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To: The Honorable Terence R. McAuliffe
Members of the General Assembly

From: David K. Paylor

Date: September 15, 2014

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

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In accordance with 10.1-1307.G of the *Code of Virginia*, the Department of Environmental Quality (DEQ), on behalf of the State Air Pollution Control Board, has completed its annual report on Air Quality and Air Pollution Control Policies of the Commonwealth of Virginia for 2014.

Overall Virginia's air quality continues to gradually improve and DEQ continues to take steps to improve air quality. Indeed, ambient concentrations of fine particulate matter, lead, carbon monoxide, nitrogen dioxide, and sulfur dioxide in Virginia were meeting all of the national ambient air quality standards during 2013. However, the air quality standards that the Commonwealth must attain are becoming increasingly stringent. In 2010, the U.S. Environmental Protection Agency published lower National Ambient Air Quality Standards (NAAQS) for sulfur dioxide (SO_2) and for nitrogen dioxide (NO_2). Both of these standards require new implementation and monitoring strategies as well as more stringent numerical ambient air quality standards.

This report is being made available on DEQ's website at http://www.deq.virginia.gov/LawsRegulations/ReportstotheGeneralAssembly.aspx.

If you have any questions concerning this report or if you would like a hard copy of this report, please contact Angie Jenkins, Policy Director, at (804) 698-4268.

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

A Report to the Honorable Terence R. McAuliffe, Governor and the General Assembly of Virginia

Virginia Department of Environmental Quality

October 2014

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Commonly Used Abbreviations

AQI	Air Quality Index
AQM	Office of Air Quality Monitoring
APA	Administrative Process Act
ASM	Acceleration Simulation Mode
BAC	Best Available Controls
BACT	Best Available Control Technology
BART	Best Available Retrofit Technology
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CASAC	Clean Air Scientists Advisory Committee
CH_4	Methane
CMS	Compliance Monitoring Strategy
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent Emissions
CPI	Consumer Price Index
CSAPR	Cross State Air Pollution Rule
CTG	Control Technique Guideline
DMV	Department of Motor Vehicles
DV	Deciviews, a metric of visibility
ECHO	Enforcement and Compliance History Online
EGU	Electric Generating Unit
ELRP	Emergency Load Response Program
EPA	Environmental Protection Agency
FCE	Full Compliance Evaluation
FOIA	Freedom of Information Act
FRM	Federal Reference Monitor
GHG	Greenhouse Gas
GVWR	Gross Vehicle Weight Rating
GWAQC	George Washington Air Quality Committee
HAP	Hazardous Air Pollutant
HPV	High Priority Violation
HRAQC	Hampton Roads Air Quality Committee
ICI	Industrial/commercial/institutional
I/M	Motor Vehicle Inspection and Maintenance Program
ISO	Independent Systems Operator
LAER	Lowest Achievable Emissions Rate
LPO	Lead Planning Organization
MACT	Maximum Achievable Control Technology
MANE-VU	Mid Atlantic/Northeast Visibility Union
MARAMA	Mid Atlantic Regional Air Management Association
MATS	Mercury and Air Toxics Standard
MOU	Memorandum of Understanding
MJO	Multi-jurisdictional planning organization
MMte	Million Metric Tons of CO_2 equivalent
MPO	Metropolitan Planning Organization
MSOS	Mobile Source Operations Section
MRAQC	Metropolitan Richmond Air Quality Committee
MW	Megawatt
MWAQC	Metropolitan Washington Air Quality Committee
NAAQS	National Ambient Air Quality Standard
NATA	National Air Toxic Assessments
NATTS	National Air Toxics Trend Site
NCore	National Core Monitoring Site
NH_3	Ammonia
NLEV	National Low Emission Vehicle Program
NO_2	Nitrogen Dioxide
NO_X	Oxides of Nitrogen
NOIRA	Notice of Intended Regulatory Action
NOV	Notice of Violation
NOX	Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
OBD	On-Board Diagnostics
OCS	Outer Continental Shelf
ORE	On-Road Emissions Program
ORVR	On Board Refueling Vapor Recovery
OTC	Ozone Transport Commission
OTR	Ozone Transport Region
Pb	Lead
PCE	Partial Compliance Evaluation
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter not more than 2.5 Angstroms in Diameter
PM_{10}	Particulate Matter no more than 10 Angstroms in Diameter
$PM_{10\text{-}2.5}$	Particulate matter with a diameter between 2.5 and 10 Angstroms
ppb	Parts per Billion
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
QFF	Qualification Fumigation Facilities
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RAP	Regulatory Advisory Process
RBIS	Risk Based Inspection System
RFG	Reformulated Gasoline
RFP	Reasonable Further Progress
RIA	Regulatory Impact Analysis
ROP	Rate of Progress
RPO	Regional Planning Organization
SACC	Significant Ambient Air Concentrations
SAPCB	State Air Pollution Control Board
SBA	Small Business Assistance
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SOP	State Operating Permit
SSI	Sewage Sludge Incinerator
STN	Speciated Trends Network
T&A	Timely and Appropriate
TPY	tons per year
TR	Transport Rule
UATM	Urban Air Toxics Monitoring network
ug/m^3	Micrograms per Cubic Meter
VDEQ	Virginia Department of Environmental Quality
VDH	Virginia Department of Health
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VOC	Volatile Organic Compounds
VPM	Virginia Productivity Measurements

1. Executive Summary

This report was prepared by the Virginia Department of Environmental Quality (VDEQ) on behalf of the State Air Pollution Control Board (SAPCB) 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 division programs, and briefly summarizes the federal and state air quality programs being implemented.

1.1. Air Quality in the Commonwealth

Air quality in Virginia continues to improve. Ambient concentrations of lead (Pb), fine particulate matter ($PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) in Virginia met EPA's National Ambient Air Quality Standards (NAAQS) in 2013. In 2010, the Environmental Protection Agency (EPA) published lower NAAQS for SO_2 and for NO_2. Both of these standards require new implementation and monitoring strategies as well as more stringent numerical ambient air quality standards. On April 30, 2012, the EPA Administrator notified VDEQ that all areas of the Commonwealth comply with the 2008 ozone NAAQS, with the exception of Northern Virginia. Northern Virginia was designated a marginal nonattainment area for this standard. On January 15, 2013, EPA published a new annual $PM_{2.5}$ standard of 12.0 $\mu g/m^3$. Air quality in all areas of the Commonwealth complies with this new standard. EPA is expected to propose a new ozone NAAQS by the end of 2014.

1.2. Air Quality Policies in the Commonwealth

On April 29, 2014, the United States Supreme Court reversed a lower court's vacatur of the Cross State Air Pollution Rule (CSAPR), and EPA has filed a motion to lift the stay of this rule. On September 20, 2013, EPA issued an updated proposal to reduce carbon pollution from new power plants, and on June 2, 2014, EPA issued a proposal to reduce carbon pollution from existing power plants. The resolution of these rules will impact air quality policies in the Commonwealth.

1.3. Summary of Annual Air Division Activities

Monitoring Locations:	39	On Site Inspections :	893
Monitoring Instruments:	126	Enforcement Actions:	246
Minor Source Permits Issued:	192	Vehicles Inspected:	868,281
PSD Permits Issued:	1	Vehicles Failed:	34,950
General Permits Issued:	27	Inspection Station Audits:	486
State Operating Permits Issued:	7	Covert Audits:	174
Federal Operating Permits Issued:	40	Consent Orders Issued:	19
Compliance Evaluations (all):	6,702	Civil Charges Collected:	$563,610

2. Status of Air Quality in the Commonwealth of Virginia

Ambient concentrations of $PM_{2.5}$, CO, NO_2, Pb, and SO_2 in Virginia met EPA's NAAQS in 2013. Air quality in the Northern Virginia region of the Commonwealth during the summer of 2013 did not comply with the 2008 ozone NAAQS.

2.1. Monitoring Network

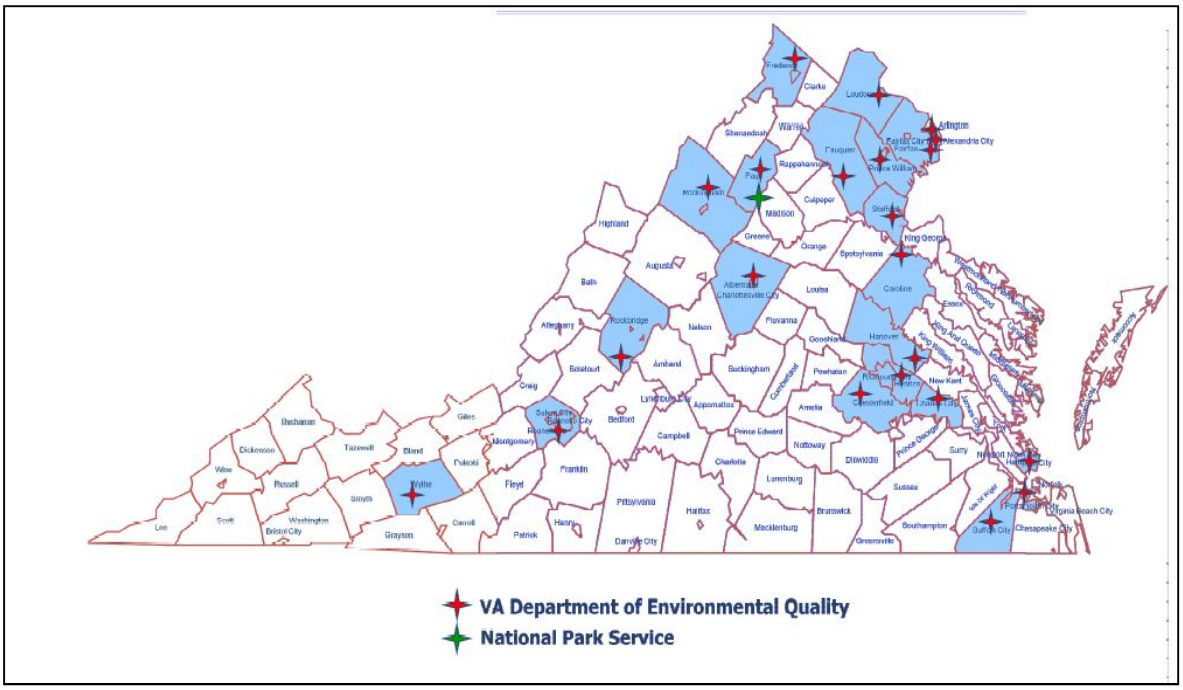


Figure 2-1: Virginia Ozone Monitoring Network

VDEQ's Office of Air Quality Monitoring (AQM) maintains an extensive air quality monitoring network throughout the Commonwealth. Approximately 126 instruments at 39 sites monitored ambient air quality across Virginia during 2013 - 2014. Figure 2-1 shows the various ozone monitoring sites in Virginia. All monitoring sites meet EPA's siting criteria (40 CFR Part 58, Appendices D and E), and all sites conform to EPA guidance documents and generally accepted air quality monitoring practices. AQM quality assures all data gathered from the Virginia air quality monitoring network in accordance with federal requirements (40 CFR Part 58, Appendix A). The data are published annually in the *Virginia Ambient Air Monitoring Data Report* and are available from the VDEQ website at http://www.deq.virginia.gov/Programs/Air/AirMonitoring/Publications.aspx.

2.1.1. Community Air Monitoring Study (Suffolk)

Pursuant to HB 1625 (2011), VDEQ is conducting an air monitoring study at fumigation sites to provide data to the Virginia Department of Health for its assessment of health impacts. VDEQ has formed a stakeholder group to help communicate the results of the study to the public.

VDEQ designed the study in cooperation with the Department of Health, and the Department of Agriculture and Consumer Services is assisting with the stakeholder process. The sampling and analysis program is ongoing with a scheduled completion date of October 1, 2015.

2.1.2. Near-Road Monitoring for NO_2

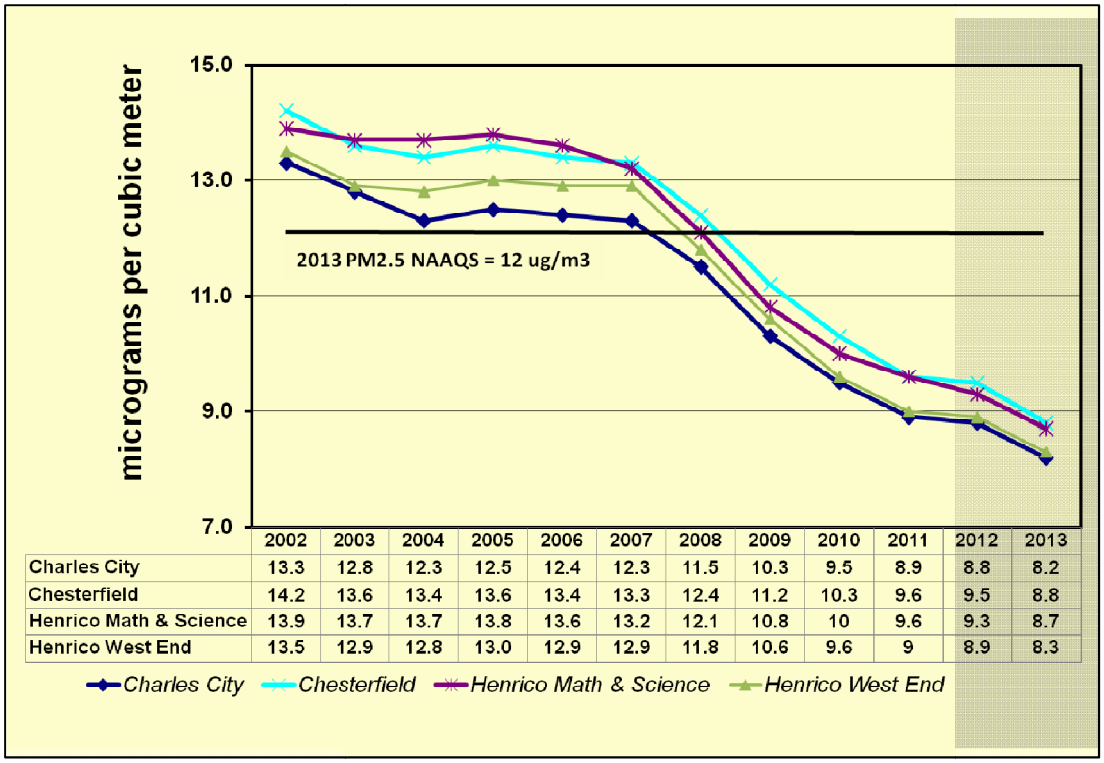
In February 2010 EPA promulgated a new ambient air quality standard for NO_2. This standard included a new requirement for the installation and operation of monitoring stations that meet the definition of a "near-road" monitoring site. No existing stations met this definition, and VDEQ must install three new monitoring stations by the regulatory deadline of January 1, 2015. These new stations are a federal mandate for which EPA is providing start-up funds but is not at this time providing operating funds. VDEQ has installed one of three monitoring stations as of this date. This station is located in Bryan Park adjacent to the I-95 and I-64 interchange, as shown in the figure to the left. The station has been up and running since October, 2013. The data from this site can be viewed at the following URL: http://vadeq.tx.sutron.com/cgi-bin/daily_summary.pl?cams=37. VDEQ must install two additional near-road monitoring sites. One is planned for Northern Virginia at the Springfield Interchange, and one is planned for Tidewater at the I-64/I-264 interchange.

Figure 2-2: Bryan Park Near-Road Monitoring Site

2.2. Data Trends for $PM_{2.5}$ and Ozone

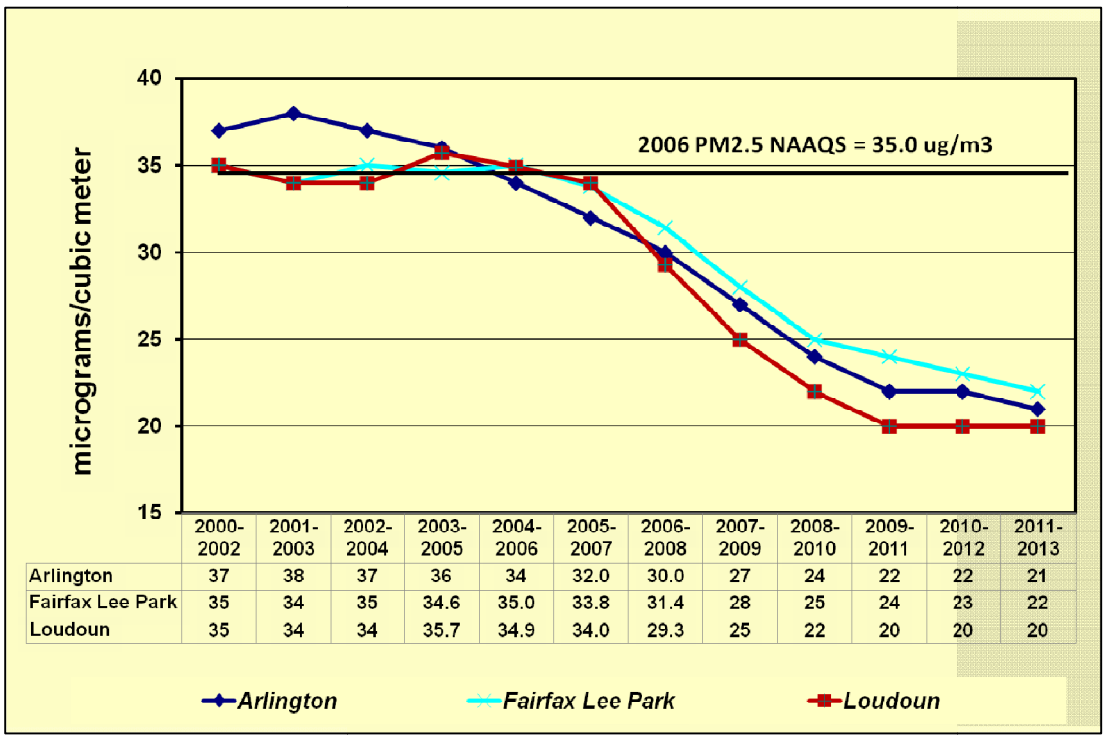
For $PM_{2.5}$, the annual average trend across the Commonwealth shows marked improvement in air quality, and all monitors show compliance with the 2013 $PM_{2.5}$ NAAQS. Figure 2-3 provides annual $PM_{2.5}$ averages for monitors in the Richmond-Petersburg area. Other areas of the Commonwealth follow a similar trend.

For the 24-hour $PM_{2.5}$ data, the monitors across the Commonwealth have registered a pattern of decreasing values, and all monitors are in compliance with the 35 $\mu g/m^3$ standard. Figure 2-4 provides data for Northern Virginia air quality $PM_{2.5}$ monitors and shows the values on a 24-hour basis. As denoted by the black line in Figure 2-4, all monitors in Northern Virginia are reading levels below the 2006 NAAQS for $PM_{2.5}$, indicating good air quality for $PM_{2.5}$. Other areas of the Commonwealth follow a similar trend.



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Charles City	13.3	12.8	12.3	12.5	12.4	12.3	11.5	10.3	9.5	8.9	8.8	8.2
Chesterfield	14.2	13.6	13.4	13.6	13.4	13.3	12.4	11.2	10.3	9.6	9.5	8.8
Henrico Math & Science	13.9	13.7	13.7	13.8	13.6	13.2	12.1	10.8	10	9.6	9.3	8.7
Henrico West End	13.5	12.9	12.8	13.0	12.9	12.9	11.8	10.6	9.6	9	8.9	8.3

Figure 2-3: Richmond Area $PM_{2.5}$ Air Quality, Annual Basis



	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013
Arlington	37	38	37	36	34	32.0	30.0	27	24	22	22	21
Fairfax Lee Park	35	34	35	34.6	35.0	33.8	31.4	28	25	24	23	22
Loudoun	35	34	34	35.7	34.9	34.0	29.3	25	22	20	20	20

Figure 2-4: Northern Virginia 24-Hour $PM_{2.5}$ Air Quality

Ozone trends continue to show improvement in air quality. In 2008, EPA finalized an ozone standard of 0.075 parts per million (ppm) or 75 parts per billion (ppb). Table 2-1 shows the

average monitoring data for the 2011 through 2013 ozone seasons for each of the monitors in Virginia. More information regarding this ozone standard may be found in Section 3.1.3.

Table 2-1: Ozone Air Quality Values for All Virginia Monitors, 2011-2013 Data

Monitor Jurisdiction	*Value, ppb*	*Monitor Jurisdiction*	*Value, ppb*	*Monitor Jurisdiction*	*Value, ppb*
Loudoun	71	Shenandoah	69	Wythe	63
Prince William	69	Stafford	71	Rockbridge	60
Arlington	79	Caroline	71	Page	65
Fairfax-Lee Park	79	Frederick	65	Fauquier	61
Chesterfield	69	Roanoke	64	Rockingham	64
Hanover	72	Henrico	73	Albemarle	65
Charles City	73	Hampton	72	Suffolk-TCC	70
				Suffolk-Holland	68

3. Air Pollution Control Overview

This overview describes planning, permitting, compliance, enforcement, and other initiatives. Information on significant current policy issues under each category is provided.

3.1. Air Quality Planning Initiatives

Air quality planning strategies now focus on preparations for compliance with the 2010 NO_2 NAAQS, the 2010 SO_2 NAAQS, and the 2008 ozone NAAQS. Additional efforts requiring attention and resources include improving the Virginia portion of EPA's emissions inventory and modeling platform, which is the basis for an upcoming rule to address transport of emissions across state boundaries, and analyzing potential effects of the proposed federal carbon standards.

3.1.1. 1997 $PM_{2.5}$ NAAQS

$PM_{2.5}$ is defined by EPA as any airborne particle of solid or liquid matter that is less than or equal to 2.5 micrometers in diameter. $PM_{2.5}$ is not a single pollutant. Rather, the nomenclature describes a category of compounds that have diameters less than 2.5 micrometers, approximately $1/30^{th}$ the width of a human hair. Exposures to high levels of $PM_{2.5}$ adversely affect human health. The main impacts of $PM_{2.5}$ are on the respiratory system and the cardiovascular system. Children, the elderly, and individuals with pre-existing pulmonary or cardiac disease are the most susceptible to $PM_{2.5}$ pollution.

On December 17, 2004, EPA designated the metropolitan Washington, D.C. area, of which Northern Virginia is a part, as a nonattainment area for the 1997 $PM_{2.5}$ NAAQS. EPA justified this designation by using air quality data that showed the area did not meet the 1997 $PM_{2.5}$ NAAQS of 15.0 $\mu g/m^3$. However, since that time, air quality in the D.C. area has improved tremendously due to the effectiveness of many $PM_{2.5}$ precursor control programs. To ensure good air quality going forward and to alleviate all Clean Air Act (CAA) mandates for $PM_{2.5}$

nonattainment areas, VDEQ developed a redesignation request and maintenance plan for the D.C. area. The Virginia Department of Transportation (VDOT) and the Metropolitan Washington Council of Governments were partners in this effort. VDEQ provided these documents to EPA on June 3, 2012. EPA must approve the maintenance plan as a state implementation plan (SIP) revision before the area may be redesignated to attainment status for the 1997 $PM_{2.5}$ NAAQS. EPA published the proposed approval of this SIP revision and opened a public comment period regarding this effort on August 6, 2014.

3.1.2. 2006 $PM_{2.5}$ NAAQS

On September 22, 2006, EPA promulgated a revised $PM_{2.5}$ NAAQS. The 2006 standard revised the daily $PM_{2.5}$ standard from 65 ug/m^3 to 35 ug/m^3 and retained the $PM_{2.5}$ annual standard of 15.0 ug/m^3. On October 8, 2009, EPA published the final designations for the 2006 daily $PM_{2.5}$ standard in the *Federal Register*, and all areas of the Commonwealth were designated as attainment or unclassifiable.

3.1.3. 2008 Ozone NAAQS

Ozone is not generally emitted directly into the atmosphere. Rather, a photochemical reaction between volatile organic compounds (VOC) and oxides of nitrogen (NO_X) creates this pollutant when these precursors combine in the presence of sunlight. Ozone is the primary component of smog and is a lung irritant. Especially susceptible populations include elderly people, children, and those with lung ailments such as asthma and emphysema. Ozone also interferes with plants' abilities to process food and ward off diseases. On March 12, 2008, EPA revised both the primary and the secondary NAAQS for ozone to 0.075 ppm. EPA published the final area designations and classifications for this standard on May 21, 2012. EPA designated all areas of the Commonwealth, with the exception of Northern Virginia, as attaining this standard. EPA designated Northern Virginia as nonattainment, with a classification of marginal. A new ozone NAAQS is expected to be proposed by the end of 2014.

3.1.4. 2008 Pb NAAQS

The element Pb and Pb compounds are emitted into the atmosphere by various source sectors and may be inhaled, or, after settling out of the air, may be ingested. Once in the body, Pb is rapidly absorbed into the bloodstream and results in a broad range of health effects. Children are most vulnerable to the harmful effects of lead, which include damage to red blood cells, weakened immune systems, and damage to developing nervous systems. Effects in adults include increased blood pressure, cardiovascular disease, and decreased kidney function.

On October 15, 2008, EPA substantially strengthened the NAAQS for lead, revising the level of the health-based standard to 0.15 µg/m^3. The 2008 Pb NAAQS is ten times more stringent than the previous standard of 1.5 µg/m^3. EPA designated areas for this standard in two rounds. In the first round, published on November 16, 2010, EPA designated 16 areas of the United States as nonattainment. For all other areas, including Virginia, the EPA deferred designations until November 8, 2011, so that information from additional lead monitoring sites could be used in the

decision-making process. On November 22, 2011, EPA published the final Pb designations for the 2008 NAAQS and designated the entire Commonwealth as attainment/unclassifiable since monitoring data showed compliance with the new standard.

3.1.5. 2010 NO_2 NAAQS

NO_2 is a gaseous air pollutant that forms when fossil fuels such as coal, oil, gasoline, or diesel burn at high temperatures. NO_2 contributes to the formation of particle pollution by converting in the atmosphere to nitrate aerosols, a component of $PM_{2.5}$. NO_2 also is a building block of ozone.

On January 22, 2010, EPA finalized a new primary NO_2 NAAQS and set the standard at 100 ppb over a one-hour average, which is significantly more stringent than the previous primary standard of 53 ppb on an annual average. EPA also established new monitoring and reporting requirements that will require the location of NO_2 monitors near major roadways. EPA noted that NO_2 concentrations near major roads are expected to be appreciably higher than the levels measured in the current network. VDEQ is working towards modifying the existing monitoring network to meet the requirements of the NO_2 NAAQS, including the installation of three near-road monitors. One monitoring location is installed and operational. This site is located at the interchange of I-95 and I-64 in Richmond, Virginia. Two more sites are planned for Tidewater and Northern Virginia.

On February 17, 2012, EPA classified all areas of the Commonwealth as attainment/unclassifiable for this standard. EPA may update these classifications once sufficient near-road NO_2 data are available.

3.1.6. 2010 SO_2 NAAQS

SO_2 is one of a group of highly reactive compounds known as "oxides of sulfur." The largest source of SO_2 emissions is fossil fuel combustion at power plants and at other types of industrial facilities. Smaller sources of SO_2 emissions include industrial processes such as extracting metal from ore and the combustion of sulfur-laden fuels by locomotives, large ships, and non-road equipment. Emissions of SO_2 also contribute to the formation of particle pollution by converting in the atmosphere to sulfate aerosols, a major component of $PM_{2.5}$.

On June 2, 2010, EPA finalized a new primary NAAQS for SO_2. This regulation significantly strengthened the short-term requirements by lowering the standard to 75 ppb on a one-hour basis. The 2010 SO_2 NAAQS revoked the previous primary standards of 140 ppb over a 24-hour period and 30 ppb over an annual period. Source sectors in Virginia have greatly reduced SO_2 emissions due to a variety of federal programs such as regulations on the interstate transport of SO_2 by power plants and the requirements for reduced sulfur content in on-road and off-road fuels. Monitoring data from the Commonwealth's monitoring network show compliance with this standard, as demonstrated by Figure 3-1.

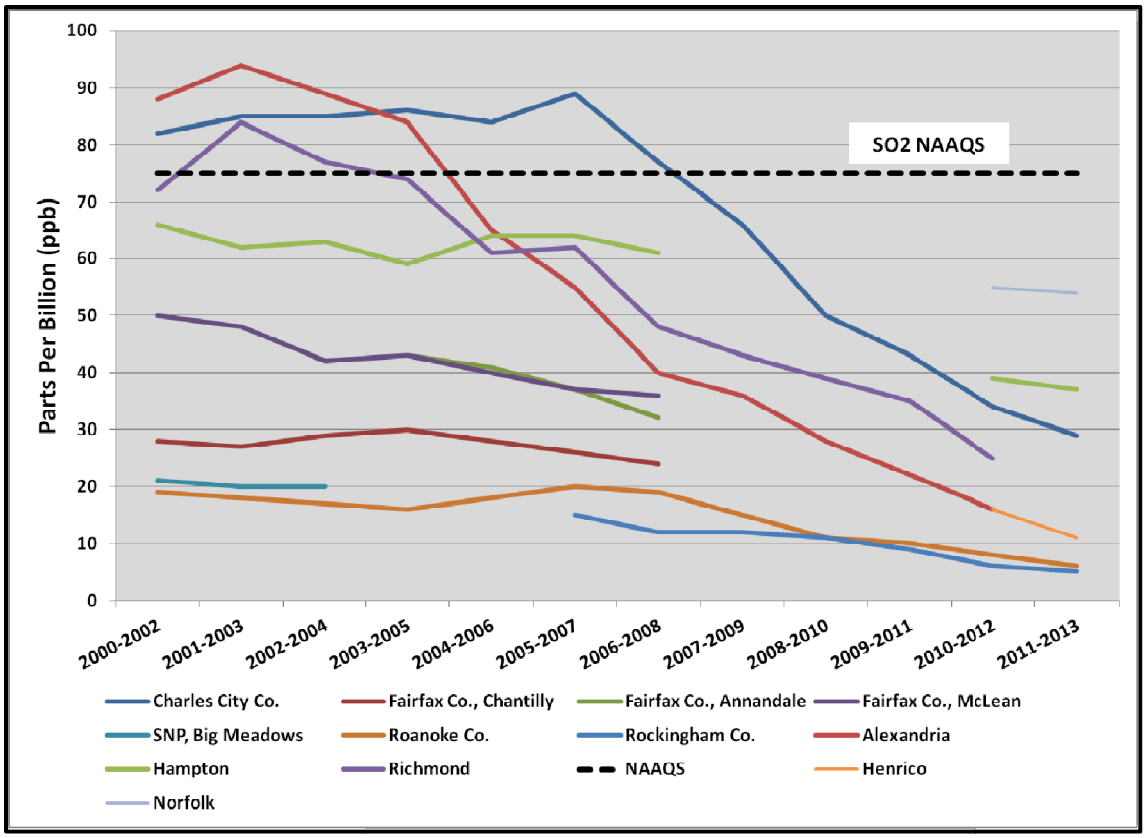


Figure 3-1: 1-Hour SO_2 Air Quality Trends 2000-2013 (99^{th} Percentile, Yearly)

Based on this air quality monitoring data, federal guidance, and the lack of source-specific modeling results, VDEQ made recommendations to the EPA Administrator on June 2, 2011, that all areas in Virginia be classified as "unclassifiable" for this standard.

3.1.7. 2013 $PM_{2.5}$ NAAQS

On January 15, 2013, EPA published in the *Federal Register* a new rule strengthening the NAAQS for $PM_{2.5}$. The 2013 $PM_{2.5}$ NAAQS retained the existing standard for coarse particle pollution (PM_{10}) and reduced the annual standard for $PM_{2.5}$ from 15.0 µg/m^3 to 12.0 µg/m^3. Current monitoring data demonstrates that all monitors in Virginia comply with the new standard. On December 13, 2013, VDEQ recommended to the EPA Administrator that all areas in Virginia be classified as attainment for this standard.

3.1.8. Regional Haze

Section 169 A of the CAA mandates the protection of visibility in national parks, forests, and wilderness areas, referred to as Class I federal areas. The absorption and scattering of light by fine particles causes visibility impairment or haze in these areas. Sources and activities that emit fine particles and their precursors, such as NO_X, SO_2, VOC, and ammonia (NH_3), contribute to this problem. In 1999, EPA finalized the Regional Haze Rule, which requires that state, tribal,

and federal agencies work together to improve visibility in 156 national parks and wilderness areas.

VDEQ developed a SIP to address visibility impairment in the Commonwealth's two Class I areas, the Shenandoah National Park and the James River Face Wilderness Area. EPA approved this plan on June 13, 2012. VDEQ also submitted a progress report to EPA that was approved on May 2, 2014. The progress report shows that visibility is improving and should continue to improve in both the Shenandoah National Park and the James River Face Wilderness area. This progress in visibility improvement is mainly due to the reduced emissions of SO_2 and sulfates from fuel combustion sources.

3.1.9. Control Technique Guidelines

As required by §183(e) of the CAA, EPA conducted a study of VOC emissions from the use of consumer and commercial products to assess their potential to contribute to levels of ozone that violate the ozone NAAQS and to establish criteria for regulating VOC emissions from these products. Any regulations issued under §183(e) must be based on "best available controls."

Section 183(e)(3)(C) provides that EPA may issue a control technique guideline (CTG) in lieu of a national regulation for a product category where EPA determines that the CTG will be substantially as effective as national regulations in reducing emissions of VOC in ozone nonattainment areas. The CAA requires a state with ozone nonattainment areas to evaluate the recommendations provided in the CTGs and determine if modification of existing regulations or creation of new regulations is needed to be consistent with the requirements of the CTG. A state with areas included in the Ozone Transport Region (OTR), like Northern Virginia, must apply the requirements in the OTR for all sources covered by the CTG. After VDEQ promulgates a regulation implementing the requirements of the CTG for a product or source category, VDEQ must submit the regulation to the EPA for approval as part of the SIP within one year from signature of the CTG. EPA has issued four groups of standards under §183(e) of the CAA:

- Group I: These standards apply to categories such as consumer products, architectural coatings, and auto body refinishing coatings. Unlike Groups II, III, and IV, these standards are national requirements and are codified in 40 CFR Part 59.
- Group II: Issued September 29, 2006, these CTGs regulate VOC emissions from flexible packaging printing operations, lithographic and letterpress printing materials, industrial cleaning solvents, and flat wood paneling coatings.
- Group III: Issued October 9, 2007, these CTGs regulate VOC emissions from paper, film, and foil coatings; metal furniture coatings; and large appliance coatings.
- Group IV: Issued July 14, 2008, these CTGs regulate VOC emissions from miscellaneous metal products coatings; plastic parts coatings; auto and light-duty truck assembly coatings; fiberglass boat manufacturing materials; and miscellaneous industrial adhesives.

VDEQ has surveyed the Northern Virginia area and submitted declarations to EPA for several of the CTG categories demonstrating that no potentially regulated facilities operate in the Northern Virginia area. However, the survey results indicate that, for some categories, potentially affected

facilities may be operating in the Northern Virginia area and that regulations must be developed for offset lithographic printing and letterpress printing; industrial cleaning solvents; miscellaneous metal and plastic parts coatings; and miscellaneous industrial adhesives. These regulations are continuing through the Commonwealth's regulatory process.

3.1.10. Stage II Gasoline Vapor Recovery Systems

On May 16, 2012, the EPA Administrator published in the *Federal Register* a notice of final rulemaking determining that onboard refueling vapor recovery (ORVR) systems are in widespread use throughout the motor vehicle fleet. That notice waived the statutory requirement that serious, severe, and extreme ozone nonattainment areas adopt and implement programs requiring Stage II vapor recovery systems on gasoline dispensing facilities. EPA finalized guidance on August 7, 2012, describing appropriate methods for removing these requirements from SIPs. Based on the information provided by EPA, VDEQ has submitted documentation to EPA showing that Stage II vapor recovery systems are no longer needed to maintain or further improve air quality in Virginia. In fact, the calculations show that due to the incompatibility of ORVR systems with some types of Stage II systems, requiring Stage II after certain dates increases emissions to the environment. Once EPA approves these submittals, VDEQ is prepared to remove these requirements from the Commonwealth's regulations.

3.2. Mercury and Air Toxics Standard

On February 16, 2012, EPA promulgated the National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units. The standard will apply to 13 facilities in Virginia. Sources have until April 16, 2015, to comply with the rule but may request a one-year compliance extension. In 2013 VDEQ granted two compliance extension requests for American Electric Power facilities. These extensions consisted of a one-year compliance extension for the Clinch River Power Plant and a 45-day compliance extension for the Glen Lyn Power Plant. AEP plans to convert two units at the Clinch River facility from coal to natural gas and plans to retire the Glen Lyn facility. In 2014, Dominion requested and received a one-year compliance extension for their Yorktown Power Station, allowing more time to build a new transmission line for the purposes of maintaining grid reliability. Dominion has indicated that the coal units at the Yorktown facility will eventually be retired.

3.3. Air Permitting

VDEQ issues two basic types of air permits: construction permits and operating permits. Construction permits, termed New Source Review (NSR) permits, apply to new facilities as well as existing facilities that undergo an expansion or modification. Operating permits apply to sources that are already in operation.

VDEQ has three construction permit programs for criteria pollutants. The Prevention of Significant Deterioration major new source review (PSD) program applies to major sources that

are located in an area that is in attainment with the NAAQS. Sources must apply Best Available Control Technology (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 I area. VDEQ issued one PSD permit in fiscal year 2014. The second program is the non-attainment major NSR program, which applies to major sources located in an area designated as nonattainment for one or more NAAQS. A facility in a nonattainment area must apply the Lowest Achievable Emission Rate, which is often more rigorous than BACT, and must obtain offsets for the pollutant for which the area is not in attainment. VDEQ did not issue any nonattainment NSR permits in fiscal year 2014. 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. During the 2014 fiscal year, VDEQ issued 192 minor NSR permits. Additionally, the minor NSR program is used to issue state major source permits, which apply to those sources that have emissions greater than 100 tons per year (tpy) of a criteria pollutant but that do not fit the criteria to be classified as PSD or nonattainment major NSR. VDEQ issued two state major permits in fiscal year 2014. Virginia also has general permits (or permits by regulation) for non-metallic mineral processors and distributed generation. If a facility meets the necessary requirements, the facility may use the general permit process instead of the normal minor NSR permitting process. VDEQ issued 27 general permits during fiscal year 2014.

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 below major source emissions thresholds and therefore exempt from a major source permitting program. Facilities often use SOPs to place federally and state enforceable limits on hazardous air pollutants (HAPs) to remain exempt from the federal HAP program. The federal HAP program generally requires the implementation of maximum achievable control technology (MACT) standards. A source may request a SOP at any time, and the SAPCB may issue a SOP as necessary (due to a modeled or actual exceedance of a NAAQS or to meet a CAA requirement). VDEQ issued seven SOPs during fiscal year 2014.

The Title V permit program applies to sources that meet the criteria for being "major" under Title V of the CAA. The purpose of a Title V permit is to compile all requirements from a source's multiple air permits and applicable regulations into one permit document. 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. Title V permits must be renewed every five years. Acid Rain permits also are considered federal operating permits. VDEQ must issue these permits to sources that are subject to the federal Acid Rain program (CAA Title IV). VDEQ issued nine federal operating permits and 31 operating permit renewals during fiscal year 2014.

3.4. Air Compliance Activities

VDEQ's air compliance program works to identify and address potential violations of applicable state and federal air regulations and laws. Facilities operating within the Commonwealth must be compliant with those regulations and laws to which they are subject, and the focus of the air

compliance program is to provide the necessary assistance to return facilities to compliance as expeditiously as possible. These concepts support VDEQ's mission to protect the environment and human health.

To ensure that industry constructs and operates within the boundary of applicable laws and regulations, VDEQ's air compliance program operates in a manner consistent with EPA's 2010 Clean Air Act Stationary Source Compliance Monitoring Strategy (CMS). This strategy targets the largest potential emitters of air pollution for a full compliance evaluation (FCE) at a minimum recommended frequency of once every two years. Often completed through a series of partial compliance evaluations (PCEs), an FCE consists of a comprehensive evaluation of the facility records and equipment associated with pollutant emissions, including the examination of documents detailing throughputs, emissions, testing, and reporting, to determine the facility's overall compliance status. VDEQ reports the compliance status and enforcement activities related to Virginia's regulated facilities to EPA on a periodic basis (approximately weekly). This information is publicly available on EPA's Environmental Compliance and History Online (ECHO) external website.

3.4.1. Inspection Planning

VDEQ advocates the use of a risk-based concept when identifying facilities for FCEs. VDEQ developed and uses this approach in collaboration with the CMS to create annual inspection plans. Referred to as VDEQ's Risked Based Inspection Strategy (RBIS), RBIS provides flexibility to use resources where they are most needed, allowing staff to focus not just on facilities with the most potential emissions but also on facilities where noncompliance may be likely.

VDEQ's RBIS may identify facilities that are not a focus of the CMS strategy. The strategy allows for increases or decreases in the frequency of inspections by basing changes to inspection frequencies on risk qualifiers such as the facility's compliance history, type, multi-media applicability, and participation in Virginia's environmental excellence program (VEEP). Other considerations include the facility's location considering environmental sensitivity and environmental justice concerns and agency initiatives. EPA initially granted VDEQ approval in 2008 to exercise the risk-based concept on a three-year trial basis with EPA Region 3 oversight, and EPA continues to support the approach as providing a sound and flexible foundation for annual inspection planning.

3.4.2. Sources Evaluated for Compliance

Virginia has nearly 4,000 registered air facilities, not including over 1,100 Stage II facilities (gasoline service stations in the Richmond area and Northern Virginia). For the 2013 Federal Fiscal Year (October 1, 2012 through September 30, 2013), the air compliance program conducted approximately 6,700 partial and full compliance evaluations, including nearly 900 on-site inspections and almost 60 stack test observations. As a result, the air compliance program issued over 240 formal and informal enforcement actions.

3.4.3. Small Business Assistance

VDEQ provides various forms of compliance assistance to potentially thousands of small businesses throughout the Commonwealth. VDEQ provides these services at no cost to facilities in order to inform, educate, and assist small businesses in complying with environmental regulations. One example was the development of compliance calendars for dry cleaners and Stage II facilities to assist owners and operators with daily and monthly compliance requirements and to improve understanding of those regulations. More generally, the Small Business Assistance (SBA) program conducts personal and web-based outreach to small businesses, providing access to various resources including regulatory updates, fact sheets, checklists, brochures, enforcement case assistance, and financial resources.

3.5. Air Enforcement Activities

The goal of enforcement is to take appropriate actions to address violations of environmental laws and return facilities to compliance with Virginia's statutory and regulatory requirements. The mechanism used by VDEQ to achieve compliance must be proportional to the violation, responsive to the facility's compliance history, and protective of human health and the environment. In addition, an appropriate enforcement action, which may include a civil charge and recovery of economic benefit, sends a message of deterrence to the regulated community.

EPA's guidance on timely and appropriate enforcement response to high priority violations (HPVs) articulates the mutual expectations of the respective parties in the federal-state partnership for the enforcement of stationary source air pollution control requirements. VDEQ's enforcement staff is responsible for implementing this policy. This policy applies to all major (as defined by the CAA) stationary sources of air pollution that are in violation of a federally enforceable regulation. The policy helps prioritize federal and state agency enforcement efforts with respect to sources of air pollution in their jurisdictions.

Agency HPV activities are designed to identify and to expeditiously return to compliance those violating sources that the agency believes are environmentally most important, namely the HPVs. The policy also promotes a more complete and accurate compliance picture and enhances the responsibility of the agency, as well as EPA, to track and address all violations. An essential part of this tracking process is assuring that all HPVs are promptly entered into the shared EPA-state database.

In federal fiscal year 2013, 19 consent orders were issued (4 of which were HPVs) and resulted in the collection of $563,610 in civil charges. Virginia also entered into a consent decree to resolve a joint state and federal enforcement action that included a penalty of $3 million, which was split evenly between the Commonwealth and EPA.

3.6. Motor Vehicle Inspection and Maintenance Program

Vehicle inspection and maintenance programs (I/M) help improve air quality by identifying high-emitting vehicles in need of repair and causing them to be fixed as a prerequisite to vehicle

registration within a given non-attainment area. The CAA mandates I/M for several areas across the country, based upon criteria such as air quality classification, population, and/or geographic location. VDEQ created a decentralized I/M program that retains the convenience of having emissions inspections and repairs performed at the same stations but uses the latest accepted technology to determine which vehicles emit excessive pollutants.

In 2005, VDEQ updated the program to allow for testing of the on-board diagnostic (OBD) systems on model year 1996 and newer vehicles. OBD systems monitor key components of the vehicle's emission control system, record any diagnostic trouble codes, and warn the driver if a condition exists that could cause excess emissions. Beginning with model year 2009, federal regulations require all vehicles up to 14,000 pounds to be OBD-compliant.

The Northern Virginia I/M program reduces air pollution in the Northern Virginia area. Vehicles up to 10,000 pounds gross vehicle weight rating (GVWR) and newer than 25 model years are required to pass an emissions test or receive a waiver every two years in order to be registered. Over 34,000 vehicles failed the initial test and received repairs in calendar year 2013.

3.6.1. Mobile Source Operations Section

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 calendar year 2013, these stations inspected 868,281 vehicles. MSOS personnel conducted 486 separate audits during that timeframe, including 174 covert audits, of approximately 520 emission inspection facilities. MSOS routinely handles in excess of 1,100 calls per month from citizens, inspectors, repair technicians, and others.

3.6.2. On-Road Emissions Monitoring Program

As required by the CAA, each vehicle emissions inspection program must conduct remote sensing of vehicle emissions in the program area. In the On-Road Emissions (ORE) monitoring program, vehicles with very high emissions as identified by remote sensing devices are sent a Notice of Violation (NOV) and are required to make any necessary repairs to their vehicles. Owners of vehicles observed by remote sensing to be exceptionally clean receive a clean screen, which constitutes an emission inspection pass. VDEQ also implemented procedures to provide repair assistance to low-income vehicle owners whose vehicles were found to be high emitters through remote sensing. After six years of operation, the ORE program has identified over 1,900 vehicles as gross emitters and issued over 1,550 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. The ORE currently observes about 18% of the Northern Virginia fleet that is subject to the I/M program.

Studies by EPA in other states have indicated that remote sensing is able to identify vehicles with very high evaporative emissions, possibly coming from leaking fuel tanks or lines. VDEQ

notifies owners of such vehicles that they may have a gasoline leak, which could be a potential safety issue. The notice is advisory only.

The 2012 General Assembly passed legislation expanding the number of vehicles eligible to receive a clean screen. Owners of certain very clean vehicles will have the option of getting a station test or purchasing a clean screen pass. Eventually up to 30% of the cleanest vehicles may be eligible.

4. Other Control Programs

As shown in Figure 4-1, VDEQ expects emissions of NO_X, PM_{10}, $PM_{2.5}$, SO_2, and VOC to decrease significantly from 2007 levels even though forecasts estimate that growth in vehicle miles traveled, population, and industry will continue through 2020. These projected reductions are the result of control programs implemented at the federal and state level as well as changing facets in the economy.

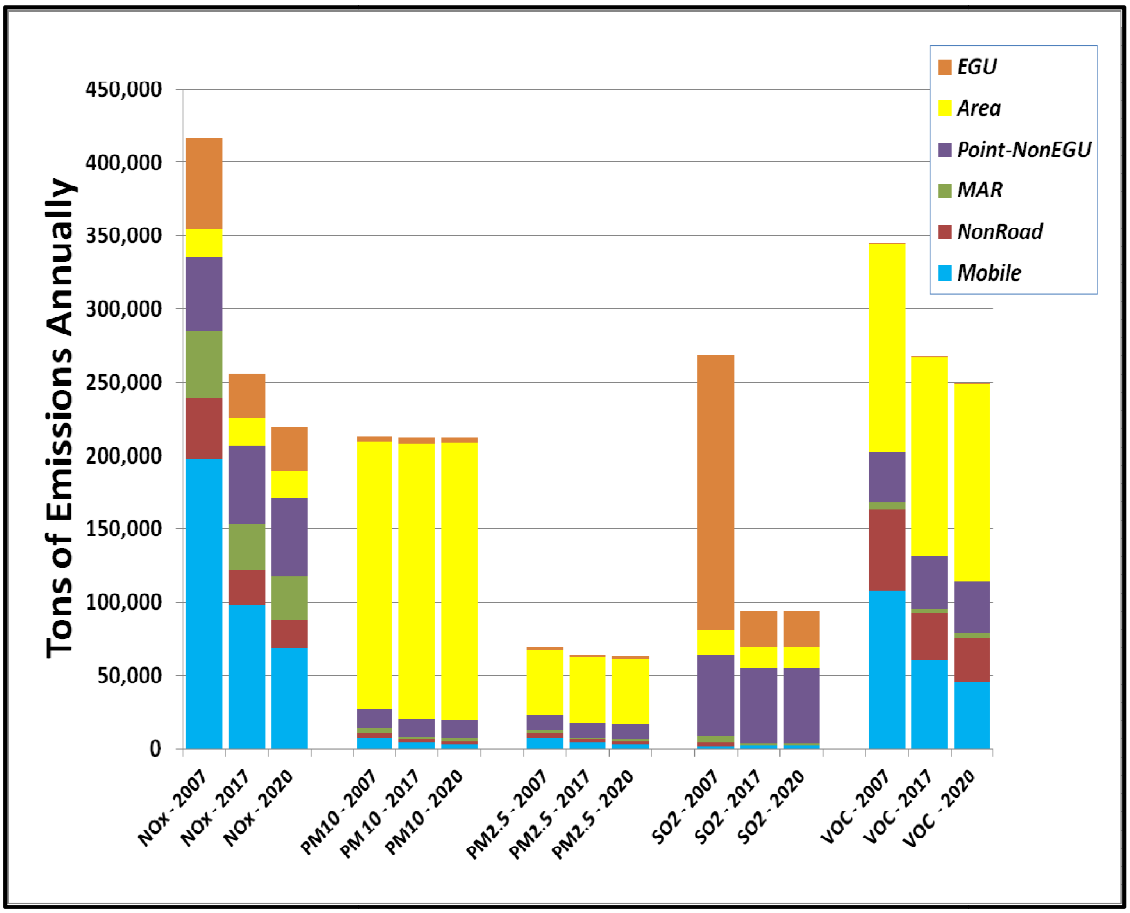


Figure 4-1: Anthropogenic Emission Estimates for Virginia: 2007, 2017, and 2020

4.1. Emissions from Electrical Generating Units

Figure 4-2 provides the annual emissions of SO_2 from coal-fired Acid Rain Program electrical generating units located in Virginia. The reduction in SO_2 emissions from this source sector is attributable to a number of factors, including a variety of control programs.

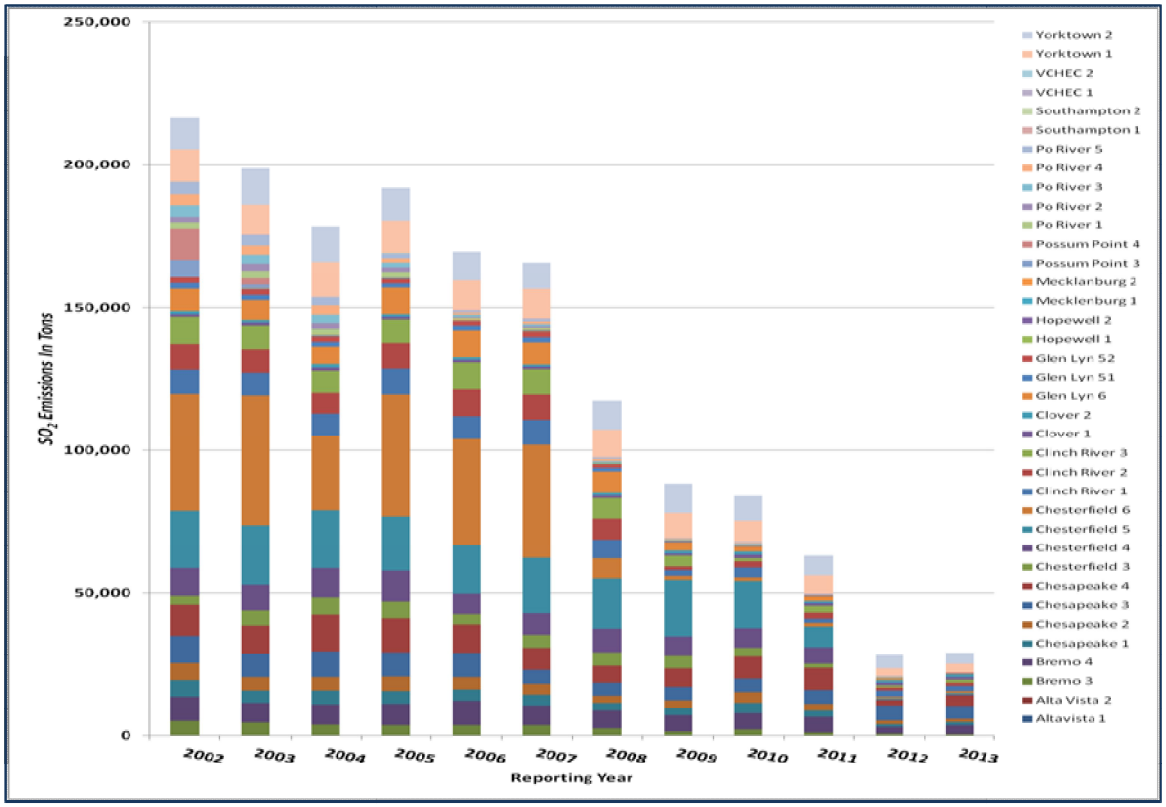


Figure 4-2: Virginia Coal Fired Acid Rain Program SO_2 Emissions

4.2. Mobile Source Programs

Studies conducted by VDEQ using EPA-approved emissions models in conjunction with VDOT data show that emissions of VOC, NO_X, SO_2, and $PM_{2.5}$ from the mobile source sector in Virginia should decrease significantly in future years. Mobile sources are generally pollution-emitting activities that move by their own power on public roadways. Examples are cars and trucks. The expected decreases in this emissions sector are the result of federal regulatory programs that require emission reductions from automobiles and heavy-duty diesel trucks. More reductions from this sector are expected in the future since EPA finalized the Tier 3 rule in March 2014. This new rule reduces emissions standards for new vehicles and lowers the sulfur content of gasoline. Implementation of this rule begins in 2017 and requires tighter tailpipe and evaporative emissions standards from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles. The program's lower gasoline sulfur standard will make emission control systems more effective for both existing and new vehicles.

4.3. Product Based Programs

A variety of both state and federal control programs are being implemented that reduce emissions from product-based categories such as the use of portable fuel containers; the coating of architectural supports; the application of 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 programs have been implemented in the northern Virginia area, the Fredericksburg area, and beginning March 2014, the Richmond-Petersburg area. These regulations generally target VOC emissions but can also help decrease public exposure to harmful chemicals.

4.4. 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 are lawn mowers, weed eaters, diesel generator sets, gasoline generator sets, marine engines, and locomotive engines.

Federal regulations 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. These federal standards will result in a 60% to 90% reduction in air pollutants. Air pollution benefits are related to the purchase of new equipment, and 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 were required to use diesel fuel with no more than 15 ppm sulfur beginning in 2010. Railroad and marine vessels began using diesel fuel with no more than 15 ppm sulfur in 2012. The cleaner fuels allow more efficient engine operation, facilitate the use of state-of-the-art emissions controls on new units, and result in greatly reduced SO_2 emissions from such equipment.