



COMMONWEALTH of VIRGINIA

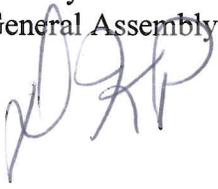
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To: The Honorable Timothy M. Kaine
Members of the General Assembly

From: David K. Paylor 

Date: October 1, 2008

Subject: Report on Air Quality and Air Pollution Control Policies in the Commonwealth

In accordance with 10.1-1307.G of the Virginia Code, the Department of Environmental Quality has completed its annual report on Air Quality and Air Pollution Control Policies of the Commonwealth of Virginia for 2008.

Overall Virginia's air quality continues to gradually improve and DEQ continues to take steps to improve air quality. Indeed, the United States Environmental Protection Agency recently determined that the entire Commonwealth is currently meeting the National Ambient Air Quality Standards for fine particulate matter and planning for compliance and maintenance of new air quality standards are well underway.

This report is being made available at www.deq.virginia.gov/regulations/reports/html. If you have any questions concerning this report or if you would like a hard copy of this report, please contact Angela Jenkins, Assistant Director of Legislative and Legal Affairs at (804) 698-4268.

AIR QUALITY AND AIR POLLUTION CONTROL POLICIES
OF THE COMMONWEALTH OF VIRGINIA



*A Report to the Honorable Timothy M. Kaine, Governor
and the General Assembly of Virginia*

Virginia Department of Environmental Quality

October 2008

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Abbreviations

| | | | |
|-----------------|---|----------------------|--|
| AQI | Air Quality Index | NATA | National Air Toxic Assessments |
| ASM | Acceleration Simulation Mode | NATTS | National Air Toxics Trend Site |
| BACT | Best Available Control Technology | NH ₃ | Ammonia |
| CAA | Clean Air Act | NLEV | National Low Emission Vehicle Program |
| CAIR | Clean Air Interstate Rule | NO ₂ | Nitrogen Dioxide |
| CAMR | Clean Air Mercury Rule | NO _x | Nitrogen Oxides |
| CASAC | Clean Air Scientists Advisory Committee | NSR | New Source Review |
| CH ₄ | Methane | OTC | Ozone Transport Commission |
| CMS | Compliance Monitoring Strategy | OTR | Ozone Transport Region |
| CO | Carbon Monoxide | PM _{2.5} | Particulate Matter not more than 2.5 Angstroms in Diameter |
| CO ₂ | Carbon Dioxide | PM ₁₀ | Particulate Matter no more than 10 Angstroms in Diameter |
| CTG | Control Technique Guideline | PM _{10-2.5} | Particulate matter with a diameter between 2.5 and 10 Angstroms |
| DMV | Department of Motor Vehicles | PPB | Parts per Billion |
| ECHO | Enforcement and Compliance History Online | PPM | Parts per Million |
| EGU | Electric Generating Unit | PSD | Prevention of Significant Deterioration |
| EPA | Environmental Protection Agency | RACM | Reasonably Available Control Measures |
| FRM | Federal Reference Monitor | RACT | Reasonably Available Control Technology |
| GHG | Greenhouse Gas | RBIS | Risk Based Inspection System |
| GVWR | Gross Vehicle Weight Rating | RFG | Reformulated Gasoline |
| GWAQC | George Washington Air Quality Committee | RFP | Reasonable Further Progress |
| HAP | Hazardous Air Pollutant | RIA | Regulatory Impact Analysis |
| HRAQC | Hampton Roads Air Quality Committee | ROP | Rate of Progress |
| I/M | Motor Vehicle Inspection and Maintenance Program | RPO | Regional Planning Organization |
| LAER | Lowest Achievable Emissions Rate | SHEN-AIR | Shenandoah Valley Air Quality Initiative |
| LPO | Lead Planning Organization | SIP | State Implementation Plan |
| MACT | Maximum Achievable Control Technology | SOP | State Operating Permit |
| MANE-VU | Mid Atlantic/Northeast Visibility Union | STN | Speciated Trends Network |
| MARAMA | Mid Atlantic Regional Air Management Association | ug/m ³ | Micrograms per Cubic Meter |
| MMte | Million Metric Tons of CO ₂ equivalent | VISTAS | Visibility Improvement State and Tribal Association of the Southeast |
| MSOS | Mobile Source Operations Section | VPM | Virginia Productivity Measurements |
| MRAQC | Metropolitan Richmond Air Quality Committee | | |
| MWAQC | Metropolitan Washington Air Quality Committee | | |
| NAAQS | National Ambient Air Quality Standard | | |

1. Executive Summary

This report was prepared by the Department of Environmental Quality (VDEQ) on behalf of the State Air Pollution Control Board for the Governor and General Assembly pursuant to § 10.1-1307 G of the Code of Virginia. This report details the status of Virginia's air quality, provides an overview of the air compliance and air permitting programs, and briefly summarizes the federal, state and local air quality programs being implemented.

1.1. Air Quality in the Commonwealth

Air quality in Virginia continues to improve. The air quality standards the Commonwealth must attain, however, continue to become more stringent. Earlier this year, EPA published a lower National Ambient Air Quality Standard (NAAQS) for ozone that may prove challenging for some Virginia localities to meet. Additionally, wildfires in Virginia and North Carolina heavily influenced air quality during June and July of 2008 during time periods when meteorological conditions were such that the wildfire pollution was directed at Virginia population centers.

1.2. Air Quality Policies in the Commonwealth

During this past year, the Air Pollution Control Board and VDEQ issued three permits for electric generating units (EGUs) that set precedent nationwide. During this same period, the United States Environmental Protection Agency (EPA) published new policies and guidance concerning permitting of emissions of Fine Particulate (PM_{2.5}). EPA's recently proposed designations for the new PM_{2.5} NAAQS (published in 2006) note that all areas of the Commonwealth are currently in compliance with the 24-hour PM_{2.5} standard.

VDEQ's planning activities for the 2008 ozone NAAQS are on going. This new ozone standard is much more stringent than prior standards and, at this time, some areas in the Commonwealth are unable to meet the new standard.

Efforts toward meeting Clean Air Act (CAA) requirements for the 1997 ozone and PM_{2.5} NAAQS as well as Regional Haze requirements have been severely hampered by recent decisions of the U.S. Court of Appeals for the D.C. Circuit. These decisions vacated two EPA rules: the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR). VDEQ awaits guidance from EPA regarding air quality issues in the absence of these rules.

2. Status of Air Quality in the Commonwealth of Virginia

Ambient concentrations of carbon monoxide (CO), nitrogen dioxide (NO₂), and sulfur dioxide (SO₂) in Virginia were meeting all of EPA's NAAQS in 2007-08. Virginia continued to experience problems in 2008 with summertime ozone levels. EPA

promulgated a new, more stringent 8-hour ozone standard (see paragraph 3.1.4) that has impacted most areas of Virginia where ozone monitors are sited. Virginia has recorded exceedances of the new standard as early as April 18, 2008.

Wildfires in North Carolina and southern Virginia have complicated the evaluation of the impact of the new ozone standard. Meteorological conditions at certain times during the active phases of these fires brought air masses through Virginia that caused broad-based exceedances of the 2008 ozone NAAQS and the 2006 PM_{2.5} NAAQS. The air quality in Hampton Roads was particularly degraded. Richmond-Petersburg and Charlottesville also monitored unusually high levels of PM_{2.5} during this time frame, mainly due to the influence of these natural disasters.



Figure 2-1: NC Wildfires

As noted above and described in more detail in paragraph 3.1.4, EPA replaced the original 8-hour ozone standard with a revised standard in April 2008. The new standard, 0.075 ppm versus the old standard of 0.08 ppm, may impact the attainment status of the Richmond-Petersburg, Tidewater, and Fredericksburg areas. Data through the end of mid-September show that Northern Virginia, Fredericksburg, Hampton Roads, Richmond, and Caroline County will likely exceed this new, more stringent 8-hour ozone standard. This data has yet to be quality assured and approved as final by EPA.

Virginia is meeting the NAAQS for PM₁₀. The 24-hour standard for PM_{2.5} as well as the annual standard for PM_{2.5} are being met everywhere in the state for the period from 2004-2007.



Figure 2.1-1: Albemarle County Air Monitoring Site

2.1. Monitoring Network

VDEQ maintains an extensive air quality monitoring network throughout the Commonwealth. Ambient air quality was measured by approximately 114 instruments at 49 sites during 2007-08. These monitoring sites were established in accordance with EPA's siting criteria contained in Appendices D and E of Title 40, Part 58 of the Code of Federal Regulations, and conform to EPA guidance documents and generally accepted air quality monitoring practices. All data reported for the Virginia air quality monitoring network were quality assured in accordance with requirements contained in 40 C.F.R. Part 58, Appendix A. These data

are published annually in the Virginia Ambient Air Monitoring Data Report and are available from the VDEQ website at www.deq.virginia.gov/airmon.

The Office of Air Quality Monitoring worked in partnership with the Shenandoah Valley Air Quality Initiative (SHENAIR) to upgrade the Frederick County air monitoring station at Rest, Virginia. SHENAIR purchased an environmental shelter to replace the aging air monitoring shelter at this site. SHENAIR also purchased a continuous PM_{2.5} monitor for the site. VDEQ continues to operate the ozone monitor at this site and added a PM_{2.5} 24-hour sampler as well. The new monitoring shelter and instrumentation at Rest, Virginia began operating in the fall of 2007.

The Office of Air Quality Monitoring completed installation of an air monitoring station on the campus of Albemarle High School. Active instrumentation at the monitoring station includes an ozone analyzer, a continuous PM_{2.5} monitor, and a PM_{2.5} 24-hour sampler. VDEQ plans to install a PM₁₀ particulate monitor at this site that can be operated by the school's science classes. The new shelter was installed in March 2008, and the ozone monitor began operation on April 1, 2008.

In spring of 2006, VDEQ moved the PM_{2.5} monitor located in Salem. The relocation was necessary due to construction that impacted the air flow on the building where the monitor was located. The monitor was relocated to a site in Roanoke where a monitoring shelter already existed. Evaluation of the data from this new location over 18 months indicated that no significant numerical differences existed between the data developed from the two PM_{2.5} monitors. VDEQ will move the previously sited PM_{2.5} monitor and place it at a permanent location in the area of Salem High School. The new monitor should be operating by September 2008.

2.2. Data Trends for PM_{2.5} and Ozone

For PM_{2.5}, the general trend for the annual average across the Commonwealth shows improvement in air quality. Figure 2.2-1, below, shows annual PM_{2.5} averages for monitors in the Richmond-Petersburg area. Other areas of the Commonwealth follow a similar trend.

For the 24-hour PM_{2.5} data, the monitors across the Commonwealth have generally registered a similar pattern of decreasing values. Figure 2.2-2 provides data for Northern Virginia air quality PM_{2.5} monitors and shows the values on a 24-hour basis. As denoted by the red line in the chart below, all monitors in Northern Virginia are showing levels below the 2006 NAAQS for PM_{2.5}, indicating good air quality in the area for PM_{2.5}.

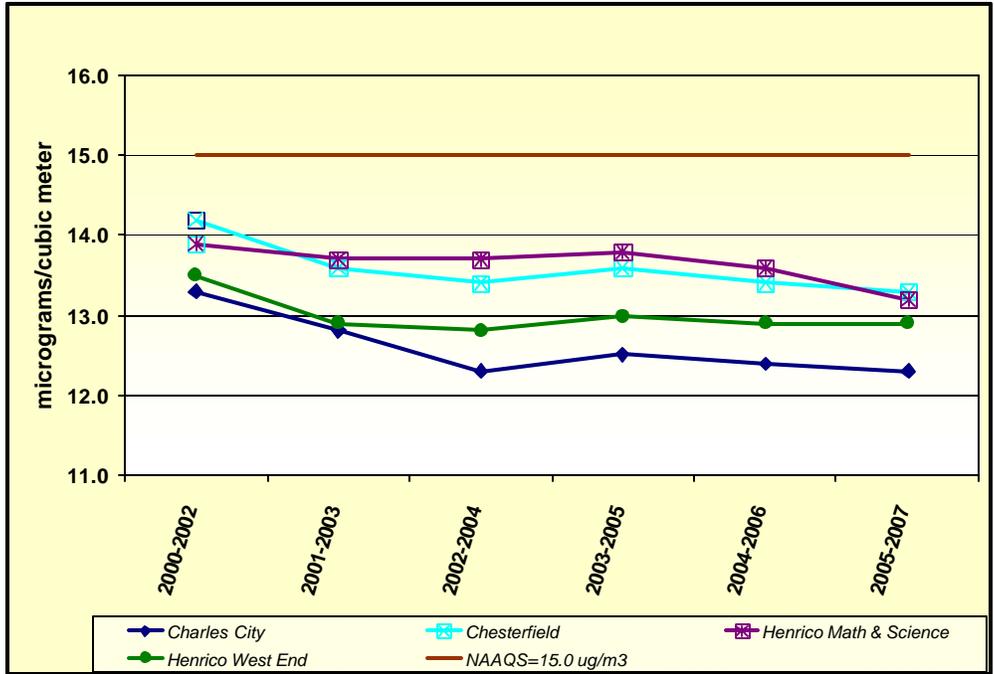


Figure 2.2-1: Annual PM_{2.5} Air Monitoring Values for the Richmond-Petersburg Area

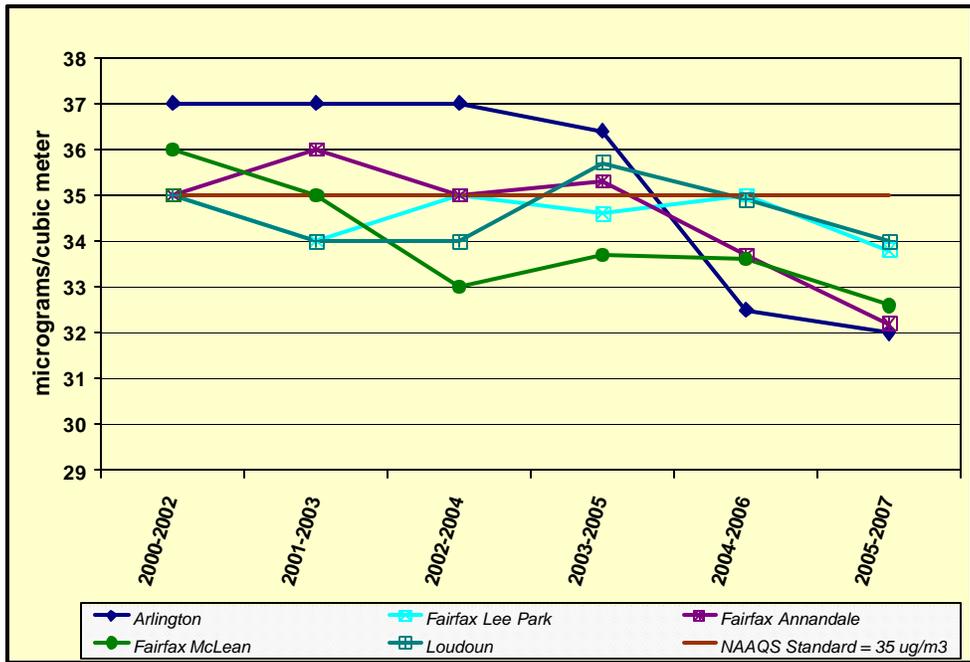


Figure 2.2-2: 24-Hour PM_{2.5} Air Monitoring Values for the Northern Virginia Area

Ozone trends continue to show improvement in air quality. Some areas of the Commonwealth, however, are above the new 0.075 ppm 2008 ozone NAAQS standard. The following charts show data trends from a few areas of the Commonwealth that may have difficulty complying with the 2008 ozone standard in the near future.

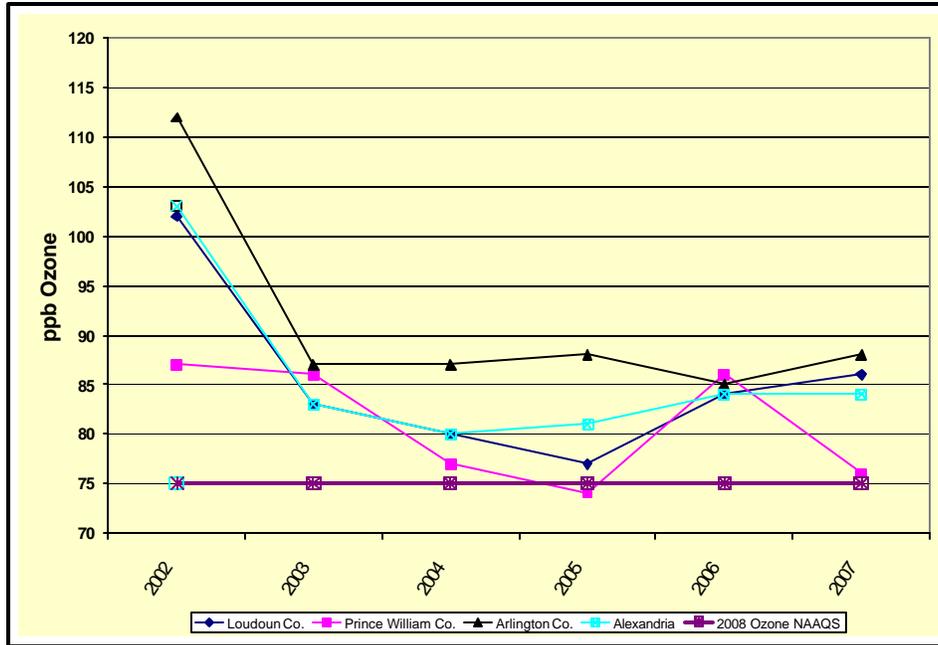


Figure 2.2-3: Annual Ozone Values for Monitors in Northern Virginia

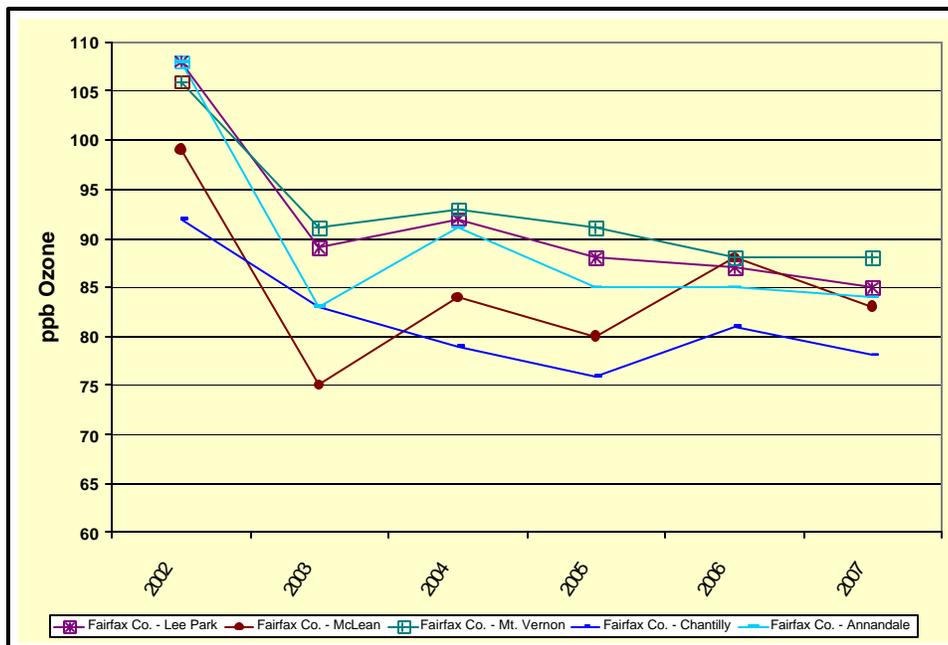


Figure 2.2-4: Annual Ozone Values for Monitors in Fairfax County

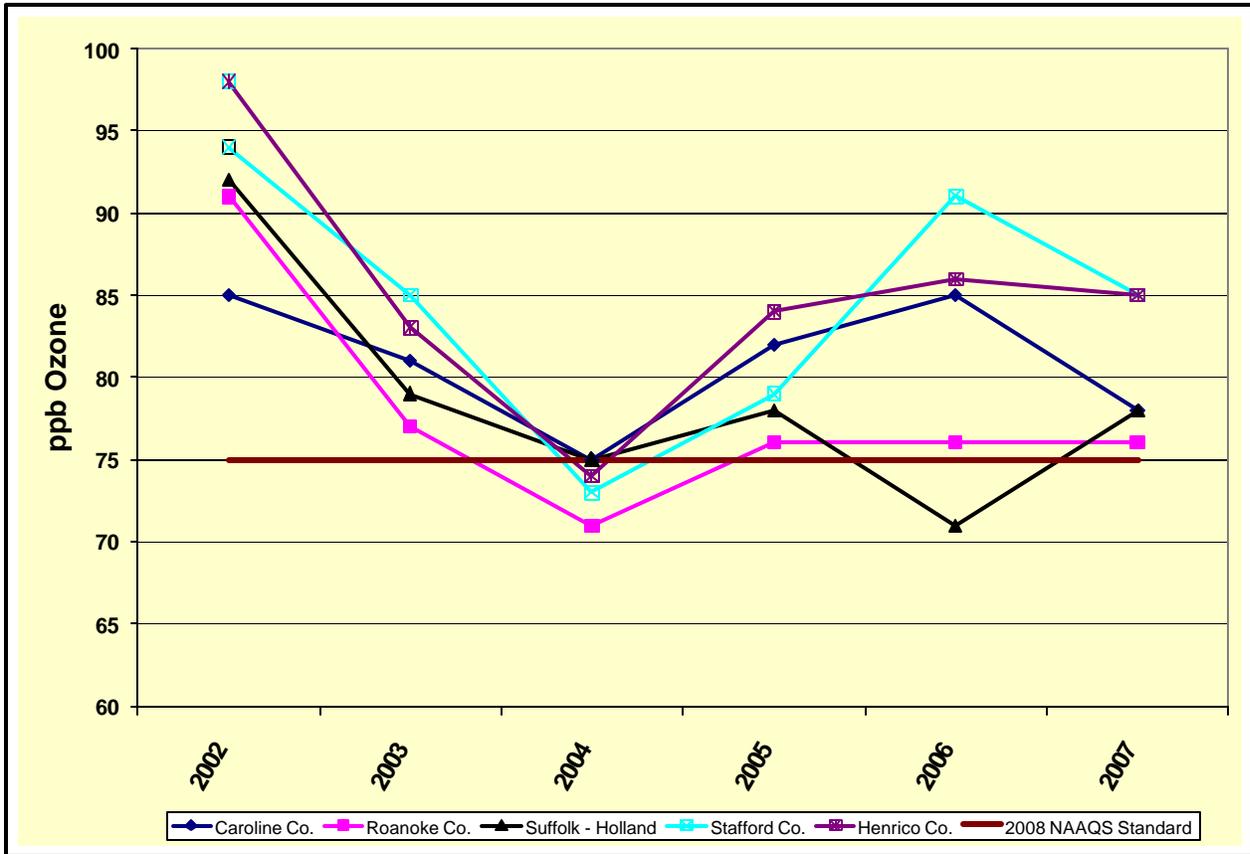


Figure 2.2-5: Annual Ozone Values for Various Parts of the Commonwealth

2.3. Hopewell Air Toxics Study

In 2006, VDEQ began performing a two-year air toxic study/monitoring project in Hopewell, Virginia. The sampling project was designed to allow VDEQ to accomplish the following objectives:

- To establish a baseline for ambient air exposure of hazardous volatile organics in these communities and help to identify the potential existence of “hot spots.”
- To provide information to support the development of the residual risk standards and evaluation of future emission control programs.
- To assess the validity of the National Air Toxics Assessment findings. The comparison would enable VDEQ to validate the model-to-monitor relationship for the Hopewell/Colonial Heights area.

The Hopewell project is ongoing. Once data gathering has been completed, VDEQ will evaluate all of the data and perform a risk analysis to assess the potential impact of the measured results on the citizens of Hopewell.

2.4. NATTS Site

In April, 2008, VDEQ received approval for a National Air Toxics Trend Site (NATTS) Grant. This grant will allow VDEQ to upgrade the monitoring site at the Math and Science Innovation Center in Eastern Henrico County to a National Trend site. The data generated at the trend site will be included with that of other trend sites throughout the country and the combined data will be used to determine the direction of the trend for ambient air toxics concentrations. The Math and Science Center site was previously part of the urban air toxics program. This upgrade to a trend site will allow VDEQ to relocate the urban air toxics site to another location in the Richmond area.

3. Air Pollution Control Overview

This overview is broadly categorized into planning, permitting, compliance, and other initiatives and includes descriptions of significant current policy issues under each broad category.

3.1. Air Quality Planning Initiatives



The figure to the left shows the various jurisdictions within the Commonwealth and their current status under the CAA. Current air quality planning is very complex due primarily to the confluence of deadlines for compliance with the 1997 standards for PM_{2.5} and ozone, the promulgation of the new 2006 PM_{2.5} NAAQS, the promulgation of the new 2008 ozone NAAQS, and the statutory deadlines for the Regional Haze program. These elements comprise the main focus of planning initiatives in the last year and will continue to do so for the next few years. Other initiatives, including the development and submittal of various Clean Air Act infrastructure requirements and the ongoing issues surrounding CAA § 126 petitions to

Figure 3.1: Planning areas across the Commonwealth

alleviate out of state air quality impacts from Virginia facilities, however, also continue to require attention and resources.

3.1.1. 1997 NAAQS for Ozone

Ground-level ozone is the primary constituent of smog. Ozone is not usually emitted directly into the air. At ground level, ozone is created by a chemical reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Sunlight and hot weather cause ground-level ozone to form in harmful concentrations in the air.

In 1997, EPA replaced the 1-hour average ozone concentration standard of 0.12 ppm with an 8-hour average ozone concentration standard of 0.08 ppm. On February 10, 2004, the Commonwealth submitted its final recommendations and comments on the designations of areas in Virginia under the 1997 8-hour ozone NAAQS. On April 30, 2004, EPA's nonattainment and attainment/unclassifiable designations for the 8-hour ozone standards were published in the Federal Register, along with area classifications. The designations became effective June 15, 2004 (except for Early Action Compact areas). Below is a comparison of EPA's final designations and Virginia's recommendations. After publication of these final designations and classifications, EPA reclassified the Richmond-Petersburg area to marginal based on improved air quality data.

Table 3.1.1-1: 1997 Ozone NAAQS Designations

| Area | Commonwealth's 2/10/04 proposal | EPA's 4/30/04 response/classification |
|---------------------------------|--|---|
| Northern Virginia | Same as previous 1-hour nonattainment area; transfer Stafford County to Fredericksburg. | No change/moderate. |
| Richmond-Petersburg | Same as previous 1-hour nonattainment area. | Add all of Charles City County, City of Petersburg and Prince George County/moderate. |
| Hampton Roads | Same as previous 1-hour nonattainment area. | Add Gloucester and Isle of Wight Counties/marginal. |
| Fredericksburg | Establish area separate from Northern Virginia but with same classification; transfer Stafford County from Northern. | No change/moderate. |
| Caroline County | New nonattainment area. | Denied. |
| Roanoke | New nonattainment area; designation deferred by EAC. | No change/basic. |
| Frederick County/ Winchester | New nonattainment area; designation deferred by EAC. | No change/basic. |
| Shenandoah National Park | Portion of park within Madison and Page Counties. | No change/basic. |

On April 30, 2004, EPA published Phase One of its rule for implementing the 8-hour ozone standard. Phase One covers two key implementation issues: classifying areas for the 8-hour standard and transitioning from the 1-hour to the 8-hour standard, which includes revocation of the 1-hour standard and the anti-backsliding principles that should apply upon revocation. EPA revoked the 1-hour standard in full, including the associated designations and classifications, one year following the effective date of the 8-hour ozone designations (June 15, 2005). As a result, EPA will no longer make findings of failure to attain the 1-hour standard and, therefore, 1) EPA will not reclassify areas to a higher classification for the 1-hour standard based on such a finding and 2) areas that were classified as severe nonattainment for the 1-hour ozone NAAQS are not obligated to impose fees on major stationary sources of volatile organic compounds as provided under §§ 181(b)(4) and 185A of the CAA.

The rule also set forth attainment dates. For certain areas in Virginia, the maximum period for attainment began with the effective date of designations and classifications for the 8-hour standard and was defined as the same periods as provided in Table 1 of § 181(a) of the CAA. Compliance with the 1997 8-hour standard was required by June 15, 2010. Data for an entire summer are needed to determine compliance, therefore, the June 15, 2010, compliance date effectively required that any attainment plan demonstrate compliance with the 1997 ozone NAAQS during the summer of 2009.

Several states and environmental groups challenged the anti-backsliding provisions of the rule; in particular, EPA's treatment of New Source Review (NSR), § 185 penalties, contingency plans and motor vehicle conformity demonstrations. On December 22, 2006, the U.S. Court of Appeals for the D.C. Circuit Court ruled that EPA failed to heed the restrictions in the Clean Air Act when it promulgated the Phase One 8-hour ozone implementation rule. The court vacated the rule and remanded the matter to EPA. Currently the Commonwealth's emissions thresholds for triggering major NSR correspond to the requirements of the original Phase One rule and are set at levels associated with the 1997 8-hour ozone classification of moderate, 100 tpy of NO_x and 50 tpy of VOC. VDEQ is waiting for final revision of the Phase One rule to update these major stationary source NSR thresholds in the northern Virginia area. If EPA decides to require NSR thresholds equivalent to the 1-hour ozone classification, which for northern Virginia was severe nonattainment, these NSR thresholds may need to be reduced to 25 tpy of NO_x and 25 tpy of VOC. VDEQ is waiting for final rule revisions on the issue prior to the development of new NSR thresholds for the area.

3.1.1.1. 1997 Ozone NAAQS Implementation

EPA released the final Phase Two ozone implementation rule on November 9, 2005. This rule covered issues not addressed in the Phase One ozone implementation rule and described required content of the attainment plan state implementation plan (SIP) revision, including attainment demonstrations and modeling, NSR requirements, Reasonably Available Control Technology (RACT) determinations, Reasonably Available Control Measure (RACM) determinations, reasonable further progress, and reformulated gasoline requirements. Areas that are required to submit attainment demonstrations must

do so no later than three years after the effective date of designation for the 8-hour ozone standard. A state was not required to perform a NO_x RACT analysis if it was subject to CAIR and if it was planning to satisfy CAIR NO_x requirements solely through emissions reductions from electric generating units (EGUs). The final rule was published in the Federal Register on November 29, 2005 and became effective January 30, 2006. The Federal Court of Appeals for the D.C. Circuit has now vacated CAIR, and it is unclear at this point what additional attainment demonstrations may be required of states subject to CAIR.

3.1.1.2. Early Action Compacts

As part of the implementation of the 1997 NAAQS for ozone, EPA created an ozone Early Action Compact (EAC) program. This program allowed areas to reduce ozone precursor pollutants and improve local air quality in a proactive manner. Additionally, air quality improvements were realized sooner so that citizens enjoyed improved air quality in a timelier manner. This program was available to areas where air quality was only marginally in the unhealthy range and had monitoring data showing values of no more than 87 ppb of ozone.

Two areas in Virginia (Roanoke and Winchester) submitted voluntary 8-hour EAC's to EPA by December 31, 2002. These compacts contained enforceable measures and milestones. In exchange, EPA deferred the effective date of a nonattainment designation as long as all the terms and the milestones in the compacts were met. The voluntary EAC's instituted a wide range of control programs, both voluntary and mandatory. Programs are wide ranging and include public incentives to reduce individual impacts to air quality, programs to reduce locomotive idling emissions, mandatory restrictions by jurisdictions on Air Quality Action Days (see paragraph 3.1.5), and control of emissions via RACT at certain large industries within the area.

On December 17, 2008, VDEQ submitted final reports to EPA on these compacts, including monitoring data from the years 2005 through 2007. These data demonstrated significant air quality improvement in both areas. On April 2, 2008, EPA finalized the status of these areas as attainment for the 1997 ozone NAAQS.

The EAC program was a highly successful program that improved air quality more rapidly than required by the Clean Air Act and allowed local areas more flexibility in achieving that improvement. In exchange for early emission reductions and early improvements in air quality, areas were spared the implementation of expensive control programs such as mobile source conformity budgets and nonattainment NSR permitting. VDEQ has encouraged EPA to implement another Early Action Compact program for the 2008 ozone NAAQS and to broaden the applicability of such a program so that more areas of the Commonwealth may benefit.

3.1.1.3. 1997 Ozone NAAQS Maintenance Areas

Improvements in air quality allowed the following areas to demonstrate compliance with the 1997 ozone NAAQS standard after these areas were originally designated as nonattainment: Richmond-Petersburg, Fredericksburg, the Shenandoah National Park, and Hampton Roads. When an area is redesignated from nonattainment to attainment, the attainment area is considered to be a maintenance area, and the state is obligated to prepare a SIP that meets the requirements for 8-hour ozone maintenance areas. Using EPA guidance, the Commonwealth submitted redesignation requests, inventories, and maintenance plans for these areas to EPA, which were approved after review and public comment.

During the 2007 ozone season, a violation was registered at a monitor in Henrico County, part of the Richmond-Petersburg maintenance area. Based on data that has not yet been quality assured, this same monitor may also have registered a violation during the 2008 ozone season. The maintenance plan for the area, however, includes contingency measures to be implemented in the case of such an event. A regulatory action has been initiated in order to implement control strategies specified in the contingency measures for the Richmond-Petersburg area. These contingency measures include control strategies for mobile equipment repair and refinishing, architectural and industrial maintenance coatings, consumer products, and portable fuel containers.

Fredericksburg also registered a violation of the 1997 NAAQS for ozone in 2007. Contingency measures were implemented in that area as a result of the maintenance plan requirements and included controls on mobile equipment repair and refinishing, architectural and industrial maintenance coatings, consumer products, and portable fuel containers.

3.1.1.4. Submittal of 1997 NAAQS 8-hour Ozone Attainment Plan for Northern Virginia

The Northern Virginia area was designated by EPA as a moderate nonattainment area for the 1997 8-hour ozone standard, as part of the metropolitan Washington, D.C. nonattainment area. The metropolitan Washington, D.C. nonattainment area includes the city of Washington, D.C. as well as the Virginia counties of Fairfax, Prince William, Loudoun, and Arlington and the Virginia cities of Manassas, Manassas Park, Falls Church, Fairfax, and Alexandria. The southern Maryland portion of this nonattainment area includes the counties of Montgomery, Prince George's, Frederick, Charles, and Calvert. This tri-state area was required to submit an attainment plan for the 1997 8-hour ozone NAAQS. The plan was due to EPA on June 15, 2008, and was required to demonstrate compliance with the 1997 8-hour ozone NAAQS no later than June 15, 2010.

The purpose of this plan was to show the progress being made to improve air quality in the metropolitan Washington nonattainment area and the efforts underway to

assure that all necessary steps are taken to reach the 1997 federal health standard for ground level ozone by the summer of 2009. The plan was prepared in conjunction with the Metropolitan Washington Air Quality Committee (MWAQC), the lead planning organization certified by the Governors of Virginia and Maryland and the Mayor of Washington, D.C. to carry out air quality planning endeavors.

This plan was submitted to EPA on June 12, 2007, and included all elements as required by EPA guidance to ensure the approvability of the plan by EPA. In addition to establishing new mobile source budgets for both NO_x and VOC, the plan calls for the implementation of three new regulations in the area. These regulations will further limit air emissions from portable fuel containers and consumer products, and the regulations will implement new controls on air emissions from the use of industrial adhesives and sealants. This plan relied heavily upon the significant NO_x reductions achieved through the Virginia-specific regulation requiring the imposition of emissions caps on facilities subject to CAIR that were located within nonattainment areas. This plan also relied on the Maryland Healthy Air Act, which similarly capped the emissions of facilities subject to CAIR in southern Maryland. Following the vacatur of CAIR, VDEQ has requested further guidance from EPA on approaches for ensuring plan suitability. VDEQ, in conjunction with Washington, D.C. and Maryland air division personnel, also have been examining options to ensure the continued emissions reductions estimated for 2009 within the nonattainment area. Work in this area is on going.

3.1.2. 1997 PM_{2.5} NAAQS

Particulate matter, or PM, is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. Many manmade and natural sources emit PM directly or emit other pollutants that react in the atmosphere to form PM. These solid and liquid particles come in a wide range of sizes. Particles less than 10 micrometers in diameter (PM₁₀) pose a health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter (PM_{2.5}) are referred to as "fine" particles and are believed to pose the greatest health risks.

In 1997, after reviewing air quality criteria and standards, EPA established two new PM_{2.5} standards: an annual standard of 15.0 ug/m³ and a 24-hour standard of 65 ug/m³. A series of legal challenges to the 1997 PM_{2.5} NAAQS were not resolved until March 2002, at which time the standards and EPA's decision process were upheld.

On February 13, 2004, the Commonwealth submitted its initial recommendations on the designations of areas in Virginia under the 1997 PM_{2.5} NAAQS. The submittal explained that based on the most recent three years of fine particulate matter monitoring data from 2001 to 2003, all monitors within the Commonwealth of Virginia were measuring compliant PM_{2.5} concentrations. The submittal also noted that no short-term (24-hour) exceedances of the 65 ug/m³ standard had ever been recorded in the Commonwealth. Based on these monitoring data, the submittal recommended that the entire Commonwealth be designated attainment for the 1997 PM_{2.5} NAAQS.

On January 5, 2005, EPA published the final PM_{2.5} designations in the Federal Register (70 FR 944) with an effective date of April 5, 2005. The Virginia localities designated by EPA as nonattainment for PM_{2.5} were the northern Virginia counties of Fairfax, Loudon, Prince William, and Arlington as well as the cities of Fairfax, Manassas, Manassas Park, Falls Church, and Alexandria. EPA designated Northern Virginia nonattainment for the 1997 annual PM_{2.5} standard based on its findings that pollution was being transported to and contributing to nonattainment monitoring sites in the District of Columbia and Maryland.

3.1.2.1. 1997 PM_{2.5} NAAQS Implementation Rule

EPA released its proposed PM_{2.5} Implementation Rule on September 9, 2005. The proposed rule described the implementation framework that state and local governments were required to meet in developing 1997 PM_{2.5} NAAQS attainment SIPs. The proposal covered attainment demonstrations and modeling, RACM, RACT, EPA's policy on PM_{2.5} and precursors, and NSR requirements. The proposal required that direct PM_{2.5} and SO₂ emissions must be addressed in all nonattainment areas, and NO_x must be addressed unless EPA or the state determines that it is not a significant contributor in a specific area. VOCs and ammonia (NH₄) need only be addressed if the state or EPA demonstrates that either compound is a significant contributor.

On March 29, 2007, EPA released its final rule for implementing the PM_{2.5} standard. The final rule was published in the Federal Register on April 25, 2007. A number of state agencies expressed concerns over this rule. For example, on the issue of CAIR and RACT, the rule includes a presumption that for states satisfying their CAIR requirements entirely through emission reductions from EGUs, RACT and RACM requirements for SO₂ and NO_x would be satisfied for EGU sources covered by CAIR if existing selective catalytic reduction controls commence year-round operation in 2009. Therefore, power plants in CAIR states could comply with RACT and RACM by buying emission credits rather than installing controls. With respect to RACT thresholds, the final rule requires only that sources of PM_{2.5} and precursors be evaluated; there is no requirement – RACT threshold – that sources over a certain size install controls. Regarding condensable emissions, EPA did not finalize its proposal to require a comprehensive inclusion of condensable PM for all aspects of SIP development for PM_{2.5}. Instead, the agency has established a transition period for developing emissions limits and regulations for condensable PM_{2.5}. This rule does not include final PM_{2.5} requirements for the NSR program. The final PM_{2.5} requirements for the NSR program were published as a separate rule and are described in paragraph 3.2.1.

3.1.2.2. Submittal of 1997 NAAQS PM_{2.5} Plan

After the designation of the metropolitan Washington, D.C. area as a nonattainment area for the 1997 PM_{2.5} NAAQS, air quality in the region improved to the point that the area demonstrated compliance with the standards. This improvement in air quality allowed the metropolitan Washington, D.C. region significant flexibility when creating the necessary state implementation plan revisions to address the nonattainment designation.

Table 3.1.2.2-1: Annual PM_{2.5} Air Quality for 2001-2007 in Metro D.C.

| Time Frame | Design Value |
|------------|------------------------|
| 1999-2001 | 17.3 ug/m ³ |
| 2000-2002 | 17.1 ug/m ³ |
| 2001-2003 | 15.8 ug/m ³ |
| 2002-2004 | 15.1 ug/m ³ |
| 2003-2005 | 14.6 ug/m ³ |
| 2004-2006 | 14.5 ug/m ³ |
| 2005-2007 | 14.3 ug/m ³ |

One approach that was examined was the submittal of a redesignation request and maintenance plan in place of an attainment plan. A redesignation request and maintenance plan would have required mobile source budgets, similar to an attainment plan. Other requirements of the attainment plan, however, would have been alleviated. Also, the area would have enjoyed the benefit of being redesignated to attainment/maintenance once the revision was approved by EPA. Unfortunately, significant controversy existed over this approach between the tri-state partners. Both D.C. and Maryland staffs were concerned that such an approach may undermine their legal efforts to have the annual standard strengthened from 15.0 ug/m³ to 13-14 ug/m³ in the 2006 standard (see paragraph 3.1.3). Local elected officials from within the northern Virginia area also felt that such an approach may compromise efforts to control pollution from utilities. After much consideration, the MWAQC decided against submitting a redesignation request and maintenance plan.

Accordingly, VDEQ, in partnership with MWAQC, developed an attainment plan for the area, along with associated required base year inventories. As required, this plan was submitted to EPA by April 5, 2008.

This attainment plan contained annual mobile source budgets for direct emissions of PM_{2.5} and NO_x for 2009. This plan marks the first time transportation planners developed annual mobile budgets for use in conformity tests. The plan also established a 2010 mobile source emissions budget for NO_x to aid with contingency requirements in the attainment plan. The plan, however, does not establish an SO₂ mobile source budget. The implementation rule for PM_{2.5} required that SO₂ be examined and analyzed as a significant pollutant for control purposes within PM_{2.5} attainment plans, but the guidance allows the option for a region to analyze the significance of mobile source SO₂ emissions to the PM_{2.5} air quality problem. The MWAQC developed a step-by-step analysis methodology to determine the significance of mobile source SO₂ emissions and came to the conclusion that an SO₂ mobile source budget was not needed to either attain the 1997 PM_{2.5} NAAQS or to maintain compliance with the 1997 PM_{2.5} NAAQS in the future. Therefore, this attainment plan does not contain a mobile source SO₂ budget.

3.1.3. 2006 NAAQS for PM_{2.5}

On December 21, 2005, EPA issued its proposal for revising the PM_{2.5} NAAQS to change the daily standard for PM_{2.5} and create a new indicator for the coarse fraction of PM. EPA proposed to lower the daily PM_{2.5} standard to 35 μm^3 from the 1997 standard of 65 μm^3 and retain the existing annual standard of 15.0 μm^3 . EPA also proposed a new indicator for coarse particles that covers particles between 10 and 2.5 micrometers in diameter: PM_{10-2.5}. Under the proposal, coarse particles are defined to exclude particles from sources such as windblown dust and soils, agricultural sources and mining sources, and to include coarse particles that come from sources such as high-density traffic on paved roads, industrial sources and construction activities. The proposed PM_{10-2.5} standard would be a 24-hour standard set at 70 μm^3 . The annual PM₁₀ standard would be revoked completely. In a separate staff paper, EPA staff recommended two options for the PM_{2.5} standard: 1) retaining the 15 $\mu\text{g}/\text{m}^3$ annual standard and lowering the daily standard to between 25 and 35 μm^3 or 2) lowering the annual standard to between 12 and 14 $\mu\text{g}/\text{m}^3$ and lowering the daily standard to between 30 and 40 $\mu\text{g}/\text{m}^3$. EPA's Clean Air Scientists Advisory Committee (CASAC) recommended an annual average standard between 13 and 14 $\mu\text{g}/\text{m}^3$ combined with a daily PM_{2.5} standard between 30 and 35 $\mu\text{g}/\text{m}^3$.

In early 2006, EPA released an interim Regulatory Impact Analysis (RIA) that focused on the costs and benefits of attaining the standard by 2015 in five localities. The RIA concluded that if EPA were to adopt the more stringent annual and daily alternatives (14 $\mu\text{g}/\text{m}^3$ annual and 30 $\mu\text{g}/\text{m}^3$ daily), additional regional reductions would be necessary.

On September 22, 2006, EPA announced the agency's final decision regarding revisions to the PM NAAQS. The agency 1) revised EPA's previous daily PM_{2.5} standard from 65 $\mu\text{g}/\text{m}^3$ to 35 $\mu\text{g}/\text{m}^3$, 2) retained the current PM_{2.5} annual standard of 15 $\mu\text{g}/\text{m}^3$, 3) retained the existing daily PM₁₀ standard of 150 $\mu\text{g}/\text{m}^3$, 4) rescinded the annual PM₁₀ standard and 5) rescinded the PM_{10-2.5} standard. The implementation schedule for the 2006 PM_{2.5} standards is as follows:

- December 2007: state recommendations for attainment and nonattainment designations due to EPA.
- December 2008: EPA to publish final designations
- December 2011: SIPs are due three years after designation
- 2015-2020: States must attain the standards.

In October 2007, EPA completed its RIA for the 2006 PM_{2.5} NAAQS. Consistent with CAA prohibitions, EPA did not consider costs in setting the NAAQS. The RIA, however, examined the benefits and costs associated with reducing fine particle pollution. The analysis showed that the benefits associated with revisions to the PM_{2.5} standard clearly outweighed the costs. EPA estimated that the revised standards will yield \$9 billion to \$76 billion a year in health and visibility benefits in 2020. Health benefits included

reductions in premature death, diseases and symptoms associated with exposure to fine particle pollution.

On December 15, 2006, several environmental and agriculture groups filed challenges to EPA's decision to revise the PM_{2.5} NAAQS. Earthjustice filed a challenge on behalf of the American Lung Association, Environmental Defense, the National Parks Conservation Association, and Natural Resources Defense Council. The American Farm Bureau and National Pork Producers Council also filed a petition for review, focusing on coverage of agricultural dust. Thirteen states, the District of Columbia and the South Coast Air Quality Management District filed suit in the U.S. Court of Appeals for the D.C. Circuit to challenge the revision to the PM_{2.5} NAAQS. They alleged that EPA failed to set a standard protective of public health. Several industry groups also filed petitions separately seeking court review of the PM_{2.5} NAAQS.

EPA issued guidance for states and localities to use in designating areas that attain or do not attain the revised 2006 24-hour standard for PM_{2.5} on June 11, 2007. Designation recommendations were to be based on 2004-2006 data and submitted by December 18, 2007. EPA intends to complete final designations by December 18, 2008, though if insufficient information is available at that time for an area, the final designation date may be extended to December 18, 2009. The guidance also addressed factors to use in determining the boundaries of nonattainment areas.

On December 17, 2007, Virginia submitted to the EPA Regional Administrator a letter requesting that all areas in the Commonwealth be designated attainment for the 2006 PM_{2.5} NAAQS. This request was based on data from monitors showing all sites in Virginia measuring values beneath the 2006 PM_{2.5} NAAQS levels. Also provided were future year modeling results further supporting the request for an attainment designation and inventory data demonstrating expected reductions in PM_{2.5} precursors in the coming years. In an August 18, 2008, letter to Governor Kaine, EPA agreed that the entire Commonwealth is currently attaining the 2006 PM_{2.5} NAAQS. Final designations are expected to be published in the Federal Register in December of 2008.

3.1.4. 2008 NAAQS for Ozone

On January 31, 2007, EPA released its final staff paper reviewing the ozone NAAQS. The staff paper called for a lowering of the primary standard within the range of somewhat below 0.080 ppm to 0.060 ppm and concluded that the overall body of evidence on ozone health effects may call into question the adequacy of the current standard. On October 24, 2006, the Clean Air Scientists Advisory Committee (CASAC) told EPA that there was no scientific justification for keeping the primary standard at 0.08 ppm and recommended a range of 0.060 to 0.070 ppm. With respect to the secondary standard, EPA staff agreed with CASAC's recommendation to use a cumulative seasonal standard. EPA also released the final Human Exposure Analysis and the Health Risk Assessment and Technical Report on Ozone Exposure, Risk and Impact Assessments for Vegetation.

EPA proposed, on June 20, 2007, to strengthen the 8-hour ozone standard, recommending a range for the primary standard between 0.070 and 0.075 ppm. At the same time, the agency requested comments on alternative levels of the standard, including retention of the current standard (0.08 ppm). On March 12, 2008, EPA revised both the primary and the secondary NAAQS for ozone to 0.075 ppm. To attain the 1997 standard of 0.08 ppm, monitors needed to record data no higher than 0.084 ppm on an 8-hour average due to the rounding conventions used by EPA. Therefore, the 0.075 ppm standard, as measured over an 8-hour average, represents a considerable strengthening of the standard.

EPA estimated that the 2008 ozone NAAQS will yield health benefits valued between \$2 billion and \$17 billion across the United States. Those benefits include preventing cases of bronchitis, aggravated asthma, hospital and emergency room visits, nonfatal heart attacks, and premature death. In creating the new standard, EPA evaluated more than 1,700 new scientific studies and concluded that ozone causes adverse health effects at the level of the 1997 standard (0.08 ppm) and below. Additionally, new scientific evidence demonstrates that repeated exposure to ozone damages sensitive vegetation and trees, including those in forests and parks. Such damage may lead to reduced growth and productivity, increased susceptibility to diseases and pests, and damaged foliage.

The Commonwealth of Virginia must make recommendations to EPA no later than March of 2009 for areas to be designated attainment, nonattainment, or unclassifiable. VDEQ intends to work closely with both EPA Region III and the lead planning organizations across the Commonwealth to develop these recommendations. Current air quality data indicates that Richmond-Petersburg, Hampton Roads, Northern Virginia, Fredericksburg, and Caroline County exceed the 2008 8-hour ozone NAAQS. EPA will not publish designations until March of 2010, unless more information is needed. If the decision is made that more information is needed, the Clean Air Act does not require EPA to publish designations until March of 2011. If EPA decides to publish designations in 2011, the most likely years upon which the designations would be based are 2008, 2009, and 2010. Therefore, the air quality monitoring data for ozone will be especially important in those years.

As noted above, EPA must publish final designations no later than March 2011, and plans for areas not attaining the standard would be due no later than March 2013. Compliance dates for the standard will depend on the severity of the poor air quality within each nonattainment area and will begin in 2016.

3.1.5. Air Quality Index

On March 12, 2008, EPA revised the Air Quality Index (AQI), a color coded tool developed by EPA that is used for communicating daily air quality forecasts and conditions to the public. Code Orange (a category indicative of air quality unhealthy for sensitive groups) and Code Red (a category indicative of unhealthy air quality) are examples of frequently used terms from the AQI.

VDEQ provides air quality forecasts for a number of areas in the Commonwealth, including the metropolitan Richmond-Petersburg area, Hampton Roads, Fredericksburg, Roanoke, and metropolitan Washington DC. Air quality forecasts are used to inform the public of potential poor air quality days and to provide information to the public on actions they may take to help alleviate air pollution. These types of programs are referred to as Air Quality Action Day programs. See paragraph 4.5.

The March 12, 2008, revisions to the AQI reflect the 2008 NAAQS for ozone. As noted in paragraph 3.1.4, the revised ozone NAAQS lowered the standard from 0.08 ppm over an 8-hour average to 0.075 ppm over an 8-hour average, strengthening the standard considerably. Based on these changes, the breakpoints and colors for various AQI categories representing good, moderate, unhealthy for sensitive groups, and unhealthy air quality were updated as follows:

Table 3.1.5-1: Changes to the Air Quality Index

| Category | AQI Value | 1997 8-hour (ppm) | 2008 8-hour (ppm) |
|---------------------------------------|-----------|-------------------|-------------------|
| Good | 0-50 | 0.000-0.064 | 0.000-0.059 |
| Moderate | 51-100 | 0.065-0.084 | 0.060-0.075 |
| Unhealthy for Sensitive Groups | 101-150 | 0.085-0.104 | 0.076-0.095 |
| Unhealthy | 151-200 | 0.105-0.124 | 0.096-0.115 |
| Very Unhealthy | 201-300 | No Change | No Change |
| Hazardous | 401-500 | No Change | No Change |

VDEQ began using the updated AQI during the spring and summer of 2008. Information alerting citizens to the changes in the AQI was provided to the public via the email alerts used for the forecasting system as well as via the VDEQ internet site. Use of the new system has resulted in more Code Orange and Code Red days being forecasted during this summer, which has caused the episodic control programs to be triggered more frequently. The increased forecasting of Code Orange and Code Red days is not indicative of worsening air quality but rather is the result of tighter health-based standards and a concurrent update to the AQI structure.

3.1.6. Motor Vehicle Inspection and Maintenance Program (I/M)

Vehicle inspection and maintenance programs (I/M) help improve air quality by identifying high-emitting vehicles in need of repair (through visual inspection, emissions testing, and/or the downloading of fault codes from a vehicle's onboard computer) and causing them to be fixed as a prerequisite to vehicle registration within a given non-attainment area. The 1990 Amendments to the Clean Air Act made I/M mandatory for several areas across the country, based upon various criteria, such as air quality classification, population, and/or geographic location. Following passage of the 1990

CAA Amendments, Virginia has put forth considerable effort to develop and implement a motor vehicle inspection and maintenance program for the northern Virginia area. In 1995, the General Assembly passed legislation that specified both the type of inspection system (decentralized) and inspection equipment (Acceleration Simulation Mode or ASM) that would be used in the Northern Virginia program. In 1996, Congress and the EPA changed their requirements to allow a decentralized program as adopted by the General Assembly. VDEQ created a program that retains the convenience of having emissions inspections and repairs performed in the same stations, while upgrading the equipment to more accurately identify those vehicles which emit excessive pollutants when operating under roadway conditions.

With the help of service stations, repair garages, and auto dealerships, a program has been implemented that is a model for other states to follow. Acceptance by and support from the vehicle repair industry has been very good. This enhanced emissions inspection program provides significant air pollution reduction benefits in the Northern Virginia area.

In 2005, DEQ updated the program to allow for testing the on-board diagnostic (OBD) system on model year 1996 and newer vehicles. For these vehicles, OBD is more accurate in identifying emissions malfunctions than is the ASM test. OBD testing is also able to identify excess emissions from systems such as the fuel cap and the engine compartment as well as the tailpipe, providing better air quality benefit than tail pipe testing alone. All light duty vehicles 1996 and newer must be equipped with OBD systems according to federal law. The OBD system monitors key components of the vehicle's emission control system, records any diagnostic trouble codes, and warns the driver if there is a condition that could cause excess emissions. The information from the diagnostic trouble codes can be used by the repair technician to facilitate effective and efficient repairs. The CAA requires that each vehicle emissions inspection program monitor the OBD systems. Programs must fail vehicles if the OBD warning light is illuminated or if other malfunctions are detected. For most vehicles, the OBD test takes the place of a tailpipe test and thus greatly reduces the amount of time for an emissions test. VDEQ has now substituted the OBD test for the tailpipe test for most 1996 and newer vehicles. For program evaluation purposes, some vehicles may get both the OBD test and, for data collection only, the tailpipe test. In July of 2007 VDEQ began testing light-duty (i.e., up to 8,500 lbs gross vehicle weight rating) diesel vehicles of model year 1997 and newer using the OBD technology.

The Mobile Source Operations Section (MSOS) is part of the Northern Virginia Regional Office and monitors the performance of the various service stations, certified emissions repair facilities, and licensed emissions inspectors within the I/M program. In 2007, over 760,000 vehicles were inspected. MSOS personnel conducted nearly 2,500 separate audits during that time frame, including 177 covert audits of emission inspection facilities. MSOS routinely handles in excess of 11,000 calls per month from citizens, inspectors, repair technicians and others.



Figure 3.1.6-1: ORE equipment in operation at road side

As required by the CAA, each vehicle emissions inspection program must conduct remote sensing of vehicle emissions in the program area. In response to this requirement, the General Assembly passed legislation in 1996 to authorize VDEQ to perform remote sensing of vehicle emissions throughout the Northern Virginia area. A preliminary remote sensing study was undertaken in 1996 through 1997 to assess remote sensing technology. Additional legislation was adopted in 2002 to promote the remote sensing program and to authorize VDEQ to establish a repair subsidy program for low-income vehicle owners that fail the remote sensing test. A comprehensive pilot study was conducted in 2002 to obtain information

regarding the feasibility of such a program.

The later study indicated that vehicles subject to emission inspections are from 16 percent to 30 percent cleaner than those in other areas that are not subject to such inspections, a greater difference than was observed in the earlier study. The later study confirmed that out-of-state vehicles comprise about 15 percent of the fleet in Northern Virginia and that another 13 percent of the automobiles in the program area are registered in other areas of Virginia. Most of the out-of-state vehicles are subject to emission inspection programs in other states; the other Virginia vehicles (13 percent) could be subject to emission inspections in the new program if identified by remote sensing as regular commuters and gross polluters.

The study indicated that remote sensing had the potential to identify gross polluting vehicles and supported a program requiring that vehicles be repaired. The State Air Pollution Control Board adopted regulations to implement a remote sensing or on-road emissions (ORE) monitoring program to identify gross polluting vehicles and require out-of-cycle retesting and repair, if needed. A contractor was hired to provide remote sensing services beginning late 2004, and data procedures were coordinated with the Virginia Department of Motor Vehicles (DMV). Inspection station equipment software was updated to accommodate the ORE program in 2005.

In August of 2006 DEQ began implementation of ORE. Vehicles with very high emissions, as identified by remote sensing devices, are sent a Notice of Violation (NOV) and are required to take their vehicles to an inspection station for a confirmation test. If the vehicle fails the confirmation test, repairs must be made, and the vehicle must be retested. There is no inspection fee if the vehicle passes. Owners of vehicles observed by remote sensing to be exceptionally clean are notified that their vehicle has received a clean screen, which constitutes an emission inspection pass. At the same time VDEQ implemented procedures to provide repair assistance to low-income vehicle owners whose vehicles were found to be high emitters through remote sensing.

After two years of operation, the ORE program has identified over 350 vehicles as gross emitters and issued 335 clean screen passes. The gross emitters were repaired and passed an emissions test, taken off the road, or sold outside of the Northern Virginia program area. Moreover, analysis of the data indicates that the ORE standards can be made more stringent. VDEQ is working with the remote sensing contractor to tighten the standards to identify more high polluting vehicles. In addition, unmanned remote sensing units may soon be available, which would greatly increase the number of observations being recorded. Currently only about 10 percent of the Northern Virginia fleet are observed.

By 2010 about 90 percent of the vehicles in the fleet will receive an OBD test rather than the tailpipe tests. New technologies are emerging that provide more convenient testing options for OBD vehicles. These technologies can also be more effective in reducing emissions. The 10 percent of non-OBD vehicles, mostly pre-1996 models, however, will still contribute almost 50 percent of the VOC and 25 percent of the NO_x emission benefits from the program. VDEQ is currently involved in discussions with representatives of the over 450 emissions inspection stations about ways to continue operating the tailpipe testing program for pre-OBD vehicles while providing more convenient and cost-effective testing options for OBD vehicle owners.

3.1.7. Regional Haze

§ 169 A of the CAA mandates the protection of visibility in national parks, forests, and wilderness areas, referred to as Class I federal areas. Visibility impairment or haze is caused by absorption and scattering of light by fine particles, and regional haze is caused by sources and activities that emit fine particles and their precursors, such as NO_x, SO₂, VOC, and NH₃. In 1999, EPA finalized the Regional Haze Rule, calling for state, tribal, and federal agencies to work together to improve visibility in 156 national parks and wilderness areas. VDEQ is developing a SIP to address visibility impairment in the Commonwealth's Class I areas, the Shenandoah National Park and the James River Face.

This plan must establish goals and emission reduction strategies based on trends from various sources including point source emissions such as EGU's and other industrial operations, area source emissions, mobile source emissions, biogenic emissions, and wildfire and agriculture emissions. This plan must reduce visibility impairment such that the visibility in the Shenandoah and the James River Face will be returned to natural conditions by 2064. With the help of the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) regional planning organization (RPO), VDEQ has developed a draft SIP to address visibility impairment in these two Class I areas. The draft SIP addresses reasonable progress requirements of the CAA, long term strategies, and Best Available Retrofit Technology (BART) requirements for certain industrial facilities.



Figure 3.1.7-1: Expected Visibility Improvement between 2004 (left) and 2018 (right) in Shenandoah

The BART requirements of the Regional Haze Rule apply to facilities built between 1962 and 1977 that have the potential to emit of more than 250 tons a year of visibility-impairing pollution. Those facilities fall into 26 categories, including utility and industrial boilers, and large industrial plants such as pulp mills, refineries, and smelters. Many of these facilities have not previously been subject to federal pollution control requirements.

Virginia has three (non-EGU) facilities subject to BART requirements: Georgia Pacific Big Island, Meadwestvaco Covington, Carmeuse Strasburg. Necessary permitting has been completed for Georgia Pacific-Big Island and resulted in approximately 1,000 tons of SO₂ emission reductions annually. Permits for Meadwestvaco and Carmeuse are in various stages of processing. For BART units that are also EGUs, the requirements for the CAIR rule (see paragraph 4.1) were deemed to be at least as stringent as BART. Therefore, the vacatur of CAIR, as described in paragraph 4.1, may require a different BART strategy for EGUs.

The Regional Haze SIP was due to EPA by December 17, 2007. Unexpected issues within the BART process, however, did not allow VDEQ to complete BART requirements and submit the document in a timely manner. Additionally, the vacatur of the CAIR rule has called into question several analyses within the Regional Haze SIP, including reasonable progress analyses, future year emissions inventories, and BART analyses for EGUs. VDEQ is working with EPA and VISTAS to resolve these very significant issues.

3.2. Air Permitting

VDEQ issues two basic types of air permits: construction permits and operating permits. Construction permits or NSR permits apply to new facilities as well as existing facilities that are undergoing an expansion or modification. Operating permits apply to sources that are already in operation.

VDEQ currently has three construction permit programs for criteria pollutants. The Prevention of Significant Deterioration (PSD) program applies to major sources that are located in an area that is in attainment with the NAAQS. Sources are required to apply BACT as well as undergo a thorough air quality analysis demonstration (i.e. air modeling) to assure the new facility or major modification will not cause or contribute to a violation of the NAAQS or have an adverse impact on any Class 1 area. The second program is the non-attainment major NSR program that applies to major sources that are located in an area that is not in compliance with one or more NAAQS. A source in a non-attainment area has greater control requirements and must obtain offsets for the pollutant for which the area is not in attainment. The third program is the minor NSR program. This program applies to new sources or existing sources that are undergoing a modification and that are below major source emissions thresholds. This program is used more than any other in Virginia. During the 2008 fiscal year, 292 minor NSR permits were issued. Additionally, the minor NSR program is used to issue state major source permits, which apply to those sources greater than 100 tons per year of a criteria pollutant, but do not fit the criteria to be classified as PSD or nonattainment major NSR. There were 14 state major permits issued in Virginia in fiscal year 2008. Virginia also has a permit-by-rule or general permit for non-metallic mineral processors. If the source meets the necessary requirements, they may use the general permit process instead of the normal minor NSR process. Forty general permits were issued in Virginia during fiscal year 2008.

VDEQ issues two types of operating permits: state operating permits (SOPs) and federal operating permits that include Title V permits. SOPs are used primarily to cap a source's emissions to keep it out of a major source permitting program. SOPs are often used to place federally and state enforceable limits on hazardous air pollutants (HAPs) to keep a source out of the federal HAP program. The federal HAP program generally requires the use of maximum achievable control technology (MACT) standards. A source may request a SOP at any time. Additionally, the State Air Pollution Control Board has the authority to issue a SOP if such a permit is deemed necessary due to a modeled or actual exceedence of a NAAQS or to meet a Clean Air Act requirement such as a SIP requirement. There were 60 SOPs issued during fiscal year 2008.

The Title V permit program applies to sources that meet the criteria for "major" under Title V of the 1990 Clean Air Act Amendments. Unlike all other air permit programs, Title V permits have an expiration date. Title V permits are required to be renewed every five years. The purpose of a Title V permit is to compile all requirements from a source's multiple air permits (NSR and operating) into one permit document. The Title V permit does not place any new substantive requirements on a source, but combines all the existing requirements. A newly constructed source that is large enough to qualify as a Title V source must apply for a Title V permit within one year of starting operation.

Acid Rain permits are also considered federal operating permits. These permits are issued to sources that are applicable to the federal acid rain program (CAA Title IV). There were 64 federal operating permits (Title V and Title IV) issued in during fiscal year 2008.

3.2.1. NSR Guidance for PM_{2.5}

On May 8, 2008, EPA issued final rules governing the implementation of the NSR permitting programs for PM_{2.5}. This rule finalized several NSR program requirements for sources that emit PM_{2.5} and PM_{2.5} precursor pollutants. The rule requires NSR permits to address directly emitted PM_{2.5} as well as pollutants responsible for secondary formation of PM_{2.5} such as SO₂ and NO_x. This rule does not initially require states to account in PSD or nonattainment NSR permits for the condensable portion of PM_{2.5}, which are gases that could condense to form particles well after being emitted from the stack or process. After January 1, 2011, condensables must be considered in such permits. This transition period allows EPA to conduct a collaborative validation of test methods used to measure emissions of these particles.

The rule defined the threshold for major sources for the PM_{2.5} PSD NSR program at 100 tpy of PM_{2.5} if the facility is included among one of the specific 28 source categories listed in the current federal PSD requirements or emits 250 tpy of PM_{2.5} for other source categories. For the nonattainment NSR provisions, the major source threshold is defined as 100 tpy or more of PM_{2.5}. The rule also specified significant emissions rates and requirements for inter-pollutant offset trading. VDEQ is in the process of drafting a SIP revision to update the Commonwealth's regulations with these new requirements.

A related rule, proposed on September 21, 2007, established draft increments, significant impact levels, and significant monitoring concentrations for the PSD program. The final rule establishing these thresholds, however, has not been published.

3.2.2. Significant Permitting Actions

Three permit actions in 2008 will have significant environmental impact. The Dominion Virginia City Hybrid Energy Center (VCHEC), located in Wise County, received two permits on June 30, 2008. The first permit was a PSD permit and the second permit was a § 112(g) – Case-by-Case MACT permit. The Mirant Potomac River Generating Plant in Alexandria was issued a SOP on July 31, 2008.

The Dominion VCHEC PSD permit established BACT for all criteria pollutants. This permit is one of, if not the most, stringent permit issued to a coal-fired EGU in Virginia and the United States. The following table lists the difference between what the potential to emit would be for VCHEC if it were allowed to run uncontrolled at maximum capacity for 8,760 hours a year versus what the facility's PSD permit limits allow. The difference in the two values is often referred to as "avoided emissions".

Table 3.2.2-1: Avoided Emissions from the VCHEC

| Pollutant | PTE (tpy) | PSD Permit Limit (tpy) | Difference (tpy) |
|-----------------|-----------|------------------------|------------------|
| SO ₂ | 105,777 | 603.6 | 105,173.4 |
| NO _x | 8,814.75 | 1,920.54 | 6,894.21 |
| CO | 31,733.1 | 2,743.63 | 28,989.47 |
| PM | 29,970.15 | 246.92 | 29723.23 |
| PM-10 | 63,818.79 | 329.24 | 63,489.55 |

Another unique feature about the VCHEC PSD permit is that air quality analysis modeling was conducted on a regional basis for PM_{2.5} to ensure the PM_{2.5} NAAQS would not be exceeded. The permit also has a condition that requires the source to establish an independent PM_{2.5} permit limit once the source is operating and stack testing can be conducted to determine an appropriate emission limit.

The Dominion VCHEC § 112(g) Case-by-Case MACT permit was the first such permit issued for an EGU, in the United States, following the vacatur of CAMR (see paragraph 4.2). After the D.C. Circuit Court of Appeals vacated CAMR, new EGUs were required to conduct an analysis based on § 112(g) of the CAA to establish limits for the HAPs that would be emitted. This analysis requires that the lowest limit being achieved in practice by a similar source for all HAPs must be met by the proposed source. The main HAP of concern is mercury, and the VCHEC permit established a limit of 0.09 lb/trillion BTU. This limitation is the lowest limit that has been established in an EGU permit to date. As a result of this permit, new EGUs requesting permits will be required to establish limits as low as those in the VCHEC permit.

The third major permit action in 2008 was the SOP issued to the Mirant Potomac River Generating Station in Alexandria. This permit went through a very lengthy process with multiple public comment periods, public meetings, and public hearings. In 2002, the Mirant plant was emitting in excess of 15,000 tpy of SO₂. The Mirant SOP limits the amount of SO₂ that can be emitted to 3,813 tpy. The permit also was the first permit in Virginia to require a PM_{2.5} limit.

These precedent-setting permits involved significant time and effort to produce, and all three were thoroughly vetted through the public process.

3.3. Air Compliance Activities

The goal of the compliance program is to have every facility in the Commonwealth operating in compliance with applicable state and federal regulations and statutes. Unfortunately, achieving 100 percent compliance is often difficult to accomplish. The secondary goal of the compliance program is to provide the necessary compliance and enforcement assistance to facilities that fall short of full compliance to help afford them the opportunity to operate within the boundaries of all applicable regulations while conducting

business in Virginia. This ensures that the agency's mission to protect the environment and human health is achieved.

The primary objective of the Air Compliance Program is to ensure Virginia industries comply with all applicable state and federal regulations while operating in a manner consistent with minimizing their environmental impact and protecting the human health of all who work, play, go to school, and live in Virginia. The compliance program operates in a manner consistent with EPA's National Compliance Monitoring Strategy (CMS) to ensure the largest potential emitters of air pollution in Virginia are targeted for a full compliance evaluation biannually. A full compliance evaluation consists of a comprehensive evaluation of all aspects of the facility related to pollutant emissions, including the examination of throughputs, recordkeeping, testing, and reporting documents to determine the facility's compliance status. The compliance status of Virginia's regulated facilities is promptly reported to EPA and is publicly available on EPA's Environmental Compliance and History Online (ECHO) website. The compliance program also implements Virginia's own program initiatives under the recently developed and implemented Risk Based Inspection Strategy (RBIS) and Virginia Productivity Measures (VPS).

The RBIS identifies facilities for full compliance evaluation inspections that are not a focus of the national CMS strategy. The RBIS also may be utilized to increase inspection frequency where needed. Alternatively, the RBIS may be utilized to justify a reduction in the inspection frequencies of those facilities that have demonstrated a history of strong environmental stewardship and awareness in their programs. Determinations of increased or decreased inspection frequencies are based on risk qualifiers in the RBIS such as environmental enhancement program participation, compliance history, facility type, environmental sensitivity, multi-media applicability, environmental justice concerns, and agency initiatives.

The VPM challenges the air compliance program to re-evaluate a percentage of facilities issued formal enforcement actions (i.e. warning letters and notices of violation) from the previous inspection cycle. This promotes the risk-based concept of inspection planning by assuring a certain percentage of facilities with poor compliance histories from the previous year will be re-inspected to verify their return to full compliance. This is an agency strategy, which is not a focus of the national CMS.

The compliance program works closely with the permitting program to reduce the amount of pollution generated. Virginia has 5,538 registered facilities operating within its borders, not including approximately 1,192 gasoline dispensing stage II vapor recovery facilities. EPA is currently requesting that VDEQ take delegation of up to 26 area source MACT regulations. These regulations apply control strategies to categories of sources that have small emissions but that have numerous sources, for instance coating operations and gasoline stations. If VDEQ accepted responsibility to inspect all 26 source category regulations, an additional 16,000 facilities would require inspections or some type of compliance assistance.

During the 2007 federal fiscal year, the air compliance program completed a total of 8,318 partial and full compliance inspection reports, conducted a total of 3,187 on-site inspections including complaint investigations, and observed 77 stack tests.

3.4. Greenhouse Gas Emissions Inventory

In order to assess the Commonwealth’s impact on climate change and the effectiveness for potential mitigation measures, VDEQ has developed an inventory and report of greenhouse gas (GHG) emissions for the Commonwealth of Virginia. This inventory covers the period 2000 to 2005. The inventory is based on energy consumption as well as other activities within the state, and the inventory projects future emissions through 2025. This inventory also facilitates the work of the Governor’s Commission on Climate Change to identify the actions necessary to meet the goal of reducing GHG emissions 30 percent by 2025 as set forth in the Virginia Energy Plan and Executive Order 59. The final draft inventory may be found at: <http://www.deq.virginia.gov/info/climatechange.html>.

4. Control Programs

As shown in Figure 4-1, emissions of VOC, NO_x, and SO₂ will decrease significantly from 2002 levels in the years 2009 and 2018, even though growth in both vehicle miles traveled and population continue throughout this time frame. These reductions are the result of several control programs being implemented at the federal level as well as programs being implemented in the Commonwealth. Some of these programs, and the legal and technical challenges they pose, are described in the following paragraphs.

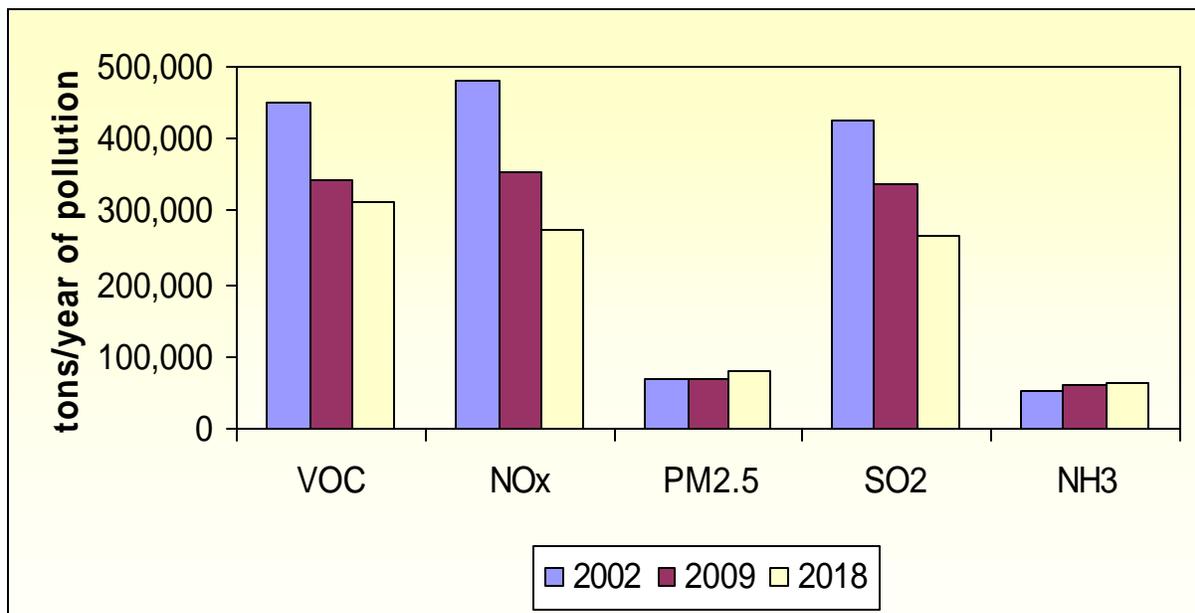


Figure 4-1: Anthropogenic emission estimates for the Commonwealth

4.1. Clean Air Interstate Rule

On May 12, 2005, EPA published the final CAIR rule (70 FR 25162), designed to reduce the interstate transport of SO₂ and NO_x from EGUs across the eastern portion of the United States via a cap-and-trade program. These reductions were necessary to help states and localities attain the 1997 8-hour ozone and the 1997 PM_{2.5} standards. CAIR covered 23 states and the District of Columbia for PM_{2.5} and 25 states and the District of Columbia for 8-hour ozone. Emissions of NO_x were capped at 2.5 million tons in 2009 and 1.3 million tons in 2015. Emissions of SO₂ were capped at 3.6 million tons in 2010 and 2.5 million tons in 2015. The program was designed to function as a trading program, where facilities could choose to comply through the addition of control technology or through the purchase of allowances.

The State Air Pollution Control Board adopted its final regulation to implement the federal CAIR program on December 6, 2006. The regulation became effective on April 18, 2007. The SIP revision (regulation and allocations) for the Virginia CAIR program was submitted to EPA on March 30, 2007. The final approval of this SIP submittal was published in the Federal Register on December 28, 2007 (72 FR 76302).

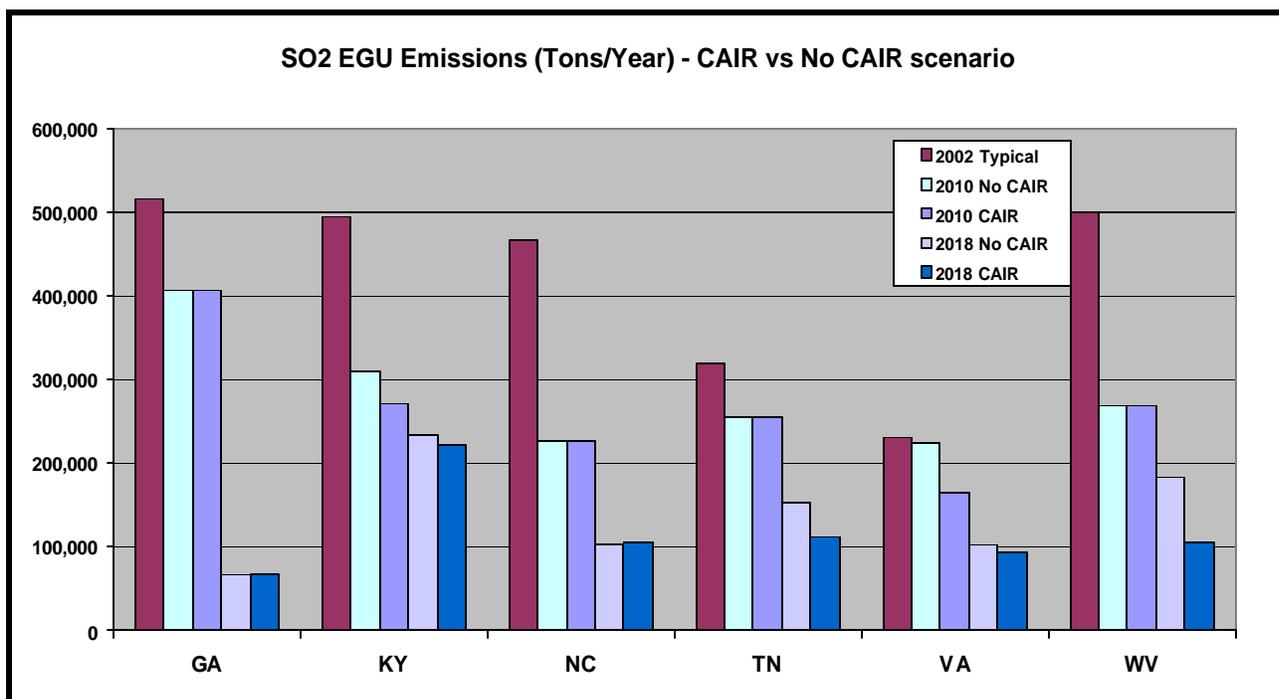


Figure 4.1-1: Estimates of SO₂ reductions provided by CAIR for Virginia and Surrounding States

On July 11, 2008, the U.S. Court of Appeals for the D.C. Circuit issued a decision vacating CAIR. The court vacated the rule in its entirety, remanding CAIR and its associated federal implementation plan to EPA to promulgate a new rule consistent with

the court's decision. In addition to identifying specific problems with the rule, the court questioned the appropriateness of the use of a regional cap-and-trade program as a mechanism for satisfying Clean Air Act requirements regarding interstate contribution to nonattainment where the program contains no state-specific, quantitative contribution determinations or emissions requirements.

The court noted that the NO_x SIP Call trading program will continue in the absence of CAIR, mitigating any disruption resulting from the vacatur with regard to NO_x. The court also emphasized that downwind states can still seek immediate relief from unlawful interstate pollution statutorily via CAA § 126 petitions.

In August of 2008, the Department of Justice (DOJ), on behalf of EPA, filed a petition with the appeals court seeking an extension of time for requesting either a panel rehearing or a rehearing *en banc* of the court's decision vacating CAIR. DOJ requested a 30-day extension – from August 25, 2008, until September 24, 2008. DOJ said the extension is necessary because of the complexity of the regulatory scheme involved, the need to review the impact of the Court's decision on the Clean Air Act programs administered by EPA and the States, and the need to consult with affected parties concerning the impact of the Court's vacatur of CAIR.

Many of the state implementation plan revisions recently submitted to EPA or that are in development stages relied heavily on the SO₂ and NO_x reductions expected from the CAIR program. VDEQ has been working closely with other states and the regional planning organizations to formulate plans for future SIP development.

4.2. Clean Air Mercury Rule

In March 2005, EPA delisted EGUs from § 112 of the Clean Air Act in what is often referred to as the "Delisting Rule". EPA then developed CAMR (70 FR 28606), a program to regulate mercury emissions from coal-fired EGUs under § 111 of the Clean Air Act. CAMR set emissions standards for new coal-fired EGUs and established a cap-and-trade program for mercury emissions from new and existing EGUs.

On February 8, 2008, the U.S. Circuit Court of Appeals for the District of Columbia vacated EPA's rules delisting EGUs from Clean Air Act § 112 (MACT standards) and regulating them under § 111. Sources regulated under § 112 may not be regulated for the same pollutants under § 111, therefore, the court also vacated CAMR. Both rules were vacated and remanded to EPA for reconsideration. Requests by EPA and electric utilities to the D.C. Circuit Court of Appeals for an *en banc* hearing were denied, and the court's vacatur of these rules remains in effect.

States were required to submit their state plans and mercury allocations to comply with CAMR by November 17, 2006. Many states, including Virginia, underwent extensive stakeholder processes and rulemaking to develop their programs. States have adopted a variety of programs to comply with the CAMR requirements, many of which are more stringent than EPA's rule.

The 2006 General Assembly passed legislation, Chapters 867 and 920, 2006 Acts of Assembly, requiring the State Air Pollution Control Board to adopt two regulations: a regulation adopting EPA’s model CAMR trading program and a state-specific mercury rule. The state-specific rule limited mercury emissions trading by Virginia’s largest EGUs and by sources located in nonattainment areas. The legislation also requires that an assessment of mercury deposition in Virginia be conducted, with a final report due in October 2008.

The State Air Pollution Control Board adopted its final regulation to implement the federal CAMR program on January 16, 2007. The regulation became effective on April 4, 2007. The § 111(d) plan submittal (legal authority, regulation, inventory and allocations) for the state CAMR program was made to EPA on May 8, 2007.

In August 2008, the DOJ filed a petition with the Supreme Court seeking a 30-day extension for filing a petition for a writ of *certiorari* to appeal the court decision vacating CAMR. DOJ requested a second extension and has until October 17, 2008, to file its writ with the Supreme Court.

4.3. Mobile Source Programs

As noted in charts 4.3-1 and 4.3-2, emissions of VOC, NO_x, SO₂, and PM_{2.5} from the mobile source sector in Virginia are expected to decrease significantly in future years. Mobile sources are generally pollution emitting activities that move by their own power,

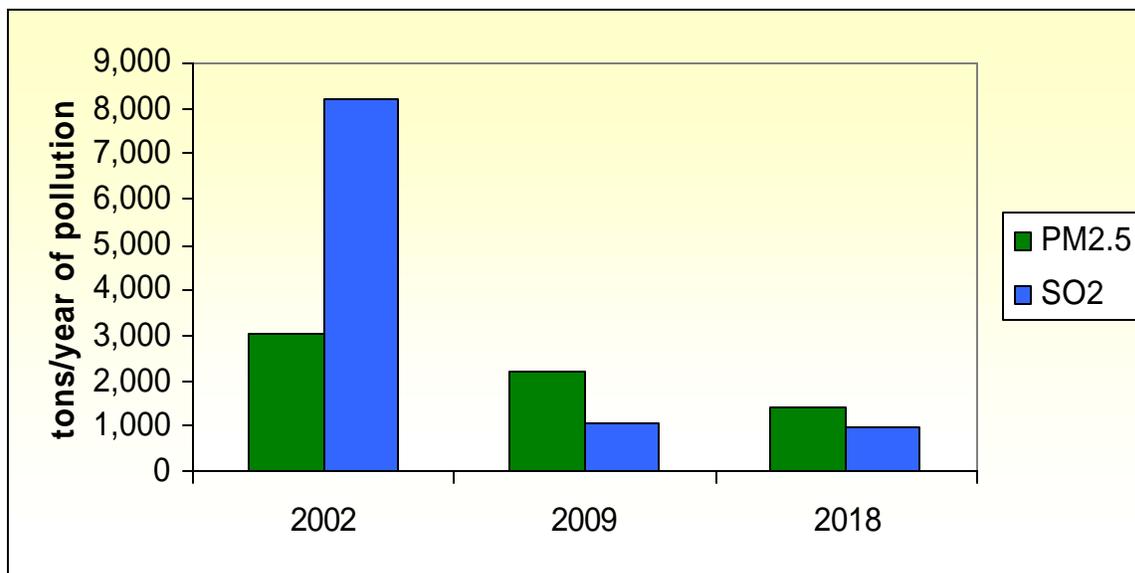


Figure 4.3-1: VOC and NO_x Emissions from Mobile Sources in the Commonwealth

such as cars and trucks, on public roadways. The main reasons for the expected decreases in this emissions sector are the federal regulatory programs described below.

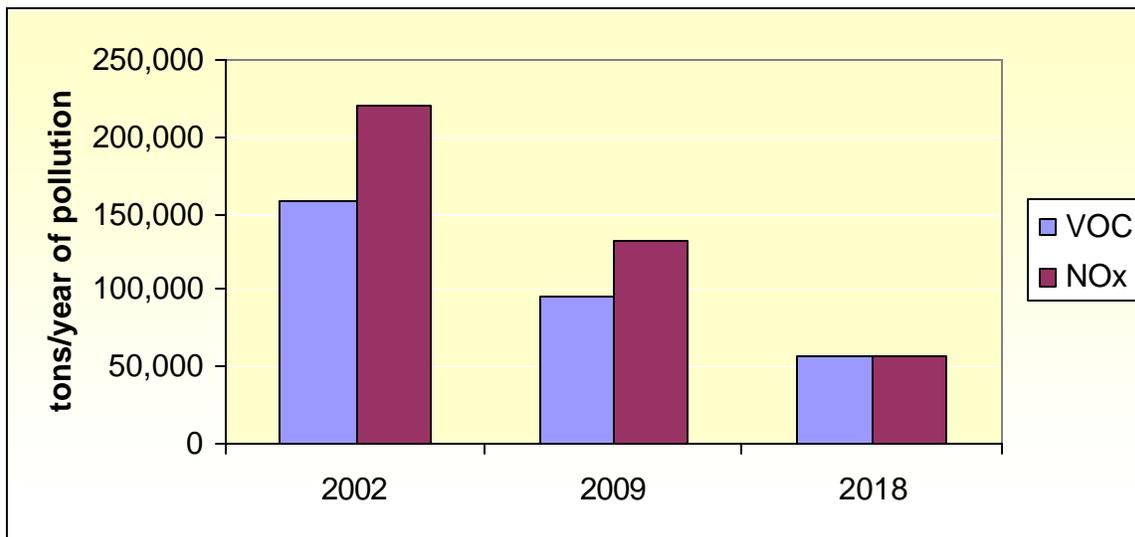


Figure 4.3-2: SO₂ and PM_{2.5} Emissions from Mobile Sources in the Commonwealth

4.3.1. Automobiles

The realized and expected reductions in emissions from automobiles are due to several federal and state programs that are now in place. In January 1998, Virginia opted in to the National Low Emission Vehicle (NLEV) program. NLEV was a voluntary program through which the automobile industry and many eastern states jointly agreed to adopt and implement more stringent automobile emissions standards beginning in the 1999 model year. The NLEV standards reduced the emissions of ozone forming emissions by more than 50 percent and applied to all vehicles up to 6000 pounds gross vehicle weight, which include about 70 percent of the SUVs and pickup trucks on the road today. These vehicles, many of which are still on the road, continue to emit less pollution than those not subject to the program.

In January 2000, EPA promulgated the Tier II vehicle emissions regulation, marking the first time that SUVs, other light-duty trucks, and the largest passenger vehicles were subject to the same national pollution standards as cars. The rule took effect in the 2004 model year and reduced ozone-forming emissions of VOC and NOx about 95 percent when compared to many earlier model vehicles. As older vehicles are scrapped and new vehicles are purchased, Tier II ensures an overall emissions reduction from vehicles in the Commonwealth's passenger fleet.

Tier II regulations also require that gasoline be manufactured with much lower levels of sulfur. Beginning in 2004, refiners and importers of gasoline had the flexibility to manufacture gasoline with a range of sulfur levels as long as all production was capped at

300 ppm sulfur and the annual corporate average sulfur levels were no more than 120 ppm. In 2005, the refinery average was set at 30 ppm, with a corporate average of 90 ppm, and a maximum cap of 300 ppm. Finally in 2006, refiners met a 30 ppm average sulfur level with a maximum cap of 80 ppm. Reduced sulfur in gasoline allowed better catalytic converter operations and also greatly reduced the amount of SO₂ formed by automobiles.

4.3.2. Heavy Duty Diesel On-Road Engines

The Heavy-Duty Diesel Engine Rule required that truck manufacturers comply with stringent tail pipe standards by 2004 and 2007. New engines purchased after 2007 or later must be equipped with state of the art emissions controls for pollutants like NO_x, VOC, and PM_{2.5}. Similar to the Tier II regulation for passenger vehicles, the diesel rule also required the sulfur level in diesel fuel to be reduced about 97 percent to a level of 15 ppm sulfur so that state of the art control technologies could be installed on new engines. These new diesel engine standards will reduce the emissions of particulate matter and nitrogen oxides by about 90 percent compared to pre-2007 diesel engines. As older engines are taken out of the fleet and new trucks purchased, the fleet emissions will continue to decrease even though vehicle miles traveled are expected to increase.

4.4. Product Based Programs

A variety of both state and federal control programs are being implemented that are reducing emissions from product-based categories. These types of controls reduce emissions from activities such as the use of portable fuel containers; the coating of architectural supports and traffic markings; the use of personal products such as deodorant and hair spray; and the use of household products such as cleaners and pesticides. These types of controls have been implemented in the northern Virginia area and have been expanded to the Fredericksburg area. Currently, these regulations are under consideration for use as contingency measures within the Richmond-Petersburg area. These regulations generally target VOC emissions but can also help decrease public exposure to harmful chemicals.

While some programs are already in place and providing benefit, other programs such as the national portable fuel container standards have later compliance dates. These programs will continue to provide reductions in emissions into the future from product based emissions categories.

4.5. Non-Road Control Programs

Non-road equipment consists of devices with an engine where the power from the engine is generally not used to move the equipment along roadways. Examples of these types of engines are lawn mowers, weed eaters, diesel generator sets, gasoline generator sets, marine engines, and locomotive engines.

Federal regulations have been finalized that control emissions of various pollutants from all these categories. Most of these regulations have phase-in periods, where

standards are more stringent for equipment manufactured in later years. Final standards are quite stringent and result in between 60 percent and 90 percent reduction in air pollutants. Additionally, air pollution benefits are related to the purchase of new equipment, thus the benefits to air quality continue until the entire fleet of a type of equipment has been replaced.

In addition to engine standards, the non-road heavy duty diesel engine standards and the rail and marine vessel standards require the phase-in of much cleaner diesel fuel. Non-road engines must use diesel fuel with no more than 15 ppm sulfur beginning in 2010. Railroad and marine vessels must use diesel fuel with no more than 15 ppm sulfur beginning in 2012. The cleaner fuels will allow more efficient engine operation, will facilitate the use of state of the art emissions controls on new units, and will directly result in greatly reduced SO₂ emissions from such equipment.

4.6. Voluntary and Episodic Control Programs

Virginia has numerous voluntary programs designed to promote environmental stewardship. VDEQ provides daily predictions for many areas of the Commonwealth by forecasting air quality. This information is used to encourage the citizenry to behave differently. Large companies, small businesses, institutions, and private citizens are all encouraged to participate in keeping the air clean. Such voluntary measures can help Virginia avoid activities mandated by the federal government. For example, Virginians have adjusted their routines on the hot summer days that help raise ozone levels. Citizens have reduced unnecessary driving, lawn mowing, and other activities on extremely hot, still, sunny, summer days when weather conditions make unhealthy ozone levels possible.

State agencies such as VDOT also participate. In the Richmond-Petersburg area, VDOT shuts down fueling pumps on predicted poor air quality days at stations lacking air pollution control equipment.

Commercial gas stations in Roanoke offer incentives to motorists to fuel up in early morning or late evening hours on predicted poor air quality days. The Roanoke area and the northern Virginia area have programs that allow free or reduced rate transit trips on predicted poor air quality days.

Localities within the Northern Virginia jurisdictions have been very proactive about implementing voluntary reduction programs. Fairfax County has retrofitted its entire school bus and other heavy duty diesel equipment fleet with pollution control devices designed to reduce nitrogen oxides and volatile organic compounds. These devices have the added benefit of reducing children's exposure to air toxic emissions when aboard school buses. Loudoun County undertook a similar school bus program, and both Arlington and Alexandria are currently engaged in retrofitting school buses with air pollution control devices. Fairfax County and Arlington County purchased wind power to supply a portion of each county's electrical needs, helping to reduce emissions from power generation and also helping to reduce dependence on fossil fuels. Several counties in the Northern Virginia area have committed to using very low VOC paints and coatings in the

maintenance of buildings and other county structures. All of these programs help to reduce the amount of pollution to which citizens are exposed each day.

APPENDIX A

Description of Air Quality Plans and Programs

STATE IMPLEMENTATION PLAN

Among the primary goals of the Clean Air Act (CAA) are the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS) and the prevention of significant deterioration (PSD) of air quality in areas cleaner than the NAAQS.

The NAAQS, developed and promulgated by the U.S. Environmental Protection Agency (EPA), establish the maximum limits of pollutants that are permitted in the outside ambient air. The CAA requires that each state submit a plan (called a State Implementation Plan or SIP), including any laws and regulations necessary to enforce the plan, showing how the air pollution concentrations will be reduced to levels at or below these standards (i.e. attainment). Once the pollution levels are within the standards, the plan must also demonstrate how the state will maintain the air pollution concentrations at the reduced levels (i.e., maintenance). The Virginia SIP was submitted to EPA in early 1972. More than 100 revisions (mostly regulation revisions) to the plan have been made since the original submittal in 1972. Generally, the plan is revised, as needed, based upon changes to the CAA and its requirements.

A state implementation plan is the key to the air quality programs. The CAA is specific concerning the elements required for an acceptable SIP. If a state does not prepare such a plan, or EPA does not approve a submitted plan, then EPA itself is empowered to take the necessary actions to attain and maintain the air quality standards - that is, it would have to promulgate and implement an air quality plan for that state. EPA is also, by law, given authority to impose sanctions in cases where there is no approved plan or the plan is not being implemented. The sanctions may include loss of federal funds for highways and other projects and/or more restrictive requirements for new industry.

The basic approach to developing a SIP is to examine air quality across the state, delineate areas where air quality needs improvement, determine the degree of improvement necessary, inventory the sources contributing to the problem, develop a control strategy to reduce emissions from contributing sources enough to bring about attainment of the air quality standards, implement the strategy, and take the steps necessary to ensure that the air quality standards are not violated in the future.

The heart of the SIP is the control strategy. The control strategy describes the emission reduction measures to be used by the state to attain and maintain the air quality standards. There are three basic types of measures: stationary source control measures, mobile source control measures, and transportation source control measures. Stationary source control measures are directed at limiting emissions primarily from commercial/industrial facilities and operations. Mobile source control measures are directed at limiting tail pipe and other emissions primarily from motor vehicles and include the following: Federal Motor Vehicle Emission Standards, fuel volatility limits, reformulated gasoline, emissions control system anti-tampering programs, and inspection and maintenance programs.

Transportation source control measures are directed at limiting the location and use of motor vehicles and include the following: carpools, special bus lanes, rapid transit systems, commuter park and ride lots, bicycle lanes, signal system improvements, and many others.

Most of Virginia's air regulations are designed to provide the means for implementing and enforcing SIP control measures (primarily stationary source and some mobile source) necessary to obtain emissions reductions. About 95 percent of Virginia's air regulations fall into this category and are, therefore, subject to EPA approval.

In addition, development and enforcement of regulations under the Virginia SIP must be continually pursued, as well as development of new plan revisions as federal laws and regulations change.

REGULATORY PROGRAMS

The state's air quality programs are developed in order to implement the provisions of the Virginia Air Pollution Control Law and to fulfill the Commonwealth's mandates under the federal CAA (originally enacted in 1970) to implement air quality programs required by the Act. The regulations are adopted in order to provide a legally enforceable means to implement air quality programs required by the CAA.

The basic approach and content of these two laws greatly influence agency program development. The state law provides the agency with latitude in developing the state air program and addresses the general development and processing of regulations. The federal law, however, differs sharply by laying out, often in explicit detail, the exact requirements for an air quality program. In cases where the law is not explicit, the accompanying federal regulations fill in the gap in even greater detail, in some cases, going as far as actually requiring states to adopt certain federal regulations verbatim. The chief influences on the Commonwealth's air quality programs are the federal law and the regulations drawn pursuant to it. For any air quality program to become acceptable under the CAA, it must be submitted to and approved by the EPA. Although the programs of the State Air Pollution Control Board are heavily influenced by federal legislation, it is state law that provides the legal basis for programs developed by the Board and VDEQ. Below is a summary of the basic programs established by the laws, both federal and state.

State Implementation Plan Regulatory Programs. The SIP is designed to attain and maintain the ambient air quality standards throughout the Commonwealth. The standards prescribe limits for six "criteria pollutants": carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur oxides. Regulations are one element of the plan and are included to provide a legal basis to restrict the emissions of air pollution from individual sources. The Board's SIP regulations may be divided into four general categories as follows:

Stationary Source Regulatory Program. Covers existing sources and requires compliance with emission standards based on emission limits achievable through the use of reasonably available control technology.

New and Modified Source Permit Program. Covers new facilities and expansions to existing ones and requires a permit be obtained prior to beginning construction of the new facility or the expansion to the existing one.

Motor Vehicle Emissions Control Programs. The emissions inspection program covers motor vehicles in the Northern Virginia area and requires compliance with tailpipe emission limits. Compliance is determined by a periodic inspection of the vehicle emissions.

Air Pollution Episode Prevention Program. Covers certain sources subject to the SIP regulatory program and requires the filing of plans to prescribe steps to be taken should air quality levels exceed the standards by a substantial amount.

Conformity Program. Establishes criteria and procedures for federal agencies to determine that federal non-transportation related actions or transportation plans and projects are in conformance with the SIP in the Northern Virginia, Richmond-Petersburg, Fredericksburg, and Hampton Roads areas.

Other Clean Air Act Regulatory Programs.

New Source Performance Standards (NSPS). Nationwide technology-based performance standards consisting of emission limits and other limitations to control certain pollutants from certain newly built plants and modifications to existing ones. Enforced by the state through delegation of authority from EPA and designed to provide a minimum level for consistency among the states in requirements for new industrial development.

National Emission Standards for Hazardous Air Pollutants (NESHAP). Nationwide health-based emission standards consisting of emission limits and other limitations to control certain pollutants from certain industry and other activities which emit hazardous air pollutants. Enforced by the state through delegation of authority from EPA and designed to provide a minimum level for consistency among the states.

Maximum Achievable Control Technology Standards (MACTs). Nationwide technology based emission standards consisting of emission limits and other limitations to control certain pollutants from certain industry and other activities which emit hazardous air pollutants. Enforced by the state through delegation of authority from EPA and designed to provide a minimum level for consistency among the states.

Designated Pollutant Plan Regulatory Program. Similar to a SIP but applies only to designated pollutants. These are pollutants for which a NSPS has been promulgated but

are not criteria pollutants or hazardous pollutants (NESHAP). Covers existing sources and requires compliance with emission standards based on emission limits achievable through the use of reasonably available control technology.

Operating Permit (Title V) Program. Covers major regulated industrial/commercial facilities and requires a renewable permit be obtained to operate the facility.

Acid Deposition Control Program. Designed to reduce sulfur dioxide and nitrogen oxide emissions from electric utilities by 10 million tons per year nationwide in two stages by the year 2000.

State-Only Regulatory Programs.

Toxic Pollutant Control Program. Provides for case-by-case source-specific assessment and establishment of control requirements after evaluation against threshold levels derived from occupational health and safety standards.

Medical Waste Incinerator Emissions Control program. Designed to limit emissions of dioxins/furans, particulate matter, carbon monoxide, and hydrogen chloride from regulated medical waste incinerators.

Odor Emissions Control Program. Provides a general standard for odor and a general approach to use in determining whether an odor is objectionable. The purpose is to require the source to take action to eliminate or reduce the odorous emissions if deemed to be objectionable to individuals of ordinary sensibility. However, unlike most other emission standards, there are no definitive requirements in the standard itself; the standard merely provides a mechanism for VDEQ, on a case-by-case basis, to require the owner to reduce emissions after investigation by VDEQ.

Open Burning Emissions Control Program. Limits or prohibits, in some instances, open burning and restricts emissions of particulates and volatile organic compounds during the peak ozone season to the level necessary for the protection of public health and welfare and provides guidance to local governments on the adoption of ordinances to regulate open burning.