2011 AIR QUALITY REPORT

Jefferson County Department of Health
Environmental Health Services
Air and Radiation Protection Division
Birmingham, AL

Foreword

The Air Pollution Control Program of the Jefferson County Department of Health (JCDH) prepares this report annually. It analyzes the results of air monitoring stations located throughout Jefferson County for the purpose of measuring the outdoor concentrations of those pollutants for which the U. S. Environmental Protection Agency has established ambient air quality standards (with the exception of nitrogen dioxide, which is not necessary in an urban area the size of Birmingham):

- Carbon Monoxide
- Ozone
- Lead (not currently monitored by JCDH)
- Particulate Matter
- Sulfur Dioxide

This report includes general discussions of the background information, possible sources, and health effects of each pollutant, along with any exceedances of air quality standards. Also included is a summary of compliance and enforcement activities. An effective field enforcement program contributes directly to improved air quality and the effort to maintain pollutant levels within acceptable limits.

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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
CMZ	community monitoring zone
CO	carbon monoxide
EHS	Environmental Health Services
EPA	Environmental Protection Agency
FCE	Full Compliance Evaluation
IMPROVE	Interagency Monitoring of Protected Visual Environments
JCDH	Jefferson County Department of Health
NAAQS	National Ambient Air Quality Standards
NAMS	National Air Monitoring Station
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_x	oxides of nitrogen
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
ppm	parts per million
RadNet	radiation network
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Station
SMOPs	Synthetic Minor Operating Permits
SO_2	sulfur dioxide
SPM	Special Purpose Monitoring
$\mu g/m^3$	micrograms per cubic meter
VOCs	volatile organic compounds

Executive Summary

The air quality index (AQI) was created for use as a standard measure of daily air quality. 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 level of air pollution and the greater the health concern. The AQI is based on the pollutants for which primary short-term National Ambient Air Quality Standards (NAAQS) have been established by the Environmental Protection Agency (EPA). Among those pollutants, particulate matter, sulfur dioxide, carbon monoxide, and ozone (see Table 2.1) are monitored in Jefferson County.

As shown below, the AQI of each pollutant 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 when AQI values are expected to be above 100 for any pollutant stated above.

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	Air Quality Alert: Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151-200	Air Quality Alert: Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201-300	Air Quality Alert: Everyone may experience more serious health effects.
Hazardous	> 300	Air Quality Alert: The entire population is more likely to be affected.

The AQI is available daily, Monday through Friday, via phone at (205) 933-0583 and online at www.jcdh.org. The following table was extracted from EPA's Air Quality System and summarizes the measurements of air quality in terms of the AQI for Jefferson County, Alabama, for 2011:

Air Quality Description	Number of Days
Good (1 - 50)	213
Moderate (51 - 100)	133
Unhealthy for Sensitive Groups (101 - 150)	18
Unhealthy (151 - 200)	1
Very Unhealthy (201 - 300)	0
Hazardous (> 300)	0
Total Number of Days	365

In 2011 there were 19 days in which the air quality was equal to or exceeded an AQI value of 101, representing 5.2% of the time air quality was unhealthy for sensitive groups or unhealthy in Jefferson County.

1.0 Introduction

The Jefferson County Department of Health operates an air pollution control program with its goal to ensure that citizens of Jefferson County, Alabama, have access to air which meets the health standards as established by the Environmental Protection Agency. A significant portion of air pollution control resources is devoted to monitoring pollutant levels in the ambient air (that portion of the atmosphere to which the general public has access). Also, 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.

2.0 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 with an adequate margin of safety. The secondary standards are designed to protect public welfare-related values (such as property, materials, plants and animal life). 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 and Radiation Protection Division of the Jefferson County Department of Health utilizes the following standards established by the EPA:

Table 2.1
National Ambient Air Quality Standards

Pollutant and Averaging Time	Primary Standard	Secondary Standard
Carbon Monoxide		
8-hour average[1]	9 ppm	None
1-hour average[1]	35 ppm	None
Lead		
Rolling 3-month average	0.15 $\mu g/m^3$	0.15 $\mu g/m^3$
Nitrogen Dioxide		
Annual average	53 ppb	53 ppb
1-hour[2]	100 ppb	None
Particulate Matter (PM_{10})		
24-hour average[3]	150 $\mu g/m^3$	150 $\mu g/m^3$
Particulate Matter ($PM_{2.5}$)		
Annual average[4]	15 $\mu g/m^3$	15 $\mu g/m^3$
24-hour average[5]	35 $\mu g/m^3$	35 $\mu g/m^3$
Ozone		
8-hour average[6]	0.075 ppm	0.075 ppm
Sulfur Dioxide		
3-hour average[1]		0.5 ppm
1-hour average[7]	75 ppb	

[1] Not to be exceeded more than once a year.
[2] A 3-year average concentration, based on 98th percentile, determines compliance with the NAAQS.
[3] Not to be exceeded more than once per year on average over a 3-year period.
[4] A 3-year average of annual means determines compliance with the NAAQS.
[5] A 3-year average concentration, based on 98th percentile, determines compliance with the NAAQS.
[6] A 3-year average of annual 4th highest daily maximum 8-hour concentrations determines compliance with the NAAQS.
[7] Final rule signed June 2, 2010. A 3-year average, based on the 99th percentile, determines compliance with the NAAQS.

3.0 Monitoring 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 2011 the network consisted of 15 monitoring sites with 55 air monitors and 22 collocated monitors (see Tables 3.1 and 3.2). The air pollutants monitored at these sites were ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), reactive nitrogen compounds (NOy), particulates 2.5 microns and less in size ($PM_{2.5}$), and particulates 10 microns and less in size (PM_{10}). Nitrogen dioxide is not monitored because the county population is less than one million, and monitoring is therefore not required. Each air monitor was classified as one of the following: State and Local Air Monitoring Station (SLAMS) or Special Purpose Monitoring (SPM) 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 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.

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. In 2001 three $PM_{2.5}$ speciation monitors were added to the network as part of the National Speciation Trends Network to assess the chemical composition of fine particles. However, the Providence monitor was shut down in July 2006, which leaves two speciation monitors at North Birmingham and Wylam.

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.

Table 3.1
Jefferson County Air Monitoring Network—Monitoring Types

	Monitoring Type	
Site Location	**SLAMS**	**SPM**
Corner	1	5
Dolomite	1	0
East Thomas	1	0
Fairfield	4	0
Hoover	1	5
Leeds	2	5
McAdory	1	5
Shuttlesworth	2	1
North Birmingham	6	9
Northside	2	0
Pinson	2	4
Providence	1	5
Tarrant, ABC Coke	1	1
Tarrant	2	0
Wylam	2	8

Table 3.2
Jefferson County Air Monitoring Network—Pollutants Monitored

Site Location	CO	NOy	O_3	PM_{10}	$PM_{2.5}$	SO_2
Corner			●	●	●	
Dolomite				●		
East Thomas	●					
Fairfield	●		●	●		●
Hoover			●	●	●	
Leeds			●	●	●	
McAdory			●	●	●	
Shuttlesworth	●			●		
North Birmingham	●	●	●	●	●	●
Northside				●		
Pinson			●	●	●	
Providence			●	●	●	
Tarrant, ABC Coke				●		
Tarrant			●	●		
Wylam				●	●	

4.0 Description of Pollutants

4.1 Carbon Monoxide

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.

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.

4.2 Ozone

Ozone is a highly reactive oxidant gas with a pungent odor and a faint bluish color. Ozone is photochemically produced in the atmosphere when volatile organic compounds (VOCs) combine with oxides of nitrogen (NOx) and carbon monoxide (CO) in the presence of sunlight. In the lower atmosphere, ozone 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 nitrogen oxides and VOCs lead to the formation of ozone in the lower atmosphere. Nitrogen oxides are 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, and industrial use of solvents or coatings.

Ozone 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. Ozone also damages plants, trees, rubber and fabrics.

4.3 Particulate Matter

Particulate matter consists of airborne particles ranging from about 0.001 to 500 micrometers in diameter. Particulate matter includes dust, soot and other tiny bits of materials (solids and aerosols) released into and moving around in the air. $PM_{2.5}$ consists of particles less than or equal to 2.5 micrometers in diameter, and PM_{10} consists of particles 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 has many sources, including 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; operation of fireplaces and wood stoves; and industrial processes (such as steel making and mining operations).

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.

4.4 Sulfur Dioxide

Sulfur dioxide is a colorless, nonflammable 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.

Globally, emissions from human activities account for one-third of total emissions of sulfur compounds in the atmosphere. Of the natural emissions, most are hydrogen sulfide released from the decay of organic matter or sulfate particles released in sea spray. The combustion of sulfur-containing coal and oil in utility and industrial boilers is the major man-made source of sulfur dioxide emissions.

Sulfur dioxide is an irritant to the pulmonary system, primarily affecting the upper respiratory system. Damage to lungs occurs with deep inhalation of particles absorbing sulfur dioxide. Sulfur dioxide plays an important role in the production of acid rain (acid aerosols), which damages trees and lakes. Acid aerosols also erode stone used in buildings, statues, and monuments.

5.0 Monitoring Data

5.1 Carbon Monoxide

The carbon monoxide monitoring network consists of 4 monitors (4 SLAMS) strategically located within Jefferson County. Carbon monoxide was not the responsible pollutant on the air quality index (AQI) scale on any day in 2011. Refer to Graphs 5.5.1 and 5.5.2 and Tables 5.5.1, 5.5.2, 5.5.3, and 5.5.4 for 1-hour and 8-hour concentrations and design values. Only monitors used for compliance purposes are shown in the graphs. There were no violations of the 1-hour or 8-hour National Ambient Air Quality Standards (NAAQS) for the 2010-2011 reporting period at any of the monitoring sites.

5.2 Ozone

The ozone monitoring network consists of 9 monitors (9 SLAMS) strategically located throughout Jefferson County. All of the ozone monitors are operated from March 1 through October 31, except the North Birmingham monitor which operates year round. Ozone was the responsible pollutant on the AQI scale 172 total days or 47.1% of the days in 2011.

Graph 5.5.3 and Tables 5.5.5 and 5.5.6 display ozone concentrations and show that all monitors in Jefferson County and the Helena monitor in Shelby County averaged at or below the 0.075 ppm NAAQS for the 2009-2011 monitoring period. Thus, all monitors for the 2009-2011 monitoring period are in compliance with the NAAQS.

5.3 Particulate Matter

The particulate matter monitoring network consists of 19 PM_{10} monitors (9 SLAMS; 10 SPM), 19 $PM_{2.5}$ monitors (3 SLAMS; 16 SPM), and 1 RadNet monitor (1 SPM) strategically located throughout Jefferson County. PM_{10} was not the responsible pollutant on the AQI scale on any day in 2011. $PM_{2.5}$ was the responsible pollutant on the AQI scale 193 total days or 52.9% of the days in 2011.

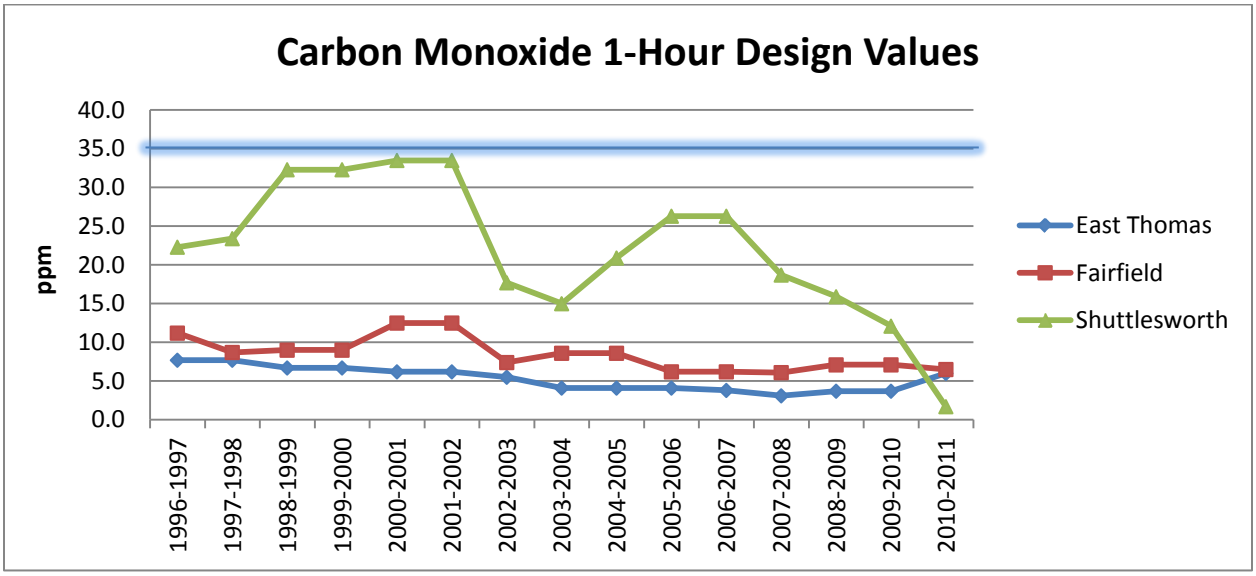
Graph 5.5.4 and Table 5.5.8 show that the 24-hour PM_{10} design values at all monitors were compliant with the NAAQS for the 2009-2011 monitoring period. Graph 5.5.5 and Table 5.5.10 show that all monitors were below the annual $PM_{2.5}$ NAAQS. Graph 5.5.6 and Table 5.5.12 show that all monitors were below the 24-hour $PM_{2.5}$ NAAQS for the 2009-2011 monitoring period. Only monitors used for compliance purposes are shown in the graphs. Refer to following tables for individual yearly values: Table 5.5.7 for the PM_{10} 24-hour 99^{th} percentile values, Table 5.5.9 for the $PM_{2.5}$ annual average values, and Table 5.5.11 for the $PM_{2.5}$ 24-hour 98^{th} percentile values.

5.4 Sulfur Dioxide

The sulfur dioxide (SO_2) monitoring network consists of 2 monitor (2 SLAMS). SO_2 was not the responsible pollutant on the AQI scale on any day in 2011. In June 2010, EPA revised the SO_2 NAAQS. The annual and 24-hour primary standards were revoked and replaced with a 1-hour standard set at 75 ppb. Table 5.5.14 shows the Birmingham area is below the 1-hour SO_2 NAAQS for the 2009-2011 monitoring period. Refer to the following for individual yearly values: Graph 5.5.7 and Table 5.5.13.

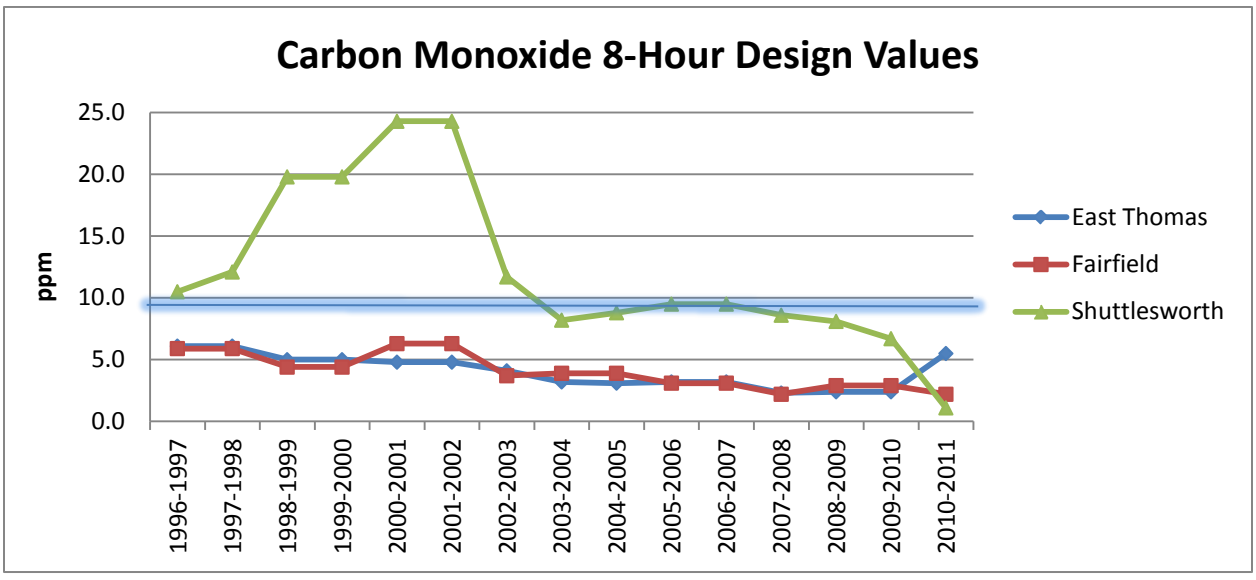
5.5 Graphs and Tables

Graph 5.5.1



- The highlighted blue line indicates the NAAQS, which is 35 ppm.

Graph 5.5.2



- The highlighted blue line indicates the NAAQS, which is 9 ppm.

Table 5.5.1
Carbon Monoxide 1-Hour 2nd Maxima Values

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
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
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
N. Birmingham																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

Table 5.5.2
Carbon Monoxide 1-Hour Design Values

	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
East Thomas	7.7	7.7	6.7	6.7	6.2	6.2	5.5	4.1	4.1	4.1	3.8	3.1	3.7	3.7	6.0
Fairfield	11.2	8.7	9.0	9.0	12.5	12.5	7.4	8.6	8.6	6.2	6.2	6.1	7.1	7.1	6.5
Shuttlesworth	22.3	23.4	32.3	32.3	33.5	33.5	17.7	15.0	20.9	26.3	26.3	18.7	15.9	12.1	1.7

Table 5.5.3
Carbon Monoxide 8-Hour 2nd Maxima Values

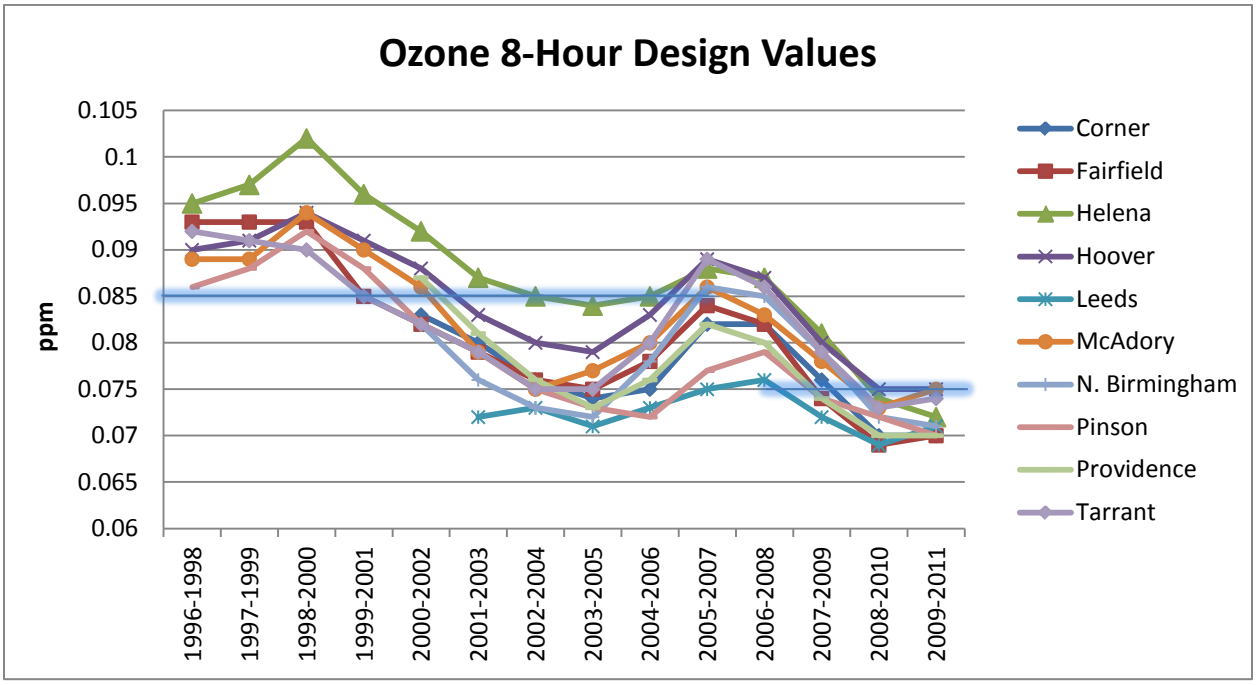
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
East Thomas	5.7	6.1	5.4	5.0	4.5	4.8	4.1	3.2	2.9	3.1	3.2	2.3	2.3	2.4	1.9	5.5
Fairfield	4.9	5.9	4.4	4.4	3.7	6.3	3.7	3.1	3.9	2.5	3.1	2.0	2.2	2.9	2.2	2.1
N. Birmingham																1.2
Shuttlesworth	10.5	9.5	12.1	19.8	16.3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

Table 5.5.4
Carbon Monoxide 8-Hour Design Values

	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2011-2012
East Thomas	6.1	6.1	5.0	5.0	4.8	4.8	4.1	3.2	3.1	3.2	3.2	2.3	2.4	2.4	5.5
Fairfield	5.9	5.9	4.4	4.4	6.3	6.3	3.7	3.9	3.9	3.1	3.1	2.2	2.9	2.9	2.2
Shuttlesworth	10.5	12.1	19.8	19.8	24.3	24.3	11.7	8.2	8.8	9.5	9.5	8.6	8.1	6.7	1.1

The current standards for Carbon Monoxide are 35 ppm for the 1-hour NAAQS and 9 ppm for the 8-hour NAAQS.
Exceedances of the NAAQS are in red text and red-shaded cells are violations of the NAAQS.
All values are measured in parts per million (ppm).
The Shuttlesworth monitor is Special Purpose Monitor and, therefore, not used for compliance purposes.

Graph 5.5.3



- The highlighted blue line indicates the NAAQS. EPA revised the level of the 8-hour Ozone NAAQS from 0.085 ppm to 0.075 ppm, effective May 27, 2008.
- When the NAAQS was set at 0.085 ppm, 0.084 ppm rounded to 0.080 ppm.

Table 5.5.5

Ozone 8-Hour 4th Highest Maxima Values

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
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
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
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
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
Leeds						0.071	0.077	0.070	0.073	0.071	0.075	0.081	0.072	0.065	0.072	0.077
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
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
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
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
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

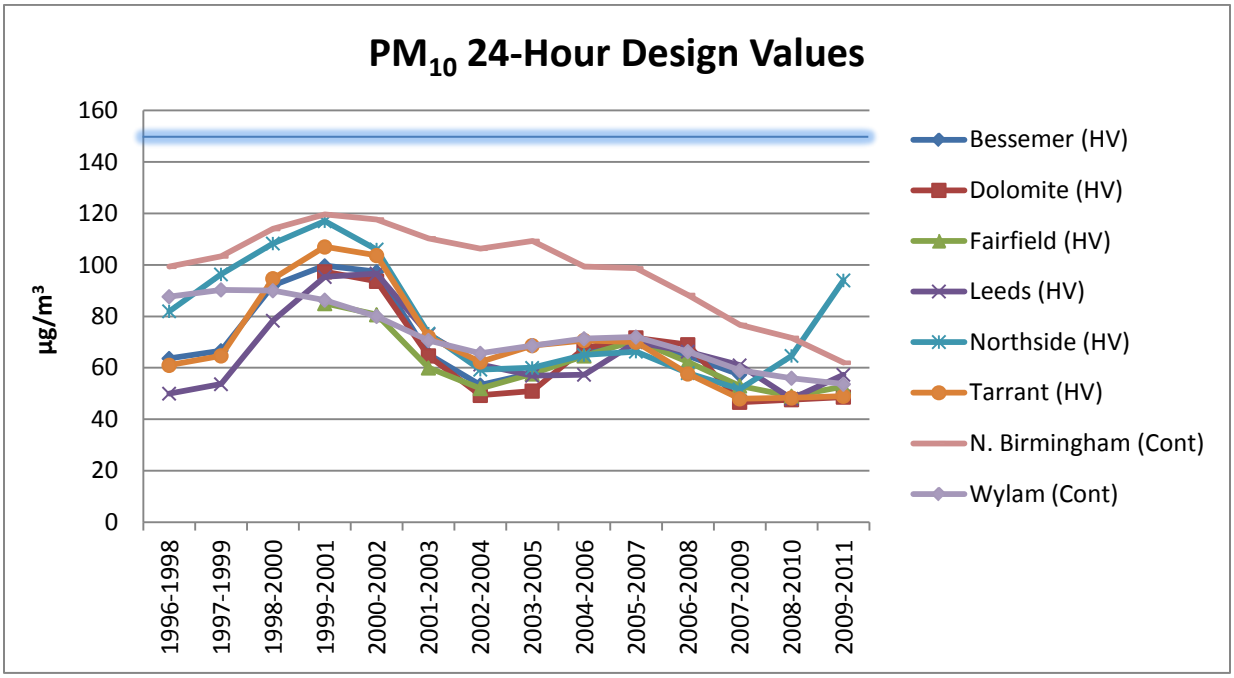
Table 5.5.6

Ozone 8-Hour Design Values

	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
Corner					0.083	0.080	0.076	0.074	0.075	0.082	0.082	0.076	0.070	0.070
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
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
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
Leeds						0.072	0.073	0.071	0.073	0.075	0.076	0.072	0.069	0.071
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
N. Birmingham					0.082	0.076	0.073	0.072	0.078	0.086	0.085	0.079	0.072	0.071
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
Providence					0.087	0.081	0.076	0.073	0.076	0.082	0.080	0.074	0.070	0.070
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

The current standard for the 8-hour Ozone NAAQS is 0.075 ppm.
Exceedances of the NAAQS are in red text and red-shaded cells are violations of the NAAQS.
All values are measured in parts per million (ppm).

Graph 5.5.4



- The highlighted blue line indicates the NAAQS, which is 150 µg/m^3.
- Code for abbreviations: Continuous monitor (Cont); Manual monitor, High Volume Method (HV).

Table 5.5.7

PM_{10} 24-Hour 99th Percentile Values

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bessemer (HV)	53	70	68	62	146	91	55	50	55	69	72	73	49	50		
Dolomite (HV)				59	138	95	48	51	49	53	101	61	45	34	64	48
Fairfield (HV)				70	112	73	57	50	49	74	71	67	49	43	55	60
Leeds (HV)	54	54	42	65	128	93	69	57	58	56	58	96	45	42	57	73
Northside (HV)	56	111	79	99	147	105	66	49	63	68	64	67	43	45	106	131
Tarrant (HV)	58	67	58	69	157	95	59	62	66	78	68	64	41	39	65	43
ABC (Cont)				134	N/A	N/A	111	N/A	N/A	132	148	142	113	73	101	135
N. Birmingham (Cont)	96	104	98	108	136	115	102	114	103	111	84	101	80	49	86	51
Shuttlesworth (Cont)				123	N/A	N/A	144	151	154	120	143	167	127	100	70	58
Wylam (Cont)	75	93	95	83	92	76	63	60	63	68	68	64	56	46	58	49
ABC (LV)														83	113	114
Corner (LV)								46	48	63	66	65	42	25	40	42
Hoover (LV)								48	42	61	64	58	38	26	47	41
Leeds (LV)								72	72	54	62	90	45	28	45	50
McAdory (LV)								62	62	93	242	59	41	34	42	46
N. Birmingham (LV)								115	109	111	91	95	79	55	98	53
Pinson (LV)								48	45	53	61	81	65	26	57	38
Providence (LV)								46	44	56	66	52	39	25	39	46
Shuttlesworth (LV)														120	78	62
Wylam (LV)								57	65	62	73	81	74	51	70	56

The current standard for the 24-hour PM_{10} NAAQS is 150 µg/m^3.

Exceedances of the NAAQS are in red text.

All values are measured in micrograms per cubic meter (µg/m^3).

Code for abbreviations: Continuous monitor (Cont); Manual monitor, High Volume Method (HV); Manual monitor, Low Volume Method (LV).

PM_{10} collected at ambient conditions (i.e., LV) and at Special Purpose Monitors (ABC and Shuttlesworth) are not used for compliance purposes.

Table 5.5.8

PM_{10} 24-Hour Design Values

	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
Bessemer (HV)	64	67	92	100	97	65	53	58	65	71	65	57		
Dolomite (HV)				97	94	65	49	51	68	72	69	47	48	49
Fairfield (HV)				85	81	60	52	58	65	71	62	53	49	53
Leeds (HV)	50	54	78	95	97	73	61	57	57	70	66	61	48	57
Northside (HV)	82	96	108	117	106	73	59	60	65	66	58	52	65	94
Tarrant (HV)	61	65	95	107	104	72	62	69	71	70	58	48	48	49
ABC (Cont)										141	134	109	65	103
N. Birmingham (Cont)	99	103	114	120	118	110	106	109	99	99	88	77	72	62
Shuttlesworth (Cont)							150	142	139	143	146	131	53	76
Wylam (Cont)	88	90	90	84	77	66	62	64	66	67	63	55	77	54
ABC (LV)														103
Corner (LV)								52	59	65	58	44	36	36
Hoover (LV)								50	56	61	53	41	37	38
Leeds (LV)								66	63	69	66	54	39	41
McAdory (LV)								72	132	131	114	45	39	41
N. Birmingham (LV)								112	104	99	88	76	99	69
Pinson (LV)								49	53	65	69	57	49	40
Providence (LV)								49	55	58	52	39	34	37
Shuttlesworth (LV)														87
Wylam (LV)								61	67	72	76	69	96	59

The current standard for the 24-hour PM_{10} NAAQS is 150 $\mu g/m^3$.

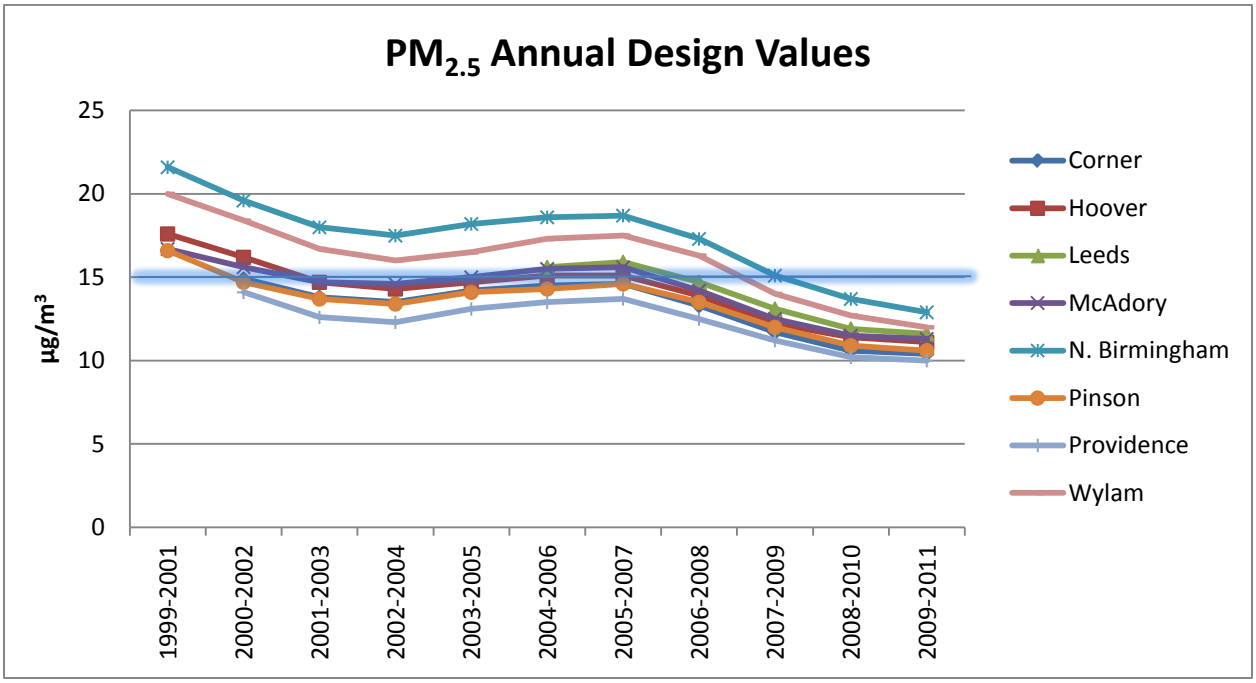
Red-shaded cells are violations of the NAAQS.

All values are measured in micrograms per cubic meter ($\mu g/m^3$).

Code for abbreviations: Continuous monitor (Cont); Manual monitor, High Volume Method (HV); Manual monitor, Low Volume Method (LV).

PM_{10} collected at ambient conditions (i.e., LV) and at Special Purpose Monitors (ABC and Shuttlesworth) are not used for compliance purposes.

Graph 5.5.5



- The highlighted blue line indicates the NAAQS, which is 15 µg/m^3.

Table 5.5.9

$PM_{2.5}$ Annual Average Values

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
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
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
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
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

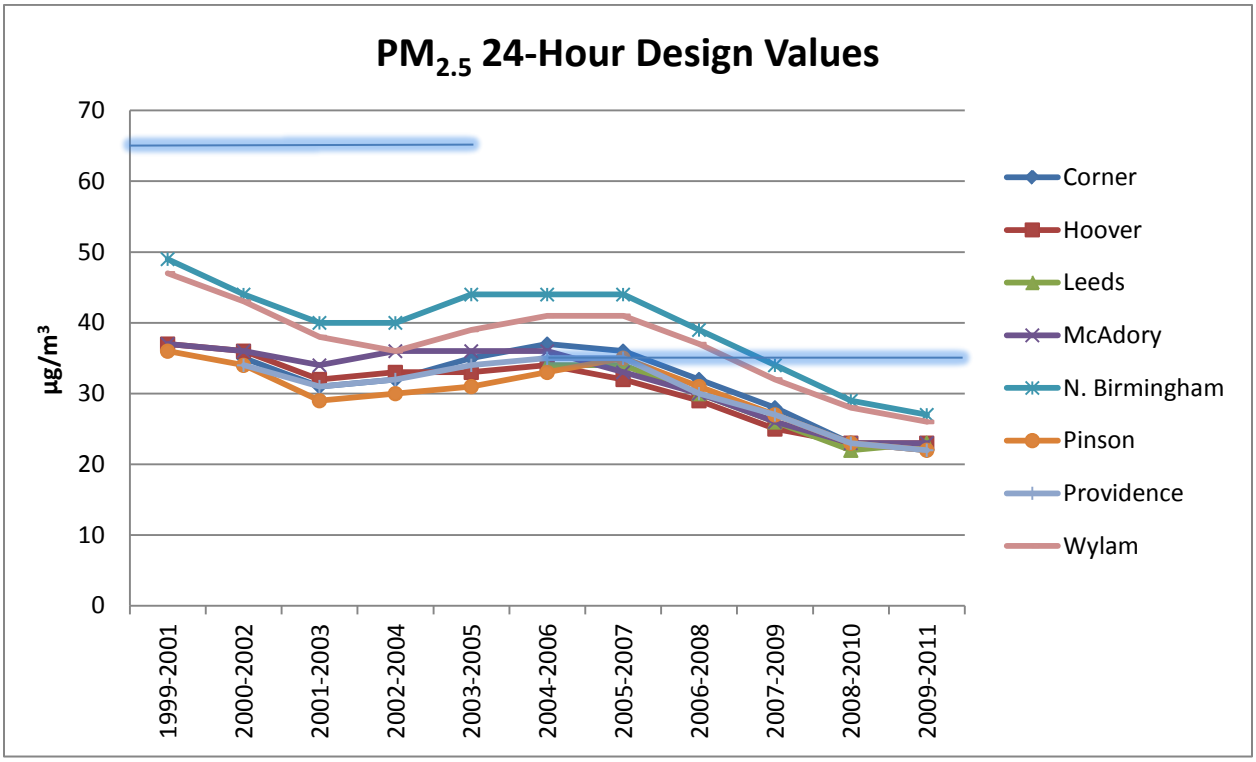
Table 5.5.10

$PM_{2.5}$ Annual Design Values

	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011
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
McAdory	16.7	15.6	14.7	14.6	15.0	15.5	15.6	14.2	12.5	11.5	11.3
N. Birmingham	21.6	19.6	18.0	17.5	18.2	18.6	18.7	17.3	15.1	13.7	12.9
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

The current standard for the annual $PM_{2.5}$ NAAQS is 15 µg/m^3.
Exceedances of the NAAQS are in red text and red-shaded cells are violations of the NAAQS.
All values are measured in micrograms per cubic meter (µg/m^3).

Graph 5.5.6



- The highlighted blue line indicates the NAAQS. EPA revised the level of the 24-hour $PM_{2.5}$ NAAQS from 65 µg/m^3 to 35 µg/m^3, effective December 18, 2006.

Table 5.5.11

$PM_{2.5}$ 24-Hour 98th Percentile Values

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
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
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
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
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

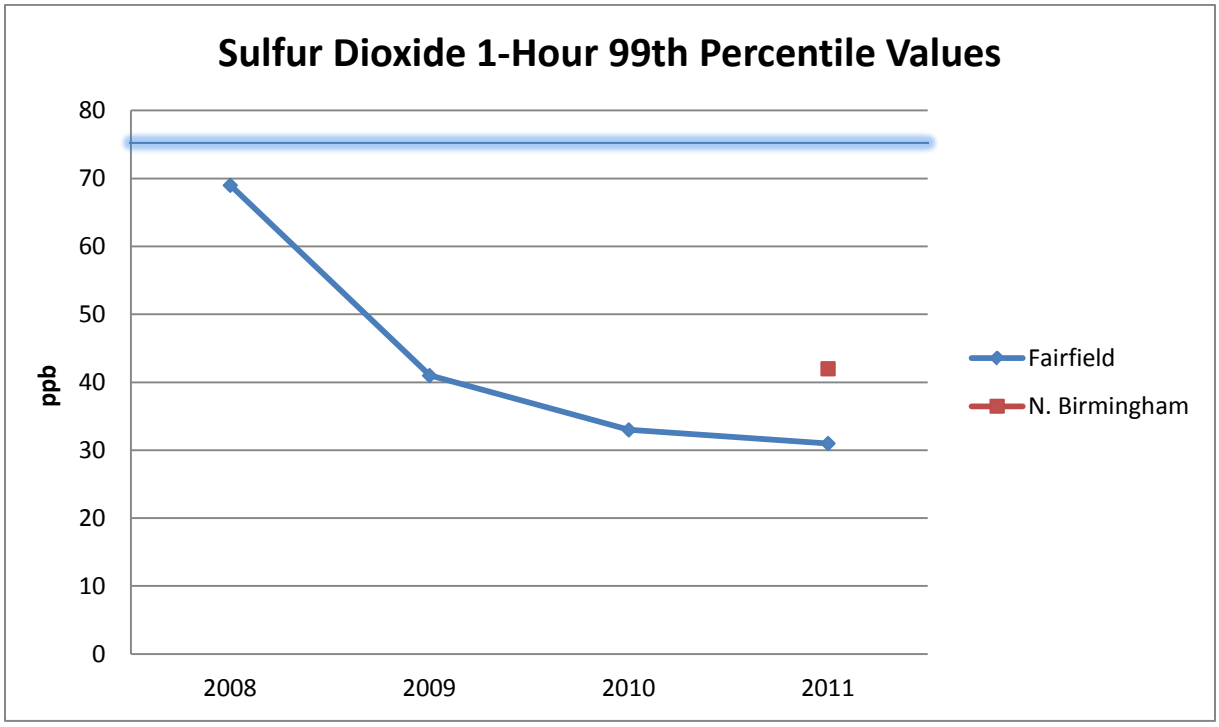
Table 5.5.12

$PM_{2.5}$ 24-Hour Design Values

	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011
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
McAdory	37	36	34	36	36	36	33	30	26	23	23
N. Birmingham	49	44	40	40	44	44	44	39	34	29	27
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

The current standard for the 24-hour $PM_{2.5}$ NAAQS is 35 µg/m^3.
Exceedances of the NAAQS are in red text and red-shaded cells are violations of the NAAQS.
All values are measured in micrograms per cubic meter (µg/m^3).

Graph 5.5.7



- The highlighted blue line indicates the NAAQS, which is 75 ppb.

Table 5.5.13
Sulfur Dioxide 1-Hour 99th Percentile Values

	2008	2009	2010	2011
Fairfield	69	41	33	31
N. Birmingham				42

Table 5.5.14
Sulfur Dioxide 1-Hour Design Values

	2008-2010	2009-2011
Fairfield	48	35
N. Birmingham		

The current standard for the 1-hour SO_2 NAAQS is 75 ppb.
Exceedances of the NAAQS are in red text and red-shaded cells are violations of the NAAQS.
All values are measured in parts per billion (ppb).

6.0 Exceedances and Violations of the National Ambient Air Quality Standards

6.1 Exceedances

An exceedance of an ambient standard is the occurrence of a pollutant concentration that is greater than the numerical value of the standard for a period of time equal to the averaging time specified by the standard (see Table 2.1). An excludable exceedance is one that occurred as a result of an unusual natural or human-made event such as a severe drought, wildfire, tornado, structural fire, or temporary construction project near a monitor. The question of whether or not an exceedance will be excluded arises in determining the attainment status of an area. It is not a question of whether or not the exceedance occurred, but, rather, of what it represents. An exceedance can be excluded only after consultation with the Alabama Department of Environmental Management and the Environmental Protection Agency (EPA). Historically, there have been three instances related to this issue:

(1) EPA granted exclusion of Jefferson County's ozone and particulate matter data for May 13, 14, 18, and 19 in 1998 because of Central-American forest fires which affected a large portion of the eastern United States.

(2) The Jefferson County Department of Health (JCDH) requested that EPA exclude late season exceedances of the 8-hour ozone and particulate matter (PM_{10} and $PM_{2.5}$) National Ambient Air Quality Standards (NAAQS) on October 23, 2000, and October 25, 2000. However, EPA failed to respond to both written requests and in-person requests. JCDH, therefore, included these data as valid.

(3) EPA granted exclusion of Jefferson County's $PM_{2.5}$ data for May 15 (except at Pinson), 22-23, 26-30 (except at Wylam on May 29), and June 1-2, in 2007 because of the southeast Georgia and northeast Florida wildfires that affected a large portion of the southeast United States.

6.2 Violations

A violation of an ambient standard, at a single monitor, is the occurrence of more exceedances of the numerical value of the standard than are allowed within a specified period of time.

6.2.1 Ozone

In 2005 the Jefferson and Shelby County area was designated "basic" nonattainment for the 8-hour ozone NAAQS. On November 16, 2005, ADEM submitted a request to the Environmental Protection Agency (EPA) to redesignate the Birmingham area to attainment of the 8-hour ozone NAAQS, based on acceptable data of 2003-2005 at all ozone monitors in the two-county nonattainment area (Jefferson and Shelby Counties). On May 12, 2006, the EPA redesignated

the area to attainment for the 8-hour ozone NAAQS (*Federal Register*, May 12, 2006, Vol. 71, No. 92, pp. 27631-27636). The EPA last revised the 8-hour ozone NAAQS to 0.075 ppm and it was effective May 27, 2008.

The Alabama Department of Environmental Management's (ADEM) Contingency Plan was triggered on June 30, 2006, because there was a three-year violation of the 8-hour ozone NAAQS at the Helena monitor for 2004-2006. Section 175A(d) of the Clean Air Act Amendments requires the inclusion of contingency provisions that would be implemented by the State to correct any future violation of the NAAQS in areas that had been redesignated as attainment of the NAAQS. *The most recent monitoring period, 2009-2011, indicates that there were no violations of the 8-hour ozone NAAQS in the Birmingham area.*

6.2.2 Particulate Matter

EPA designated Jefferson County, Alabama, nonattainment of the annual $PM_{2.5}$ NAAQS based on 2001-2003 data with an effective date of April 5, 2005. The Birmingham Area Particulate Study was initiated to address the attainment of the annual $PM_{2.5}$ NAAQS. In 2006 JCDH, in collaboration with other organizations (ADEM, EPA Region 4, Envair, and industry), began to analyze the particulate matter problem with special focus upon the Community Monitoring Zone (CMZ) and its two monitors (one at Wylam and one at North Birmingham). A final report (dated July 14, 2006), "Particulate Matter Sources in Birmingham, Alabama," was prepared by the Envair Company for ADEM and JCDH. This report was considered preliminary work for the State Implementation Plan (SIP) that began in 2007. The SIP, which provides information on how the Birmingham area will reach attainment status of the annual standard, was submitted to EPA in April 2009 and has yet to be acted upon by EPA through calendar year 2010. On May 2, 2011, ADEM submitted a request for EPA to redesignate the Birmingham area to attainment of the annual standard. The EPA proposed to approve the request on November 10, 2011. *The most recent monitoring period, 2009-2011, indicates that there were no violations of the annual $PM_{2.5}$ NAAQS in Jefferson County*.

EPA designated Jefferson County nonattainment of the 24-hour $PM_{2.5}$ NAAQS with an effective date of December 14, 2009. In March 2010, ADEM sent a request to EPA to redesignate the Birmingham area as attainment of the 24-hour $PM_{2.5}$ NAAQS since all monitors were in compliance with the NAAQS for the monitoring period of 2008-2010. EPA has yet to act upon the request through calendar year 2011. However, the EPA did approve a clean data determination, effective October 20, 2010. *The most recent monitoring period, 2009-2011, indicates that there were no violations of the 24-hour $PM_{2.5}$ NAAQS in Jefferson County*.

7.0 Compliance and Enforcement Activities

7.1 Industrial Facilities

Industrial air pollution sources are subject to compliance monitoring by Environmental Health Specialists (EHS) and Air Pollution Control Engineers (APCE). Synthetic Minor air pollution sources receive a Full Compliance Evaluation (FCE) by the assigned EHS or APCE at least once every five years. Major air pollution sources receive an FCE biennially by an engineer. An FCE includes a thorough review of relevant records and an onsite inspection of the facility. The APCE or EHS prepares a comprehensive inspection report that is stored in the facility file maintained by the Air Pollution Control Program (APCP). Emissions from regulated industrial sources are calculated annually. During 2011 the APCP performed 173 visible emission evaluations, conducted 56 inspections, investigated 324 complaints, and issued 3 Notices of Violation.

7.2 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 2011 the APCP issued 21 open burning authorizations.

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 2011 the APCP investigated 198 open burning complaints and wrote 57 Notices of Violation.

7.3 Other Programs

7.3.1 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. Regulatory activities for this segment of the gasoline marketing industry are performed by the Field Services Section staff. During 2011 the APCP issued 691 Air Stickers.

7.3.2 Asbestos Abatement

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 2011 there were 170 regulated asbestos abatement or demolition notifications received and reviewed, of which 102 were subject to Federal asbestos standards, 74 inspections conducted, 8 complaints investigated, and 2 Notices of Violation issued.

7.3.3 Indoor Air Quality

The APCP acts as an information and referral resource regarding indoor air quality problems. Indoor air quality complaints in public buildings 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 2011 the ARPD investigated 1 indoor air complaint.

7.3.4 Dry Cleaners

During 2011 there were 24 inspections of dry cleaning facilities in Jefferson County that are subject to National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR 63, Subpart M).

8.0 Air Pollution 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 2011 air permits were issued for 95 new, renewed, or modified sources. The Air Pollution Control Program continues to issue Title V Major Source Operating Permits under Chapter 18 of *The Jefferson County Board of Health Air Pollution Control Rules and Regulations*. Qualified sources may apply for and receive a Synthetic Minor Operating Permit under Chapter 17 of the Regulations. Minor sources receive air permits under Chapter 2 of the Regulations.

The tables below are a summary of source permitting for 2011.

Table 8.1
Number of Permits Issued in 2011 by Source Type

Source Type	Number of Permits Issued
Industrial/Commercial	34
Gasoline Tanker Trucks	61
Total	**95**

Table 8.2
Number of Permits Issued in 2011 by Types of Permit

Type of Permit	Number of Permits Issued
Title V Major	7
Synthetic Minor	12
Minor	15
Total	**34**

Jefferson County Department of Health
Environmental Health Services
Air and Radiation Protection Division
1400 Sixth Avenue South
Birmingham, Alabama 35233
www.jcdh.org