

2013

Air Quality Annual Report

west virginia department of environmental protection



Air Quality Annual Report

West Virginia
Department of Environmental Protection
Division of Air Quality
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Charleston, WV 25304



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2013 Highlights

PM_{2.5}

West Virginia continues making progress redesignating former nonattainment areas to attainment as air quality improves. Attainment areas are monitoring compliance with previous federal and state fine particulate (PM_{2.5}) air quality standards. Furthermore, the Division of Air Quality (DAQ) recommended that the entire state of West Virginia be designated as attainment/unclassifiable for the most recent 2012 PM_{2.5} National Ambient Air Quality Standard (NAAQS), which is considerably more stringent than the former standards.

SO₂

The EPA initially designated two counties, Brooke and Marshall, as nonattainment for the 2010 one-hour SO₂ standard. DAQ performed a technical analysis showing that only subsections of the two counties should be included in the respective nonattainment areas. The DAQ has begun further analysis to develop plans to bring the areas back into attainment with the standard. The linchpin of the analysis will be dispersion modeling of the large emission sources in these areas including potential controls that could mitigate air quality violations.

Carbon Dioxide Standards for Power Plants

In September of 2013, EPA re-proposed carbon dioxide (CO₂) standards for new electric power plants under the authority of Clean Air Act section 111(b). The proposed new source performance standards (NSPS) establish CO₂ limits for new coal-fired and gas-fired units. Under the proposed NSPS new coal-fired units will be required to install partial-to-full (50 - 90%) carbon capture and sequestration (CCS), while new gas-fired units will be required to be combined cycle units.

Concurrently, EPA solicited input from a wide variety of stakeholders on how it should regulate CO₂ emissions from existing power plants. EPA plans to use its authority under CAA section 111(d) to require states to establish performance standards for existing units. EPA would establish “emission guidelines” based on the Best System of Emission Reduction (BSER) that has been adequately demonstrated, on which states would base the performance standards for existing units. The agency has publicly stated that CCS would not be required as BSER for existing units. The EPA plans to propose the guidelines in the summer of 2014.

Boiler Replacement Project

Over a three-quarters of a million dollars collected as part of a negotiated multi-state federal enforcement consent decree are being used for a project that will help school children in West Virginia for many years to come. The Division of Air Quality is working with the West Virginia Department of Education’s Office of School Facilities 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. The old boilers at Spanishburg Elementary School, Lashmeet/Matoaka Elementary School, and Montcalm High School, ranged from 30 to 60 years old, and were at the end of their useful life. The funding provided through the efforts of DAQ were leveraged by the school system to obtain additional funding via a School Building Authority grant. Final engineering design is complete on the new, upgraded boilers, which will be part of renovations at these schools. The new boilers will be delivered in Spring 2014, and are scheduled to be installed over the summer break.

2013 Highlights

Horizontal Drilling Study

In order to address citizen concerns over the significant increase in horizontal drilling and hydraulically fractured oil and gas wells in the Marcellus shale, the Legislature directed the West Virginia Department of Environmental Protection (WVDEP) to conduct three separate studies to assess structural safety and radioactivity at pits and impoundments, as well as noise, light, dust and volatile organic compounds near well pads.

The DAQ was instrumental in coordinating with academic and federal researchers, as well as across the WVDEP to collect environmental data, and report back to the Legislature. Sampling included air quality monitoring during all stages of well pad development, as well as an evaluation of the structural integrity of pits, impoundments and groundwater associated with centralized pits. Final reports regarding the safety of pits and impoundments used in the drilling of horizontal wells, along with those regarding air monitoring data and air quality impacts were filed with the Legislature in 2013. These reports, along with supporting information, have been posted to the WVDEP's Office of Oil and Gas website (<http://www.dep.wv.gov/oil-and-gas/>) under the "Horizontal Drilling" tab and within the "legislative studies" section.

Air Monitoring Quality Assurance

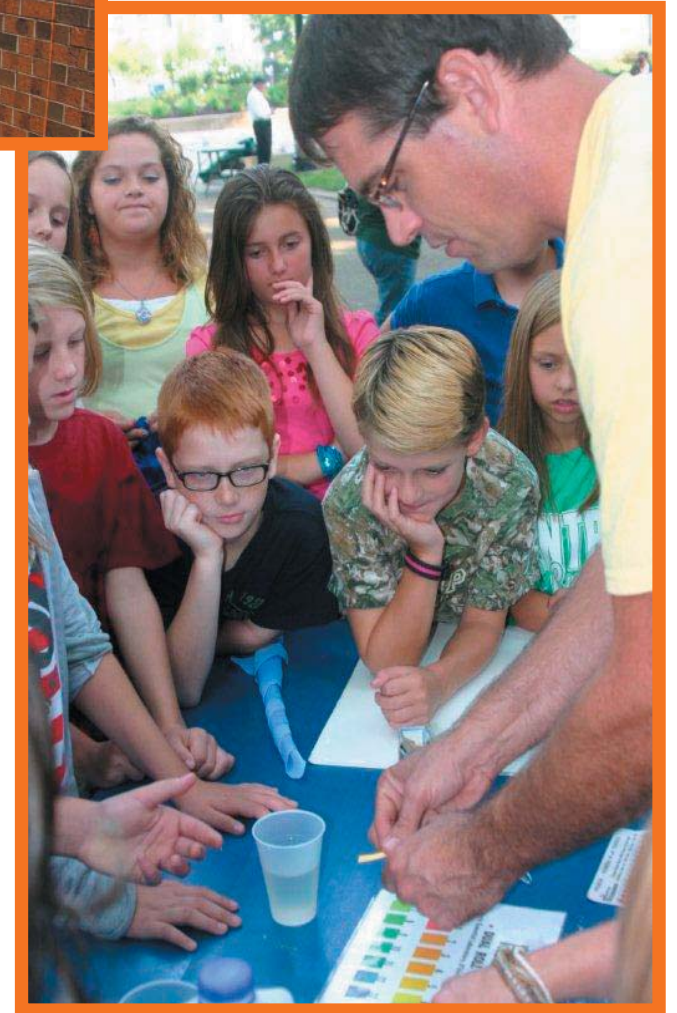
The EPA mandates specific methods of sampling and analysis to determine compliance with the National Ambient Air Quality Standards (NAAQS) criteria air pollutants. These methods are published in the Code of Federal Regulations (CFR). The EPA generally approves one Federal Reference Method (FRM) for each criteria pollutant. If a different method can be shown to provide equivalent analysis, the EPA may approve it as a Federal Equivalent Method (FEM). The DAQ uses only the EPA approved FRM or FEM methods for all NAAQS criteria pollutant monitoring.

The DAQ conducts performance audits and precision checks on air monitoring equipment to assess the data accuracy of the monitors. These quality assurance checks are performed in compliance the EPA requirements.

Air Monitoring Network Review

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

Environmental Outreach and Education



Outreach and Education

In 2013, the Division of Air Quality education and outreach team continued the agency's involvement at events around the State of West Virginia, bringing our interactive displays to highlight how individual choices can save money, save energy, save the environment and improve air quality.

For eight days in July, staff worked at the 2013 Boy Scout Jamboree held for the first time at the Summit Bechtel Reserve near Glen Jean, West Virginia. The inaugural event was attended by over 30,000 Scouts from across the United States, as well as representatives of 18 different countries. In addition to our compact fluorescent and LED light display, new displays were developed.

The Electrostatic Precipitator (ESP) machine demonstrated how an induced electrostatic charge controls smoke at a coal-fired power plant by removing fine particulate matter such as dust from the stacks. The BioLite Campstove showed Scouts how heat from fire can generate electricity via a thermoelectric generator to power a fan which in return creates airflow for improved combustion. The surplus electricity is sent to a USB port for charging electronic devices, even in the middle of a camp with no electricity.



A multi-cache geocaching exercise with environmental questions was created for interested Scouts. And, of course, a unique environmental patch was awarded to those who successfully found the cache.

In December, the entire DEP headquarters became the newest outreach display. The DEP Energy Tree allowed the public to provide the power, via hand crank, to light up a traditional 100-bulb incandescent tree and then an 800-plus light, 35-foot tall LED tree, draped along the side of the DEP building. LED lights use 90 percent less electricity than traditional incandescent lights and last up to 50,000 hours. Less energy use creates less pollution from combustion of fossil fuels. A kickoff, complete with cookies, hot chocolate and Santa himself, was held on December 6. The hand crank tree was available to the public every evening from 6 to 9 p.m. through January 6, 2014.



National Ambient Air Quality Standards

Pollutants with Standard

Criteria Pollutants

The Clean Air Act (CAA) requires the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (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.

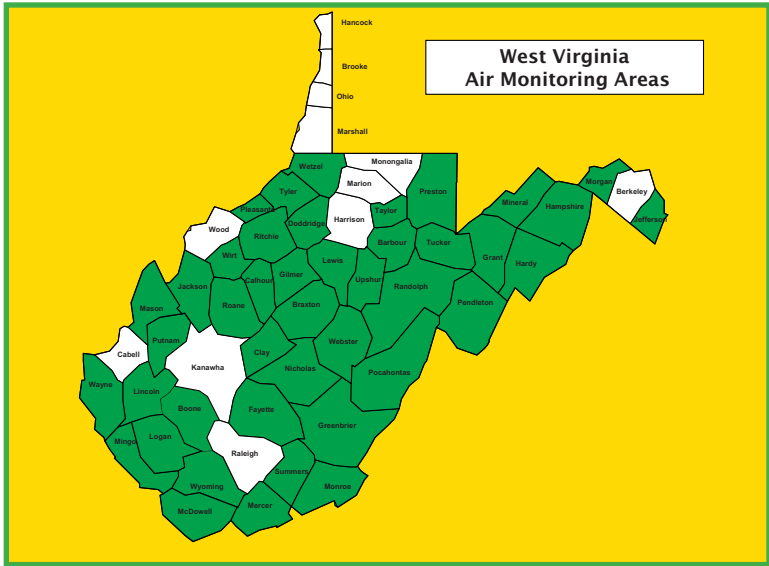
Such standards have been established for six principal pollutants:

- 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 ($\mu\text{g}/\text{m}^3$). 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 34. 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 (O₃)

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.

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 - in the presence of sunlight. Nitrogen oxides are formed as a by-product of combustion from motor vehicles, boilers, incinerators and power plants.

Sources of volatile organic compounds (VOC's) 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.

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.

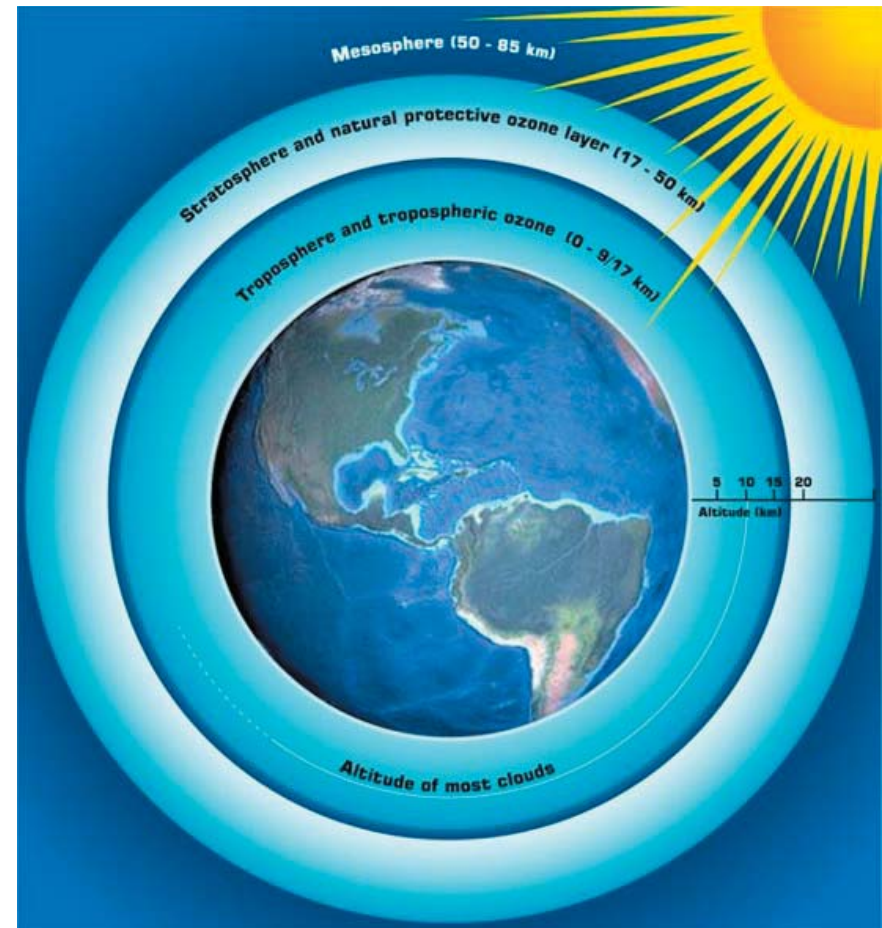
Ozone (O_3)

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.

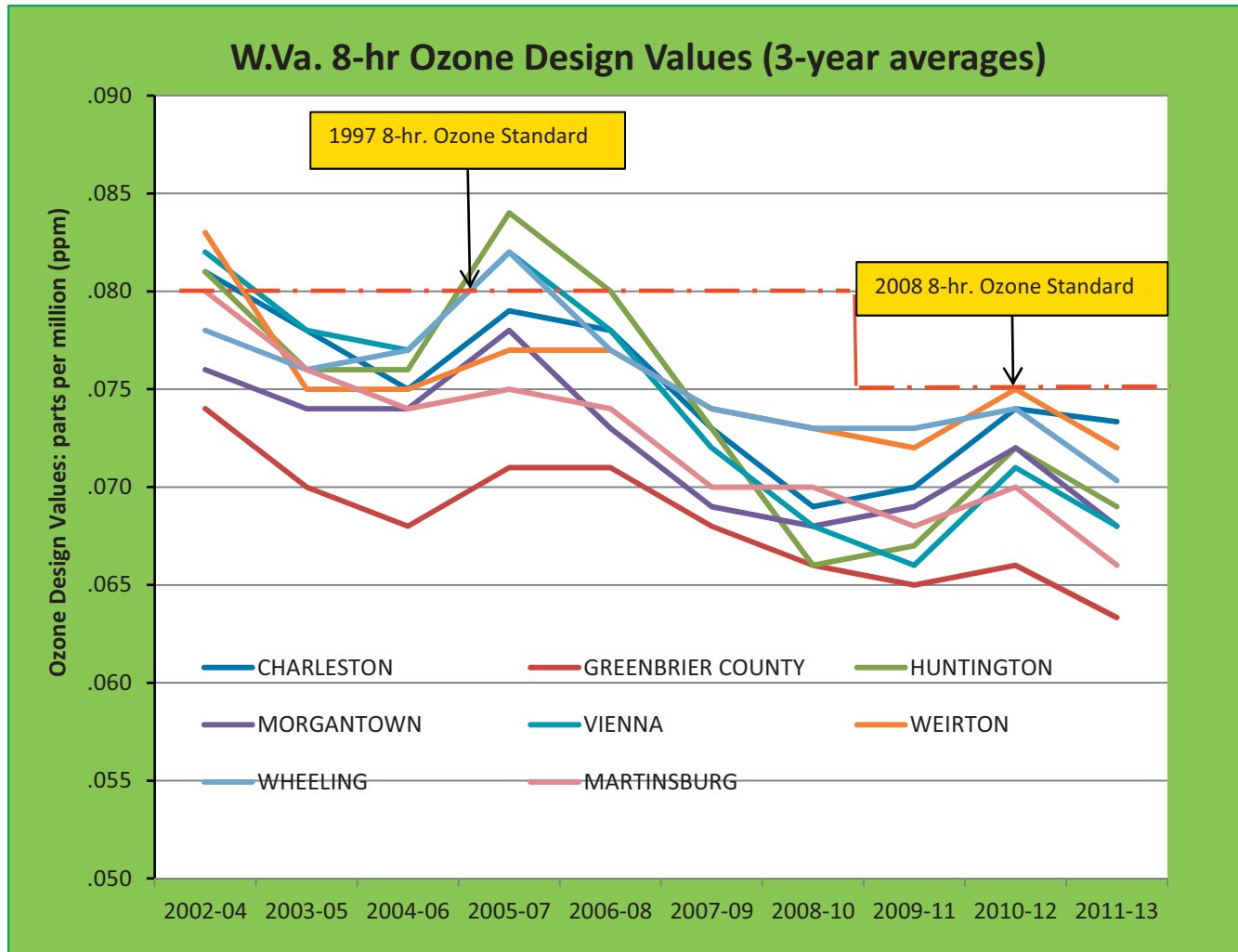
Ground-level ozone is a complex problem due to the variety of sources for nitrogen oxides and VOCs and the long-distance transport of ozone and its precursors. A summary of monitored ozone data is shown on page 8.

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 Clean Air Act 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/commercial products, such as paints and chemical solvents that contain VOC's.



Ozone (O_3)



Particulate Matter (PM₁₀)

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 PM₁₀ 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 PM₁₀ over short periods (such as a day). Particles in the PM₁₀ 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 PM₁₀ standard in 1987, replacing a previous total suspended particulate standard. In a 2006 revision, the EPA established the current 24-hour PM₁₀ 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.

The DAQ's monitoring network measures PM₁₀ 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.

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:

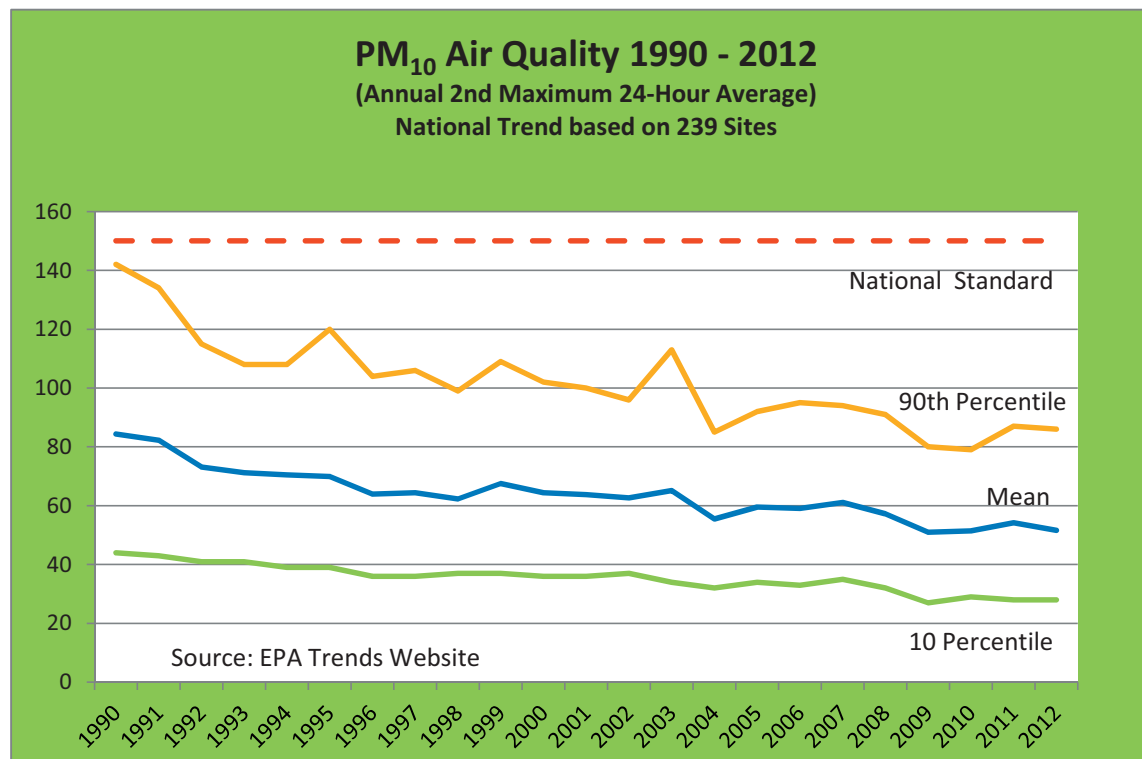
Same as primary standard.

Particulate Matter (PM₁₀)

Less than 10 microns in diameter

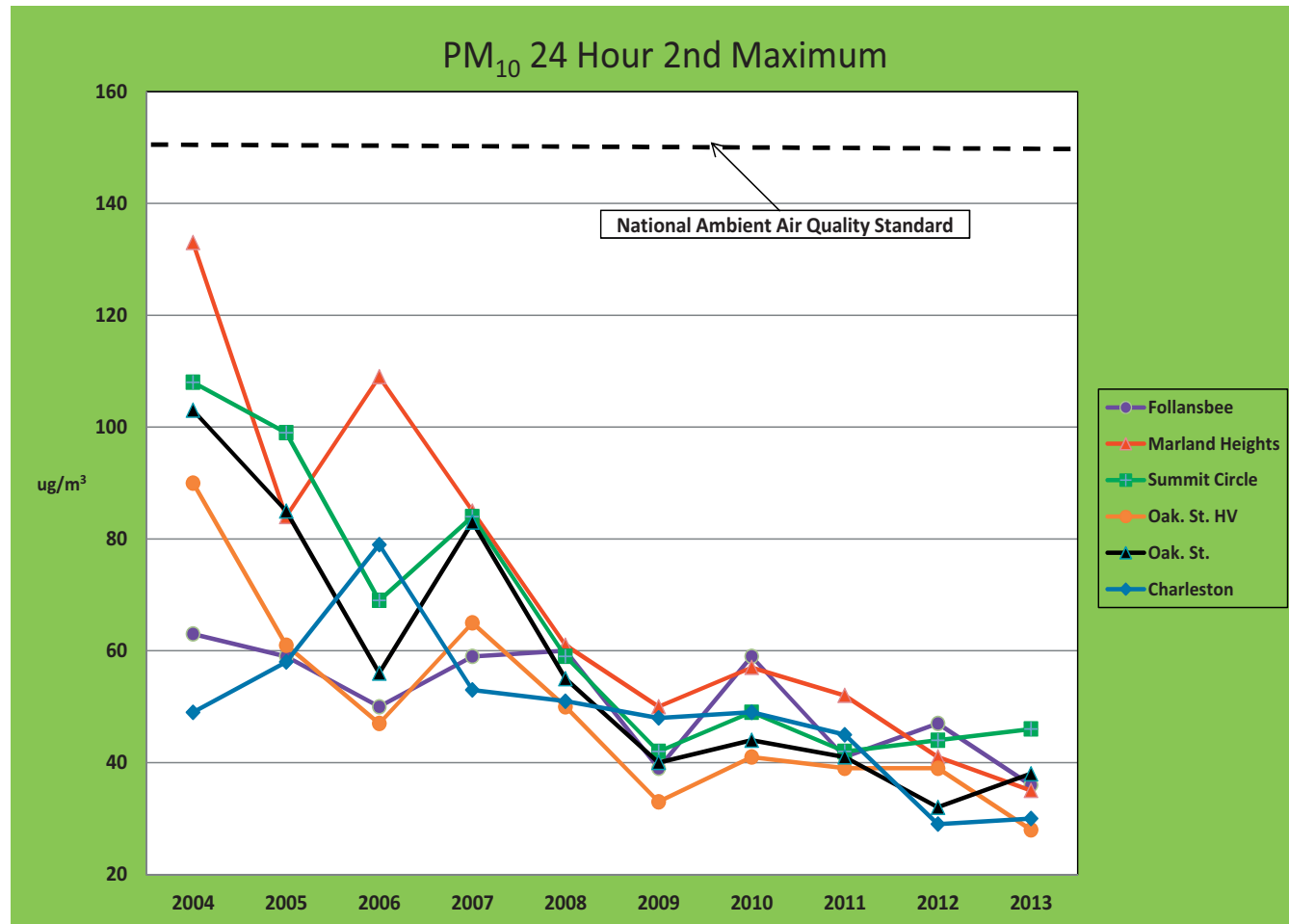
Nationally, PM₁₀ concentrations have decreased 39% since 1988. Programs aimed at reducing direct emissions of particles have played an important role in PM₁₀ concentrations. Some examples of PM₁₀ controls include paving previously unpaved roads, replacing wood and coal with cleaner-burning fuels such as natural gas and using best management practices for dust sources at agricultural facilities.

Additionally, EPA's Acid Rain Program has substantially reduced SO₂ emissions from power plants since 1995 in the eastern United States, contributing to lower particulate matter concentrations. Direct emissions of PM₁₀ have decreased approximately 25% nationally since 1988.



Particulate Matter (PM₁₀)

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 PM₁₀ 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. Fourteen PM_{2.5} monitoring sites were operated in West Virginia in 2013. A special filter-weighing laboratory is used to analyze filters from these monitors.

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 13. 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. The agency also submitted formal redesignation requests to EPA for the Charleston, Parkersburg, Weirton and Wheeling areas. However, the areas will formally remain designated nonattainment until EPA approves the related maintenance plans that ensure attainment for at least 10 years.

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. A historical summary of monitored PM_{2.5} data is located on page 14. Notably, PM_{2.5} concentrations have improved such that during 2010-2012, the entire state continues to attain the 15 µg/m³ annual standard.

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.

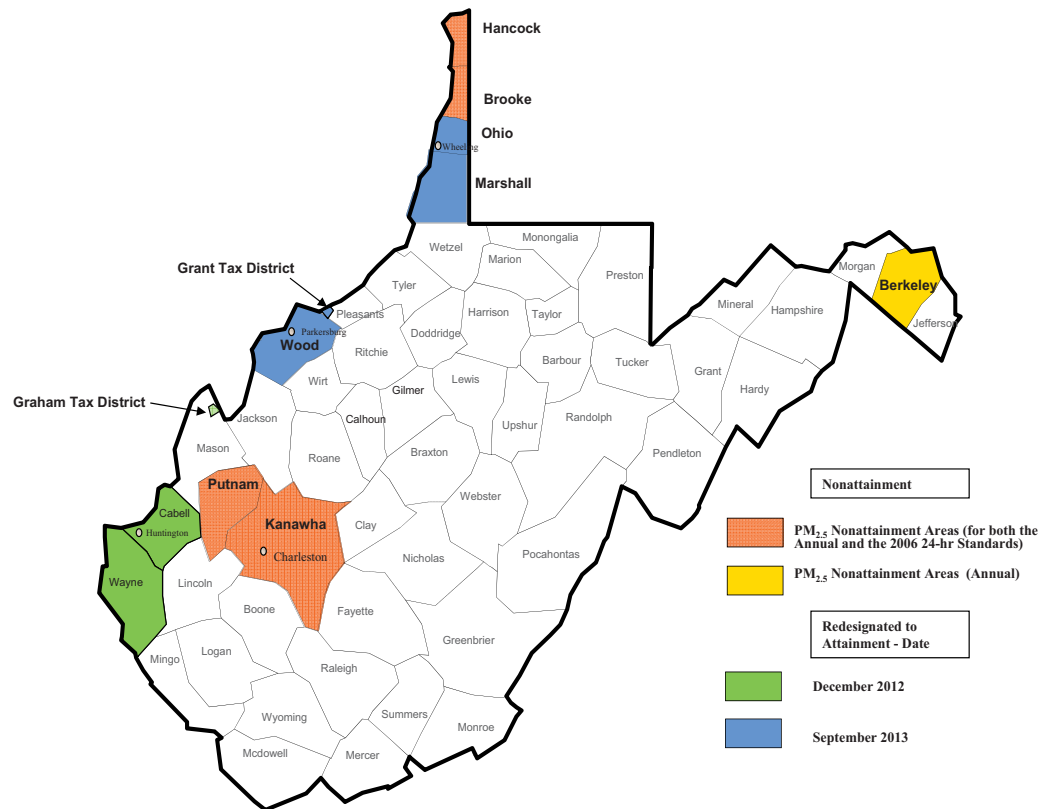
EPA most recently revised this standard in December 2012, tightening it to 12 µg/m³. Although the standard is significantly more stringent than the previous one, all monitored areas in the state currently meet the standards. EPA plans to issue attainment/nonattainment designations in December 2014. Those designations will likely be based on 2010-2013 data,

which show air quality improvement. The charts on page 14 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, total carbonaceous material and fine particulate mass.

Particulate Matter (PM_{2.5})

Less than 2.5 microns in diameter



DESIGNATED 35 µg/m³ PM_{2.5} (24-hour) NONATTAINMENT AREAS

Charleston, W.Va. MSA*
- including Kanawha and Putnam counties, W.Va.

Steubenville, Ohio, Weirton, W.Va. MSA*
- including Brooke and Hancock counties, W.Va.

DESIGNATED 15 µg/m³PM_{2.5} (annual) NONATTAINMENT AREAS **

Berkeley County, W.Va.

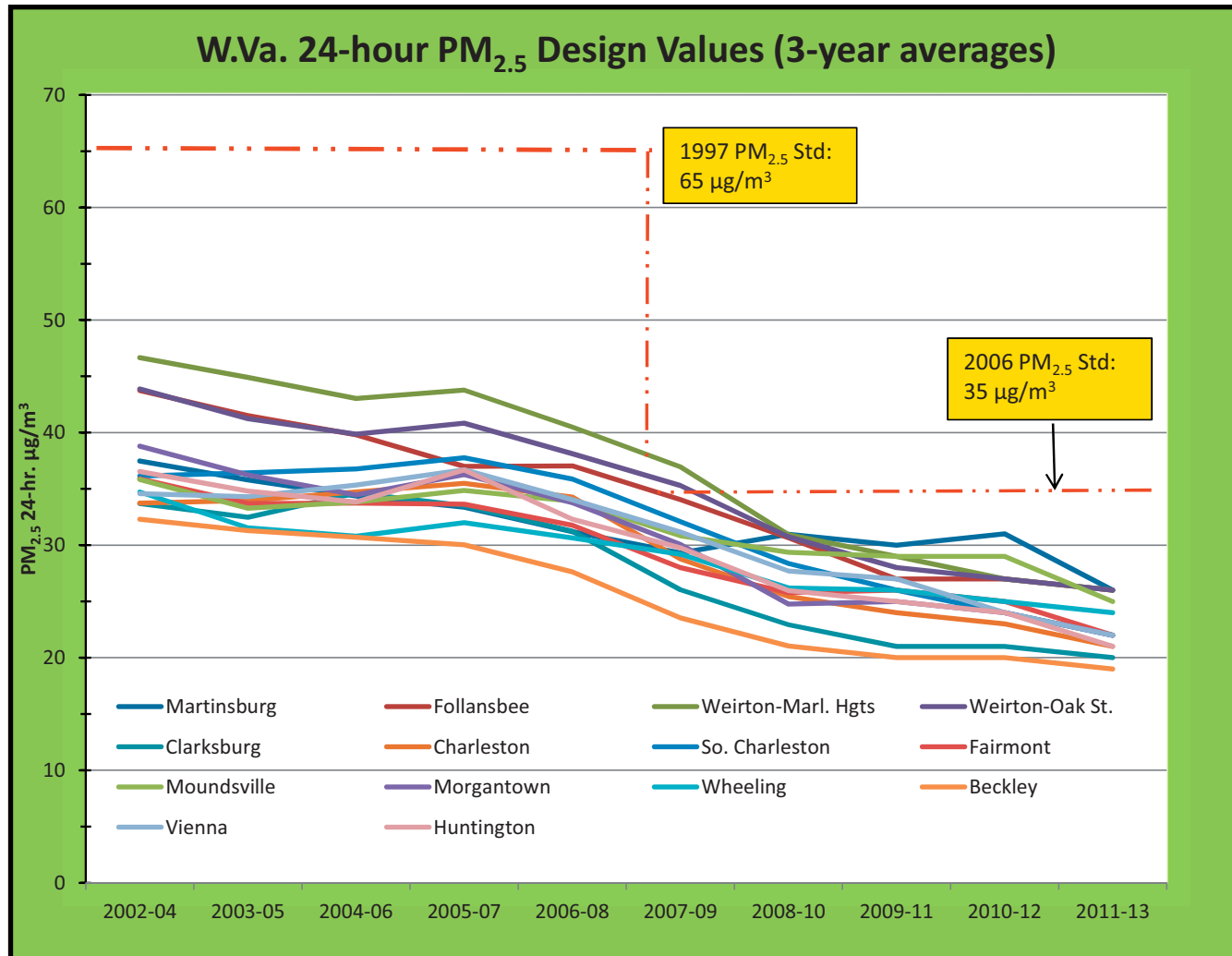
Charleston, W.Va. MSA*
- including Kanawha and Putnam counties, W.Va.

Steubenville, Ohio, Weirton, W.Va. MSA*
- including Brooke and Hancock counties, W.Va.

*Metropolitan Statistical Area
**1997 Annual PM_{2.5} Standard

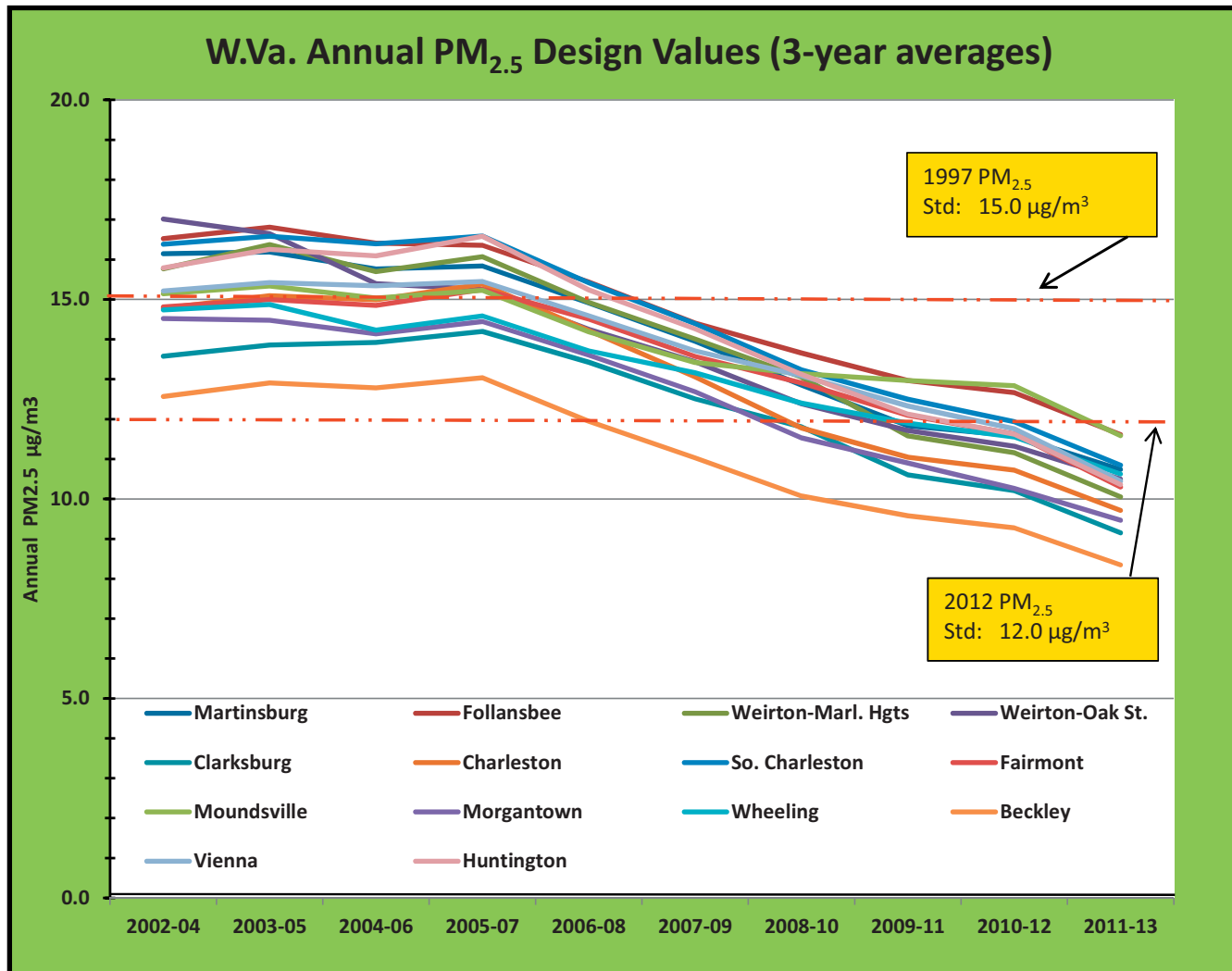
Particulate Matter (PM_{2.5})

Less than 2.5 microns in diameter



Particulate Matter (PM_{2.5})

Less than 2.5 microns in diameter



Sulfur Dioxide (SO₂)

Sulfur dioxide is a colorless gas that has a pungent odor. SO₂ 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 (H₂SO₄), 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 SO₂ are combustion of coal and oil, refineries, smelters and industrial boilers. Nationally, two-thirds of all SO₂ emissions are from power plants.

SO₂ 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.

In June 2010, the EPA revised the primary SO₂ 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 are being 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 SO₂ 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 SO₂ exposure and increased visits to emergency rooms and hospital admissions for respiratory illnesses, particularly in at-risk populations including children, the elderly and asthmatics.

SO₂ 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 17 shows how the monitoring sites compare to the new one-hour SO₂ standard. The one-hour standard is a new short term averaging period for SO₂ monitoring. While air quality has continued to improve over the years and the 24-hour, annual and three-hour SO₂ values have declined, the current data show two sites (Brooke county) remain above the more stringent one-hour standard. The EPA is assessing the need for changes to the secondary standard under a separate review for both NO₂ and SO₂.

PRIMARY AIR QUALITY STANDARDS:

1-hour concentration
75 ppb (3-year average
99th percentile)

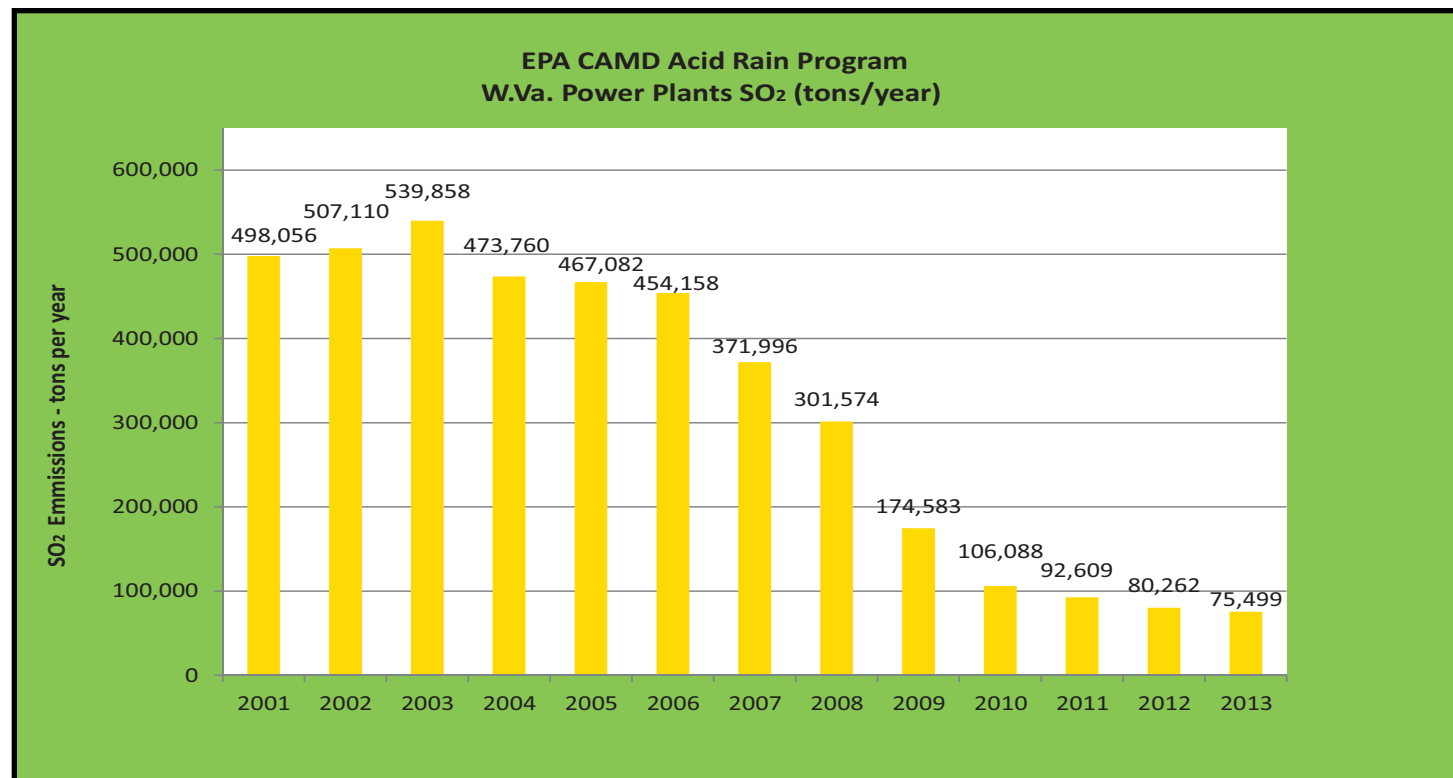
SECONDARY NAAQS:

3-hour concentration not to
exceed 0.50 ppm more than
once per year.

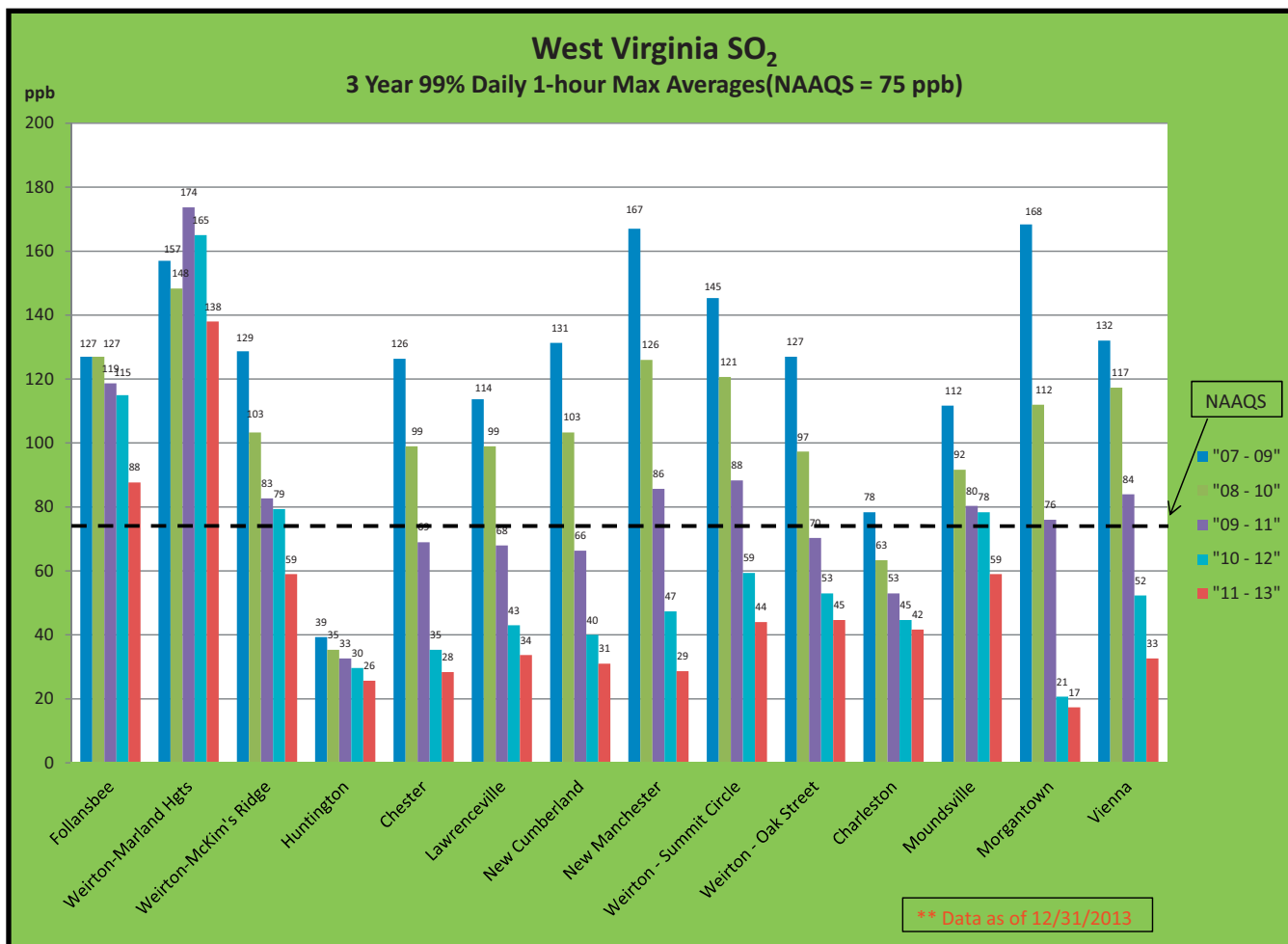
Sulfur Dioxide (SO₂)

West Virginia has made significant reductions in sulfur dioxide emissions from power plants. Through implementation of the federal Acid Rain Program and the regional Clean Air Interstate Rule (CAIR), SO₂ emissions have plummeted about 87%, from 539,858 (CY 2003) to 75,499 (CY 2013) 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 SO₂ emissions.



Sulfur Dioxide (SO₂)



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 20 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.

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 2013, 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 is requiring the co-location of one CO monitor with a “near-road” NO₂ monitor in urban areas having populations of 1 million or more. Also, the EPA is specifying that monitors required in Core Based Statistical Areas (CBSA’s) of 2.5 million or more people are to be operational by January 1, 2015. Those 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 pages 20 and 21.

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.

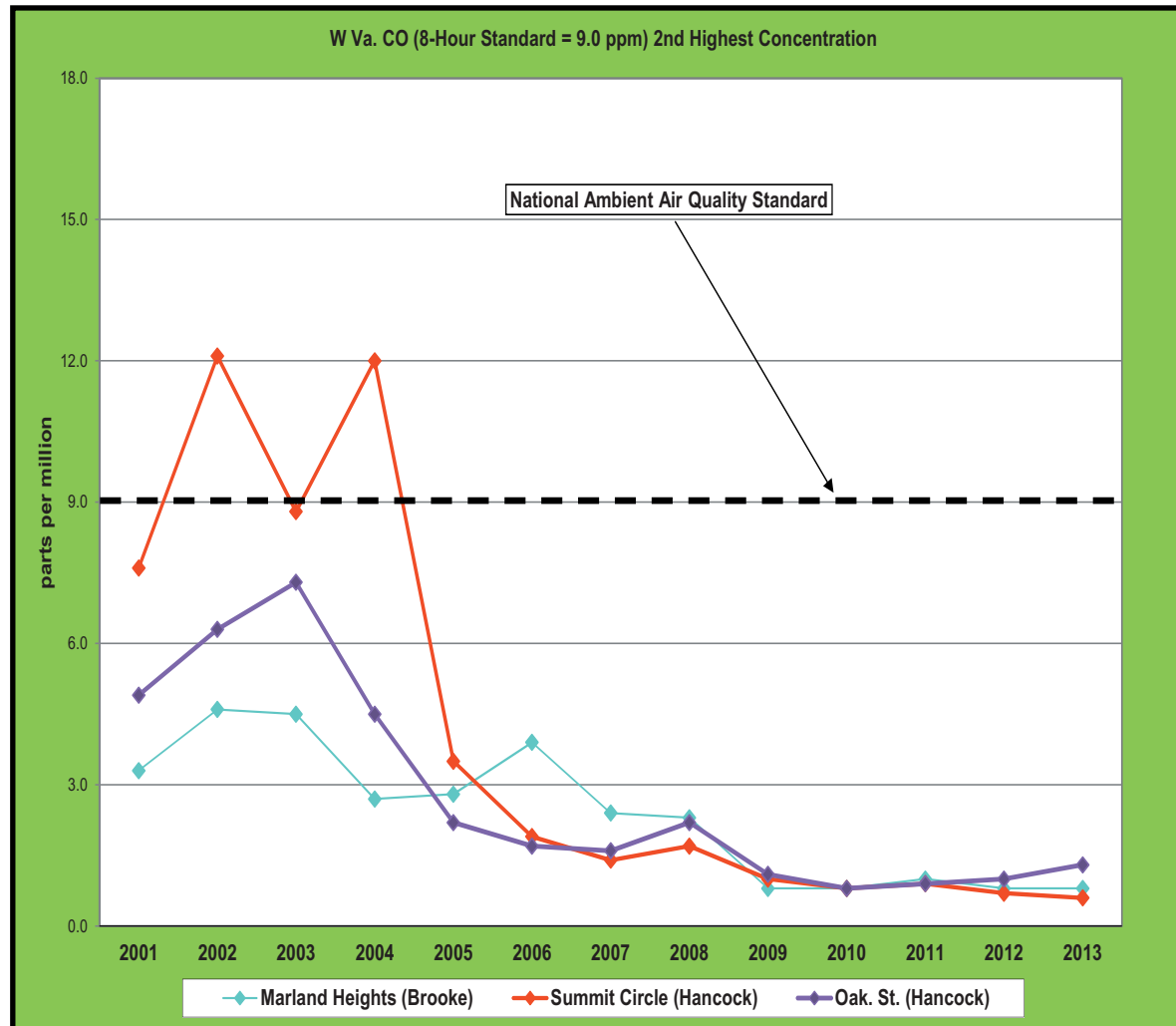
In addition to CO in the ambient air outside of the home, CO levels from in the home are of concern. Dangerous levels of CO in your home can be caused by improper installation and maintenance of fuel burning applications.

PRIMARY AIR QUALITY STANDARDS:

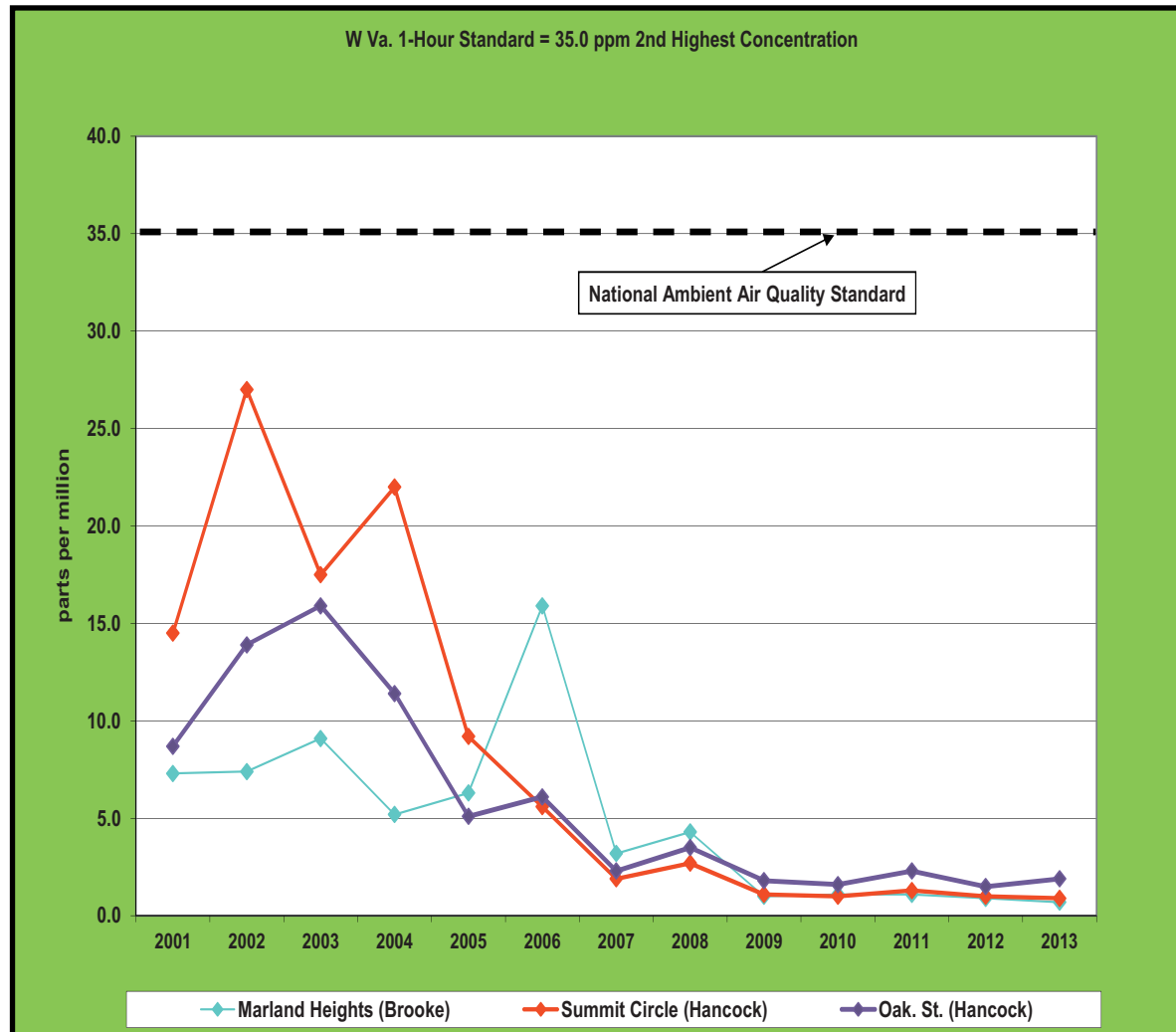
8-hour average not to exceed 9 ppm more than once per year.
1-hour average not to exceed 35 ppm more than once per year.

SECONDARY NAAQS: None.

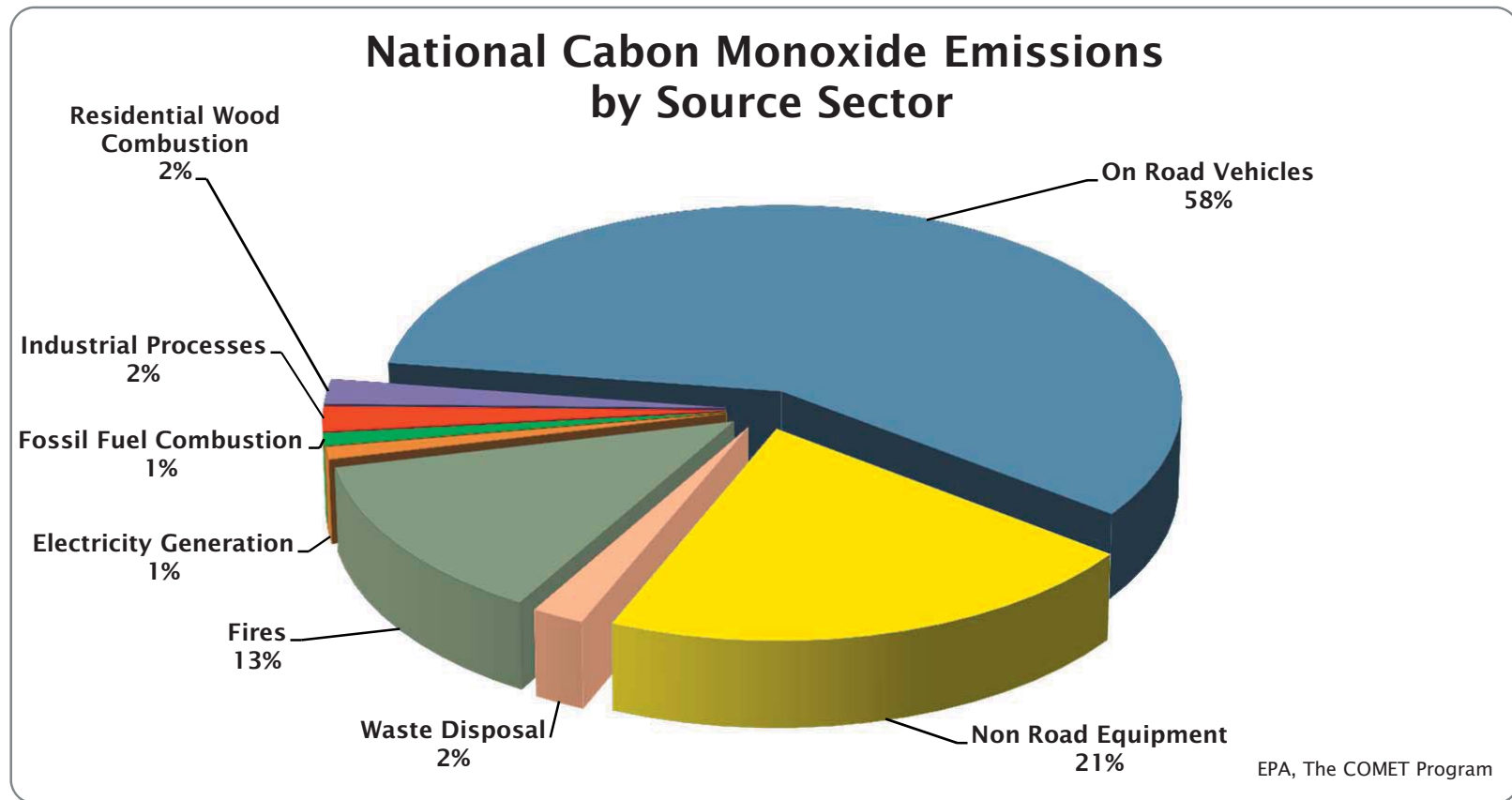
Carbon Monoxide (CO)



Carbon Monoxide (CO)



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 a June 2011 letter to Governor Tomblin, the EPA notified West Virginia that the agency planned to designate the entire state as unclassifiable/attainment, meaning the whole state is considered to be meeting the lead standard. This designation was finalized in a Federal Register notice published November 2011 [76 FR 72097].

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, WV and began collecting data on February 3, 2012. Although there is less than three years of data, the results for 2012 and 2013 indicate that the site is well below the lead NAAQS of 0.15µg/m³. For the period February 2, 2012 through December 29, 2013, values

have ranged from a low of 0.001µg/m³ to a high of 0.101µg/m³. The highest 3-month reviewing average value to date has been 0.014µg/m³, well below the standard.

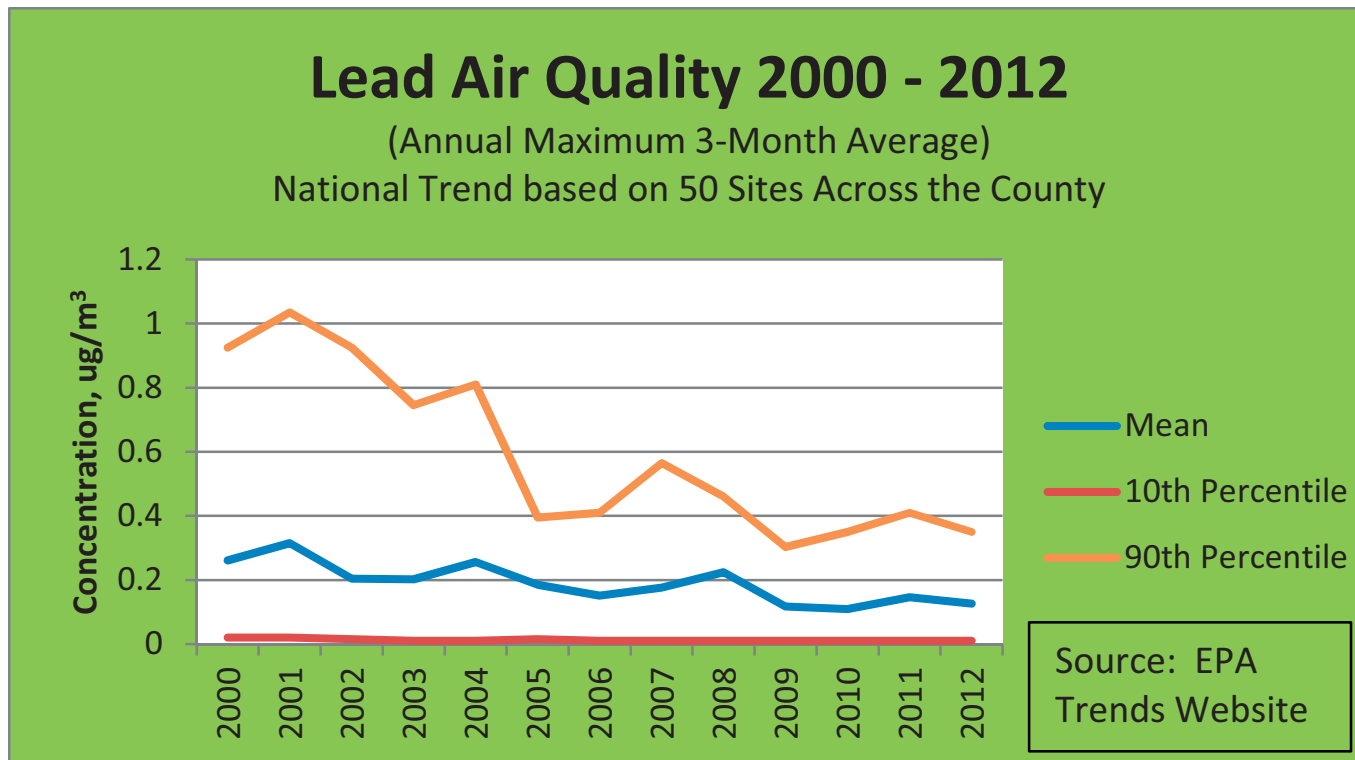
The EPA is also requiring monitors to be placed at airports that emit one ton or more of lead. Monitoring is also required at NCore sites in urban areas with more than 500,000 people to gather information on the general population's exposure to lead in air and ensure protection against sources of airborne dust containing lead.

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.

Lead that is emitted into the air can be inhaled or, after it settles out in the air, can be ingested. Ingestion of lead that has settled onto surfaces is the main route of human exposure to lead originally released into the air. Once in the body, lead is rapidly absorbed into the bloodstream and results in a broad range of adverse health effects.

Children are most vulnerable to the damaging effects of lead because they are more likely to ingest lead due to hand-to-mouth activity and their rapidly developing bodies. Exposures to low levels of lead early in life have been linked to effects on learning, memory and behavior. There is no known safe level of lead in the body.

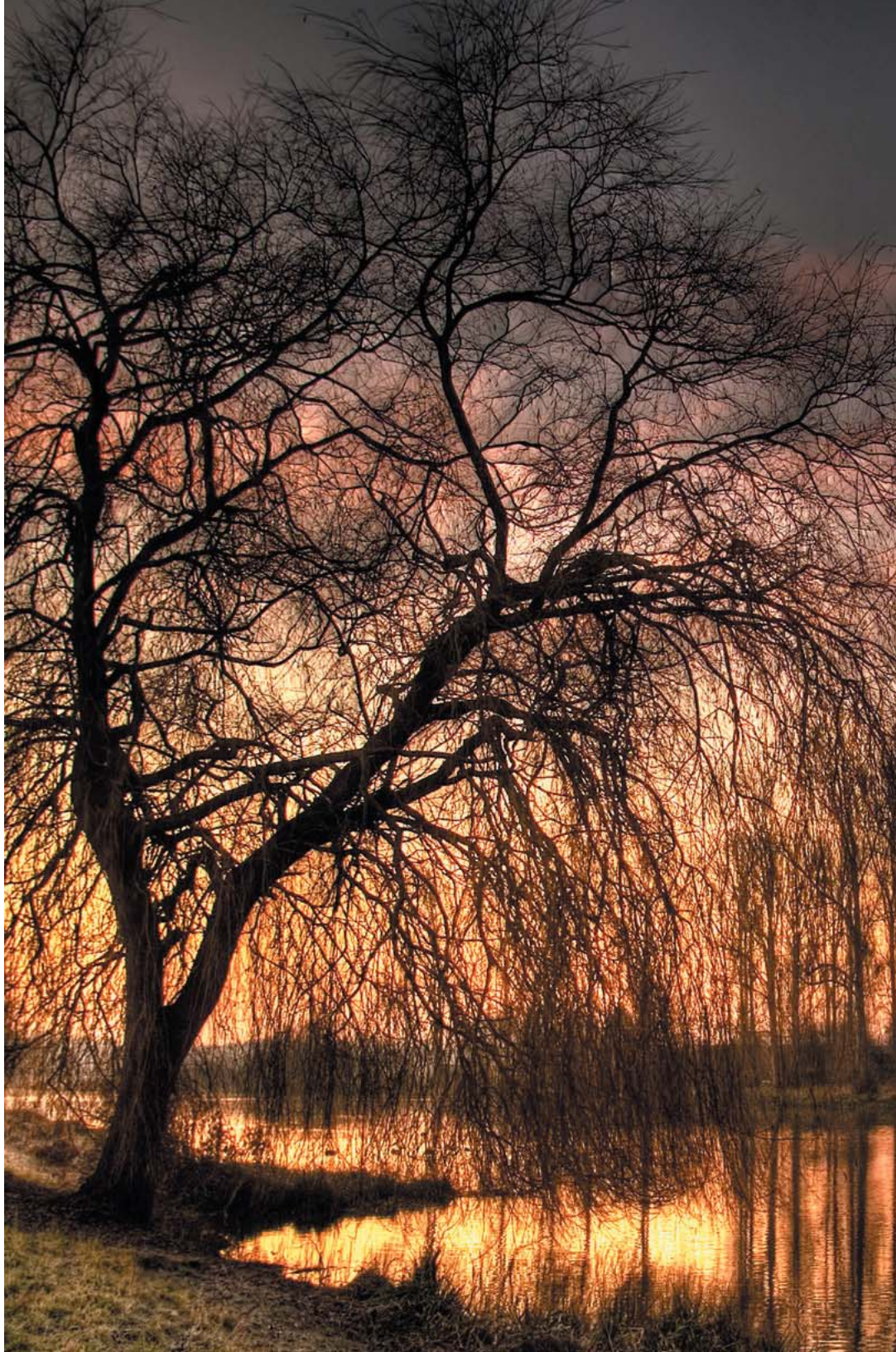
Lead (Pb)



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 (NO₂) 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 (O₃) 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 (PM₁₀, 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 (SO₂) 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 and Enforcement

Compliance & Enforcement

The Division of Air Quality'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 FCE's of both major and minor sources of air emissions. The charts on pages 27 and 28 show the FCE of major and minor sources, respectively, by regional office across the state during 2013.
- **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 its 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**

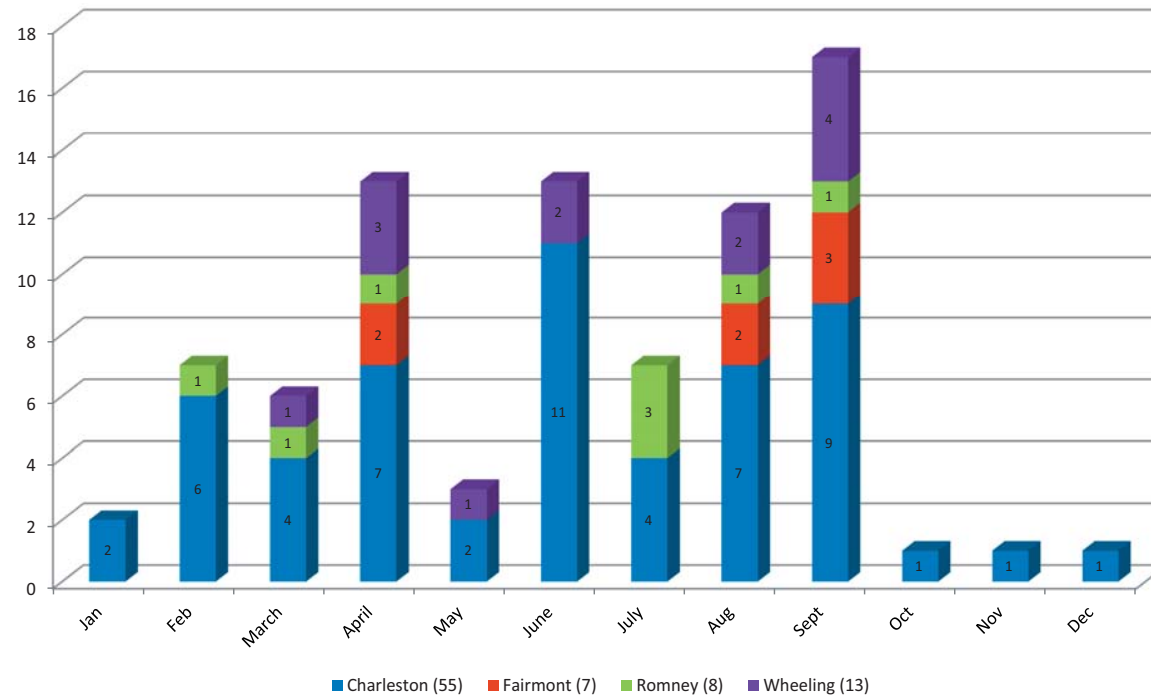
A CEMS is a system of instruments that continuously measures pollutant emission concentrations and/or quantity and is capable of recording and reporting them. The Compliance and Enforcement Section reviews CEMS reports.

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 29 shows the citizen complaints handled by the regional office during 2013.

Compliance & Enforcement

Title V Major Full Compliance Evaluations by Office

January 2013 ~ December 2013

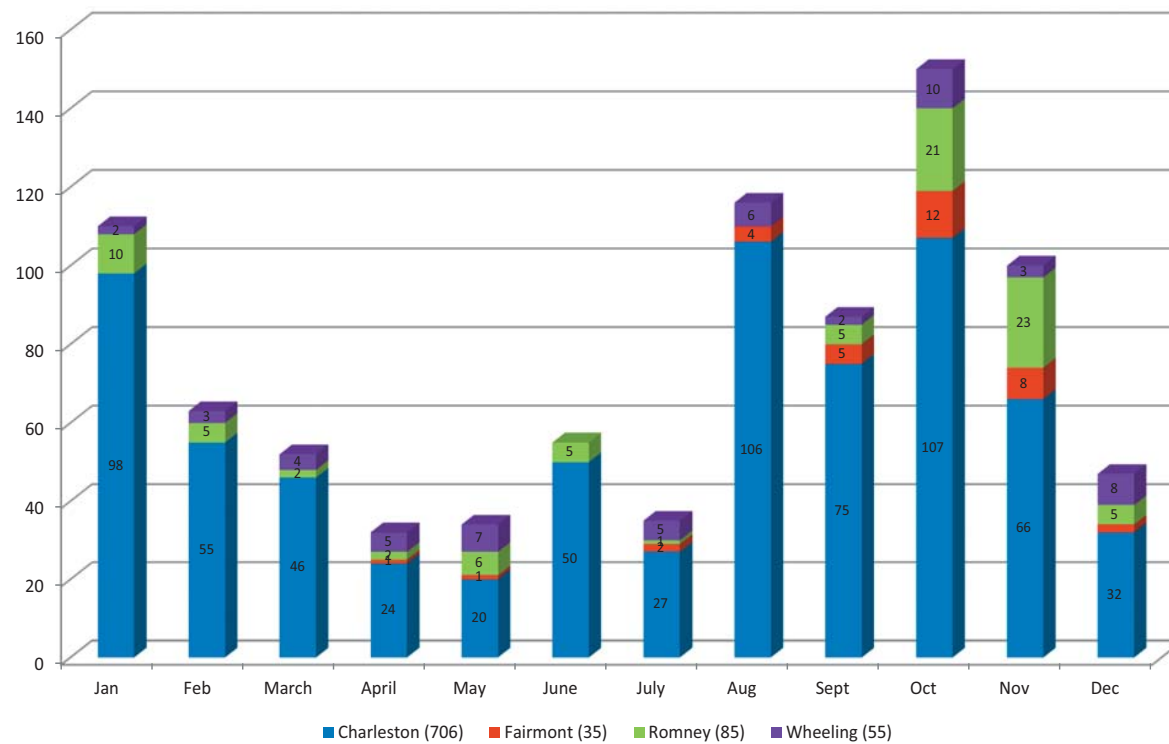


Statewide Total = 83

Compliance & Enforcement

Full Compliance Minor Inspections by Office

January 2013 ~ December 2013

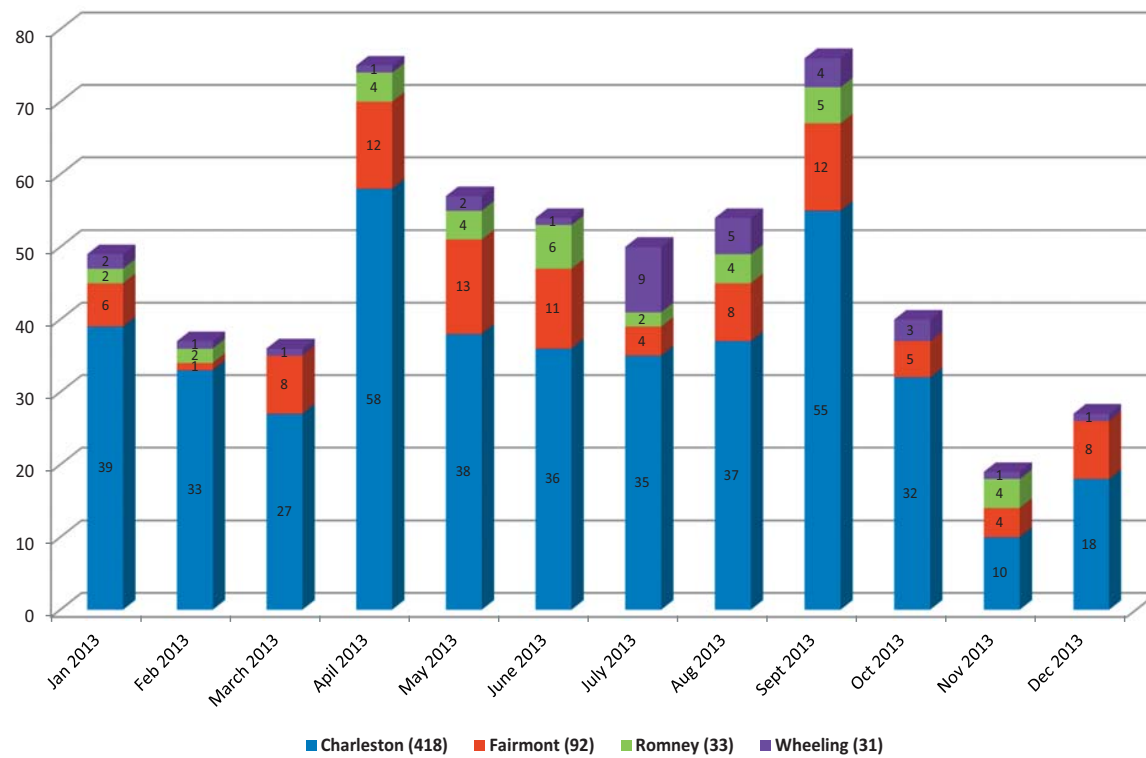


Statewide Total = 881

Compliance & Enforcement

Complaints Received by Office

January 2013– December 2013



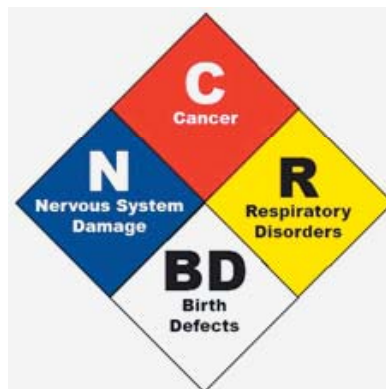
Statewide Total = 574



Air Toxics

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.



shown in the bar chart on page 29, 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 30, 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 from 2011 to 2012 is due to reductions of acid gas emissions at coal-fired electric utilities, likely due to a slight decrease in energy generation as well as operations of cleaner power plants. Three of the smaller electric utilities in West Virginia shutdown in fall 2012; cleaner, and in some cases newer, electricity generation in the state is taking its place.

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 standards for dry cleaners, chromium electroplaters, secondary aluminum producers, wood preservers, small chemical manufacturing facilities, small boilers for natural gas facilities with dehydrators and reciprocating internal combustion engines. 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

Air Toxics Monitoring

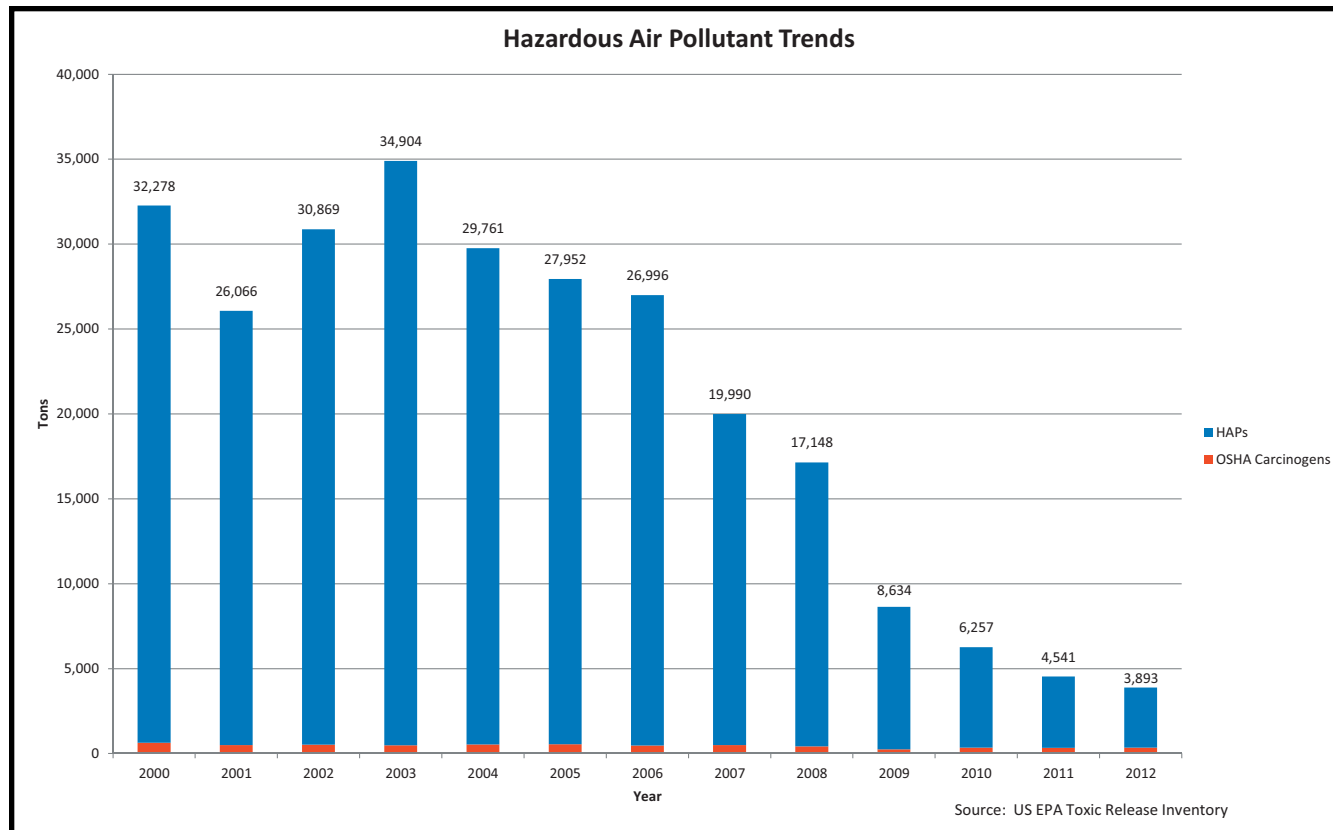
The DAQ operates a network of air toxics monitors to fulfill a variety of programmatic goals, including periodic special projects in specific areas. The DAQ began to install and operate ambient air toxics monitoring stations in 2005, and now has three sites, which operate in Charleston, Wheeling and Morgantown. These monitors collect samples every sixth day, and 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

Air Toxics

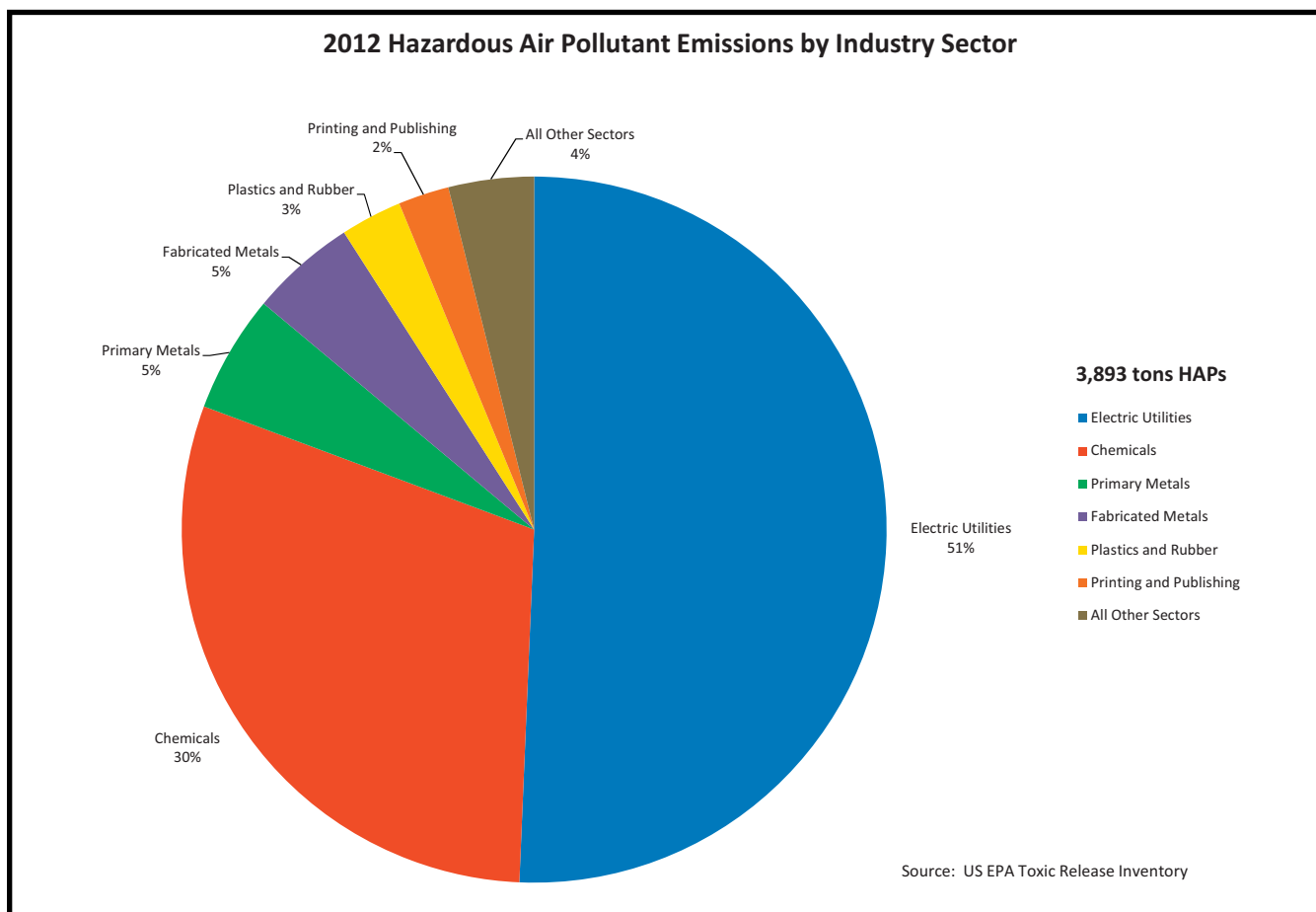
particulate metals from the West Virginia toxics monitors, the National Air Toxics Trends site in Washington, D.C., and for other EPA Region III state and local agencies. Additionally, there are no national criteria for ambient levels of air toxics as there are for criteria pollutants. Instead, chronic 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.

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





Air Quality Index

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 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 33 includes the more stringent one-hour SO₂ standard for those sites that monitor SO₂. The revised SO₂ 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	2013 - Days in each category:				Highest Value AQI	Pollutants Considered
	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy		
Berkley	225	38	1	0	131	O ₃ , PM _{2.5}
Brooke	305	60	0	0	97	SO ₂ , PM _{2.5} , PM ₁₀
Cabell	285	31	0	0	70	O ₃ , SO ₂ , PM _{2.5}
Greenbrier	208	6	0	0	80	O ₃
Hancock	309	55	1	0	116	O ₃ , SO ₂ , PM _{2.5} , PM ₁₀
Harrison	93	26	0	0	69	PM _{2.5}
Kanawha	316	49	0	0	97	O ₃ , SO ₂ , PM _{2.5} , PM ₁₀
Marion	94	28	0	0	75	PM _{2.5}
Marshall	213	152	0	0	90	SO ₂ , PM _{2.5}
Monongalia	334	30	0	0	100	O ₃ , SO ₂ , PM _{2.5}
Ohio	221	43	0	0	97	O ₃ , PM _{2.5}
Raleigh	106	14	0	0	73	PM _{2.5}
Wood	332	33	0	0	97	O ₃ , SO ₂ , PM _{2.5}



Appendix A

Technical Information

Ambient Monitoring

2013 Monitoring Network

West Virginia Division of Air Quality - Monitoring Network

CY 2013

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
Raleigh		1						
Wood		1		1	1			
Total Sites	5	14	3	14	8	1	3	3

2013 Criteria Pollutants Ozone Summary

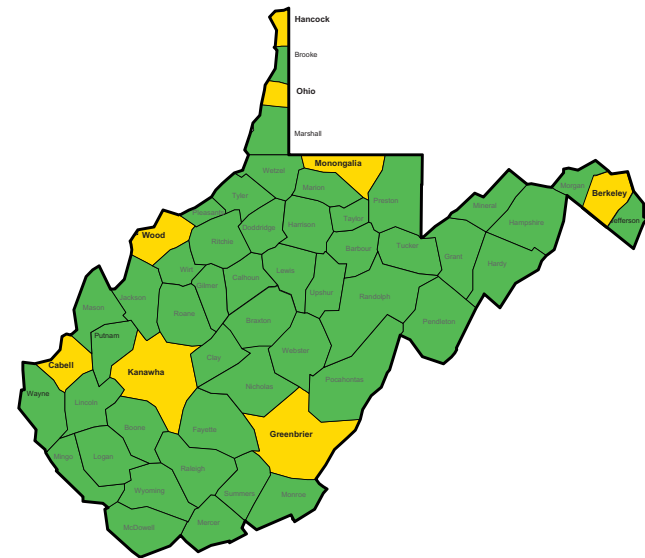
Criteria Pollutant Summary Report - 2013

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

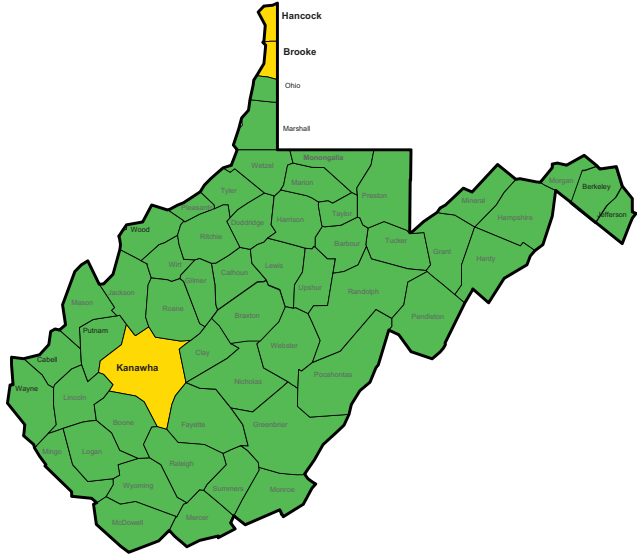
Secondary NAAQS: Same as Primary Standard



County	Site	EPA-ID	# Valid Days	8-Hour Averages					
				Obs >0.075	1st Max	2nd Max	3rd Max	4th Max	'11-'13 4th Max Avg
Berkeley	Martinsburg	54-003-0003	199	0	.068	.068	.065	.063	.066
Cabell	Huntington	54-011-0006	198	0	.063	.062	.061	.059	.069
Greenbrier	Sam Black Church	54-025-0003	214	0	.069	.063	.061	.060	.063
Hancock	Weirton	54-029-1004	211	1	.082	.074	.073	.069	.072
Kanawha	Charleston	54-039-0010	209	0	.074	.071	.068	.067	.073
Monongalia	Morgantown	54-061-0003	183	0	.075	.066	.066	.064	.068
Ohio	Wheeling	54-069-0010	214	0	.074	.071	.068	.063	.070
Wood	Vienna	54-107-1002	207	0	.074	.072	.066	.064	.068

2013 Criteria Pollutant PM₁₀ Summary

Criteria Pollutant Summary Report - 2013		
Pollutant:	Particulate Matter PM ₁₀	
Monitoring Season:	January 1 - December 31	
Data Interval:	24-Hour	
Units:	Micro-grams per cubic meter (ug/m ³)	
<u>National Ambient Air Quality Standards (NAAQS)</u>		
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	119	17.4	0	148	36	32	32
Brooke	Weirton	54-009-0011	8746	13.6	0	48	35	35	34
Hancock	Weirton	54-029-0009	8728	13	0	55	45	40	34
Hancock	Weirton	54-029-1004	61	14.2	0	29	28	27	27
Hancock	Weirton	54-029-1004	8403	13.5	0	38	38	32	30
Kanawha	Charleston	54-039-0010	8147	12.6	0	31	30	29	29

2013 Criteria Pollutants PM_{2.5} Summary

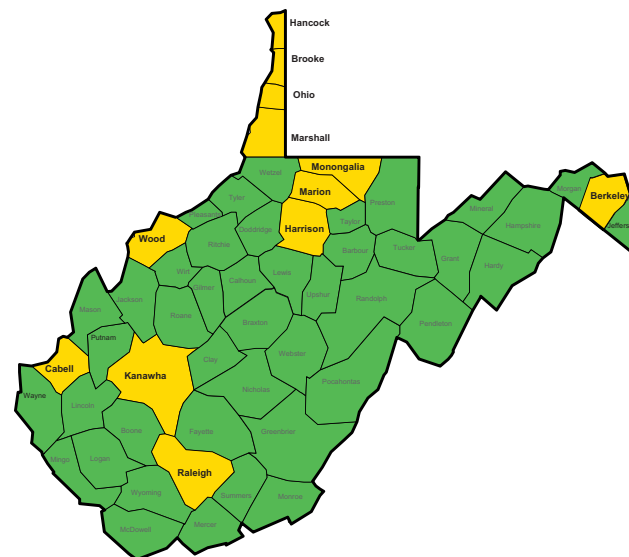
Criteria Pollutant Summary Report - 2013

Pollutant: Particulate Matter PM_{2.5}
Monitoring Season: January 1 - December 31
Data Interval: 24-Hour
Units: Micro-grams per cubic meter (ug/m³)

National Ambient Air Quality Standards (NAAQS)

Primary NAAQS: Annual Arithmetic Mean (3yr average) 15.0 ug/m³
24-Hour Average 35 ug/m³
(3yr average 98th percentile)

Secondary NAAQS: Same as Primary Standard



County	Site	EPA-ID	# Obs	Annual Mean	24-Hour Average				3 Year Average	
					Obs > 35	98%	1st Max	2nd Max	Annual	24-Hr 98%
Berkeley	Martinsburg	54-003-0003	121	9.8	1	21.7	47.8	29.5	10.7	26
Brooke	Follansbee	54-009-0005	122	11.0	0	26.8	31.3	27.0	11.6	26
Brooke	Weirton	54-009-0011	121	10.3	0	26.8	31.1	30.2	10.1	26
Cabell	Huntington	54-011-0006	117	9.4	0	20.3	21.0	20.7	10.4	21
Hancock	Weirton	54-029-1004	122	10.1	0	27.3	29.2	28.6	10.5	26
Harrison	Clarksburg	54-033-0003	119	8.8	0	19.1	20.8	20.4	9.2	20
Kanawha	Charleston	54-039-0010	115	8.6	0	16.7	21.5	18.6	9.7	21
Kanawha	South Charleston	54-039-1005	117	9.8	0	19.7	21.8	21.7	10.8	22
Marion	Fairmont	54-049-0006	122	9.3	0	18.4	23.6	20.8	10.3	22
Marshall	Moundsville	54-051-1002	118	10.4	0	23.2	29.0	25.0	11.6	25
Monongalia	Morgantown	54-061-0003	118	8.9	0	19.0	22.2	20.9	9.5	22
Ohio	Wheeling	54-069-0010	121	10.1	0	24.9	29.1	28.0	10.6	24
Raleigh	Beckley	54-081-0002	120	7.5	0	18.0	22.4	19.2	8.3	19
Wood	Vienna	54-107-1002	111	9.4	0	20.5	32.0	22.5	10.4	22

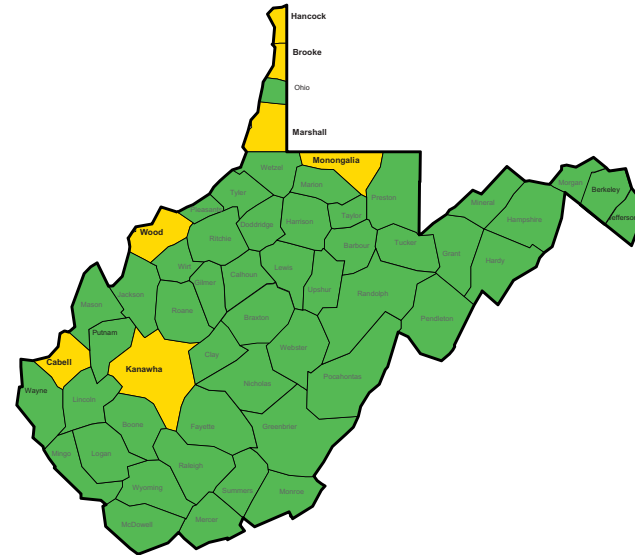
2013 Criteria Pollutants SO₂ Summary

Criteria Pollutant Summary Report - 2013

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%	11-13 99%	obs > 500	1st Max	2nd Max%
Brooke	Follansbee	54-009-0005	8682	3.25	71	66	49	88	0	60	56
Brooke	Weirton	54-009-0007	8213	3.29	45	40	31	59	0	32	28
Brooke	Weirton	54-009-0011	8665	4.38	71	70	62	138	0	54	48
Cabell	Huntington	54-011-0006	6345	1.78	22	21	19	26	0	21	19
Hancock	New Manchester	54-029-0005	8676	4.21	36	34	29	29	0	28	24
Hancock	New Cumberland	54-029-0007	8701	3.11	40	25	23	31	0	17	16
Hancock	Chester	54-029-0008	8708	3.12	35	30	23	28	0	28	20
Hancock	Weirton	54-029-0009	8118	2.97	31	29	22	44	0	24	22
Hancock	Lawrenceville	54-029-0015	8683	3.56	47	43	40	34	0	28	24
Hancock	Weirton	54-029-1004	8650	5.08	31	28	26	45	0	24	23
Kanawha	Charleston	54-039-0010	8426	3.59	55	53	42	42	0	39	33
Marshall	Moundsville	54-051-1002	8621	4.92	58	55	43	59	0	47	39
Monongalia	Morgantown	54-061-0003	8179	1.58	24	18	14	17	0	18	14
Wood	Vienna	54-107-1002	8137	3.56	29	26	25	33	0	22	20

2013 Criteria Pollutants CO Summary

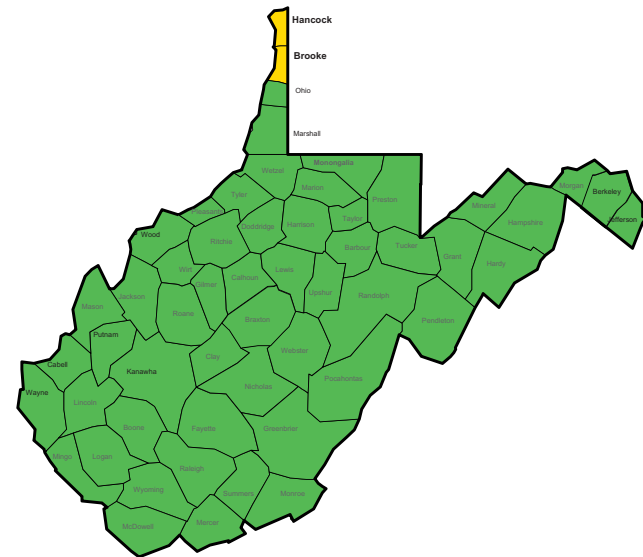
Criteria Pollutant Summary Report - 2013

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	8713	0	1.5	.9	0	.7	.7
Hancock	Weirton	54-029-0009	8685	0	1.1	.9	0	.6	.6
Hancock	Weirton	54-029-1004	8677	0	2.0	1.9	0	1.5	1.3



Appendix B Definitions, Terms and Acronyms

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 (SF₆). 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.

O₃

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 micrometers 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.

PM₁₀

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.

SO₂

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.

µg/m³

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/toxdatt.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/

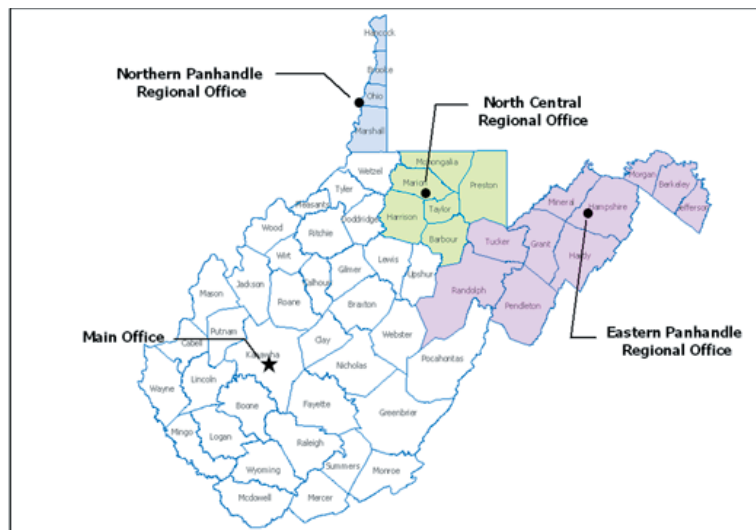
Provides links to outreach efforts about technical air
training, upcoming conferences and environmental
education
www.apti-learn.net

Public Notices for Regulatory Actions
[www.dep.wv.gov/daq/publicnoticeandcomment/Pages/
default.aspx](http://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_monhabs.
html](http://www.epa.gov/airquality/airdata/ad_rep_monhabs.html).

Contact Information

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