AIR QUALITY REPORT 2015

Jefferson County Department of Health
Air and Radiation Protection Division

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JEFFERSON COUNTY
DEPARTMENT OF HEALTH

Environmental Health Services
Air and Radiation Protection Division
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LIST OF ACRONYMS AND UNITS OF MEASURE

ADEM	Alabama Department of Environmental Management
APCE	Air Pollution Control Engineer
APCP	Air Pollution Control Program
AQI	Air Quality Index
CO	Carbon monoxide
EHS	Environmental Health Specialist
EPA	Environmental Protection Agency
FCE	Full Compliance Evaluation
$\mu g/m^3$	Micrograms per cubic meter
NAAQS	National Ambient Air Quality Standards
NCore	National Core Multipollutant
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
O_3	Ozone
Pb	Lead
$PM_{2.5}$	Particulate matter of size 2.5 microns or less in diameter
PM_{10}	Particulate matter of size 10 microns or less in diameter
ppb	Parts per billion
ppm	Parts per million
RadNet	Radiation Network
SLAMS	State and Local Air Monitoring Station
SPM	Special Purpose Monitor
SO_2	Sulfur dioxide
tpy	Tons per year
VOC	Volatile Organic Compound

1. INTRODUCTION

The goal of the Air Pollution Control Program (APCP) within the Air and Radiation Protection Division in Environmental Health Services at the Jefferson County Department of Health is to ensure that citizens of Jefferson County, Alabama, have access to air which meets the health standards established by the United States Environmental Protection Agency (EPA). A significant portion of resources by the APCP are devoted to monitoring pollutant levels in the ambient air, which it has done for over 40 years. Information received from the monitoring network concerning pollutant levels is used as the basis for developing any control strategies necessary to ensure that health standards are attained and maintained.

The APCP prepares this report annually by analyzing data from air monitoring sites throughout the Birmingham area. The pollutants monitored at the air monitoring sites include those that the EPA has established a national ambient air quality standard (NAAQS) since they are considered harmful to public health and the environment. The six principal pollutants that have an NAAQS are: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter smaller than 2.5 and 10 microns in diameter ($PM_{2.5}$ and PM_{10}), and sulfur dioxide (SO_2).

This report includes information on the NAAQS, the air monitoring network throughout Jefferson County, and the description, emission sources, health effects, attainment or nonattainment status, and monitoring data of each principal pollutant. Also included is how the Air Quality Index is used to report daily air quality. The APCP permitting, compliance, and enforcement activities completed are also discussed.

2. NATIONAL AMBIENT AIR QUALITY STANDARDS

The Environmental Protection Agency (EPA) has two types of national ambient air quality standards (NAAQS) – primary and secondary. The primary standards are designed to protect public health within an adequate margin of safety. The secondary standards are designed to protect public welfare (such as property damage, materials, damage to plants and animals, and visibility). Units of measure for the NAAQS are parts per billion (ppb), parts per million (ppm), and micrograms per cubic meter of air ($\mu g/m^3$). The Air Pollution Control Program utilizes the current standards established by the EPA in Table 2.1.

Table 2.1: National Ambient Air Quality Standards.

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		Primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead (Pb)		Primary and Secondary	Rolling 3 month average	0.15 $\mu g/m^3$ (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		Primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		Primary and Secondary	Annual	53 ppb (2)	Annual mean
Ozone (O_3)		Primary and Secondary	8-hour	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution (PM)	**$PM_{2.5}$**	Primary	Annual	12.0 $\mu g/m^3$	Annual mean, averaged over 3 years
		Secondary	Annual	15.0 $\mu g/m^3$	Annual mean, averaged over 3 years
		Primary and Secondary	24-hour	35 $\mu g/m^3$	98th percentile, averaged over 3 years
	PM_{10}	Primary and Secondary	24-hour	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		Primary	1-hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.

(2) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2)any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO2 standards or is not meeting the requirements of a SIP call under the previous SO2 standards (40 CFR 50.4(3)), A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the require NAAQS.

3. AMBIENT AIR QUALITY NETWORK

Data provided through a complex network of air monitoring stations located throughout Jefferson County determine the quality of ambient air in the county. In 2015 the network consisted of 10 monitoring sites (Figure 3.1) with 31 air monitors and 6 collocated monitors at those sites. The criteria air pollutants monitored at these sites were carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter 2.5 microns and less in size ($PM_{2.5}$), particulate matter 10 microns and less in size (PM_{10}), and sulfur dioxide (SO_2). Most of the air monitors in the network are classified as one of the following: State and Local Air Monitoring Station (SLAMS), Special Purpose Monitoring (SPM), or National Core Multi-pollutant (NCore) based on the general monitoring objectives.

The objective of the SLAMS network is to collect data that provide an overview of the state's air quality used in the development of statewide control strategies. The NCore network is a nation-wide multi-pollutant network that integrates several advanced measurement systems for particles, pollutant gases, and meteorology. This multi-pollutant approach benefits health assessments, emissions strategy development, and future monitoring efforts. The monitoring sites in Jefferson County that observe criteria pollutant concentrations that are used for compliance with the National Ambient Air Quality Standards (NAAQS) come from the SLAMS and NCore networks (Table 3.1). Data shown in subsequent sections of this report are from these two networks.

The objective of the SPM network is to provide data for the development and refinement of local control strategies. The data also verify maintenance of air standards in areas not monitored by the SLAMS network.

There are also other networks within Jefferson County that provide data beyond compliance purposes with the NAAQS. The National Speciation Trends Network program's objectives are to measure current aerosol conditions in certain areas, to identify chemical species and emission sources responsible, and to document long-term trends for aerosol conditions. The Radiation Network (RadNet) provides important information on background levels of radiation in the environment. The objective of the near-real time air monitoring component of the RadNet is to provide verified decision-making data to federal and state agency decision makers and the public in hours instead of days. The Interagency Monitoring of Protected Visual Environments (IMPROVE) program's objectives are to establish current visibility and aerosol conditions in mandatory Class I areas, to identify chemical species and emission sources responsible for existing man-made visibility impairment, to document long-term trends for assessing progress towards the national visibility goal, and with the enactment of the Regional Haze Rule, to provide regional haze monitoring representing all visibility-protected Federal Class I areas where practical.

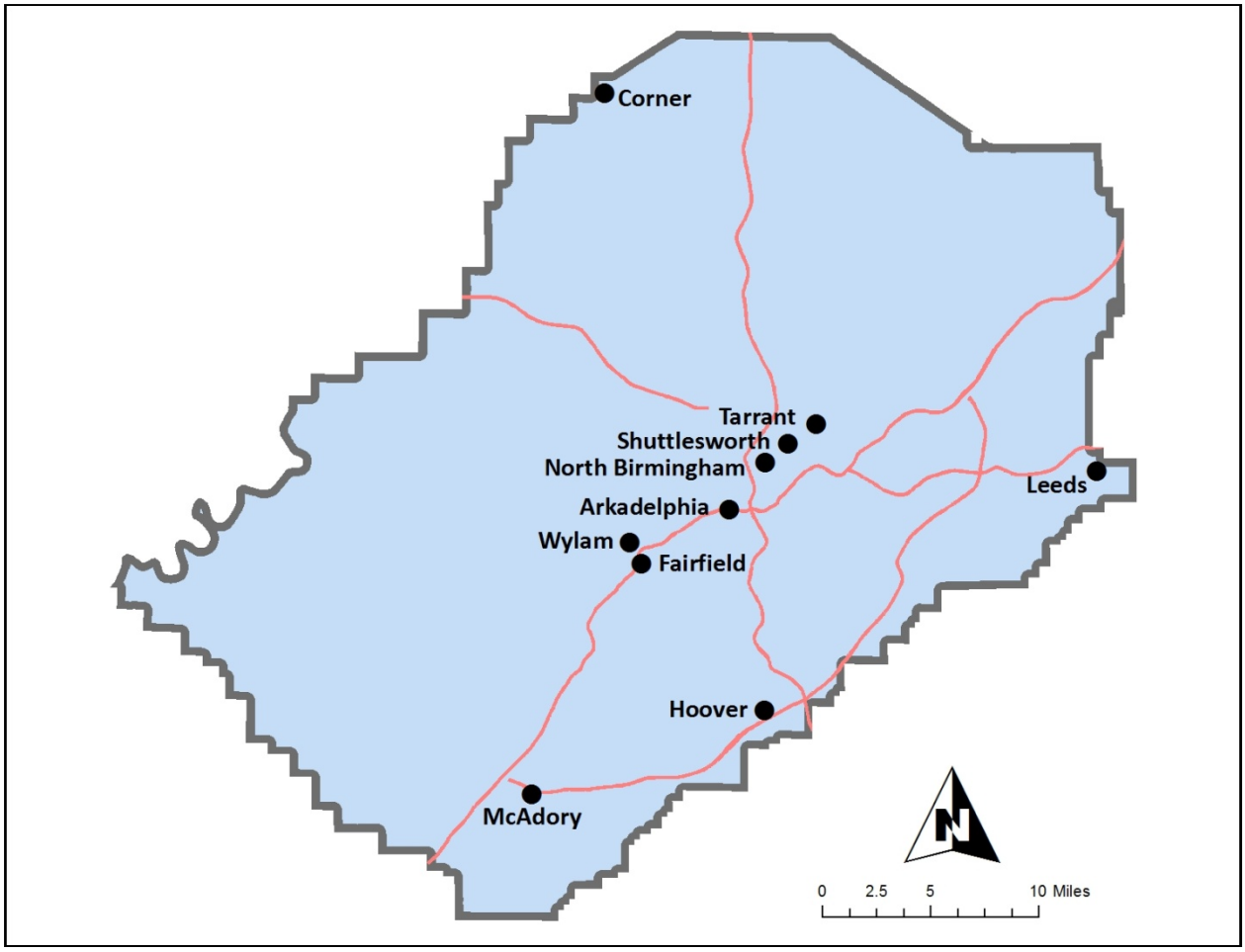

Figure 3.1: Location of monitoring sites in Jefferson County.

Table 3.1: Air Pollution Monitors in Jefferson County Used for NAAQS Compliance Purposes.

Site Name	Site ID	CO	Pb	NO_2	O_3	$PM_{2.5}$	PM_{10}	SO_2
Arkadelphia	01-073-2059	●		●		●		
Corner	01-073-5003				●			
Fairfield	01-073-1003	●			●			●
Hoover	01-073-2006				●			
Leeds	01-073-1010				●	●	●	
McAdory	01-073-1005				●	●		
North Birmingham	01-073-0023	●	●	●	●	●		●
Shuttlesworth	01-073-6004	●					●	
Tarrant	01-073-6002				●		●	
Wylam	01-073-2003					●	●	

4. AMBIENT AIR QUALITY DATA

4.1 Carbon Monoxide (CO)

General Information

Carbon monoxide (CO) is a colorless, odorless, and tasteless gas. It is emitted into the atmosphere by natural and man-made sources. Globally, total emissions of CO are greater than emissions of any other air pollutant, due to the widespread extent of low-level emissions from natural sources.

The major natural source of CO is the spontaneous oxidation of naturally occurring methane. Other natural sources include the oceans, plant growth and decay, terpene oxidation, and forest fires. Globally, natural sources account for nearly 90 percent of CO emissions. The major man-made source of CO is the incomplete combustion of carbon-based fuels. Gasoline motor vehicles, primarily automobiles and light duty trucks, are the most common source. Other sources include industrial process losses, open burning and industrial or utility boilers. Figure 4.1 shows the emission sources of CO in Jefferson County.

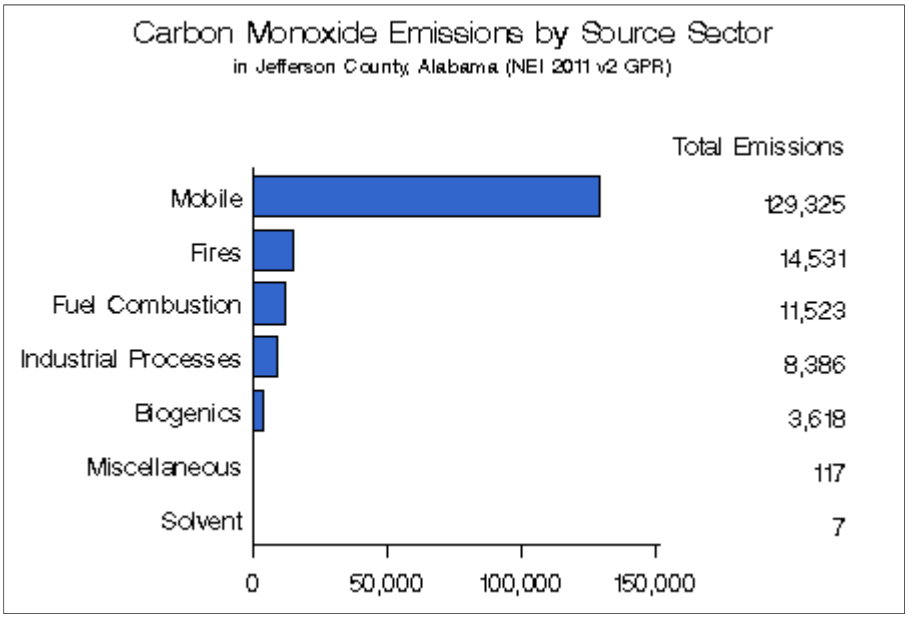

Figure 4.1: Sources of carbon monoxide in Jefferson County from the 2011 National Emissions Inventory (from EPA's State and County Emission Summaries).

CO poses a threat to human health because of its ability to react with hemoglobin that carries oxygen to cell tissue. Hemoglobin preferentially absorbs CO, thus reducing the amount of oxygen transported throughout the body. Most people will experience symptoms including dizziness and headaches when exposed to high levels of CO. Eliminating exposure causes blood to return to normal levels of oxygen.

Monitoring Data

The Environmental Protection Agency (EPA) has established two primary standards for CO. The 1-hour standard is set at 35 ppm and the 8-hour standard is set at 9 ppm. Neither standard is to be exceeded more than once per year [76 FR 54294, August 31, 2011].

In 2015, the CO monitoring network consisted of 4 monitoring sites. No monitoring sites exceeded the 1-hour or 8-hour standards during 2015 (Table 4.1). Compliance with the CO standards are based upon the most recent 2 years of data. During the most recent 2 years of monitoring data (2014-2015), all monitors were in compliance with both the 1-hour (Figure 4.2; Appendix) and 8-hour (Figure 4.3; Appendix) standards. There has been a downward trend in CO levels since the mid-1990s and are now well below the standards. The Birmingham area is designated as attainment of the standards for CO.

Table 4.1: Highest 1-Hour and 8-Hour Average CO Concentrations (in ppm) and Number of 1-Hour and 8-Hour Average CO Observations Exceeding the NAAQS in 2015.

Site Name	Site ID	1-Hour Averages			8-Hour Averages		
		1st Max	2nd Max	Obs > 35.0	1st Max	2nd Max	Obs > 9.0
Arkadelphia	01-073-2059	3.2	2.1	0	1.4	1.4	0
Fairfield	01-073-1003	10.3	6.9	0	2.3	1.9	0
N. Birmingham	01-073-0023	1.6	1.5	0	1.0	0.9	0
Shuttlesworth	01-073-6004	2.7	2.3	0	1.0	1.0	0

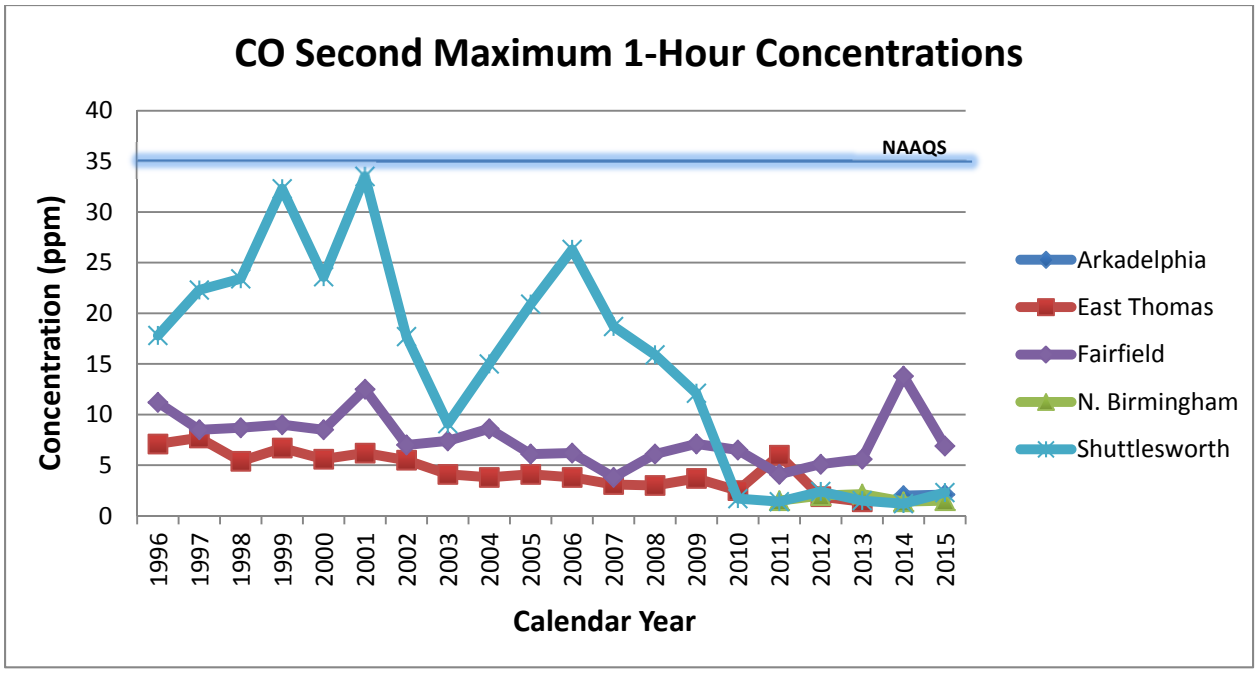

Figure 4.2: Carbon monoxide second maximum 1-hour average concentrations (in ppm) for 1996-2015. The highlighted blue line indicates the NAAQS, which is 35 ppm.

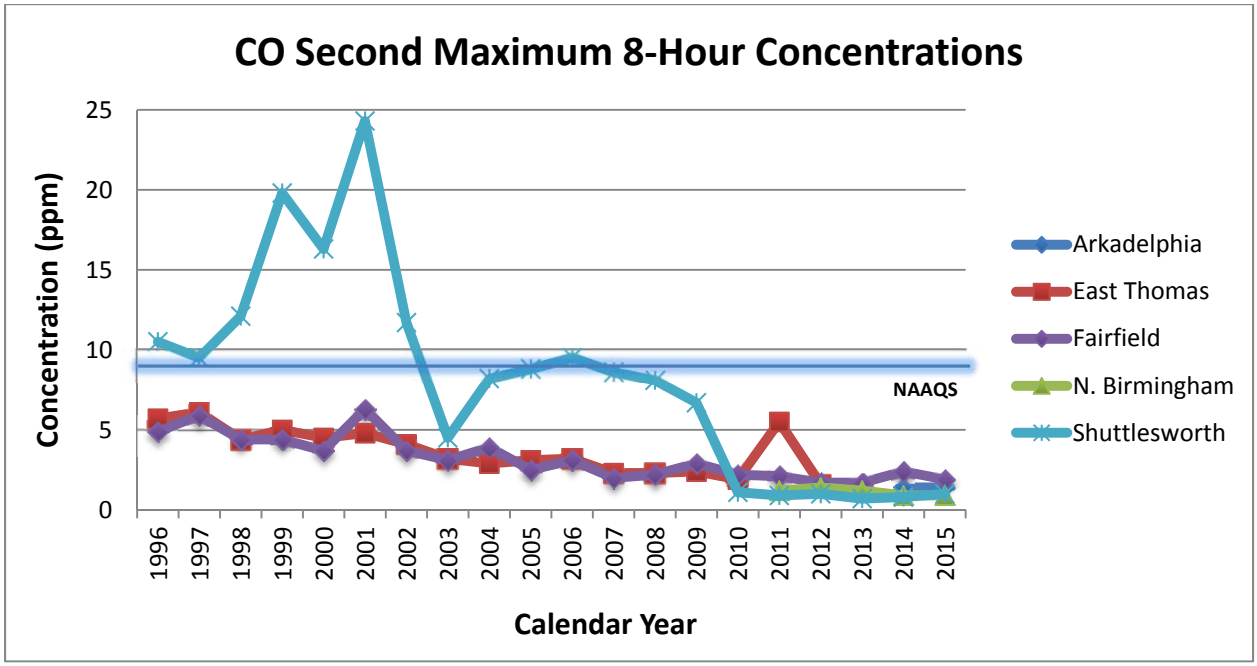

Figure 4.3: Carbon monoxide second maximum 8-hour average concentrations (in ppm) for 1996-2015. The highlighted blue line indicates the NAAQS, which is 9 ppm.

4.2 Lead (Pb)

General Information

Lead (Pb) is a naturally occurring, bluish-gray metal. Pb is persistent in the environment and accumulates in soils and sediments from air sources, direct discharge of waste streams to water bodies, mining, and erosion. The phase-out of leaded gasoline in the 1970s has led to dramatically reduced Pb concentrations across the United States.

The highest air concentrations of Pb today are found near lead-acid battery manufacturers and lead smelters. Other industrial sources are combustion of solid waste, metals processing, and iron and steel production. Pb can also be found in non-industrial sources such as older lead-based paints and in drinking water due to the presence of lead in certain older pipes, solder, and fixtures. Figure 4.4 shows the emission sources of Pb in Jefferson County.

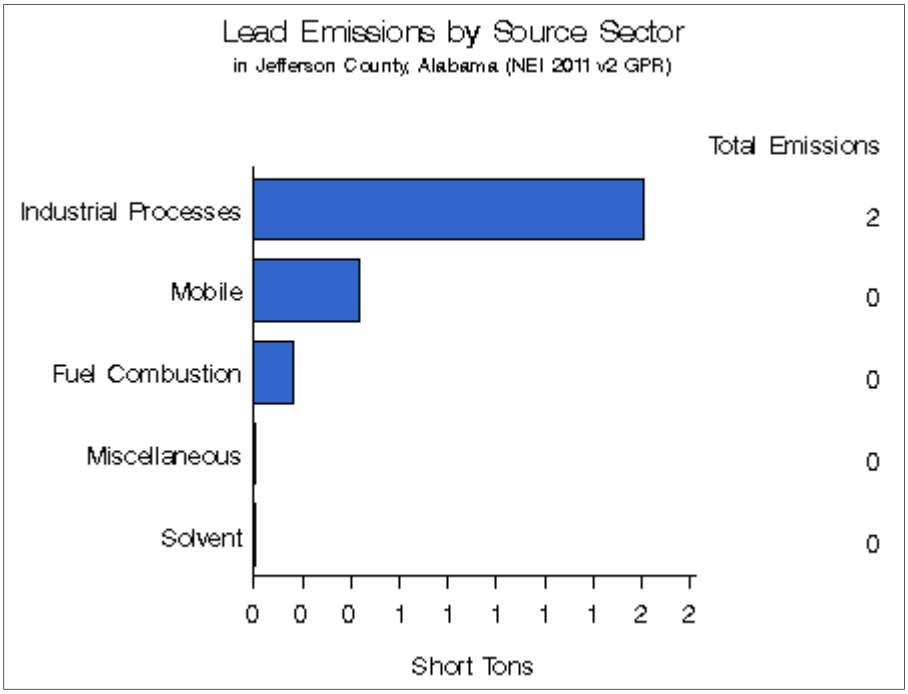

Figure 4.4: Sources of lead in Jefferson County from the 2011 National Emissions Inventory (from EPA's State and County Emission Summaries).

Human exposure to Pb occurs through inhalation and oral ingestion of Pb in food, water, soil or dust. Pb distributes throughout the body in the blood and accumulates in the bones. Pb can adversely affect the nervous system, kidneys, immune system, and other organs. Pb has recently been shown to have

cardiovascular effects (high blood pressure and heart disease). Childhood exposure to Pb can lead to learning deficits, behavior problems, and lowered IQ.

Monitoring Data

The Environmental Protection Agency (EPA) has established a primary rolling 3-month average standard for Pb. The rolling 3-month average standard is set at 0.15 µg/m^3. The standard is not to be exceeded for any rolling 3-month average over a 3-year period [73 FR 66964, November 12, 2008].

In 2015, the Pb monitoring network consisted of 1 monitoring site (North Birmingham). The North Birmingham monitoring site did not have any rolling 3-month average Pb concentrations over the Pb standard in 2015 (Table 4.2). The most recent 3 years of data are used to determine compliance with the Pb standard. During the most recent 3 years of monitoring data (2013-2015), no 3-month rolling average was above the standard (Figure 4.5).

Table 4.2: Highest Rolling 3-Month Average Pb Concentrations (in µg/m^3) in 2015 (includes data from November and December 2014 to calculate averages with January and February 2015).

Site Name	Site ID	Rolling 3-Month Average			
		1st Max	2nd Max	3rd Max	4th Max
N. Birmingham	01-073-0023	0.02	0.02	0.02	0.02

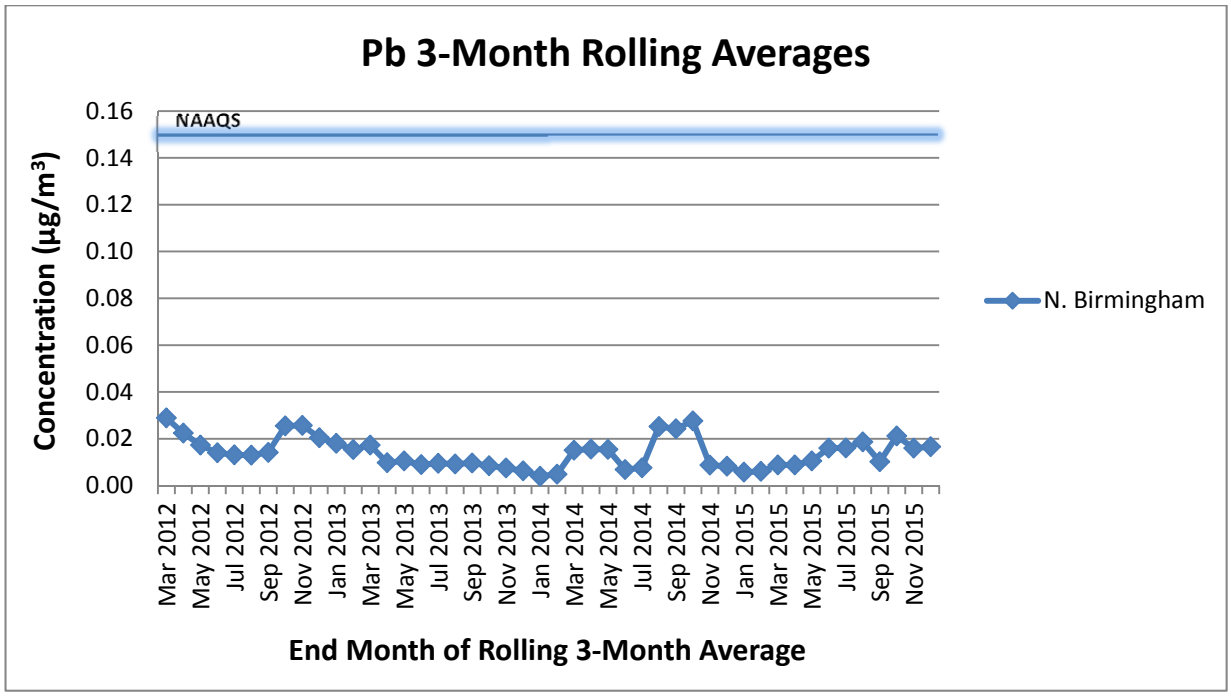

Figure 4.5: 3-month rolling averages (labeled with the month that the 3-month period ended) of lead (in µg/m^3) for 2012-2015. The highlighted blue line indicates the NAAQS, which is 0.15 µg/m^3.

4.3 Nitrogen Dioxide (NO_2)

General Information

Nitrogen dioxide (NO_2) is a reddish-brown gas formed through the oxidation of nitric oxide (NO). NO_2 is the component of greatest concern in a group of highly reactive gases known as nitrogen oxides (NO_x), which also includes NO, nitrous acid, and nitric acid. NO_x reacts with ammonia, moisture, and other compounds to form small particles. NO_x also reacts with volatile organic compounds to from ozone.

The major man-made source of NO_x are high-temperature combustion processes from automobiles, industries, and power plants. Other sources of NO_2 include home heaters, gas stoves, and non-road equipment. The natural sources of NO_x come from lightning, fires, and biogenic emissions from soil. Figure 4.6 shows the emission sources of NO_x in Jefferson County.

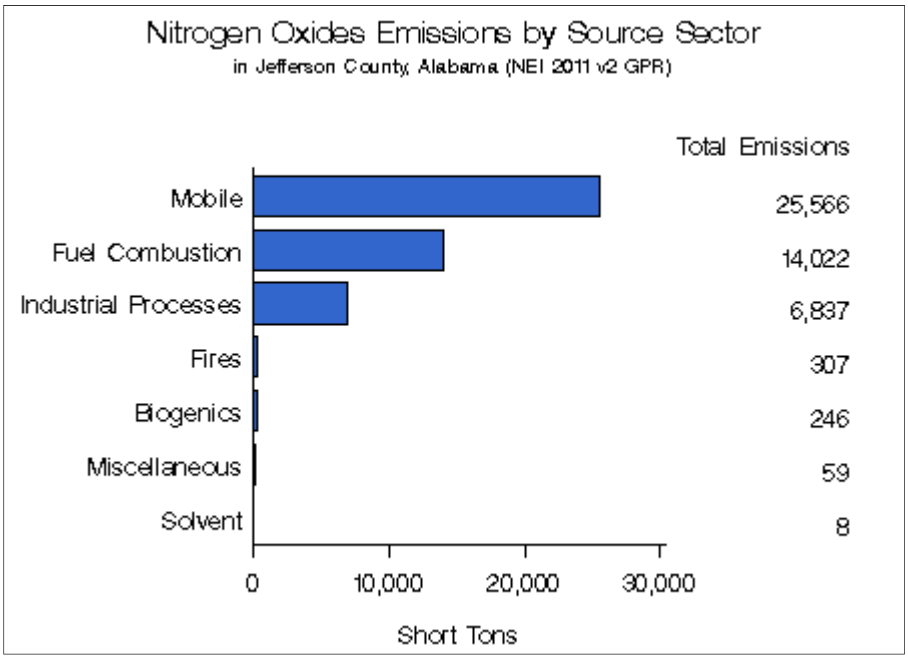

Figure 4.6: Sources of nitrogen oxides in Jefferson County from the 2011 National Emissions Inventory (from EPA's State and County Emission Summaries).

Short-term exposure to NO_2 can lead to adverse respiratory effects that include airway inflammation in healthy people and increased respiratory symptoms with those that have asthma. Long-term exposure to NO_2 may cause structural damage to the lungs and increase susceptibility to respiratory infection. NO_2 can also lead to a reduction in visibility.

Monitoring Data

The Environmental Protection Agency (EPA) has established two primary standards for NO_2. In 2010, the EPA set a new 1-hour NO_2 standard at 100 ppb and retained the annual NO_2 standard at 53 ppb [75 FR 6474, February 9, 2010]. A 3-year average (design value) of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations is used to determine compliance with the 1-hour NO_2 standard. The annual mean is averaged over 3 years (design value) to determine compliance with the annual NO_2 standard.

In 2015, the NO_2 monitoring network consisted of 2 monitoring sites. No monitoring sites exceeded the 1-hour or annual standards during 2015 (Table 4.3). The design value for the 1-hour NO_2 standard is based upon the most recent 3 years of data, but no monitor has been operating long enough to determine compliance. Compliance with the annual standard is based upon the most recent year of data. During the most recent year of monitoring data (2015), only the North Birmingham monitor fulfilled completeness criteria and it was below the 1-hour standard (Table 4.3).

Table 4.3: Highest 1-Hour Average NO_2 Concentrations (in ppb), the 98th Percentile of 1-Hour Average NO_2 Concentrations (in ppb), and Annual Mean of 1-Hour NO_2 Concentrations (in ppb) for 2015.

Site Name	Site ID	1st Max	2nd Max	98th Percentile	Annual Mean
Arkadelphia*	01-073-2059	61.6	58.1	49.8	13
North Birmingham	01-073-0023	48.5	44.8	40.1	9

*Annual values for this year do not meet completeness criteria.

4.4 Ozone (O_3)

General Information

Ozone (O_3) is a colorless gas that is photochemically produced in the atmosphere when volatile organic compounds (VOCs) combine with nitrogen oxides (NO_x) in the presence of sunlight. In the lower atmosphere, O_3 is the predominant component of photochemical smog and is most likely to reach high concentration levels on hot, dry, summer days when sunlight is intense and wind movement is low.

In urban areas, emissions of NO_x and VOCs lead to the formation of O_3 in the lower atmosphere. NO_x is primarily emitted from combustion sources such as motor vehicles and boilers. Primary sources of VOCs include motor vehicle exhaust, gasoline evaporation from storage facilities or tanker trucks, paint, dry cleaners, industrial use of solvents or coatings, and biogenic emissions from natural sources. The emission sources of NO_x and VOCs in Jefferson County are shown in Figures 4.6 and 4.7, respectively.

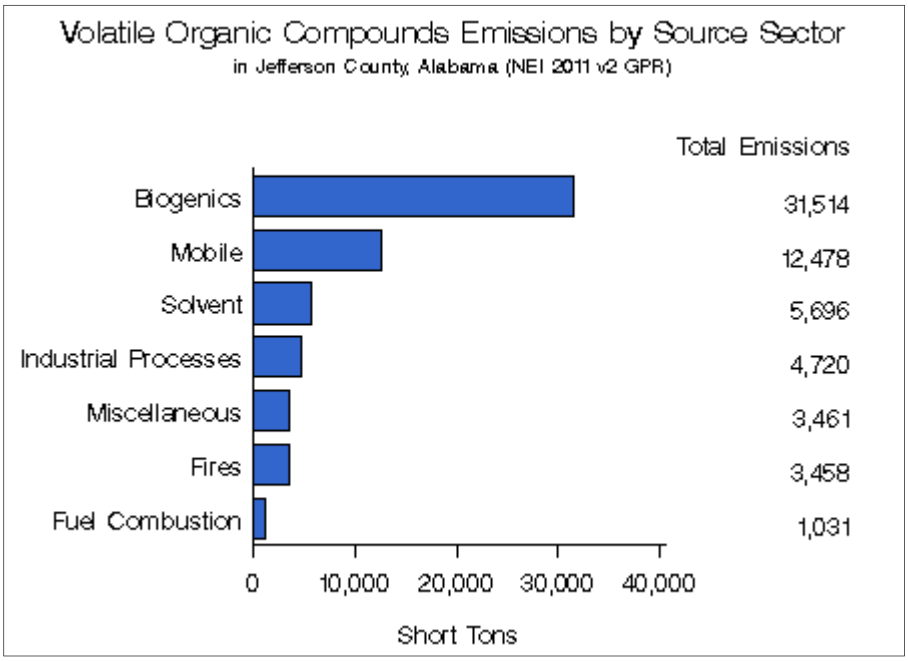

Figure 4.7: Sources of volatile organic compounds in Jefferson County from the 2011 National Emissions Inventory (from EPA's State and County Emission Summaries).

O_3 is a pulmonary irritant. Symptoms include irritation of the eyes, nose, throat and lungs as well as reduced lung function, asthma, stuffy nose, reduced resistance to colds and other infections. O_3 also damages plants, trees, rubber, and fabrics.

Monitoring Data

The Environmental Protection Agency (EPA) has established a primary 8-hour standard for O_3. In 2015, the EPA revised the 8-hour O_3 standard and lowered it to 0.070 ppm [80 FR 65292, October 26, 2015]. The annual fourth-highest daily maximum 8-hour average concentration is averaged over 3 years (design value) to determine compliance with the standard.

The O_3 monitoring season in the Birmingham area begins on March 1st and ends on October 31st. In 2015, the O_3 monitoring network consisted of 8 monitoring sites throughout the Birmingham area (7 in Jefferson County and 1 in Shelby County). There were 14 daily maximum 8-hour averages that were greater than 0.070 ppm during 2015 (Table 4.4). The design values for O_3 are based upon the most recent 3 years of data. During the most recent 3 years of monitoring data (2013-2015), no monitors had a design value above the 8-hour standard (Figure 4.8; Appendix). There has been a general downward trend in O_3 levels since the mid-1990s. The EPA will make attainment and nonattainment designations based on the new 2015 standard beyond calendar year 2015.

Table 4.4: Highest Daily Maximum 8-Hour Average O_3 Concentrations (in ppm) and Number of 8-Hour Average O_3 Observations Exceeding the NAAQS in 2015.

Site Name	Site ID	Daily Maximum 8-Hour Averages				
		1st Max	2nd Max	3rd Max	4th Max	Obs > 0.070
Corner	01-073-5003	0.069	0.069	0.067	0.066	0
Fairfield	01-073-1003	0.074	0.072	0.068	0.068	2
Helena[1]	01-117-0004	0.075	0.074	0.066	0.065	2
Hoover	01-073-2006	0.074	0.071	0.069	0.068	2
Leeds	01-073-1010	0.066	0.065	0.064	0.062	0
McAdory	01-073-1005	0.069	0.066	0.066	0.065	0
N. Birmingham	01-073-0023	0.084	0.077	0.074	0.071	4
Tarrant	01-073-6002	0.077	0.076	0.074	0.073	4

[1] Monitor operated by the Alabama Department of Environmental Management

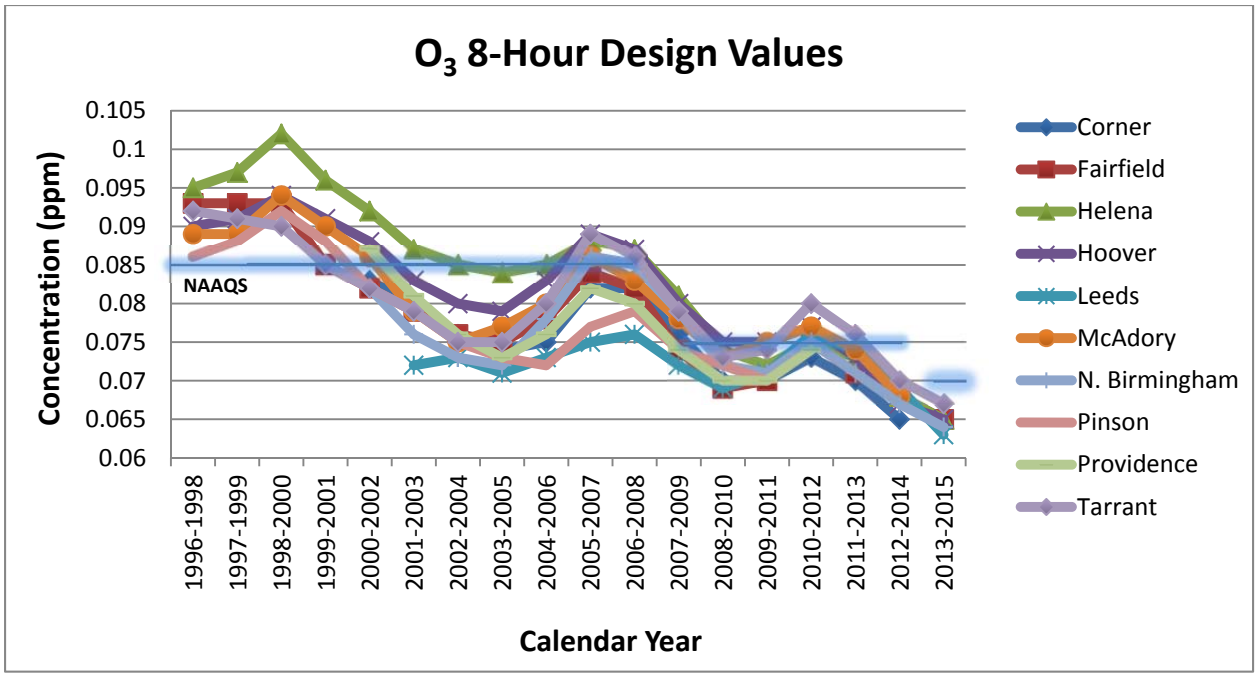

Figure 4.8: 8-hour ozone design values (in ppm) for 1996-2015. The highlighted blue line indicates the NAAQS, which is 0.070 ppm (previously set at 0.085 ppm, in which 0.084 ppm rounded to 0.080 ppm, and at 0.075 ppm).

4.5 Particulate Matter ($PM_{2.5}$ and PM_{10})

General Information

Particulate matter consists of solid particles and liquid droplets. Particulate matter includes dust, soot and other tiny bits of materials released into and moving around in the air. $PM_{2.5}$ consists of fine particles that are less than or equal to 2.5 micrometers in diameter, and PM_{10} consists of coarse particles that are less than or equal to 10 micrometers in diameter. These are used as the basis for the ambient air quality standard. PM_{10} and $PM_{2.5}$ are both subsets of the total airborne particles in the air.

Particulate matter can be emitted directly from a source (primary) or forms from chemical reactions in the atmosphere (secondary). Primary sources include burning of diesel fuels by trucks, buses and other diesel engines; incineration of garbage; mixing and application of fertilizers and pesticides; road construction; vehicular tire wear and exhaust; windblown dust; operation of fireplaces and wood stoves; forest fires; and industrial processes (such as steel making and mining operations). Secondary formation of particulate matter occurs with the presence of nitrogen oxides and sulfur dioxides that are emitted from automobiles, industries, and power plants. Figures 4.9 and 4.10 show the emission sources of $PM_{2.5}$ and PM_{10}, respectively, in Jefferson County.

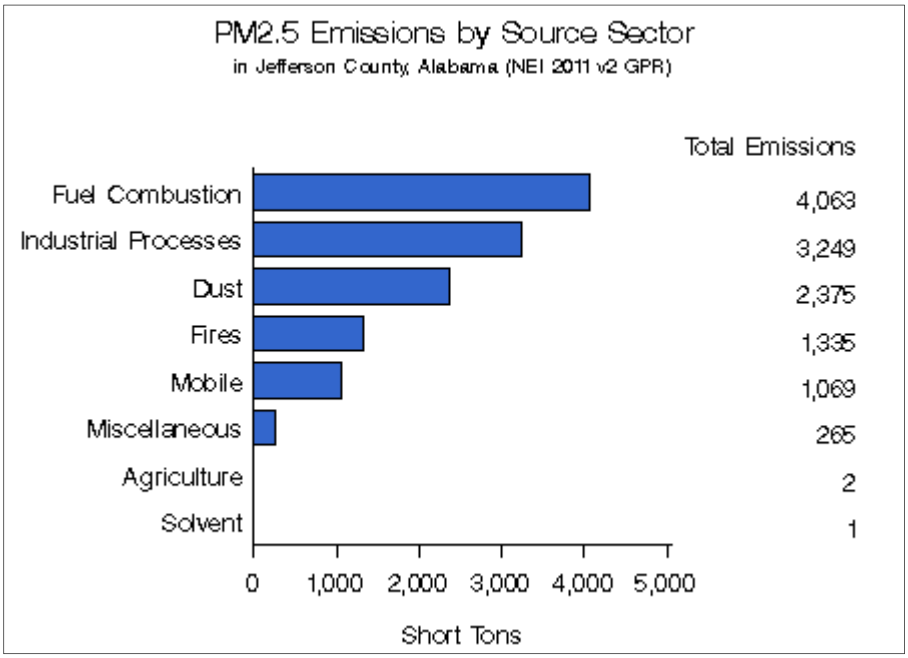

Figure 4.9: Sources of $PM_{2.5}$ in Jefferson County from the 2011 National Emissions Inventory (from EPA's State and County Emission Summaries).

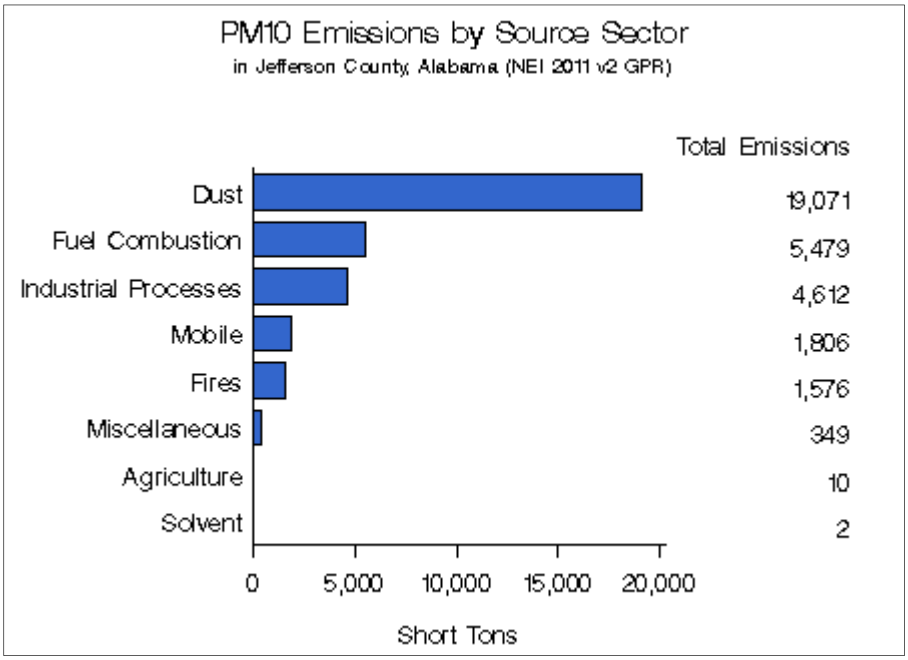

Figure 4.10: Sources of PM_{10} in Jefferson County from the 2011 National Emissions Inventory (from EPA's State and County Emission Summaries).

$PM_{2.5}$ and PM_{10} are such small particles that they are able to penetrate deep into the lungs and can possibly get into the bloodstream, especially $PM_{2.5}$. Therefore, these particles can affect the function of both the lungs and the heart. Exposure to high concentrations of particulate pollution causes eye, nose and throat irritation, aggravation of chronic lung disease, and symptoms of heart and respiratory problems. Particulates are the main source of haze that reduces visibility.

Monitoring Data

The Environmental Protection Agency (EPA) has established two primary standards for $PM_{2.5}$. In 2013, the EPA revised the annual $PM_{2.5}$ standard and lowered it to 12 $\mu g/m^3$ and retained the 24-hour $PM_{2.5}$ standard already set at 35 $\mu g/m^3$ [78 FR 3086, January 15, 2013]. The annual mean is averaged over 3 years (design value) to determine compliance with the standard. For the 24-hour $PM_{2.5}$ standard, the 98th percentile concentrations are averaged over 3 years (design value) to determine compliance with the standard.

In 2015, the $PM_{2.5}$ monitoring network consisted of 5 monitoring sites. No monitoring sites exceeded the annual or 24-hour $PM_{2.5}$ standards during 2015 (Table 4.5). The design values for both $PM_{2.5}$ standards are based upon the most recent 3 years of data. During the most recent 3 years of monitoring data (2013-2015), all monitors were in compliance with both the annual (Figure 4.11; Appendix) and 24-

hour (Figure 4.12; Appendix) standards. There has been a downward trend in $PM_{2.5}$ concentrations since the late 1990s and are below both current standards. The Birmingham area was designated as attainment of the 2006 24-hour $PM_{2.5}$ standard in 2013 [78 FR 5306, January 25, 2013] and attainment of the 2013 annual $PM_{2.5}$ standard in 2015 [80 FR 2206, January 15, 2015].

Table 4.5: 24-Hour Average 98th Percentile (in µg/m^3) of $PM_{2.5}$, Number of 24-Hour Average $PM_{2.5}$ Concentrations Exceeding the NAAQS, and Annual Mean of $PM_{2.5}$ (in µg/m^3) for 2015.

Site Name	Site ID	98th Percentile	Obs > 35	Annual Mean
Arkadelphia	01-073-2059	23.6	0	11.8
Leeds	01-073-1010	19.9	0	10.1
McAdory	01-073-1005	18.5	0	9.6
N. Birmingham	01-073-0023	22.5	0	10.8
Wylam	01-073-2003	18.6	0	10.3

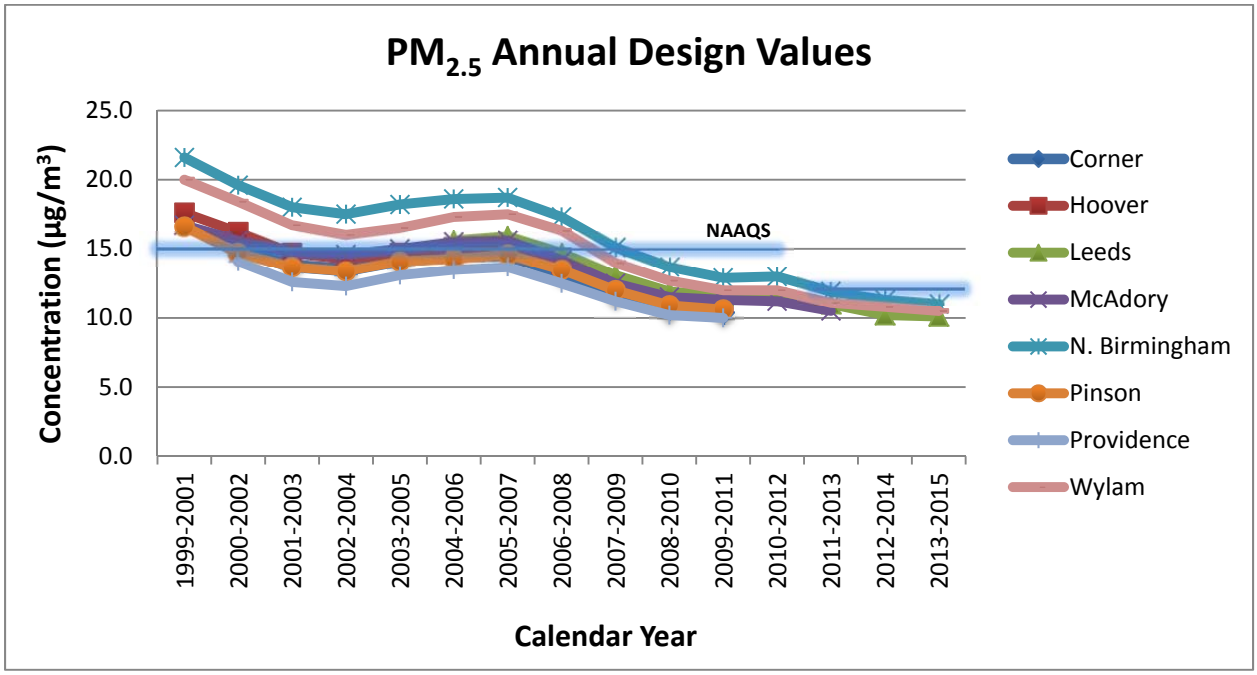

Figure 4.11: Annual $PM_{2.5}$ design values (in µg/m^3) for 1999-2015. The highlighted blue line indicates the NAAQS, which is 12 µg/m^3 (previously set at 15 µg/m^3).

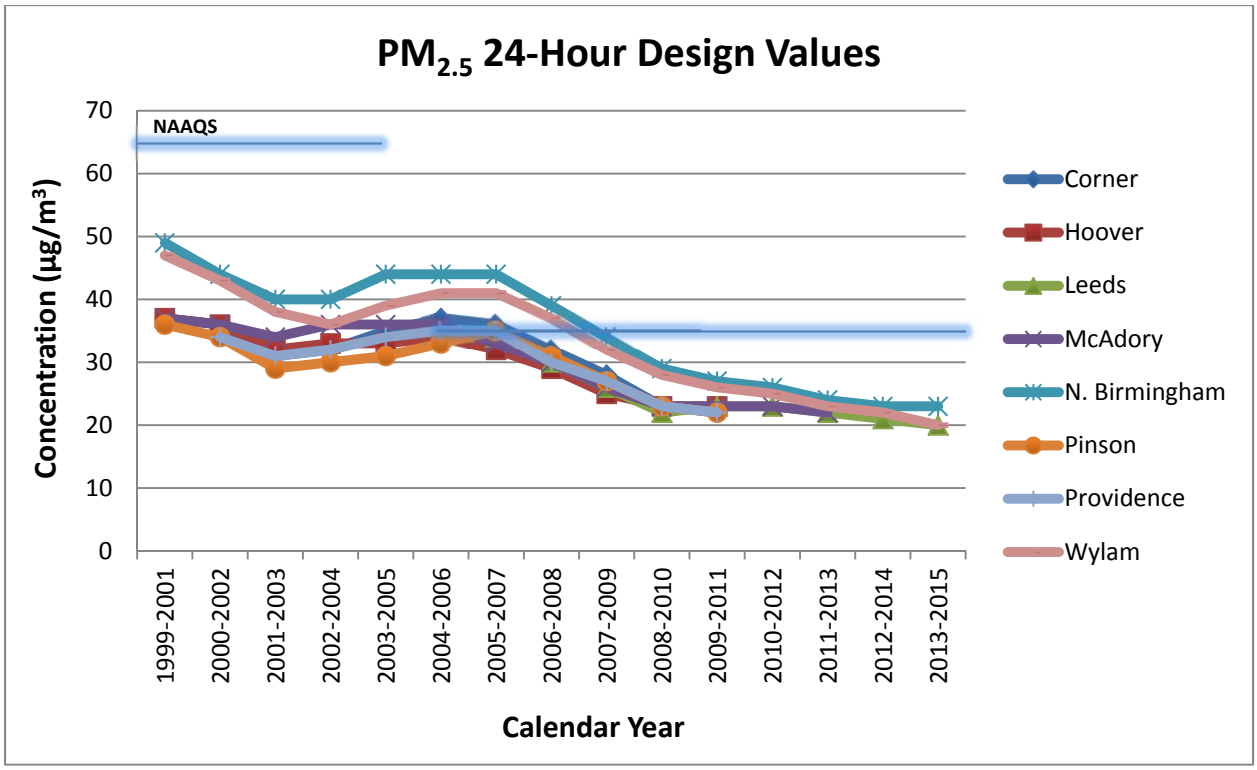

Figure 4.12: 24-hour $PM_{2.5}$ design values (in µg/m^3) for 1999-2015. The highlighted blue line indicates the NAAQS, which is 35 µg/m^3 (previously set at 65 µg/m^3).

The Environmental Protection Agency (EPA) has established a primary 24-hour standard for PM_{10}. The 24-hour PM_{10} standard is set at 150 µg/m^3. The estimated number of days with a maximum 24-hour concentration above the standard is not to be exceeded more than once per year on average over 3 years to determine compliance with the standard [71 FR 61144, October 17, 2006]. If a site reports concentrations on a daily basis, then the actual number of days that exceed the standard is equal to the estimated number of days that exceed the standard. When a site does not report concentrations on a daily basis, a calculation determines the estimated number of exceedances.

In 2015, the PM_{10} monitoring network consisted of 5 monitoring sites. No monitoring sites exceeded the 24-hour PM_{10} standard during 2015 (Table 4.6; Figure 4.13). Compliance with the 24-hour PM_{10} standard is based upon the most recent 3 years of data. During the most recent 3 years of monitoring data (2013-2015), all monitors were in compliance with the 24-hour standard (Table 4.7). There has been an overall downward trend in PM_{10} concentrations over time and are now well below the standard (Appendix). The Birmingham area is designated as attainment of the standard for PM_{10}.

Table 4.6 Highest 24-Hour Average PM_{10} Concentrations (in µg/m^3) and Actual Number and Estimated Number of 24-Hour Average PM_{10} Observations Exceeding the NAAQS for 2015.

Site Name	Site ID	24-hour Average					
		1st Max	2nd Max	3rd Max	4th Max	Obs > 150	Estimated Obs > 150
Leeds	01-073-1010	66	64	35	35	0	0
N. Birmingham	01-073-0023	82	58	56	52	0	0
Shuttlesworth	01-073-6004	96	73	56	54	0	0
Tarrant	01-073-6002	78	45	35	34	0	0
Wylam	01-073-2003	72	58	45	38	0	0

Table 4.7: Estimated Number of Exceedances of PM_{10} for 2013-2015 and Expected Number of PM_{10} Exceedances for the Most Recent 3-years (2013-2015) to Determine Compliance with the NAAQS.

Site Name	Site ID	Estimated Number of Exceedances			
		2013	2014	2015	Expected 3-year Avg.
Leeds	01-073-1010	0	0	0	0
N. Birmingham	01-073-0023	*	*	0	NA
Shuttlesworth	01-073-6004	0	0	0	0
Tarrant	01-073-6002	0	0	0	0
Wylam	01-073-2003	0	0	0	0

*Annual values for this year do not meet completeness criteria. Therefore, compliance with the NAAQS (expected 3-year avg.) over the most recent 3-year period cannot be determined for this monitor.

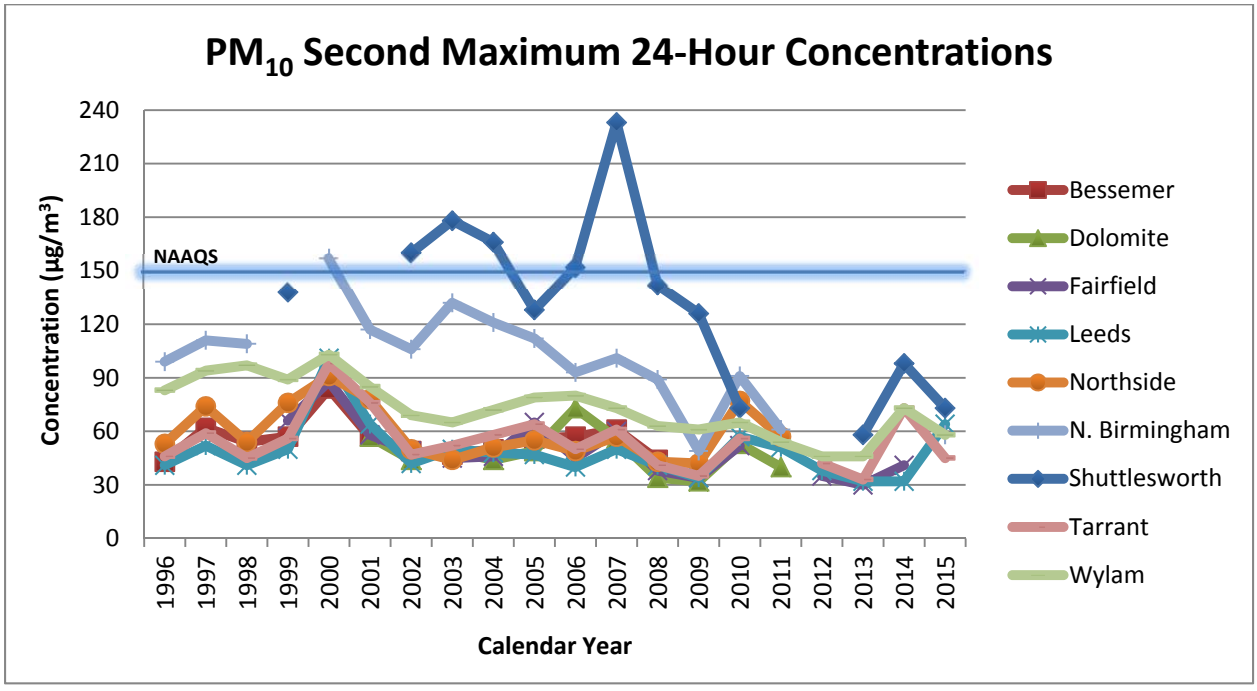

Figure 4.13: The second maximum 24-hour average concentrations of PM_{10} for 1996-2015. The highlighted blue line indicates the NAAQS, which is 150 µg/m^3.

4.6 Sulfur Dioxide (SO_2)

General Information

Sulfur dioxide (SO_2) is a colorless gas formed during combustion of sulfur-containing fuels such as coal and oil. Partly converted by photochemical and catalytic reactions in the atmosphere, sulfur dioxide becomes sulfur trioxide, sulfuric acid, and various sulfate particles that can also have adverse health and welfare effects.

The major man-made source of SO_2 emissions are from coal-burning power plants and industrial facilities. The burning of sulfur-containing fuels from locomotives, large ships, and non-road equipment allows the sulfur to be oxidized to form SO_2, which can react with other pollutants to form aerosols. Of the natural emissions, most are hydrogen sulfide released from the decay of organic matter or sulfate particles released in sea spray. Figure 4.14 shows the emission sources of SO_2 in Jefferson County.

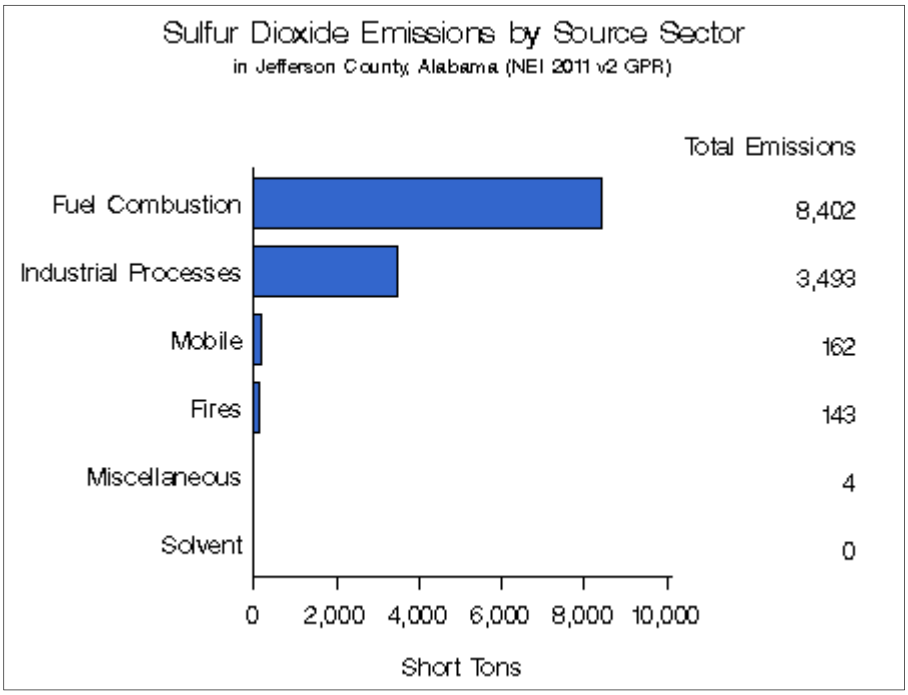

Figure 4.14: Sources of sulfur dioxide in Jefferson County from the 2011 National Emissions Inventory (from EPA's State and County Emission Summaries).

SO_2 is an irritant to the respiratory system and is an aggravation of existing respiratory, cardiovascular, and pulmonary disease. Damage to lungs occurs with deep inhalation of particles absorbing SO_2. SO_2 plays an important role in the production of acid rain, which causes the acidification of soil, lakes, and streams and damages trees. Acid rain also erodes stone used in buildings, statues, and monuments.

Monitoring Data

The Environmental Protection Agency (EPA) has established a primary 1-hour standard for SO_2. The 1-hour standard is set at 75 ppb. The 99th percentile of 1-hour daily maximum concentrations are averaged over 3 years (design value) to determine compliance with the standard [75 FR 35520, June 22, 2010].

In 2015, the SO_2 monitoring network consisted of 2 monitoring sites. No monitoring sites exceeded the 1-hour standard during 2015 (Table 4.8). The design values for SO_2 are based upon the most recent 3 years of data. During the most recent 3 years of monitoring data (2013-2015), only the Fairfield monitor fulfilled completeness criteria and it was below the 1-hour standard (Figure 4.15; Appendix). In a letter to EPA [May 25, 2011], the Alabama Department of Environmental Management recommended that Jefferson County be designated as attainment of the SO_2 standard. The EPA replied to ADEM in a letter [February 6, 2013] that acknowledged that there were no violations of the 2010 SO_2 standard for 2009-2011 air quality data, but stated the EPA is not yet prepared to propose designation action.

Table 4.8: Highest 1-Hour Average SO_2 Concentrations (in ppb), the 99th Percentile of 1-hour Average SO_2 Concentrations (in ppb), and Number of 1-Hour Average SO_2Observations Exceeding the NAAQS for 2015.

Site Name	Site ID	1st Max	2nd Max	99th Percentile	Obs > 75
Fairfield	01-073-1003	39.7	37.0	17	0
N. Birmingham*	01-073-0023	50.2	45.8	45	0

*Annual values for this year do not meet completeness criteria. Therefore, compliance with the NAAQS (expected 3-year avg.) over the most recent 3-year period cannot be determined for this monitor.

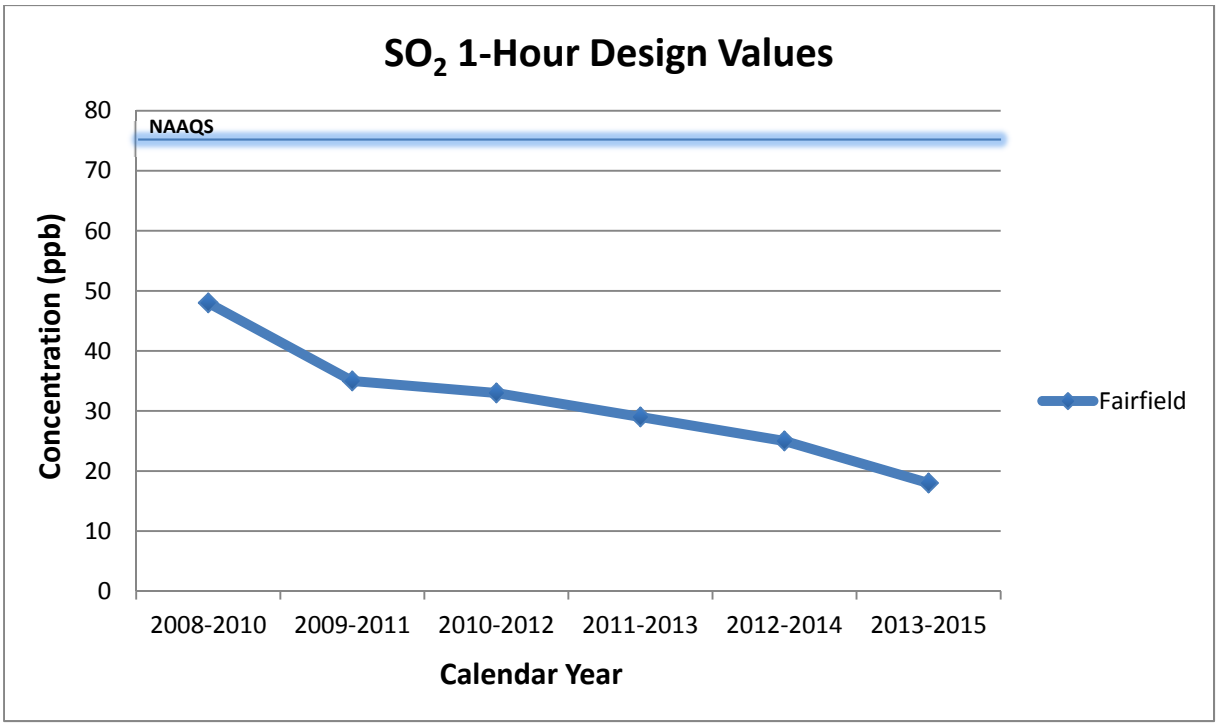

Figure 4.15: 1-hour sulfur dioxide design values (in ppb) for 2008-2015. The highlighted blue line indicates the NAAQS, which is 75 ppb.

5. AIR QUALITY INDEX (AQI)

The Air Quality Index (AQI) is a standard way to report daily air quality and was developed by the Environmental Protection Agency (EPA). The AQI explains how clean or polluted the air is and the associated health effects that might be of concern. The higher the AQI value is, the greater the amount of air pollution and health concern. The AQI is based on the pollutants for which primary short-term National Ambient Air Quality Standards have been established by the EPA: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide.

As shown in Figure 5.1, the AQI is scaled on a range from 0 to 500 with values above 100 corresponding to the level at which the pollutant is considered unhealthy. Air quality alerts are issued for the Birmingham area when an AQI value is forecast to be above 100 since this corresponds to the level a pollutant is over the air quality standard. The overall daily air quality of the area is based upon the highest AQI value for any pollutant at any monitoring site within the Birmingham area.

Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0-50	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	51-100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101-150	Members of sensitive groups (children, older adults, and those with lung or heart disease) may experience health effects. The general public is not likely to be affected.
Unhealthy	151-200	Everyone may begin to experience health effects. Members of sensitive groups may experience more serious health effects.
Very Unhealthy	201-300	Everyone may experience more serious health effects.
Hazardous	301-500	The entire population is more likely to be affected.

Figure 5.1: The Air Quality Index

An air quality forecast for the Birmingham area, based on the AQI, is done for every single day of the year by the Jefferson County Department of Health. Fine particle pollution ($PM_{2.5}$) is forecast year-round and ozone is forecast during the warm season. The forecast is available by phone recording at (205)

933-0583, online at www.jcdh.org, via email by signing up at http://birmingham.enviroflash.info, and on Twitter @JCDH_AirQuality.

The AQI value for each day of the year is based on the pollutant that had the highest AQI value on that day for monitors within the Birmingham area. The AQI value is based on all monitors in Jefferson County that measure CO, NO_2, O_3, $PM_{2.5}$, PM_{10}, and SO_2 and the Helena monitor in Shelby County that measures O_3. Figure 5.2 shows a percentage of days in 2015 within each AQI range for the Birmingham area.

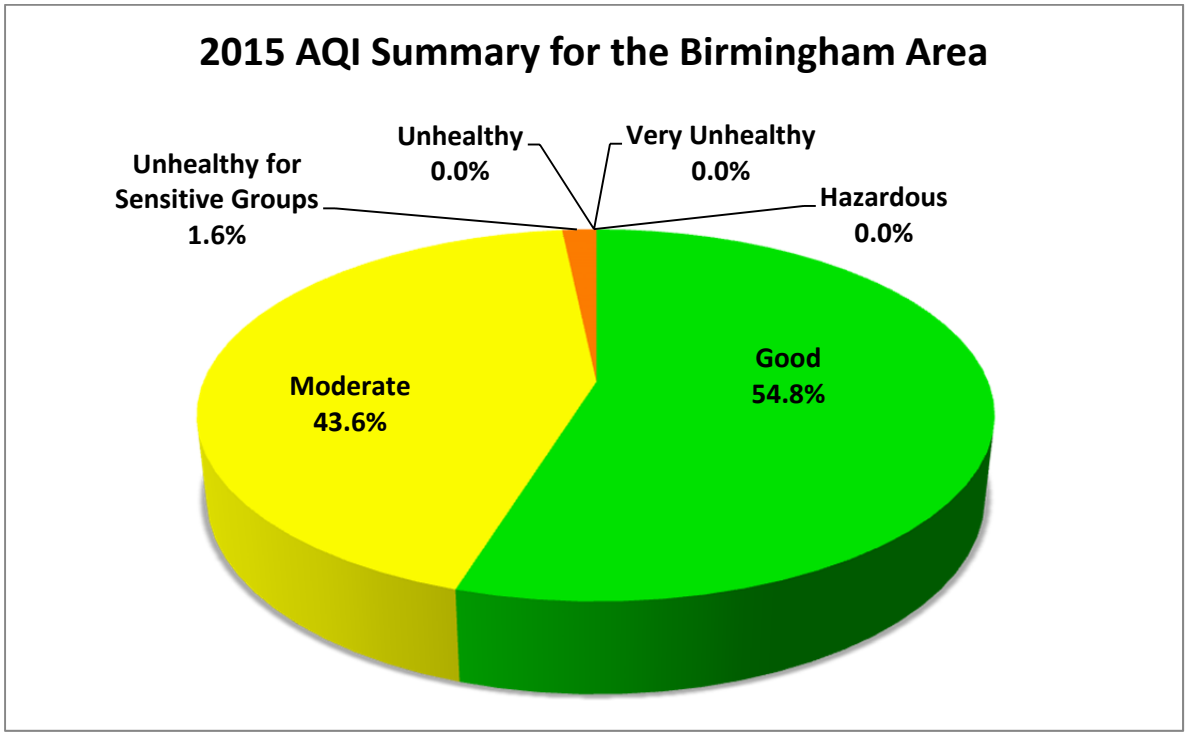

Figure 5.2: The percentage of days in each Air Quality Index (AQI) level based on the pollutant (CO, NO_2, O_3, $PM_{2.5}$, PM_{10}, and SO_2) that had the highest AQI value each day for the Birmingham area in 2015.

6. AIR POLLUTION COMPLIANCE ASSURANCE

6.1 Compliance Activities

Permitted and non-permitted sources in Jefferson County are subject to the *Jefferson County Board of Health Air Pollution Control Rules and Regulations*. Compliance for non-permitted sources involves observations by field patrol and permitted sources are subject to regular compliance monitoring by Environmental Health Specialists (EHS) and Air Pollution Control Engineers (APCE). Minor and Synthetic Minor permitted air pollution sources receive a Full Compliance Evaluation (FCE) by the assigned EHS or APCE at least once every five years. Major permitted air pollution sources receive an FCE at least every two years by an APCE. A FCE includes a thorough review of relevant records and an on-site inspection of the facility. The APCE or EHS prepares a comprehensive inspection report that is placed in the facility's file maintained by the Air Pollution Control Program (APCP). Further, emissions for all permitted facilities are calculated annually to ensure compliance with their permit. During 2015, the APCP performed 3 visible emissions evaluations, 15 stack test observations, conducted 145 permitted inspections, and issued 3 Notice of Violation. The APCP investigated a total of 211 air pollution complaints in 2015 (Figure 6.1), of which 18 were for permitted facilities. When compared to 2014, there was a decrease in complaint investigations in 2015 as a result of less complaints received.

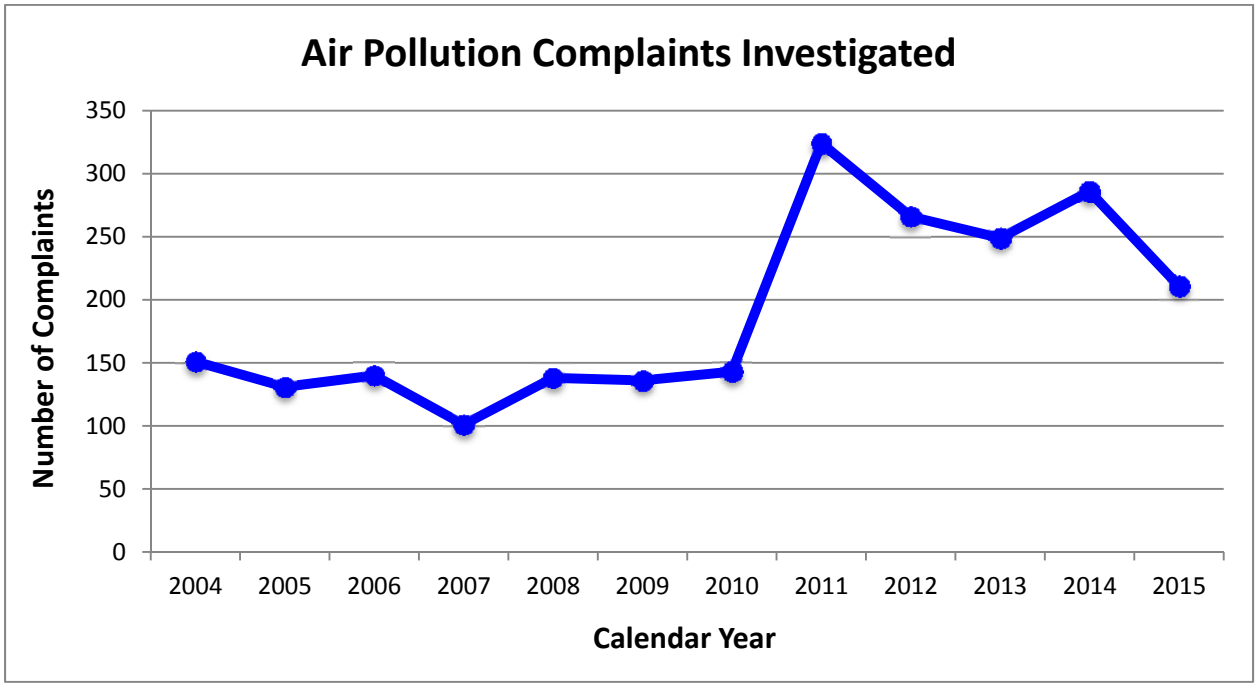

Figure 6.1: The number of air pollution complaints investigated for 2004-2015.

6.2 Open Burning

The APCP regulates open burning due to smoke nuisance, as well as particulate and volatile organic compounds (VOCs) emissions. Generally, open burning is prohibited except under specific circumstances allowed by the Department. All open burning for construction and right-of-way clearing is prohibited during the months of May through October. The issuing of open burning authorizations for land-clearing operations requires a site evaluation by an EHS to determine if the material and circumstances meet regulation requirements and to set distance restrictions for the burning site. During 2015, the APCP issued 26 open burning authorizations, which is a decrease from 2014 (Figure 6.2).

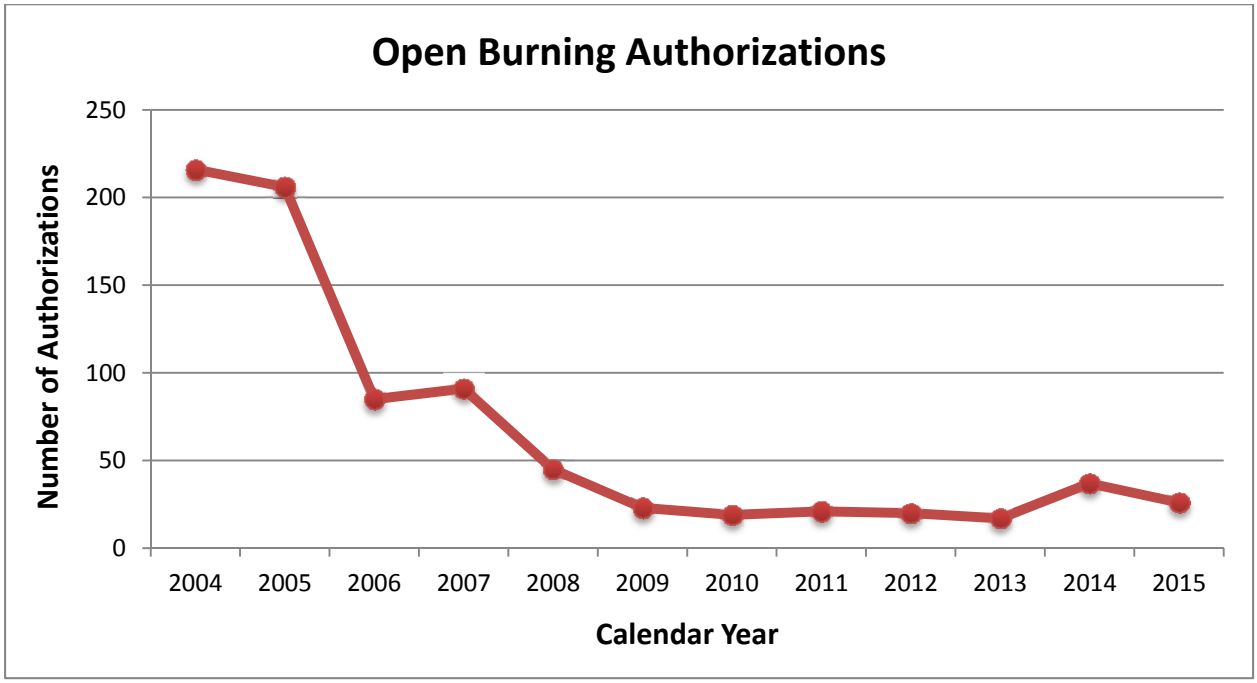

Figure 6.2: The number of open burning authorizations for 2004-2015.

The APCP also investigates complaints regarding open burning. An Advisory Notice or Official Notice of Violation is issued if the investigation determines a violation of the regulations. During 2015, the APCP investigated 116 open burning complaints (Figure 6.3) and issued 54 Notices of Violation.

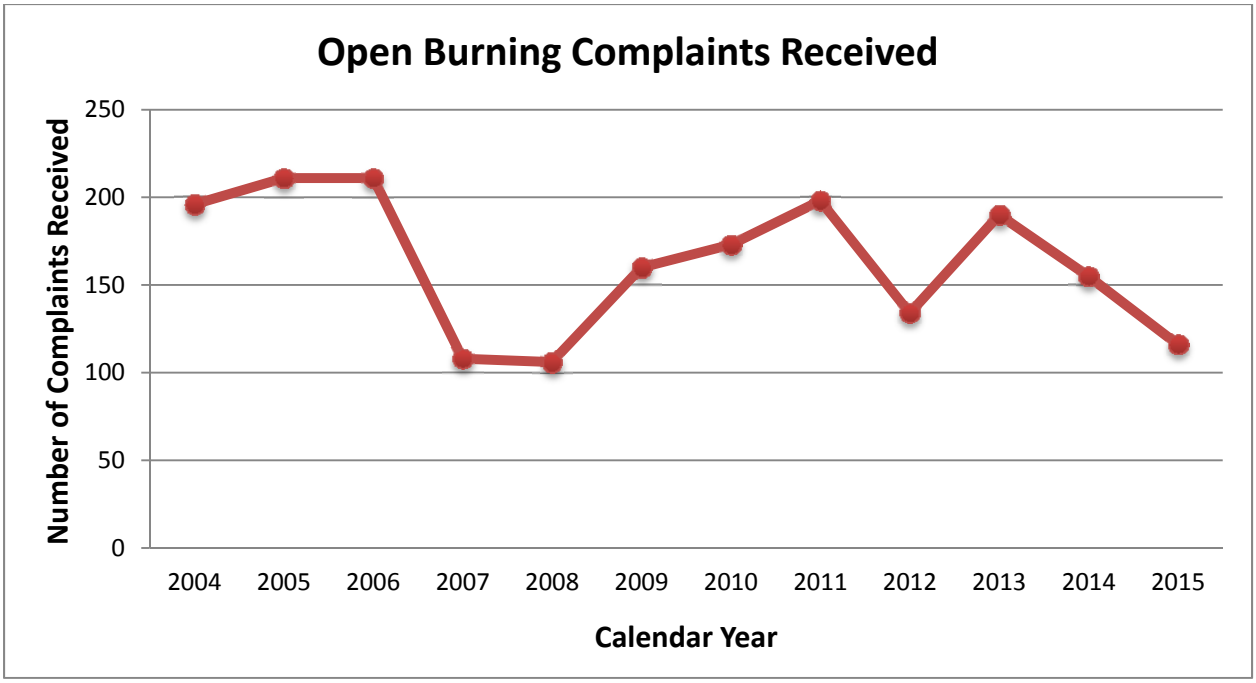

Figure 6.3: The number of open complaints received for 2004-2015.

6.3 Gasoline Dispensing Facilities and Tanker Trucks

The APCP regulates gasoline-dispensing facilities and tanker trucks due to emissions of VOCs. Gasoline-dispensing facilities must have and use Stage I Vapor Balance equipment while filling storage tanks. Gasoline tanker trucks are required to recover gasoline vapors while filling or emptying the truck vessels. Gasoline tanker trucks must certify vapor tightness annually and display an Air Sticker issued by the APCP. During 2015, the APCP issued 878 Air Stickers.

6.4 Indoor Air Quality

The APCP acts as an information and referral resource regarding indoor air quality problems. Indoor air quality complaints in institutional buildings (i.e., hospitals and schools) are investigated to a limited degree. Owners are often referred to other resources for more complex investigations or solutions. Individuals complaining about residential indoor air quality problems are also referred to other resources for additional information. The APCP has no regulations or enforcement policies regarding indoor air quality at this time. Complainants may be referred to other agencies like the Occupational Health and Safety Administration, if appropriate. During 2015, the APCP investigated 4 indoor air complaints.

6.5 Asbestos Abatement

Asbestos is a mineral fiber that is used in thousands of consumer products, many of them building materials. Breathing asbestos fibers can cause lung cancer and other respiratory diseases. Without proper precautions, renovations, demolitions, and even routine maintenance can cause asbestos-containing materials to release microscopic asbestos fibers into the air. Undisturbed asbestos materials can be safely maintained if they are kept in good condition. Before renovating or demolishing a structure, it is checked for asbestos by APCD personnel and the removal must be done by a certified contractor.

The APCP enforces the National Emission Standards for Hazardous Air Pollutants (NESHAPs) for asbestos during renovation and demolition operations. An Environmental Health Program Supervisor for Field Services serves as the Asbestos Abatement Coordinator for Jefferson County and is responsible for the regulatory activities in this program area. During 2015, there were 207 regulated asbestos abatement or demolition notifications received and reviewed, of which 127 were subject to Federal asbestos standards. Regarding asbestos, there were 93 inspections conducted, 9 complaints investigated, and 2 Notices of Violation issued. Some of these statistics during the last twelve years can be found in Figure 6.4.

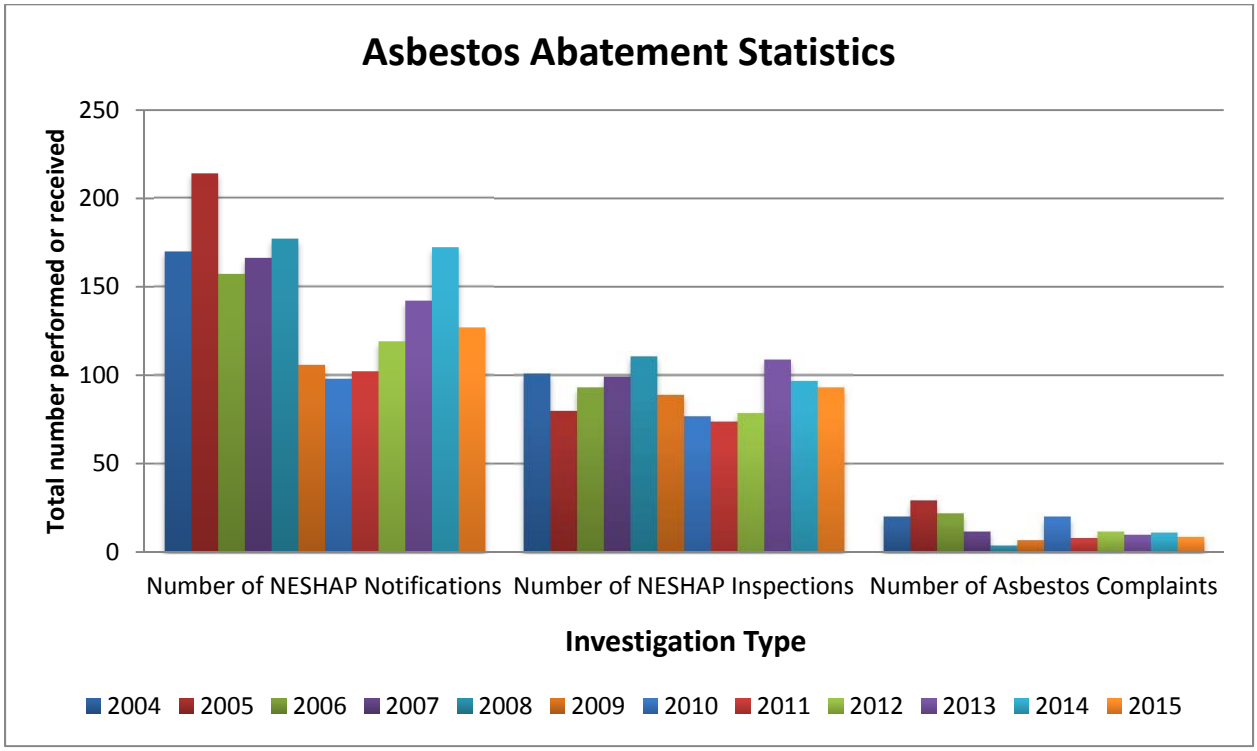

Figure 6.4: The number of NESHAP notifications, NESHAP inspections, and asbestos complaints for 2004-2015.

6.6 Dry Cleaners

The APCP regulates dry cleaners in Jefferson County that use perchloroethylene. Perchloroethylene, also known as perc, is a solvent used in dry cleaning. Approximately 28,000 U.S. dry cleaners use perc, which is the only air toxic emitted from the dry cleaning process (24 facilities located in Jefferson County). The APCP inspects freestanding small dry cleaners commonly located in a strip shopping center or as a stand-alone building. These dry cleaners are classified as "area sources," which means they emit less than 10 tons of perc each year. These dry cleaners are covered by emissions standards known as generally available control technology (GACT) standards. During 2015, there were 20 inspections of dry cleaning facilities in Jefferson County.

7. AIR POLLUTION EMISSION SOURCE PERMITTING

Permit applications must be submitted prior to the construction of new sources that have the potential to emit air pollutants and before the modification of existing air pollution sources. The type of emission source determines the information required in the application. The Engineering Section evaluates the degree of air pollution control required for all emission points within each industrial/commercial facility. Field Services Section staff are responsible for processing all permit applications for gasoline tanker trucks and dispensing facilities. Using established emission factors to ensure allowable air emission standards, calculations are made to determine the estimated emissions for the proposed source. During 2015, air permits were issued for 138 new, renewed, or modified sources (Table 7.1).

Table 7.1: Number of Permits Issued by Source Type in 2015.

Source Type	Number of Permits Issued
Industrial/Commercial	41
Gasoline Tanker Trucks	97

The Air Pollution Control Program issues three types of permits for industrial and commercial sources (Table 7.2): Title V Major, Synthetic Minor, and Minor. Title V Major Source Operating Permits are issued under Chapter 18 of the *Jefferson County Board of Health Air Pollution Control Rules and Regulations* (*Rules and Regulations*) for sources that have the potential to emit 10 tons per year (tpy) or more of any one hazardous air pollutants, 25 tpy or more of any combination of hazardous air pollutants, or 100 tpy or more of any regulated air pollutant. Qualified sources may apply for and receive a Synthetic Minor Operating Permit under Chapter 17 of the Regulations if the source's potential to emit is restricted to less than a major source threshold. Minor sources receive air permits under Chapter 2 of the *Rules and Regulations*.

Table 7.2: Number of Industrial and Commercial Permits Issued by Permit Type in 2015.

Type of Permit	Number of Permits Issued
Title V Major	9
Synthetic Minor	12
Minor	20

APPENDIX: Additional Ambient Air Quality Data

Carbon Monoxide

Second Maximum 1-Hour Average Concentrations (in ppm)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Arkadelphia																			2.0	2.1
East Thomas	7.1	7.7	5.4	6.7	5.6	6.2	5.5	4.1	3.8	4.1	3.8	3.1	3.0	3.7	2.5	6.0	1.9	1.5		
Fairfield	11.2	8.5	8.7	9.0	8.5	12.5	7.0	7.4	8.6	6.1	6.2	3.8	6.1	7.1	6.5	4.1	5.1	5.6	13.8	6.9
N. Birmingham																1.5	2.0	2.2	1.4	1.5
Shuttlesworth	17.8	22.3	23.4	32.3	23.6	33.5	17.7	9.1	15.0	20.9	26.3	18.7	15.9	12.1	1.7	1.4	2.4	1.5	1.2	2.3

Second Maximum 8-Hour Average Concentrations (in ppm)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Arkadelphia																			1.4	1.4
East Thomas	5.7	6.1	5.4	5.0	4.5	4.8	4.1	3.2	2.9	3.1	3.2	2.3	2.3	2.4	1.9	5.5	1.6	1.2		
Fairfield	4.9	5.9	4.4	4.4	3.7	6.3	3.7	3.1	3.9	2.5	3.1	2.0	2.2	2.9	2.2	2.1	1.7	1.7	2.4	1.9
N. Birmingham																1.2	1.4	1.2	0.9	0.9
Shuttlesworth	10.5	9.5	12.1	19.8	16.3	24.3	11.7	4.5	8.2	8.8	9.5	8.6	8.1	6.7	1.1	0.9	1.0	0.7	0.8	1.0

Values in red indicate an exceedance of the NAAQS.

Ozone

Fourth-Highest Daily Maximum 8-Hour Average Concentrations (in ppm)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Corner					0.087	0.081	0.083	0.077	0.068	0.077	0.081	0.090	0.077	0.062	0.072	0.076	0.071	0.064	0.061	0.066
Fairfield	0.093	0.086	0.101	0.092	0.086	0.078	0.084	0.075	0.070	0.081	0.084	0.088	0.074	0.062	0.073	0.075	0.077	0.063	0.065	0.068
Helena	0.095	0.084	0.107	0.100	0.099	0.089	0.090	0.083	0.084	0.085	0.087	0.094	0.082	0.068	0.074	0.076	0.076	0.067	0.063	0.065
Hoover	0.095	0.083	0.094	0.097	0.092	0.086	0.086	0.077	0.077	0.085	0.089	0.093	0.079	0.069	0.077	0.080	0.074	0.065	0.062	0.068
Leeds						0.071	0.077	0.070	0.073	0.071	0.075	0.081	0.072	0.065	0.072	0.077	0.080	0.066	0.063	0.062
McAdory	0.093	0.079	0.096	0.092	0.094	0.084	0.081	0.073	0.073	0.085	0.084	0.091	0.075	0.070	0.074	0.081	0.078	0.063	0.065	0.065
N. Birmingham					0.085	0.079	0.082	0.068	0.070	0.079	0.086	0.093	0.078	0.068	0.070	0.077	0.079	0.058	0.065	0.071
Pinson	0.089	0.078	0.092	0.096	0.089	0.080	0.078	0.081	0.068	0.072	0.078	0.081	0.079	0.063	0.075	0.074	0.075			
Providence					0.088	0.086	0.088	0.070	0.070	0.079	0.081	0.087	0.074	0.061	0.075	0.076	0.073			
Tarrant	0.094	0.088	0.095	0.092	0.085	0.080	0.083	0.075	0.068	0.084	0.088	0.095	0.076	0.066	0.077	0.079	0.084	0.065	0.063	0.073

8-Hour Design Values (in ppm)

	1996-1998	1997-1999	1998-2000	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015
Corner					0.083	0.080	0.076	0.074	0.075	0.082	0.082	0.076	0.070	0.070	0.073	0.070	0.065	*
Fairfield	0.093	0.093	0.093	0.085	0.082	0.079	0.076	0.075	0.078	0.084	0.082	0.074	0.069	0.070	0.075	0.071	0.068	0.065
Helena	0.095	0.097	0.102	0.096	0.092	0.087	0.085	0.084	0.085	0.088	0.087	0.081	0.074	0.072	0.075	0.073	0.068	0.065
Hoover	0.090	0.091	0.094	0.091	0.088	0.083	0.080	0.079	0.083	0.089	0.087	0.080	0.075	0.075	0.077	0.073	0.067	0.065
Leeds						0.072	0.073	0.071	0.073	0.075	0.076	0.072	0.069	0.071	0.076	0.074	0.069	0.063
McAdory	0.089	0.089	0.094	0.090	0.086	0.079	0.075	0.077	0.080	0.086	0.083	0.078	0.073	0.075	0.077	0.074	0.068	*
N. Birmingham					0.082	0.076	0.073	0.072	0.078	0.086	0.085	0.079	0.072	0.071	0.075	0.071	0.067	0.064
Pinson	0.086	0.088	0.092	0.088	0.082	0.079	0.075	0.073	0.072	0.077	0.079	0.074	0.072	0.070	0.074			
Providence					0.087	0.081	0.076	0.073	0.076	0.082	0.080	0.074	0.070	0.070	0.074			
Tarrant	0.092	0.091	0.090	0.085	0.082	0.079	0.075	0.075	0.080	0.089	0.086	0.079	0.073	0.074	0.080	0.076	0.070	0.067

* The 3-year period does not meet data completeness criteria. Therefore, compliance with the NAAQS cannot be determined.

Values in red indicate an exceedance of the NAAQS. Cells highlighted in red indicate a violation of the NAAQS.

Particulate Matter ($PM_{2.5}$)

Annual Average Values (in µg/m^3)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Arkadelphia																11.1	11.8
Corner		16.8	14.7	13.3	13.5	13.7	15.4	14.5	13.9	11.5	9.7	10.7	10.8				
Hoover	18.7	18.5	15.6	14.4	14.1	14.4	15.7	15.3	14.3	12.1	10.3	11.8	11.2				
Leeds						14.7	16.7	15.3	15.7	13.2	10.3	12.1	12.3	10.5	10.2	10.0	10.1
McAdory	18.4	16.9	15.0	15.0	14.1	14.6	16.3	15.6	14.9	12.2	10.4	11.8	11.7	10.1	9.7	9.6*	9.6
N. Birmingham	23.4	22.3	19.1	17.5	17.4	17.7	19.6	18.4	18.0	15.5	11.7	13.8	13.3	11.9	10.4	11.8	10.8
Pinson	19.1	16.5	14.3	13.3	13.5	13.5	15.2	14.3	14.3	11.9	9.9	10.9	10.8				
Providence		16.7	13.3	12.3	12.2	12.4	14.5	13.4	13.3	10.8	9.6	10.1	10.3				
Wylam	21.3	20.7	17.7	16.6	15.6	15.9	17.9	18.0	16.4	14.4	11.3	12.4	12.3	11.2	9.9	11.3	10.3

Annual Design Values (in µg/m^3)

	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015
Arkadelphia															
Corner		14.9	13.8	13.5	14.2	14.5	14.6	13.3	11.7	10.6	10.4				
Hoover	17.6	16.2	14.7	14.3	14.7	15.1	15.1	13.9	12.2	11.4	11.1				
Leeds						15.6	15.9	14.7	13.1	11.9	11.6	11.6	11.0	10.2	10.1
McAdory	16.7	15.6	14.7	14.6	15.0	15.5	15.6	14.2	12.5	11.5	11.3	11.2	10.5		
N. Birmingham	21.6	19.6	18.0	17.5	18.2	18.6	18.7	17.3	15.1	13.7	12.9	13.0	11.9	11.3	11.0
Pinson	16.6	14.7	13.7	13.4	14.1	14.3	14.6	13.5	12.0	10.9	10.6				
Providence		14.1	12.6	12.3	13.1	13.5	13.7	12.5	11.2	10.2	10.0				
Wylam	20.0	18.4	16.7	16.0	16.5	17.3	17.5	16.3	14.0	12.7	12.0	12.0	11.1	10.8	10.5

*Annual values for this year do not meet completeness criteria.

Values in red indicate an exceedance of the NAAQS. Cells highlighted in red indicate a violation of the NAAQS.

Particulate Matter ($PM_{2.5}$) continued

24-Hour 98th Percentile Values (in µg/m³)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Arkadelphia																22.0	23.6
Corner		39.3	32.3	33.3	28.6	34.5	41.8	33.4	32.5	30.0	21.3	18.3	26.6				
Hoover	39.2	39.9	32.2	34.4	29.9	36.1	34.3	31.9	29.8	25.9	20.4	21.6	25.5				
Leeds						31.8	37.6	32.5	33.0	24.6	19.1	22.3	26.1	20.8	19.0	22.0	19.9
McAdory	41.1	38.1	32.9	35.7	33.7	37.3	35.5	33.9	30.9	25.8	21.3	22.7	26.2	20.8	19.6	21.5*	18.5
N. Birmingham	52.7	52.5	42.8	37.6	39.1	42.3	50.3	39.6	42.8	33.5	24.4	28.7	27.9	22.6	20.3	25.9	22.5
Pinson	19.1	40.3	28.7	32.7	26.7	29.3	37.2	33.2	34.2	26.4	21.3	20.0	23.6				
Providence		38.5	29.7	34.2	29.5	32.4	39.8	32.7	31.4	27.3	22.1	18.4	26.6				
Wylam	46.9	50.4	42.7	35.8	35.3	37.8	44.5	40.3	37.7	33.5	25.2	25.4	25.9	22.7	20.6	21.5	18.6

24-Hour Design Values (in µg/m³)

	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015
Arkadelphia															
Corner		35	31	32	35	37	36	32	28	23	22				
Hoover	37	36	32	33	33	34	32	29	25	23	23				
Leeds						34	34	30	26	22	23	23	22	21	20
McAdory	37	36	34	36	36	36	33	30	26	23	23	23	22		
N. Birmingham	49	44	40	40	44	44	44	39	34	29	27	26	24	23	23
Pinson	36	34	29	30	31	33	35	31	27	23	22				
Providence		34	31	32	34	35	35	30	27	23	22				
Wylam	47	43	38	36	39	41	41	37	32	28	26	25	23	22	20

*Annual values for this year do not meet completeness criteria.

Values in red indicate an exceedance of the NAAQS. Cells highlighted in red indicate a violation of the NAAQS.

Particulate Matter (PM_{10})

24-Hour Second Maximum 24-Hour Average Concentrations (in µg/m^3)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bessemer	43	62	54	57	84	57	49	47	50	56	57	61	44							
Dolomite						57	44	49	44	49	73	56	34	32	53	40				
Fairfield				66	88	58	49	45	46	65	45	60	38	34	52		35	30	41	
Leeds	41	52	41	50	101	64	42	50	48	47	40	50	41	34	57	51	38	32	32	64
Northside	53	74	54	76	91	78	50	44	51	55	49	57	43	42	77	57				
N. Birmingham	99	111	109		157	117	106	132	121	112	93	101	89	49	91	61				58
Shuttlesworth				138			160	178	166	128	152	233	142	126	73			58	98	73
Tarrant	46	59	45	56	98	76	47	52	58	64	50	61	41	35	56		42	33	73	45
Wylam	83	94	97	89	103	85	69	65	72	79	80	73	63	61	65	54	46	46	73	58

Sulfur Dioxide

1-Hour 99th Percentile Values (in ppb)

	2008	2009	2010	2011	2012	2013	2014	2015
Fairfield	69	41	33	31	36	22	17	17
N. Birmingham				42	55*	29	41	45*

1-Hour Design Values (in ppb)

	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015
Fairfield	48	35	33	29	25	18
N. Birmingham						

*Annual values for this year do not meet completeness criteria.

Values in red indicate an exceedance of the NAAQS. Cells highlighted in red indicate a violation of the NAAQS.

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