

Region 3 Plan Summary
Pennsylvania Portion of the Philadelphia-Wilmington-Trenton Ozone Nonattainment Area

Title: Post-1996 Rate of Progress (ROP) Plan for the Pennsylvania Portion of the Philadelphia-Wilmington -Trenton Ozone Nonattainment Area

Federal Register Dates: August 24, 2001, 66 FR 44568 (proposed rule); October 26, 2001, 66 FR 54143 (final rule); March 16, 2004, 69 FR 12293 (proposed rule); May 21, 2004, 69 FR 29238 (final rule).

EPA Effective date: November 26, 2001; revised, effective June 21, 2004.

State Submittal Dates: April 30, 1998, July 31, 1998, February 25, 2000, and February 23, 2004.

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

Summary of the Plan: This approach to post-1996 rate of progress (ROP) plans consists of two “phases”. Phase I requires the states to submit a plan to meet ROP between 1996 and 1999, and a set of three enforceable commitments. For Phase II, states are required to submit ROP from 1999 to the area’s attainment year, and modeled attainment demonstration. On July 31, 1998, the Pennsylvania Department of Environmental Protection (PADEP) submitted a revision to the Pennsylvania State Implementation Plan (SIP) pertaining to the Phase I plan for the Philadelphia severe ozone nonattainment area. On April 30, 1998 the Pennsylvania Department of Environmental Protection (PADEP) submitted a revision to the Pennsylvania SIP pertaining to the ROP demonstration for the 2002 and 2005 milestone years. On February 23, 2004, PA DEP submitted a revision to the ROP demonstration for the 2005 milestone year based on the MOBILE6 motor vehicle emissions factor model.

A total VOC reduction of 42% is required by the Commonwealth. Pennsylvania achieved 15% of the total through control measures contained in the 15% ROP plan. This leaves a 27% VOC reduction as a requirement to be achieved by 2005. The key elements for the post-1996 ROP plan are (1) base year inventories, (2) target level calculations, and (3) control measures.

1. Summary of Projected Emissions, 1990 - 2005 in PADEP’s ROP Plans

The following summarizes VOC and NOx emissions expected if no new additional controls (post 1990 controls) were in effect. These estimates are considered uncontrolled inventories, that take into account growth in each category.

VOC “Uncontrolled” Emissions (in tons per day)

	1990	1999	2002	2005
Point	153	162	166	169
Area	194	203	205	207
Nonroad	81	83	83	84
Highway Vehicle	240*	177	180	187
Totals	668*	625	634	647

NOx “Uncontrolled” Emissions (in tons per day)

	1990	1999	2002	2005
Point	162	177	182	187
Area	47	47	47	47
Nonroad	72	74	75	75
Highway Vehicle	253*	156	157	160
Totals	534*	455	461	469

*Revised through the use of the MOBILE6 emissions model

2. Target Level Calculations

PADEP built upon the 15% calculations to determine the target level for its milestone year of 1999.

Rate of Progress (ROP) Target Level Calculation		
Steps	Equation/Method (Calculation)	tons per day (tpd)
1. Develop the 1990 VOC ROP base year inventory	Actual emission from all anthropogenic (point, area, and mobile) sources	616
2. Calculate the 1990 adjusted VOC base year inventory	1990 VOC base year inventory minus FMVCP/RVP reductions between 1990 and 1999 (616 - 39) Note: “FMVCP/RVP reduction between 1990 and 1996” is the non creditable emission reductions from these pre-1990 control measures (39 tpd)	576

3. Calculate the required reduction	9% of the 1990 adjusted VOC base year inventory (576 x 0.09)	52
4. Calculate the 1990 ROP target level	previous target - required reduction - fleet turnover correction (494 - 52 - 6) Note: "fleet turnover correction" is the FMVCP/RVP reductions between 1990 and 1999 minus FMVCP/RVP reductions between 1990 and 1996 (39 - 33 = 6)	436
5. Calculate the reductions needed for ROP	1999 uncontrolled emissions - 1999 target (625 - 436) Note: "1999 uncontrolled VOC emissions" is the 1990 VOC base year inventory projected to 1999 (625)	189

1999 Rate of Progress (ROP) VOC & NO_x Target Level Calculation
9% ROP = 0% VOC + 9% NO_x (MOBILE5a Emissions Model)

0% VOC	
Steps	tpd VOC
1. 1990 ROP base year inventory = 1990 base year inventory - biogenic emissions	732 - 116 = 616
2. 1990 adjusted base year inventory = 1990 ROP base year inventory - 1990 to 1999 FMVCP/RVP reductions	616 - 39 = 576
3. 1999 target level = 1996 target - required reduction - fleet turnover correction	494 - 0 - 6 = 488
5. Reduction needed to offset VOC growth = 1999 uncontrolled emissions - 1999 target	625 - 488 = 137
9% NO _x	
Steps	tpd NO_x
1. 1990 ROP base year inventory (sum of all point, area, and mobile source emission)	440
2. 1990 adjusted base year inventory = 1990 ROP base year inventory - 1990 to 1999 FMVCP/RVP reductions	440 - 20 = 420

3. Required reduction = 9% x 1990 adjusted base year inventory	$9\% \times 420 = 38$
4. 1999 ROP target level = 1990 ROP base year inventory - required reduction - 1990 to 1999 FMVCP/RVP reductions	$440 - 38 - 20 = 382$
5. Reductions needed for ROP and to offset NO _x growth = 1999 uncontrolled emissions - 1999 target	$455 - 382 = 73$

2002 Rate of Progress (ROP) VOC & NO_x Target Level Calculation
9% ROP = 5% VOC + 4% NO_x (MOBILE 5a Emissions Model)

5% VOC	
1. 1999 VOC target level	488
2. Required reduction = 5% x 2002 adjusted VOC inventory	$5\% \times 572 = 28.6$
3. 2002 ROP target level = 1999 ROP target level - required reduction - fleet turnover correction	$488 - 28.6 - 3.81 = 455.6$
4. Reductions needed for ROP and to offset growth = 2002 uncontrolled emissions - 2002 ROP target	$634.5 - 455.6 = 179$
4% NO _x	
1. 1999 NO _x target level	382
2. Required reduction = 4% x 2002 adjusted NO _x inventory	$4\% \times 416.8 = 16.7$
3. 2002 ROP target level = 1999 ROP target level - required reduction - fleet turnover correction	$382 - 16.7 - 3.23 = 362.3$
4. Reductions needed for ROP and to offset growth = 2002 uncontrolled emissions - 2002 ROP target	$461.35 - 362.3 = 99$

The following chart summarizes the emission reductions needed and the emission reduction

claimed by the Commonwealth for milestone years 1999 and 2002, using the MOBILE5a model.

ROP Milestone year	VOC needed	VOC claimed	NOx needed	NOx claimed
1999	137	146	73	81
2002	179	189	99	102

2005 Rate of Progress (ROP) VOC & NOx Target Level Calculation (as revised using the MOBILE6 emissions model)

Inventory Summaries (Tons per Day)

	VOC		NOx	
	1990	2005	1990	2005
Point Sources	153	139	162	146
Area Sources	194	156	47	47
Non-Road Sources	81	68	72	31
On-Road Sources	240	80	253	145
Total Emissions (All sources)	668	443	534	369

Control Measures:

The following table outlines EPA's analysis of the fully creditable reductions in the PA plan. All numbers are in tons per day.

Control Measure	VOC			NOx		
	1999	2002	2005	1999	2002	2005
RFG	22.56	35.24	160.26*	0.47	7.17	108.20*
I/M	58.69	61.44		32.22	32.73	
FMVCP and Tier 1	6.95	13.12		14.11	22.59	
Compression-Ignition Engines	---	---	---	---	---	44.00

Control Measure	VOC			NOx		
	1999	2002	2005	1999	2002	2005
Spark-Ignition Engines	---	---	15.79	---	---	---
NLEV	---	1.01	2.85	---	1.69	4.71
Heavy-Duty Diesel Engine Standard	---	---	---	---	---	---
Stage II Vapor Recovery	17.71	19.82	21.25	---	---	---
OTC NOx MOU	---	---	---	27.37	30.82	34.20
RACT	9.79	10.07	10.38	3.63	3.72	3.81
Autobody Refinish Coatings	5.95	6.07	6.12	---	---	---
Mobile Equipment Refinishing	0.0	0.0	4.09	---	---	---
Consumer Products	4.12	4.16	4.20	---	---	---
AIM coatings	7.33	7.38	7.43	---	---	---
Solvent Cleaning Operations	0.0	0.0	17.87	---	---	---
TSDFs	9.52	9.61	9.70	---	---	---
Rule Effectiveness for Point Sources	---	16.17	16.45	---	---	---
Shutdowns	---	2.59	2.79	---	0.94	1.21
Totals	142.62	186.68	279.18*	77.8	99.66	196.51*

* As recalculated by the MOBILE6 emissions model

ROP Milestone year	VOC needed	VOC creditable	NOx needed	NOx creditable
1999	137	142.62	73	77.80
2002	179	186.68	99	99.66

2005	267.15*	279.18*	196.51*	196.51*
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*As recalculated by the MOBILE6 emissions model

Emissions Reductions from Individual Sources

The Commonwealth claims the following reductions from the listed facilities for the years 2002 and 2005.

VOC Rule Effectiveness Company	2002 reductions	2005 reductions
Pre Finish Metals, Inc.	0.39	0.41
Paramount Packaging	0.25	0.26
Cleveland Steel Container	0.02	0.02
Dunmore Corporation	0.11	0.11
NVF Co.	1.53	1.58
Reynolds Metals Co.	0.18	0.19
Congoleum Corp.	12.62	12.79
Brown Printing Co.	0.10	0.10
Allied Chemical Corp.	0.31	0.32
Kurz-Hastings Inc.	0.66	0.67
Total	16.17	16.45

EPA Evaluation: EPA's evaluation of PADEP's protocol and matrix for determining rule effectiveness follows guidance set forth by EPA. The reductions claimed by PADEP for rule effectiveness are fully creditable for 2002 and 2005.

Source and Process Shutdowns

State Submittal: PADEP claims credit for source shutdowns for milestone years 2002 and 2005. Sources which were operational in 1990 and included in the inventory, but have since shutdown were evaluated for ROP credit. PADEP also claims credit for some shutdown sources that did not apply to bank emission reduction credits (ERCs) within the regulatory deadlines established in 25 Pa Code section 127.207(2).

In addition, Pennsylvania regulations require a 1.3:1 offset ratio for banked emissions; which means that sources who have banked emissions under the provision of 25 Pa. Code 127(E) may use no more than 77% of these emissions at a later date. The remaining 23% are permanent reductions. The following table lists the sources and reductions claimed by PADEP for

milestone years 2002 and 2005.

VOC shutdown company	2002	2005
Rohm & Haas Delaware (Bucks)	0.02	0.02
US Steel Corp	0.00	0.00
Quebecor Printing	0.00	0.00
Sun Refining & Marketing (Delaware)	0.04	0.04
BP Oil, Inc.	0.06	0.06
Congoleum Corp.	0.22	0.24
Sun Refining & Marketing (Philadelphia)	0.04	0.05
Rohm & Haas Delaware (Philadelphia)	0.06	0.07
Allied Chemical Corporation	0.76	0.87
Crown Cork & Seal	0.25	0.28
Progress Lighting Co.	0.01	0.01
Acme Markets	0.05	0.05
SKF Ind.	0.26	0.27
Schneider Bros. Co.	0.16	0.16
Monarch MFG Works, Inc.	0.08	0.09
Craft-Bilt Co.	0.15	0.15
Container Recyclers	0.10	0.10
Quality Container Company	0.14	0.14
U.S. Naval Base	0.12	0.12
U.S. Mint	0.07	0.07
Total	2.59	2.79

Motor Vehicle Emissions Budgets: Under EPA's transportation conformity rule, the post-1996

ROP plans are a control strategy SIP under the Transportation Conformity Rule, August 15, 1997 [62 FR 43779]. A control strategy SIP establishes budgets to which Federally funded and approved transportation projects and plans must conform. The ROP plans establishes VOC and NOx budgets for the Philadelphia area that are applicable for determinations for 1999, 2002, and 2005. These budgets are applicable in later years in the absence of other applicable budgets. On February 25, 2000, the Commonwealth amended the SIP with revised motor vehicle emissions budgets for the applicable milestone years. On February 23, 2004, the Commonwealth amended the SIP with revised motor vehicle emissions budgets for Milestone Year 2005 using MOBILE6. The February 25, 2000 and February 23, 2004 SIP revisions adopt and establish the following motor vehicle emissions budgets for the Philadelphia area.

Motor Vehicle Emissions Budgets for the Philadelphia area (Tons/day)

Milestone year	VOC	NOx
1999	88.6	109.6
2002	69.52	93.13
2005	79.69	144.73

EPA Region 3 Contact: Cristina Fernandez (3AP21), U.S. EPA Region III
 1650 Arch Street, Philadelphia, PA 19103-2029
 (215) 814-2178; fernandez.cristina@epa.gov