



# AIR QUALITY REPORT 2021

JEFFERSON COUNTY DEPARTMENT OF HEALTH  
Air and Radiation Protection Division



# AIR QUALITY REPORT

## 2021



Environmental Health Services  
Air and Radiation Protection Division  
1400 Sixth Avenue South  
Birmingham, AL 35233

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## LIST OF ACRONYMS AND UNITS OF MEASURE

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
GACT	Generally Available Control Technology
IMPROVE	Interagency Monitoring of Protected Visual Environments
$\mu\text{g}/\text{m}^3$	Micrograms per cubic meter
NAAQS	National Ambient Air Quality Standards
NCore	National Core Multipollutant
NESHAP	National Emission Standards for Hazardous Air Pollutants
$\text{NO}_2$	Nitrogen dioxide
$\text{NO}_x$	Nitrogen oxides
$\text{O}_3$	Ozone
PAMS	Photochemical Assessment Monitoring Station
Pb	Lead
$\text{PM}_{2.5}$	Particulate matter of size 2.5 microns or less in diameter
$\text{PM}_{10}$	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
$\text{SO}_2$	Sulfur dioxide
tpy	Tons per year
VOC	Volatile Organic Compound

## 1. INTRODUCTION

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The Air Pollution Control Program (APCP) is a part of the Air and Radiation Protection Division in Environmental Health Services at the Jefferson County Department of Health. The goal of the APCP 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 compiling 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 a NAAQS are: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter smaller than 2.5 and 10 microns in diameter (PM<sub>2.5</sub> and PM<sub>10</sub>), and sulfur dioxide (SO<sub>2</sub>).

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 principal pollutants. 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 ( $\mu\text{g}/\text{m}^3$ ). 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	$0.15 \mu\text{g}/\text{m}^3$ <sup>(1)</sup>	Not to be exceeded
Nitrogen Dioxide (NO <sub>2</sub> )		Primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		Primary and Secondary	Annual	53 ppb <sup>(2)</sup>	Annual mean
Ozone (O <sub>3</sub> )		Primary and Secondary	8-hour	$0.070 \text{ ppm}$ <sup>(3)</sup>	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution (PM)	PM <sub>2.5</sub>	Primary	Annual	$12.0 \mu\text{g}/\text{m}^3$	Annual mean, averaged over 3 years
		Secondary	Annual	$15.0 \mu\text{g}/\text{m}^3$	Annual mean, averaged over 3 years
		Primary and Secondary	24-hour	$35 \mu\text{g}/\text{m}^3$	98th percentile, averaged over 3 years
	PM <sub>10</sub>	Primary and Secondary	24-hour	$150 \mu\text{g}/\text{m}^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO <sub>2</sub> )		Primary	1-hour	75 ppb <sup>(4)</sup>	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 ( $1.5 \mu\text{g}/\text{m}^3$  as a calendar quarter average) also remain in effect.

(2) The level of the annual NO<sub>2</sub> standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O<sub>3</sub> standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) O<sub>3</sub> standards.

(4) The previous SO<sub>2</sub> 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 an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO<sub>2</sub> standards or is not meeting the requirements of a SIP call under the previous SO<sub>2</sub> 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 required NAAQS.



### 3. AMBIENT AIR QUALITY NETWORK

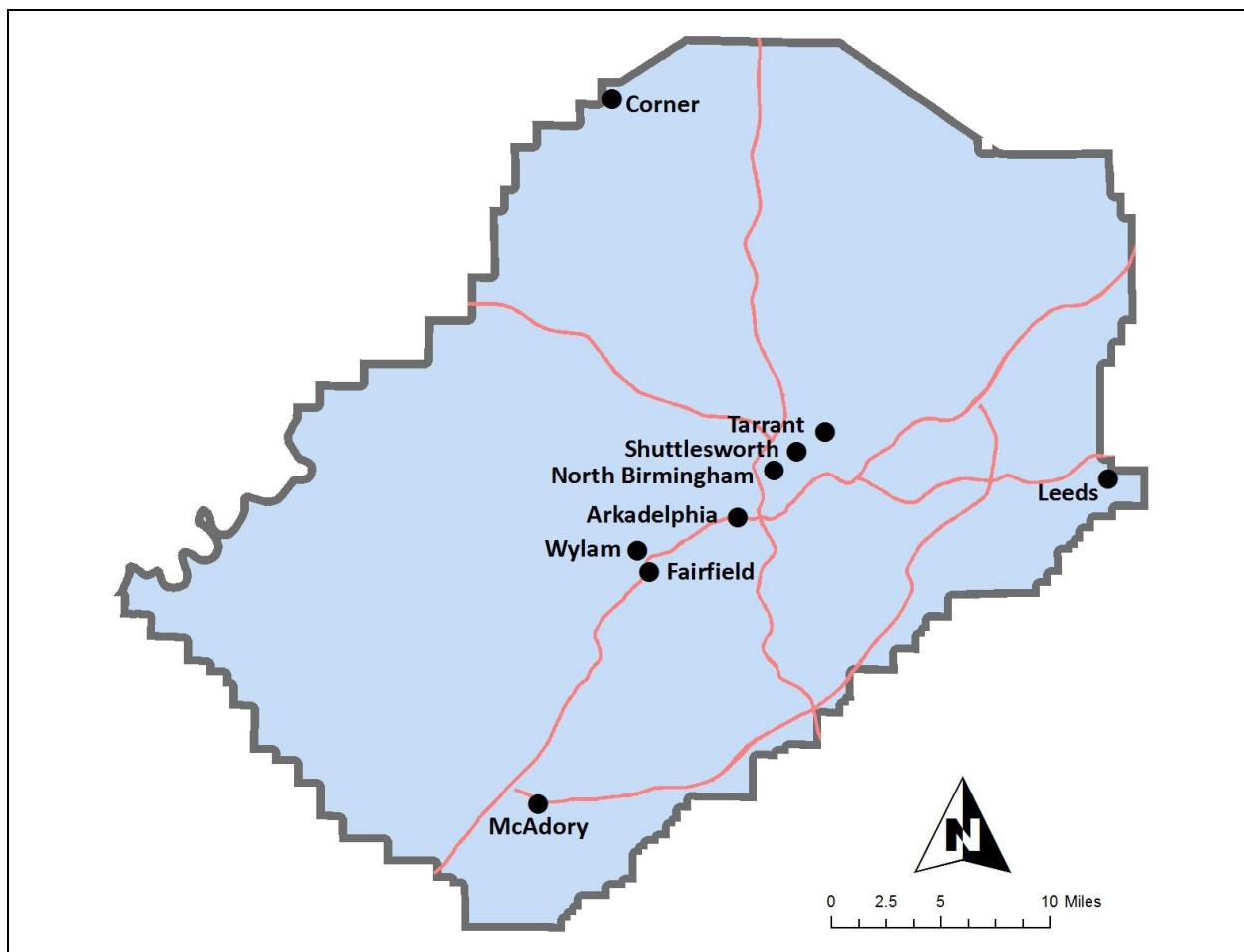
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Data provided through a complex network of air monitoring stations located throughout Jefferson County determine the quality of ambient air in the county. In 2021 the network consisted of 9 monitoring sites (Figure 3.1) with 38 air monitors and 3 collocated monitors at those sites. The criteria air pollutants monitored at these sites were carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter 2.5 microns and less in size (PM<sub>2.5</sub>), particulate matter 10 microns and less in size (PM<sub>10</sub>), and sulfur dioxide (SO<sub>2</sub>). 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 area's air quality used in the development of area-wide 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. The Photochemical Assessment Monitoring Station (PAMS) obtains more comprehensive data in areas with high levels of ozone pollution by also monitoring oxides of nitrogen and volatile organic compounds.



**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	NO <sub>2</sub>	O <sub>3</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>
Arkadelphia	01-073-2059	•	•		•		
Corner	01-073-5003			•			
Fairfield	01-073-1003	•		•			•
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				•	•	

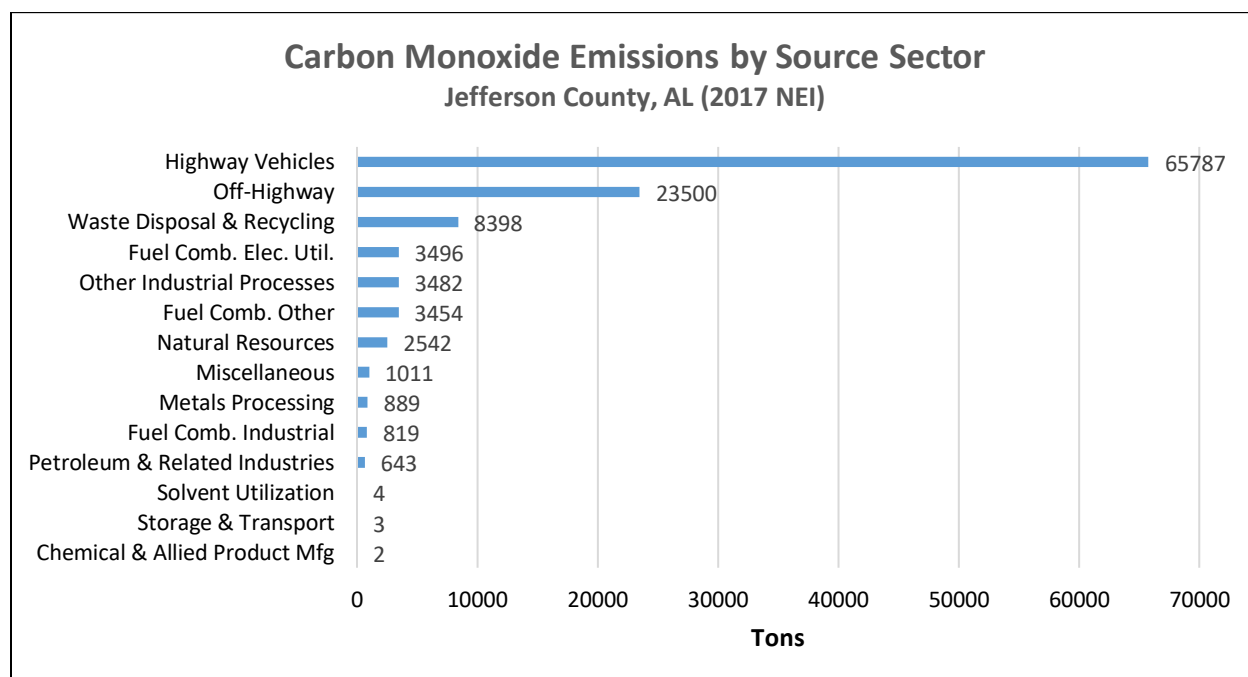
## 4. AMBIENT AIR QUALITY DATA

### 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 EPA's 2017 National Emissions Inventory.

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.

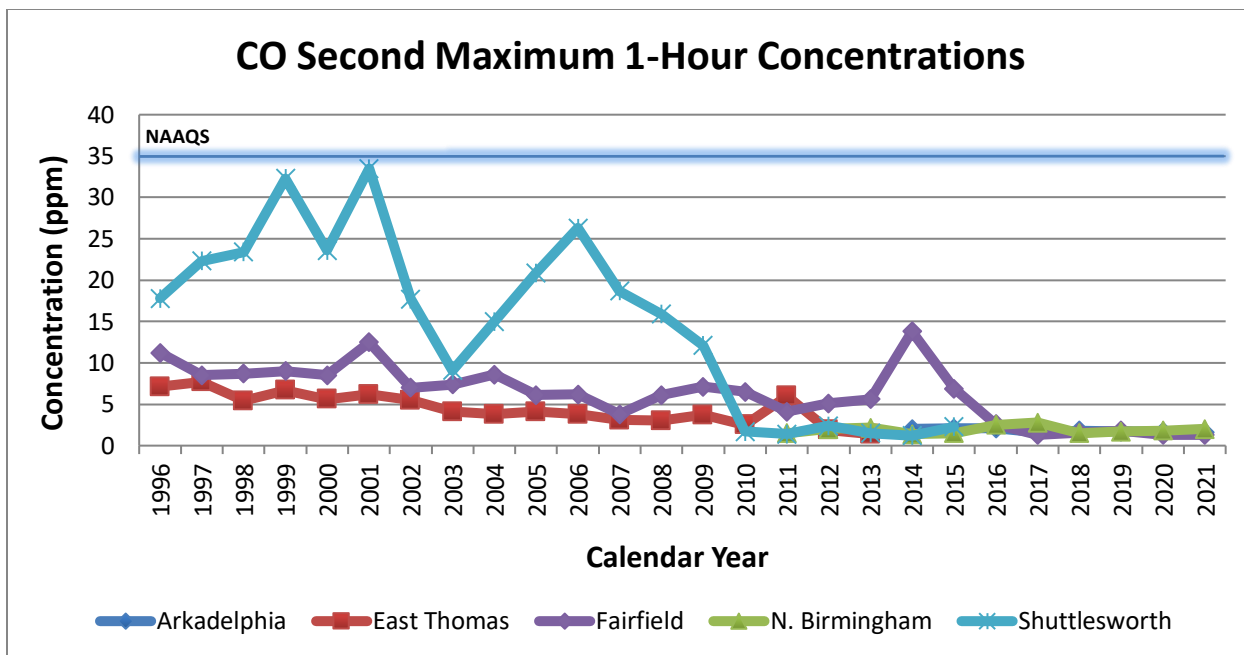
## Monitoring Data

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].

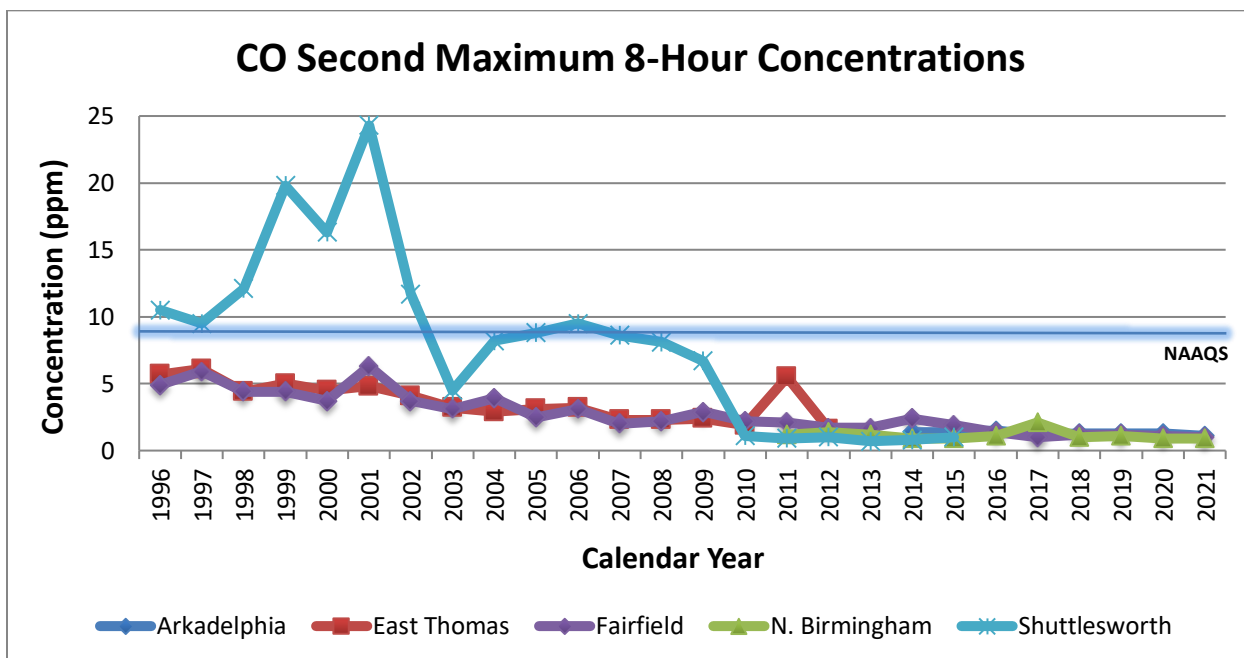
In 2021, the CO monitoring network consisted of 3 monitoring sites. No monitoring sites exceeded the 1-hour or 8-hour standards during 2021 (Table 4.1). Compliance with the CO standards are based upon the most recent 2 years of data. During the most recent 2 years of monitoring data (2020-2021), all 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 2021.

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	1.6	1.6	0	1.2	1.1	0
Fairfield	01-073-1003	1.4	1.3	0	1.2	1.0	0
N. Birmingham	01-073-0023	2.1	2.0	0	1.0	0.9	0



**Figure 4.2:** Carbon monoxide second maximum 1-hour average concentrations (in ppm) for 1996-2021. The highlighted blue line indicates the NAAQS, which is 35 ppm.



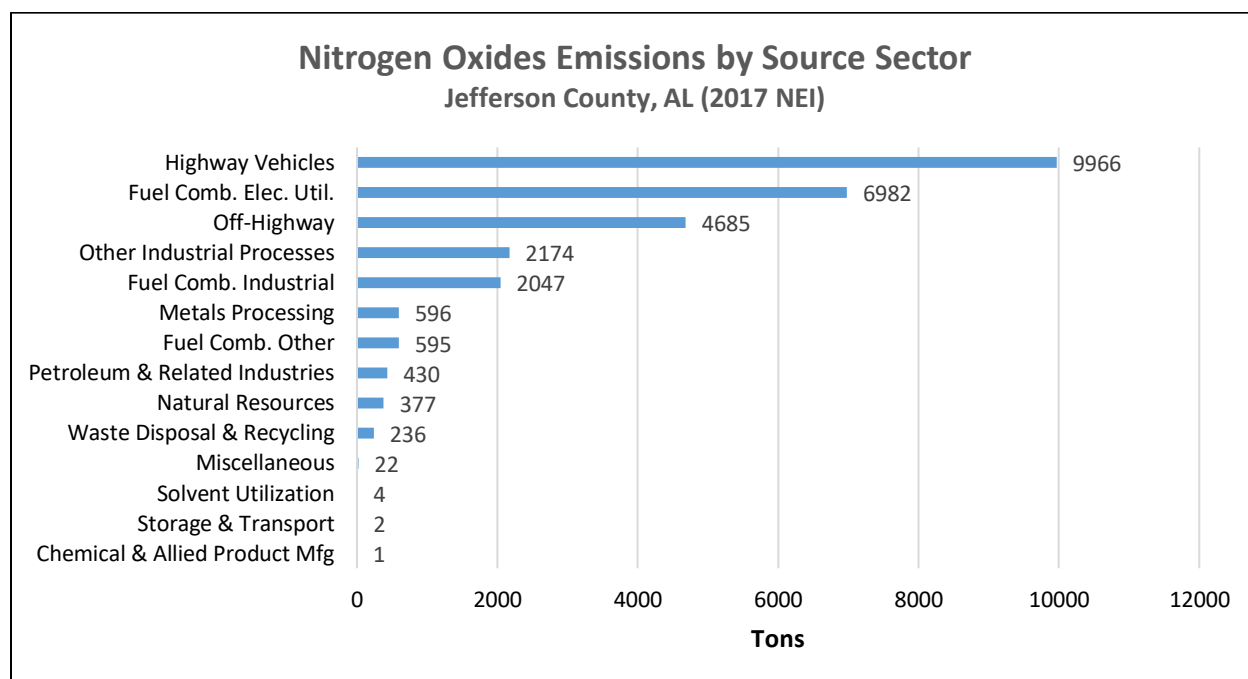
**Figure 4.3:** Carbon monoxide second maximum 8-hour average concentrations (in ppm) for 1996-2021. The highlighted blue line indicates the NAAQS, which is 9 ppm.

## 4.2 Nitrogen Dioxide (NO<sub>2</sub>)

### General Information

Nitrogen dioxide (NO<sub>2</sub>) is a reddish-brown gas formed through the oxidation of nitric oxide (NO). NO<sub>2</sub> is the component of greatest concern in a group of highly reactive gases known as nitrogen oxides (NO<sub>x</sub>), which also includes NO, nitrous acid, and nitric acid. NO<sub>x</sub> reacts with ammonia, moisture, and other compounds to form small particles. NO<sub>x</sub> also reacts with volatile organic compounds to form ozone.

The major man-made source of NO<sub>x</sub> are high-temperature combustion processes from automobiles, industries, and power plants. Other sources of NO<sub>2</sub> include home heaters, gas stoves, and non-road equipment. The natural sources of NO<sub>x</sub> come from lightning, fires, and biogenic emissions from soil. Figure 4.4 shows the emission sources of NO<sub>x</sub> in Jefferson County.



**Figure 4.4:** Sources of nitrogen oxides in Jefferson County from EPA's 2017 National Emissions Inventory.

Short-term exposure to NO<sub>2</sub> 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<sub>2</sub> may cause structural damage to the lungs and increase susceptibility to respiratory infection. NO<sub>2</sub> can also lead to a reduction in visibility.

## Monitoring Data

The Environmental Protection Agency (EPA) has established two primary standards for NO<sub>2</sub>. In 2010, the EPA set a new 1-hour NO<sub>2</sub> standard at 100 ppb and retained the annual NO<sub>2</sub> 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<sub>2</sub> standard. The annual mean is averaged over 3 years (design value) to determine compliance with the annual NO<sub>2</sub> standard.

In 2021, the NO<sub>2</sub> monitoring network consisted of 2 monitoring sites. No monitoring sites exceeded the 1-hour or annual standards during 2021 (Table 4.2). The design value for the 1-hour NO<sub>2</sub> standard is based upon the most recent 3 years of data. During the most recent 3 years of monitoring data (2019-2021), the Arkadelphia and North Birmingham monitors were both below the 1-hour standard (Appendix). Compliance with the annual standard is based upon the most recent year of data. During the most recent year of monitoring data (2021), the Arkadelphia and North Birmingham monitors were both below the annual standard (Table 4.2; Appendix).

**Table 4.2:** Highest 1-Hour Average NO<sub>2</sub> Concentrations (in ppb), the 98th Percentile of 1-Hour Average NO<sub>2</sub> Concentrations (in ppb), and Annual Mean of 1-Hour NO<sub>2</sub> Concentrations (in ppb) for 2021.

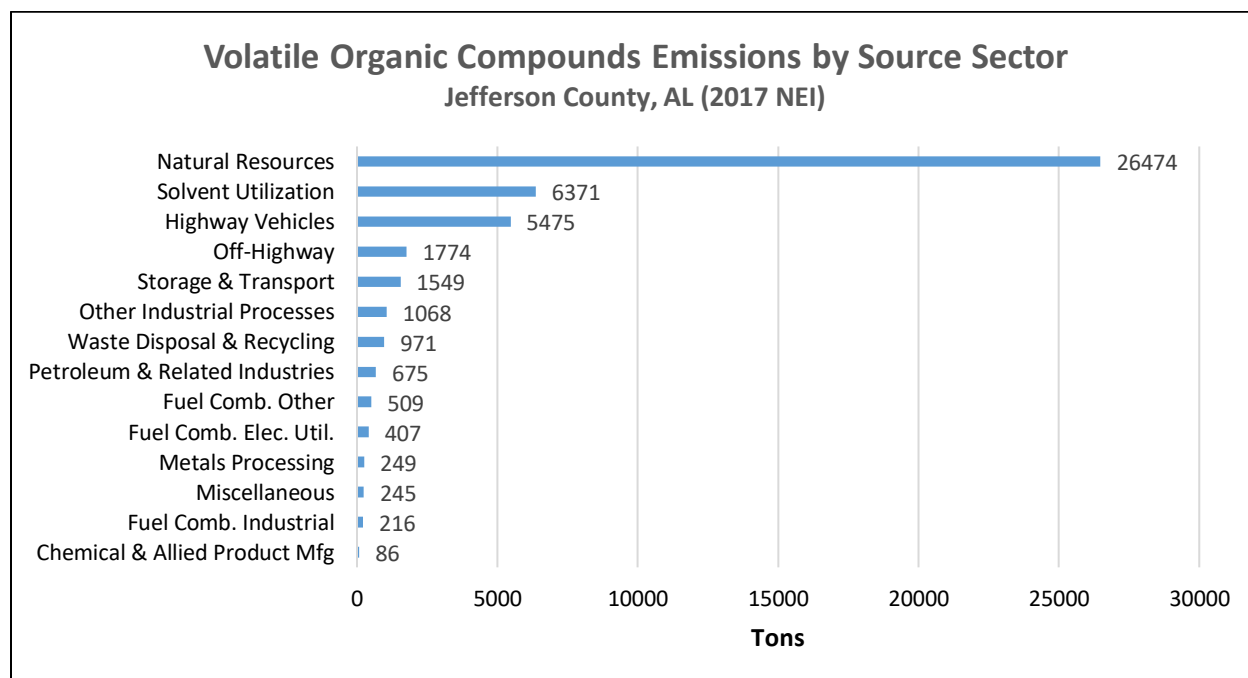
Site Name	Site ID	1st Max	2nd Max	98th Percentile	Annual Mean
Arkadelphia	01-073-2059	50.3	46.4	42.0	10
North Birmingham	01-073-0023	44.4	40.0	38.1	8

## 4.3 Ozone (O<sub>3</sub>)

### General Information

Ozone (O<sub>3</sub>) is a colorless gas that is photochemically produced in the atmosphere when volatile organic compounds (VOCs) combine with nitrogen oxides (NO<sub>x</sub>) in the presence of sunlight. In the lower atmosphere, O<sub>3</sub> 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<sub>x</sub> and VOCs lead to the formation of O<sub>3</sub> in the lower atmosphere. NO<sub>x</sub> is primarily emitted from combustion sources such as motor vehicles and industrial sources. 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<sub>x</sub> and VOCs in Jefferson County are shown in Figures 4.4 and 4.5, respectively.



**Figure 4.5:** Sources of volatile organic compounds in Jefferson County from EPA's 2017 National Emissions Inventory.

O<sub>3</sub> 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<sub>3</sub> also damages plants, trees, rubber, and fabrics.



## Monitoring Data

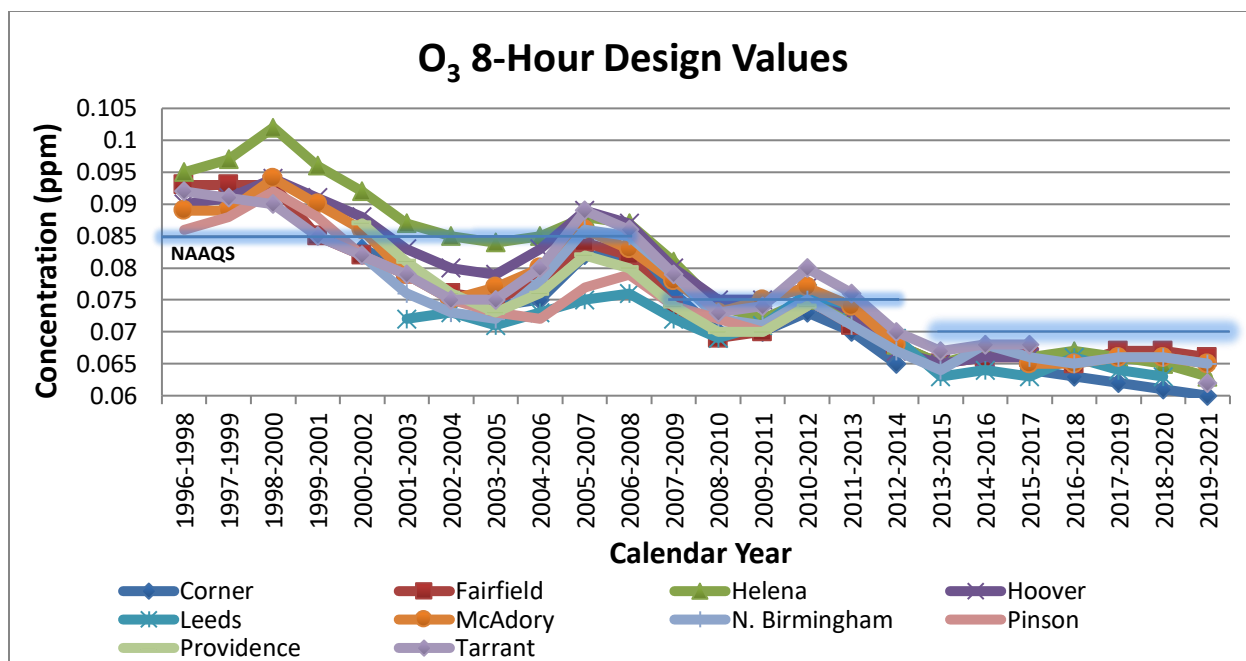
The Environmental Protection Agency (EPA) has established a primary 8-hour standard for O<sub>3</sub>. In 2015, the EPA revised the 8-hour O<sub>3</sub> standard and lowered it to 0.070 ppm [80 FR 65292, October 26, 2015]. The annual fourth-highest daily maximum 8-hour average concentration is averaged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

The O<sub>3</sub> monitoring season in the Birmingham area begins on March 1st and ends on October 31st. In 2021, the O<sub>3</sub> monitoring network consisted of 7 monitoring sites throughout the Birmingham area (6 in Jefferson County and 1 in Shelby County). There was 1 daily maximum 8-hour average that was greater than 0.070 ppm during 2021 (Table 4.3). The design values for O<sub>3</sub> are based upon the most recent 3 years of data. During the most recent 3 years of monitoring data (2019-2021), no monitors had a design value above the 8-hour standard (Figure 4.6; Appendix). There has been a general downward trend in O<sub>3</sub> levels since the mid-1990s. The Birmingham area was designated as attainment of the 2015 8-hour ozone standard in 2017 [82 FR 54232 November 16, 2017].

**Table 4.3:** Highest Daily Maximum 8-Hour Average O<sub>3</sub> Concentrations (in ppm) and Number of 8-Hour Average O<sub>3</sub> Observations Exceeding the NAAQS in 2021.

Site Name	Site ID	Daily Maximum 8-Hour Averages				
		1st Max	2nd Max	3rd Max	4th Max	Obs > 0.070
Corner	01-073-5003	0.067	0.062	0.062	0.061	0
Fairfield	01-073-1003	0.064	0.062	0.062	0.062	0
Helena <sup>1</sup>	01-117-0004	0.063	0.062	0.061	0.061	0
Leeds	01-073-1010	0.065	0.065	0.064	0.064	0
McAdory	01-073-1005	0.065	0.064	0.063	0.063	0
N. Birmingham	01-073-0023	0.073	0.068	0.066	0.063	1
Tarrant	01-073-6002	0.062	0.061	0.059	0.057	0

<sup>1</sup> Monitor operated by the Alabama Department of Environmental Management



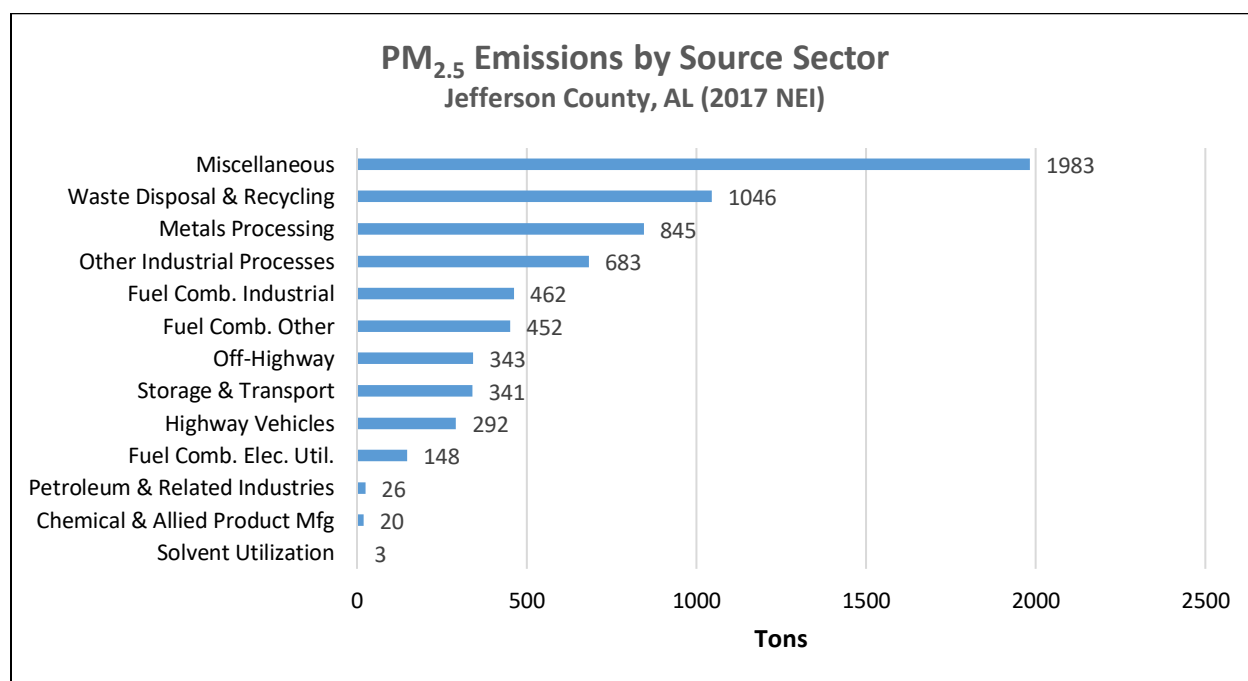
**Figure 4.6:** 8-hour ozone design values (in ppm) for 1996-2021. The highlighted blue line indicates the NAAQS, which is 0.070 ppm (previously set at 0.085 ppm, in which 0.084 ppm rounded to 0.080 ppm, and at 0.075 ppm).

## 4.4 Particulate Matter (PM<sub>2.5</sub> and PM<sub>10</sub>)

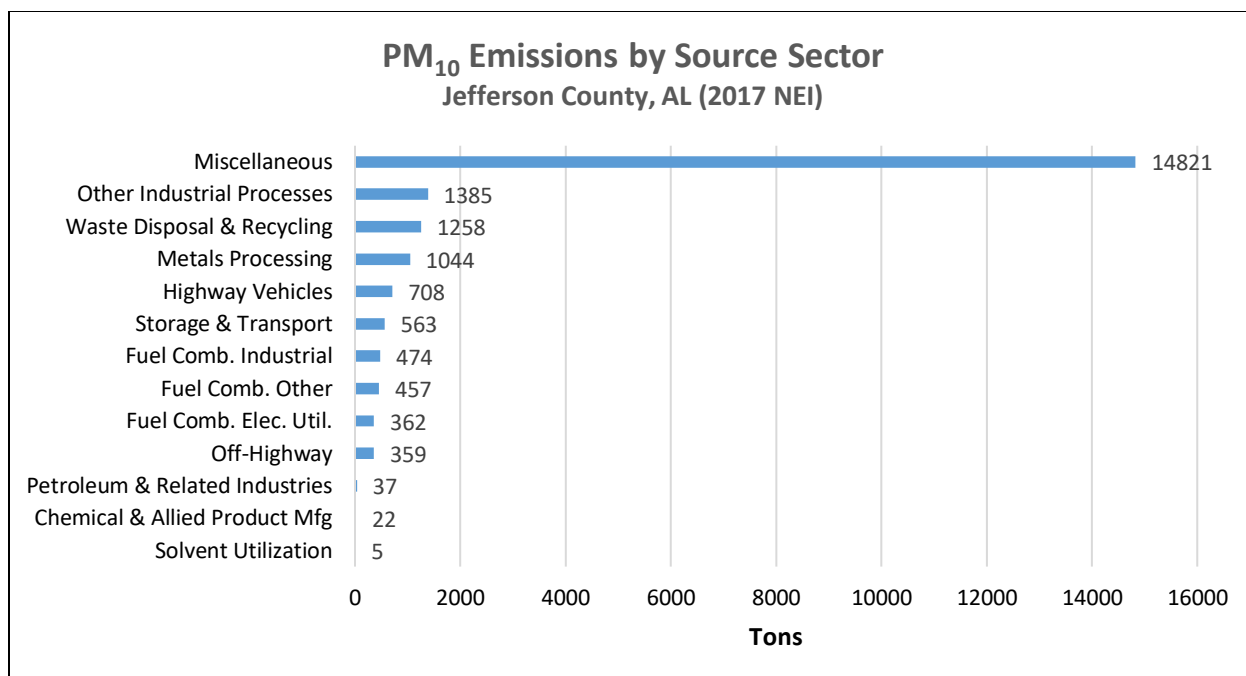
### General Information

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<sub>2.5</sub> consists of fine particles that are less than or equal to 2.5 micrometers in diameter, and PM<sub>10</sub> 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<sub>10</sub> and PM<sub>2.5</sub> 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 4.7 and 4.8 show the emission sources of PM<sub>2.5</sub> and PM<sub>10</sub>, respectively, in Jefferson County.



**Figure 4.7:** Sources of PM<sub>2.5</sub> in Jefferson County from EPA's 2017 National Emissions Inventory.



**Figure 4.8:** Sources of PM<sub>10</sub> in Jefferson County from EPA’s 2017 National Emissions Inventory.

PM<sub>2.5</sub> and PM<sub>10</sub> are such small particles that they are able to penetrate deep into the lungs and can possibly get into the bloodstream, especially PM<sub>2.5</sub>. 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

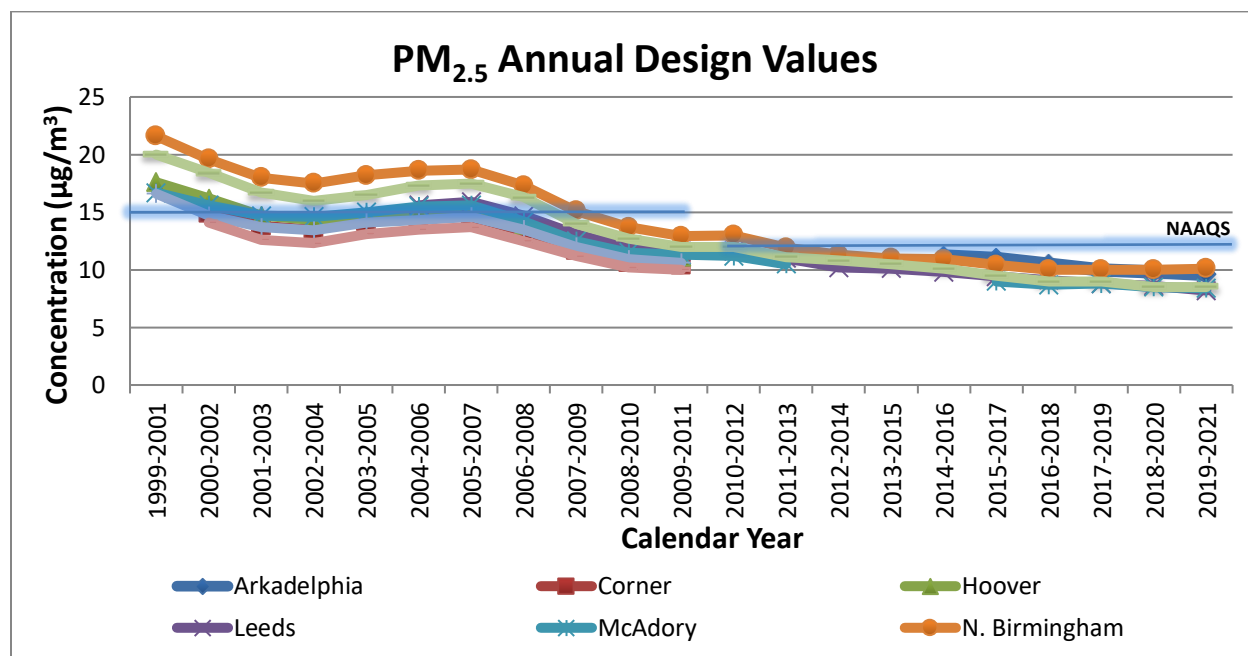
The Environmental Protection Agency (EPA) has established two primary standards for PM<sub>2.5</sub>. In 2013, the EPA revised the annual PM<sub>2.5</sub> standard and lowered it to 12 µg/m<sup>3</sup> and retained the 24-hour PM<sub>2.5</sub> standard already set at 35 µg/m<sup>3</sup> [78 FR 3086,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

In 2021, the PM<sub>2.5</sub> monitoring network consisted of 5 monitoring sites. No monitoring sites exceeded the annual PM<sub>2.5</sub> standard or 24-hour PM<sub>2.5</sub> standard (Table 4.4). The design values for both PM<sub>2.5</sub> standards are based upon the most recent 3 years of data. During the most recent 3 years of monitoring data (2019-2021), all monitors were in compliance with both the annual (Figure 4.9; Appendix) and 24-hour (Figure 4.10; Appendix) standards. There has been a downward trend in PM<sub>2.5</sub> concentrations since the late 1990s and are below both current standards. The Birmingham area was designated as

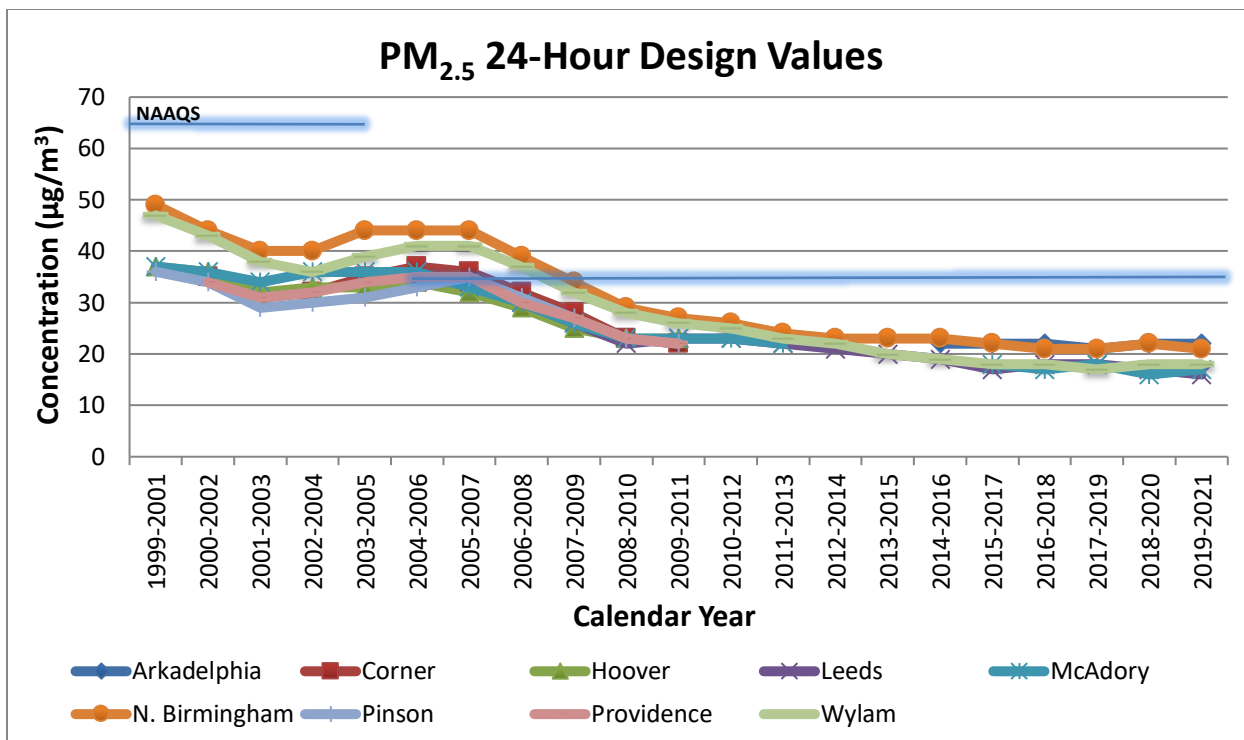
attainment of the 2006 24-hour PM<sub>2.5</sub> standard in 2013 [78 FR 5306, January 25, 2013] and attainment of the 2013 annual PM<sub>2.5</sub> standard in 2015 [80 FR 2206, January 15, 2015].

**Table 4.4:** 24-Hour Average 98th Percentile (in  $\mu\text{g}/\text{m}^3$ ) of PM<sub>2.5</sub>, Number of 24-Hour Average PM<sub>2.5</sub> Concentrations Exceeding the NAAQS, and Annual Mean of PM<sub>2.5</sub> (in  $\mu\text{g}/\text{m}^3$ ) for 2021.

Site Name	Site ID	98th Percentile	Obs > 35	Annual Mean
Arkadelphia	01-073-2059	20.1	0	9.5
Leeds	01-073-1010	15.8	0	8.0
McAdory	01-073-1005	20.2	0	8.2
N. Birmingham	01-073-0023	19.1	0	9.7
Wylam	01-073-2003	18.1	0	8.7



**Figure 4.9:** Annual PM<sub>2.5</sub> design values (in  $\mu\text{g}/\text{m}^3$ ) for 1999-2021. The highlighted blue line indicates the NAAQS, which is 12  $\mu\text{g}/\text{m}^3$  (previously set at 15  $\mu\text{g}/\text{m}^3$ ).



**Figure 4.10:** 24-hour PM<sub>2.5</sub> design values (in µg/m<sup>3</sup>) for 1999-2021. The highlighted blue line indicates the NAAQS, which is 35 µg/m<sup>3</sup> (previously set at 65 µg/m<sup>3</sup>).

The Environmental Protection Agency (EPA) has established a primary 24-hour standard for PM<sub>10</sub>. The 24-hour PM<sub>10</sub> standard is set at 150 µg/m<sup>3</sup>. 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 2021, the PM<sub>10</sub> monitoring network consisted of 5 monitoring sites. No monitoring sites exceeded the 24-hour PM<sub>10</sub> standard during 2021 (Table 4.5; Figure 4.11). Compliance with the 24-hour PM<sub>10</sub> standard is based upon the most recent 3 years of data. During the most recent 3 years of monitoring data (2019-2021), all monitors were in compliance with the 24-hour standard (Table 4.6). There has been an overall downward trend in PM<sub>10</sub> concentrations over time and are now well below the standard (Appendix). The Birmingham area is designated as attainment of the standard for PM<sub>10</sub>.

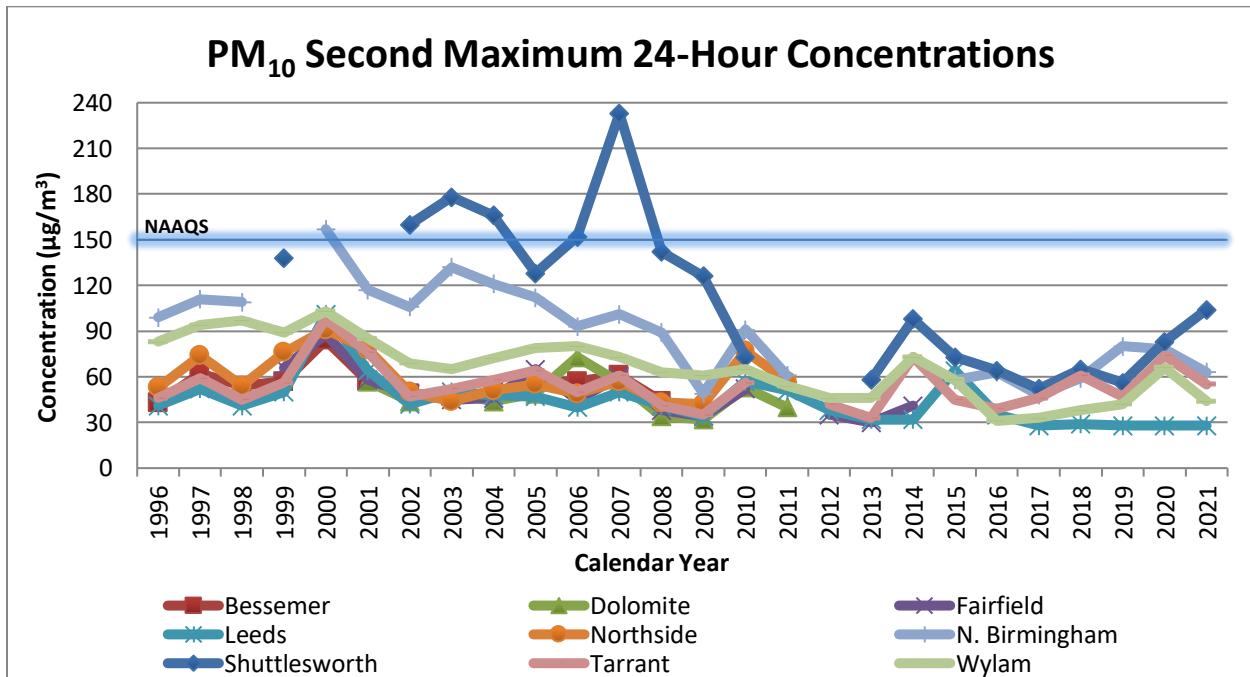
**Table 4.5:** Highest 24-Hour Average PM<sub>10</sub> Concentrations (in µg/m<sup>3</sup>) and Actual Number and Estimated Number of 24-Hour Average PM<sub>10</sub> Observations Exceeding the NAAQS for 2021.

Site Name	Site ID	24-hour Average					
		1st Max	2nd Max	3rd Max	4th Max	Obs > 150	Estimated Obs > 150
Leeds	01-073-1010	32	28	25	24	0	0
N. Birmingham	01-073-0023	64	63	55	53	0	0
Shuttlesworth	01-073-6004	136	104	88	86	0	0
Tarrant	01-073-6002	57	55	55	53	0	0
Wylam	01-073-2003	53	44	44	42	0	0

**Table 4.6:** Estimated Number of Exceedances of PM<sub>10</sub> for 2019-2021 and Expected Number of PM<sub>10</sub> Exceedances for the Most Recent 3-years (2019-2021) to Determine Compliance with the NAAQS.

Site Name	Site ID	Estimated Number of Exceedances			
		2019	2020	2021	Expected 3-year Avg.
Leeds	01-073-1010	0	0	0	0
N. Birmingham	01-073-0023	0	0	0	0
Shuttlesworth	01-073-6004	*	0	0	NA
Tarrant	01-073-6002	*	0	0	NA
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.



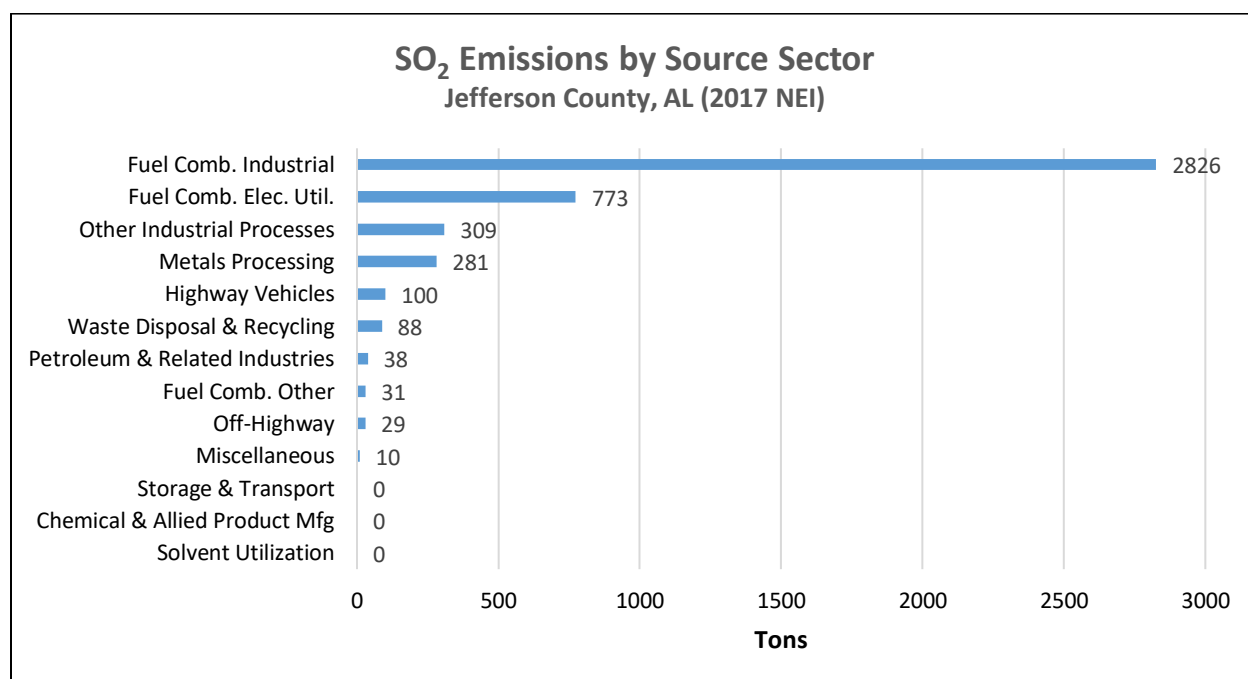
**Figure 4.11:** The second maximum 24-hour average concentrations of PM<sub>10</sub> for 1996-2021. The highlighted blue line indicates the NAAQS, which is 150 µg/m<sup>3</sup>.

## 4.5 Sulfur Dioxide (SO<sub>2</sub>)

### General Information

Sulfur dioxide (SO<sub>2</sub>) 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<sub>2</sub> 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<sub>2</sub>, 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 4.12 shows the emission sources of SO<sub>2</sub> in Jefferson County.



**Figure 4.12:** Sources of sulfur dioxide in Jefferson County from EPA's 2017 National Emissions Inventory.

SO<sub>2</sub> 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<sub>2</sub>. SO<sub>2</sub> 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.



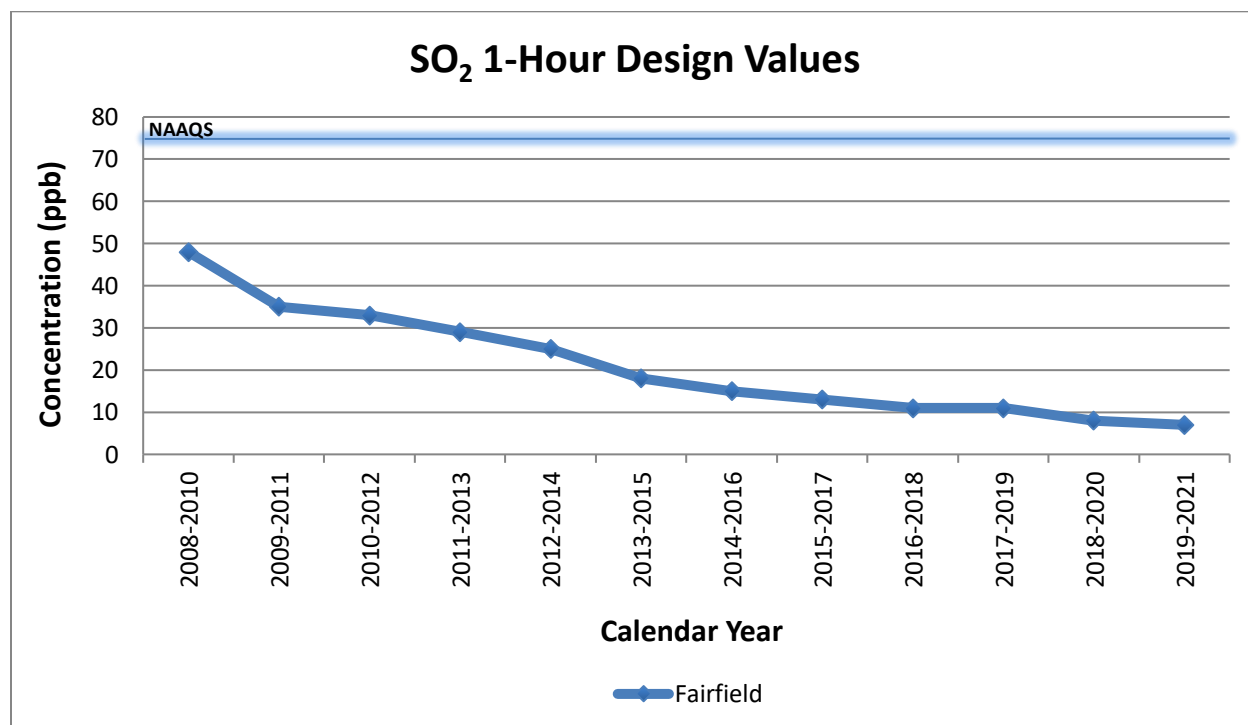
## Monitoring Data

The Environmental Protection Agency (EPA) has established a primary 1-hour standard for SO<sub>2</sub>. 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 2021, the SO<sub>2</sub> monitoring network consisted of 2 monitoring sites. No monitoring sites exceeded the 1-hour standard during 2021 (Table 4.7). The design values for SO<sub>2</sub> are based upon the most recent 3 years of data. During the most recent 3 years of monitoring data (2019-2021), only the Fairfield monitor fulfilled the 3 year data completeness criteria and it was below the 1-hour standard (Figure 4.13; Appendix). The Birmingham area was designated as attainment of the 2010 1-hour SO<sub>2</sub> standard in 2018 [83 FR 1098, January 9, 2018].

**Table 4.7:** Highest 1-Hour Average SO<sub>2</sub> Concentrations (in ppb), the 99th Percentile of 1-hour Average SO<sub>2</sub> Concentrations (in ppb), and Number of 1-Hour Average SO<sub>2</sub> Observations Exceeding the NAAQS for 2021.

Site Name	Site ID	1st Max	2nd Max	99th Percentile	Obs > 75
Fairfield	01-073-1003	9.4	7.5	6	0
N. Birmingham	01-073-0023	14.2	13.9	13	0



**Figure 4.13:** 1-hour sulfur dioxide design values (in ppb) for 2008-2021. The highlighted blue line indicates the NAAQS, which is 75 ppb.

## 5. AIR QUALITY INDEX (AQI)

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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.

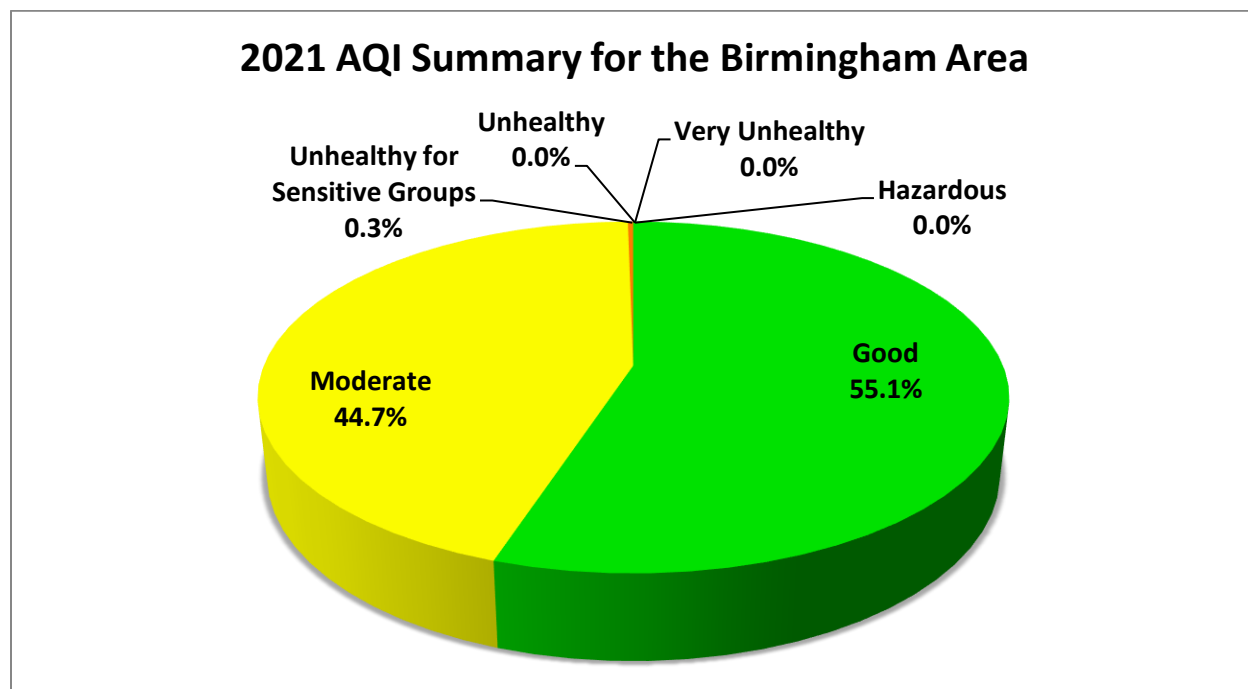
Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0-50	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	51-100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people 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<sub>2.5</sub>) 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](http://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 continuous monitors within the Birmingham area. The AQI value is based on all monitors in Jefferson County that measure CO, NO<sub>2</sub>, O<sub>3</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, and SO<sub>2</sub> and the Helena monitor in Shelby County that measures O<sub>3</sub>. Figure 5.2 shows a percentage of days in 2021 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<sub>2</sub>, O<sub>3</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, and SO<sub>2</sub>) that had the highest AQI value each day for the Birmingham area in 2021.

## 6. AIR POLLUTION COMPLIANCE ASSURANCE

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### 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 2021, the APCP performed 1 visible emissions evaluation, 41 stack test observations, conducted 94 permitted inspections, and issued 2 Notices of Violation. The APCP investigated a total of 142 air pollution complaints in 2021 (Figure 6.1), of which 25 were for permitted facilities. When compared to 2020, there was a decrease in complaint investigations in 2021.

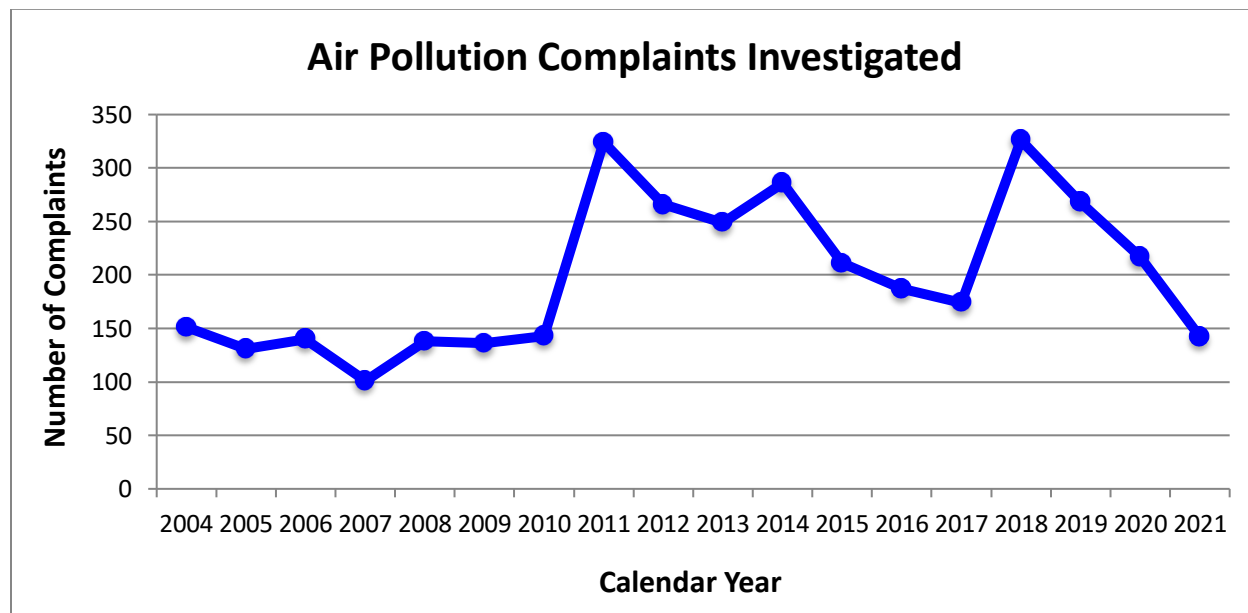
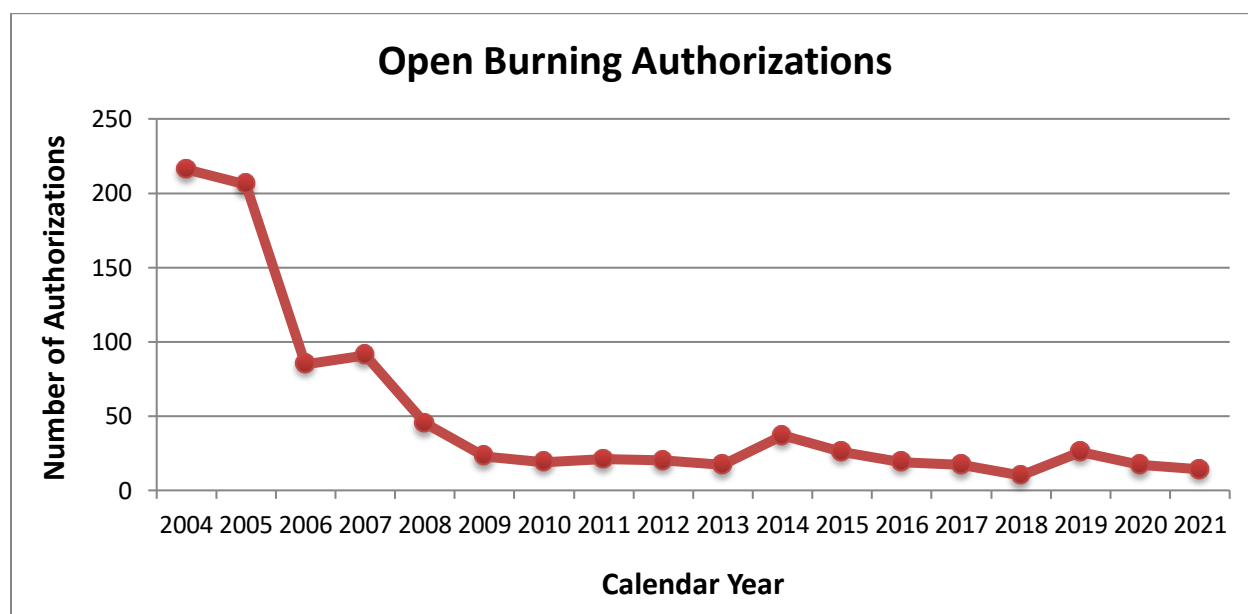


Figure 6.1: The number of air pollution complaints investigated for 2004-2021.

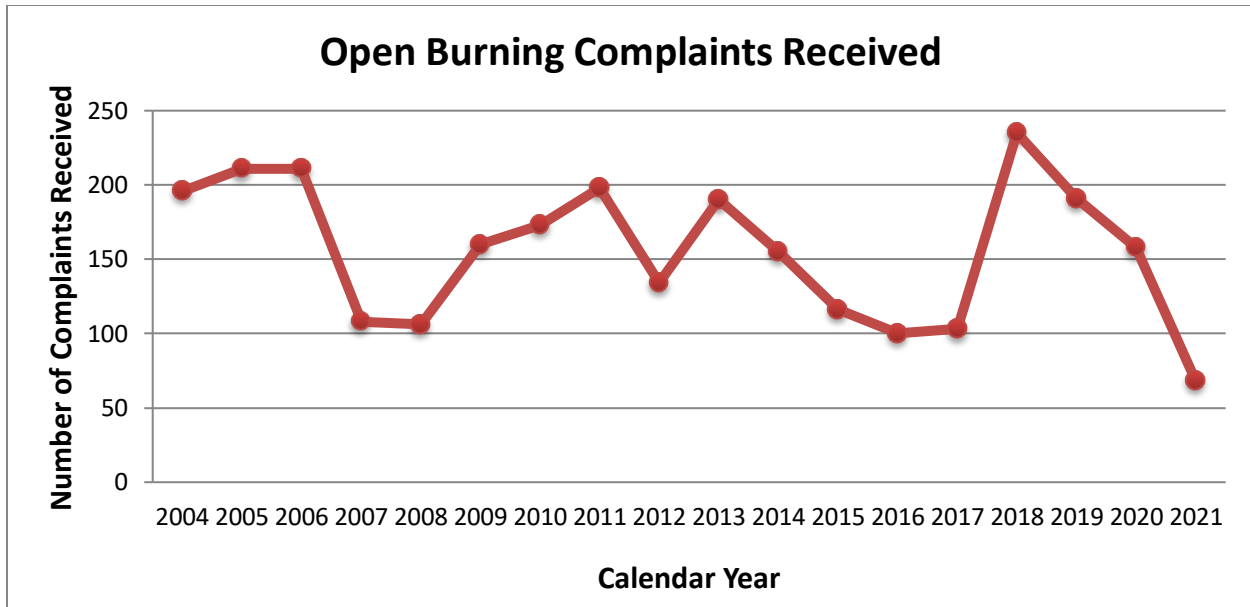
## 6.2 Open Burning

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 2021, the APCP issued 14 open burning authorizations, which is a decrease from 2020 (Figure 6.2).



**Figure 6.2:** The number of open burning authorizations for 2004-2021.

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 2021, the APCP investigated 68 open burning complaints (Figure 6.3) and issued 30 Notices of Violation.



**Figure 6.3:** The number of open burning complaints received for 2004-2021.

### 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 2021, the APCP issued 1,106 Air Stickers.

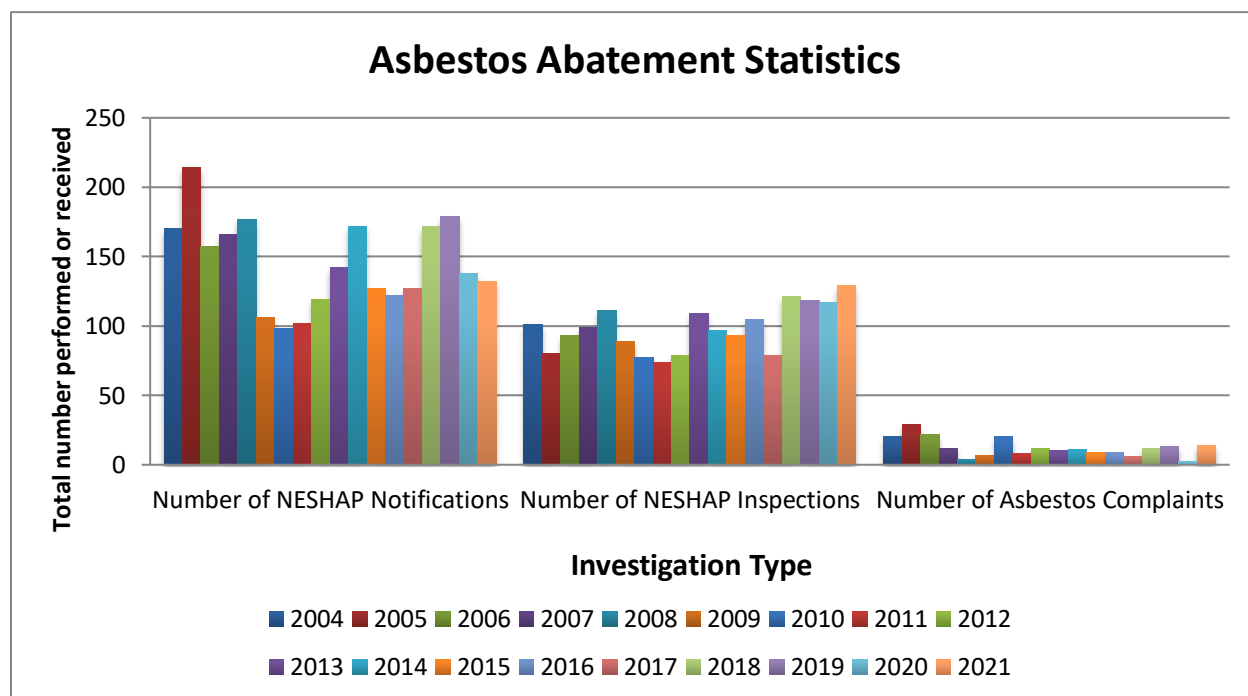
### 6.4 Indoor Air Quality

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 2021, the APCP investigated 0 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. The APCP has an Asbestos Abatement Coordinator for Jefferson County that is responsible for the regulatory activities in this program area. During 2021, there were 244 regulated asbestos abatement or demolition notifications received and reviewed, of which 132 were subject to Federal asbestos standards. Regarding asbestos, there were 129 inspections conducted, 14 complaints investigated, and 3 Notices of Violation issued. Some of these statistics during the last several years can be found in Figure 6.4.



**Figure 6.4:** The number of NESHAP notifications, NESHAP inspections, and asbestos complaints for 2004-2021.

## **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 (11 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 2021, there were 11 inspections of dry cleaning facilities in Jefferson County.



## 7. AIR POLLUTION EMISSION SOURCE PERMITTING

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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 2021, air permits were issued for 261 new, renewed, or modified sources (Table 7.1).

**Table 7.1:** Number of Permits Issued by Source Type in 2021.

Source Type	Number of Permits Issued
Industrial/Commercial	64
Gasoline Tanker Trucks	197

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 2021.

Type of Permit	Number of Permits Issued
Title V Major	3
Synthetic Minor	8
Minor	53

## APPENDIX: Additional Ambient Air Quality Data

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### Carbon Monoxide

#### Second Maximum 1-Hour Average Concentrations (in ppm)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Arkadelphia													2.0	2.1	2.1	1.6	1.8	1.7	1.7	1.6
East Thomas	5.5	4.1	3.8	4.1	3.8	3.1	3.0	3.7	2.5	6.0	1.9	1.4								
Fairfield	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	2.6	1.3	1.6	1.8	1.3	1.3
N. Birmingham										1.5	2.0	2.2	1.4	1.5	2.5	2.8	1.5	1.7	1.8	2.0
Shuttlesworth	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)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Arkadelphia													1.4	1.4	1.5	1.2	1.3	1.3	1.3	1.1
East Thomas	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	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	1.4	1.0	1.2	1.2	1.1	1.0
N. Birmingham										1.2	1.4	1.2	0.9	0.9	1.1	2.1	1.0	1.1	0.9	0.9
Shuttlesworth	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.

## Nitrogen Dioxide

1-hour Design Values (in ppb)

	2017- 2019	2018- 2020	2019- 2021
Arkadelphia		46	45
N. Birmingham	40	40	40

Annual Design Values (in ppb)

	2014	2015	2016	2017	2018	2019	2020	2021
Arkadelphia	14	13	14	11	11	12	11	10
N. Birmingham	9	9	9	9	8	10	8	8

## Ozone

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

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Corner	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	0.067	0.061	0.063	0.064	0.057	0.061
Fairfield	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	0.066	0.064	0.065	0.074	0.062	0.062
Helena	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	0.073	0.061	0.067	0.070	0.059	0.061
Hoover	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	0.070	0.061				
Leeds	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	0.067	0.062	0.069	0.063	0.059	0.064
McAdory	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	0.069	0.062	0.066	0.072	0.061	0.063
N. Birmingham	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	0.069	0.060	0.067	0.071	0.062	0.063
Pinson	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	0.070	0.070	0.079	0.081	0.087	0.074	0.061	0.075	0.076	0.073									
Tarrant	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	0.070	0.061	0.070	0.067	0.062	0.057

**8-Hour Design Values (in ppm)**

	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020	2019-2021
Corner	0.076	0.074	0.075	0.082	0.082	0.076	0.070	0.070	0.073	0.070	0.065	*	*	0.064	0.063	0.062	0.061	0.060
Fairfield	0.076	0.075	0.078	0.084	0.082	0.074	0.069	0.070	0.075	0.071	0.068	0.065	0.066	0.066	0.065	0.067	0.067	0.066
Helena	0.085	0.084	0.085	0.088	0.087	0.081	0.074	0.072	0.075	0.073	0.068	0.065	0.067	0.066	0.067	0.066	0.065	0.063
Hoover	0.080	0.079	0.083	0.089	0.087	0.080	0.075	0.075	0.077	0.073	0.067	0.065	0.066	0.066				
Leeds	0.073	0.071	0.073	0.075	0.076	0.072	0.069	0.071	0.076	0.074	0.069	0.063	0.064	0.063	0.066	0.064	0.063	*
McAdory	0.075	0.077	0.080	0.086	0.083	0.078	0.073	0.075	0.077	0.074	0.068	*	*	0.065	0.065	0.066	0.066	0.065
N. Birmingham	0.073	0.072	0.078	0.086	0.085	0.079	0.072	0.071	0.075	0.071	0.067	0.064	0.068	0.066	0.065	0.066	0.066	0.065
Pinson	0.075	0.073	0.072	0.077	0.079	0.074	0.072	0.070	0.074									
Providence	0.076	0.073	0.076	0.082	0.080	0.074	0.070	0.070	0.074									
Tarrant	0.075	0.075	0.080	0.089	0.086	0.079	0.073	0.074	0.080	0.076	0.070	0.067	0.068	0.068	*	*	*	0.062

\* 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<sub>2.5</sub>)

Annual Average Values (in µg/m<sup>3</sup>)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Arkadelphia													11.1	11.8	10.8	10.3	10.2	9.3	9.8	9.5
Corner	13.3	13.5	13.7	15.4	14.5	13.9	11.5	9.7	10.7	10.8										
Hoover	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	9.3	8.9	9.2	8.3	8.2	8.0
McAdory	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	8.5	8.9	8.7	8.7	8.2	8.2
N. Birmingham	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	10.3	10.2	9.6	10.4	10.1	9.7
Pinson	13.3	13.5	13.5	15.2	14.3	14.3	11.9	9.9	10.9	10.8										
Providence	12.3	12.2	12.4	14.5	13.4	13.3	10.8	9.6	10.1	10.3										
Wylam	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	8.7	9.5	8.8	8.6	8.0	8.7

Annual Design Values (in µg/m<sup>3</sup>)

	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020	2019-2021
Arkadelphia													11.2	11.0	10.5	10.0	9.8	9.6
Corner	13.5	14.2	14.5	14.6	13.3	11.7	10.6	10.4										
Hoover	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	9.8	9.4	9.1	8.8	8.6	8.2
McAdory	14.6	15.0	15.5	15.6	14.2	12.5	11.5	11.3	11.2	10.5				9.0	8.7	8.8	8.5	8.4
N. Birmingham	17.5	18.2	18.6	18.7	17.3	15.1	13.7	12.9	13.0	11.9	11.3	11.0	10.9	10.4	10.0	10.0	10.0	10.1
Pinson	13.4	14.1	14.3	14.6	13.5	12.0	10.9	10.6										
Providence	12.3	13.1	13.5	13.7	12.5	11.2	10.2	10.0										
Wylam	16.0	16.5	17.3	17.5	16.3	14.0	12.7	12.0	12.0	11.1	10.8	10.5	10.1	9.5	9.0	9.0	8.5	8.5

\*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<sub>2.5</sub>) continued

24-Hour 98<sup>th</sup> Percentile Values (in µg/m<sup>3</sup>)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Arkadelphia													22.0	23.6	21.4	21.2	22.2	19.1	25.4	20.1
Corner	33.3	28.6	34.5	41.8	33.4	32.5	30.0	21.3	18.3	26.6										
Hoover	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	15.7	15.6	21.6	15.3	15.4	15.8
McAdory	35.7	33.7	37.3	35.5	33.9	30.9	25.8	21.3	22.7	26.2	20.8	19.6	*	18.5	14.4	19.6	17.5	16.0	14.4	20.2
N. Birmingham	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	20.2	21.7	21.4	21.3	23.8	19.1
Pinson	32.7	26.7	29.3	37.2	33.2	34.2	26.4	21.3	20.0	23.6										
Providence	34.2	29.5	32.4	39.8	32.7	31.4	27.3	22.1	18.4	26.6										
Wylam	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	16.8	19.1	17.0	16.1	19.4	18.1

24-Hour Design Values (in µg/m<sup>3</sup>)

	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020	2019-2021
Arkadelphia													22	22	22	21	22	22
Corner	32	35	37	36	32	28	23	22										
Hoover	33	33	34	32	29	25	23	23										
Leeds			34	34	30	26	22	23	23	22	21	20	19	17	18	18	17	16
McAdory	36	36	36	33	30	26	23	23	23	22				18	17	18	16	17
N. Birmingham	40	44	44	44	39	34	29	27	26	24	23	23	23	22	21	21	22	21
Pinson	30	31	33	35	31	27	23	22										
Providence	32	34	35	35	30	27	23	22										
Wylam	36	39	41	41	37	32	28	26	25	23	22	20	19	18	18	17	18	18

\*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<sub>10</sub>)

24-Hour Second Maximum 24-Hour Average Concentrations (in µg/m<sup>3</sup>)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Bessemer	49	47	50	56	57	61	44													
Dolomite	44	49	44	49	73	56	34	32	53	40										
Fairfield	49	45	46	65	45	60	38	34	52		35	30	41							
Leeds	42	50	48	47	40	50	41	34	57	51	38	32	32	64	35	28	29	28	28	28
Northside	50	44	51	55	49	57	43	42	77	57										
N. Birmingham	106	132	121	112	93	101	89	49	91	61				58	63	48	59	80	78	63
Shuttlesworth	160	178	166	128	152	233	142	126	73			58	98	73	64	52	65	56	83	104
Tarrant	47	52	58	64	50	61	41	35	56		42	33	73	45	39	46	61	47	74	55
Wylam	69	65	72	79	80	73	63	61	65	54	46	46	73	58	31	33	38	42	66	44

## Sulfur Dioxide

1-Hour 99<sup>th</sup> Percentile Values (in ppb)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fairfield	69	41	33	31	36	22	17	17	11	12	*	10	5	6
N. Birmingham				42	*	29	41	*	*	*	*	*	12	13

1-Hour Design Values (in ppb)

	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020	2019-2021
Fairfield	48	35	33	29	25	18	15	13	11	11	8	7
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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