Redesignation Request for the Washington DC-MD-VA 2008 Ozone NAAQS Marginal Nonattainment Area

Prepared by:

Metropolitan Washington Council of Governments

for the

District Department of the Environment
Maryland Department of the Environment
Virginia Department of Environmental Quality

on behalf of the
Metropolitan Washington Air Quality Committee

December 20, 2017

Table of Contents

List of Figures

List of Tables

List of Appendices

List of Annexures

1. Introduction

The District of Columbia, the State of Maryland, and the Commonwealth of Virginia request that the United States Environmental Protection Agency (USEPA) redesignate the Washington DC-MD-VA 2008 ozone National Ambient Air Quality Standard (NAAQS) marginal nonattainment area to attainment pursuant to the provisions under § 107 of the federal Clean Air Act (CAA). USEPA designated this area nonattainment on May 21, 2012 (77 FR 30088). Since that time, the area's ozone air quality has improved due to permanent and enforceable emission reductions and is significantly better than required by the 2008 ozone NAAQS. The District of Columbia, the State of Maryland, and the Commonwealth of Virginia are also requesting that USEPA concurrently approve, as a revision to the state implementation plan (SIP) for each jurisdiction, the related § 175A maintenance plan. This plan ensures that good ozone air quality will be maintained through 2030.

2. Background

2.1 Health Effects

Ozone is a highly reactive gas that affects living tissues as well as many synthetic substances. Since 90% of inhaled ozone is never exhaled, ozone molecules react with lung tissue to cause several health consequences.[1] Exposure to ozone can result in both long-term and short-term health effects in people who work or exercise outdoors regularly, anyone with respiratory difficulties, and especially to children, asthmatics, and the elderly.

Ozone's long-term effects include reduced lung function, scarring of lung tissue, and premature death.[2] Research suggests that repeated exposure to ozone causes damage to lung tissue, thereby reducing lung function.

Children are at greater risk for ozone-related respiratory problems because their lungs are still developing, they breathe more rapidly, and they play outside during the afternoons when ozone is at its highest levels. Children also inhale more air; hence, they receive more pollution per pound of body weight than adults do.

Short-term effects of ozone exposure among healthy populations include impaired lung function and reduced ability to perform physical exercise. For example, healthy young people developed a significant reduction of lung function, additional coughing and breathing pains, and enhanced airway reactivity to irritants when exposed to ozone at concentrations of 80-120 parts per billion (ppb) for 6.6 to 7.0 hours while exercising moderately.[3] Among people who are especially

[1] Sources and Health effects of Ground-Level Ozone, downloaded from http://www.dnr.state.wi.us/eq/aie/ozone/b_effect.htm.

[2] Bell ML, Dominici F, and Samet JM. *A Meta-Analysis of Time-Series Studies of Ozone and Mortality with Comparison to the National Morbidity, Mortality, and Air Pollution Study*. Epidemiology 2005; 16:436 445.

[3] Horstman D, Folinsbee L, Ives P, Abdul-Salaam, Said, and McDonnel W, *Ozone Concentration and Pulmonary Response Relationships for 6.6-Hour Exposures with Five Hours of Moderate Exercise to 0.08, 0.10 and 0.12 ppm*, American Review of Respiratory Disease, February 1990.

sensitive to ozone pollution, short-term effects include increased hospital admissions and emergency room visits for respiratory diseases such as asthma.

In summary, health effects from exposure to ozone can include the following:

- Increased susceptibility to respiratory infection
- Impaired lung function and reduced ability to perform physical exercise
- Severe lung swelling and death, due to short-term exposures greater than 300 ppb
- Increased hospital admissions and emergency room visits for respiratory diseases

2.2 Causes of Poor Ozone Air Quality

Ground level ozone pollution results from the reaction of nitrogen oxides (NO_X) and volatile organic compounds (VOC) in the presence of sunlight and warm temperatures. Longer days and warmer temperatures make ozone air quality a problem predominantly during the summer months. A variety of anthropogenic sources emit NO_X and VOC and therefore contribute to the air quality problem.

The CAA placed a great deal of importance on VOC emission reductions. However, studies in recent years show that ozone concentrations respond to NO_X emission reductions more strongly over most of the United States and in the Mid-Atlantic region.[4] This situation is due at least partially to the substantial decreases in NO_X emissions since the inception of the CAA and particularly over the last two decades. Another factor is that peak summertime ozone formation is more sensitive to changes in NO_X with increasing temperature because emissions of highly reactive, biogenic isoprene increase with temperature and increase the total VOC emissions available for reaction. Recent studies also show that additional NO_X reductions beyond those already achieved will decrease net ozone production at a greater rate than previously estimated.[5] While the CAA focuses more on VOC, these studies indicate that NO_X reductions are equally important or more important for attaining and maintaining healthy air quality.

While anthropogenic emissions originating within the area impact ozone pollution, transported emissions of NO_X, VOC, and ozone also degrade ozone air quality. Section 110(a)(2)(D)(i) of the CAA, also called the Good Neighbor Provision, requires USEPA and states to address interstate transport of air pollution that affect the ability of downwind states to attain and maintain the NAAQS. USEPA published the Cross-State Air Pollution Rule (CSAPR) update on October 26, 2016 (81 FR 74504) as the latest regulation designed to reduce emissions of NO_X from upwind electric generating units (EGUs) in support of the 2008 ozone NAAQS.

2.3 Washington DC-MD-VA Nonattainment Designation

The CAA requires each state with areas failing to meet the 2008 ozone NAAQS to develop SIPs to expeditiously attain and maintain the standard. USEPA revised the NAAQS for ozone on

[4] Boylan J, Odman T, et al, "SEMAP 2018 Ozone Projections and Sensitivity to NO_X & VOC Emissions," LADCO Air Quality Workshop, April 2014.
[5] Goldman D, Dickerson R, et al, "Modeling Ozone in the Eastern US: Using Observations to Guide CMAX and CMAQ," EPRI ENV-Vision workshop, May 2016.

March 27, 2008 (73 FR 16436), replacing the previous ozone standard of 0.08 parts per million (ppm) with a more stringent, health-based standard of 0.075 ppm and keeping the form of the standard, the annual fourth-highest daily maximum 8-hour concentration averaged over three years, the same.

USEPA published designations for the 2008 ozone NAAQS on May 12, 2012 (77 FR 30088) and designated the Washington DC-MD-VA area as a nonattainment area based on air quality data from years 2008 to 2010. Subpart 2 of the CAA defined five ozone nonattainment classifications for areas that exceed the NAAQS based on the severity of the ozone levels: marginal, moderate, serious, severe, and extreme. Based on the 2008 to 2010 design value of 0.081 ppm, USEPA classified the Washington DC-MD-VA area as a marginal nonattainment area. As a marginal nonattainment area, the CAA prescribed limited planning requirements, so that the only state implementation plan due as a result of the marginal classification was the base year emissions inventory, as mandated by §182(a)(1).

Table 2-1 lists the jurisdictions within the Washington DC-MD-VA 2008 ozone NAAQS nonattainment area.

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

Washington DC-MD-VA Ozone Nonattainment Jurisdictions	FIPS[1]
District of Columbia	11-001
Calvert County	24-009
Charles County	24-017
Frederick County	24-021
Montgomery County	24-031
Prince George's County	24-033
Alexandria City	51-510
Arlington County	51-013
Fairfax County	51-059
Fairfax City	51-600
Falls Church City	51-610
Loudoun County	51-107
Prince William County	51-153
Manassas City	51-683
Manassas Park City	51-685

[1]Federal Information Processing Standards code

3. USEPA Requirements for Redesignation

The CAA provides a process whereby a state may petition USEPA to redesignate a nonattainment area as attainment. The CAA lists five obligations that the USEPA must meet during the redesignation process. Section 107(d)(3)(E) states:

> The Administrator may not promulgate a redesignation of a nonattainment area (or portion thereof) to attainment unless –

(i) the Administrator determines that the area has attained the national ambient air quality standard;
(ii) the Administrator has fully approved the applicable implementation plan for the area under section 110(k);
(iii) the Administrator determines that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the applicable implementation plan and applicable Federal air pollutant control regulations and other permanent and enforceable reductions;
(iv) the Administrator has fully approved a maintenance plan for the area as meeting the requirements of section 175A; and
(v) the State containing such area has met all requirements applicable to the area under section 110 and part D.

This document addresses each of these requirements and provides additional information to support continued compliance with the 2008 ozone NAAQS. USEPA has published detailed guidance in a memorandum from John Calcagni, Director, Air Quality Management Division, entitled *Procedures for Processing Requests to Redesignate Areas to Attainment* (redesignation guidance), issued September 4, 1992, to Regional Air Directors.[6] 40 CFR Part 51, Subpart AA, *Provisions for Implementation of the 2008 Ozone National Ambient Air Quality Standards* (implementation rule) provides additional information. The District of Columbia, the State of Maryland, and the Commonwealth of Virginia have based this redesignation request and its associated maintenance plan on the redesignation guidance and the implementation rule, supplemented with additional guidance received from staff of USEPA Region III.

3.1 Attainment of the Standard

States requesting redesignation must show that the area is attaining the applicable NAAQS. USEPA, in turn, must determine that states have demonstrated attainment of the 8-hour ozone NAAQS.

The Washington DC-MD-VA area federal reference monitors have demonstrated compliance with the 0.075 ppm 8-hour standard since 2015. The compliance date for 2008 ozone NAAQS marginal nonattainment areas was 2014. While the three-year average design value for the area in 2014, based on 2012-2014 data, was above 0.075 ppm, the area had no fourth highest, eight hour averages of more than 0.075 ppm during the summer of 2014. Therefore, the area was able to request an extension of the compliance deadline in accordance with §172(a)(2)(C) and 40 CFR Part 51.1107. USEPA approved this request on May 4, 2016 (81 FR 26697). The data for years 2013-2015 comply with the standard so that the area did not need any additional extensions. This section presents information that demonstrates the Washington DC-MD-VA nonattainment area attained the 2008 ozone NAAQS based on three years (2013-2015) of quality assured monitoring as specified in 40 CFR Part 58. USEPA proposed a determination of attainment based on the 2013-2015 data on April 25, 2017 (82 FR 19011). In addition, the area continues to attain the 2008 ozone NAAQS based on the 2014-2016 quality assured ambient air quality data and preliminary 2015-2017 ambient air quality data as of August 31, 2017.

[6] See http://www.epa.gov/ttn/oarpg/t5/memoranda/redesignmem090492.pdf, accessed April 27, 2012.

3.1.1 Ozone Monitoring Data Analysis Requirements

In 1992, the USEPA published redesignation guidance. This guidance documents the requirements that nonattainment areas must meet to be redesignated to attainment.

The following are the requirements regarding ambient air monitoring data and attainment:

- Monitoring data must show that the nonattainment area is attaining the NAAQS.
- The data should be collected and quality assured in accordance with 40 CFR 58 and recorded in the USEPA Air Quality System (AQS) database in order for it to be available to the public for review.

3.1.2 Washington DC-MD-VA Area Ozone Ambient Air Monitoring Network

As shown in Figure 3-1, the air monitoring network in Washington DC-MD-VA region contains 14 sites that monitor ozone. Federal regulations only mandate four ozone sites for a metropolitan statistical area of greater than 10 million people containing an ozone nonattainment area (40 CFR 58 Appendix D Section 4.1). Therefore, the Washington DC-MD-VA region currently has an exceptionally robust network.

Figure 3-1: Washington DC-MD-VA 2008 Ozone NAAQS Nonattainment Area

3.1.3 Washington DC-MD-VA Area Ozone Concentration Data

To determine whether or not a site is in compliance with the 2008 ozone NAAQS, states must calculate the annual fourth-highest daily maximum 8-hour concentration, averaged over three years, and compare these values at each of the monitoring sites to the standard of 0.075 ppm. For an area to be in compliance with the 2008 ozone NAAQS, all sites within that area must be in compliance with the standard. Even if only one station is not in compliance, that one station causes the entire area to not be in compliance with the NAAQS.

The Washington DC-MD-VA region's federal reference monitors first demonstrated compliance with the 8-hour 0.075 ppm standard using data from 2013-2015. The most recent design value based on the 2014-2016 data is 0.072 ppm. All ozone ambient monitoring data through 2016 have been quality assured in accordance with 40 CFR 58.10, recorded in AQS, and made available for public review.

Table 3-1, presented below, shows the ozone design values for the monitoring sites in the Washington DC-MD-VA nonattainment area. The data in this table rely only on valid ozone concentrations for calculating design values, and the three jurisdictions have certified this data.

Table 3-1: Washington DC-MD-VA Area Ozone Design Values, ppm

AQS ID Site Name	Jurisdiction	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016
11-001-0050[1] Takoma Park	District of Columbia	0.080	0.081	0.080	0.077	0.075	---	---	---	---	---	0.070
11-001-0041[2] River Terrace	District of Columbia	0.079	0.085	0.086	0.078	0.077	0.076	0.080	0.072	---	---	---
11-001-0043 McMillian Reservoir	District of Columbia	0.085	0.087	0.087	0.080	0.079	0.079	0.084	0.079	0.073	0.068	0.070
24-009-0011 Calvert	Calvert, MD	---	0.081	0.079	0.074	0.077	0.079	0.083	0.077	0.073	0.068	0.069
24-017-0010 Southern Maryland	Charles, MD	0.085	0.085	0.082	0.075	0.075	0.077	0.083	0.078	0.073	0.068	0.069
24-021-0037 Frederick	Frederick, MD	0.080	0.083	0.082	0.076	0.075	0.076	0.079	0.074	0.070	0.067	0.067
24-031-3001 Rockville	Montgomery, MD	0.083	0.086	0.084	0.078	0.074	0.076	0.077	0.074	0.068	0.068	0.068
24-033-8003 P.G. Equestrian Center	Prince George's, MD	0.091	0.091	0.087	0.078	0.077	0.079	0.087	0.081	0.076	0.069	0.071
24-033-0030 Hu-Beltsville	Prince George's, MD	---	0.085	0.083	0.078	0.078	0.079	0.082	0.076	0.070	0.068	0.069
24-033-9991 Beltsville	Prince George's, MD	---	---	---	---	---	---	---	0.080	0.075	0.069	0.068
51-013-0020 Arlington	Arlington, VA	0.086	0.087	0.085	0.079	0.079	0.080	0.086	0.079	0.074	0.070	0.072
51-059-0030 Franconia	Fairfax, VA	0.089	0.086	0.085	0.080	0.081	0.082	0.086	0.079	0.072	0.068	0.070
51-107-1005 Ashburn	Loudoun, VA	0.080	0.082	0.083	0.077	0.075	0.073	0.075	0.071	0.067	0.066	0.067
51-153-0009 Long Park	Prince William, VA	0.079	0.078	0.078	0.071	0.070	0.069	0.072	0.069	0.066	0.065	0.065
Washington DC-MD-VA Design Value		**0.091**	**0.091**	**0.087**	**0.080**	**0.081**	**0.082**	**0.087**	**0.081**	**0.076**	**0.070**	**0.072**

[1] The Takoma Recreation Center monitor (AQS ID 11-001-0050) was established in 2013 as a replacement for the Takoma School monitor (AQS ID 11-001-0025); the Takoma School site was permanently shut down in December 2010 due to a fire incident. These changes–Takoma School monitor shutdown and the subsequent establishment of a replacement monitor at the Takoma Recreation Center–were reflected in the DC's annual network plans approved by EPA in November 2011 and November 2012. The Takoma Recreation Center monitor (AQS ID 11-001-0050) was deployed in January 2013 but it was temporarily shut down for four months, July- October 2013, due to a facility improvement construction project. EPA was notified of this unexpected operational issue. This temporary disruption during the 2013 ozone season resulted in insufficient data for design value calculations for 2013-2015. However, the Takoma Recreation Center monitor is currently operating and expected to have sufficient data for valid design values in the future and, for this reason, included in Table 3-1.

[2] The River Terrace monitor (AQS ID 11-001-0041) was temporarily shut down in early 2014 due to major renovations for the River Terrace educational center facility. EPA approved the temporary discontinuation of this site captured in the 2014 Annual Network Plan, and the DC's network plan was duly reviewed and approved in November 2013. The River Terrace air monitoring site was reinstated in 2016 and continued operation since May 2016; this reinstatement was incorporated in the DC's annual network plan approved by EPA in November 2015. The gap in data collection resulted in insufficient data for design value calculations during 2014-2016. However, the River Terrace monitor is currently operating and expected to have sufficient data for valid design values in the future and, for this reason, included in Table 3-1.

Figure 3-2 shows an overall decreasing trend in the 8-hour ozone design values at different monitors in the region. Over the period between 2006 and 2016, the ozone design value improved from 0.091 ppm in 2004-2006 to 0.072 ppm in 2014-2016, a decrease of 21%.

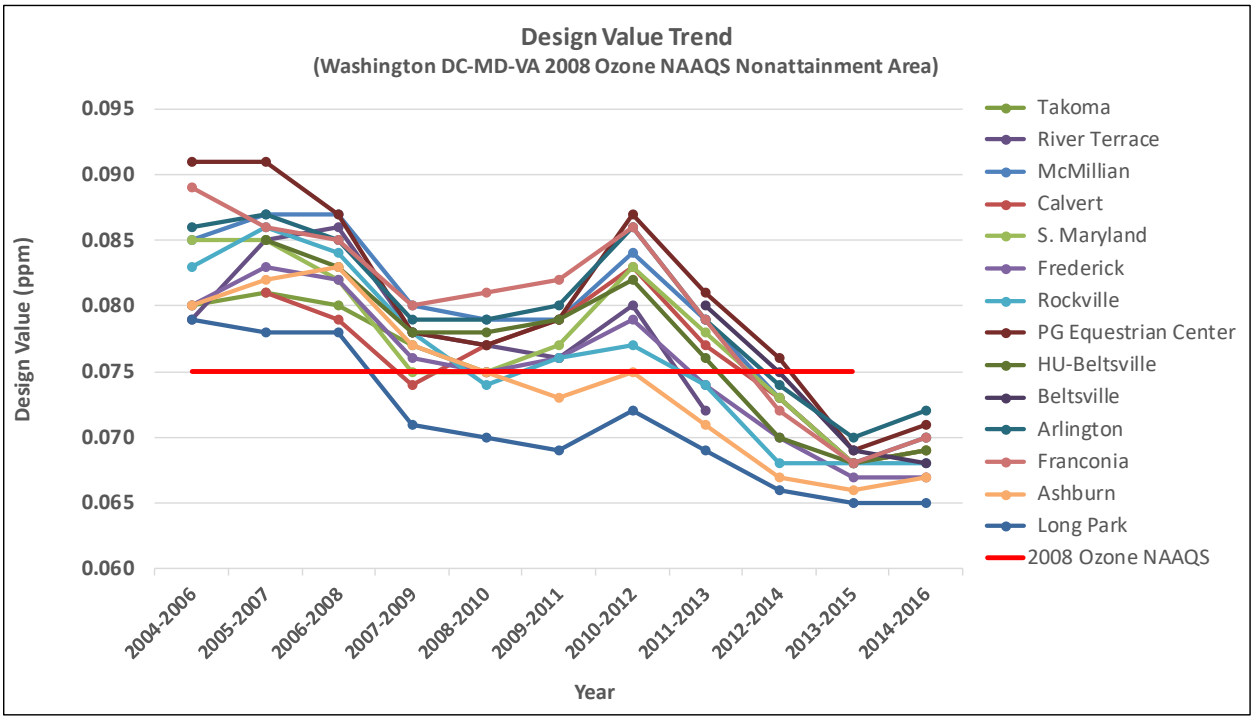

Figure 3-2: Washington DC-MD-VA Area Annual Ozone Data Trend

3.1.4 Quality Assurance

The ambient air monitoring data used in the above analysis has been quality assured in accordance with 40 CFR Part 58 and the Quality Assurance Project Plans (QAPP) for the three jurisdictions. The QAPP is a detailed description of a particular state's actions to assure the collection of ambient air monitoring measurements of sufficient quality and quantity. In addition, states must provide the public the opportunity to review the ambient air monitoring network annually through the Annual Ambient Air Monitoring Network Plans, in accordance with 40 CFR Part 58.10. The most recent Maryland draft annual network plan was available for

public review and comment from April 28, 2017, until May 28, 2017. The most recent Virginia draft annual network plan was available for public review and comment from May 15, 2017 until June 18, 2017. The most recent District of Columbia draft annual network plan was available for public review and comment from May 8, 2017, until June 7, 2017. A site can be discontinued or relocated based on the annual review and with approval from the USEPA Regional Administrator. The District of Columbia, State of Maryland, and the Commonwealth of Virginia submit the quality-assured data into AQS where the data are available to the public.

3.1.5 Continued Monitoring Commitment

The District of Columbia, State of Maryland, and the Commonwealth of Virginia commit to continue monitoring ozone concentrations in the Washington DC-MD-VA region in accordance with 40 CFR Part 58 and USEPA-approved annual monitoring plans. The three jurisdictions will continue to quality-assure the ambient air monitoring data in accordance with 40 CFR 58 and to submit the data into the AQS in a timely fashion.

3.1.6 Clean Data Determination

On April 25, 2017, USEPA published a proposed rule stating that the Washington DC-MD-VA ozone nonattainment area attained the 2008 ozone NAAQS based on three years (2013-2015) of quality-assured ambient air quality data (82 FR 19011). In addition, the area continues to attain the 2008 ozone NAAQS based on the 2014-2016 quality-assured ambient air quality data and on preliminary 2015-2017 data as of August 31, 2017.

3.2 Permanent and Enforceable Emission Reductions

As noted in § 107(d)(3)(E)(iii) and in the redesignation guidance, a state must be able to reasonably attribute its air quality improvements to ozone precursor emission reductions that are both 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 achieved from federal and state measures between the base year for attainment planning and the area's attainment year. 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.

3.2.1 Base Year and Attainment Year

For this demonstration, the base year for the Washington DC-MD-VA area is 2011. The implementation rule for the 2008 ozone NAAQS at 40 CFR Part 51.1115 describes the requirement for each nonattainment area to submit a base year inventory. Under 40 CFR Part 51.1110, which discusses reasonable further progress requirements, the federal requirements note that the baseline emissions inventory should be based upon the most recently completed triennial inventory. In this case, that inventory was for year 2011. USEPA approved the 2011 base year

information supplied by the states in accordance with §182(a)(1) and 40 CFR Part 51.1115 on May 13, 2015 (80 FR 27276) for VOC and NOx emissions and on July 23, 2015 (80 FR 43625) for carbon monoxide (CO) emissions.

The year 2014 is the attainment year for the purposes of this demonstration. The year 2014 lies in the middle of the three years (2013-2015) for which the design value initially showed compliance with the standard. 2014 is also a triennial inventory year so that quality-assured inventory data is available from USEPA's National Emissions Inventory (NEI). These reasons make 2014 an appropriate choice for the attainment year.

Between 2011 and 2014, permanent and enforceable emissions reductions within the Washington DC-MD-VA area helped improve air quality to the point where the area achieved compliance with the 2008 ozone NAAQS.

3.2.2 Emission Reduction Requirements

A variety of federal and state control programs have contributed to reduced on-road, point source, and nonroad emissions of CO, NO_X, and VOCs in the Washington DC-MD-VA nonattainment area. Many of these rules require reduced emissions from new products such as vehicles, trucks, and off-road engines. These types of control strategies provide benefit into the future as consumers replace old equipment with newer, better-controlled models. These programs include:

- Tier 2 Motor Vehicle Emission Regulations: USEPA published a rule (65 FR 6698: effective April 10, 2000) requiring more stringent tailpipe emissions standards for all passenger vehicles, including sport utility vehicles, minivans, vans, and pick-up trucks. These regulations also required lower levels of sulfur in gasoline, which ensured the effectiveness of low emission control technologies in vehicles and reduced harmful air pollution. The tailpipe standards are set at an average standard of 0.07 grams per mile for nitrogen oxides for all classes of passenger vehicles beginning in 2004. This includes all light-duty trucks, as well as the largest SUVs. Vehicles weighing less than 6000 pounds were phased-in to this standard between 2004 and 2007.

- Healthy Air Act: The Maryland Healthy Air Act (Annotated Code of Maryland Environment Title 2 Ambient Air Quality Control Subtitle 10 Healthy Air Act Sections 2-1001–2-1005, *implementing regulations at COMAR 26. 11.27*) became effective on July 16, 2007, and approved by USEPA on September 4, 2008 *(73 FR 51599)* was developed with the purpose of bringing Maryland into attainment with the NAAQS for ozone and fine particulate matter by controlling point sources. This regulation controls emissions from point sources and is the toughest power plant emission law on the east coast. The emission reductions from the Healthy Air Act come in two phases. The first phase requires reductions in the 2009/2010 timeframe and, compared to a 2002 emissions baseline, reduce NOx emissions by almost 70%. The second phase of emission controls occurs in the 2012/2013 timeframe. At full implementation, the HAA will reduce NOx emissions by approximately 75% from 2002 levels.

- Nonroad Small Gasoline Engines: This measure (73 FR 59259: effective December 8, 2008) requires small gasoline-powered engine equipment, such as lawn and garden equipment, manufactured after August 1, 1996 to meet federal emissions standards. Small gasoline-powered engine equipment includes, for example, lawn mowers, trimmers, generators, and compressors. These measures apply to equipment with engines of less than 25 horsepower. VOC emissions result from the combustion and evaporation of gasoline used to power this equipment.

- Nonroad Diesel Engines Tier 1 and Tier 2: This measure (Tier 1 (59 FR 31306): effective July 18, 1994; Tier 2 (63 FR 56968): effective December 22, 1998) takes credit for NOx emissions reductions from emissions standards promulgated by the USEPA for nonroad, compression-ignition (*i.e.*, diesel-powered) utility engines. The measure affects diesel-powered (or other compression-ignition) heavy-duty farm, construction equipment, industrial equipment, etc., rated at or above 37 kilowatts (37 kilowatts is approximately equal to 50 horsepower). Heavy-duty farm and construction equipment includes asphalt pavers, rollers, scrapers, rubber-tired dozers, agricultural tractors, combines, balers, and harvesters. This measure applies to all compression-ignition engines except engines used in aircraft, marine vessels, locomotives and underground mining activity. NOx emissions result from the combustion of diesel fuel used to power this equipment.

- Marine Engine Standards: Of the nonroad sources studied by USEPA, gasoline marine engines were found to be one of the largest contributors of hydrocarbon (HC) emissions, 30% of the nationwide nonroad total. This measure (73 FR 59194: effective December 8, 2008) controls exhaust emissions from new spark-ignition gasoline marine engines, including outboard engines, personal watercraft engines, and jet boat engines.

- Emissions Standards for Large Spark Ignition Engines: This USEPA measure (67 FR 68242: effective January 7, 2003) controls VOC and NOx emissions from several groups of previously unregulated nonroad engines, including large industrial spark-ignition engines, recreational vehicles, and diesel marine engines. The emission standards apply to all new engines sold in the United States and any imported engines manufactured after these standards begin. Controls on the category of large industrial spark-ignition engines are first required in 2004. Large industrial spark-ignition engines are those rated over 19 kW used in a variety of commercial applications; most use liquefied petroleum gas, with others operating on gasoline or natural gas. Controls on the other engine categories are required beginning in years after 2005.

- Reformulated Gasoline Use in Nonroad Motor Vehicles and Equipment: This federally mandated measure (59 FR 7716: effective March 18, 1994) requires the use of lower polluting "reformulated" gasoline in the Washington DC-MD-VA area. The measure reduces emissions from non-road mobile sources. This measure affects the various non-road mobile sources that burn gasoline, such as small gasoline-powered engine equipment including lawn mowers, trimmers, generators, and compressors. VOC emissions result from the combustion and evaporation of gasoline used to power this equipment.

- Railroad Engine Standards: This measure (63 FR 18978: effective June 15, 1998) establishes emission standards for oxides of nitrogen, hydrocarbons, carbon monoxide, particulate matter, and smoke for newly manufactured and remanufactured diesel-powered locomotives and locomotive engines, which were previously unregulated. This regulation took effect in 2000 and affects railroad manufacturers and locomotive re-manufacturers. It involves adoption of three separate sets of emission standards with the applicability dependent on the date a locomotive is first manufactured.

- GenOn Potomac River, LLC Closure: This plant was a 482 megawatt electrical generating facility located in Alexandria, Virginia. The facility consisted of five coal-fired boilers. The facility ceased operations and signed a mutual determination letter on December 21, 2012, revoking all permits for the facility (see Annexure A). This facility emitted 557.7 tons of NO_X annually and 2.7 tons of NOx per ozone season day (tpd) in 2011.

The ozone season is considered a period of time between May 1 and September 30 of each year in the Washington DC-MD-VA 2008 ozone NAAQS nonattainment area. The ozone season coincides with the summer season. Under 40 CFR 51 Subpart X *Provisions for Implementation of 8-hour Ozone National Ambient Air Quality Standard*, summer day (ozone season day) emissions are defined in 40 CFR 51.900(v):

> … an average day's emissions for a typical summer work weekday. The state will select the particular month(s) in summer and the day(s) in the work week to be represented. The selection of conditions should be coordinated with the conditions assumed in the development of reasonable further progress (RFP) plans, rate of progress (ROP) plans and demonstrations, and/or emissions budgets for transportation conformity, to allow comparability of daily emission estimates. (40 CFR 51.900(v)).

This regulation also requires that states must report ozone NAAQS inventories as summer day emissions of NOx and VOC (40 CFR 51.915). For this effort, average daily metrics for the weekdays in July were included as inputs to calculate on-road and nonroad daily emissions. For EGU emissions, nonEGU point emissions, area sector emissions, and MAR emissions, daily emissions were estimated based on available data for each sector and standard inventory practices. These are described in various appendices of the redesignation request and maintenance plan.

The reductions in emissions from the point, area, nonroad, and on-road sectors between 2011 and 2014 are presented in Table *3-2*. These emissions estimates are derived using the most recent motor vehicle, area, nonroad, and travel demand models as well as the most recent planning assumptions as updated in the Metropolitan Washington Council of Government's Cooperative Forecast 9.0. Calculating incremental benefits from the implementation of many of the individual control measures listed above is very difficult. Therefore, the information presented summarizes the combined benefits of these rules. More information on the development of these emissions estimates may be found in Appendix A1, B1, and C1.

Table 3-2: All Sectors' Emissions Reduction for the Washington DC-MD-VA Area, 2011-2014

2011	2014	Δ2011-2014	% Reduction from 2011
VOC Emissions, tpd			
295.0	259.4	35.6	12.1%
NO_X Emissions, tpd			
436.5	296.9	139.6	32.0%
CO Emissions, tpd			
1,800.8	1,617.9	182.9	10.2%

Note: 2011 emissions data is taken from the *2011 base year emissions inventory for the Washington DC-MD-VA 2008 ozone NAAQS nonattainment area* approved by EPA on May 13, 2015 (80 FR 27276) for VOC and NOx emissions and on July 23, 2015 (80 FR 43625) for CO emissions.

3.3 Maintenance Plan

Section 107(d)(3)(E) of the CAA stipulates that for an area to be redesignated, USEPA must fully approve a maintenance plan that meets the requirements of § 175(A). States 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 remain in place. The maintenance plan will constitute a SIP revision and must provide for maintenance of the relevant NAAQS in the area for at least 10 years after redesignation. Section 175(A) further states that the plan shall contain such additional measures, if any, as may be necessary to ensure such maintenance. States must also submit a SIP revision eight 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.

USEPA requires the following provisions to ensure maintenance of the NAAQS:

- The state must develop an attainment emissions inventory to identify the level of emissions in the area that is sufficient to attain the NAAQS.
- A state 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, the state must continue to operate an appropriate air quality monitoring network in order to verify the area's attainment status.
- The state must ensure that it has the legal authority to implement and enforce all measures necessary to attain and maintain the NAAQS. Continued attainment must be verified by the state by indicating how maintenance plan progress will be tracked.

- Contingency measures must be available to promptly correct any NAAQS violation. At a minimum, the contingency measures must include a requirement that the state will implement all measures contained in the nonattainment SIP prior to redesignation.

An appropriate maintenance plan for the area meeting all federal requirements is being submitted along with this redesignation request. This maintenance plan relies upon programs such as the Healthy Air Act, New Source Review (NSR) permitting, Tier Three vehicle emission standards, and other on-road and nonroad engine standards to demonstrate that air quality will be maintained at least 10 years into the future. The plan contains contingency measures to be implemented in case of worsening air quality and mobile vehicle emission budgets for transportation conformity purposes.

The Washington DC-MD-VA area's ozone Maintenance Plan is provided as a separate document, entitled *Washington DC-MD-VA Nonattainment Area 2008 Ozone NAAQS Maintenance Plan*.

3.4 Section 110 and Part D Requirements

States must provide assurances that the applicable implementation plan has been fully approved by USEPA under § 110(k) and must satisfy all requirements that apply to the area. Approval action on SIP elements and the redesignation request may occur simultaneously. An area cannot be redesignated if a required element of its plan is the subject of a disapproval; a finding of failure to submit or to implement the SIP; or partial, conditional, or limited approval.

For purposes of redesignation, states must meet all requirements of § 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 that are designated nonattainment based on a violation of the NAAQS.

3.4.1 Section 110 Demonstration of Compliance

Section 110(a) 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.

Section 110(a)(2)(D) also requires state plans to prohibit emissions from within the state that 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).

3.4.2 Part D Demonstration of Compliance

Section 172(c) contains general requirements for nonattainment plans. The requirements for reasonable further progress, identification of certain emissions increases, and other measures needed for attainment do not apply for redesignations because they only have meaning for areas not attaining the standard. The three states satisfied the requirements for an emissions inventory with the SIP revision entitled, *2011 Base Year Emissions Inventory for the Washington, DC-MD-VA 2008 Ozone NAAQS Nonattainment Area*, which the states submitted to USEPA in 2014 and that USEPA approved on July 23, 2015 (80 FR 43625).

USEPA approved Maryland's infrastructure SIP revision supporting the 2008 ozone NAAQS for all elements other than §110(a)(2)(D)(i) on November 17, 2014 (79 FR 62010). Maryland submitted an infrastructure SIP addressing §110(a)(2)(D)(i) on January 2, 2013. Maryland's SIP contains both general-conformity requirements and transportation-conformity requirements in COMAR 26.11.26 that are consistent with requirements in § 176(c)(4) and federal regulations concerning conformity.

USEPA approved Virginia's infrastructure SIP addressing all elements other than §§110(a)(2)(C), 110(a)(2)(D)(i), 110(a)(2)(J), and 110(a)(2)(E)(ii) on March 27, 2014 (79 FR 17043). USEPA approved Virginia's SIP revisions addressing § 110(a)(2)(E)(ii) regarding state board requirements on April 2, 2015 (80 FR 17692) and Virginia's SIP revisions addressing § 110(a)(2)(C) regarding permitting requirements on September 30, 2014 (79 FR 58682). USEPA does not require infrastructure submissions to address visibility requirements under § 110(a)(2)(J). Virginia adopted the federal implementation plan associated with the Cross-State Air Pollution Rule Update to address § 110(a)(2)(D)(i) interstate transport requirements. 9VAC5 Chapter 151 contains transportation conformity requirements and 9VAC5 Chapter 160 contains general conformity requirements that are consistent with requirements in § 176(c)(4) and federal regulations concerning conformity.

USEPA approved the District of Columbia's infrastructure SIP addressing all elements other than §§110(a)(2)(D)(i) - Prong 1, 2, and 3 on May 13, 2015 (80 FR 19538). The District of Columbia has submitted an infrastructure SIP addressing §110(a)(2)(D)(i) on June 18, 2014. The Title 20 (Chapter 20-15) of the District of Columbia municipal regulations contains requirements for both general conformity and transportation conformity that are consistent with requirements in § 176(c)(4) and federal regulations concerning conformity.