

Ozone Early Action Plan

Northern Shenandoah Valley

June 30, 2004

Mr. John M. Daniel, Director
Air Division
Virginia Department of Environmental Quality
629 East Main Street, 8th Floor
Richmond, VA 23219

**RE: Ozone Early Action Plan for Northern Shenandoah Valley
June 30th Progress Report Submittal to USEPA**

Dear Mr. Daniel:

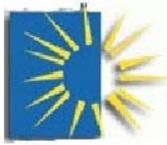
This submittal is intended to fulfill the June 30, 2004 milestone requirement as outlined in the Early Action Compact for The Northern Shenandoah Valley Region in the Commonwealth of Virginia. Per the April 4, 2003 memorandum by Ms. Lydia N. Wegman, Director of the Air Quality Strategies and Standards Division of USEPA, the following elements are included.

- Describe any progress that the local compact areas and States have made since the last progress report (December 2003), regarding development of control strategies and early action plans submitted March 31, 2004.
- Describe any progress that local areas have made toward adoption and implementation of local measures, including schedule for adoption and implementation of these measures, any changes in the schedule, and any additions or deletions of measures since submission of March 31, 2004 plans. If new measures have been added, they should be fully described in the report.
- Describe progress that States or local areas have made in completing technical analyses for attainment demonstration due December 31, 2004, including any additional modeling or analyses since submission of March 31, 2004 plans.
- Describe any meetings conducted by the stakeholders since December 31, 2003.
- Describe any current progress of the State's development of the SIP (due December 31, 2004), including schedule for adoption and implementation of State regulations, as well as a description of public meetings and/or hearings that have occurred or will be conducted prior to SIP submission.
- Describe any obstacles toward completing the December 31, 2004 milestone or any future milestones.

If you have any questions regarding our submittal, please contact me at (540) 665-0973.

Sincerely,

Patrick Barker, AICP
Executive Director



Ozone Early Action Plan **Northern Shenandoah Valley**

3rd Semi-Annual Status Report

for

The Northern Shenandoah Valley Ozone Early Action Compact Area

June 30, 2004

PROJECT BACKGROUND AND SUMMARY TO DATE

This report represents the 3rd semi-annual status report for the Northern Shenandoah Valley (NVS) Early Action Compact Area in Virginia, which consists of the City of Winchester and Frederick County. As such, this report documents the status and progress made towards the development and implementation of an Early Action Plan (EAP) to address ground level ozone air pollution in the area. Specifically, this report covers the period from January 1, 2004 to June 30, 2004.

The Early Action Compact program has been developed and endorsed by the U. S. Environmental Protection Agency as an alternative to the normal ozone nonattainment designation and attainment process. The program involves early action on the part of areas that marginally exceed the 8-hour ozone standard to reduce ozone related air pollutants and improve air quality. This effort has been initiated by the local area, the Department of Environmental Quality (DEQ), and the Environmental Protection Agency (EPA) to serve as an alternative to the traditional nonattainment designation and planning process. The purpose of this early action plan is to proactively improve local air quality and come into compliance with the ozone standard earlier than the Clean Air Act would otherwise require for the area. In return, EAC areas receive a deferral of formal nonattainment designation as long as the commitments and milestones of the area's EAP are met. If it is then demonstrated by 2007 that the local area has come into compliance with the ozone standard, the deferred nonattainment designation will be withdrawn altogether.

The EAC process in the Northern Shenandoah Valley area began back in the fall of 2002, with the establishment of the NVS Air Quality Improvement Task Force and the formal development and signing of the Early Action Compact in December 2002. Moving forward, a series of required documents have been produced, culminating in the submission of the official EAP in March 2004. Provided below is listing and timeline of the products and documents provided by the NVS EAC effort:

- **December 31, 2002** – Early Action Compact for the Northern Shenandoah Valley Area.
- **June 16, 2003** – Potential local control list submission.
- **June 30, 2003** – 1st annual status report for January to June 2003.
- **December 31, 2003** – 2nd annual status report for July to December 2003.
- **March 31, 2004** – Completed local Early Action Plan submitted to DEQ & EPA.

All these documents, along with other information concerning the EAC program and other EAC areas, can be viewed and retrieved at from the following EPA web site:

<http://www.epa.gov/ttn/naaqs/ozone/eac/index.htm>

Efforts on the state and local levels have now moved towards the implementation of the emissions control measures and other actions committed to in the EAP.

The remainder of this status report documents the major actions, milestones, and events that have occurred since the submission of the last report. This report will also summarize the early action plan and associated technical analysis submitted in March 2004. Finally, a discussion of the status and projected schedule for implementation of individual control measures and future milestone documents, such as the formal State Implementation Plan (SIP), is also provided.

PROGRESS SUMMARY (JANUARY TO JUNE 2004)

Provided below is a listing of major events held and actions taken during the period covered by this status report toward the development and implementation of the local ozone air quality improvement plan and associated nonattainment implications:

January 7, 2004 - Meeting of the Northern Shenandoah Valley Air Quality Improvement Task Force.

February 18, 2004 – Meeting of the Northern Shenandoah Valley Air Quality Improvement Task Force.

March 11, 2004 – Conference call with EPA Region III concerning the technical assessment (air quality modeling) effort in support of the early action effort.

March 24, 2004 – Effective date for State regulations that establish the EAC areas in Virginia as ozone precursor emissions control areas that are now subject to various existing source control (RACT) requirements.

March 31, 2004 – Submission of the official Northern Shenandoah Valley Early Action Plan to DEQ and EPA.

April 13, 2004 – Formal resolution of EAP adoption and support passed by the Winchester City Common Council.

April 27, 2004 – Formal resolution of EAP adoption and support passed by the Frederick County Board of Supervisors.

April 30, 2004 – Published final EPA rule for air quality designations and classifications for the 8-hour ozone standard and deferral of the effective date of nonattainment designations for approved early action compact areas.

June 2, 2004 – Meeting of the Northern Shenandoah Valley Air Quality Improvement Task Force.

MARCH 31ST EARLY ACTION PLAN SUMMARY

The main product of the EAC effort has been the development of an ozone early action plan for the Northern Shenandoah Valley area. The purpose of this plan is to develop and implement a comprehensive strategy to bring the NVS area into compliance with the 8-hour ozone standard as soon as possible. In doing so, consideration given to the fact that local area ozone levels are impacted by both local emissions activities and the transport of ozone pollution into the NVS area from other areas. As a result, the strategy developed relies on emissions control measures on all levels (local, state, and national) needed to bring the area into compliance with the ozone standard by 2007. The plan contains demonstrations based on emissions and air quality modeling showing that significant local/regional emissions reductions and a corresponding decrease in local ozone concentrations will occur as a result of the implementation of the plan that are sufficient to bring the area into compliance. This plan has been developed by the NVS Air Quality Improvement Task Force, endorsed and adopted by the local governments involved and submitted to DEQ and EPA on March 31, 2004. The key components of the plan are summarized below.

Emission Reduction Analysis

This section summarized the air pollutant emissions inventory and reduction analysis performed to support the Northern Shenandoah Valley Ozone Early Action Plan. Typical daily inventories for volatile organic compounds (VOC) and oxides of nitrogen (NO_x) during the ozone season, expressed in tons per day, were developed for this purpose. These inventories include baseline, interim, and future projection years to determine historic, current, and future emissions levels as part of the air quality plan development process. The major source categories used to present this inventory data are:

- **Stationary Point Sources**
Large utility and industrial facilities with significant individual emissions.
- **Mobile Sources**
Motor vehicles operated on public roads such as interstates, freeways, and local roads.
- **Area Sources**
Small individual sources of emissions such as gasoline distribution and marketing, solvent usage, and others.
- **Nonroad Mobile Sources**
Motor vehicles and equipment such as lawn and garden tools, construction equipment, locomotives, and aircraft.

The first inventory developed for this process was the baseline emissions inventory. 1999 was selected for this purpose, since the ozone episode being modeled to support the EAP process occurred during the summer of 1999. This inventory serves as a baseline estimate of area emissions during the time when the modeled episode occurred. This inventory reflects actual emissions in the area during this year.

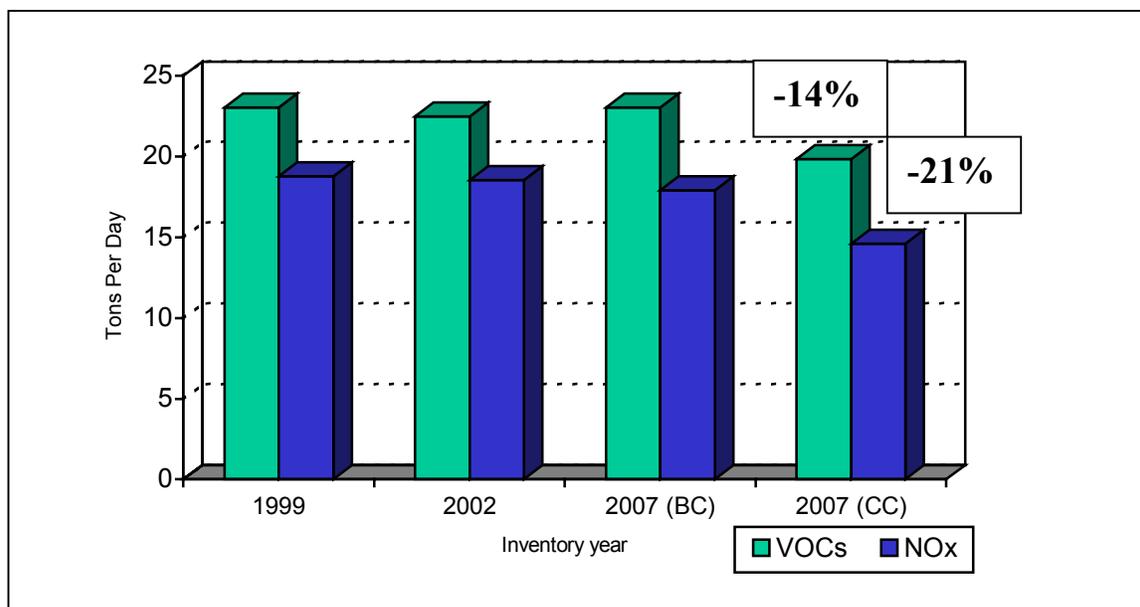
The second inventory to be developed was the interim (current) year emissions inventory. 2002 was selected for this purpose because this is the latest year for which a comprehensive inventory for all sources has been developed. This inventory serves to represent existing emissions levels in the local area and can also be compared to the baseline inventory to determine emissions trends. This inventory also reflects actual emissions in the area during this year.

The last two inventories developed for this process are predicted future year emissions inventories that represent base case (uncontrolled) and control case (controlled) emissions scenarios. The year selected for this purpose was 2007 which is the year by which the area must come into compliance with the ozone standard. The future base case inventory represents uncontrolled emissions projected with appropriate growth factors. The exception to this is the mobile source inventory that contains some reductions associated with previous federal/state motor vehicle controls. The future control case inventory represents the application of all control expected to be implemented in the local area by the attainment year. This also includes the local impact of additional federal/state control measures, and the local control measures selected as part of the EAP process. The results of this analysis are presented in a summary table and bar graph presented below:

Table 1: Northern Shenandoah Valley EAP Emissions Inventory Summary

Source Category	1999 (Baseline)	2002 (Interim)	2007 (Base Case)	2007 (Control Case)
<i>Volatile Organic Compound (VOC) Emissions in tons/day</i>				
Point Sources	6.019	5.638	6.492	6.068
Area Sources	7.806	7.982	8.221	7.081
Non-road Sources	2.450	2.612	2.911	1.885
Mobile Sources	6.750	6.250	5.373	4.786
Totals:	23.025	22.482	22.997	19.820
<i>Oxides of Nitrogen (NO_x) Emissions in tons/day</i>				
Point Sources	0.745	0.934	1.075	0.675
Area Sources	2.526	2.603	2.734	2.612
Non-road Sources	1.840	1.961	2.183	1.792
Mobile Sources	13.640	13.020	11.888	9.503
Totals:	18.751	18.518	17.880	14.582

Figure 1: Northern Shenandoah Valley EAP Emissions Trends

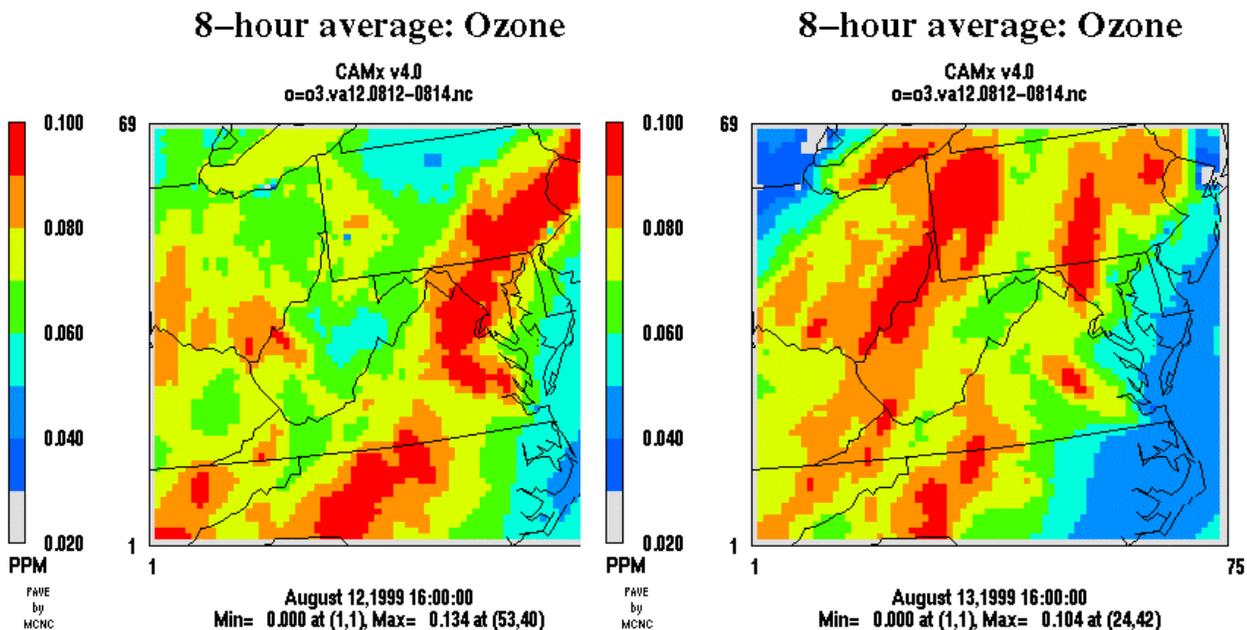


As can be seen by these graphics, substantial local emissions reductions are expected in the NSV area by 2007 as a result of a combination of local, state, and national ozone precursor control measures that address all the major emissions sectors (point, area, nonroad, and mobile). Specifically, these measures will reduce local VOC emissions by 14% and NO_x emissions by 21%. In addition, significant reduction in emissions will also occur outside of the local area that will substantially reduce the transport of ozone pollution into the NVS area and contribute the improvement of local air quality and compliance with the ozone standard.

Regional Air Quality Modeling Analysis

Regional air quality analyses using air quality predictive models are used to simulate the combination of meteorology, emissions, and atmospheric chemistry that promote ozone formation at higher ambient concentrations in a given area and during a specific timeframe. Once a representative scenario, or episode conducive to ozone formation, based on an actual observed ozone event is selected and validated, emission control and reduction strategies are tested to predict whether they would succeed in reducing ozone and attaining the ozone standard.

Such an analysis has been performed in support of the Northern Shenandoah Valley EAC area and the results are summarized in this section. For the purpose of this analysis, an actual ozone episode that occurred in August 1999 was selected for the modeling exercise. This modeling was performed using the Comprehensive Air Quality Model with Extensions (CAM_x) and related meteorological and emissions data preprocessors. A regional geographic model domain was also chosen for the analysis to account for the impact of pollution transport on the local area and the predicted reduction of this transport from regional and national control measures. This model was first run to simulate the base case episode and was successfully validated to meet EPA requirements for the use of such models for air quality planning purposes. The results of this base case (August 1999) modeling is graphically presented



Once the base case modeling and associated performance evaluation and validation was completed, the future base and control case scenarios were modeled.

First, the future base case scenario was modeled based on the assumption of emissions growth from unregulated or uncontrolled source categories. Also included in this scenario were controlled estimates for source categories subject to State/Regional/National strategies already promulgated for the control of ozone precursor emissions that were not directly relating to the strategies to be implemented through the local control program. This modeling showed substantial reductions in predicted ozone concentrations in the EAC area and throughout the

entire modeling domain. In fact, the base case controls were predicted to be sufficient to bring the Northern Shenandoah Valley EAC area into compliance with the ozone standard.

The second future modeling scenario involved the addition of the local control strategies contained in the EAP to serve as the control case inventory for this project. The combination of all the controls at all applicable levels (local, state, federal) produced the results shown below.

Figure 3: Regional Modeling Results – Future Control Case Predictions (full domain)

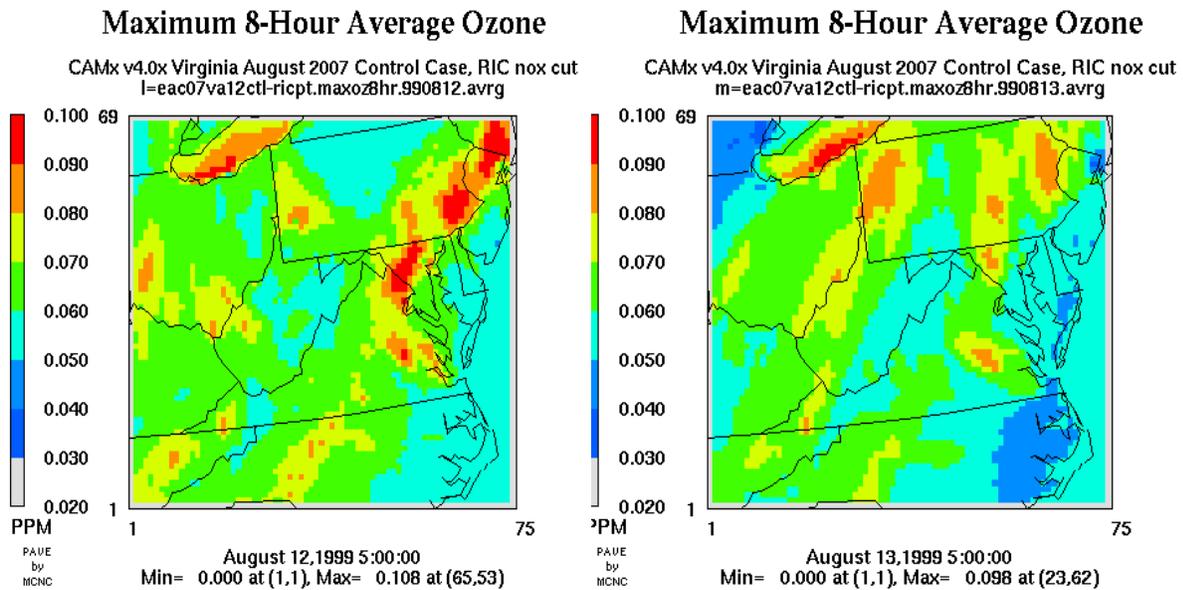
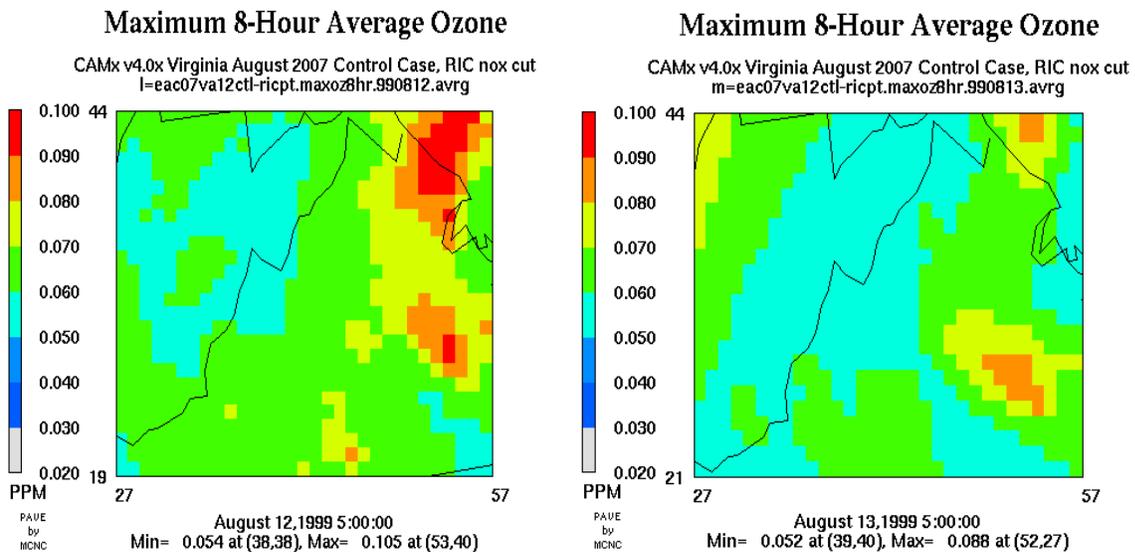


Figure 4: Regional Modeling Results – Future Control Case Predictions (Central VA)



The results of the control case modeling shows that most areas within the modeling domain would be at or below the 8-hour ozone standard in 2007 under this episode scenario as a result

of the control strategies to be implemented during this time period. **Specifically, the Northern Shenandoah Valley area is predicted to experience a 19% reduction in local ozone concentrations. It is also predicted that the base case design value for the area of 90 parts per billion will be reduced to 73 parts per billion in 2007.** Therefore, the modeling exercise indicates that the desired result of reducing ozone concentrations to levels below the 8-hour ozone standard will be achieved by the implementation of the controls included in this EAP, and combined with the control strategies being implemented on the state and federal levels. A summary of the attainment demonstration results are presented in the table below:

Table: Attainment Demonstration for the Frederick County Ozone Monitor

Modeled Average Base-Year Daily Maximum Ozone Concentration (ppbv)	Modeled Average Future-Year Daily Maximum Ozone Concentration (ppbv)	RRF	Current DV (ppbv)	Future DV	Pass/Fail Status
80.41	65.20	0.811	90	73	Pass

IV. IMPLEMENTATION STATUS OF EARLY ACTION CONTROL MEASURES

This section describes the status of each emission control measure included in the early action plan and current plan and schedule for measure implementation.

Local Phase I Controls

The Phase I strategies are to be implemented as quickly as possible, but before the end of 2005. These measures have the greatest public acceptance and will provide important foundation for any future efforts.

1. Ozone Action Days/Public Awareness

This strategy is actually a combination of several measures that had been evaluated earlier as individual strategies including:

Control Strategies	Status	Full Implementation Schedule	Voluntary Regional Implementation
General Public Awareness Program	Under development	Spring 2005	Spring 2006
School-based Public Awareness Program	Under development	Spring 2005	Spring 2006
Education and Promotion Campaign	Under development	Spring 2005	Spring 2006
Employer-based Ozone Action Days	Under development	Spring 2005	Spring 2006
Area Sources Ozone Action Days	Under development	Spring 2005	Spring 2006
Dynamic Message Signs	Completed	Summer 2004	Summer 2005
Video Monitor Deployment	Completed	Summer 2004	Summer 2005
Lawn & Garden Equipment Usage Restrictions for State/Local Govts	Researching comparable ordinances	Spring 2005	Spring 2006
Other State/Local Govt Restrictions (Refueling, Pesticides)	Researching comparable ordinances	Spring 2005	Spring 2006

2. VMT Reduction Programs

This strategy combines a number of individual programs/activities designed to reduce vehicle miles of travel (VMT). These include:

Control Strategies	Status	Full Implementation Schedule	Voluntary Regional Implementation
Enhanced/expanded NSV Regional Commission Ridesharing Program	Under development within Metropolitan Planning Organization	Spring 2005	Spring 2006
Bicycle and Pedestrian Accommodation	Working with the Green Circle Project and City/County Planning Departments	Spring 2005	Spring 2006
Green Space Preservation	Working with City/County Planning Departments to discover feasible options	Spring 2005	Spring 2006
Promotion of Mixed Use Development	Working with City/County Planning Departments to discover feasible options	Spring 2005	Spring 2006
Promotion of Telecommuting	Working with NetTech Center of Winchester on applicable opportunities	Spring 2005	Spring 2006

3. Open Burning Restrictions

Establishing open burning restrictions for land clearing activities has the potential to reduce combustion sources in the emissions inventories. While this type of rule is sometimes difficult to enforce, the reduction of related fire hazards along with the reduction of visible smoke and resulting air quality benefits were deemed important by the Task Force. This measure will be implemented by local ordinances.

Control Strategies	Status	Full Implementation Schedule	Voluntary Regional Implementation
Open Burning Restrictions	Reviewing other local ordinances	Spring 2005	Spring 2006

4. Engine Idling Restrictions

Restrictions for engine idling was another strategy included, due in part to the heavily traveled I-81 corridor in NSV, which has a high percentage of heavy truck travel. A large amount of idling emissions are generated from heavy-duty diesel vehicles that are parked at truck stops, rest areas and to a lesser extent, distribution centers. While Virginia already has an anti-idling regulation, it is anticipated that the EAC area will consider a more stringent version. The estimated emissions reduction for this measure has not yet been determined and this measure has not been included in the technical analysis of this plan.

Control Strategies	Status	Full Implementation Schedule	Voluntary Regional Implementation
Engine Idling Restrictions	Reviewing other local ordinances	Spring 2005	Spring 2006

5. School Bus/Heavy Duty Fleets Retrofits

Retrofitting heavy duty diesel engines with emissions control technologies, such as EGR systems, or after treatment devices is an emissions control measure that shows promise for the NSV. In fact, the availability of funding to support the retrofit of school buses will give implementation of this measure a positive boost. DEQ has allocated up to \$475,000 in funding assistance to assist in implementation of this strategy.

Control Strategies	Status	Full Implementation Schedule	Voluntary Regional Implementation
School Bus Fleets Retrofits	City/County School Systems implementing according to plans with VDEQ	Spring 2005	Spring 2006
Heavy Duty Fleets Retrofits	Researching feasible options and other comparable programs	Spring 2005	Spring 2006

6. Voluntary Industrial Reductions

The emissions reduction benefits are sometimes difficult to quantify for this strategy, however, an initial voluntary approach seeking industrial reductions is a reasonable and practical way for an EAC area to begin. In addition, this strategy would help increase awareness of the pollution problem and establish a relationship between local government and area industry. The estimated emissions reduction potential for these types of strategies for the area will be determined as agreements are reached with local industries.

Control Strategies	Status	Full Implementation Schedule	Voluntary Regional Implementation
Voluntary Industrial Reductions	City/County School Systems implementing according to plans with VDEQ	Spring 2005	Spring 2006

State/Federal Control Measures

In addition to the local strategies identified in the preceding discussion, several state and federal actions that have or will produce substantial ozone precursor emission reductions both inside and outside of the NSV. These reductions are aimed at reducing local emissions and the movement (transport) of pollution into the area. These strategies, when combined with the local strategies, are expected to lower area ozone concentrations to the level at or below the ozone standard.

State Control & Support Measures

At the state level, four significant actions have been taken to support ozone standard attainment in Virginia and specifically in the nonattainment and EAC areas.

- Regional ozone transport control program (i.e., the NO_x SIP Call)
- National Low Emission Vehicle Program (VA early opt-in beginning in 1999)
- Reasonably Available Control Technology (RACT) controls for existing industries

- Ozone forecasting tool for the Northern Shenandoah Valley

1. Regional Reduction of NO_x Emissions (NO_x SIP Call)

In response to EPA's call for the reduction of NO_x emissions from large combustion sources (i.e., the NO_x SIP Call), the state has adopted and implemented a program to significantly reduce emissions on NO_x as part of a regional program to reduce ozone transport.

On May 21, 2002 the Virginia Air Pollution Control Board adopted a final state regulation concerning the NO_x Budget and Emissions Trading program, 9 VAC 5 Chapter 140, in response to the EPA NO_x SIP Call. The final regulation was published in the Virginia Register on June 17, 2002 and became effective on July 17, 2002. On June 25, 2002, the regulation was submitted to EPA along with the initial allocations for the affected units. On November 12, 2002, EPA issued a notice proposing approval of the state program, with the exception of the NO_x allowance banking provisions dealing with the start date of flow control. This deficiency has subsequently been corrected and submitted to EPA for full final approval of the state program.

This program alone is predicted to reduce ozone forming NO_x emissions by up to 30,000 tons per ozone season in Virginia. Beginning on May 31, 2004, facilities and emission units subject to the state NO_x budget and trading rule must comply with this rule during the control period of from May to September of every year hence forth. As part of this program, affected sources must adhere to emission rates and caps unless additional emission allowances are obtained through the EPA administered trading program.

2. National Low Emission Vehicle Program

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

This program has and will continue to substantial ozone precursor emission reductions in Virginia that will assist areas like the NSV area in meeting air quality standards and goals.

3. Reasonably Available Control Technology (RACT) controls for existing industries

To address local emissions, the state has recently adopted Reasonably Available Control Technology (RACT) controls for industries in the area, to further reduce the local contribution to ozone formation. This regulation was adopted by the Air Pollution Control Board in October 2003 and became effective on March 23, 2004. Compliance with this rule will be required by November 15, 2005. Because this measure has specifically been adopted to support the Early Action Plan, this measure has been included and modeled as a local control measure.

The Valley Regional Office mailed letters to several potential RACT sources on February 26, 2004. Responses have been received from a majority of the facilities. This process has identified several presumptive VOC RACT sources and one NO_x RACT source. On March 29, 2004 the NO_x source notified VRO that they are subject to RACT. A compliance schedule is

anticipated from the facility by July 1, 2004. Compliance shall be achieved by November 15, 2005.

4. Ozone forecasting tool for the Northern Shenandoah Valley

Although not a direct control measure, the DEQ has initiated a contract with Sonoma Technology, Inc. to develop an area specific ozone forecast tool to support the local ozone action days program and associated voluntary emission reduction efforts. A draft version of this tool has been provided and is currently undergoing testing. A pilot test of the local forecast and action program may occur later this summer, with full implementation to begin during the 2005 ozone season.

Federal Control Measures

On the federal level, numerous EPA programs have been or will be implemented to reduce ozone pollution. These programs cover all the major categories of ozone generating pollutants and are designed to assist many areas to come into compliance with the federal ozone standard. A brief description of these strategies is provided below:

Stationary & Area Source Controls

In addition NO_x SIP Call program, the EPA has developed a number of control programs to address smaller “area” sources of emissions that are significant contributors to ozone formation. These programs reduce emissions from such sources as industrial/architectural paints, vehicle paints, metal cleaning products, and selected consumer products.

Motor Vehicle Controls

The EPA continues to make significant progress in reducing motor vehicle emissions. Several federal programs have established more stringent engine and associated vehicle standards on cars, sport utility vehicles, and large trucks. These programs combined are expected to produce progressively larger emission reductions over the next twenty years as new vehicles replace older ones.

Non-Road Vehicle & Equipment Standards

The category of “non-road” sources that covers everything from lawn & garden equipment to aircraft, has become a significant source of air pollutant emissions. In response, EPA has adopted a series of strategies to address these sources. These programs include engine emission standards for lawn & garden equipment, construction equipment, boat engines, and locomotives.

All these measure have been developed to address both the creation of ozone producing emissions in the local area, as well as reducing the movement of ozone into the area as a comprehensive approach to reducing ozone levels.

V. STATE IMPLEMENTATION PLAN (SIP) DEVELOPMENT AND SCHEDULE

The next major milestone in the EAC process is the development and submission of a formal State Implementation Plan (SIP) by DEQ. This SIP must be developed, processed, and submitted to EPA by December 31, 2004. This SIP will include the early action plan for the area along with any formally adopted control measures and regulations. The current schedule for this action is as follows:

March 24, 2004 – State RACT regulation adopted.

March 31, 2004 – Area attainment demonstration completed.

June to October, 2004 – Continued local area control development and adoption (as needed).

November, 2004 – Final SIP development and public review/comment.

December 31, 2004 – SIP submission to EPA.

Currently no major obstacles are anticipated in completing the SIP process and meeting the milestone commitment.