$	5,547	9,263	2,204		17,014

5. Maintenance Demonstration

5.1 U.S. EPA Requirements

States may demonstrate maintenance of the NAAQS by showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory. The demonstration should be for a period of 10 years following the redesignation. The projected inventory should consider future growth, including population and industry. It should also be consistent with the attainment inventory, and it should document data inputs and assumptions. All elements of the demonstration should be consistent with current U.S. EPA guidance. Enforceability through regulations must also be demonstrated.

Any assumptions concerning emission rates must reflect permanent, enforceable measures. States generally cannot take credit for reductions unless there are regulations in place requiring those reductions or the reductions are otherwise shown to be permanent. Therefore, states are expected to maintain the implemented control strategy despite redesignation to attainment, unless such measures are shown to be unnecessary for maintenance or are replaced with measures that achieve equivalent reductions. Emission reductions from source shutdowns can be considered permanent and enforceable to the extent that those shutdowns have been reflected in the SIP and all applicable permits have been modified accordingly.

5.2 Washington DC-MD-VA Approach

Table 5-1 demonstrates how future emissions of SO_2, NO_X, and primary $PM_{2.5}$ will not exceed the level of the Washington DC-MD-VA attainment inventory for a minimum of 10 years following redesignation. The projected emissions reflect the expected annual emissions based on the best available growth rates and projections, as noted in Table 5-2.

Table 5-1: Washington DC-MD-VA SO_2, NO_X, and Primary $PM_{2.5}$ Emissions from 2007 to 2025

SO_2 Emissions in tpy					
Year	**Point**	**Area**	**Non-Road**	**Mobile**	**Total (tpy)**
2007	183,449	7,731	1,646		192,826
2017	28,209	6,112	433		34,754
Δ (2017–2007)	-155,240	-1,619	-1,213		-158,072
2025	28,264	5,827	517		34,608
Δ (2025–2007)	-155,185	-1,904	-1,129		-158,218
NO_X Emissions in tpy					
Year	**Point**	**Area**	**Non-Road**	**Mobile[1]**	**Total (tpy)**
2007	37,855	9,422	26,881		74,158
2017	23,105	9,489	17,596		50,190
Δ (2017–2007)	-14,750	67	-9,285		-23,968
2025	23,441	9,820	14,713		47,974
Δ (2025–2007)	-14,414	398	-12,168		-26,184

Primary $PM_{2.5}$ in tpy					
Year	**Point**	**Area**	**Non-Road**	**Mobile**	**Total (tpy)**
2007	5,547	9,263	2,204		17,014
2017	5,256	9,305	1,583		16,144
Δ (2017–2007)	-291	42	-621		-870
2025	5,590	9,345	1,272		16,207
Δ (2025–2007)	43	82	-932		-807

Table 5-2: Growth Assumptions Used in Emission Inventory Projections

Category	Level of Detail	Source
Stationary/Industrial Source Growth	Source/Unit/Process Specific	AEO[1] State/Federal Requirements[2]
Area and Non-Road Mobile Source Growth	Category Specific	Council of Governments Cooperative Forecast
Vehicle Miles Traveled Growth	Jurisdiction-specific	Metropolitan Washington Council of Governments Transportation Planning Board

Mobile source emissions were calculated using U.S. EPA's MOVES2010a mobile source inventory model. These estimates are based on vehicle-specific registration data obtained from each jurisdiction. Mobile source emission projections included the National Low Emission Vehicle Program (NLEV); the 2004 Tier 2 and Low Sulfur Gasoline Rule; the 2004 and 2007 Heavy-Duty Diesel Vehicle Rules; and the 2006 Low Sulfur Diesel Rule. All jurisdictions were modeled with Phase II Reformulated Gasoline (RFG) and an enhanced I/M program for all analysis years. Emissions for non-road vehicles and equipments except for marine, rail, and locomotives were calculated using NMIM2008 (version NMIM20090504), which used NONROAD2008a model (version July 2009), which is U.S. EPA's most recently approved emissions estimation tool for the above mentioned nonroad sources. Area, marine, rail, and locomotive emissions were calculated using the most updated practices and inputs. More information on the development of these inventories may be found in the Technical Support Document.

5.2.1 Mobile Source Emissions Budgets

Transportation conformity is a way to ensure that federal funding and approval are given to those transportation activities that are consistent with air quality goals. Transportation activities should not worsen air quality or interfere with an area's continued compliance in regards to the 1997 $PM_{2.5}$ NAAQS. The federal transportation conformity rule is codified in 40 CFR Part 93, subpart A, entitled *Determining Conformity of Federal Actions to State or Federal Implementation Plans* (transportation conformity rule). This rule applies to areas designated as nonattainment for one or more NAAQS or that have been redesignated to attainment with federally approved air quality maintenance plans.

The responsible transportation planning entity for the Washington DC-MD-VA 1997 $PM_{2.5}$ nonattainment area is the Metropolitan Washington Council of Governments (MWCOG) Transportation Planning Board (TPB). In the transportation conformity process, overall

emissions estimates by analysis year that take into account future traffic activity and projects expected to be completed are compared to a base year, a no build scenario, or emission budgets. Emission budgets are used in this determination only if U.S. EPA has approved or found adequate emissions budgets that have been submitted as a SIP revision. For $PM_{2.5}$, the pollutant itself and potentially all is various precursors would require analysis. Ammonia and volatile organic compounds (VOC) are precursors, however, they are not considered significant overall contributors to $PM_{2.5}$ air quality issues, as noted in the $PM_{2.5}$ implementation rule at 40 CFR 51.1002(c)(3). For other pollutants and precursors, the highway contribution to those emissions may be insignificant. In that case, the transportation conformity rule allows such pollutants and precursors to be exempt from conformity analysis under certain circumstances:

> 40 CFR93.109 (k) *Areas with insignificant motor vehicle emissions.* Notwithstanding the other paragraphs in this section, an area is not required to satisfy a regional emissions analysis for §93.118 and/or §93.119 for a given pollutant/precursor and NAAQS, if EPA finds through the adequacy or approval process that a SIP demonstrates that regional motor vehicle emissions are an insignificant contributor to the air quality problem for that pollutant/precursor and NAAQS. The SIP would have to demonstrate that it would be unreasonable to expect that such an area would experience enough motor vehicle emissions growth in that pollutant/precursor for a NAAQS violation to occur. Such a finding would be based on a number of factors, including the percentage of motor vehicle emissions in the context of the total SIP inventory, the current state of air quality as determined by monitoring data for that NAAQS, the absence of SIP motor vehicle control measures, and historical trends and future projections of the growth of motor vehicle emissions. . .

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia are herein making a finding that regional highway emissions of SO_2 are insignificant contributors to the $PM_{2.5}$ air quality of the Washington DC-MD-VA area. The finding will become final if U.S. EPA concurs and approves this maintenance plan. This finding is due to the fact that the regional highway SO_2 emissions inventory constitutes a very small fraction of the overall emissions inventory in the Washington DC-MD-VA area as shown in Table 5-3.

Table 5-3: Comparison of SO_2 Emissions from On-Road Sources to the Total SO_2 Inventory

Year	Metro DC Total SO_2 Emissions, tpy	On-Road SO_2 Emissions, tpy	% On-Road SO_2
2007			
2017			
2025			

Additionally, $PM_{2.5}$ air quality in the region is good and getting better. Figure 5-1 and Figure 5-2 provide the regional trends in $PM_{2.5}$ air quality for the federal reference method

monitoring sites. The design value for the Washington DC-MD-VA region is 11.2 µg/m^3 for years 2008-2010, 3.8 µg/m^3 beneath the standard. As noted in Table 5-1, the contribution of on-road mobile emissions is expected to decline in both the 2017 and 2025, as compared to 2007. Therefore, it is highly unlikely that any increase in growth assumptions or activity data, beyond those already included in the on-road SO_2 emissions estimation methodology, could account for an exceedance or violation of the 1997 $PM_{2.5}$ NAAQS annual standard. For these same reasons, the likelihood of on-road emissions of SO_2 contributing to an exceedance of the 1997 $PM_{2.5}$ 24-hour standard is even smaller.

Figure 5-1: Washington DC-MD-VA 24 Hour $PM_{2.5}$ Trends

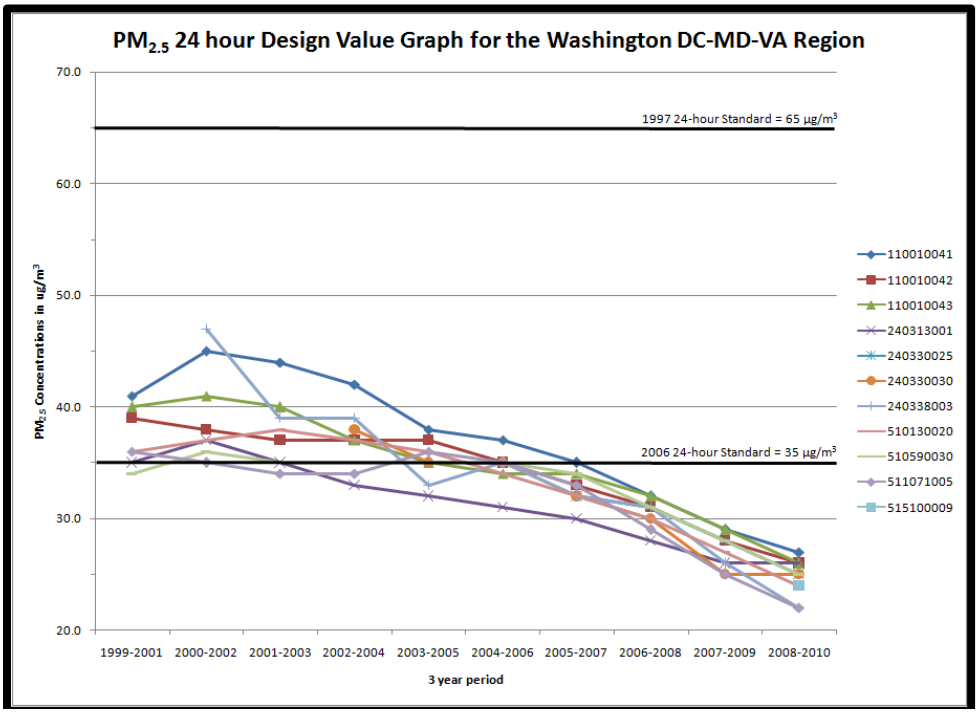
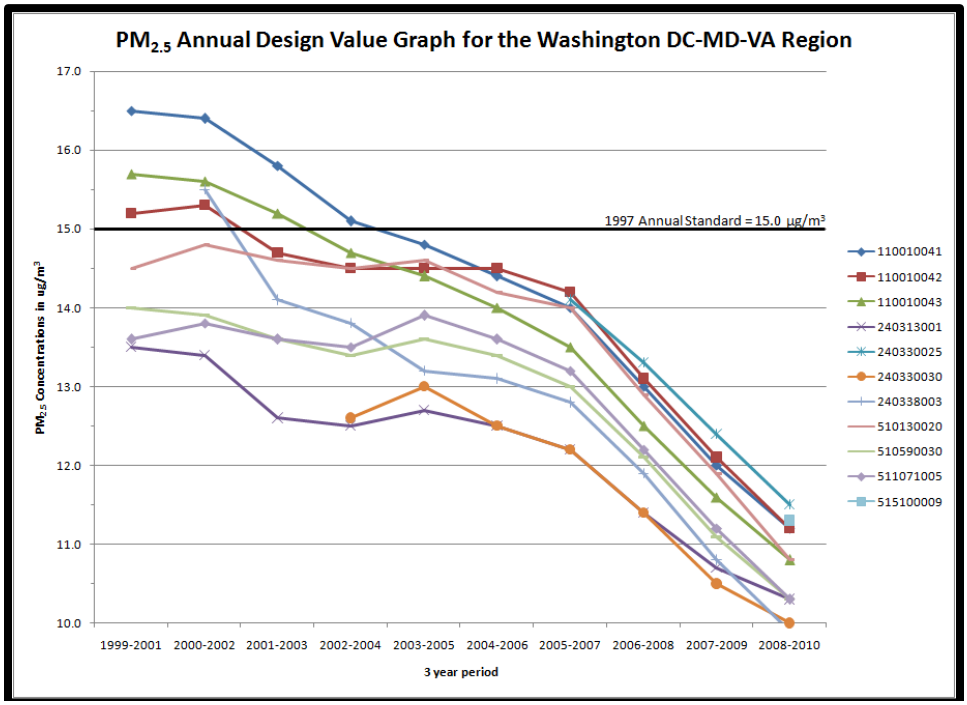


Figure 5-2: Washington DC-MD-VA Annual $PM_{2.5}$ Trend Chart



As required by the transportation conformity rule, this maintenance plan establishes on-road mobile source emissions budgets for NO_X and $PM_{2.5}$. These budgets represent the level of mobile source emissions that can be emitted in the area while supporting the air quality plan. The mobile source budgets established by this plan are presented in Table 5-4. For NO_X and $PM_{2.5}$, initial, interim and final mobile source budgets have been developed to accommodate the fluctuation in mobile source emissions estimates over time. In the near term, mobile source emissions are rapidly decreasing due to the implementation of the NLEV, Tier 2, and HDDV rules, even as VMT continues to grow. Once these rules have sufficiently penetrated the fleet, growth in VMT becomes more pronounced and eventually pushes mobile emissions back on an upward trend. To allow the area to demonstrate conformity of its transportation plans in early TIP evaluation years within the maintenance period, a higher initial budget (set at 2007 levels) has been established that will be in effect from the beginning of the maintenance period through 2016. Beginning in 2017, the interim emissions budget comes into effect and remains through 2024.

Table 5-4: Washington DC-MD-VA Maintenance Plan On-Road Mobile Source Emissions Budgets

Year	NO_X On-Road Emissions (tpy)	$PM_{2.5}$ On-Road Emissions (tpy)
2007 Attainment Year		
2017 Interim Budget		
2025 Final Budget		

5.2.2 Control Measures for Maintenance of Good Air Quality

Point, area, non-road and on-road emission projections for 2017 and 2025 include a variety of control strategies that will reduce emissions of $PM_{2.5}$, NO_X, and SO_2 in the future years. The sections below describe the major control programs in each category. Many of these programs are federal programs that are enforced on a regional or national level. In cases where the programs are delegated programs or state programs, the District of Columbia, the State of Maryland, and the Commonwealth of Virginia commit to the continuation of each program, to include compliance and enforcement mechanisms as appropriate to ensure that reductions assumed in 2017 and 2025 will be achieved.

5.2.2.1 Point Sector Controls

Point source emissions of $PM_{2.5}$, SO_2, and NO_X are dominated in the Washington DC-MD-VA region by the emissions from electrical generating units (EGU). The EGUs located in the Washington DC-MD-VA nonattainment area are the Possum Point Power Station in Fairfax, Virginia (ORIS 3804); the Potomac River Power Station in Alexandria, Virginia (ORIS 3788); the Chalk Point Generating Plant, in Prince George's County, Maryland (ORIS 1571); the Dickerson Generating Plant, in Montgomery County, Maryland (ORIS 1572); the Morgantown Generating Plant, in Charles County, Maryland (ORIS 1573); the Buzzard Point Power Plant in the District of Columbia (ORIS ????); and the Benning Road Power Plant in the District of Columbia (ORIS 603). These facilities are subject to a variety of federal and state-enforceable mechanisms that have reduced emissions at these units since 2007 and will continue to reduce emissions into the future.

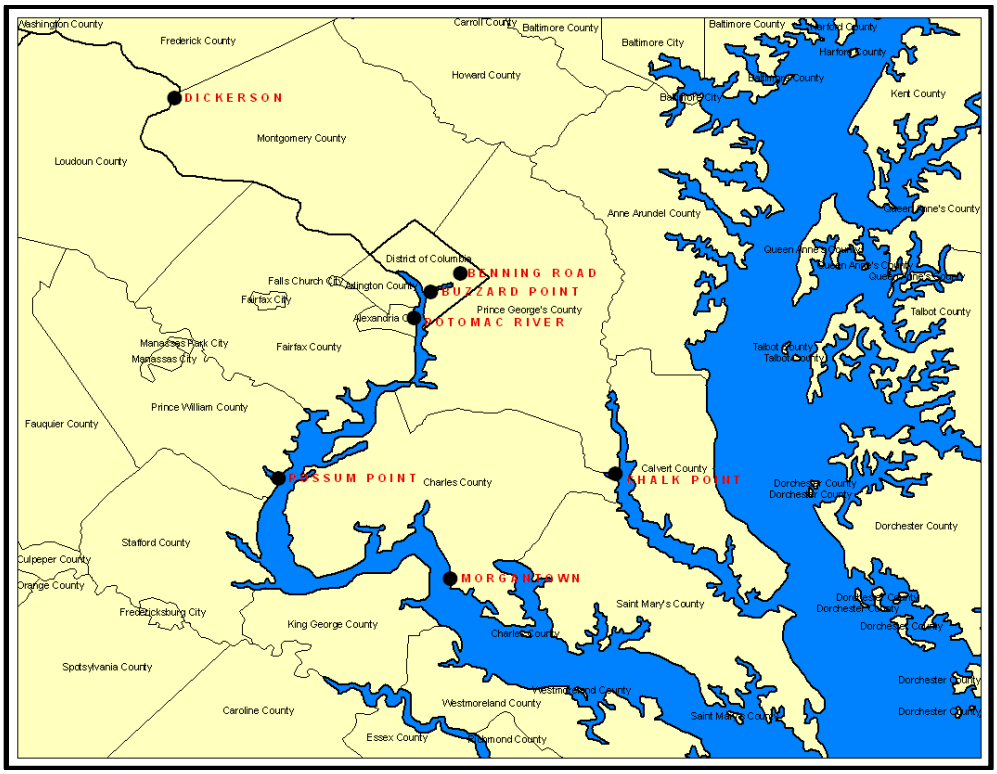


Figure 5-3: Large EGUs in the Washington DC-MD-VA Area

5.2.2.1.1 Maryland Healthy Air Act

The Maryland Health Air Act (HAA) regulations became effective on July 16, 2007 and required reductions in NO_X, SO_2, and mercury emissions from large coal burning power plants in Maryland. Specifically, this program limits emissions from the Chalk Point Generating Plant, the Dickerson Generating Plant, and the Morgantown Generating Plant, all of which are coal fired power plants located within the Maryland border of the Washington DC-MD-VA nonattainment area. Emission reductions from the HAA are phased. The first phase required reductions in the 2009/2010 timeframe, and compared against a 2002 emissions baseline, reduced NO_X emissions by almost 70% and SO_2 emissions by 80%. The second phase of emissions controls will occur in the 2012/2013 time frame. At full implementation, the HAA will reduce NO_X emissions by approximately 75% from 2002 levels and SO_2 emissions by approximately 85% from 2002 levels. The first phase of the HAA was successfully implemented, and the second phase of the program is expected to be implemented in a timely manner.

5.2.2.1.2 District of Columbia Source Shutdowns

The Buzzard Point Power Plant ceased commercial operation on _____ and entered into a formal agreement with the District of Columbia to shut down operations. Additionally, Benning Road Power Plant has agreed to shut down operations by _____. Both of these facilities are large, uncontrolled oil-fired turbines.

5.2.2.1.3 Virginia Permitting Requirements.

A federal settlement reduced emissions of NO_X and SO_2 significantly at the Possum Point Power Station, which is located within the Virginia border of the Washington DC-MD-VA nonattainment area in Fairfax County. This consent decree was signed April 17, 2003 and involved Virginia Electric and Power Company (VEPCO). The decree required the Possum Point Power Station to switch two coal-fired boilers to natural gas, thereby removing coal as a fuel at the facility. This requirement was also codified in a federally enforceable permit issued by the Virginia Department of Environmental Quality on October 5, 2001. The fuel switch from coal to natural gas was made in the 2003-2004 timeframe and resulted in large reductions in $PM_{2.5}$, SO_2, and NO_X from these units.

Two other permitting actions affected the emissions of SO_2 and NO_X from the Potomac River Power Station, a coal-fired EGU located in Alexandria, Virginia. The first was a state operating permit issued on July 31, 2008 by the Commonwealth of Virginia's State Air Pollution Control Board to address modeled exceedances of the National Ambient Air Quality Standards and the Significant Ambient Air Concentrations. This permit limited the facility's primary $PM_{2.5}$ emissions to 207 tpy, the SO_2 emissions to 3,813 tpy, and the NO_X emissions to 3,700 tpy. On July 29, 2010, a second state operating permit was issued, further limiting the facility to 890 tons of NO_X per ozone season (May 1 through September 30). This permit supported the emissions reductions associated with the Washington DC-MD-VA 1997 ozone NAAQS nonattainment area's attainment plan, entitled *Plan to Improve Air Quality in the Washington, DC-MD-VA Region.*

5.2.2.1.4 Future Point Source Emissions Reductions Programs

Three federal regulations may reduce emissions of SO_2 even further than is already estimated by the 2017 and 2025 inventory shown in Table 5-1 for the Washington DC-MD-VA area. These rules are not yet finalized and therefore were not considered in the 2017 and 2025 estimates included in this document. If these regulations are finalized, each should instigate significant further reductions, both within and outside the Washington DC-MD-VA area.

- Mercury and Air Toxics Rule: On March 16, 2011, U.S. EPA proposed the Mercury and Air Toxics Rule to reduce emissions of toxic air pollutants from new and existing coal and oil-fired EGUs. The proposed rule would establish numerical emission limits for hydrogen chloride (HCl) as a surrogate for toxic acid gases, or alternative standards for SO_2. U.S. EPA estimates that this rule would affect approximately 1,200 coal-fired units nationwide and would reduce SO_2 emissions from power plants by 55%. The final rule is expected to be published in 2012 so that existing sources may be required to demonstrate compliance with applicable standards by 2015.

- 2010 SO_2 NAAQS: On June 2, 2010, U.S. EPA strengthened the primary NAAQS for SO_2 by revising the primary SO_2 standard to 75 ppb averaged over one hour. This short term standard is significantly more stringent than the revoked standards of 140 ppb averaged over 24 hours and 30 ppb averaged over a year. Under the new standard's proposed guidance, facilities emitting more than 100 tpy of SO_2, many of which are EGUs, will be required to demonstrate compliance with the standard no later than 2017.

- Industrial/Commercial/Institutional (ICI) Boiler Maximum Achievable Control Technology (MACT) Standard: U.S. EPA finalized the revised ICI Boiler MACT on February 21, 2011, although portions of the rule are under reconsideration. U.S. EPA estimates that implementation of the revised rulemaking will reduce emissions nationwide from major source boilers and process heaters by 47,000 tpy of PM, 440,000 tpy of SO_2, and 7,000 tpy of VOCs.

5.2.2.2 Nonroad Diesel Emissions Program

Under 40 CFR Part 89, U.S. EPA adopted standards for emissions of NO_X, hydrocarbons, and carbon monoxide (CO) from several groups of nonroad engines, including industrial spark-ignition engines and recreational nonroad vehicles. Industrial spark-ignition engines power commercial and industrial applications and include forklifts, electric generators, airport baggage transport vehicles, and a variety of farm and construction applications. Nonroad recreational vehicles include snowmobiles, off-highway motorcycles, and all-terrain vehicles. These rules were initially effective in 2004 and will be fully phased in by 2012.

The nonroad diesel rule sets standards that reduced emissions by more than 90% from nonroad diesel equipment and, beginning in 2007, the rule reduced fuel sulfur levels by 99% from previous levels. The reduction in fuel sulfur levels applied to most nonroad diesel fuel in 2010 and will apply to fuel used in locomotives and marine vessels in 2012.

This program will continue to provide emission reductions of NO_X as new equipment is purchased and older equipment is scrapped. Additionally, SO_2 emissions from the combustion of nonroad diesel fuel and locomotive and marine diesel fuel will continue to be reduced through 2012.

5.2.2.3 On-Road Emissions Programs

In the 2007 heavy-duty highway rule, which is codified in 40 CFR Part 86, Subpart P, U.S. EPA set a PM emission standard for new heavy-duty engines of 0.01 grams per brake horsepower-hour (g/bhp-hr). This standard took full effect for diesel engines in the 2007 model year. This rule included standards for NO_X and non-methane hydrocarbons (NMHC) of 0.20 g/bhp-hr and 0.14 g/bhp-hr, respectively. These diesel engine NO_X and NMHC standards were successfully phased in together between 2007 and 2010. The rule also required that sulfur in diesel fuel be reduced to facilitate the use of modern pollution control technology on these trucks and buses. U.S. EPA required a 97% reduction in the sulfur content of highway diesel fuel -- from levels of 500 parts per million (ppm) for low sulfur diesel to 15 ppm for ultra-low sulfur diesel. The reductions in sulfur content engendered similar reductions in SO_2 emissions. These requirements were successfully implemented on the timeline in the regulation.

The Tier 2 vehicle and gasoline sulfur program, as codified in Subpart H of 40 CFR Part 80, 40 CFR Part 85, and 40 CFR Part 86, became effective in the 2005 model year. This program for fleet averaging of on-road vehicles is modeled after the California LEV II standards. The Tier 2 program allows manufacturers to produce vehicles with emissions ranging from relatively dirty to very clean, but the mix of vehicles a manufacturer sells each year must have

average NO_X emissions below a specified value. Mobile emissions continue to benefit from this program as motorists replace older, more polluting vehicles with cleaner vehicles.

In additional to the federal Tier 2 program and the federal 2007 heavy duty highway rule, the District of Columbia, the State of Maryland, and the Commonwealth of Virginia have all instituted enhanced vehicle emissions inspection and maintenance (enhanced I/M) requirements. The requirements involve mandating regional vehicle emission I/M programs that are stricter than basic programs, as required under §§182 and 202 of the CAA. Before 1994, basic automobile emissions testing checked only tailpipe emissions while idling and sometimes at 2,500 rpm. Enhanced I/M procedures include the use of On Board Diagnostic (OBD) system evaluations, a wider range of vehicles tested, and may include a dynamometer (treadmill) test that checks the car's emissions under driving conditions. The OBD evaluations provide a more complete inspection, checking for excess evaporative emissions and other issues that might affect emissions from the vehicle.

5.2.2.4 Area Source Emission Reduction Strategies

6. Air Quality Monitoring Network

6.1 U.S. EPA Requirements

Once an area has been redesignated, the states must continue to operate an appropriate air quality monitoring network in accordance with 40 CFR Part 58, to verify the area's attainment status. In cases where measured mobile source parameters (for example, vehicle miles traveled) have changed over time, the state may also need to perform a saturation monitoring study to determine the need for and location of additional permanent monitors.

6.2 Washington DC-MD-VA Approach

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia operate a monitoring network that is significantly more robust than required by federal regulation. Figure 6-1 provides a map showing the locations of the various monitoring in the current network.

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia commit to operating and maintaining an air quality network for $PM_{2.5}$ monitoring that meets all federal requirements. Should measured mobile source parameters change significantly over time, the states comprising the Washington DC-MD-VA nonattainment area will perform a saturation monitoring study to determine the need for and location of $PM_{2.5}$ monitors.

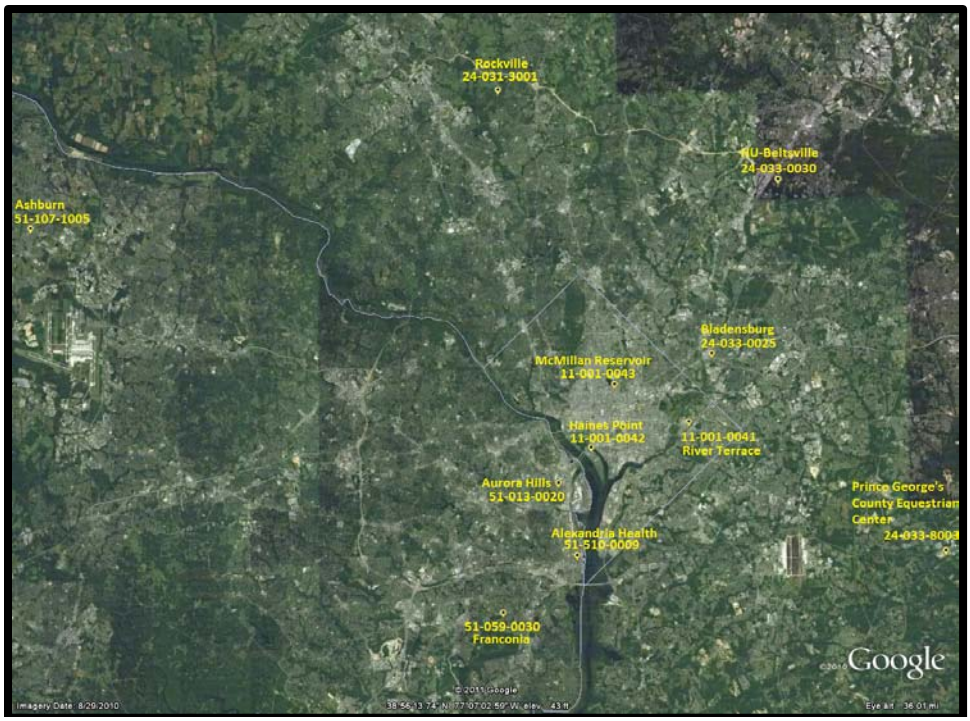


Figure 6-1: Washington DC-MD-VA $PM_{2.5}$ Monitoring Sites

7. Verify Continued Attainment

7.1 U.S. EPA Requirements

States must ensure that they have the legal authority to implement and enforce all measures necessary to attain and maintain the NAAQS. Sections 110(a)(2)(B) and (F) of the CAA, and regulations promulgated in 40 CFR 51.110(k) suggest that one such measure is the acquisition of air quality and source emission data to demonstrate attainment and maintenance. The submittal must indicate how the states will track the progress of the maintenance plan. This is necessary due to the fact that the emission projections made for the maintenance demonstration depend on assumptions of point, area, and mobile source growth.

One option for tracking the progress of the maintenance demonstration would be for the states to periodically update the emissions inventory. In this case, the maintenance plan should specify the frequency of any planned inventory updates. Such an update could be based, in part, on the annual update of the EPA Aerometric Information Retrieval System (AIRS) and could indicate new source growth and other changes from the attainment inventory (such as changes in vehicle miles traveled or in traffic patterns). As an alternative to a complete update of the inventory, states may choose to do a comprehensive review of the factors that were used in developing the attainment inventory to show no significant change. If this review does show a significant change, states should then perform an update of the inventory.

7.2 Washington DC-MD-VA Approach

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia have the legal authority to implement and enforce specified measures necessary to attain and maintain the NAAQS. Key regulatory elements that the respective state will keep in place to maintain attainment are as follows:

- Shutdown requirements, permitting requirements, and cap requirements, as described in Section 5.2.2.1.

- I/M program requirements, as described in Section 5.2.2.3.

In addition to maintaining key elements of its regulatory program in place, each state will acquire ambient and source emission data to track attainment and maintenance. Each state will track the progress of the maintenance demonstration by periodically updating the emissions inventory. This tracking will consist of annual and periodic evaluations. The annual evaluation will consist of checks on key emissions trend indicators such as the annual emissions update of stationary sources, the Highway Performance Monitoring System (HPMS) vehicle miles traveled data reported to the Federal Highway Administration, and other growth indicators. These indicators will be compared to the growth assumptions used in the plan to determine if the predicted versus the observed growth remains relatively constant. Each state will also develop and submit to EPA comprehensive tracking inventories every three years or as required by federal regulation during the maintenance plan period.

8. Contingency Measures

8.1 U.S. EPA Requirements

The maintenance plan must include contingency measures, as necessary, to promptly correct any NAAQS violation that occurs after redesignation of an area. It should include measures to be adopted, a schedule and procedures for adoption and implementation, and a specific time limit for action. Specific triggers that would put the plan into motion must be identified. This plan is considered to be an enforceable part of the SIP and should ensure that the contingency measures are adopted explicitly once they are triggered.

8.2 Washington DC-MD-VA Approach

The ability of the Washington DC-MD-VA nonattainment area to stay in compliance with the 1997 $PM_{2.5}$ NAAQS depends at least partially on the level of NO_X, SO_2, and primary $PM_{2.5}$ emissions in the region. Emissions are projected to stay well below the 2007 attainment year levels, through 2025. However, if emissions increase, the area may experience a $PM_{2.5}$ violation. To address this unlikely situation, the District of Columbia, the State of Maryland, and the Commonwealth of Virginia have developed a contingency plan to address this situation. Either of the two situations described below would trigger the implementation of the contingency measures described in Section 8.2.1 and Section 8.2.2.

- Any annual exceedance (annual average for one year at any federal reference method monitor in the Washington DC-MD-VA nonattainment area) of 15.0 $\mu g/m^3$ or greater.
- Any violation (three year average of the annual average at any federal reference method monitor in the Washington DC-MD-VA nonattainment area) of 15.0 $\mu g/m^3$ or greater.

8.2.1 Near Term Contingency Measures

If either of the two situations listed in Section 8.2 occur prior to January 1, 2013, the Maryland Healthy Air Act's second phase will provide significant emissions reductions of precursors to $PM_{2.5}$. This regulation, included in COMAR 26.11.27, requires additional SO_2 reductions beginning January 1, 2013, for applicable coal-fired power plants in Maryland. These applicable units include coal-fired boilers located at the Morgantown Power Plant, the Dickerson Power Plant, and the Chalk Point Power Plant in the Washington DC-MD-VA nonattainment area. In 2013 the allowable tonnage cap for the units at these facilities will be reduced from 24,209 tpy of SO_2 to 18,541 tpy of SO_2, a reduction of almost 24%. This regulation has the added benefit of already being codified; these reductions will take place in January of 2013 without further action by the State of Maryland.

8.2.2 Long Term Contingency Measures

If an annual exceedance, as described in Section 8.2, occurs after January 1, 2013, the District of Columbia, the State of Maryland, and the Commonwealth of Virginia commit to implementing one of the programs listed in Table 8-1 to garner additional emission reductions to improve air quality.

If an annual violation, as described in Section 8.2, occurs after January 1, 2013, the District of Columbia, the State of Maryland, and the Commonwealth of Virginia commit to implementing two or more of the programs listed in Table 8-1 to garner additional emission reductions to improve air quality.

Table 8-1: Contingency Control Measures

$PM_{2.5}$ Reasonable Available Control Measure (RACM) Determination
SO_2 RACM Determination
NO_X RACM Determination
Non Road Diesel Emission Reduction Strategies
Alternative Fuel and Diesel Retrofit Programs for Fleet Vehicle Operations
Concrete Manufacturing – Wet Suppression Upgrade Requirements

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia commit to the implementation of any long term contingency measure on the following schedule:

- Schedule onset: notification received from U.S. EPA that a contingency measure must be implemented, or three months after quality assured data determine that an exceedance or violation occurred within the previous year.

- Applicable regulation or program to be adopted six months after this date.
- Applicable regulation to be implemented six months after adoption.
- Compliance with regulation, or full program implementation, to be achieved within 12 months of adoption.