2014 Air Quality Annual Report

west virginia department of environmental protection

Air Quality Annual Report

West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street S.E.
Charleston, WV 25304

Earl Ray Tomblin
Governor

Randy C. Huffman
Cabinet Secretary

Director's Page

I am pleased to present the *2014 Air Quality Annual Report*. While this is my first report as the Director of the Division of Air Quality (DAQ), I was very involved during my previous position as Deputy Director and Assistant Director of Planning in helping provide the information you have come to expect from this publication.

The year began with the DAQ receiving odor complaints from citizens in the Charleston area on the morning of January 9. Our Compliance and Enforcement staff were dispatched to investigate and discovered that a spill of 4-Methylcyclohexane Methanol (MCHM) had breached containment at the Freedom Industries site. As most of you know from the widespread news coverage, the drinking water for 300,000 people was contaminated and a "do not use" order was issued for a nine-county region. I am proud of the work and professionalism of our staff who were involved from that first morning until the last tank at the site was dismantled by order of Governor Earl Ray Tomblin.

Our former Director, John Benedict, retired in late February. John left with almost 44 years experience and knowledge of work on air quality in West Virginia, as well as national air quality issues. While the agency will miss his expertise, we appreciate and applaud his work and accomplishments. John is a personal friend and mentor – he freely shared his knowledge and always encouraged me to learn and grow over the nearly 22 years that we worked together. I want to thank him publicly for all he taught me and for his common-sense approach to improving air quality in the state. I wish him all the best in his well-earned retirement.

Throughout the latter half of 2014, staff worked on a proposal from the U. S. Environmental Protection Agency regarding carbon dioxide emission guidelines for existing power plants, also known as the "Clean Power Plan." Our work culminated in the fall with the development and submittal of a 60-page comment document which demonstrated why the proposed rule was unprecedented, impractical and, if enacted, would result in higher energy prices and lower energy reliability for West Virginia residents. We appreciate the input from the West Virginia Division of Energy and West Virginia Public Service Commission, and await a final rule from U.S. EPA sometime in the summer of 2015.

Marcellus Shale natural gas drilling activity has continued to dominate our staff time and resources. In 2009, just five years ago, natural gas air permits issued in West Virginia comprised less than one-fifth of the total permits. Just five years later, 2014, natural gas air permitting dominates our efforts with almost a tenfold increase in construction/modification permits. Approximately four, full-time positions in our Permitting Section spent 2014 working on natural gas industry permits, while our Compliance and Enforcement Section has been impacted as well, with approximately three, full-time positions working solely on inspections and citizen complaints at natural gas sites.

In last year's report, we added information on the DAQ's Compliance and Enforcement Section and we have updated and included that information again this year. We have also added information on our Permitting Section – New Source Review (minor) source and Title V (major) source programs. Now, with a more complete picture of our agency – Air Monitoring, Compliance and Enforcement, and Permitting and Planning – readers may get a better sense of how our sections work together to ensure economic growth and the preservation of existing clean air resources, as well as protect the public health and welfare from any adverse effects which might occur. We would like to know what you find useful in the report and how it can be improved … please send your comments and suggestions to stephanie.e.hammonds@wv.gov.

William "Fred" Durham
Director

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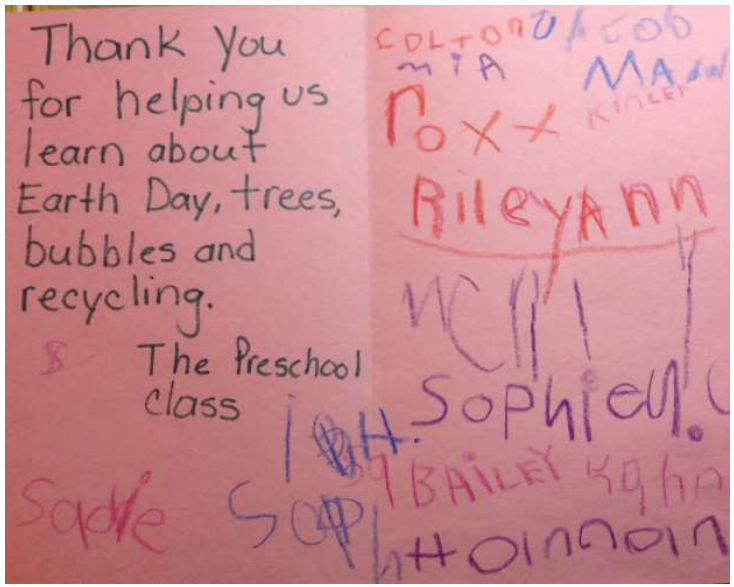

2014 Highlights

$PM_{2.5}$

West Virginia continued progress redesignating nonattainment areas to attainment as air quality improved, with all former nonattainment areas now designated as attainment with both the 1997 fine particulate matter ($PM_{2.5}$) National Ambient Air Quality Standards (NAAQS) and the 2006 $PM_{2.5}$ air quality standards. Furthermore, the United States Environmental Protection Agency (EPA) designated the entire State of West Virginia as attainment/ unclassifiable for the most recent 2012 $PM_{2.5}$ NAAQS, which is considerably more stringent than the former standards.

Carbon Dioxide Standards for Power Plants

In June 2014, EPA proposed carbon dioxide (CO_2) standards for modified and reconstructed electric power plants under the authority of Clean Air Act Section (CAA) 111(b). The proposed new source performance standards (NSPS) establish CO_2 limits for modified or reconstructed coal-fired and gas-fired units. The proposed emission limits for modified or reconstructed sources are based on the performance of available and demonstrated technology. These proposed limits for modified and reconstructed sources do not require implementation of carbon capture and storage (CCS) technology, as has been proposed for new sources. EPA plans to finalize the NSPS in mid-2015.

Concurrently, EPA proposed emission guidelines under the authority of CAA Section 111(d) to require states to establish performance standards for CO_2 for existing units. The proposal has two main parts: state specific goals for CO_2 emissions from power plants and "emission guidelines" based on the Best System of Emission Reduction (BSER) that EPA determined has been adequately demonstrated, on which states would base the performance standards for existing units. EPA identified four sets of measures - or "building blocks" - that together make up the best system for reducing carbon pollution. The four building blocks identified by EPA include:

- improved power plant efficiency
- increased use of natural gas power sources
- increased use of renewable and nuclear power sources
- more efficient use of electricity

The EPA plans to finalize the emission guidelines in mid-2015.

School Boilers Replacement Project

Over three-quarters of a million dollars collected as part of a negotiated multi-state federal enforcement consent decree was used for a project that will help school children in West Virginia for many years to come. The DAQ partnered with the West Virginia Department of Education's Office of School Facilities and Transportation, and the Mercer County Board of Education to replace outdated boilers with new, cleaner, more efficient gas-fired boilers at three schools in Mercer County during the 2014 summer break. The older boilers were 30 - 60 years old and at the end of their useful life. The funding provided through the efforts of DAQ was leveraged by the school system to obtain additional funding via a School Building Authority of West Virginia grant.

All of the new boilers not only provide more reliable heating for the students, but also use low-NO_x technology and flue gas recirculation which results in lower air emissions to the environment. The new boilers should be in service another 40 years.

2014 Highlights

- Over a single heating season (October – April), an estimated 104 tons of air emissions reductions are anticipated, mostly of SO_2, PM, NO_x, and CO.

- Over a 40-year lifetime of service, more than 4,100 tons of air emissions reductions are anticipated, mostly of SO_2, PM, NO_x, and CO.

Almost 800 students will benefit from this project in 2014 and for many years to come:

- Lashmeet/Matoaka Elementary School:
  K – grade 5 259 students

- Montcalm High School:
  grades 7 – 12 316 student

- Spanishburg Elementary School:
  K – grade 5 207 students

A press event to recognize the new boilers was held at Montcalm High School in Mercer County, West Virginia, on October 7, 2014. Mercer County Schools decided to involve the entire student body by holding the press event as a special assembly at Montcalm High School, including a presentation of colors and Pledge of Allegiance by the Jr. ROTC Color Guard, musical prelude by the band, and a choral selection by the choir. The student body president acted as the master of ceremonies along with the school principal. The students enthusiastically chanted a countdown for the ribbon cutting portion of the event.

School officials noted that students learn better when in a well-ventilated setting with consistent heating and cooling capability. The press event was a good way to recognize the results of over two years of sustained, detailed work by the schools and other partners, as well as conclude the project on a positive note.

In addition to being easier to operate, more efficient and achieving air emissions reductions, the new boilers are much more reliable than the older boilers, and provide a comfortable environment more conducive to learning not only for the current students, but those in future generations.

2014 Highlights

NCore Network

NCore is a multi-pollutant network that integrates several advanced measurement systems for particles ($PM_{2.5}$, PM_{10}, continuous $PM_{2.5}$), trace level pollutant gases (SO_2, O_3, NO_x, CO) and meteorology.

The NCore Network addresses the following objectives:

- Daily reporting of data to EPA AIRNow;
- Support for development of emission strategies through air quality model evaluation and other observational methods;
- Accountability of emission strategy progress through tracking long-term trends of criteria and non-criteria pollutants and their precursors;
- Support for long-term health assessments that contribute to ongoing reviews of the NAAQS;
- Compliance through establishing nonattainment/attainment areas through comparison with the NAAQS;
- Support to scientific studies ranging across technological, health, and atmospheric process disciplines; and,
- Support to ecosystem assessments recognizing that national air quality networks benefit ecosystem assessments and, in turn, benefit from data specifically designed to address ecosystem analyses.

There are approximately 80 NCore sites across the country and one of those sites is being established in Charleston, West Virginia. The DAQ located an appropriate site, secured a lease agreement and began site infrastructure development efforts in the late fall of 2014. The NCore shelter and instrumentation was delivered on December 30th and gently lifted by crane onto the concrete. The NCore site was fully funded by EPA and is the largest, most comprehensive air monitoring site in the state.

Air Monitoring Network Plan

The DAQ is also required by EPA to post its ambient air monitoring network plan on the web and submit it to the EPA by July 1 every year. The plan may be found at: http://www.dep.wv.gov/daq/airmonitoring/pages/default.aspx.

Outreach

Bernie the Burn Barrel

Education

Environmental Outreach and Education

The DAQ's outreach team began 2014 on a cold day in January at DEP Day at the Legislature, held at the West Virginia State Capitol, then working throughout the rest of the year at events across the state highlighting how our personal actions can help to save money, improve West Virginia's air quality and benefit the overall environment.

Outreach team members were involved with Water Festivals at Wirt, Putnam, Kanawha, Fayette, Nicholas and Cabell Counties. While it may sound odd to have an air quality demonstration at a water festival, staff help fourth and fifth grade students understand how acid rain is formed using interactive displays created and built by DAQ employees. The demonstration leads students through the inversion at Donora, Pennsylvania, the creation of the Clean Air Act, and culminates with a coal-fired boiler demonstration, depicting how air emissions can be reduced with control devices, and an electrostatic precipitator machine, which demonstrates how an electrostatic charge can remove fine particulate matter from a stack. Students are quick to make the connection that what we put up into the air can cause environmental problems when it ultimately returns to the ground.

Due to the water crisis in Charleston and surrounding areas and a harsh winter, the annual DEP Earth Day Celebration was cancelled. County school boards determined that students had missed too many days. However, two schools chose to host DEP for "Mini Earth Day" events. In April, staff traveled to Ramage Elementary in Boone County and Rock Branch Elementary in Kanawha County. DAQ took our energy house, crank generator, tire pressure demonstration and "nickel" smasher on the road to celebrate our planet with these young West Virginians.

DAQ's outreach team partnered with the Charleston Area Robotics Team (CART) in 2014. CART is made up of high school and middle school students from the Charleston area. CART members designed, built and operated "Bernie the Burn Barrel," a robotic burn barrel which traveled around, via remote control, at Youth Environmental Day and the DEP Energy Tree Kickoff reminding everyone to "Learn Before You Burn." Open burning is illegal in West Virginia and CART members and their pal, "Bernie," helped DAQ bring this message to event-goers.

In the fall, DAQ participated in the 10-year celebration of DEP's headquarters in Charleston. Outreach team members manned our solar-powered race track and provided energy saving information on CFL and LED lighting choices to those in attendance. Outside, our Toyota Prius hybrid was available for inspection after 9 years and over 150,000 miles of use by our agency.

Charleston Area Robotics Team members and Bernie at an outreach event.


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USES LESS ENERGY
ENERGY EFFICIENCY
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PRODUCES LESS POLLUTION


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Division of Air Quality


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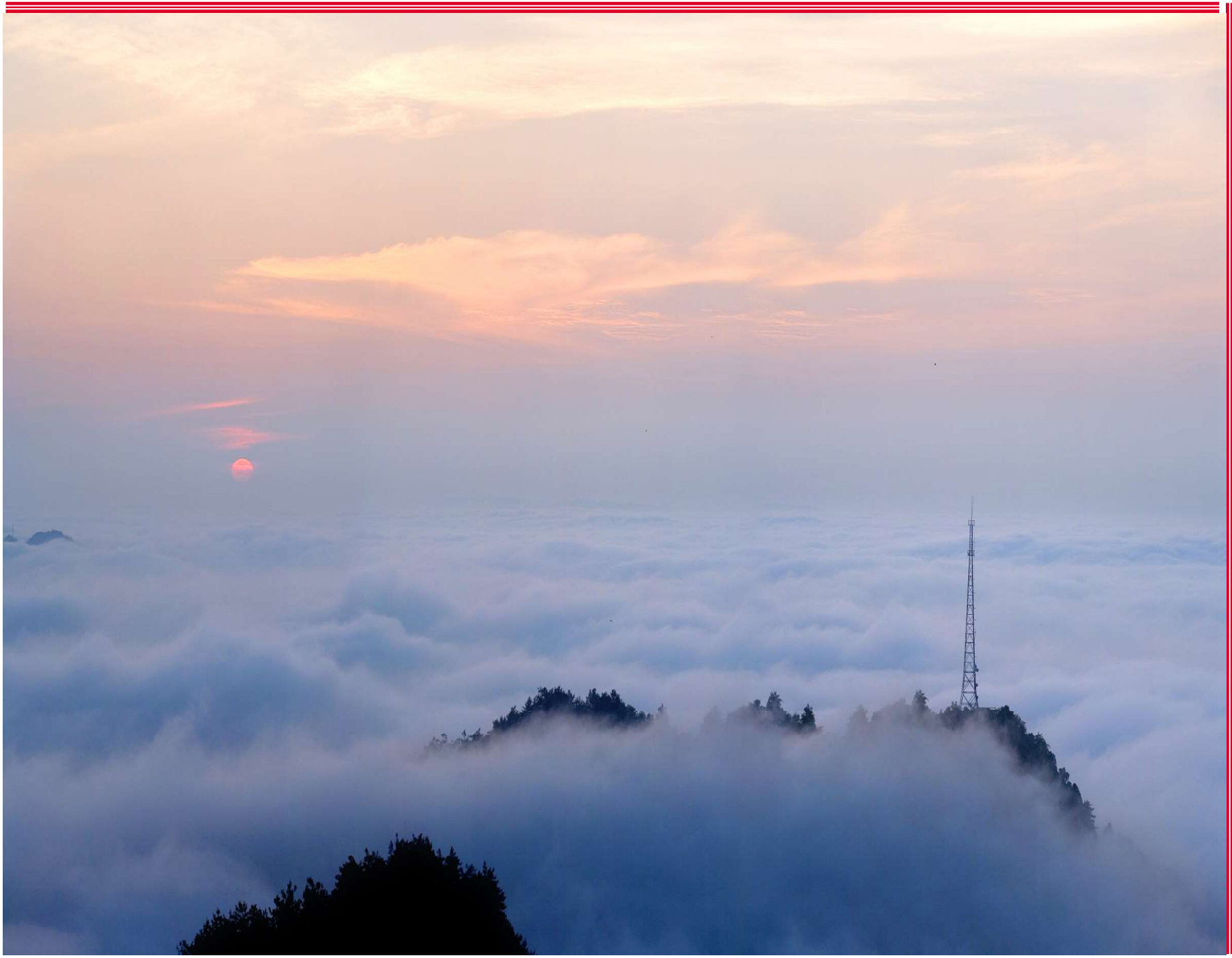
National Ambient Air Quality Standards



Pollutants with Standards

Criteria Pollutants

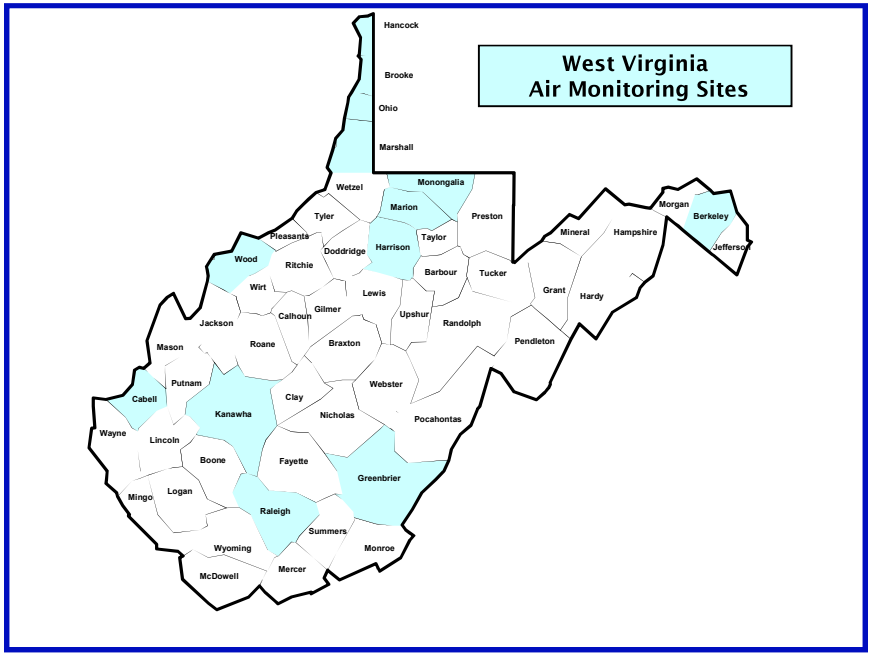
The CAA requires the EPA to set NAAQS for criteria pollutants considered to be harmful to public health and the environment. Criteria pollutants are those pollutants that are common and found all over the United States. The EPA uses these criteria pollutants as indicators of air quality. The agency establishes two distinct kinds of standards for acceptable concentrations of specific pollutants in the ambient (outdoor) air. Primary standards establish limits to protect public health, including the health of sensitive populations, such as children, the elderly and those with asthma. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation and buildings.

Such standards have been established for six principal pollutants:

ground-level ozone (O_3)
particulate matter (PM_{10} and $PM_{2.5}$)
sulfur dioxide (SO_2)
carbon monoxide (CO)
nitrogen dioxide (NO_2)
lead (Pb)

Health effects of air pollution vary greatly, depending on the exposure level, duration and pollutant. The air quality standard is expressed as an average concentration over a specific time period (an hour, a day or a year) to account for the fact that the concentration of a pollutant in the air varies over time. The concentration is expressed in parts per million (ppm) or micrograms of pollutant per cubic meter of air ($\mu g/m^3$). To help put the terms in perspective, one part per million (ppm) is about one inch compared to 15.8 miles or one second in nearly two years. Some standards may be expressed in parts per billion (ppb). It takes 1,000 ppb to equal 1 ppm. The standard also specifies whether the limit applies to an annual average concentration, a specific percentile, or a number of times the level can be exceeded during the calendar year.

West Virginia maintains a statewide network of monitoring stations as shown on page 39. The network takes samples and measures (monitors) the air quality. If the air quality fails to meet any of the NAAQS, the EPA designates the region as a nonattainment area. The DAQ is then required to develop a state implementation plan (SIP) to achieve and maintain air quality standards in that area. State implementation plans must be approved by the EPA.



Ozone (O_3)

Ozone is a highly reactive gaseous molecule that occurs in two levels of the atmosphere - in the Earth's upper atmosphere and at ground-level. Ozone can be "good" or "bad" for your health and the environment, depending on its location in the atmosphere.

Good ozone, or the naturally occurring stratospheric ozone (commonly referred to as the ozone layer), exists in the upper portion of the atmosphere (from about 10 to 30 miles above the planet's surface) and protects life on Earth from the sun's harmful ultraviolet rays. This protective ozone layer is affected by man-made chemicals. Even though we have reduced or eliminated the use of many of these ozone-depleting substances, their past use still affects the thinning of this layer today. Ozone depletion can cause increased amounts of ultraviolet radiation to reach the Earth, which can lead to more cases of skin cancer, cataracts and impaired immune systems. Monitoring and observation of the good ozone is accomplished using satellite measurements, which covers a much broader area than our state monitoring system.

PRIMARY AIR QUALITY STANDARDS:	Maximum 8-hour average concentration of 0.075 ppm based on 3-year average of the annual fourth highest daily maximum 8-hour averages.
SECONDARY NAAQS:	Same as primary standard.

The ozone monitors that the DAQ maintains and operates measure the ground-level, or bad, ozone pollution. This ozone can be a hazard rather than a benefit. It is a colorless gas which is not emitted directly into the atmosphere from sources. Instead, it is formed by complex chemical reactions involving two categories of pollutants - nitrogen oxides and volatile organic compounds (VOCs) - in the presence of sunlight. Nitrogen oxides (NO_x) are VOCs formed as a by-product of combustion from motor vehicles, boilers, incinerators and power plants. Sources of VOCs include motor vehicle exhaust, dry cleaning, paint solvents and evaporation of gasoline from storage and transfer facilities.

Bad ozone is of most concern during the summer months because strong sunlight and hot weather can result in harmful ozone concentrations in the air we breathe. Ozone levels are usually highest after noon and through early evening hours on hot, sunny days and, therefore, this part of the day is the peak time for symptoms. Many urban and suburban areas throughout the United States have high levels of bad ozone. Many rural areas of the country are also subject to high ozone levels as winds carry emissions hundreds of miles away from their original sources.

Ground-level ozone is a strong irritant to the eyes and upper respiratory system and can be particularly harmful to people with asthma and circulatory problems. Ground-level ozone also causes damage to trees and vegetation and is the primary component of smog.

Ozone levels fluctuate depending on weather conditions and air emissions. In West Virginia, the ozone monitoring season runs from April 1 to October 31. Hot, dry weather and stagnant air favor the formation of ozone and the greatest number of days with exceedences typically occurs during the hottest and driest summers.

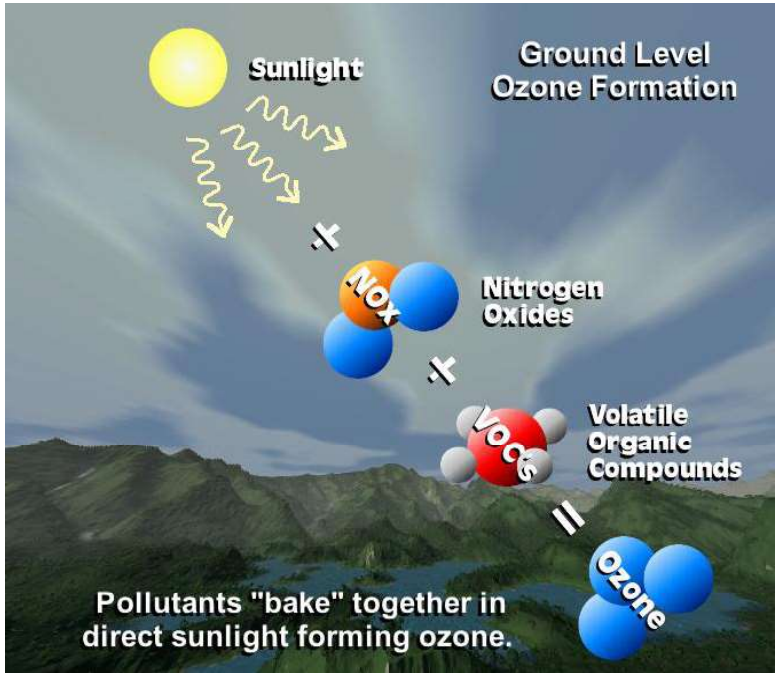
Ozone (O_3)

In most areas, ozone levels decrease after sunset. However, if there is little movement of air masses and the heat continues, high ozone levels can continue over several days. West Virginia's mountainous topography can add to ozone levels by capturing air in the valleys, limiting air dispersion.

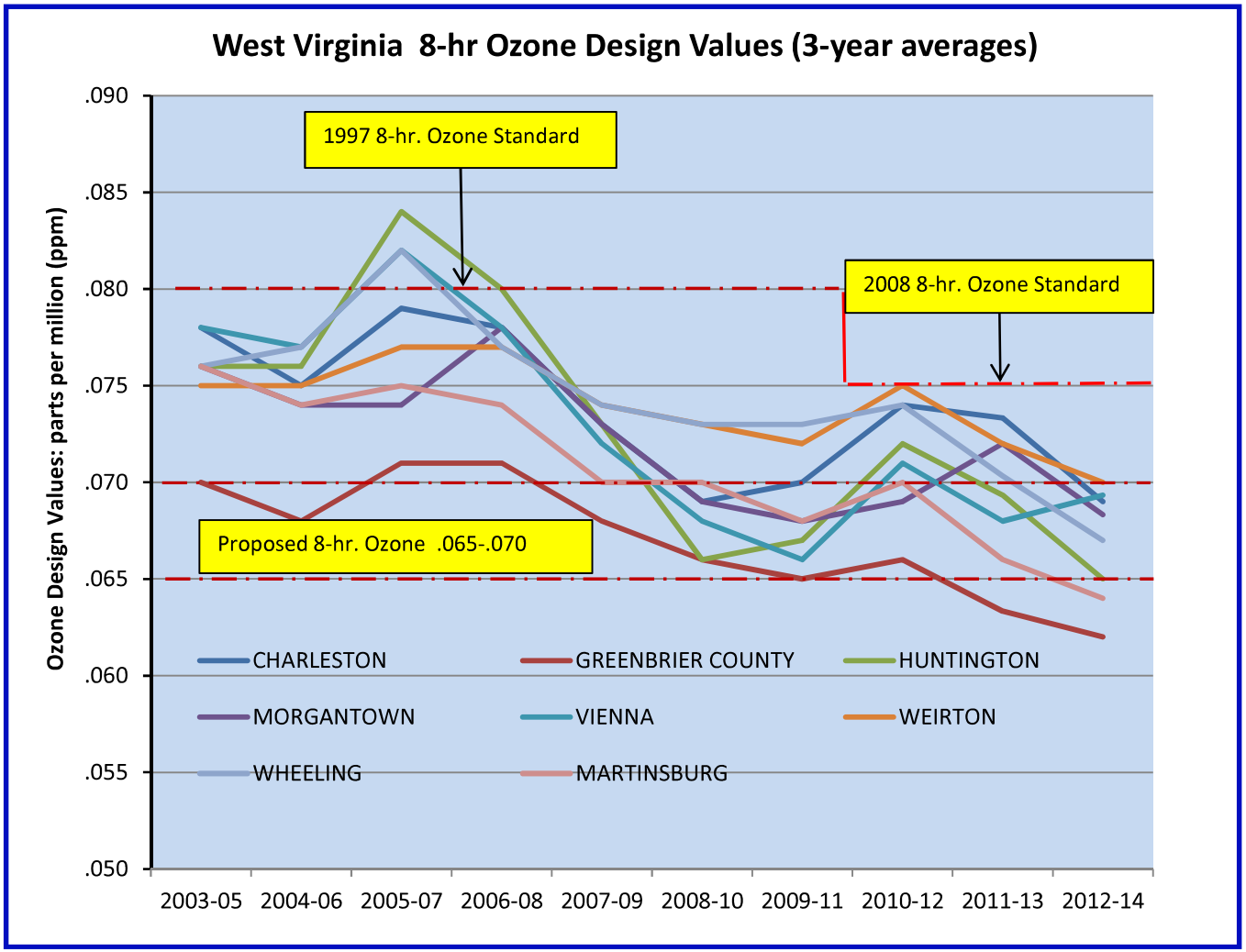
Ground-level ozone is a complex problem due to the variety of sources for NO_x and VOCs and the long-distance transport of ozone and its precursors. A summary of monitored ozone data is shown on page 10.

Breathing air containing ozone can reduce lung function and increase respiratory symptoms, thereby aggravating asthma or other respiratory conditions. Ozone exposure also has been associated with increased susceptibility to respiratory infections, medication use by asthmatics, doctor and emergency room visits, and hospital admissions for individuals with respiratory disease. According to the EPA, ozone exposure may also contribute to premature death, especially in people with heart and lung disease.

The EPA has identified environmentally protective standards under the CAA for ozone and instituted a variety of multi-faceted programs to meet these standards. Additional programs are in place to reduce NO_x and VOC emissions from vehicles, industrial facilities and electric utilities. Programs are also aimed at reducing pollution by reformulating fuels and consumer/commerical products, such as paints and chemical solvents that contain VOCs.



Ozone (O_3)


West Virginia 8-hr Ozone Design Values (3-year averages)
Ozone Design Values: parts per million (ppm)
.090
.085
.080
.075
.070
.065
.060
.055
.050
1997 8-hr. Ozone Standard
2008 8-hr. Ozone Standard
Proposed 8-hr. Ozone .065-.070
CHARLESTON
GREENBRIER COUNTY
HUNTINGTON
MORGANTOWN
VIENNA
WEIRTON
WHEELING
MARTINSBURG
2003-05
2004-06
2005-07
2006-08
2007-09
2008-10
2009-11
2010-12
2011-13
2012-14

Particulate Matter (PM_{10}) Less than 10 microns in diameter

Particulate matter (PM) consists of solid particles and liquid droplets found in the air. These particles and droplets come in a wide range of sizes. Individually, they are invisible to the naked eye. Collectively, however, the particles can appear as clouds or a fog-like haze. Particulates result from many different sources including wind-blown dust, wood-burning stoves, leaf burning, vehicle exhaust, electric power plants, incinerators, construction, vehicles traveling on paved and unpaved roads, materials handling and crushing, as well as aggregate grinding operations. Water sprays and other dust suppressants are often used to reduce PM emissions from stockpiles and haul roads.

The environmental and health effects of PM can vary depending on the size of the particles. Larger particles rapidly settle out of the air due to gravity and pose a limited health risk. Particles between 10 and 50 microns in diameter rarely penetrate deeply into the human respiratory system, but are trapped and removed by the body's natural defenses. Smaller particles are less heavy, stay in the air longer and travel farther, contributing to haze. These particles also can be inhaled more deeply into human lungs, increasing the potential for significant adverse health effects. In addition, smaller particles generally are comprised of more toxic substances than larger particles.

Because of these differences, the EPA maintains two separate ambient air quality standards for particulate matter. One standard addresses PM_{10} particles that are equal to or less than 10 microns in diameter. The other standard addresses levels of very fine particulate matter (known as $PM_{2.5}$), which contains particles equal to or less than 2.5 microns in diameter. In comparison, a human hair is about 70 microns in diameter. Adverse health effects have been associated with exposures to PM_{10} over short periods (such as a day). Particles in the PM_{10} range are small enough to invade the body's natural defense systems and penetrate into the lungs, where tissue is damaged and the immune system is weakened. As a result of research on particulate matter, the EPA adopted a PM_{10} standard in 1987, replacing a previous total suspended particulate standard. In a 2006 revision, the EPA established the current 24-hour PM_{10} ambient air quality standard. However, the EPA revoked the annual standard, meaning the standard is no longer in effect. The federal agency has determined that the short-term 24-hour standard makes the annual standard unnecessary.

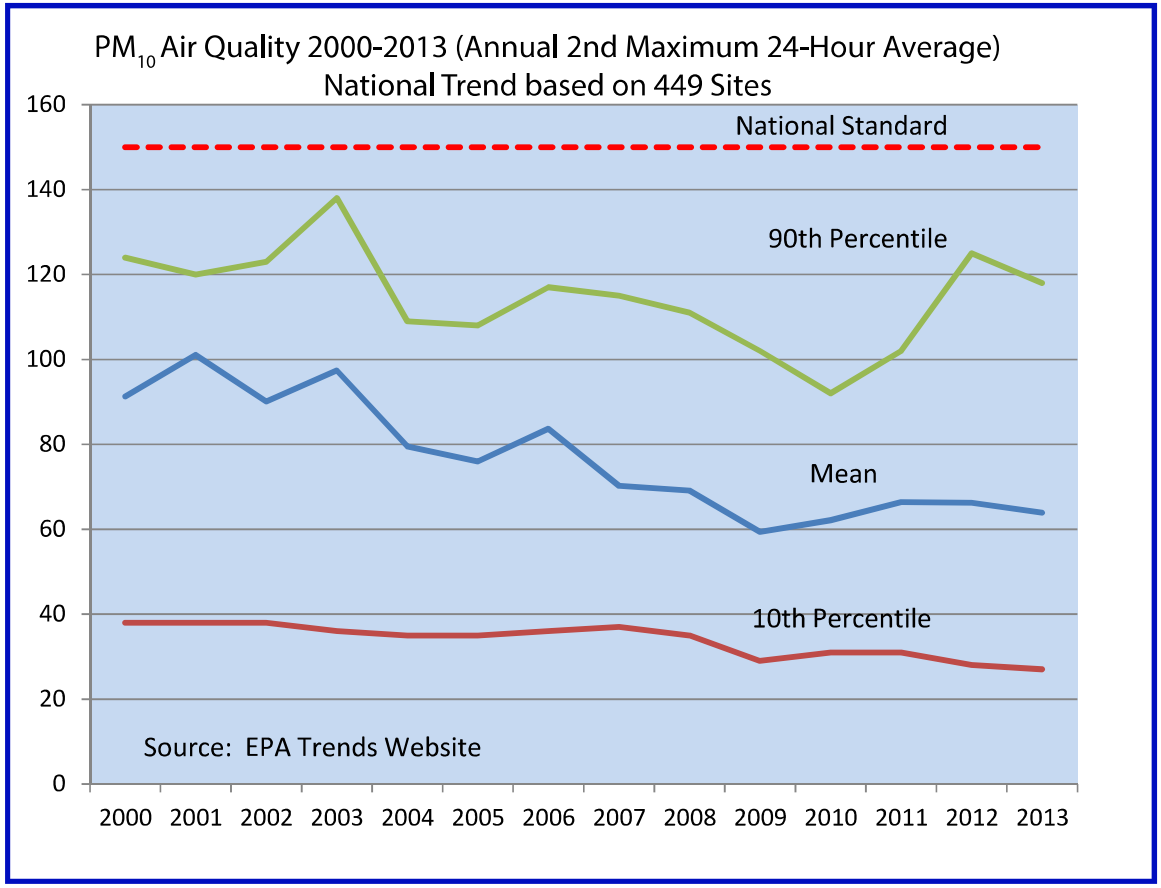
PRIMARY AIR QUALITY STANDARDS:	24-hour average not to exceed 150 µg/m³. Average number of expected exceedances per year not to exceed 1.0.
SECONDARY NAAQS:	Same as primary standard.

The DAQ's monitoring network measures PM_{10} at five different sites in three counties across West Virginia. Monitors are jointly located at Oak Street in Weirton for quality assurance and quality control purposes. All monitoring sites have shown consistent averaged values that are well below the current 24-hour and the former annual NAAQS.

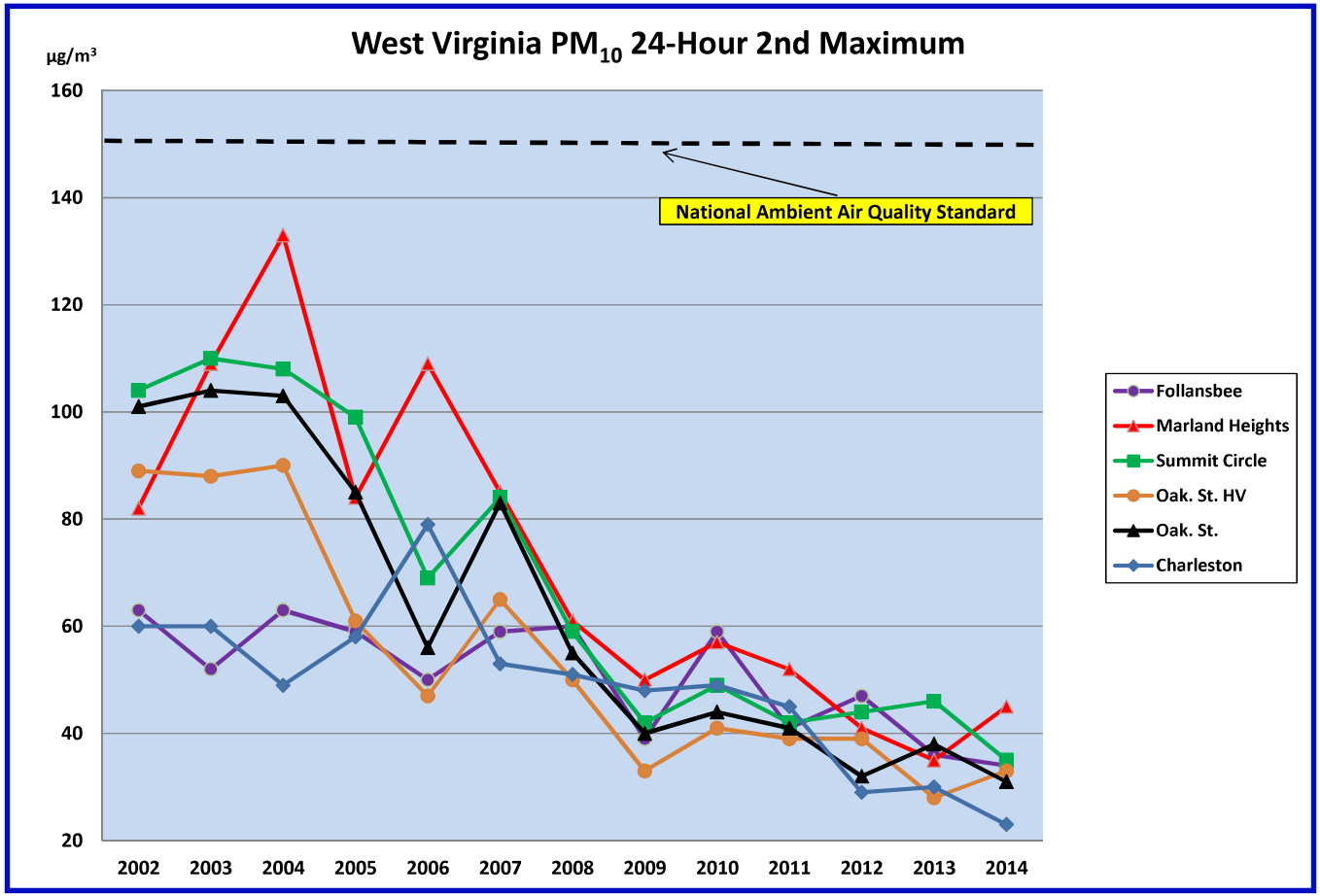
Particulate Matter (PM_{10}) Less than 10 microns in diameter

Nationally, PM_{10} concentrations have decreased 39% since 1988. Programs aimed at reducing direct emissions of particles have played an important role in PM_{10} concentrations. Some examples of PM_{10} controls include paving previously unpaved roads, replacing wood and coal with cleaner-burning fuels, such as natural gas, and using best management practices for dust sources at agricultural facilities.

Additionally, EPA's Acid Rain Program has substantially reduced SO_2 emissions from power plants since 1995 in the eastern United States, contributing to lower particulate matter concentrations. Direct emissions of PM_{10} have decreased approximately 25% nationally since 1988.



Particulate Matter (PM_{10}) Less than 10 microns in diameter



Particulate Matter ($PM_{2.5}$) Less than 2.5 microns in diameter

Medical and scientific research on the health effects of particulate matter continued after the implementation of the PM_{10} standard. As a result of further research, it was determined that very fine particles in the 2.5 microns diameter and less size range have the most adverse effects on human health. Discussion of $PM_{2.5}$ standards may sometimes be confusing because separate but overlapping sets of standards were adopted in 1997, 2006, and 2012, respectively. Each set has an annual standard and a 24-hour standard. After each standard was established, EPA designated areas as meeting (attainment) or not meeting (nonattainment). Therefore, each area could be designated as nonattainment for the 1997 standard but designated as attainment for the 2006 standard. The 2012 standard is the most stringent and all monitored areas in West Virginia are meeting that standard. Thirteen $PM_{2.5}$ monitoring sites were operated in West Virginia in 2014. A special filter-weighing laboratory is used to analyze filters from these monitors.

PRIMARY AIR QUALITY STANDARDS:	Annual arithmetic mean not to exceed 12 µg/m³ (based on a 3-year average). 24-hour concentration 35 µg/m³. (3-year average of the 98th percentile)
SECONDARY NAAQS:	Same as primary standard.

Based on the 2002-2004 data, the annual 15 µg/m³ $PM_{2.5}$ non-attainment areas, as published by the EPA in April 2005, for the state are shown in the chart on page 15. The rest of the state was considered to be in attainment for the annual $PM_{2.5}$ standard. The DAQ successfully redesignated the Huntington area to attainment in December 2012. Parkersburg and Wheeling were redesignated to attainment in September 2013. In 2014, Charleston and Weirton were redesigned to attainment in March and Martinsburg in November.

In December 2006, the EPA strengthened the 24-hour fine particle standard from the 1997 level of 65 µg/m³ to 35 µg/m³, and retained the annual fine particle standard at 15 µg/m³. The EPA issued final designations in November 2009. Except for the Charleston and Weirton areas, the entire state was designated attainment/unclassifiable. Both areas later monitored compliance with the 24-hour standard and were redesignated to attainment in March 2014. A historical summary of monitored $PM_{2.5}$ data is located on page 16.

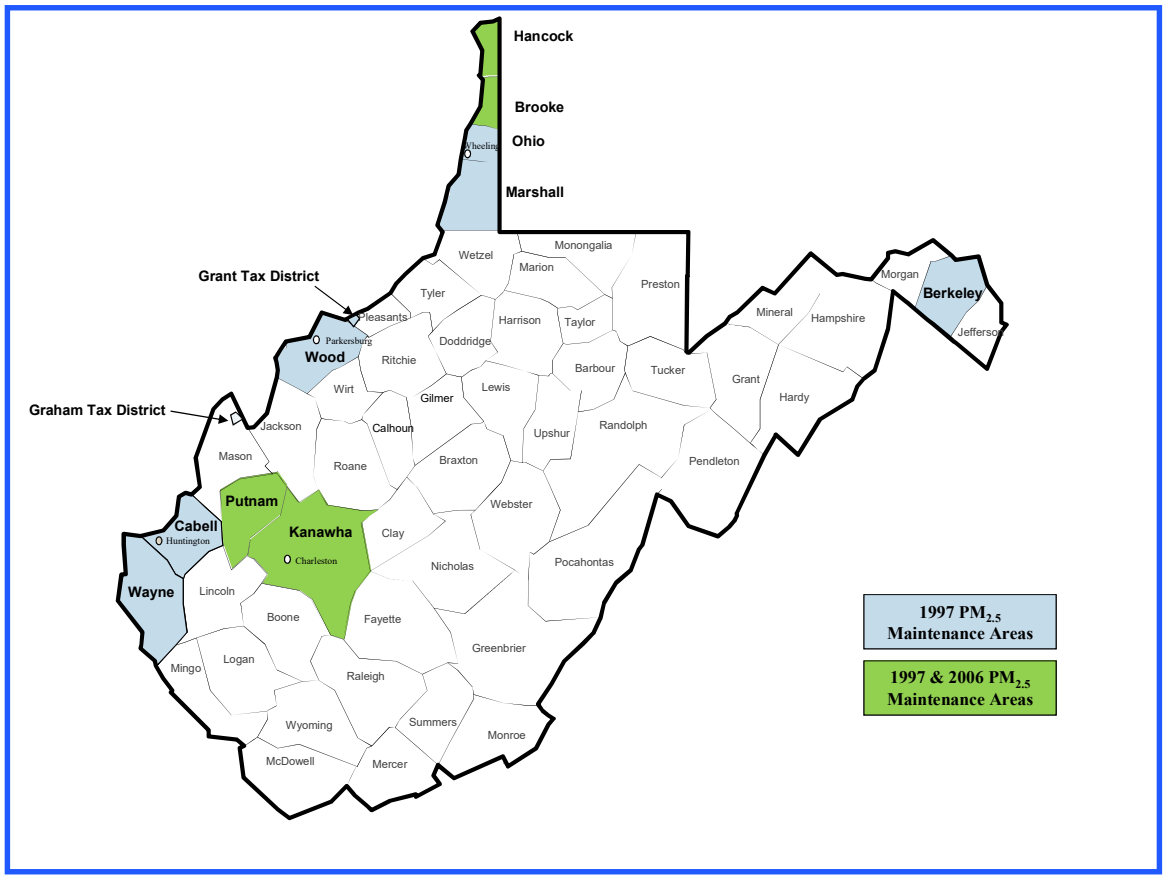
EPA most recently revised this standard in December 2012, tightening it to 12 µg/m³. Although the standard is significantly more stringent than the previous one, EPA designated the entire state to attainment/unclassifieable.The charts on page 17 show trends for $PM_{2.5}$ concentrations.

The DAQ operates three $PM_{2.5}$ speciation monitors to help determine the chemical makeup of fine particles. The monitors are located at South Charleston, in the Kanawha Valley; at the Guthrie Agricultural Center north of Charleston; and at Moundsville in the Northern Panhandle. Samples collected by these monitors are analyzed for anions (particulate sulfate and nitrate), cations (particulate ammonium, sodium and potassium), trace elements and total carbonaceous material.

Particulate Matter ($PM_{2.5}$) Less than 2.5 microns in diameter

$PM_{2.5}$ Maintenance Areas

These areas are considered attainment with approved Maintenance Plans.



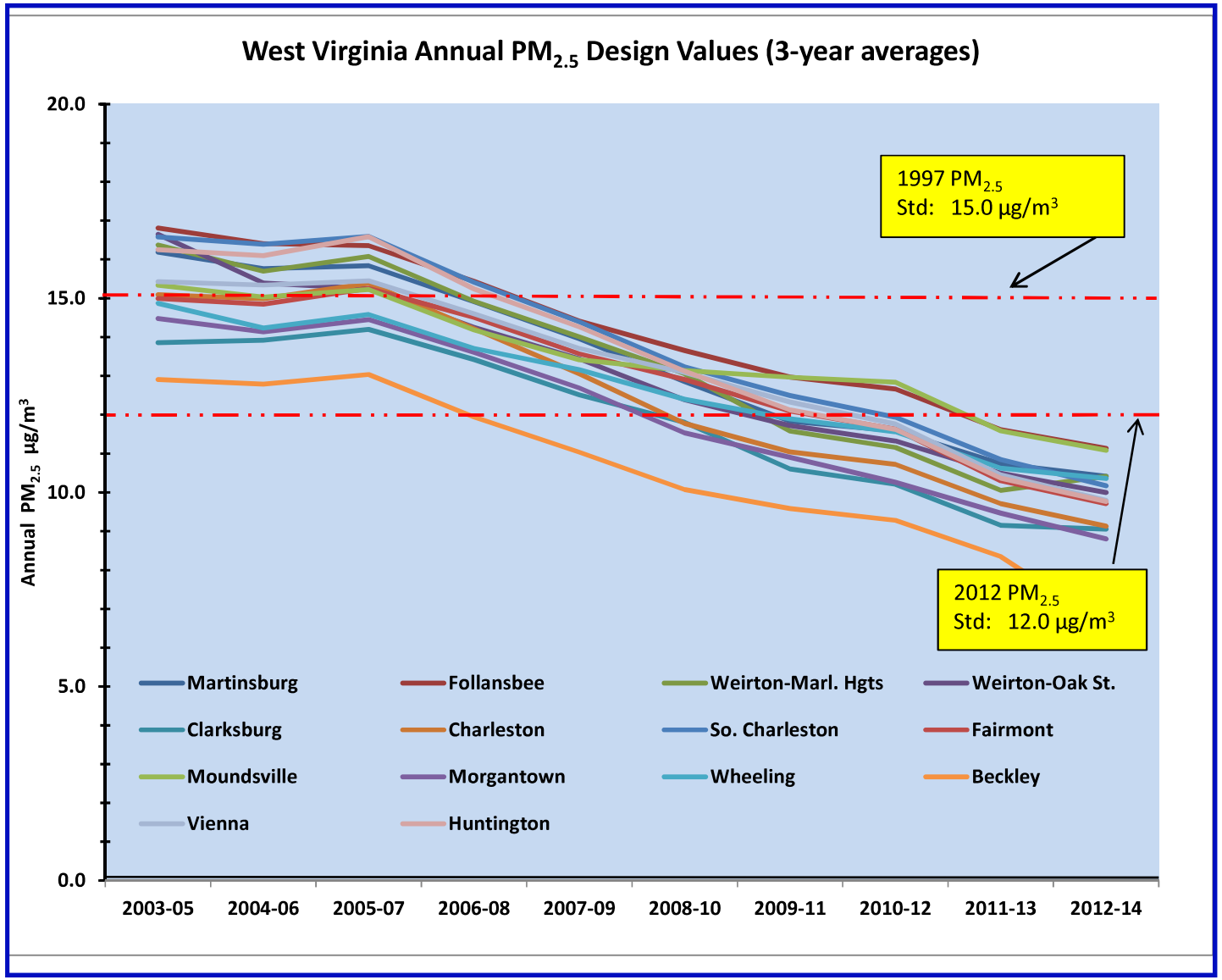
1997 $PM_{2.5}$ Maintenance Areas

Charleston (Kanawha and Putnam Counties)
Huntington (Cabell and Wayne Counties, Graham Tax District in Mason County)
Parkersburg (Wood County, Grant Tax District in Pleasants County)
Martinsburg (Berkeley County)
Weirton (Brooke and Hancock Counties)
Wheeling (Marshall and Ohio Counties)

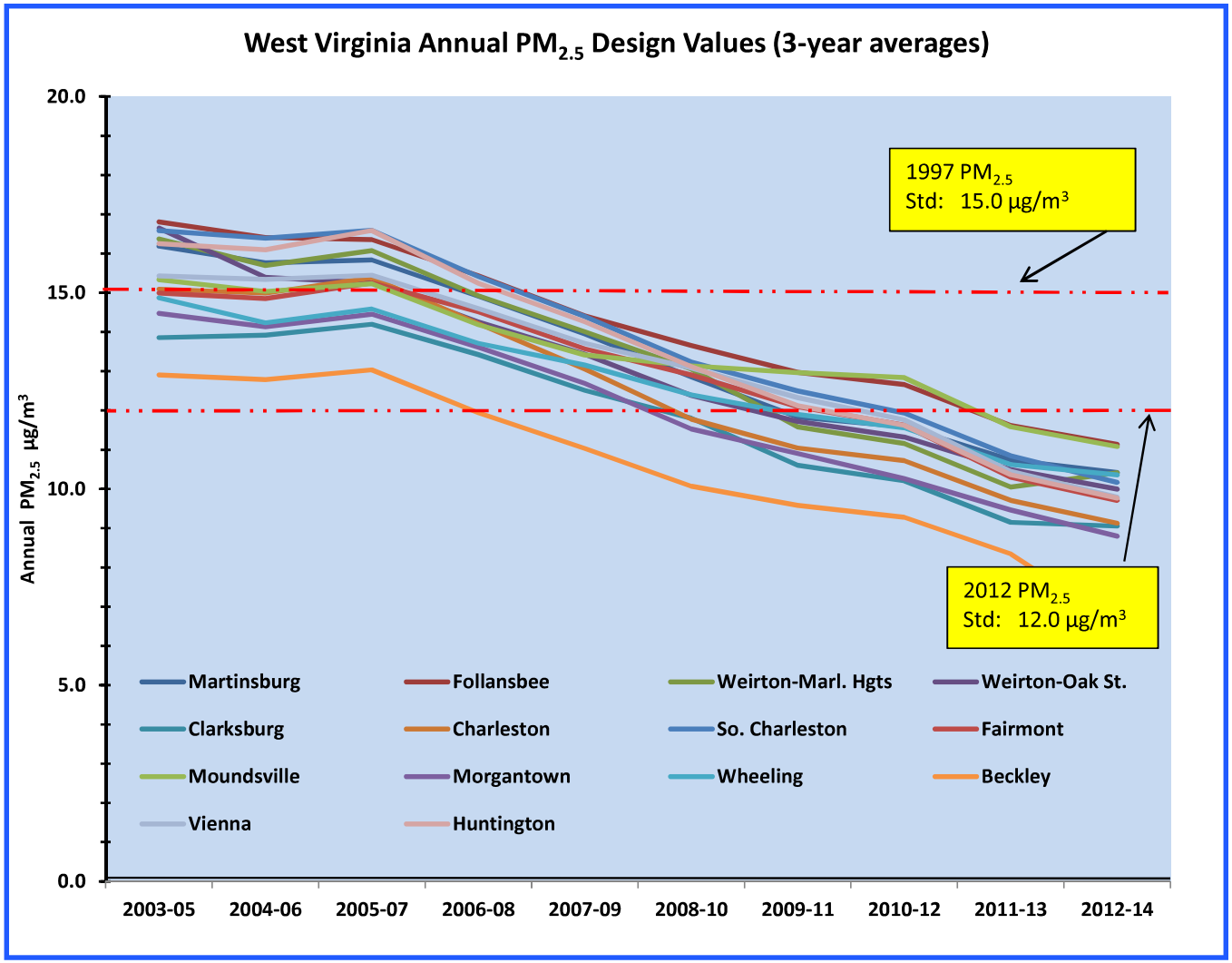
2006 $PM_{2.5}$ Maintenance Areas

Charleston (Kanawha and Putnam Counties)
Weirton (Brooke and Hancock Counties)

Particulate Matter ($PM_{2.5}$) Less than 2.5 microns in diameter



Particulate Matter ($PM_{2.5}$) Less than 2.5 microns in diameter



Sulfur Dioxide (SO_2)

Sulfur dioxide (SO_2) is a colorless gas that has a pungent odor. SO_2 can bind to dust particles and aerosols in the atmosphere, traveling long distances on prevailing winds. It can also combine with moisture in the atmosphere to form sulfuric acid (H_2SO_4), which is a component of acid precipitation (also known as acid rain) that causes acidification of soil and water, and the erosion of building surfaces. Sulfur compounds contribute to visibility degradation in many areas and can damage the foliage of trees and agricultural crops.

The main sources of SO_2 are combustion of coal and oil, refineries, smelters and industrial boilers. Nationally, two-thirds of all SO_2 emissions are from power plants.

SO_2 is an irritant that can interfere with normal breathing functions even at low concentration levels. It also aggravates pre-existing respiratory, cardiovascular and pulmonary diseases.

PRIMARY AIR QUALITY STANDARDS:	1-hour concentration 75 ppb (3-year average 99th percentile)
SECONDARY NAAQS:	3-hour concentration not to exceed 0.50 ppm more than once per year.

In June 2010, the EPA revised the primary SO_2 standard, designed to protect public health, to 75 parts per billion (ppb) measured over a 1-hour period. The previous primary standards were 140 ppb measured over 24-hours and 30 ppb averaged over an entire year, which were revoked. The EPA also adopted a new "form" of the standard (based on the 3-year average of the 99th percentile) to determine compliance with the new NAAQS. Current scientific evidence links health effects with short-term exposure to SO_2 ranging from five minutes to 24 hours. Adverse respiratory effects include narrowing of the airways which can cause difficulty breathing (bronchoconstriction) and asthma symptoms. These effects are particularly important for asthmatics during periods of faster or deeper breathing (e.g. while exercising or playing). Studies also show an association between short-term SO_2 exposure and increased visits to emergency rooms and hospital admissions for respiratory illnesses, particularly in at-risk populations including children, the elderly and asthmatics.

In 2012 the EPA finalized action to retain the current secondary standard for SO_2. All of West Virginia SO_2 monitored values are well below the secondary standard of 0.50 ppm (3-hour concentration not to be exceeded more than once per year).

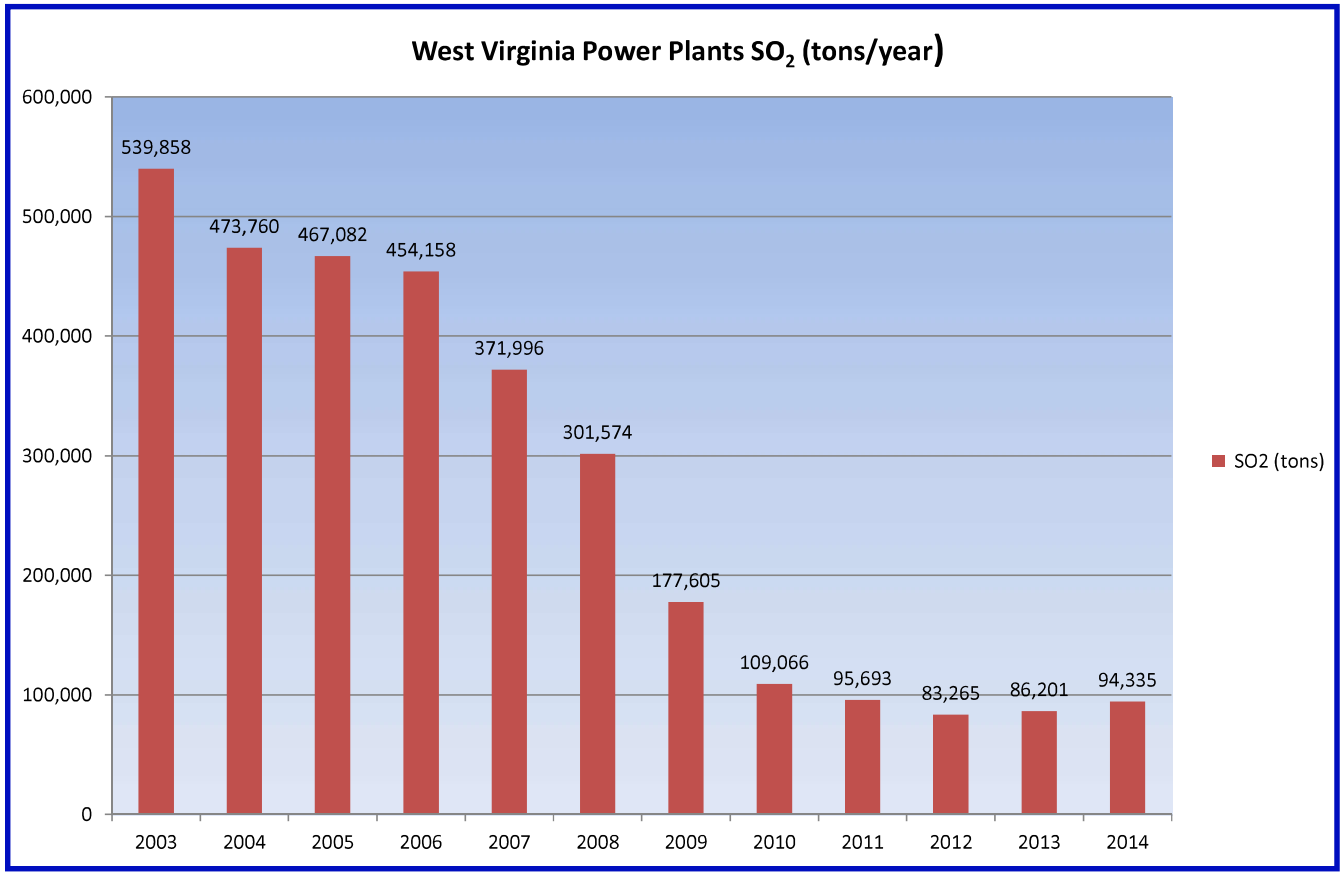
SO_2 can also react with other compounds in the atmosphere to form small particles. These small particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis, and can aggravate existing heart disease, leading to increased hospital admissions and premature death.

The chart on page 20 shows how the monitoring sites compare to the one-hour SO_2 standard. The one-hour standard is a short term averaging period for SO_2 monitoring. While air quality has continued to improve over the years and the 24-hour, annual and three-hour SO_2 values have declined, the current data show that the Brooke County sites remain above the more stringent one-hour standard.

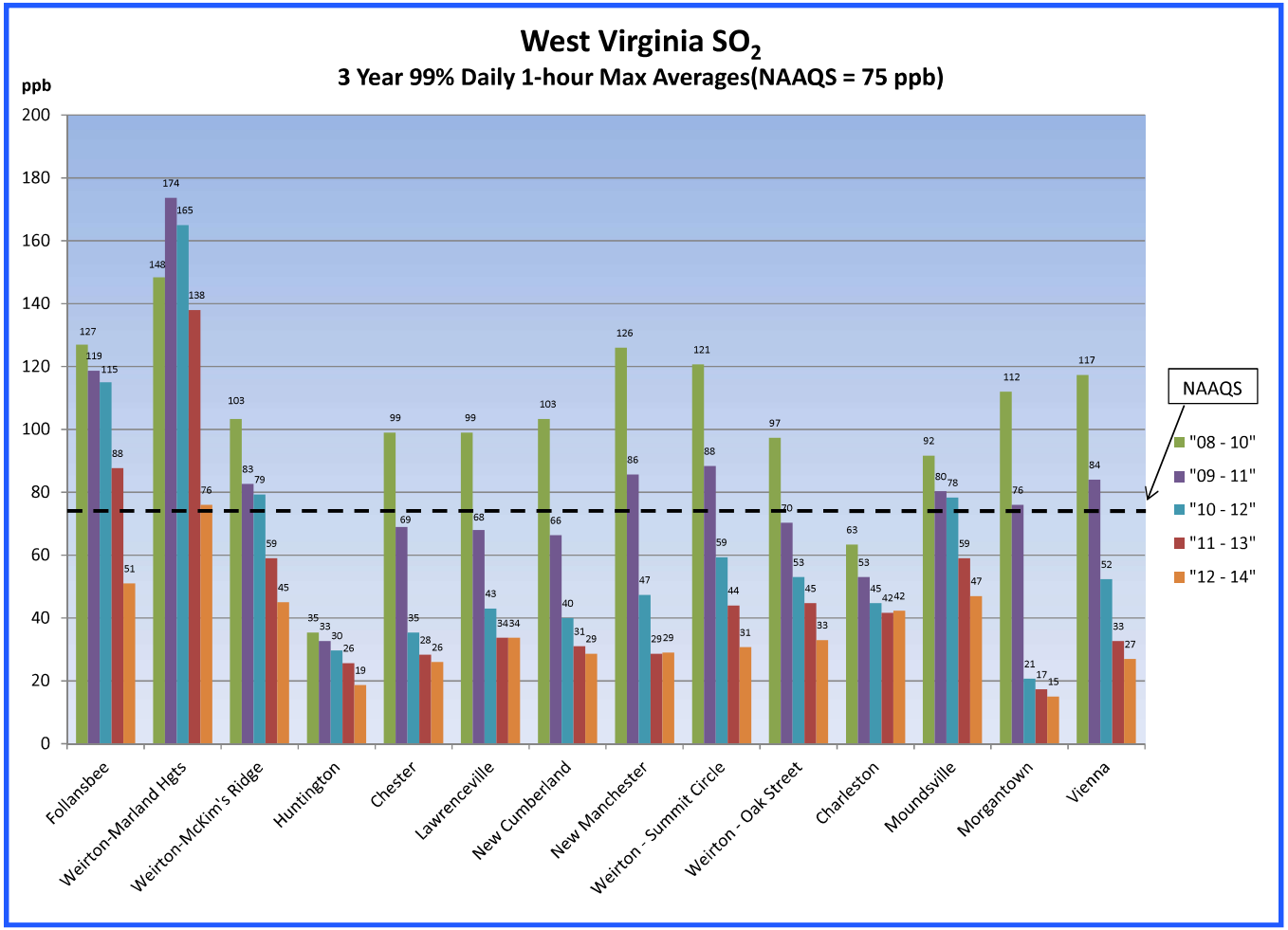
Sulfur Dioxide (SO_2)

West Virginia has made significant reductions in SO_2 emissions from power plants. Through implementation of the federal Acid Rain Program and the regional Clean Air Interstate Rule (CAIR), SO_2 emissions have plummeted about 83%, from 539,858 (CY 2003) to 94,335 (CY 2014) tons/year. Several large power plants in the state have invested in very efficient control technologies such as flue-gas desulfurization (FGD). The sharp decrease in emissions after CY 2008 is largely due to application of this technology.

Like many environmental issues, power plant emissions are affected by the cumulative actions of millions of individual people. Therefore, each individual can also reduce their contribution to the problem and become part of the solution. Individuals can contribute directly by conserving energy, since energy production is closely related to SO_2 emissions.



Sulfur Dioxide (SO_2)



Carbon Monoxide (CO)

Carbon monoxide is an odorless, colorless, poisonous gas produced by incomplete combustion of fuels. The primary source of carbon monoxide is the exhaust from motor vehicles, which includes highway vehicles, as well as non-road vehicles, such as construction equipment. Concentrations are usually highest along heavily traveled highways, but industrial sources can also cause levels to rise. Other sources include incinerators, kerosene and wood stoves, furnaces and some industrial processes. The chart on page 24 shows these national sources of CO emissions.

The main health effect of CO is its tendency to reduce the oxygen carrying-capacity of the blood. Depending on the level of exposure, CO can cause fatigue, headaches, and impaired vision and reflexes at moderate concentrations. Unconsciousness and even death may occur at high concentrations. The severity of the effects is related to the length of exposure and concentration level of CO.

PRIMARY AIR QUALITY STANDARDS:	8-hour average not to exceed 9 ppm more than once per year. 1-hour average not to exceed 35 ppm more than once per year.
SECONDARY NAAQS:	None.

In August 2011, the EPA issued a decision to retain the existing NAAQS for carbon monoxide. The EPA affirmed that the current standards provide the required level of public health protection, including protection for people with heart disease, who are especially susceptible to health problems associated with exposures to CO in ambient air. There are no secondary (welfare-based) NAAQS for CO due to a lack of evidence of direct effects on public welfare at ambient concentrations. Two Hancock County and one Brooke County monitoring sites measured carbon monoxide levels through December 31. In 2014, all sites reported levels below the one-hour and eight-hour standards.

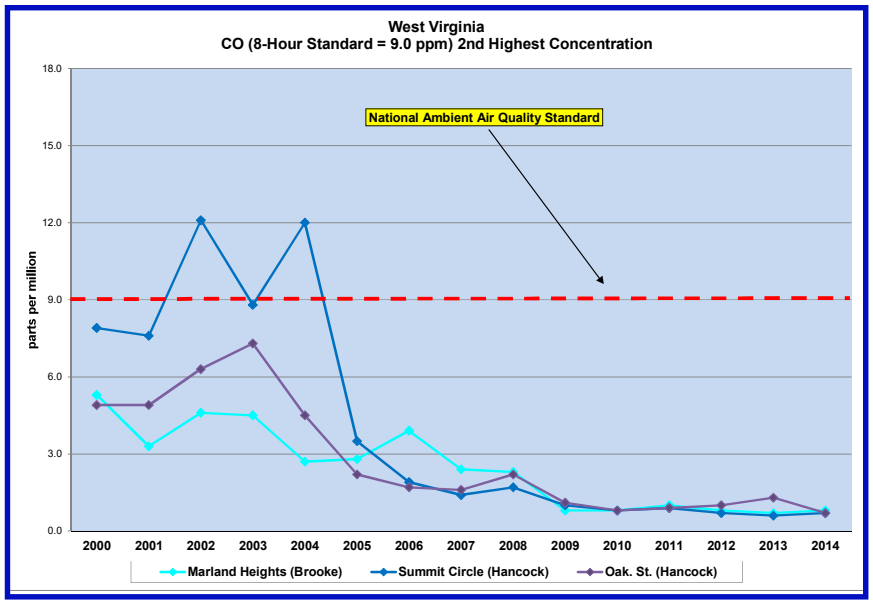
The EPA revised minimum requirements for CO monitoring by requiring monitors to be sited near roads in certain urban areas. Specifically, the EPA required the co-location of one CO monitor with a "near-road" NO_2 monitor in urban areas having populations of 1 million or more. Also, the EPA specified that monitors required in Core Based Statistical Areas (CBSAs) of 2.5 million or more people be operational by January 1, 2015. Monitors required in CBSAs having 1 million or more people are required to be operational by January 1, 2017. West Virginia does not have any areas that trigger these "near-road" monitoring requirements.

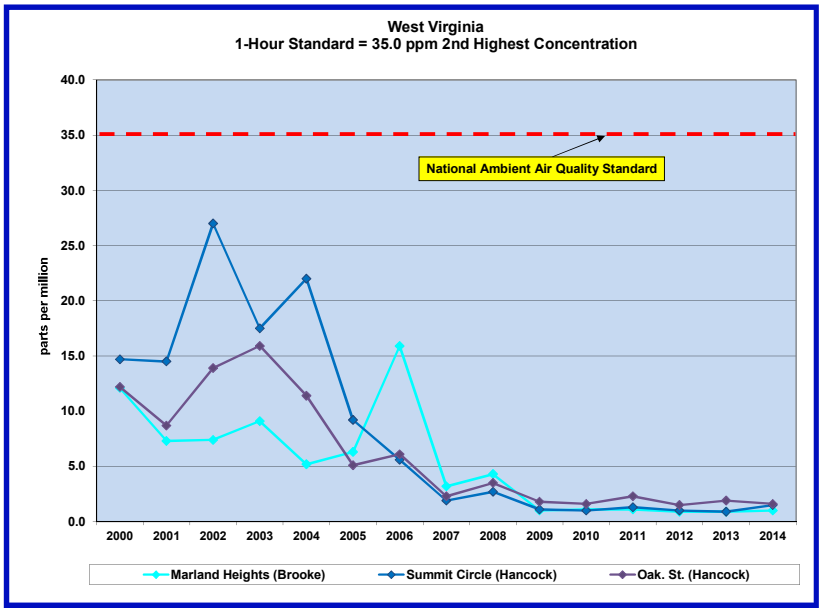
A historical summary of monitored CO data is located on page 22.

Many strategies for reducing CO emissions from energy usage are cross-cutting and apply to homes, businesses, industry, and transportation. Make sure appliances are installed and operated according to the manufacturer's instructions and local building codes. Most appliances should be installed by qualified professionals. Have your heating system professionally inspected and serviced annually to ensure proper operation. The inspector should also check chimneys and flues for blockages, corrosion, partial and complete disconnections, and loose connections.

In addition to CO in the ambient air outside of the home, CO levels in the home are of concern. Dangerous levels of CO in your home can be caused by improper installation and maintenance of fuel burning applications.

Carbon Monoxide (CO)

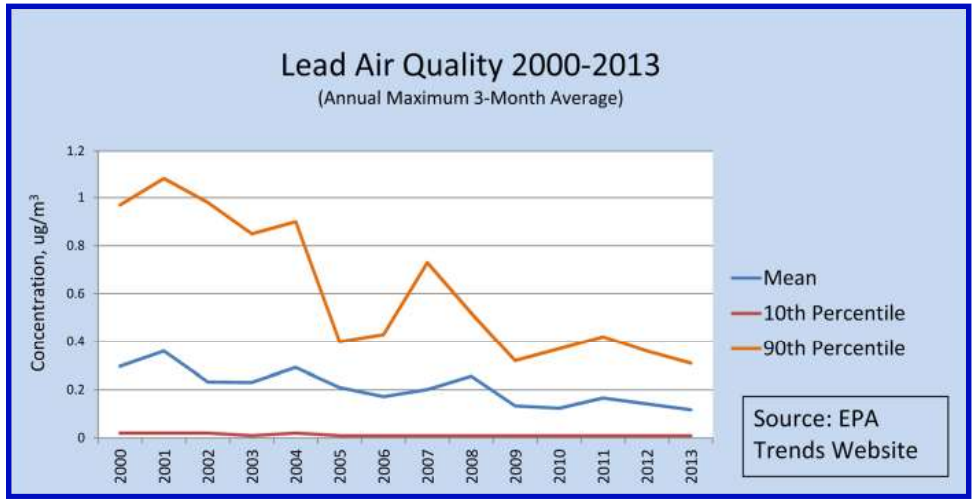




Lead (Pb)

Prior to 1996, lead additions in gasoline burned in engines was a significant portion of lead emissions in ambient air. Under the Clean Air Act Amendments of 1990, lead in gasoline was required to be eliminated by January 1, 1996, and replaced with unleaded gasoline. The DAQ lead monitoring network in place at that time began recording much lower lead values as a result of the switch. As monitored lead concentrations in the ambient air dropped significantly and the national emphasis on lead monitoring diminished, these monitors were removed and the resources reallocated to other monitoring initiatives, such as for $PM_{2.5}$.

Based on new health studies, the EPA tightened the lead standard in 2008, making it 10 times more stringent than the previous standard. The agency revised the primary standard from 1.5 micrograms per cubic meter to 0.15 µg/m³.



In December 2010, the EPA changed the emission threshold that state monitoring agencies must use to determine if an air quality monitor should be placed near an industrial facility that emits lead. The new emission threshold is 0.5 tons per year (tpy), reduced from the previous threshold of 1.0 tpy. As a result of this change, the DAQ installed a lead monitor at an existing monitoring site in Huntington, West Virginia and began collecting data on February 3, 2012.

The EPA changed the calculation method for the averaging time to use a "rolling" three-month period with a maximum (not-to-be-exceeded) form, evaluated over a three-year period. This replaces the current approach of using calendar quarters. A rolling three-month average yields 12 three-month periods associated with a given year, not just the four calendar quarters within that year.

Finding Sources of Air Pollution

Criteria Pollutants

Pollutant	Sources	Health Effects	Environmental Effects
Carbon Monoxide (CO) Colorless, odorless poisonous gas, formed when carbon in fuels is not burned completely	Burning of gasoline, wood, natural gas, coal, oil, etc. (motor vehicle exhaust, industrial processes, fuel combustion)	Reduces oxygen delivery to the body's organs and tissues, causes visual impairment, and reduces work capacity, manual dexterity, and learning ability	A precursor to ozone and a useful tracer of combustion-derived pollutants
Lead (Pb) Solid metallic element	Aviation fuel, paint, metal smelters, battery plants, steel plants	May cause anemia, kidney disease, reproductive disorders, behavioral disorders, neurological impairments (seizures, mental retardation)	Harmful to wildlife
Nitrogen Dioxide (NO_2) From the nitrogen oxide family, forms when fuel is burned at high temperatures	Burning of gasoline, natural gas, coal, oil, etc. (diesel trucks, wood stoves, power plants, cars)	Irritates the lungs, lowers resistance to respiratory infections, increases incidence of acute respiratory illness in children	Contributes to acid rain and eutrophication (a reduced amount of oxygen) in coastal waters, which is destructive to fish and other animal life
Ozone (O_3) Chemical reaction of nitrogen oxides and volatile organic compound emissions (primary component of smog)	Gasoline vapors, chemical solvents, combustion products of various fuels, consumer products	Reduces lung function, induces respiratory inflammation, asthma, chest pain, coughing, nausea, pulmonary congestion	Damage to plants and trees, reduced visibility due to smog, permanent structural damage to the lungs of animals
Particulate Matter (PM_{10}, $PM_{2.5}$) Solid or liquid particles found in the air, originates from a variety of mobile and stationary sources	Burning of wood, diesel, and other fuels (diesel trucks, wood stoves, power plants), agriculture (plowing and burning of fields), unpaved roads	Effects on breathing and respiratory system, damage to lung tissue, nose and throat irritation, cancer, premature death	Reduced visibility, damage to manmade materials when acidic
Sulfur Dioxide (SO_2) From the sulfur oxide family, forms when fuel containing sulfur is burned	Burning of coal and oil, diesel engines, industrial processes (metal smelting, paper, oil refining)	Effects on breathing, respiratory illness, alterations in pulmonary defenses, aggravation of existing cardiovascular disease	Damage to the foliage of trees and agricultural crops, acidification of lakes and streams, accelerated corrosion of buildings and monuments, reduced visibility

Compliance & Enforcement

Compliance & Enforcement

The DAQ's Compliance and Enforcement Section is responsible for conducting inspections and investigations of air pollution sources in West Virginia, addressing citizen complaints involving alleged air pollution violations, and inspecting asbestos demolition and renovation projects in West Virginia.

The sources involved are subject to a wide range of regulations, including EPA-delegated programs, EPA-approved State Implementation Plans (SIPs), and state-only regulations. Most of the EPA-delegated programs are rules governing the emissions of hazardous air pollutants utilizing maximum achievable control technology (MACT) standards or are subject to federal new source performance standards (NSPS).

Compliance actions are defined as follows:

- **Full Compliance Evaluation (FCE)**
  A comprehensive evaluation of a facility addressing all regulated pollutants at all regulated emission points. DAQ conducts FCEs of both major and minor sources of air emissions. The charts on pages 26 and 27 show FCEs of major and minor sources, respectively, by regional office across the state during 2014.

- **Partial Compliance Evaluation (PCE)**
  A comprehensive evaluation of a subset of regulated pollutants or regulated emission points at a facility.

- **Stack Test Activity**
  A stack test is the actual measurement of pollutant emissions from a process vent and is performed using a scientifically developed and approved method(s) designed for the specific pollutant being measured. Stack test activities include observing the test in person and reviewing the analytical results.

- **Title V Certification Review**
  A Title V certification is written documentation certifying that a company has or has not complied with each of the requirements of it's Title V operating permit. These certifications are reviewed by the Compliance and Enforcement Section.

- **Self Monitoring Report (SMR) Review**
  A self monitoring report is a report submitted by a company, often required by a permit or regulation, to report actual emissions of pollutants or operating conditions that may indicate emissions of pollutants. These reports are reviewed by the Compliance and Enforcement Section.

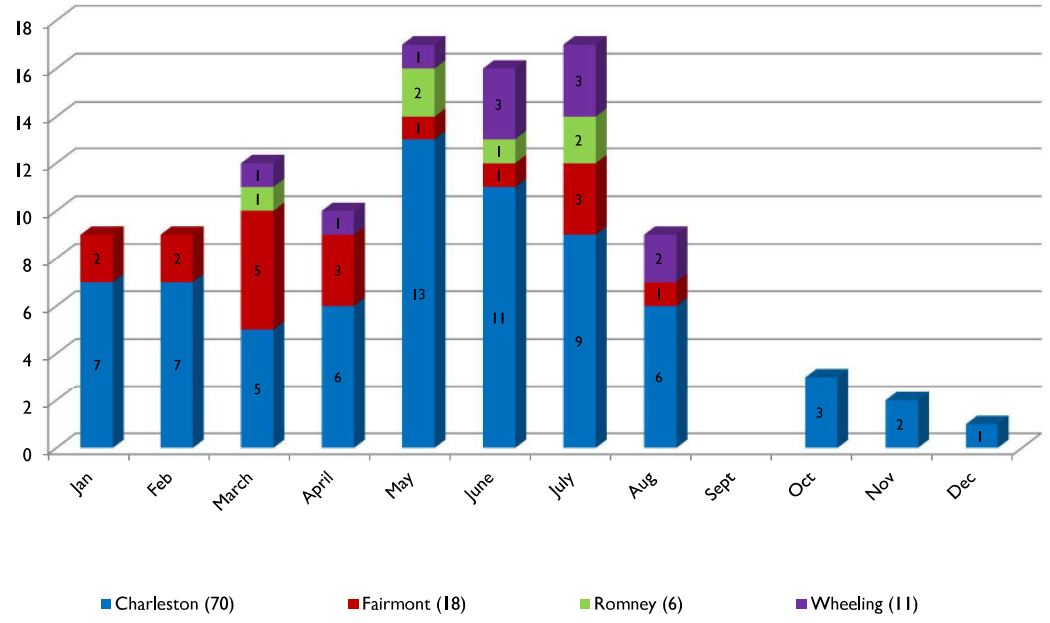
- **Continuous Emissions Monitoring System (CEMS) Review**
  A CEMS is a system of instruments that continuously measures pollutant emission concentrations and/or quantity and is capable of recording and reporting them. The Compliance and Enforcement Section reviews CEMS reports.

Sources are regularly inspected in order to determine compliance and meet program goals, as follow-up to previously cited violations and to address citizen complaints. The chart on page 28 shows the citizen complaints handled by regional office during 2014.

Compliance & Enforcement

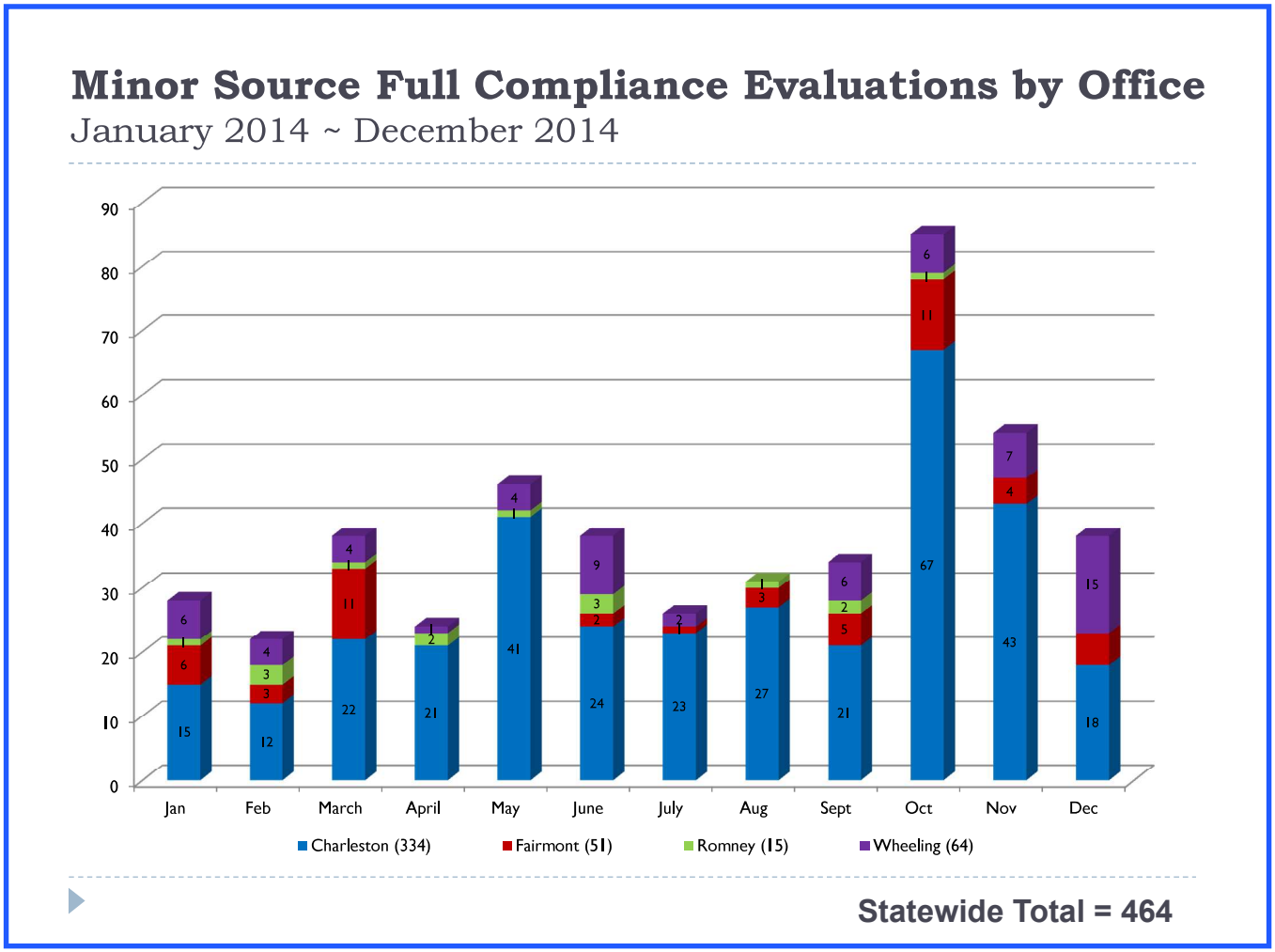
Title V Major
Full Compliance Evaluations by Office

January 2014 ~ December 2014

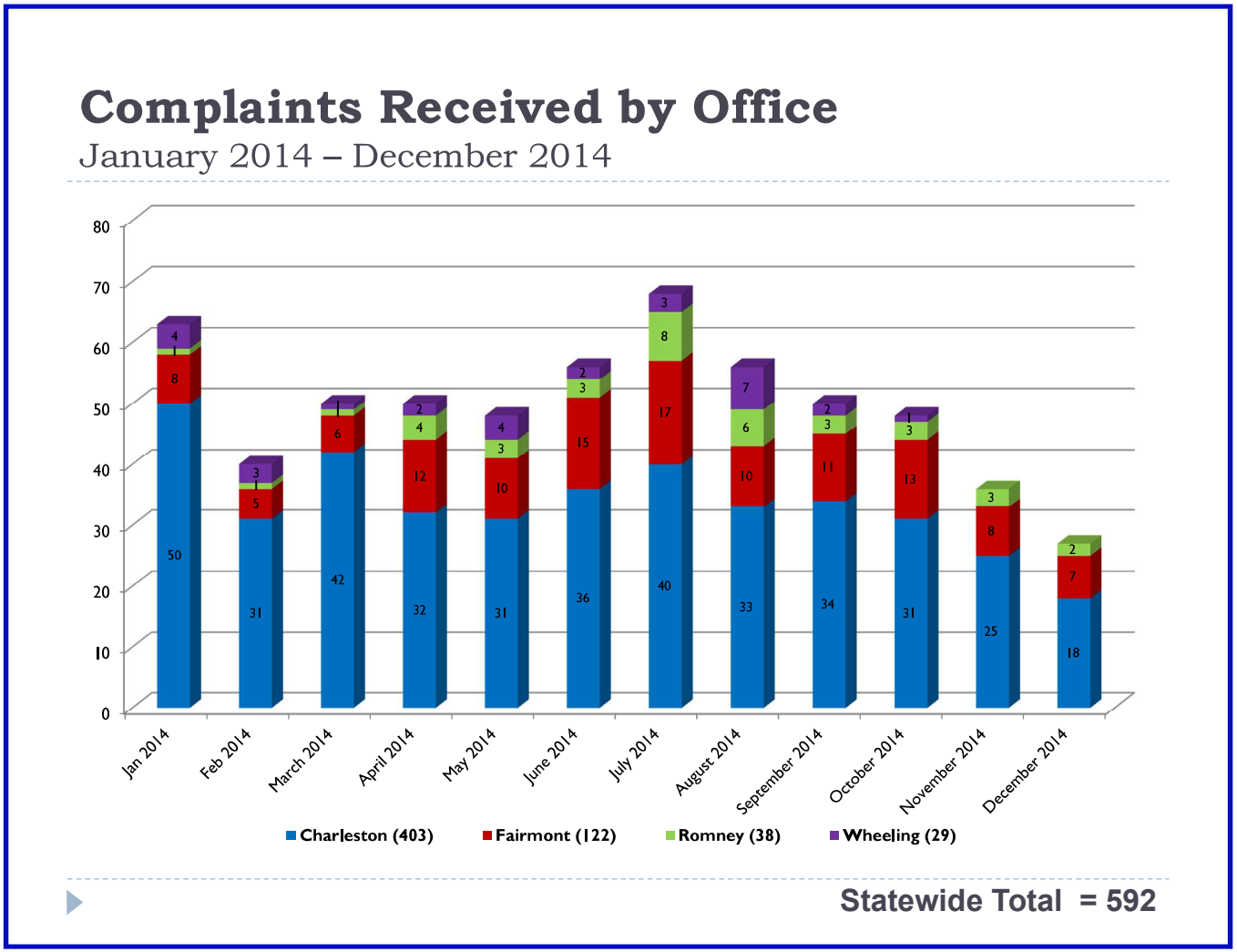


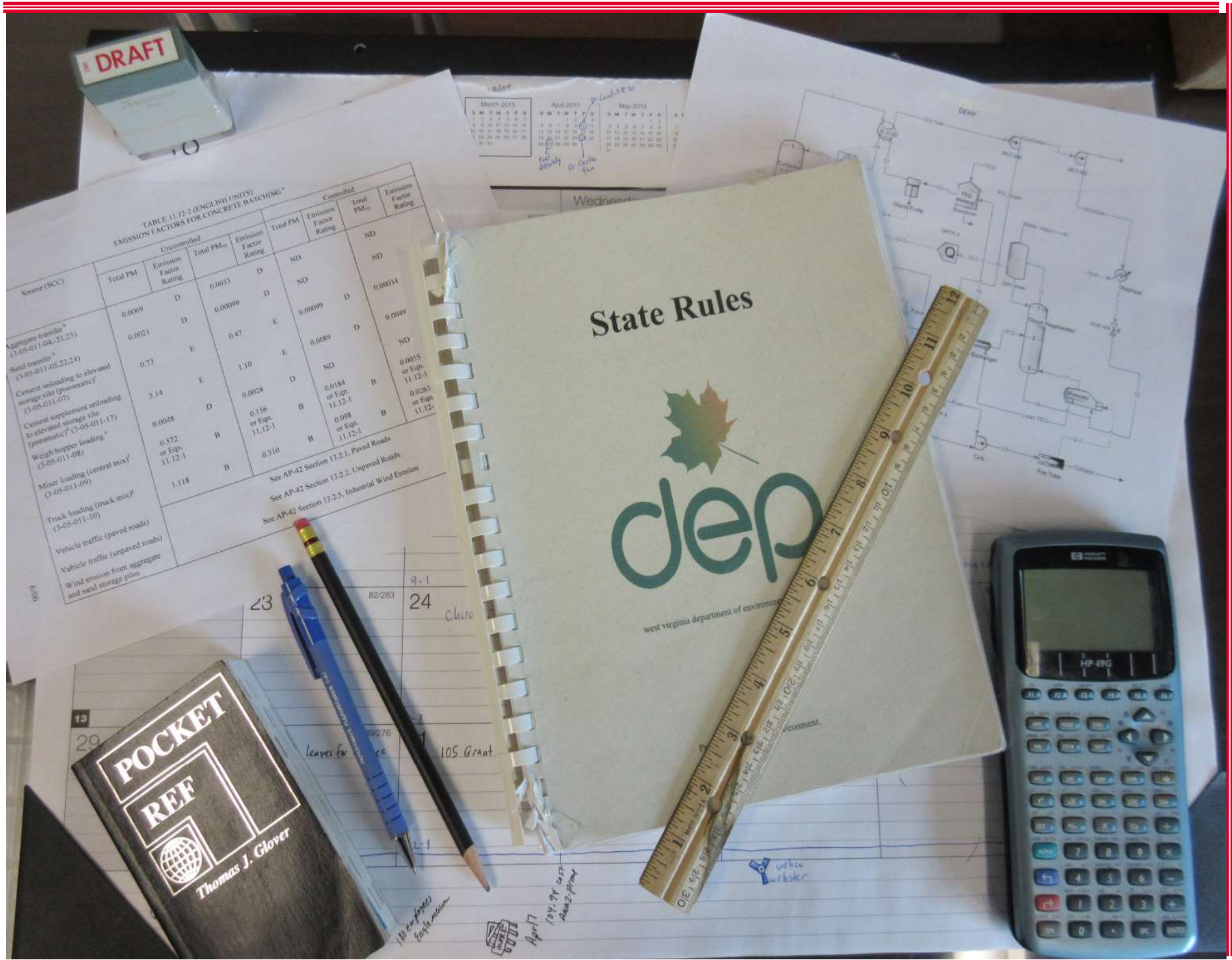
Statewide Total = 105

Compliance & Enforcement



Compliance & Enforcement




DRAFT
State Rules
dep
west virginia department of environment
POCKET
REF
Thomas J. Glover
HP 48G

Permitting

Permitting

The DAQ's Permitting Section implements West Virginia's permit program established under the State's Air Pollution Control Act.

New Source Review (NSR)

West Virginia's permit program includes review of applications, determination of permit applicability and issuance of permits for both minor and major sources. Minor sources are primarily permitted under the minor source rule found at 45CSR13. Major sources are primarily permitted under the new source review rules found at 45CSR14 and 45CSR19. NSR permits must be obtained prior to operation of the source.

Our goal is to set forth the procedures for obtaining a permit to construct, modify, relocate and operate a new stationary source; a temporary permit; a general permit registration; and, for filing notifications of changes not otherwise subject to permit requirements. All applications by any person must conform to the review procedures and conditions of the West Virginia Code as well as West Virginia permitting rules.

We strive to ensure that economic growth will occur in harmony with the preservation of existing clean air resources; to prevent the development of any new nonattainment problems; to protect the public health and welfare from any adverse effects which might occur even at air quality levels better than the NAAQS; and, to preserve, protect and enhance the air quality in areas of special natural, recreational, scenic and/or historic value.

The charts located on pages 31 and 32 provide a summary of the permitting actions in 2014.

Title V

Operating permits are legally enforceable documents that permitting authorities issue to air pollution sources after the source has begun to operate. Title V of the federal Clean Air Act, as amended in 1990, required each state to develop an operating permit program for major sources (and some minor sources) of air pollution. West Virginia's operating permit program issues Title V operating permits under the authority of 45CSR30 (Requirements for Operating Permits) which is the implementing rule of Title V of the 1990 Federal Clean Air Act Amendments. Sources required to obtain a Title V permit include the following:

- A major source which has the potential to emit, in aggregate, 10 tons per year (tpy) or more of any hazardous air pollutant listed pursuant to §112(b) of the CCA or 25 tpy or more of any combination of such hazardous air pollutants;
- A major source which has the potential to emit 100 tpy or more of any air pollutant;
- Any source, including an area source, subject to a standard or other requirements promulgated under §111 of the CCA;
- Any source, including an area source, subject to a standard or other requirements under §112 of the CCA;
- Any affected source which includes one or more affected units under Title IV of the CCA (Acid Deposition Control).

Permitting

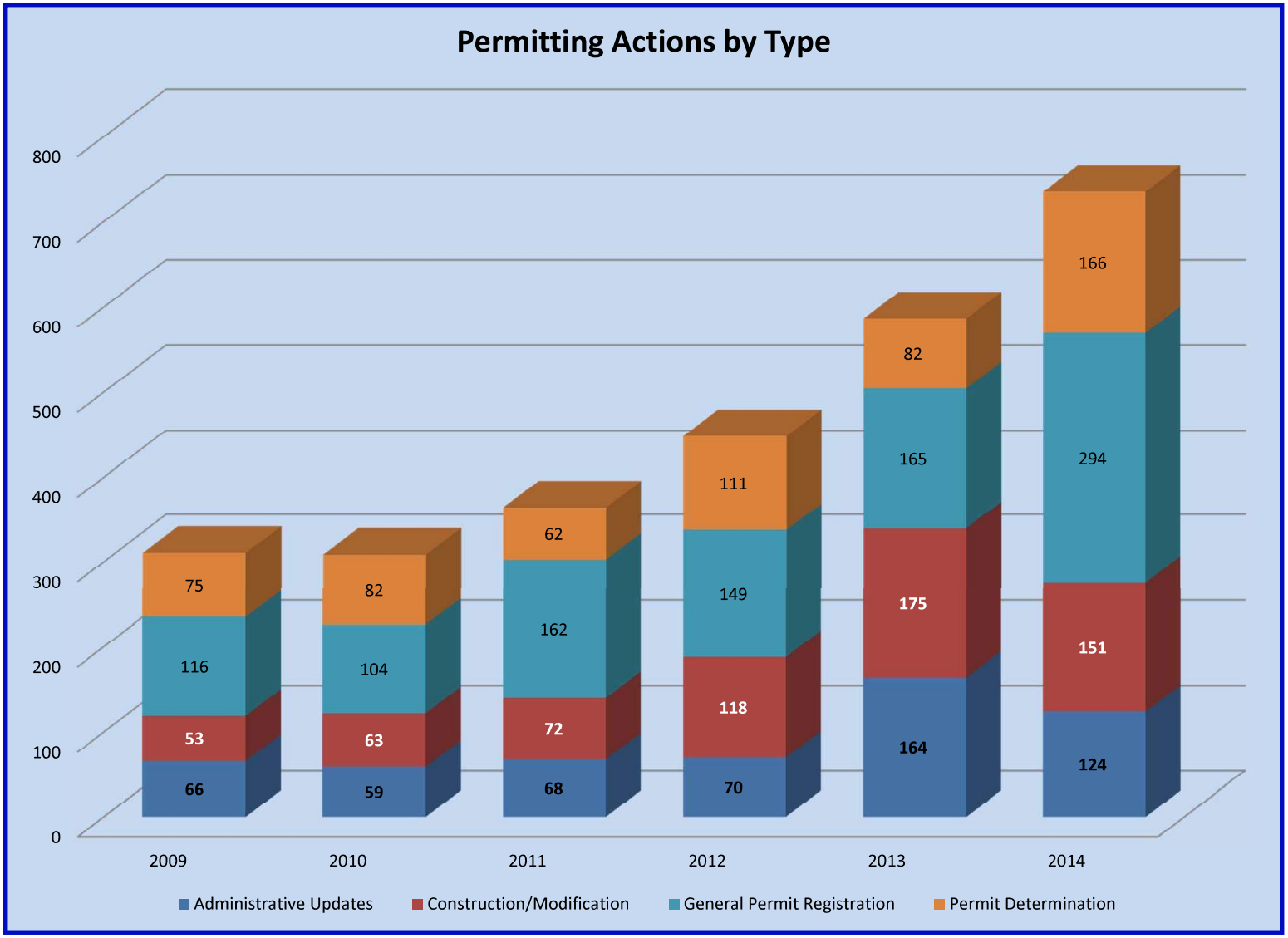
Title V operating permits identify all "applicable requirements" and include emission limits and standards, as well as monitoring, testing, recordkeeping, and reporting requirements. These permits also require submittal of reports of any required monitoring in the form of Semi-annual Monitoring Reports; and, the submittal of Annual Compliance Certifications which require the permittee to certify compliance with the conditions of their permit.

In addition to issuing and renewing Title V permits, the Title V Permit Group also reviews and processes administrative amendments, minor modifications, significant modifications, reopenings, and off-permit changes to a facility's existing Title V operating permit.

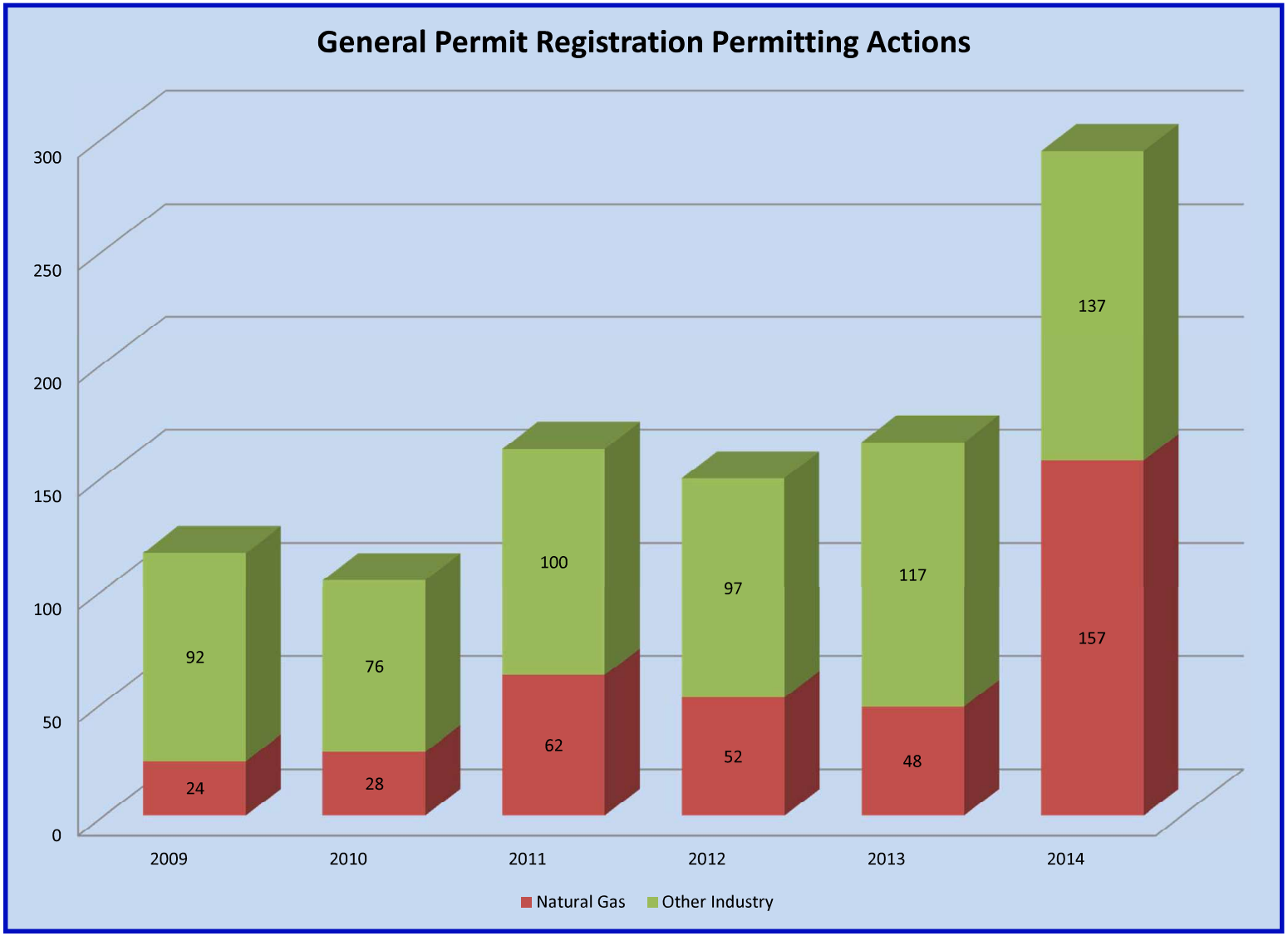
As of December 31, 2014, there were 168 Title V facilities in West Virginia and 193 active Title V permits (some facilities have multiple Title V permits). From January 1, 2014 to December 31, 2014, the following permitting actions were issued:

- 3 initial permits
- 20 renewals
- 12 significant modifications
- 40 minor modifications
- 10 administrative amendments

Permitting


Permitting Actions by Type
800
700
600
500
400
300
200
100
0
2009
2010
2011
2012
2013
2014
66
53
116
75
59
63
104
82
68
72
162
62
70
118
149
111
164
175
165
82
124
151
294
166
Administrative Updates
Construction/Modification
General Permit Registration
Permit Determination

Permitting


General Permit Registration Permitting Actions
300
250
200
150
100
50
0
92
24
76
28
100
62
97
52
117
48
137
157
2009
2010
2011
2012
2013
2014
Natural Gas
Other Industry

Photos taken with DAQ's FLIR GF320 camera that can detect hydrocarbon gases and changes in temperature that are not visible to the unaided eye. All photos are of the same stack. Top left photo shows the stack in visible light; top right photo shows colored thermal image of same object (bright is hotter than dark); bottom left image shows an infrared image in high sensitivity mode; bottom right image shows a black and white thermal image. This camera was purchased with an EPA grant. This technology is increasingly being used to detect leaking hydrocarbons from oil and natural gas industry processes.

Air Toxics

Implementation of the federal maximum achievable control technology (MACT) standards and other programs authorized by the 1990 Clean Air Act Amendments has been an on-going effort. Continued implementation of these federal rules, as well as state rules, has helped reduce emissions of air toxics in West Virginia and the nation. MACT standards, established by the EPA, regulate emissions of the 187 Hazardous Air Pollutants (HAPs) from various industrial sources, such as chemical plants, metallurgical manufacturers, refineries and surface coaters. Some HAPs are carcinogenic, some have only non-cancerous or acute effects, and some may exhibit all of these properties at certain exposure levels. Approximately two-thirds of the HAPs are known, probable, or possible human carcinogens. A few HAPs are known to bioaccumulate and bioconcentrate in humans and in the environment. All HAPs are not equivalent to one another in toxicity to humans or the environment.

Since 1993, the EPA has issued nearly 100 MACT standards covering almost 200 categories of large industrial sources. Additionally, there are a number of air toxics standards for smaller facilities, including older standards for dry cleaners, chromium electroplaters, secondary aluminum producers, wood preservers, small chemical manufacturing facilities, small boilers and newer standards for natural gas facilities with dehydrators. More information on air toxics efforts can be found at www.dep.wv.gov/daq and choosing the "air toxics" link.

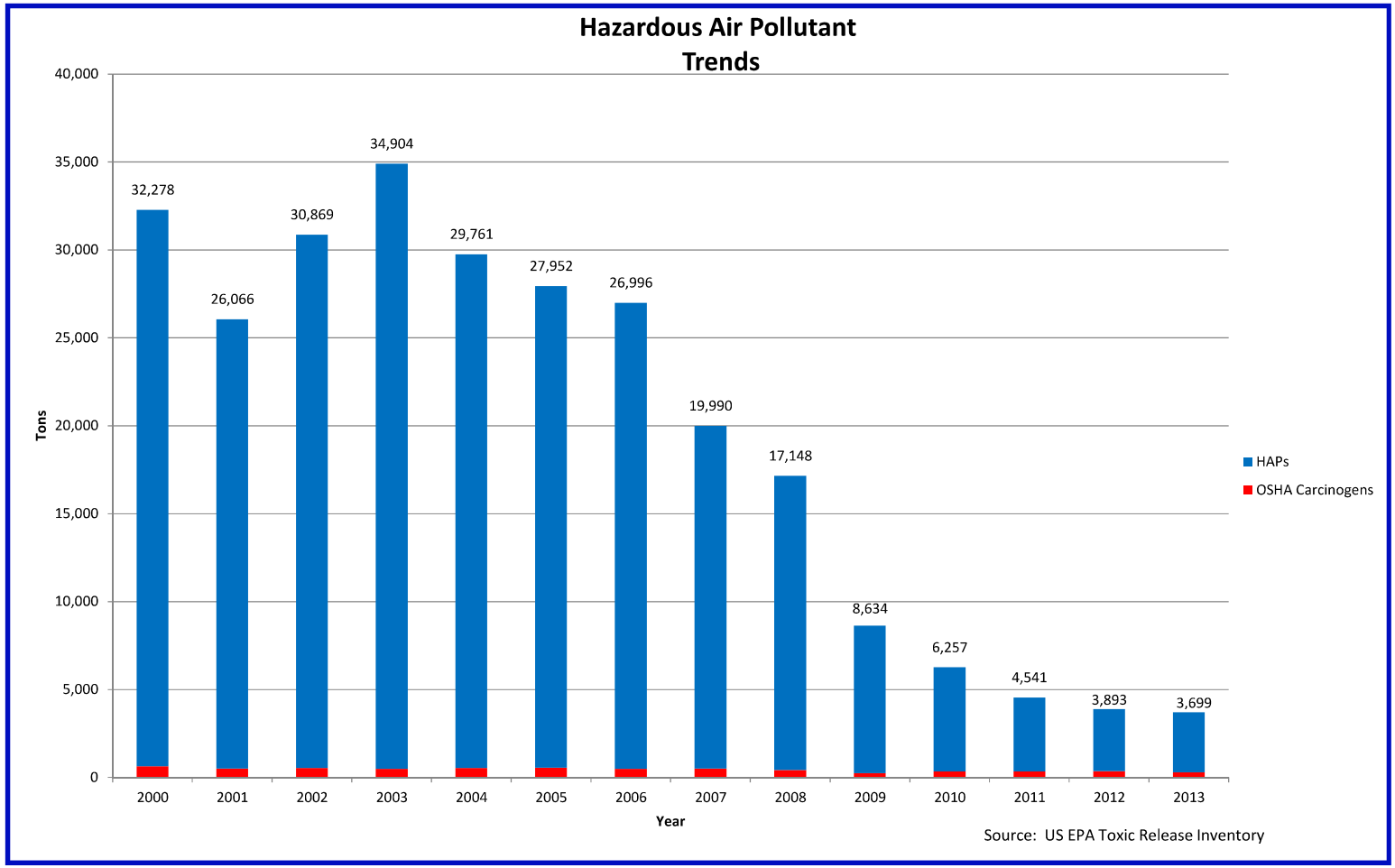
Air toxics emissions have decreased significantly in recent years due to the implementation of federal standards. As shown in the bar chart on page 34, HAP emissions continue to be reduced as the dates for complying with each of these standards for large and small facilities arrive. Over this period, the number of major sources has remained fairly consistent. The majority of HAP emissions in the state are acid gases, such as hydrogen chloride and hydrogen fluoride, which are primarily generated from the combustion of coal. As shown in the pie chart on page 35, the electric utility sector emits the most HAP emissions into the atmosphere, followed by the chemicals and metals sectors. Much of the recent decline in HAPs is due to reductions of acid gas emissions at coal-fired electric utilities, as well as operations of cleaner power plants achieving co-beneficial air pollutant reductions.

Air Toxics Monitoring

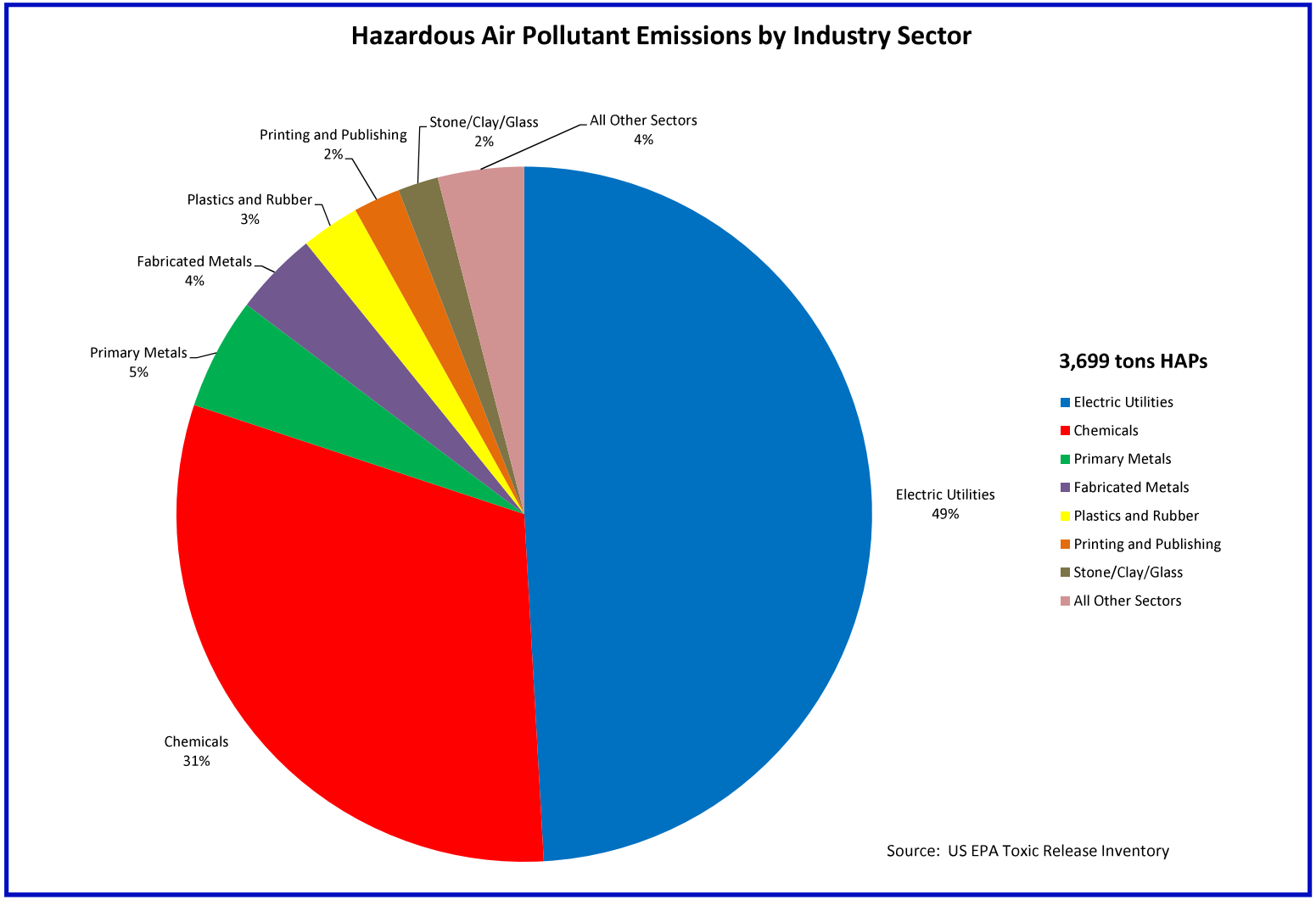
The DAQ operates air toxics monitors to fulfill a variety of programmatic goals, including periodic special projects in specific areas. The DAQ has three sites, which operate in Charleston, Wheeling and Morgantown, and these monitors provide snapshots of what is in the urban air in West Virginia. The samples undergo laboratory analysis for volatile organic compounds, carbonyls and metals in particulate matter. The DAQ's laboratory continues to analyze sampled particulate metals from the West Virginia toxics monitors, the National Air Toxics Trends site in Washington, D.C., and for other EPA Region III state and local agencies. Additionally, there are no national criteria for ambient levels of air toxics as there are for criteria pollutants. Instead, chronic inhalation health benchmarks for cancer or non-cancer effects (such as respiratory or neurological), where such data is known, are typically used as a comparison point for ambient air toxics levels. In general, the results for West Virginia's air toxics monitors are well below these health benchmarks on an annual basis.

Air Toxics

EPA recently launched a new website facilitating public access to a database of air toxics measured at individual monitoring stations - http://www.epa.gov/airquality/airdata/ad_rep_monhaps.html.



Air Toxics


Hazardous Air Pollutant Emissions by Industry Sector
Printing and Publishing 2%
Stone/Clay/Glass 2%
All Other Sectors 4%
Plastics and Rubber 3%
Fabricated Metals 4%
Primary Metals 5%
Chemicals 31%
Electric Utilities 49%
3,699 tons HAPs
Electric Utilities
Chemicals
Primary Metals
Fabricated Metals
Plastics and Rubber
Printing and Publishing
Stone/Clay/Glass
All Other Sectors
Source: US EPA Toxic Release Inventory

AIR QUALITY INDEX

Air Quality Index (AQI) Values	Levels of Health Concern
0 to 50	Good
51-100	Moderate
101-150	Unhealthy for Sensitive Groups
151-200	Unhealthy
201-300	Very Unhealthy
301 to 500	Hazardous

Air Quality Index

What is the Air Quality Index?

The Air Quality Index (AQI) is a simplified guide for understanding daily air quality. It indicates how clean or polluted the air is, and the associated health concerns. The AQI focuses on health effects that can happen within a few hours or days after breathing polluted air. The EPA uses the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide and nitrogen dioxide. For each of these pollutants, the EPA has established national air quality standards to protect against harmful health effects. The AQI does not indicate the levels of natural allergens, such as pollen count, which may also affect respiratory function.

How does the AQI Work?

The AQI can be thought of as a ruler that runs from 0 to 500. The higher the AQI value, the greater the level of air pollution and the greater the health danger. For example, an AQI value of 50 represents good air quality and little potential to affect public health. An AQI value of over 300 represents hazardous air quality.

An AQI value of 100 generally corresponds to the national air quality standard for the pollutant and is thought of as satisfactory. When AQI values are above 100, air quality is considered to be unhealthy for certain sensitive groups of people, and then for everyone as AQI values rise.

The AQI summary table on page 38 includes the more stringent one-hour SO_2 standard for those sites that monitor SO_2. The revised SO_2 AQI has increased the number of days in the Unhealthy for Sensitive Groups category (USG).

How do I find the AQI for WV?

The AQI for nine areas in West Virginia can be accessed by going to www.dep.wv.gov/daq and clicking on the AQI icon. The index may also be accessed by calling the DEP's hotline at (866) 568-6649, ext. 274.

The AQI is reported for Charleston, Huntington, Morgantown, Moundsville, Parkersburg, Weirton and Wheeling year round. The reported index is the calculated value for the past 24 hours and is updated daily, Monday through Friday, at approximately 8:30 a.m. During ozone season, April 1 through October 31, Greenbrier County and Martinsburg are also reported.

Due to computer security constraints, the AQI must be manually updated by the DAQ staff and is not available on the weekends. However, these monitoring sites are linked with the EPA's AirNOW network at www.airnow.gov, which provides an hourly update from 9 a.m. to 9 p.m. daily during the ozone season.

The purpose of the AQI is to help citizens understand what local air quality means in relation to short-term health effects. To make the AQI as easy to understand as possible, the EPA has divided the AQI scale into six levels of health concern.

Air Quality Index

Category, Color & Range	What does this mean?	Precautions to take
Good 0-50	Air quality is good.	None: Everyone enjoy outdoor activities.
Moderate 51-100	Air quality is a concern for people who are extra sensitive to air pollution.	People extra sensitive to air pollution: Plan strenuous outdoor activities when air quality is better.
Unhealthy for Sensitive Groups 101-150	Air quality is unhealthy for many people including active adults, people with lung disease (including asthma), older adults and children.	Sensitive groups: Cut back or reschedule strenuous outdoor activities.
Unhealthy 151-200	Air quality is unhealthy for everyone, especially people with heart or lung disease.	Everyone: Avoid strenuous outdoor activities.
Very Unhealthy 201-300	Air quality is unhealthy for everyone, especially people with heart or lung disease.	Everyone: Avoid physical outdoor activities.
Hazardous 301-500	Air quality is hazardous for everyone.	Everyone: Avoid all outdoor activities.

Air Quality Index

County	2014 - Days in each category:				Highest Value AQI	Pollutants Considered
	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy		
Berkeley	223	35	0	0	90	O_3, $PM_{2.5}$
Brooke	306	56	3	0	138	SO_2, $PM_{2.5}$, PM_{10}
Cabell	327	33	0	0	87	O_3, SO_2, $PM_{2.5}$
Greenbrier	207	7	0	0	77	O_3
Hancock	313	52	1	0	97	O_3, SO_2, $PM_{2.5}$, PM_{10}
Harrison	86	24	0	0	72	$PM_{2.5}$
Kanawha	308	57	0	0	84	O_3, SO_2, $PM_{2.5}$, PM_{10}
Marion	79	30	0	0	68	$PM_{2.5}$
Marshall	212	153	0	0	82	SO_2, $PM_{2.5}$
Monongalia	336	29	0	0	74	O_3, SO_2, $PM_{2.5}$
Ohio	213	44	1	0	120	O_3, $PM_{2.5}$
Raleigh	8	0	0	0	24	$PM_{2.5}$
Wood	321	41	0	0	84	O_3, SO_2, $PM_{2.5}$

Technical Information/Ambient Monitoring

Appendix A

2014 Air Monitoring Network

West Virginia Division of Air Quality - Monitoring Network

CY 2014

COUNTY	PM_{10}	$PM_{2.5}$	CO	SO_2	O_3	MET	$PM_{2.5}$ SPECIATION	AIR TOXICS
Berkeley		1			1			
Brooke	2	2	1	3				
Cabell		1		1	1			
Greenbrier					1			
Hancock	2	1	2	6	1	1		
Harrison		1						
Kanawha	1	2		1	1		2	1
Marion		1						
Marshall		1		1			1	
Monongalia		1		1	1			1
Ohio		1			1			1
Wood		1		1	1			
Total Sites	5	13	3	14	8	1	3	3

2014 Criteria Pollutants - Ozone Summary

Criteria Pollutant Summary Report - 2014

Pollutant:	Ozone	
Monitoring Season:	April 1 - October 31	
Data Interval:	Hourly	
Units:	Parts per million (PPM)	
National Ambient Air Quality Standards (NAAQS)		
Primary NAAQS:	8-Hour (3-year average of 4th max.)	0.075 PPM
Secondary NAAQS:	Same as Primary Standard	

County	Site	EPA-ID	# Valid Days	8-Hour Averages					
				Obs >0.075	1st Max	2nd Max	3rd Max	4th Max	'11-'14 4th Max Avg
Berkeley	Martinsburg	54-003-0003	209	0	.064	.062	.062	.060	.064
Cabell	Huntington	54-011-0006	213	0	.071	.064	.063	.063	.064
Greenbrier	Sam Black Church	54-025-0003	210	0	.068	.068	.062	.061	.062
Hancock	Weirton	54-029-1004	210	0	.074	.068	.067	.065	.070
Kanawha	Charleston	54-039-0010	209	0	.070	.069	.067	.067	.069
Monongalia	Morgantown	54-061-0003	210	0	.067	.067	.065	.064	.066
Ohio	Wheeling	54-069-0010	214	0	.067	.066	.066	.066	.067
Wood	Vienna	54-107-1002	206	0	.070	.070	.070	.067	.069

2014 Criteria Pollutants - PM_{10} Summary

Criteria Pollutant Summary Report - 2014

Pollutant:	Particulate Matter PM_{10}
Monitoring Season:	January 1 - December 31
Data Interval:	24-Hour
Units:	Micro-grams per cubic meter (ug/m^3)

National Ambient Air Quality Standards (NAAQS)

Primary NAAQS:	24-Hour Average	150 ug/m^3
Secondary NAAQS:	Same as Primary Standard	

County	Site	EPA-ID	# Obs	Annual Mean	24-Hr Average				
					Obs > 150	1st Max	2nd Max	3rd Max	4th Max
Brooke	Follansbee	54-009-0005	122	16.9	0	40	34	34	31
Brooke	Weirton	54-009-0011	361	13.9	0	48	45	39	37
Hancock	Weirton	54-029-0009	350	12.6	0	45	35	34	32
Hancock	Weirton	54-029-1004	61	14.1	0	52	33	30	26
Hancock	Weirton	54-029-1004	172	13.7	0	31	31	30	29
Kanawha	Charleston	54-039-0010	275	11.3	0	24	23	22	22

2014 Criteria Pollutants - $PM_{2.5}$ Summary

Criteria Pollutant Summary Report - 2014

Pollutant:	Particulate Matter $PM_{2.5}$	
Monitoring Season:	January 1 - December 31	
Data Interval:	24-Hour	
Units:	Micro-grams per cubic meter (ug/m^3)	
National Ambient Air Quality Standards (NAAQS)		
Primary NAAQS:	Annual Arithmetic Mean (3-year average)	15.0 ug/m^3
	24-Hour Average (3-year average 98th percentile)	35 ug/m^3
Secondary NAAQS:	Same as Primary Standard	

County	Site	EPA-ID	# Obs	Annual Mean	24-Hour	
					Obs > 35	98%
Cabell	Huntington	54-011-0006	108	9.8	0	22.4	24.6	23.4	9.9	21
Hancock	Weirton	54-029-1004	116	9.8	0	21.7	25.7	24.4	10.0	23
Harrison	Clarksburg	54-033-0003	110	8.9	0	17.5	22.3	19.2	9.1	19
Kanawha	Charleston	54-039-0010	101	9.2	0	17.0	23.3	19.7	9.2	18
Kanawha	South Charleston	54-039-1005	104	10.2	0	19.9	26.7	22.4	10.2	20
Marion	Fairmont	54-049-0006	109	9.7	0	18.4	20.0	19.0	9.8	19
Marshall	Moundsville	54-051-1002	111	11.1	0	22.1	23.1	22.4	11.1	23
Monongalia	Morgantown	54-061-0003	109	8.9	0	17.2	19.3	18.2	8.9	18
Ohio	Wheeling	54-069-0010	114	10.5	1	21.1	43.3	21.6	10.4	22
Wood	Vienna	54-107-1002	103	9.8	0	18.1	24.2	19.7	9.9	19

2014 Criteria Pollutants - SO_2 Summary

Criteria Pollutant Summary Report - 2014

Pollutant:	Sulfur Dioxide	
Monitoring Season:	January 1 - December 31	
Data Interval:	Hourly	
Units:	Parts per billion (PPB)	
National Ambient Air Quality Standards (NAAQS)		
Primary NAAQS:	1-Hour Daily Max 3 Year 99% Average	75 PPB
Secondary NAAQS:	3-Hour Average	500 PPB

County	Site	EPA-ID	# Obs	Annual Mean	1-Hr Average				3-Hr Average		
					1st Max	2nd Max	99%	12-14 99%	obs > 500	1st Max	2nd Max
Brooke	Follansbee	54-009-0005	8634	2.80	88	73	33	51	0	85	67
Brooke	Weirton	54-009-0007	8521	3.58	80	40	32	45	0	50	29
Brooke	Weirton	54-009-0011	8696	3.47	159	65	48	76	0	105	83
Cabell	Huntington	54-011-0006	8226	1.70	33	22	21	19	0	23	18
Hancock	New Manchester	54-029-0005	8705	4.83	39	38	34	29	0	27	26
Hancock	New Cumberland	54-029-0007	8700	3.26	33	31	29	29	0	26	25
Hancock	Chester	54-029-0008	8698	2.81	31	30	23	26	0	25	22
Hancock	Weirton	54-029-0009	8679	2.30	40	28	26	31	0	29	26
Hancock	Lawrenceville	54-029-0015	8686	3.53	40	38	34	34	0	31	26
Hancock	Weirton	54-029-1004	8688	3.27	35	31	28	33	0	28	25
Kanawha	Charleston	54-039-0010	8341	2.16	60	58	47	42	0	47	46
Marshall	Moundsville	54-051-1002	8710	2.51	58	53	43	47	0	43	41
Monongalia	Morgantown	54-061-0003	8158	1.43	28	18	15	15	0	22	13
Wood	Vienna	54-107-1002	8273	3.09	50	45	31	27	0	37	31

2014 Criteria Pollutants - CO Summary

Criteria Pollutant Summary Report - 2014

Pollutant:	Carbon Monoxide	
Monitoring Season:	January 1 - December 31	
Data Interval:	Hourly	
Units:	Parts per million (PPM)	
National Ambient Air Quality Standards (NAAQS)		
Primary NAAQS:	1-Hour Average	35 PPM
	8-Hour Average	9 PPM
Secondary NAAQS:	None	

County	Site	EPA-ID	# Obs	1-Hr Average			8-Hr Average		
				Obs >35.0	1st Max	2nd Max	Obs >9.0	1st Max	2nd Max
Brooke	Weirton	54-009-0011	8649	0	1.1	1.0	0	.8	.8
Hancock	Weirton	54-029-0009	8514	0	1.9	1.5	0	.8	.7
Hancock	Weirton	54-029-1004	8649	0	3.2	1.6	0	.8	.7

Definitions, Terms and Acronyms

Appendix B

Definitions

Acid precipitation or acid rain
Water falling in drops condensed from vapor in the atmosphere with acidic qualities. Principal components typically include nitric and sulfuric acid with water vapor.

Air pollutants
Solids, liquids, or gases which, if discharged into the air, may result in statutory air pollution.

Air pollution
Statutory air pollution has the meaning ascribed to it in West Virginia Code §22-5-2.

Air toxics
Term generally referring to hazardous air pollutants, and used in the context of implementation of a program to address such emissions and their impacts.

Ambient air
Generally, the atmosphere; outdoors.

Annual arithmetic mean
The numerical average of the data for the year.

AQI
Air Quality Index.

Attainment
EPA designation that an area meets the National Ambient Air Quality Standards.

24-hour average
The average concentration for a 24-hour period.

CAA
Clean Air Act.

CAIR
Clear Air Interstate Rule.

CO
Carbon monoxide.

Criteria pollutant
An air pollutant for which certain levels of exposure have been determined to injure health, harm the environment and cause property damage. EPA-developed National Ambient Air Quality Standards, using science-based guidelines as the basis for setting acceptable levels.

DAQ
Division of Air Quality - Department of Environmental Protection office that administers West Virginia's air quality management program for the protection of public health, welfare, and the environment.

DEP
Department of Environmental Protection - West Virginia's regulatory agency charged with protecting and promoting a healthy environment.

De minimis
Refers to a level which is considered to be insignificant.

Elements
Chemicals, such as hydrogen, iron, sodium, carbon, nitrogen, or oxygen, whose distinctly different atoms serve as the basic building blocks of all matter. There are 92 naturally occurring elements. Another 15 have been made in laboratories. Two or more elements combine to form compounds that make up most of the world's matter.

Emissions
Air pollutants exhausted from a unit or source into the atmosphere.

Exceedance
An incident occurring when the concentration of a pollutant in the ambient air is higher than the National Ambient Air Quality Standards.

EPA or U.S. EPA
Environmental Protection Agency, federal agency that oversees the protection of the environment.

Fossil fuels
Natural gas, petroleum, coal or any form of solid, liquid or gaseous fuel derived from such material.

Greenhouse gas
The gaseous compounds: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF_6). These gases absorb infrared radiation and trap heat in the atmosphere.

HAP
Hazardous Air Pollutant.

MACT
Maximum Achievable Control Technology.

Definitions

Mercury
A naturally occurring element that is found in air, water and soil. It exists in several forms, elemental or metallic mercury, inorganic mercury compounds, and organic mercury compounds. Elemental or metallic mercury is a shiny, silver-white metal and is liquid at room temperature.

MSA
Metropolitan Statistical Area.

NAAQS
National Ambient Air Quality Standards, set by EPA to protect human health and welfare.

NCore
A multi-pollutant network that integrates several advanced measurement systems for particles, pollutant gases and meteorology.

Nonattainment
EPA designation that an area does not meet the National Ambient Air Quality Standards.

NO_x
Nitrogen oxides.

O_3
Ozone.

Ozone season
Varies geographically but for W.Va. it is the period beginning April 1 and ending on October 31 of the same year.

Pb
Lead.

PM
Particulate Matter.

$PM_{2.5}$
Particles that are 2.5 micometers or less in size. These fine particles can be easily inhaled deep into the lungs where they can accumulate, react, be cleared or absorbed. These particles are about 30 times smaller than the diameter of a human hair.

PM_{10}
Particles that are 10 micrometers in size or less. This includes both fine particles (2.5 micrometers or less) and inhalable coarse particles having diameters larger than 2.5 micrometers and smaller than 10 micrometers.

Particulate Matter
Any material, except uncombined water, that exists in a finely divided form as a liquid or solid.

ppb
Parts per billion by volume.

ppm
Parts per million by volume.

Precursor
A substance that is the source of, or aids in the formation of, another substance.

Regulated air pollutant
Any air pollutant subject to a standard or other requirement promulgated under section 112 of the Clean Air Act, or any air pollutant for which a National Ambient Air Quality Standard has been promulgated including particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone and lead or lead compounds.

Sinks
Any process, activity or mechanism which removes a greenhouse gas from the atmosphere. Forests are considered sinks because they remove carbon dioxide through photosynthesis.

SIP
State Implementation Plan. Plan to attain and maintain the National Ambient Air Quality Standards for criteria pollutants.

SO_2
Sulfur dioxide.

Source or stationary source
Any governmental, institutional, commercial or industrial structure, installation, plant, building or facility that emits or has the potential to emit any regulated air pollutant under the Clean Air Act.

Statutory Air Pollution
The discharge into the air by the act of man, of substances (liquid, solid, gaseous, organic or inorganic) in a locality, manner and amount as to be injurious to human health or welfare, animal or plant life, or property, or which would interfere with the enjoyment of life or property.

$\mu g/m^3$
Micrograms per cubic meter.

VISTAS
Visibility Improvement - State and Tribal Association of the Southeast.

VOC
Volatile organic compound.

Air Quality Internet Sites

West Virginia Department of Environmental Protection - Division of Air Quality
www.dep.wv.gov/daq

Environmental Protection Agency
www.epa.gov/

Air Quality Data
Airdata gives you access to air quality data collected at outdoor monitors across the United States, Puerto Rico, and the U.S. Virgin Islands.
Emissions data or Air Toxics data is not available at this site.
www.epa.gov/airdata

Emissions Data
www.epa.gov/air/emissions/

Air Toxics Data
www.epa.gov/ttn/amtic/toxdat.html

Air Monitoring - Provides information for evaluating the status of the atmosphere as compared to clean air standards and historical information
www.epa.gov/ttn/amtic

Air Now - Ozone mapping, AQI and real time data
www.airnow.gov/

Air Quality and Emissions Trends Reports - Trends Reports are EPA's "report card" on the status of air quality and air pollutant emissions
www.epa.gov/airtrends/reports.html

Nonattainment area descriptions
www.epa.gov/oar/oaqps/greenbk/

EPA Technology Transfer Network (TTN Web)
Air Quality Monitoring www.epa.gov/ttn/amtic/
NAAQS Information www.epa.gov/ttn/naaqs/

Education Links for educational resources
www.epa.gov/students/

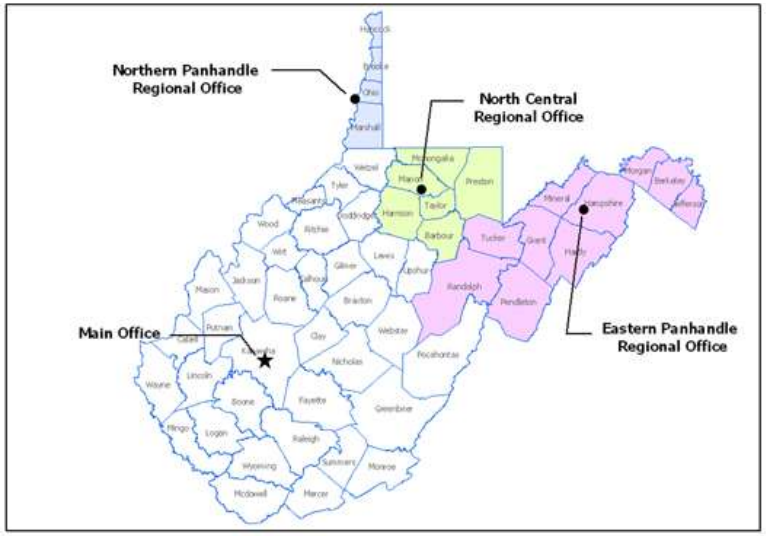
Provides links to outreach efforts about technical air training, upcoming conferences and environmental education
www.apti-learn.net

Public Notices for Regulatory Actions
www.dep.wv.gov/daq/publicnoticeandcomment/Pages/default.aspx

EPA recently launched a new website facilitating public access to a database of air toxics measured at individual monitoring stations
http://www.epa.gov/airquality/airdata/ad_rep_monhaps.html.

Contact Information

DEP - Division of Air Quality Regional Offices



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Fairmont, WV 26554
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131A Peninsula Street
Wheeling, WV 26003
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Guthrie Lab:
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Charleston, WV 25312
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Small Business Assistance Program:
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