

Mississippi Department of Environmental Quality

2005

Air Quality Data Summary



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Introduction

Under the Clean Air Act, EPA establishes primary air quality standards to protect public health, including the health of “sensitive populations such as people with asthma, children, and older adults”. EPA also sets secondary standards to protect public welfare. This includes protecting ecosystems, including plants and animals, from harm, as well as protecting against decreased visibility and damage to crops, vegetation, and buildings.

EPA has set national ambient air quality standards (NAAQS) for six principal air pollutants (also called criteria pollutants): Ground-Level Ozone (O₃), Particulate Matter (PM), Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), Carbon Monoxide (CO), and Lead (Pb). The Mississippi Department of Environmental Quality (MDEQ) monitors all of these pollutants except lead. Lead has been monitored in the past. However, because the concentrations reported were so much lower than the air quality standard and because lead is no longer used in automobile fuels, it was determined by EPA and MDEQ that it no longer needed to be monitored in Mississippi. MDEQ also monitors hazardous air pollutants. However, because there are no NAAQS for these pollutants, the monitoring data is not shown in this report.

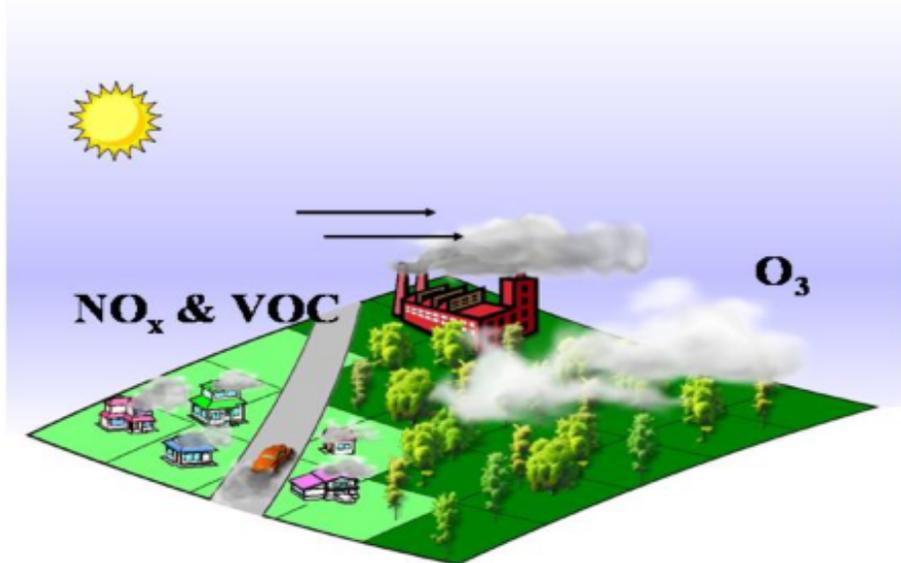
Hurricane Katrina caused catastrophic damage to our Hancock County monitoring sites due to the storm surge and high winds. We also had damage to our particulate matter monitoring equipment at the Meridian site due to wind damage. Our other monitoring sites along the coast, in addition to our other monitoring sites located in central and south Mississippi, sustained little or no damage. Therefore, when power became available in those areas, the various monitoring sites were restarted. Except for Hancock County, all of the MDEQ monitoring sites were operating within a month after the hurricane hit.

This report looks at the reported levels of the criteria pollutants in 2005 at various monitoring sites located in Mississippi. It compares these levels to the NAAQS to determine how the state is doing in meeting these standards. As you will see, Mississippi is meeting all of the NAAQS and has recently been designated attainment with the fine particulate matter (PM_{2.5}) standards. In fact, Mississippi is one of only three states east of the Mississippi River (Florida and Vermont) that is meeting all of the standards.

Ground-Level Ozone (O₃)

Ozone is a gas composed of three atoms of oxygen. Ozone occurs both in the Earth's upper atmosphere and at ground level. Ozone can be good or bad, depending on where it is found. It occurs naturally in the stratosphere approximately 6 to 30 miles above the Earth's surface where it forms a protective layer that shields us from the sun's harmful ultraviolet rays. In the Earth's lower atmosphere, near ground level, ozone occurs naturally in lower amounts and additional ozone is formed when nitrogen oxides (NO_x) and volatile organic compounds (VOCs) emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources react chemically in the presence of sunlight. Because this reaction takes time to occur, ozone is usually formed downwind of emission sources.

Ozone is Usually Formed Downwind of Emission Sources



Ozone Standards

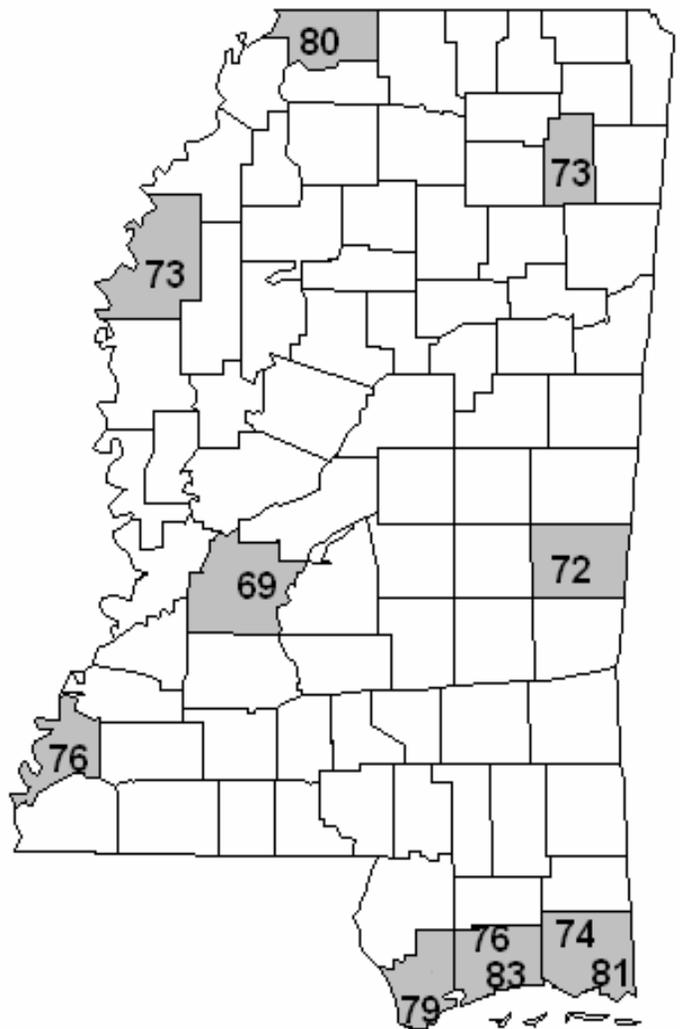
There are two ozone standards: (1) 8-hour average and (2) 1-hour average. The 1-hour average ozone standard was revoked by EPA on June 30, 2005. MDEQ monitors ozone continuously from March 1 through October 31 each year at the monitoring sites listed below.

Primary and Secondary 8-Hour Ozone Standard

The 8-hour standard is met when the 3-year average of the annual fourth highest daily maximum 8-hour average concentration (also known as the design value) is less than 0.08 parts per million (ppm) or 84 parts per billion (ppb).

2005 8-Hour Ozone Design Values Standard – 84 ppb

County	City	2005 Design Values (ppb)
Adams County	Natchez	76
Bolivar County	Cleveland	73
DeSoto County	Hernando	80
Hancock County	Port Bienville I.P.	79
Harrison County	Gulfport	83
Harrison County	Saucier	76
Hinds County	Jackson	69
Jackson County	Pascagoula	81
Jackson County	Vanceleave	74
Lauderdale County	Meridian	72
Lee County	Tupelo	73

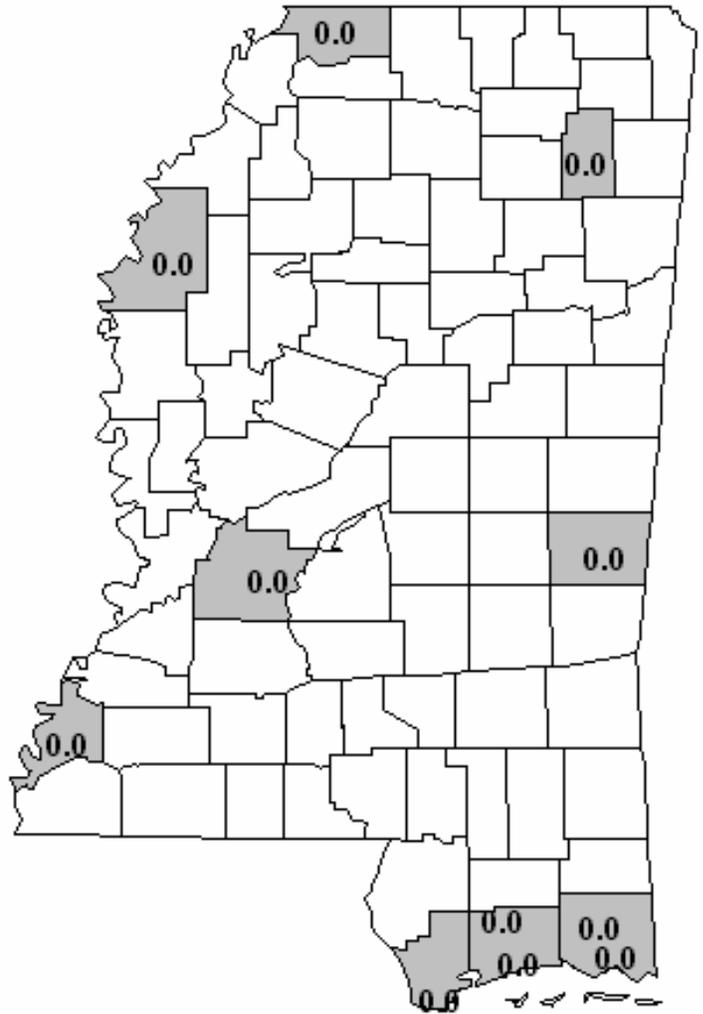


Primary and Secondary 1-Hour Ozone Standard

The 1-hour standard is met when the expected number of days per calendar year over a 3-year period with maximum hourly concentrations above 0.12 parts per million (ppm) or 124 parts per billion (ppb) is equal to or less than 1.

2005 Expected Number of Exceedance Days Standard – 1

County	City	2005 Expected No. of Exceedances
Adams County	Natchez	0.0
Bolivar County	Cleveland	0.0
DeSoto County	Hernando	0.0
Hancock County	Port Bienville I.P.	0.0
Hancock County	Stennis Airport	0.0
Harrison County	Gulfport	0.0
Harrison County	Saucier	0.0
Hinds County	Jackson	0.0
Jackson County	Pascagoula	0.0
Jackson County	Vancleave	0.0
Lauderdale County	Meridian	0.0
Lee County	Tupelo	0.0
Madison County	State Hwy. 22	0.0



Particulate Matter

In general, particulate matter consists of a mixture of larger materials, called “coarse particles”, and smaller particles, called “fine particles”. Coarse particles have diameters ranging from 2.5 micrometers (μm) to more than 40 μm , while fine particles, also known as $\text{PM}_{2.5}$, include particles with diameters equal to or smaller than 2.5 μm . MDEQ also monitors PM_{10} , which refers to particles less than or equal to 10 μm in diameter.

These tiny particles come in many shapes and sizes and can be made up of hundreds of different chemicals. Some particles are emitted directly from a source, while others form in complicated chemical reactions in the atmosphere.

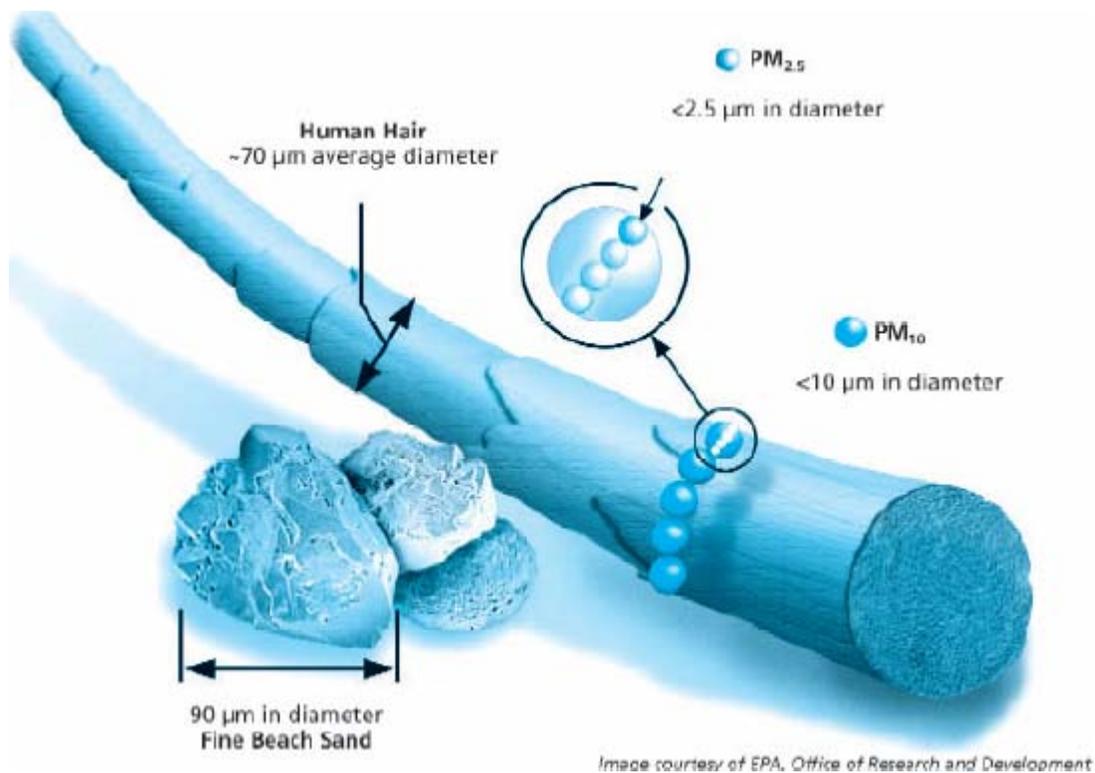


Image courtesy of EPA, Office of Research and Development

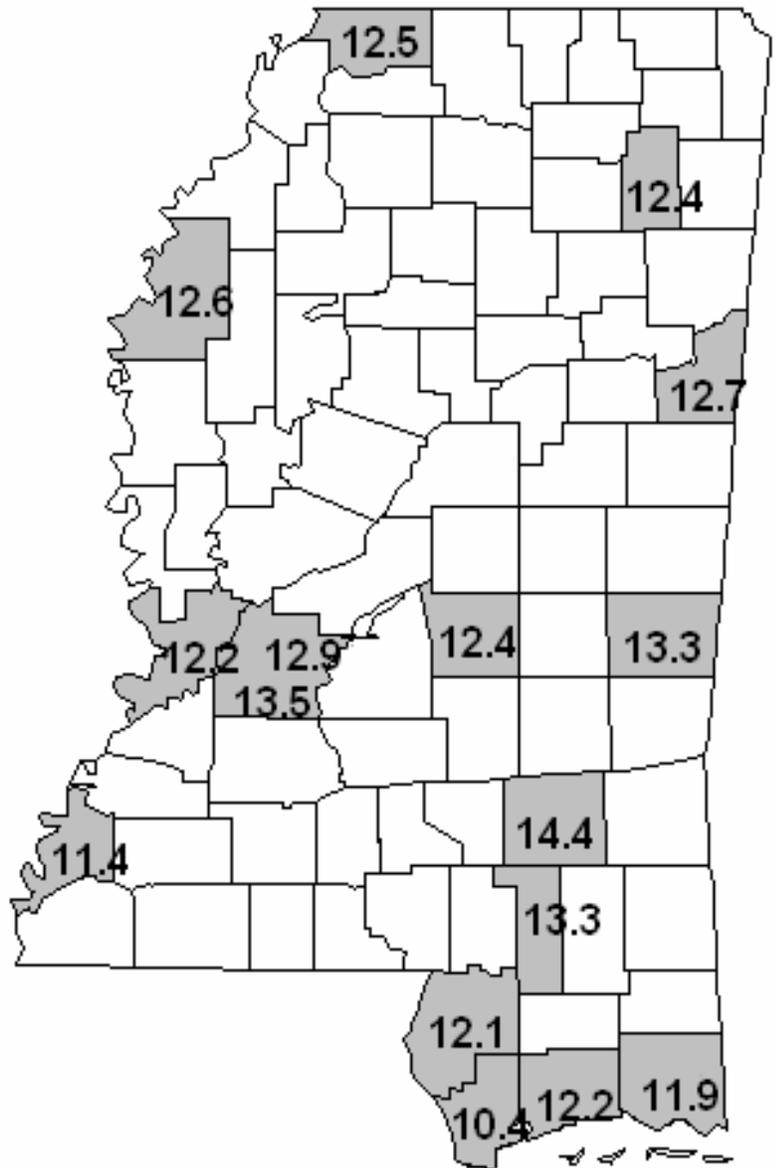
PM_{2.5} Standards

There are two PM_{2.5} standards: (1) Annual Average and (2) 24-Hour Average. MDEQ monitors PM_{2.5} every 3rd day at the monitoring sites listed below.

Primary and Secondary Annual Average Standard – 15.0 µg/m³

The annual average standard is met when the annual average does not exceed 15.0 micrograms per cubic meter (µg/m³).

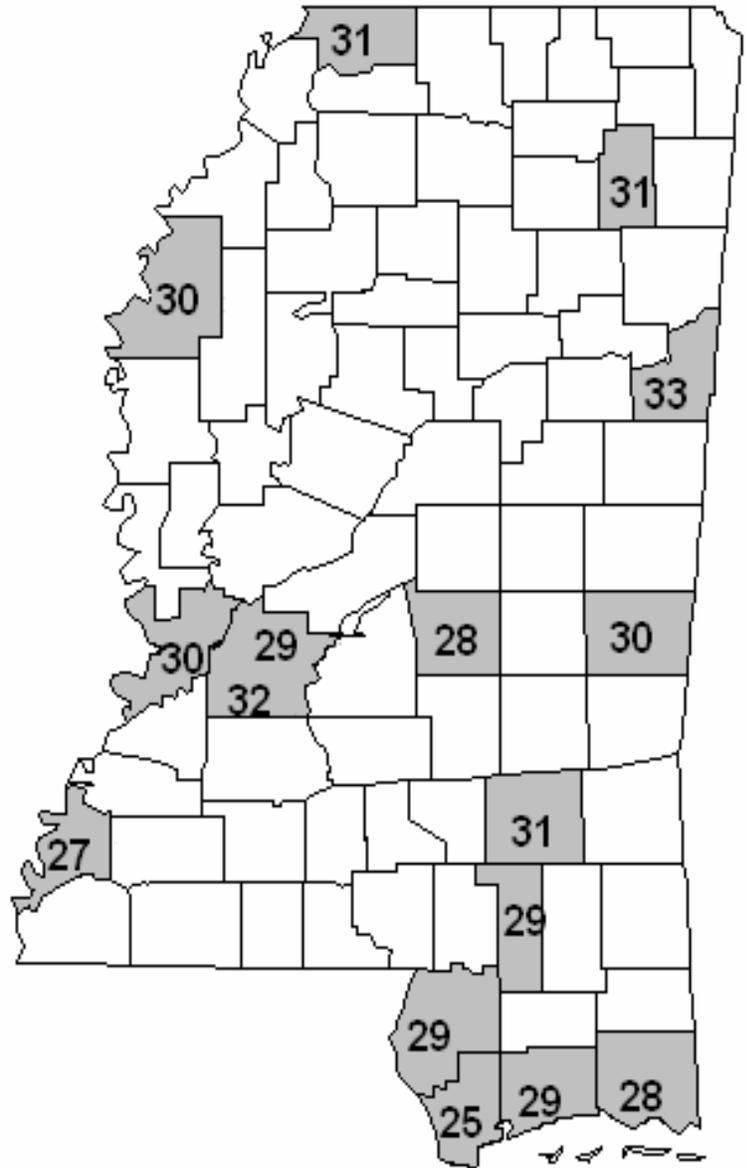
County	City	2005 Annual Average (µg/m ³)
Adams County	Natchez	11.4
Bolivar County	Cleveland	12.6
DeSoto County	Hernando	12.5
Forrest County	Hattiesburg	13.3
Hancock County	Port Bienville I.P.	10.4
Harrison County	Gulfport	12.2
Hinds County	Northeast Jackson	12.9
Hinds County	Downtown Jackson	13.5
Jackson County	Pascagoula	11.9
Jones County	Laurel	14.4
Lauderdale County	Meridian	13.3
Lee County	Tupelo	12.4
Lowndes County	Columbus	12.7
Pearl River County	Picayune	12.1
Scott County	Roosevelt S.P.	12.4
Warren County	Vicksburg	12.2



**Primary and Secondary 24-Hour Average
Standard (98th Percentile) – 65 µg/m³**

The 24-hour average standard is met when the 98th percentile of the 24-hour averages does not exceed 65 micrograms per cubic meter (µg/m³).

County	City	2005 24-Hour Average – 98th Percentile (µg/m³)
Adams County	Natchez	27
Bolivar County	Cleveland	30
DeSoto County	Hernando	31
Forrest County	Hattiesburg	29
Hancock County	Port Bienville I.P.	25
Harrison County	Gulfport	29
Hinds County	Northeast Jackson	29
Hinds County	Downtown Jackson	32
Jackson County	Pascagoula	28
Jones County	Laurel	31
Lauderdale County	Meridian	30
Lee County	Tupelo	31
Lowndes County	Columbus	33
Pearl River County	Picayune	29
Scott County	Roosevelt S.P.	28
Warren County	Vicksburg	30



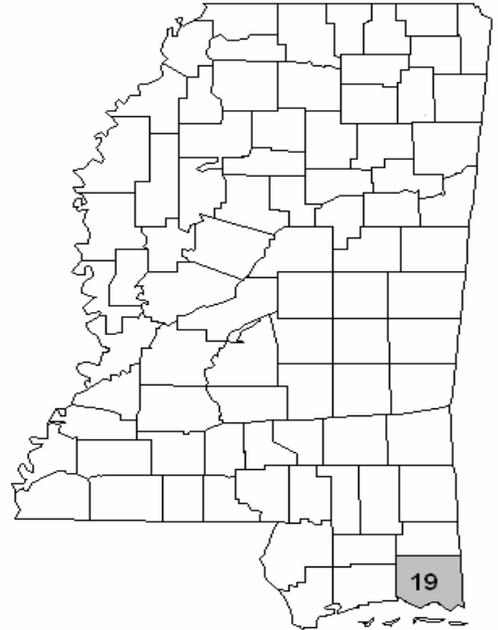
PM₁₀ Standards

There are two PM₁₀ standards: (1) Annual Average and (2) 24-Hour Average. MDEQ monitors PM₁₀ every 6th day at the monitoring site listed below.

Primary and Secondary Annual Average Standard – 50 µg/m³

The annual average standard is met when the annual average does not exceed 50 micrograms per cubic meter (µg/m³).

County	City	2005 Annual Average (µg/m ³)
Jackson County	Pascagoula	19



Primary and Secondary 24-Hour Average Standard (99th Percentile) – 150 µg/m³

The 24-hour average standard is met when the 98th percentile of the 24-hour averages does not exceed 150 micrograms per cubic meter (µg/m³).

County	City	2005 Annual Average (µg/m ³)
Jackson County	Pascagoula	40



Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56% of all CO emissions nationwide. Other non-road engines and vehicles (such as construction equipment and boats) contribute about 22% of all CO emissions nationwide. Other sources of CO emissions include industrial processes, residential wood burning, and natural sources such as forest fires.

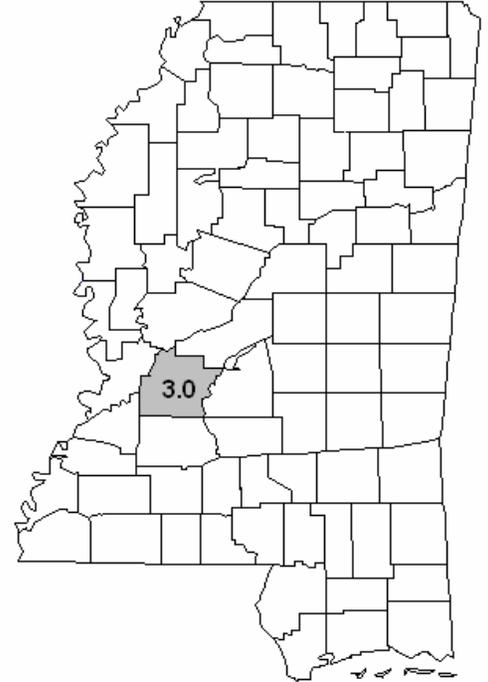
Carbon Monoxide Standards

There are two carbon monoxide standards: (1) 8-Hour Average and (2) 1-Hour Standard. MDEQ monitors carbon monoxide continuously year-round at the monitoring site listed below.

Primary and Secondary 8-Hour Average Standard – 9 ppm

The 8-hour average standard is met if the 8-hour average of 9 parts per million (ppm) is not exceeded more than once per year over a 2-year period.

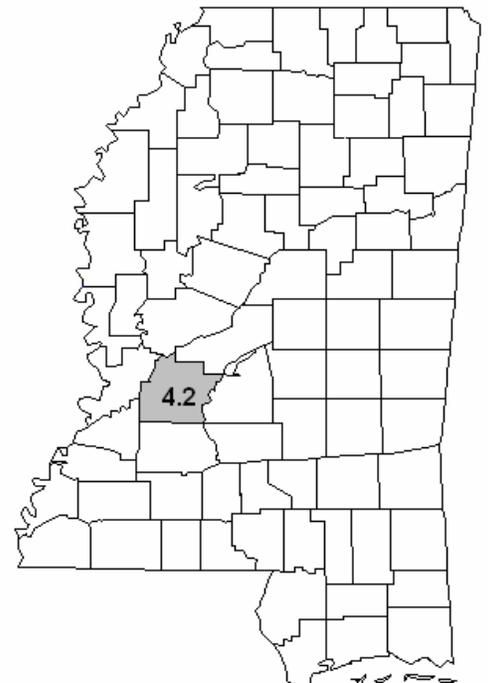
County	City	2004-2005 2nd Maximum 8-Hour Average (ppm)	2004 No. of Exceedances	2005 No. of Exceedances
Hinds County	Jackson	3.0	0	0



Primary and Secondary 1-Hour Average Standard – 35 ppm

The 1-hour average standard is met if the 1-hour average of 35 parts per million (ppm) is not exceeded more than once per year over a 2-year period.

County	City	2004-2005 2nd Maximum 8-Hour Average (ppm)	2004 No. of Exceedances	2005 No. of Exceedances
Hinds County	Jackson	4.2	0	0



Nitrogen Dioxide

Nitrogen dioxide can often be seen as a reddish-brown layer. Nitrogen dioxide forms when fuel is burned at high temperatures, as in a combustion process. The primary manmade sources of nitrogen dioxide are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. It can also be formed naturally.

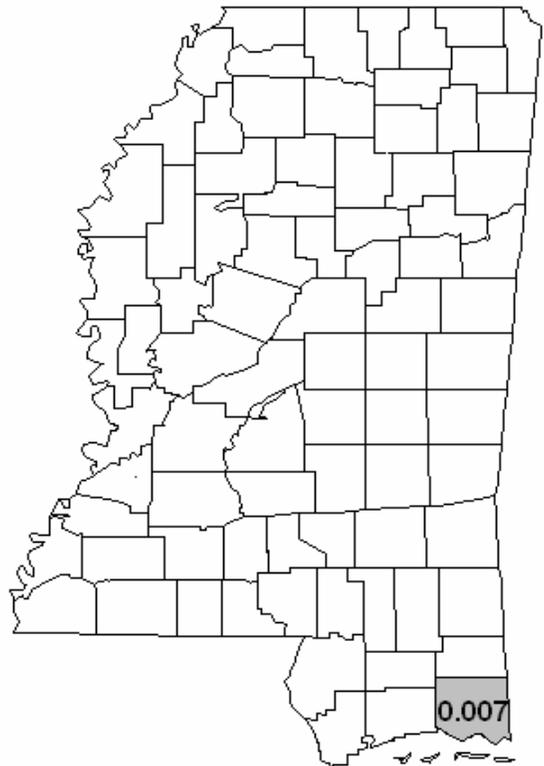
Nitrogen Dioxide Standard

There is one nitrogen dioxide standard – an annual average. MDEQ monitors nitrogen dioxide continuously year-round at the monitoring site listed below.

Primary and Secondary Annual Average Standard – 0.053 ppm

The nitrogen dioxide standard is an annual average of 0.053 parts per million (ppm).

County	City	2005 Annual Average (ppm)
Jackson County	Pascagoula	0.007



Sulfur Dioxide

Sulfur dioxide, or SO₂, belongs to the family of sulfur oxide gases (SO_x). These gases dissolve easily in water. Sulfur is prevalent in all raw materials, including crude oil, coal, and ore that contains common metals like aluminum, copper, zinc, lead, and iron. SO_x gases are formed when fuel containing sulfur, such as coal and oil is burned, and when gasoline is extracted from oil, or metals extracted from ore. SO₂ dissolves in water vapor to form acid, and interacts with other gases and particles in the air to form sulfates and other products that can be harmful to people and their environment.

Over 65% of SO₂ released to the air comes from electric utilities, especially those that burn coal. Other sources of SO₂ are industrial facilities that derive their products from raw materials like metallic ore, coal, and crude oil, or that burn coal or oil to produce process heat. Examples are petroleum refineries, cement manufacturing, and metal processing facilities.

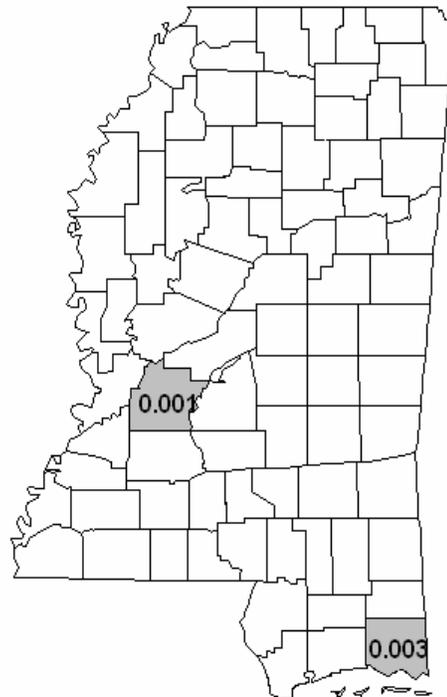
Sulfur Dioxide Standards

There are three sulfur dioxide standards: (1) an annual average, (2) a maximum 24-hour concentration, and (3) a maximum 3-hour concentration. MDEQ monitors sulfur dioxide continuously year-round at the monitoring sites listed below.

Primary and Secondary Annual Average Standard – 0.030 ppm

The annual average standard is met if the annual average does not exceed 0.030 parts per million (ppm).

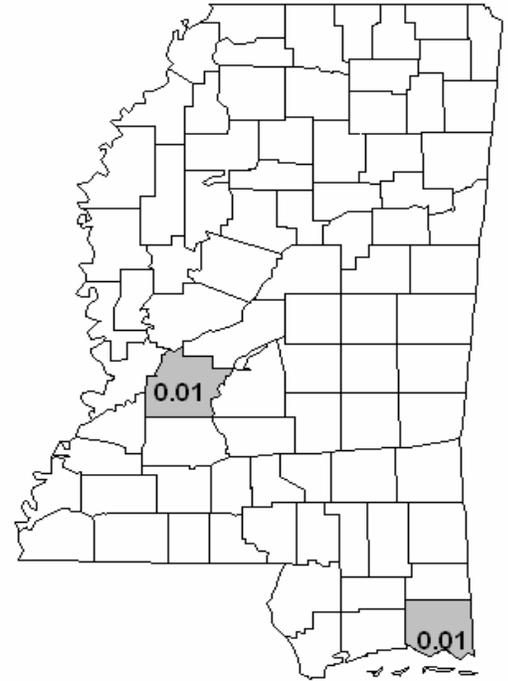
County	City	2005 Annual Average (ppm)
Hinds County	Jackson	0.001
Jackson County	Pascagoula	0.003



Primary and Secondary 24-Hour Standard – 0.14 ppm

The 24-hour standard is met if the maximum 24-hour average concentration of 0.14 parts per million (ppm) is not exceeded more than once per calendar year.

County	City	2005 2nd Maximum 24-Hour Average (ppm)	2005 Number of Exceedances
Hinds County	Jackson	0.01	0
Jackson County	Pascagoula	0.01	0



Secondary 3-Hour Average Standard – 0.5 ppm

The 3-hour standard is met if the maximum 3-hour average concentration of 0.5 parts per million (ppm) is not exceeded more than once per calendar year.

County	City	2005 2nd Maximum 3-Hour Average (ppm)	2005 Number of Exceedances
Hinds County	Jackson	0.0	0
Jackson County	Pascagoula	0.0	0

