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December 28, 2006

Mrs. Judith M. Katz
Director, Air Protection Division
US EPA Region III
1650 Arch Street (3AP00)
Philadelphia, PA 19103-2029

Dear Judy:

The purpose of this letter is to formally transmit the December 2006 status reports and supporting documents for the Early Action Compact areas of Roanoke and the Northern Shenandoah Valley to EPA Region III. This submission is in response to the requirements of the EAC program and EPA guidance on this subject.

These status reports document the continuing effort and progress that has been made at both the local and state levels to meet all the commitments of the ozone early action plans for these areas. As a result of these plans, both areas continue to be in compliance with the 8-hour ozone standard.

Please contact me if you have any questions concerning these reports, and thank you again for your support in this effort.

Sincerely,

/ S / TRB – December 28, 2006

Thomas R. Ballou, Director
Office of Air Data Analysis and Planning

Enclosures

cc: M. Morris, EPA R3
E. Wentworth, EPA R3
D. Cole, EPA OAQPS
J. Sydnor, VADEQ

Roanoke Clean Air Plan



Roanoke Ozone Early Action Area

State Air Quality & Program Update

December 31, 2006



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APPENDIX – Control Program and Measures Summary

Roanoke Ozone Early Action Area Plan State Air Quality & Program Update – December 31, 2006

Introduction

Provided in this report is a status of the state efforts to assist the Roanoke Ozone Early Action Compact (EAC) Area to implement the commitments contained in the Early Action Plan for the area. This plan was submitted as a State Implementation Plan (SIP) by the Virginia Department of Environmental Quality (VADEQ) on December 20, 2004 on behalf of the Commonwealth and the localities participating in the EAC process.

Since the formal submission of this plan, great strides have been made at the local, state, and regional levels to both implement control measures and produce emission reductions in ozone precursor pollutants. In turn, these controls and emission reductions have continued to translate into cleaner air for the Roanoke area.

To demonstrate this progress in term of improved air quality, reduced emissions and pollutant transport, and the implementation of controls, the following discussed in the remainder of this report:

- Updated air quality improvement trends and observed reductions in regional ozone transport
- Preliminary 2006 emissions inventory demonstrating progress towards 2007 attainment goals.
- Implementation of regional and state programs contributing to the EAP process.
- Summary and status of control measures implemented as part of the Roanoke EAP.

Air Quality Update

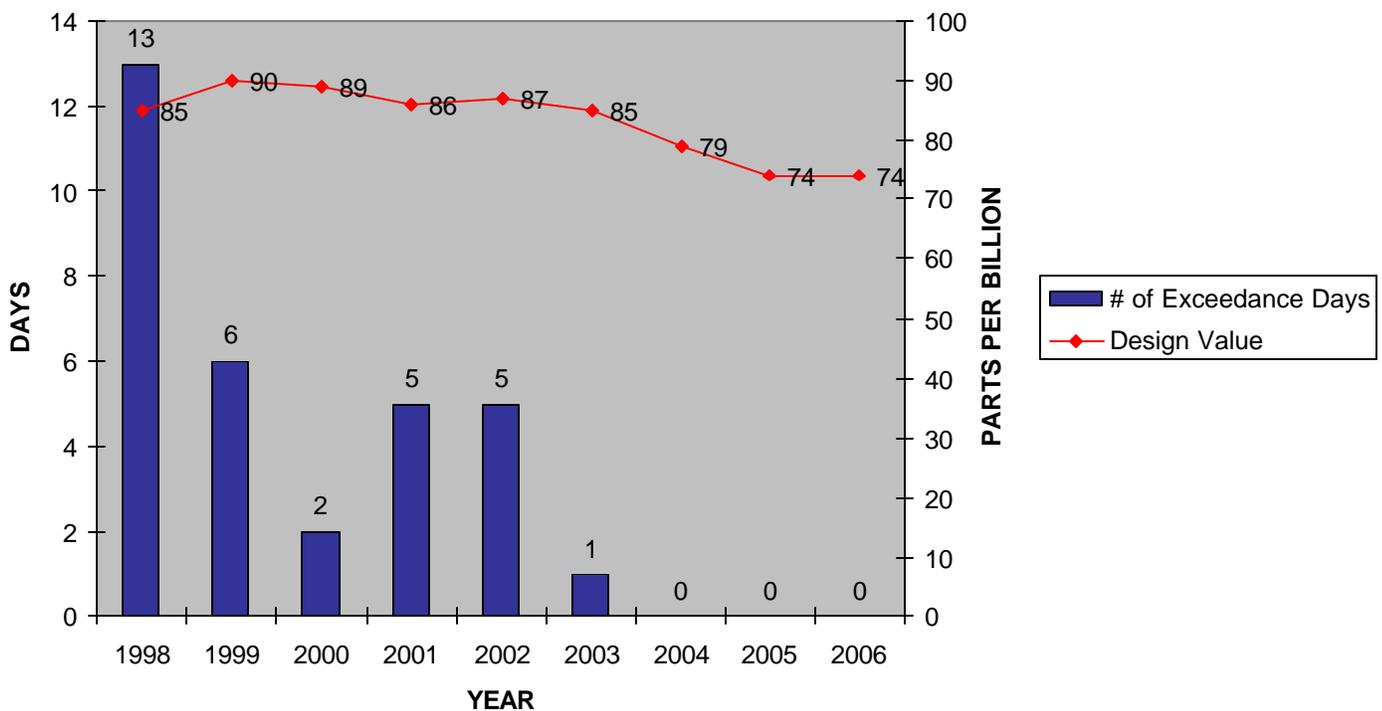
As the 2006 ozone season come to a close, air quality continues to improve in the Roanoke area. This is demonstrated by the fact that the area recorded no exceedances of the 8-hour ozone standard since 2003. The improvement of air quality continued in 2005 despite weather more conducive to ozone formation than in previous years. This trend in air quality improvement is documented below from highs recorded in the late 1990s. As a result, the Roanoke area is now in compliance with the 8-hour ozone standard. No exceedances have been recorded in the Roanoke area during 2006. Please note that the 2006 ozone season data presented in this report has not yet been officially certified or submitted to EPA

Table 1 – Roanoke Ozone Exceedance & Design Value Trends

YEAR	# OF EXCEEDANCE	3-YEAR DESIGN VALUE
1998	13	85 Parts Per Billion (PPB)
1999	6	90 PPB
2000	2	89 PPB
2001	5	86 PPB
2002	5	87 PPB
2003	1	85 PPB
2004	0	79 PPB
2005	0	74 PPB
2006*	0*	74 PPB*

*** 2006 data has not yet been certified and submitted to EPA**

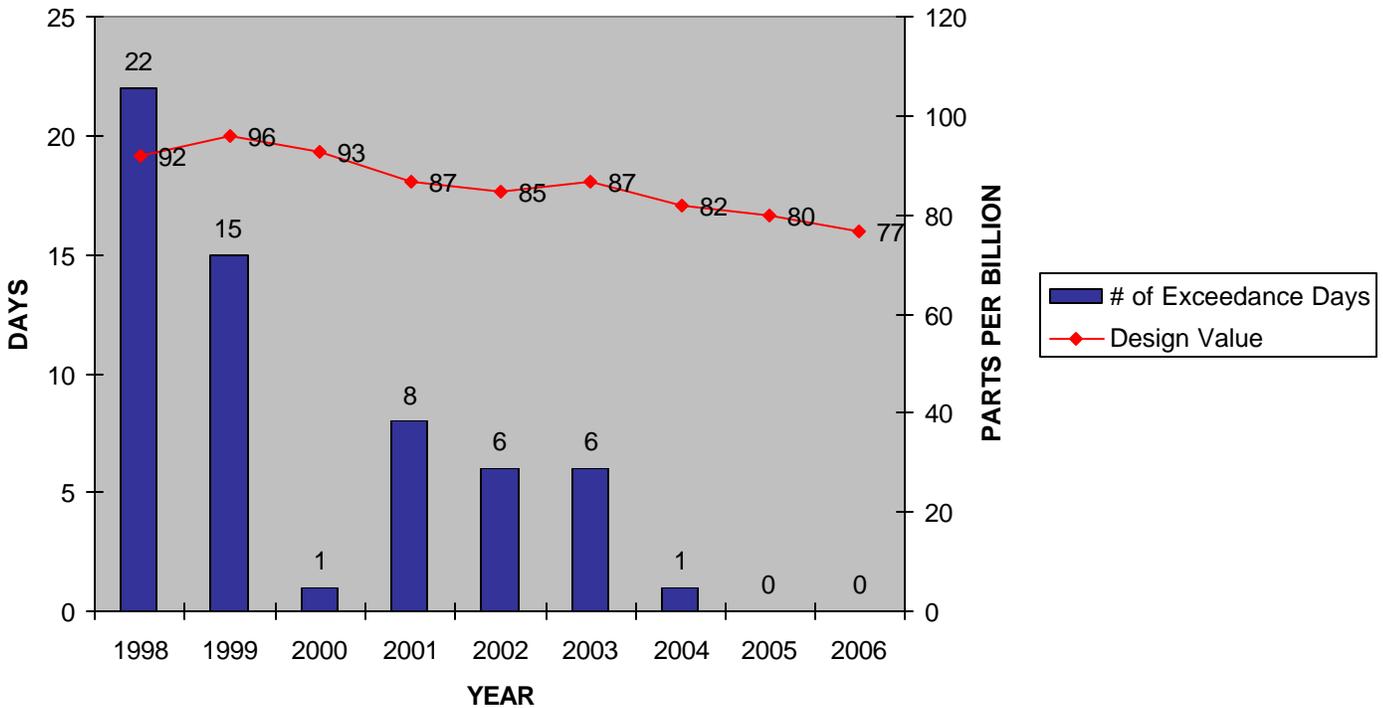
Figure 1 – Roanoke Ozone Exceedance & Design Value Trends



Of equal or even more importance than the local ozone air quality improvement in Roanoke is the trends being observed in the reduction of ozone being transported in to Virginia and the EAC areas. Small areas like Roanoke and Winchester, with relatively small local ozone precursor pollutant emissions are significantly impacted by the regional pollutant load of ozone that is generated in upwind areas and transported into these areas by typical summer weather patterns.

To track and analyze the influence of transported ozone, Virginia has a long standing high-altitude monitor in the Shenandoah National Park (SNP) at Big Meadows. It is well accepted that high ozone values observed at this monitor is reflective of pollution being transported into Virginia from areas west of this monitoring station. As shown in the graph below, ozone air quality has also improved significantly at the SNP monitor.

Figure 2 – Big Meadow (SNP) Ozone Exceedance & Design Value Trends

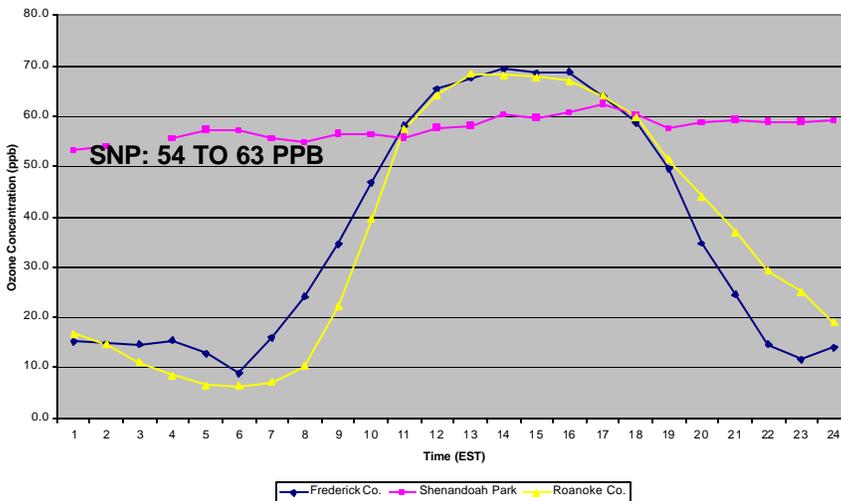
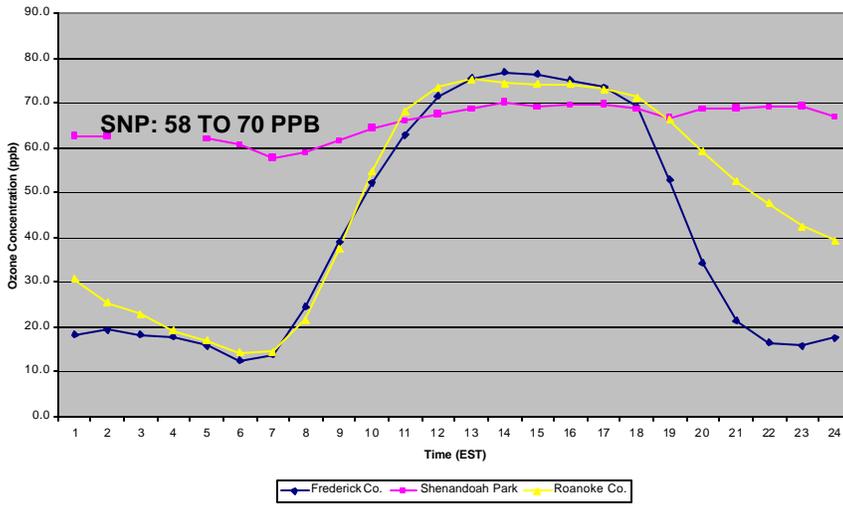
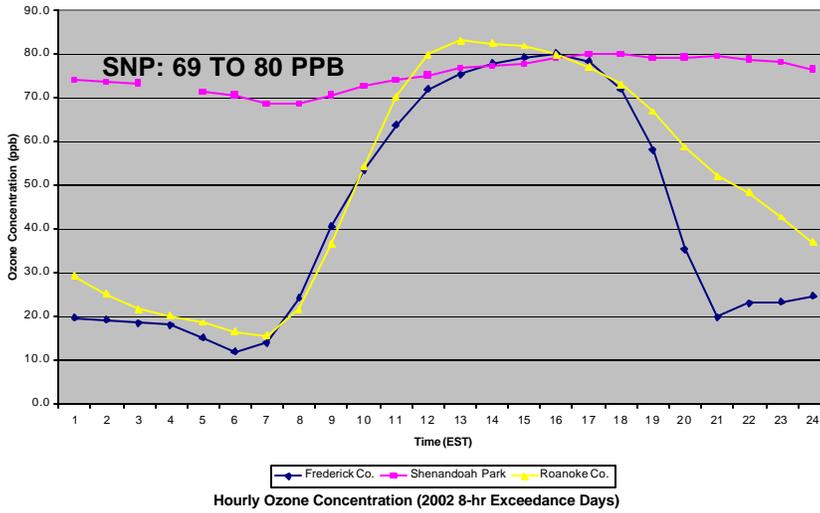


To investigate this reduction in transported pollution, the following analysis was performed. The table and charts presented below and on the next page show that the average ozone levels measured at Big Meadows during ozone exceedance days has dropped from 1998 to 2005 by approximately 15 ppb.

Table 2 – Range of Big Meadows Hourly Average Concentrations

YEAR	AVERAGE CONCENTRATION RANGES
1998	69 TO 80 PPB
1999	65 TO 76 PPB
2000	67 TO 74 PPB
2001	68 TO 75 PPB
2002	58 TO 70 PPB
2003	70 TO 77 PPB
2004	56 TO 69 PPB
2005	54 TO 63 PPB

Figure 3-5: Reduction in Ozone Transport (1998, 2002, & 2005)
 Hourly Ozone Concentration (1998 8-hr Exceedance Days)



This reduction in the regional ozone load is most likely due to the numerous control programs implemented to reduce ozone precursor emissions on the state and national levels. Most significant of these, the regional reduction of Oxides of Nitrogen (NO_x) emissions from power plants. This analysis of transport will be updated to 2006 once the data becomes available.

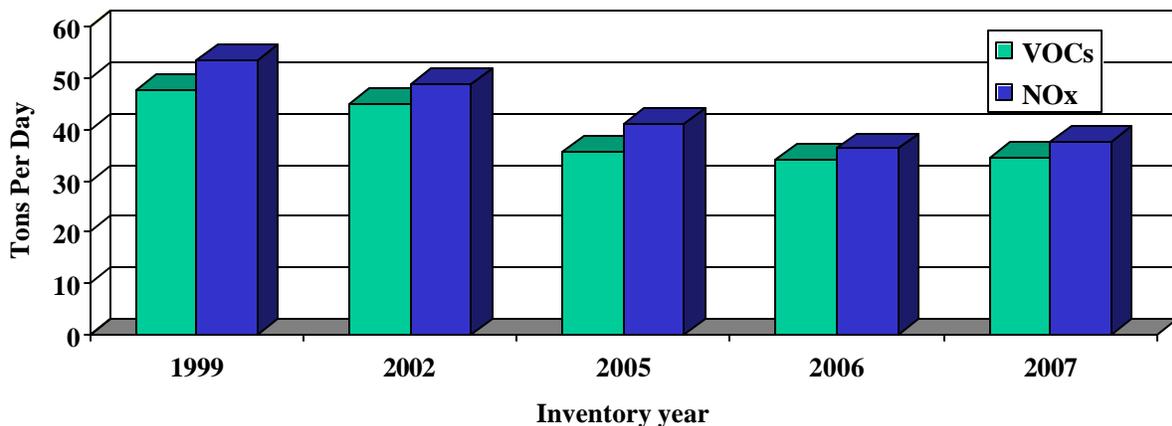
Emissions Inventory Update

To demonstrate that the Roanoke area is making good progress towards the emissions reductions committed to in the EAP, a preliminary 2006 emissions inventory for the area has been developed and is presented below along with a comparison to the 1999, 2002, 2005, and 2007 emissions inventories developed to support the planning process. The 2005 point and area source estimates have been carried forward because actual 2006 emissions data are not yet available.

Table 3 – Roanoke Area Emissions Inventories and Trends

Source Category	1999 (Baseline)	2002 (Interim)	2005 (Previous Year)	2006 (Current Year)	2007 (Control Case)
Point Sources	4.551	3.518	3.510	3.510	3.927
Area Sources	18.845	19.360	14.590	14.590	15.300
Non-road Sources	6.063	5.922	4.718	3.988	4.352
Mobile Sources	18.074	16.071	12.600	11.935	10.813
Totals:	47.533	44.871	35.418	34.023	34.392
Point Sources	9.312	7.231	6.560	6.560	7.086
Area Sources	5.091	5.254	3.590	3.590	5.293
Non-road Sources	7.877	8.036	5.201	3.694	6.424
Mobile Sources	31.036	28.336	25.500	22.350	19.481
Totals:	53.316	48.857	40.851	36.194	38.284

Figure 4 – Roanoke Area Emissions Inventory Trends



The Roanoke area has already met the attainment year (2007) goals. In fact, the preliminary 2006 emissions levels are below the 2007 attainment emissions level goals for both pollutants.

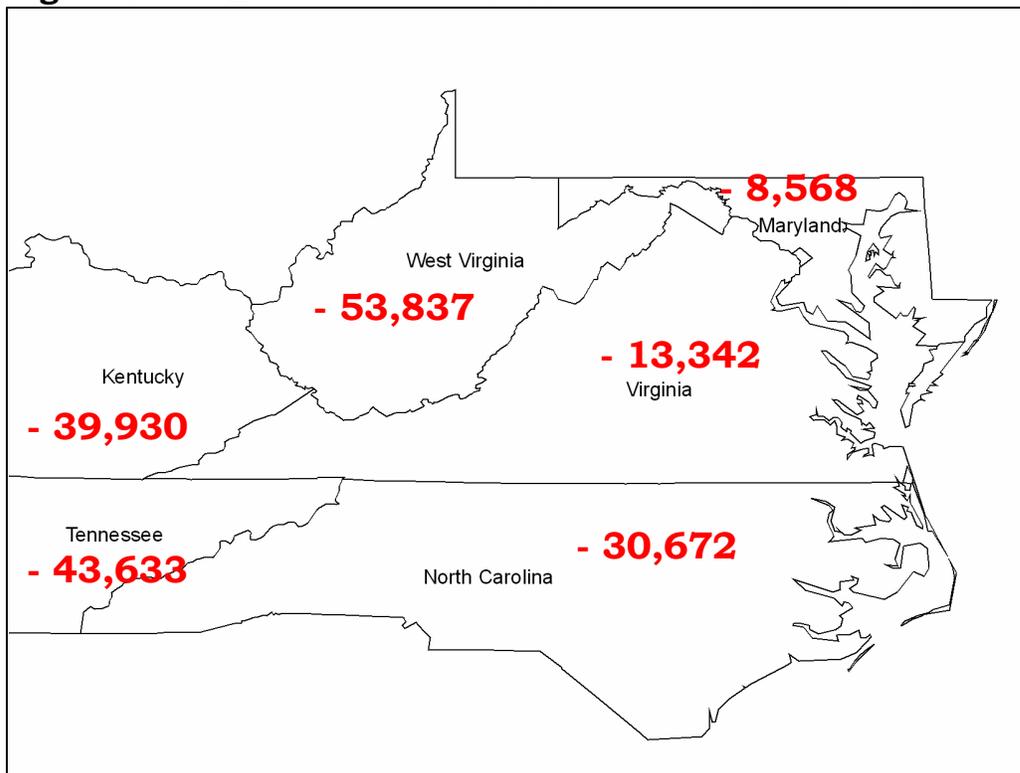
Regional/State Programs Update

The Virginia Department of Environmental Quality (VADEQ) has implemented several control measures to assist the Roanoke area in achieving its air quality goals.

1. Regional Reduction of NO_x Emissions (SIP Call)

The most significant of these programs has been the regional program to reduce NO_x emissions from power plants and large industrial boilers. This regional program, commonly known as the “NO_x SIP Call”, was established by the EPA to address the transport of ozone and precursor emissions in the eastern United States. Virginia, along with 22 other states became subject to this rule. Recent reductions in ozone have been linked to this program and the significant reduction of NO_x emissions in the SIP Call control area. An assessment of NO_x emissions and emissions reductions has also been performed for Virginia and surrounding states using data from the EPA Clean Air Markets Division.

Figure 5 – NO_x Emissions Reductions from 2002 to 2006



TOTAL REDUCTION: 189,082 TONS/SEASON

As can be seen by this analysis, significant NO_x emissions reductions are being achieved through the SIP Call program that is certainly contributing to the improvement in air quality being observed throughout the region and specifically in the EAC areas. This analysis will be updated to 2006 once the ozone season utility data becomes available.

2. National Low Emissions Vehicle Program

The National Low Emissions Vehicle (NLEV) program is a voluntary clean vehicle program established by the EPA through national regulation on December 16, 1997. Due to the voluntary nature of the program, it was contingent upon agreement by a number of Northeast states and the major automobile manufacturers. Virginia opted into this program for lower vehicle emissions standards, beginning with model year 1999 vehicles and subsequently adopted a state NLEV regulation, 9 VAC 5 Chapter 200, which became effective on April 14, 1999.

This program along with the federal motor vehicle control programs, have and continue to provide substantial emissions reductions in Virginia that will assist areas like Roanoke in meeting air quality standards and goals.

3. Existing Source Controls and NO_x RACT

To address local point source emissions, the state extended certain existing source and Reasonably Available Control Technology (RACT) regulations to the Roanoke area to reduce the local contribution to ozone formation. These regulations were adopted by the Air Pollution Control Board in October 2003 and became effective on March 23, 2004. Compliance with these regulations was then required by November 15, 2005. These regulations mainly apply to two categories of sources which are described below.

A number of state regulations (Chapter 40) regarding existing sources of the Volatile Organic Compound (VOC) have been extended to the Roanoke area. These regulations are as follows:

- Article 5 - Synthesized Pharmaceutical Products Manufacturing Operations
- Article 6 - Rubber Tire Manufacturing Operations
- Article 11 - Petroleum Refinery Operations
- Article 24 - Solvent Metal Cleaning Operations Using Non-Halogenated Solvents
- Article 25 - Volatile Organic Compound Storage and transfer Operations
- Article 26 - Large Appliance Coating Application Systems
- Article 27 - Magnet Wire Coating Application Systems
- Article 28 - Automobile and light Duty Truck Coating Application Systems
- Article 29 - Can Coating Application Systems
- Article 30 - Metal Coil Coating Application Systems
- Article 31 - Paper and Fabric Coating Application Systems
- Article 32 - Vinyl Coating Application Systems

Article 33 – Metal Furniture Coating Application Systems
Article 34 – Miscellaneous Metal Parts and Products Coating Application Systems
Article 35 – Flatwood Paneling Coating Application Systems
Article 37 – Petroleum Liquid Storage and Transfer Operations
Article 39 – Asphalt Paving Operations (Cutback Asphalt Restrictions)

Once these regulations became effective, the VADEQ regional office identified 33 point sources in the Roanoke area that were potentially subject to one or more these regulations (not including gasoline service stations). These sources were subsequently notified of the potential applicability of these regulations by letter dated March 12, 2004.

As a result of this notification process, eight sources were determined to be exempt from these rules. The remaining sources have been determined to be in compliance with the applicable rule(s) and/or have permits which include VOC control requirements equal to or more stringent than the Chapter 40 requirements. Compliance with these regulations is specific to the individual process and regulation and mainly relies on VOC content limitations and/or emission reduction requirements. The estimate of about 1 ton per day of cumulative reductions from these requirements remains valid. The reductions from cutback asphalt restriction also remain valid (0.005 tons per day).

In addition to these controls, the gasoline bulk terminal requirements of Article 37 were also extended to Bedford County which is adjacent to the Roanoke EAC area. There are five bulk terminal facilities located in this County and all five have been issued State Operating Permits which include the Article 37 requirement. Furthermore, all these facilities are now in compliance with these requirements that provide additional VOC reductions above and beyond those claimed in the Roanoke EAP.

The second part of the control requirements involved case by case RACT determinations for major sources of NO_x. Three point sources in the Roanoke area were identified as being subject to this requirement which resulted in source specific RACT determinations and permits that were submitted to the EPA and approved as separate SIP revisions as part of the overall EAP SIP. The current compliance status of these three facilities is as follows:

Roanoke Cement: A RACT permit was issued to this source on December 22, 2004. As of November 15, 2005, the emissions from the RACT applicable unit have been reduced by a combination of process controls and good combustion practices. In addition, during the plant shutdown in January 2006, the source installed low NO_x burners to its cement Kiln system.

Roanoke Electric Steel: A RACT permit was issued to this source on December 22, 2004. This permit required that NO_x emissions from the source be controlled through a combination of proper operation and maintenance, and low NO_x burners. The source is currently in compliance with all the conditions of this RACT permit.

Norfolk Southern Railroad: A RACT permit was issued to this source on December 22, 2004. This permit required that NO_x emissions from the source be controlled by meeting a 0.4 lbs/mmBtu emission rate for the power plant boilers at the facility. Initial source testing was conducted in November 2005 which indicated a violation of RACT emission rate. Subsequently, the DEQ issued the facility a Notice of Violation (NOV). Subsequently, the source retested in March 2006 and has now demonstrated compliance with the RACT emission rate. A consent order was signed by the company in August which included a civil penalty of \$5,700.

Due to the fact that many of the requirements of these RACT permits did not become effective until late 2005, emissions estimates resulting from these requirements are not yet available. However, it should be noted that total point source NO_x emissions in the Roanoke area are already below the projected 2007 post control attainment levels as presented in the emission inventory section of this report.

4. Enhanced Ozone Forecasting tool for the Roanoke Area

One of the main components of the local early action program is the establishment of an ozone action days program. This program requires a combination of mandatory and voluntary action by local governments and residents to reduce ozone precursor producing activities and emissions. In order to implement such a program, daily air quality forecasts are needed. To support this program, the VADEQ has completed the following actions to enhance the ozone forecast and health advisory program for the Roanoke area:

- The VADEQ contracted with Sonoma Technologies Inc. to develop an enhanced ozone forecasting tool for various areas in Virginia, including the Roanoke area. This work has been completed.
- An additional meteorologist has been hired to support the VADEQ air quality forecast and advisory program.
- The forecasts for the Roanoke area have been updated to reflect the 8-hour ozone standard. In addition, daily forecasts for fine particulate matter are now being issued for the Roanoke area all year.

- The Roanoke area has been updated on the VADEQ air quality forecast webpage, and on the EPA's AIRNOW national forecast webpage to reflect these changes. These sites are shown in the figures below:

Figure 6 – VADEQ Air Quality Forecast Page

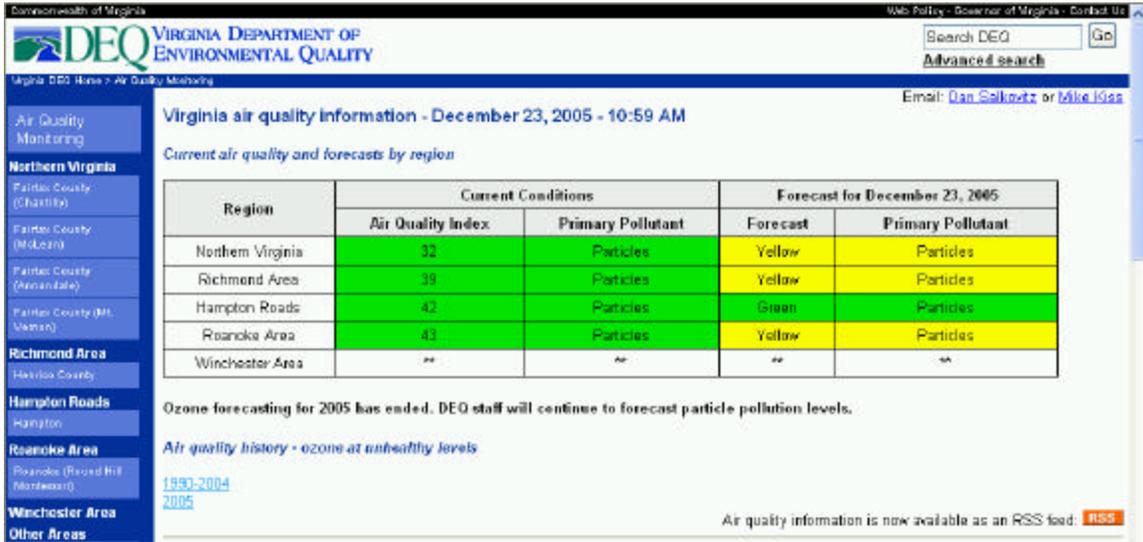
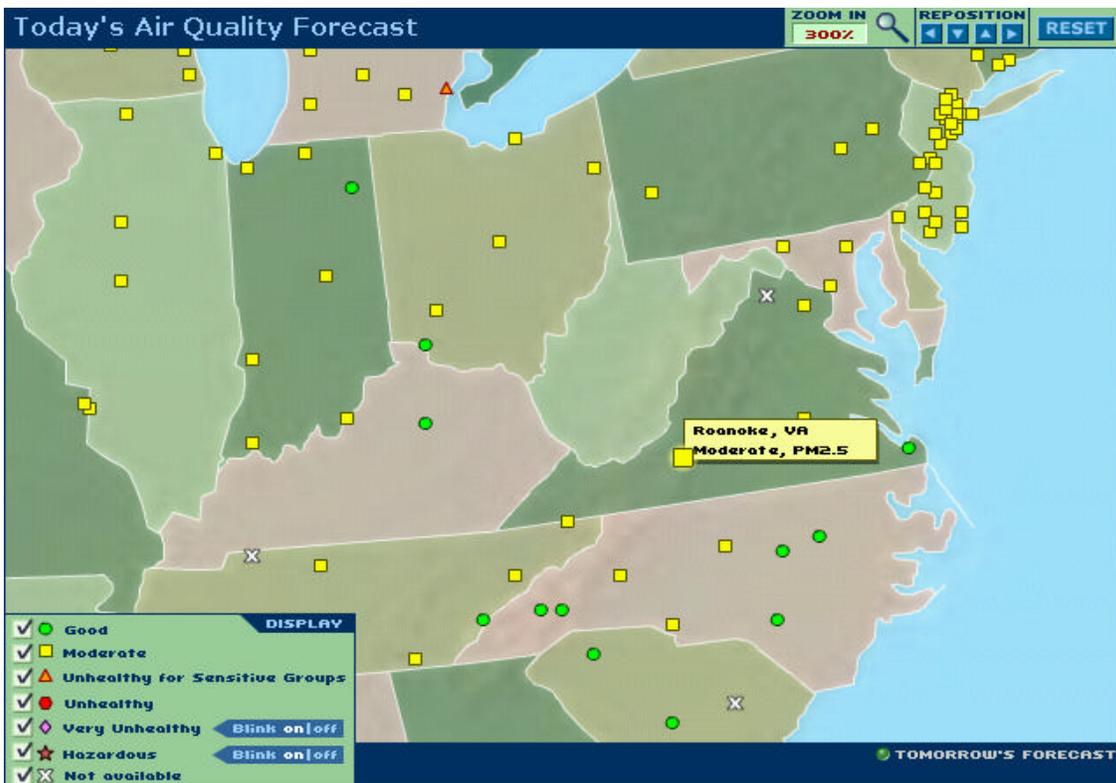


Figure 7 – EPA AIRNOW Air Quality Forecast Page



5. School Bus Emissions Control Retrofit Program

As part of a EPA/VADEQ funded and administered program, Roanoke County and the City of Roanoke have completed projects to retrofit a significant number of school buses with emission control technologies. The results of these projects are as follows:

Roanoke County: 100 school buses retrofitted with diesel oxidation catalysts (DOC) at a total cost of \$144,000.

Roanoke City: 121 school buses retrofitted with DOC. The electronic control modules (ECMs) on 19 buses have also been reprogrammed to further reduce NO_x emissions. Total cost of the project was \$124,000.

6. Stage I Vapor Recovery Control at Service Stations

Section 9 VAC 5-40-5200 B. 3. of Article 37 of the Chapter 40 VOC regulations specifically requires the installation and use of Stage I vapor control and recovery systems at services stations in Roanoke County and the Cities of Roanoke and Salem. A final compliance review has been completed and has reaffirmed that 100% compliance with this regulation has been achieved in the area.

7. State Open Burning Regulation (NEW)

On June 21, 2006 the State Air Pollution Control Board gave final approval to the expansion of a more restrictive seasonal open burning control program to the Roanoke area. This more restrictive program will replace the local program when it becomes effective in 2007.

Control Program and Measures Summary

In general, the Roanoke area and its state and federal partners have been very successful in implementing the commitments contained in the Early Action Plan. A summary of the control measures and estimated reductions in 2007 is presented below. No changes have occurred in the emission reduction estimates since the 2004 SIP. The Appendix to this report contains a summary table of the control measures implemented in the Roanoke area. More details on local implementation of measures are provided in the local area status report for June 2006.

Control Measures & Estimated Emissions Reductions (2007)

Emissions Control Measures	VOC (tpd)	NO_x (tpd)	Modeled
State/Federal Area Source Controls			
Stage I Vapor Recovery at Gasoline Service Stations (Federally Enforceable)	1.756	0.000	YES
Architectural Products – Federal Rule (Federally Enforceable)	0.372	0.000	YES
Consumer Products – Federal Rule (Federally Enforceable)	0.178	0.000	YES
Metal Cleaning Solvents – Federal Rule (Federally Enforceable)	0.163	0.000	YES
Motor Vehicle Refinishing – Federal Rule (Federally Enforceable)	0.158	0.000	YES
Cutback Asphalt – State Rule (Federally Enforceable)	0.005	0.000	YES
Emissions Control Measures	VOC (tpd)	NO_x (tpd)	Modeled
Subtotals:	2.632	0.000	
Federal Non-Road Source Controls			
Small Gasoline Engine Standards – Federal Rule (Federally Enforceable)	1.681	0.059	YES
Diesel Engine Standards – Federal Rule (Federally Enforceable)	0.158	0.969	YES
Locomotive Engine Standards – Federal Rule (Federally Enforceable)	0.000	1.112	YES
Large Gasoline Engine Standards – Federal Rule (Federally Enforceable)	0.146	0.546	YES
Recreational Engine Standards – Federal Rule (Federally Enforceable)	0.015	0.000	YES
Subtotals:	1.995	2.686	
Federal Mobile Source Controls			
Previous Motor Vehicle Standards – Federal Rule (Federally Enforceable)	6.343	7.600	YES
Tier 2 Vehicle Standards – Federal Rule (Federally Enforceable)	0.917	3.799	YES
Heavy Duty Diesel Standards – Federal Rule (Federally Enforceable)	0.001	0.156	YES
Subtotals:	7.261	11.555	
State/Local Early Action Plan Controls			
Existing Source CTG RACT Controls – State Rule (Federally Enforceable)	1.098	0.790	YES
Ozone Action Days Program – State/Local (Mandatory/Voluntary)	0.918	0.611	YES
Open Burning Restrictions – Local (Soon to be replaced by State Rule)	0.564	0.238	NO
All Other Local Programs – Local (Voluntary)	0.020	0.228	NO
Subtotals:	2.580	1.639	
TOTALS:	14.468	15.880	

Early Action Compacts December Progress Summary Table

A. Control Measure	B. Summary Description of Measure	C. Program/Measure Status	D. Specific Implementation Date	E. VOC Reduction	F. NOx Reduction	G. Resources (FTE's, \$\$)	H. Additional Information
31 Roanoke area, VA (Effective date of nonattainment designation deferred)							
Reduce locomotive idling	Reduction of locomotive idling by the Norfolk Southern Railway Co.	Measure has been fully implemented at this time	May-05	0	0.153 TPD		
Limit idling-school buses	Limit on idling times for school buses through internal policy and management	Measure has been fully implemented at this time	May-05	0	0.003 TPD		
Retrofit 100 school buses-oxidation catalyst	Retrofit of 100 school buses in Roanoke County	Fully implemented	July, 2004	0.586 TPY	1.67 TPY	144,000	
Retrofit 102 school buses-oxidation catalyst	Retrofit of 119 school buses in Roanoke City - Purchase of 21 new buses with controls	Fully implemented	July, 2004	NQ	NQ	124,000 - retrofits only	
Bio-diesel solid waste trucks-purchased	Purchase of bio-diesel trucks by Roanoke City	In 2003 the City of Roanoke began purchasing bio-diesel solid waste trucks. Five trucks have been purchased as June 2006.	2003 - Ongoing	0	0.27 TPY		In December 2006 the City of Roanoke began using B2. Next Year the City will consider implementing B5 or B10.
Ethanol alternative fuel vehicles	Purchase of ethanol alternative vehicles by Roanoke City	11 sedans and station wagons purchased since 2003. 15 additional vehicles expected to be purchased. In June - Dec. 2006 period 2 flex fuel vehicles were	2003 - Ongoing	NQ	NQ		
Biodiesel ready trucks	Purchase of bio-diesel trucks by Roanoke City	9 new trucks purchased since 2003. Additional 12 trucks to be purchased.	2003 - Ongoing	NQ	NQ		In December 2006 the City of Roanoke began using B2.
Hybrid vehicles	Purchase of hybrid vehicles by Roanoke City	Two additional hybrid vehicles purchased June-Dec	Jun-05	<0.001 TPD	<0.001 TPD		
Low emissions vehicles	Purchase of low emissions vehicles	Five vehicles purchased in 2005. 2 purchased in 2006.	Jun-05	<0.001 TPD	<0.001 TPD		
Implement effective environmental driving	Develop training materials and video on air quality	220 Roanoke County employees trained	Nov-05	NQ	NQ		
Public education: Air Quality Action Day	An area-wide program of mandatory and voluntary actions to reduce ozone precursor emissions during predicted high ozone days	Program fully implemented	May-05	NQ	NQ	0.5 FTE	Main website redesigned in June - December 2006 reporting period.
Timing of refueling vehicles	Local and state commitments to limit refueling of vehicles during the ozone season. 14 private companies also participating in this program	Program fully implemented	May-05	NQ	NQ		
Promote alternative fuel vehicles	Promotion of alternative fuel vehicles as part of overall emission reduction program - web based	Program fully implemented	2005 - Ongoing	NQ	NQ		Website redesigned in June - Dec 2006 reporting period.
Media/public relations program	Public outreach and information program to educate and inform public on air quality issues and specific ozone action days - 13 media outlets participating	Program fully implemented	Jun-05	NQ	NQ		
Public transit incentives	Overall program to promote the use of various transit options	300 free bus passes distributed, discount summer youth pass program, substantial increase in transit ridership is continuing and documented	May-05	NQ	NQ		Close to 200 summer youth passes sold for Summer 2006.
Bike Infrastructure and Amenities	Overall program to promote bicycle usage	Regional plan developed and currently being implemented	2005 - Ongoing	NQ	NQ		
Expand public education program	Outreach program to K-12 classes. Outreach to daycare, preschools, and summer camps	Materials produced and class arrangements being made. 50 participating daycares, preschools, and camps	2005 - Ongoing	NQ	NQ		
Tree planting program	Program to plant trees for environmental purposes	350 trees and 1,550 seedlings planted thus far in 2006	2005 - Ongoing	NQ	NQ		
Mass transit to Blacksburg	Bus service between Roanoke and Blacksburg	Ridership increased in range of 500 to 1,000 per month	2004 - Ongoing	0.009 TPD	0.004 TPD	950,000	
Replace gas golf carts w/electric	Purchase/use electric golf carts at local courses	In progress	End of 2005		0.061 TPY		
Replace gas mowers w/electric	Program to purchase new or electric lawn mowers	Five lawn mower sales and recycling centers currently participating in this program	2005 - Ongoing	0.017 TPD	0.001 TPD		
Open burning ban -expanded	Restriction of open burning on an episodic and/or seasonal basis	Program fully implemented	May-05	0.56 TPD	0.24 TPD		To be replaced by more restrictive state rule in 2007
Mandatory Restriction lawn equipment usage during ozone action days	Mandatory restriction of landscaping activities by local and state agencies during high ozone days	Program fully implemented	May-05	0.366 TPD	0.094 TPD		
Voluntary Private Sector Restriction lawn equipment usage during ozone action days	Voluntary restriction of landscaping activities by businesses and residents during high ozone days	Program fully implemented	May-05	0.072 TPD	0.016 TPD		
Cradle to Cradle Design Competition	Design and construction of environmentally friendly houses	Eight houses designed and slated for construction. Arrow/Rife House being constructed in November 2006.	2005 - Ongoing	NQ	NQ		
Regional Reduction in NOx emissions	Regional program to reduce ozone transport by reducing NOx emissions from power plants	Fully implemented by state regulation during 2004 ozone season	May 31, 2004	NQ	NQ		11,000 tons/per season reduced in VA between 2002 and 2005. Over 150,000 tps reduced in VA and adjacent states
National Low Emission Vehicle Program	Requirement for the sale of low emissions vehicles	Program fully implemented by state regulation	1999	NQ	NQ		
Stage1 Vapor Recovery	Requirement for use of Stage I vapor recovery equipment at gasoline service stations	Fully implemented in Roanoke County, and the Cities of Roanoke and Salem	May-04	640.9 TPY	NA		
CTG RACT -- CTG VOC RACT and NOx RACT	Expansion of existing source VOC control regulations and non-CTG RACT for major NOx sources	Fully implemented region-wide by state regulation	Nov-05	355.5 TPY	288.4 TPY		
State Cutback Asphalt Regulation	Restriction on the use of cutback asphalt	Fully implemented region-wide by state regulation	Nov-05	1.75 TPY	NA		
Enhanced Ozone Forecasting tool	Preparing daily ozone forecasts during the ozone	Program is fully implemented	May-05	NQ	NQ	70,000 & 1 FTE	

Early Action Compacts December Progress Summary Table

A. Control Measure	B. Summary Description of Measure	C. Program/Measure Status	D. Specific Implementation Date	E. VOC Reduction	F. NOx Reduction	G. Resources (FTE's, \$\$)	H. Additional Information
Comments:							