

**Region III Plan Summary**  
**Pennsylvania Portion of the Philadelphia-Wilmington-Atlantic City**  
**8-Hour Ozone Moderate Nonattainment Area**

**Title:** Rate of Progress (ROP) Plan for the Pennsylvania Portion of the Philadelphia-Wilmington-Atlantic City 1997 8-Hour Ozone Moderate Nonattainment Area

**Federal Register Dates:** November 5, 2010, 75 FR 68251 (Proposed Rule); February 7, 2011, 76 FR 6559 (Final Rule)

**EPA Effective date:** March 9, 2011

**State Submittal Date:** August 29, 2007; amendments submitted on December 10, 2009 and April 12, 2010.

**Affected Areas:** Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties

**Summary of the Plan**

On December 10, 2009, PA DEP submitted two SIP revisions to the August 29, 2007 SIP revision to address errors identified in the stationary point source portion of the 2002 base year emissions inventory of the August 2007 plan. The first makes minor corrections to the stationary, area, and nonroad emissions categories of the 2002 base year emissions inventory. These revisions to the 2002 base year emission inventory also affected the calculations for the RFP demonstration submitted as part of the August 29, 2007 SIP revision. The second of the two December 10, 2009 SIP revisions contains a revised RFP demonstration that supersedes the RFP demonstration submitted as part of the August 2007 SIP revision.

On April 12, 2010, PA DEP submitted a SIP revision containing the stationary source annual 2002 base year emissions inventory. The December 10, 2009 SIP revision contained only the daily stationary base year emissions inventory, but not the revised annual emissions inventory.

In 1997, EPA revised the health-based NAAQS for ozone, setting it at 0.08 parts per million (ppm) averaged over an 8-hour time frame. On April 30, 2004 (69 FR 23951), EPA finalized its attainment/nonattainment designations for areas across the country with respect to the 8-hour ozone standard. These actions became effective on June 15, 2004. Among those nonattainment areas is the Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD moderate nonattainment area (NAA). This multistate NAA includes five Pennsylvania counties — Bucks, Chester, Delaware, Montgomery, and Philadelphia.

Pursuant to Phase 1 of the 8-hour ozone implementation rule, an area was classified under Subpart 2 of the CAA based on its 8-hour design value if that area had a 1-hour design value at or above 0.121 ppm (the lowest 1-hour design value in Table 1 of Subpart 2). Based on this

criterion, the Philadelphia-Wilmington-Atlantic City NAA was classified under Subpart 2 as a moderate nonattainment area.

### **Emission Inventories**

A summary of the 2002 base year VOC and NO<sub>x</sub> emissions inventory for the Pennsylvania portion of the Philadelphia-Wilmington-Atlantic City NAA is included in Table 2, below.

**Table 2. Pennsylvania Portion of the Philadelphia-Wilmington-Atlantic City NAA 2002 Base Year VOC & NO<sub>x</sub> Emissions in Tons per Day (tpd)**

<b>Emission Source Category</b>	<b>VOC</b>	<b>NO<sub>x</sub></b>
Point	22.21	59.63
Stationary Area	149.84	14.64
Non-Road Mobile	79.06	70.95
On-Road Mobile	98.76	184.66
Total (excluding Biogenics)	349.87	329.88

The Clean Air Act (CAA) requires the exclusion from the base year inventory of emissions benefits resulting from the Federal Motor Vehicle Control Program (FMVCP) regulations and the Reid Vapor Pressure (RVP) regulations. The FMVCP and RVP emissions reductions are determined by the state using most recent version of EPA's on-road mobile source emissions modeling software (which at that time these plans were prepared was MOBILE6). The FMVCP and RVP emission reductions are then removed from the base year inventory by the state, resulting in an adjusted base year inventory. The emission reductions needed to satisfy the RFP requirement are then calculated from the adjusted base year inventory. These reductions are then subtracted from the adjusted base year inventory to establish the emissions target for the RFP milestone year (2008).

For moderate areas like the Philadelphia-Wilmington-Atlantic City NAA, the CAA specifies a 15 percent reduction in ozone precursor emissions over an initial 6-year period. The RFP SIP revision must provide for a 15 percent emission reduction (either NO<sub>x</sub> and/or VOC) accounting for any growth that occurs during the 6-year period following the baseline emissions inventory year, that is, 2002-2008.

The Pennsylvania portion of the Philadelphia-Wilmington-Atlantic City ozone nonattainment area under the 1997 8-hour ozone standard has the same boundary as the as the Philadelphia-Wilmington-Trenton NAA under the prior 1-hour ozone standard. Under the 1-hour ozone standard, the Philadelphia-Wilmington-Trenton nonattainment area was classified as "severe." On September 12, 1996 (later amended on April 10, 1997 and June 5, 1998), Pennsylvania submitted a 15% Plan SIP revision for the Pennsylvania portion of the Philadelphia-Wilmington-Trenton 1-hour ozone nonattainment area. On August 24, 2001, EPA fully approved Pennsylvania's 15% plan for the Commonwealth's portion of the Philadelphia-Wilmington-

Trenton 1-hour severe ozone NAA (66 FR 44547). Therefore, according to the Phase 2 Rule, the RFP plan for the Philadelphia-Wilmington-Atlantic City 8-hour ozone NAA may use either NOx or VOC emissions reductions (or both) to achieve the required 15 percent emission reduction.

The Pennsylvania portion of the Philadelphia-Wilmington-Atlantic City NAA 2002 anthropogenic base year inventory is summarized in Table 3, below.

**Table 3. Pennsylvania Portion of the Philadelphia-Wilmington-Trenton NAA 2002 Anthropogenic Base Year Inventory (Ozone Season tpd)**

Source Category	VOC	NOx
Point	22.21	59.63
Area	149.84	14.64
Non-Road	79.06	70.95
On-Road	98.76	184.66
<b>Total</b>	<b>349.87</b>	<b>329.88</b>

The non-creditable reductions are calculated in Table 4, below.

**Table 4. Pennsylvania Portion of the Philadelphia-Wilmington-Atlantic City NAA Non-Creditable Emission Reductions from 2002-2008 (Ozone Season tpd)**

Source Category	VOC	NOx
(i) 2002 On-Road (Adjusted)	421.44	370.02
(ii) 2008 On-Road (Adjusted)	408.72	354.44
Non-creditable Reductions (i) – (ii)	12.72	15.58

The Commonwealth's calculation of its portion of the Philadelphia-Wilmington-Atlantic City NAA 2002 VOC and NOx inventories adjusted relative to 2008 and VOC and NOx target levels for 2008 are summarized in Table 5, below.

**Table 5. Pennsylvania portion of the Philadelphia-Wilmington-Atlantic City NAA 2008 RFP Target Level Calculations, with NOx Substitution (Ozone Season tpd)**

Description		Formula	VOC	NOx
A	2002 Rate-Of Progress Base Year Inventory		349.87	329.88
B	FMVCP/RVP Reductions Between 2002 And 2008		12.72	15.58
C	2002 Adjusted Base Year Inventory Relative To 2008	A - B	337.15	314.30
D	RFP Ratio		0.075	0.075
E	Emissions Reductions Required Between 2002 & 2008	C * D	25.29	23.57
F	<b>Target Level for 2008</b>	C - E	<b>311.86</b>	<b>290.73</b>

## Projected Inventories and Determination of RFP

Projected controlled 2008 emissions for the Pennsylvania counties that are part of the Philadelphia-Wilmington-Atlantic City nonattainment area is presented in Table 6, below.

**Table 6. Pennsylvania portion of the Philadelphia-Wilmington-Atlantic City NAA 2008 Projected Controlled VOC & NOx Emissions (tpd)**

Emission Source Category	VOC Emissions (tpd)	NOx Emissions (tpd)
Point	21.56	57.13
Area	143.23	15.50
Non-road	62.84	62.67
Mobile	61.09	108.78
<b>Total</b>	<b>288.72</b>	<b>244.08</b>

As shown below in Table 7, the total VOC and NOx emission projections meet the 2008 emission targets -- based in part on the Commonwealth's reliance on NOx substitution to demonstrate RFP.

**Table 7. Determination of whether RFP is met in 2008 in the Pennsylvania Portion of the Philadelphia-Wilmington-Atlantic City NAA**

Description		VOC Emissions (tpd)	NOx Emissions (tpd)
A	Target Level for 2008	311.86	290.73
B	2008 Projected Controlled Emissions (including non-creditable FMVCP)	288.72	244.08
C	2008 Projected Controlled Emissions (excluding reductions from non-creditable FMVCP)	301.44	259.66
<b>Is RFP met?</b> [i.e., 2008 Projected Emissions (C) < 2008 Target Level (A)]		<b>Yes</b>	<b>Yes</b>

## Control Measures and Emission Reductions for RFP

The control measures for which Pennsylvania relies upon to demonstrate reasonable further progress (RFP) and attainment of the 8-hour ozone NAAQS consist of a combination of (1) stationary point, (2) stationary area, (3) highway mobile, and (4) non-road mobile source control measures.

### 1. Stationary Point Source Measures

- a. NO<sub>x</sub> SIP Call Rule (Interstate Pollution Transport Reduction)
- b. Small Sources of NO<sub>x</sub>, Cement Kilns, & Large Stationary Internal Combustion Engines
- c. Federal Standards for Hazardous Air Pollutants.

## **2. Stationary Area Source Measures**

- a. Portable Fuel Containers Rule
- b. Consumer Products Rule
- c. Architectural and Industrial Maintenance Coatings Rule

## **3. Highway Mobile Source Measures**

- a. Federal Motor Vehicle Control Program (FMVCP) and Pennsylvania Clean Vehicle Program for passenger vehicles and light-duty trucks and cleaner gasoline.
- b. Heavy-Duty Diesel Control Program
- c. Vehicle Emission Inspection and Maintenance Program
- d. Federal Low Sulfur Gasoline Rule
- e. Stage II Gasoline Vapor Recovery
- f. Federal Reformulated Gasoline Rule

## **4. Non-Road Mobile Measures**

- a. Non-Road Small Gasoline Engines
- b. Non-Road Diesel Engines Tier I and Tier II
- c. Marine Engine Standards
- d. Emissions Standards for Large Spark Ignition Engines
- e. Reformulated Gasoline Use in Non-Road Motor Vehicles and Equipment
- f. Railroad Engine Standards (Tier 2)

### **RFP Emission Reduction Summary**

Table 8 identifies the categorical emission reductions due to control measures from 2002-2008. These emission reductions are net of growth from 2002 to 2008 because they are derived from subtracting the 2008 emissions projections with controls from the 2002 anthropogenic base year inventory. The Highway Sources category includes all expected emissions reductions, including those from measures that are not creditable under reasonable further progress. The negative reductions for NO<sub>x</sub> from area sources indicate that emissions in this category will increase from 2002 to 2008. This increase occurs because the new control strategies that were implemented in this category affected VOC emissions only.

### **Table 8. Control Measures and 2008 Emission Reductions in the Pennsylvania Portion of**

**the Philadelphia-Wilmington-Atlantic City NAA 8-hour Reasonable Further Progress Plan**

<b>Control Strategies</b>	<b>VOC (tpd)</b>	<b>NOx (tpd)</b>
<b>Stationary Point Sources</b>	<b>0.65</b>	<b>2.50</b>
NOx SIP Call		
Smaller Sources of NOx		
Hazardous Air Pollutant Regulations		
<b>Stationary Area Sources</b>	<b>6.61</b>	<b>-0.86</b>
Portable Fuel Containers		
Consumer Products		
AIM Coatings		
<b>Highway Sources (includes non creditable reductions from pre-1990 FMVCP between 2002-08)</b>	<b>37.67 (12.72 non-creditable)</b>	<b>75.88 (15.58 non-creditable)</b>
Federal Motor Vehicle Control Programs		
Pennsylvania Clean Vehicles Program		
Heavy duty diesel control Programs		
Inspection/Maintenance Program		
Low Sulfur Gasoline		
Other Motor Vehicle Programs		
<b>Non-road Sources</b>	<b>16.22</b>	<b>8.28</b>
Federal Nonroad Regulations including Fuel Standards		
<b>Total Expected Emission Reductions (2002-2008) (including non-creditable reductions)</b>	<b>61.15</b>	<b>85.80</b>

**Contingency Measures**

EPA allows for the use of early implementation of control measures as contingency measures. EPA also allows the substitution of NOx emission reductions for VOC emission reductions in the contingency plans (by any combination of NOx and VOC, as long as the 3 percent reduction is achieved and 0.3 percent of the total is attributable to VOCs).

The RFP contingency requirement may be met by including in the RFP plan a demonstration of 18 percent VOC & NOx RFP. The additional 3 percent reduction above the 15 percent requirement must be attributed to specific measures. Pennsylvania elected to use early emission reductions from the Federal Tier 2 motor vehicle program towards meeting the contingency measure requirement.

The results are presented in Table 9, below.

**Table 9. Pennsylvania Portion of the Philadelphia-Wilmington-Atlantic City Nonattainment Area 2008 RFP Contingency Measure Target Level Calculations**

Description		Formula	VOC (tpd)	NOx (tpd)
A	2002 Rate-Of Progress Base Year Inventory		349.87	329.88
B	Non-creditable FMVCP/RVP Reductions Between 2002 And 2008		12.72	15.58
C	2002 Adjusted Base Year Inventory Relative To 2008	A - B	337.15	314.3
D	RFP Ratio (Target Percent Reduction for RFP)		7.5	7.5
E	RFP Emissions Reductions Required Between 2002 & 2008 for RFP	$C * (1-(D/100))$	25.29	23.57
F	Contingency Percentage		3.00	0
G	Contingency Emission Reduction Requirements	$C * F$	10.11	0
H	Contingency Measure Target Level for 2008	$C - E - G$	301.76	314.30
I	2008 Projected Emissions (including growth and controls and non-creditable FMVCP)		288.72	244.08
J	2008 Project Emissions Excluding Reductions from non-creditable FMVCP		301.44	259.66

The contingency measure target was calculated based on the entire contingency percentage reduction of 3 percent coming from VOCs, with no NOx substitution. Table 10 shows that Pennsylvania would meet the contingency measure target if this assumption is made. Assuming NOx substitution of 2.7 percent would show that an entirely NOx-substituted contingency plan would also meet the test.

**Table 10. Evaluation of the Pennsylvania Portion of the Philadelphia-Wilmington-Atlantic City Nonattainment Area 2008 RFP Contingency Measure Requirement**

Description		VOC (tpd)	NOx (tpd)
A	Total 2008 Projected Controlled Emissions	301.44	259.66
B	Contingency Measure Target Level for 2008 (if assumed to be entirely VOC-based)	301.76	314.30
<b>Contingency measure requirement met if A &lt; B</b>		<b>Yes</b>	<b>Yes</b>

### RACM Analysis and Determination

The purpose of the RACM analysis is to determine whether or not reasonably available control measures exist that would advance the attainment date for nonattainment areas. Control measures that would advance the attainment date are considered RACM and must be included in the SIP. RACM are necessary to ensure that the attainment date is achieved “as expeditious as practicable.” Since the Philadelphia area is classified as a moderate ozone nonattainment area

under the 1997 8-hour ozone standard, the area was required to demonstrate attainment by the 2009 ozone season. Therefore, Pennsylvania considered measures that would potentially advance the attainment date, allowing the area to attain by the prior 2008 ozone season.

Pennsylvania determined that no measure or group of measures would individually or collectively achieve the necessary level of emission reductions to advance the attainment date. Further, many of these measures could not be adopted and implemented in time to meet serve as RACM measures.

Pennsylvania lists its most recently adopted measures, in conjunction with the most recently adopted federal measures in Section V.B of its August 2007 Attainment Demonstration SIP. Pennsylvania lists as its recently adopted state measures include:

- Small Source NO<sub>x</sub> Provisions (Chapter 129, Sections 201-205);
- Portable Fuel Containers Rule (Chapter 130, Sections 101-108);
- Consumer Products Rule (Chapter 129, Section 63);
- Architectural and Industrial Maintenance Coatings Rule (Chapter 130, Sections 601-611);
- Degreasing Operations Rule (Chapter 129, Section 63);
- NO<sub>x</sub> SIP Call (Internal Combustion Engines provisions) (Chapter 145, Sections 111-113);
- NO<sub>x</sub> SIP Call (Portland Cement Kiln provisions) (Chapter 145, Sections 141-144);
- RACT for the 8-Hour Ozone NAAQS (2006 EPA SIP Revision);
- Enhanced Vehicle I/M Program (67 Pa Code Chapter 177) ;
- Pennsylvania Clean Vehicle Program (Chapter 126, Subchapter D); and
- Pennsylvania Heavy-Duty Diesel Emission Control Program (Chapter 126, Subchapter E).

### Transportation Conformity Budgets

The motor vehicle emissions budgets (MVEB) for the Pennsylvania portion of the Philadelphia-Wilmington-Atlantic City 8-hour ozone nonattainment area for the 2008 RFP is based on projected 2008 mobile source emissions accounting for all mobile control measures, inclusive of growth. The MVEBs for the 2008 RFP are shown in Table 11, below.

**Table 11. Pennsylvania Portion of the Philadelphia-Wilmington-Atlantic City NAA 2008 RFP MVEB**

	VOC	NO <sub>x</sub>
Kilograms/day	55,421	98,686
Tons/day	61.09	108.78

In a December 19, 2008 Federal Register notice, EPA notified the public that EPA found that the 2008 RFP MVEBs in the Pennsylvania portion of the Philadelphia-Wilmington-Atlantic City 8-hour ozone plan are adequate for transportation conformity purposes (73 FR 77682). As a result



of EPA's finding, the Commonwealth of Pennsylvania must use the MVEBs from its August 29, 2007 8-hour ozone plan for the Philadelphia area for future conformity determinations for the 1997 8-hour ozone standard.

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