



MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101 • www.mde.state.md.us

Martin O'Malley
Governor

Robert M. Summers, Ph. D.
Secretary

Anthony G. Brown
Lieutenant Governor

***Baltimore Nonattainment Area
PM_{2.5}
Redesignation Request***

SIP Number: 13-10

May 28, 2013

Prepared for:

U.S. Environmental Protection Agency

Prepared by:

Maryland Department of the Environment



This Page Left Intentionally Blank

Table of Contents

1. Introduction.....	1
2. Background.....	1
2.1 Health Effects.....	1
2.2 Baltimore, MD Nonattainment Designation.....	2
3. USEPA Requirements for Redesignation.....	4
3.1 Attainment of the Standard.....	4
3.1.1 PM _{2.5} Monitoring Data Analysis Requirements.....	5
3.1.2 Baltimore Area PM _{2.5} Ambient Air Monitoring Network.....	5
3.1.3 Baltimore Area PM _{2.5} Annual Concentration Data.....	6
3.1.4 Missing Data under the 1997 Annual PM _{2.5} Standard.....	9
3.1.5 Quality Assurance.....	10
3.1.6 Continued Monitoring Commitment.....	10
3.1.7 Clean Data Determination.....	10
3.2 Implementation Plan Approval.....	11
3.3 Permanent and Enforceable Emission Reductions.....	11
3.3.1 On-Road Emission Reduction Requirements.....	11
3.4 Maintenance Plan.....	13
3.5 Section 110 and Part D Requirements.....	14
3.5.1 Demonstration of Compliance.....	14

List of Figures

Figure 2-1: Baltimore, MD PM _{2.5} NAAQS Nonattainment Area.....	3
Figure 3-1: Baltimore, MD Nonattainment Area PM _{2.5} Monitoring Sites.....	6
Figure 3-2: Baltimore Area Annual PM _{2.5} Data Trends.....	9

List of Tables

Table 2-1: Baltimore, MD Nonattainment Area with FIPS Codes.....	2
Table 3-1: Baltimore, MD Annual PM _{2.5} Design Values.....	8
Table 3-2: On-Road Emission Reductions for the Baltimore Area, 2002-2007.....	13
Table 3-3: Infrastructure Submittals for Maryland.....	15

This Page Left Intentionally Blank

1. Introduction

The State of Maryland requests that the United States Environmental Protection Agency (USEPA) redesignate the Baltimore, MD 1997 fine particulate (PM_{2.5}) nonattainment area to attainment for this standard pursuant to the provisions under § 107 of the federal Clean Air Act (CAA). Since the designations for the National Ambient Air Quality Standards (NAAQS) for this pollutant were published (Federal Register, Vol. 70, No. 3, 1/5/2005), the area's PM_{2.5} air quality has improved due to permanent and enforceable emission reductions. Air quality in the area is significantly better than required by this standard. Due to the improvement in PM_{2.5} air quality, the USEPA finalized a clean data determination for the Baltimore area on May 22, 2012 (Federal Register, Vol. 77, No. 99, 5/22/2012). The State of Maryland is also requesting that USEPA concurrently approve, as a revision to the state implementation plan (SIP), the related § 175A maintenance plan. This plan ensures that good PM_{2.5} air quality will be maintained through 2025.

2. Background

2.1 Health Effects

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

Sources of PM_{2.5} and PM_{2.5} 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 sulfates, ammonium nitrate, soot, sea salt, organic carbon, and metals (crustal metals, transitional metals, and potassium).

Exposure to high levels of PM_{2.5} adversely affects human health. The main impacts of PM_{2.5} on human health are on the respiratory system and the cardiovascular system. Children, the elderly, and individuals with pre-existing pulmonary or cardiac disease are the most susceptible to PM_{2.5} pollution. Complications that can arise from exposure to elevated levels of PM_{2.5} include decreased lung function, chronic bronchitis, respiratory symptoms such as asthma attacks and difficulty breathing, nonfatal heart attacks, irregular heartbeat, and premature death in individuals with pulmonary or cardiac disease.

2.2 Baltimore, MD Nonattainment Designation

The CAA requires each state with areas failing to meet the 1997 PM_{2.5} NAAQS to develop SIPs to expeditiously attain and maintain the standards. The USEPA revised the NAAQS for particulate matter in July 1997 (Federal Register, Vol. 62, No. 138, 7/18/1997). The USEPA issued a new primary (health-based) PM_{2.5} standard and retained the primary PM₁₀ standard. The standards include an annual standard set at 15.0 micrograms per cubic meter (µg/m³), based on the 3-year average of annual mean PM_{2.5} concentrations, and a 24-hour standard of 65 µg/m³, based on the 3-year average of the 98th percentile of 24-hour concentrations.

On December 17, 2004, the USEPA administrator signed the final rule regarding the initial PM_{2.5} nonattainment areas designations for the PM_{2.5} standards across the country. The final rule became effective on April 5, 2005 (Federal Register, Vol. 70, No. 3, 1/5/2005). The Baltimore, MD area was originally designated nonattainment for the 1997 PM_{2.5} NAAQS based on air quality data showing that the area did not meet the 15.0 µg/m³ annual standard. Unlike Subpart 2 of the CAA that defined five ozone nonattainment classifications for the areas that exceed the NAAQS based on the severity of the ozone levels, PM_{2.5} nonattainment designations are simply labeled “nonattainment”. The CAA required states with PM_{2.5} nonattainment areas to submit an attainment plan within three years of the effective date of the designations (April 5, 2008) detailing how the PM_{2.5} standards will be attained by April 5, 2010. The attainment plans were submitted in a timely manner.

The area designated nonattainment for the 1997 PM_{2.5} NAAQS is defined in Table 2-1 and depicted in Figure 2-1.

Table 2-1: Baltimore, MD Nonattainment Area with FIPS Codes

Baltimore, MD PM_{2.5} Nonattainment Jurisdictions

Anne Arundel County (24-003)
Baltimore County (24-005)
Carroll County (24-013)
Harford County (24-025)
Howard County (24-027)
Baltimore City (24-510)

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 1997 PM_{2.5} 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.² 40 CFR Part 51, Subpart Z, entitled *Provisions for Implementation of PM_{2.5} National Ambient Air Quality Standards* (implementation rule) provides additional information. The State of Maryland has 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

The Baltimore, MD federal reference monitors have demonstrated compliance with the 65 µg/m³ daily standard since the inception of the PM_{2.5} monitoring program and thus the focus of the attainment demonstration will be on the annual standard.

A state requesting redesignation must show that the area is attaining the applicable NAAQS. The 1997 annual PM_{2.5} NAAQS is met when the annual design value is less than or equal to the 15.0 micrograms per cubic meter (µg/m³). This section presents information that demonstrates the Baltimore, MD nonattainment area has attained the NAAQS for PM_{2.5}. This demonstration is based on three years of quality assured monitoring data as specified

² See <http://www.epa.gov/ttn/oarpg/t5/memoranda/redesignmem090492.pdf>, accessed April 27, 2012.

in 40 CFR Part 58.

3.1.1 PM_{2.5} Monitoring Data Analysis Requirements

In 1992 the USEPA published “Procedures for Processing Request to Redesignate Areas to Attainment”. This is a guidance document that details requirements nonattainment areas (NAA) must meet to be redesignated to attainment.

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

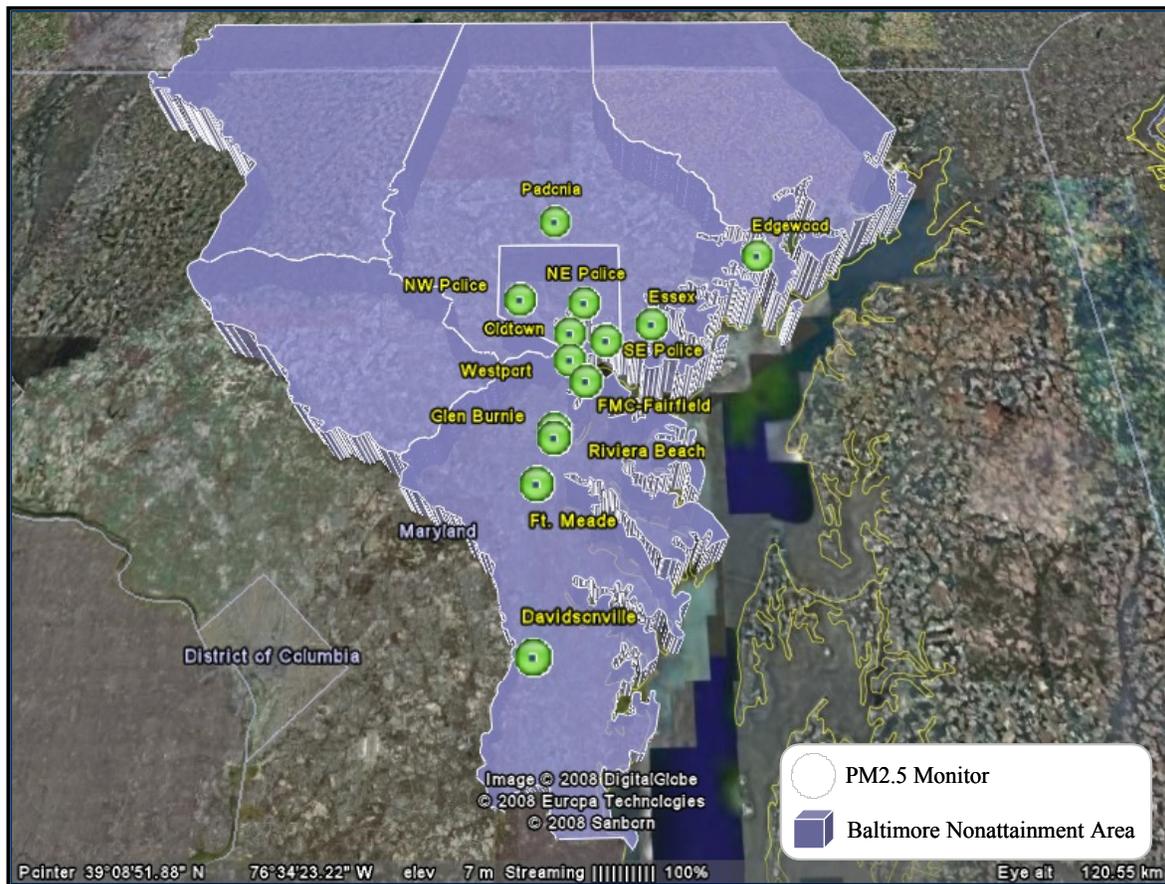
- Monitoring data must show that the non-attainment area is attaining the NAAQS
- The data should be collected and quality assured in accordance with 40 CFR 58 and recorded in the USEPA Air Quality System (AQS) database in order for it to be available to the public for review.

The monitoring data analysis below illustrates how each of the requirements has been addressed.

3.1.2 Baltimore Area PM_{2.5} Ambient Air Monitoring Network

There are currently thirteen (13) sites that monitor PM_{2.5} in the Baltimore Region. The PM_{2.5} monitoring sites are shown in Figure 3-1. MDE uses both manual gravimetric and automated monitors to measure PM_{2.5} mass concentrations in the Maryland network. A filter attached to the inlets of these monitors excludes particles having diameters greater than 2.5 microns. The PM_{2.5} Beta Attenuation Monitor (BAM) automatically measures and records dust concentrations with built-in data logging. It uses the principle of beta ray attenuation to provide a simple determination of mass concentration. An external pump pulls a measured amount of air through a filter tape for a one-hour period. The filter tape, impregnated with ambient dust, is placed between the source and the detector thereby causing the attenuation of the measured beta-particle signal. The degree of attenuation of the beta-particle signal is used to determine the mass concentration of particulate matter on the filter tape and hence the hourly volumetric concentration of particulate matter in the ambient air. MDE uses MetOne SuperSAAS samplers and IMPROVE samplers for the collection of samples for the chemical speciation of PM_{2.5}. The samplers collect 3 to 4 filter samples simultaneously every third or sixth day for a period of 24 hours. These samples are then sent to an USEPA contract laboratory for chemical analyses. There are over 50 species consisting of ions, metals and carbon species quantified by the analyses.

FIGURE 3-1: BALTIMORE, MD NONATTAINMENT AREA PM_{2.5} MONITORING SITES



3.1.3 Baltimore Area PM_{2.5} Annual Concentration Data

To determine whether or not a site is in compliance with the 1997 annual PM_{2.5} NAAQS, the three-year average of annual average PM_{2.5} concentrations must be calculated and compared to the standard of 15.0 µg/m³. For an area to be in compliance with the 1997 PM_{2.5} NAAQS, all sites within that area must be in compliance with the annual NAAQS. 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 Baltimore, MD region’s federal reference monitors have demonstrated compliance with the 65 µg/m³ daily standard since the inception of the PM_{2.5} monitoring programs within the states. The federal reference monitors have demonstrated compliance with the 15.0 µg/m³ annual standard since 2008. The most recent design value for the annual standard, based on 2010-2012 data, is 11.0 µg/m³.

All PM_{2.5} ambient monitoring data through 2012 have been quality assured in accordance with 40 CFR 58.10, recorded in USEPA’s AQS, and made available for public review. The 2005-2007 design value has been chosen as the attainment year for this area, and therefore the

attainment year inventory used within this redesignation request and the Section 175A maintenance plan is based on the year 2007.

The state commits to continuing the operation of an appropriate PM_{2.5} air quality monitoring network to verify the maintenance of the attainment status.

Table 3-1, presented below, shows the PM_{2.5} design values for the monitoring sites in the Baltimore, MD nonattainment area. Note that only valid PM_{2.5} concentrations were used to calculate design values and that all data used in the design value calculations was certified by the state and sent to the Director to USEPA, April, 2013.

Table 3-1: Baltimore, MD Annual PM_{2.5} Design Values³

AIRS ID Site Name	Jurisdiction	Date Site Started	Sampling Ended	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
24-003-0014 Davidsonville	ANNE ARUNDEL	6/6/1980		12.9	12.1	12.1	11.9	12.2	12					
24-003-0019 Fort Meade	ANNE ARUNDEL	2/1/1980	12/31/2004	13.9	13	12.8	12.7	13.2						
24-003-1003 Glen Burnie	ANNE ARUNDEL	1/1/1965		15.7	15.3	15.2	15.3	14.9	14.3	13.3	12.3	11.5	10.9	10.7
24-003-2002 Riviera Beach	ANNE ARUNDEL	1/1/1968	12/31/2005	14.4	14.2	14.1	14.6	15.1	15.7					
24-005-1007 Padonia	BALTIMORE	1/1/1979		14.6	14.2	13.8	14	13.7	13.6	12.6	11.8	10.8	10.1	9.6
24-005-3001 Essex	BALTIMORE	4/1/1967		15	15.2	14.9	15.1	14.8	14.5	13.6	12.6	11.7	11.1	11.0
24-025-1001 Edgewood	HARFORD	1/1/1980		13.8	12.8	12.5	12.9	12.6	12.4	11.7	11	10.1	9.8	10.3
24-510-0006 NE Police Station	BALTIMORE	1/1/1970		14.9	14.1	14.1	14.4	14.2	13.8	12.8	11.8	10.8	10	10.0
24-510-0007 NW Police Station	BALTIMORE	1/1/1970		15.4	15	14.7	15	14.3	13.9	12.9	12	11	10.2	9.9
24-510-0008 Fire Dept. 20	BALTIMORE	1/1/1970		17.4	16.5	15.3	15.9	15.9	15.6	14	12.9	11.6	10.9	10.4
24-510-0035 Fairfield FMC	BALTIMORE	1/1/1980	8/18/2008	16.4	15.9	15.8	16.2	15.7	15.1	14.5**				
24-510-0040 Old Town	BALTIMORE	1/1/1981		16.9	16.6	16.3	16.6	16	15.2	14	12.7	11.7	11.3	11.1
24-510-0049 Westport E S	BALTIMORE	7/1/1990	12/31/2005	15.3	15.4	15.3	15.6	15.8	16.1					
	Baltimore NAA annual design value*			17.4	16.5	15.8	16.2	15.9	16.1	14	12.9	11.7	11.1	11.0

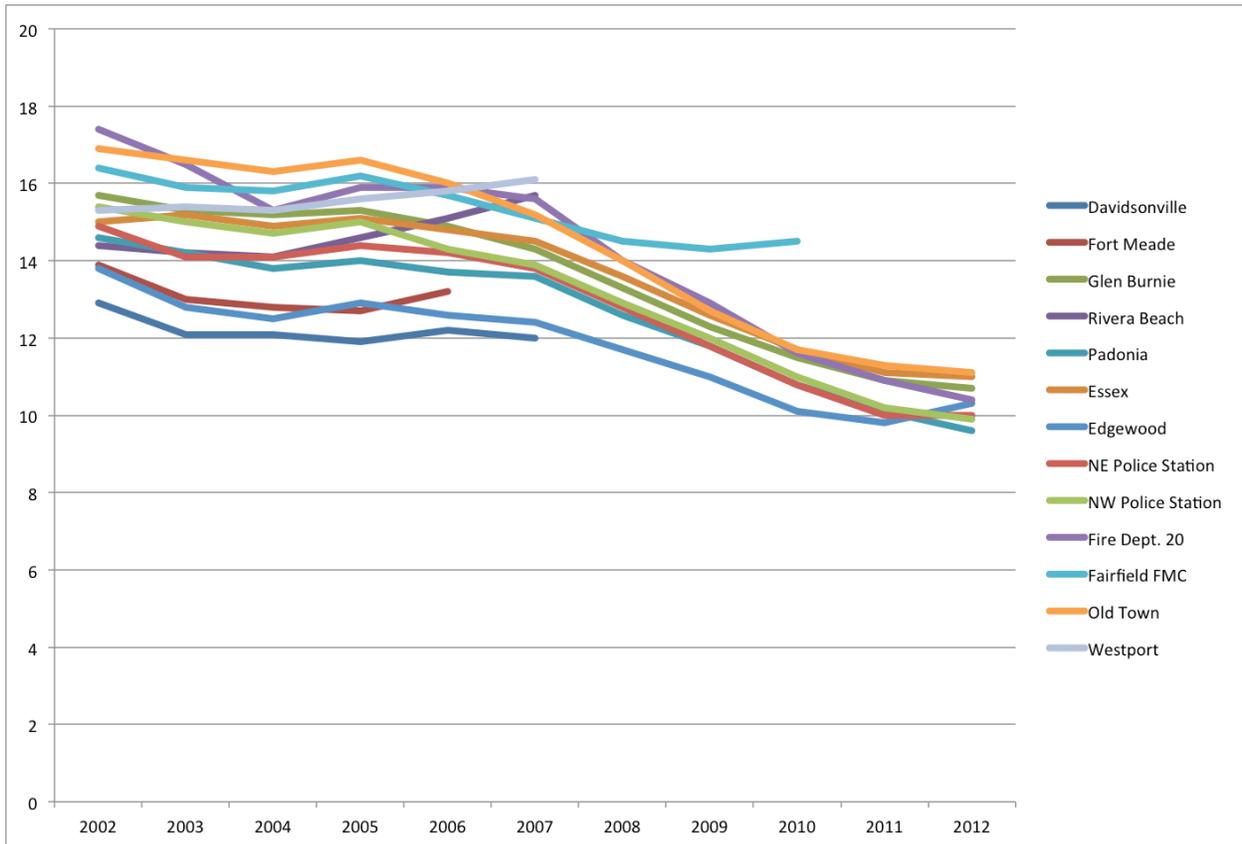
*The site, "Old Town," AIRS ID 24-510-0040, should not be used for planning attainment of the annual NAAQS, because it measures the 'middle-scale' near a busy downtown intersection.

**For 2008, the site "Fairfield FMC" AIRS ID 24-510-0035 was shut down in August and did not report enough data to calculate a valid design value. Therefore this value was not used in the Baltimore non-attainment area design value designation.

³ Report of Maryland PM_{2.5} Design Values, MDE Air Monitoring Program

Figure 3-2 shows a decreasing trend in the annual PM_{2.5} design value as well. For each year from 2002 to 2012, the annual PM_{2.5} design value decreased for the Baltimore, MD 1997 PM_{2.5} NAAQS nonattainment area. Over this time period, the annual PM_{2.5} design value improved dramatically.

FIGURE 3-2: BALTIMORE AREA ANNUAL PM_{2.5} DATA TRENDS⁴



3.1.4 Missing Data under the 1997 Annual PM_{2.5} Standard

Annual PM_{2.5} attainment is determined according to federal procedures cited in Appendix N to Part 50—Interpretation of the National Ambient Air Quality Standards for PM_{2.5}. For a single site, 3 years of valid annual means are required to produce a valid annual standard design value.

A year meets data completeness requirements when at least 75 percent of the scheduled sampling days for each quarter have valid data. Quarterly data capture rates (expressed as a percentage) are specifically calculated as the number of creditable samples for the quarter

⁴ PM_{2.5} Design Values, MDE Air Monitoring Program

divided by the number of scheduled samples for the quarter, the result then multiplied by 100 and rounded to the nearest integer. Years with at least 11 samples in each quarter can be considered valid, as long as the quarters meet the capture requirements, if certain requirements are met. (See abovementioned CFR for further information.) If these criteria are not met, then compliance with the annual PM_{2.5} standard cannot be established. To date, acceptable monitoring has been maintained and exceeded in the State of Maryland for the annual PM_{2.5} standard.

3.1.5 Quality Assurance

The Maryland ambient air monitoring data used in the above analysis has been quality assured in accordance with 40 CFR Part 58 and Maryland's Quality Assurance Project Plan (QAPP) for particulate matter. Maryland's QAPP is a detailed description of the state's actions to assure the collection of ambient air monitoring measurements of sufficient quality and quantity. In addition, the ambient air monitoring network is reviewed annually through the Annual Ambient Air Monitoring Network Plans, in accordance with 40 CFR Part 58.10. A site can be discontinued or relocated based on the annual review and with approval from the USEPA Regional Administrator. The Maryland quality assured ambient air monitoring data is submitted into the AQS database and is available to the public.

3.1.6 Continued Monitoring Commitment

The State of Maryland is committed to continue monitoring PM_{2.5} concentrations in the Baltimore area and throughout the state in accordance with 40 CFR Part 58 and USEPA approved Annual Monitoring Plans. Maryland will continue to quality assure the ambient air monitoring data in accordance with 40 CFR 58 and submit the data into the AQS in a timely fashion.

The State of Maryland commits to continue working with the USEPA to ensure that the PM_{2.5} monitoring network is sufficiently meeting the monitoring requirement of 40 CFR 58 and its monitoring objectives.

3.1.7 Clean Data Determination

On November 23, 2011, USEPA published a proposed rule in the Federal Register stating that the Baltimore, MD PM_{2.5} nonattainment area has attained the 1997 annual PM_{2.5} standard based on three years of quality assured ambient air quality data (Federal Register Vol. 76, No. 226, 11/23/2011). The USEPA finalized this clean data determination for the Baltimore area on May 22, 2012 (Federal Register, Vol. 77, No. 99).

3.2 Implementation Plan Approval

The area must have a fully approved PM_{2.5} implementation plan. The State of Maryland Plan for PM_{2.5} and Attainment Demonstration for the Baltimore, MD Nonattainment Area was proposed for public hearing on April 30, 2008, and was submitted to USEPA in June 2008. Section 110(k) of the CAA established criteria that any plan submission must meet before USEPA is required to act on the submission. This PM_{2.5} SIP was deemed to be complete (except for the PM_{2.5} Nonattainment NSR) on December 8, 2008. In that plan, Maryland adopted several regulations and programs as needed to reduce PM_{2.5} and precursors.

3.3 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 PM_{2.5} precursor and direct PM_{2.5} 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 (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.

For this redesignation request and the associated maintenance plan, 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). Therefore, this maintenance demonstration focuses on SO₂, direct PM_{2.5}, and NO_x. Although the focus of the redesignation request and maintenance plan is on the dominant PM_{2.5} precursors (SO₂, direct PM_{2.5}, and NO_x), all PM_{2.5} precursors (ammonia and volatile organic compounds included) are evaluated in Appendix G of the Maintenance Plan.

Permanent and enforceable reductions of PM_{2.5}, NO_x, and SO₂ from a variety of state and federal measures have contributed to the attainment of the standard for fine particles. Measures that have contributed to fine particulate air quality improvement include, but are not limited to, a variety of on-road emissions control programs and the Healthy Air Act.

3.3.1 On-Road Emission Reduction Requirements

A variety of federal vehicle control programs have contributed to reduced on-road emissions of PM_{2.5}, NO_x, and SO₂ in the Baltimore, MD nonattainment area between 2002 and 2007. These programs include:

- Federal Tier 1 New Vehicle Emission and New Federal Evaporative Emission Standards: Under § 202, USEPA established federal motor vehicle emission standards (Tier I standards), which were phased in beginning with model year 1994. The benefits of this program are reflected in the 2002 base year inventory and the 2007 attainment year inventory. This federally implemented program affects light duty vehicles and light duty trucks. The regulations require more stringent exhaust emission standards as well as a uniform level of evaporative emission controls.
- National Low Emission Vehicle Program: Under the National Low Emission Vehicle program, automobile manufacturers agreed to comply with tailpipe standards that were more stringent than USEPA could mandate prior to model year 2004. Once manufacturers committed to the program, the standards became enforceable in the same manner in which other federal motor vehicle emission control requirements were enforceable. The program was in place nationwide for model year 2001, and the benefits of this program are reflected in the 2002 base year inventory and the 2007 attainment year inventory.
- Tier 2 Motor Vehicle Emission Regulations: On February 10, 2000 (65 FR 6698), USEPA promulgated a rule 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 and sulfur standards required passenger vehicles to be 77 to 95 percent cleaner than those built before the rule was promulgated and reduced the sulfur content of gasoline by up to 90 percent by 2006. The benefits of this program are reflected in the 2007 attainment year on-road mobile inventory.
- Heavy Duty Diesel Engine Rule: This federal rule (66 FR 5002) required truck manufacturers to comply with more stringent tailpipe standards by 2004 and 2007. The rule also mandated use of ultra-low sulfur diesel fuel to enable modern pollution control technology on trucks and buses. Refiners began producing the cleaner-burning diesel fuel for use in highway vehicles beginning June 1, 2006. The benefits of this program are reflected in the 2007 attainment year inventory for on-road mobile sources.

The reductions in emissions from the on-road sector between 2002 and 2007 are presented in Table 3-2.. These emissions estimates are derived using the Motor Vehicle Emissions Simulator (MOVES2010a), Travel Demand Model Version 2.3, and the most recent planning assumptions as updated in the Baltimore Metropolitan Council Forecast. To calculate incremental benefits from the implementation 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 the Technical Support Document (see the *Baltimore Nonattainment Area PM_{2.5} Maintenance Plan*, “Appendix D: Emission Inventory Documentation”).

Table 3-2: On-Road Emission Reductions for the Baltimore Area, 2002-2007

2002 On-Road Emissions	2007 On-Road Emissions	2002-2007 % On-Road Reduction, Area-Wide
SO₂ On-Road Emissions, tpy		
2,025.51	385.34	80.98%
NO_x On-Road Emissions, tpy		
76,060.01	49,140.12	35.39%
PM_{2.5} On-Road Emissions, tpy		
2,344.86	1,789.28	23.69%

3.4 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 which 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 permitting, Tier II 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 State of Maryland's PM_{2.5} Maintenance Plan for the Baltimore, MD area is provided as a separate document, titled *Baltimore Nonattainment Area PM_{2.5} Maintenance Plan*.

3.5 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 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 PM_{2.5} standard, the USEPA's implementation rule stated Subpart 1, rather than Subpart 4, is appropriate for the purpose of implementing PM_{2.5} (Federal Register, Vol.72, No. 79, 4/25/2007).

3.5.1 Demonstration of Compliance

The Baltimore, MD area has had few SIP submittal requirements in the past since the area has not been a persistent nonattainment area for PM_{2.5}. Since the area's air quality improved so that the area met the 1997 PM_{2.5} NAAQS well prior to the 2010 compliance date, most requirements, other than those associated with major new source review permitting and conformity, were limited.

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 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 requirements for an emissions inventory were satisfied by the information in Chapter 3 and Appendix A of the *Baltimore Nonattainment Area PM_{2.5} State Implementation Plan and Base Year Inventory (SIP Number: 08-04)*, which was submitted to USEPA on June 6, 2008.

The SIP contains provisions that are consistent with the § 176(c)(4) conformity requirements. For Maryland's SIP, both general conformity requirements and transportation conformity requirements are contained in COMAR 26.11.26.