State of Ohio
Enviromental Protection Agency

Division of Air Pollution Control
2004 Ohio Air Quality Report

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STATE OF OHIO

AIR QUALITY

CALENDAR YEAR 2004

PREPARED BY

AIR QUALITY AND ANALYSIS UNIT
DIVISION OF AIR POLLUTION CONTROL
OHIO ENVIRONMENTAL PROTECTION AGENCY

EXECUTIVE SUMMARY

A. General Review

2004 air quality data are summarized for the seven criteria pollutants: particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$); sulfur dioxide (SO_2); nitrogen dioxide (NO_2); carbon monoxide (CO); ozone (O_3); and lead (Pb). Data are also summarized for total suspended particulates (TSP).

A section discussing Toxics monitoring projects conducted in 2004 is included.

Trend studies are presented for three criteria pollutants: SO_2, CO, and O_3.

Precision and accuracy data gathered through the quality assurance programs are also included.

B. Discussion of Violations

Violations of multiple year, annual and short term air quality standards by county and pollutant are shown in Figures 3 through 17 and in Table 3.

C. Conclusions

1. There are now 61 PM_{10} and 48 $PM_{2.5}$ monitoring sites with 78 monitors, continuous, intermittent and speciation. In 1987 there were 30 PM_{10} and no $PM_{2.5}$ monitoring sites. Nearly all monitoring for particulate matter is conducted using PM_{10} and $PM_{2.5}$ samplers. Monitoring for TSP has essentially been discontinued. During 2004, 10 TSP sites reported data, down from 217 sites in 1987. Of those 10 sites all are monitoring for lead or other metals and also report TSP data.

2. Sulfur dioxide levels in urban areas have dropped an average of 12.1% in the last ten years. There were no violations of SO_2 air quality standards in 2004.

3. No overall trend is indicated for the past several

years for carbon monoxide. Figure 20 shows individual urban area trends.

4. The relatively high lead concentrations sampled in Fulton and Logan Counties are the result of industrial source monitoring. Monitors are located near lead processing sources in those counties to determine compliance with the standard.

5. All areas except Geauga county, which had 5 exceedances, are in attainment of the one hour ozone standard. Six counties are in attainment of the eight hour standard. There are 31 counties with monitored non-attainment based on data for 2002 through 2004.

6. No violations of air quality standards for nitrogen dioxide were recorded in 2004.

7. No air pollution alerts were declared in 2004.

D. The Ohio Network

In 2004 there were a total of 246 monitors collecting data. There were 18 carbon monoxide, 36 sulfur dioxide, 4 nitrogen dioxide, 49 ozone, 62 10 micron particulate (PM_{10}), 49 2.5 micron particulate ($PM_{2.5}$) and 18 lead sites.

The only states with comparable or more monitoring sites are California with 682, Texas with 263 and Pennsylvania with 259 sites.

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I. INTRODUCTION

A. General

A variety of substances are generated and released into the atmosphere by a multitude of manmade sources as well as natural sources. Those substances that may affect public health and welfare are regarded as "air pollutants". The US EPA has established National Ambient Air Quality Standards (NAAQS) to safeguard the public health and welfare from selected air pollutants. The pollutants for which standards have been promulgated are: Sulfur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO), Ozone (O_3), Lead (Pb), Particulate Matter $\leq$10 microns (PM_{10}) and Particulate Matter $\leq$2.5 microns ($PM_{2.5}$). The standards are ambient concentrations that are expressed in micrograms per cubic meter ($\mu g/m^3$) or parts per million (ppm) per duration (1 hr., 3 hr., etc.) with a restriction (not to be exceeded or not to be exceeded more than once per year, etc.). Table 1 shows the NAAQS in effect during 2004.

In some cases, standards are separated into two parts: primary and secondary. The primary standard sets the level of air pollution above which human health is endangered. The secondary standard sets the level above which the welfare of citizens is endangered due to air pollution damage to crops, animals, vegetation and materials.

This report contains a summary of measured high concentrations of the pollutants, selected statistics, including quality assurance of the data, and trend analyses for various areas in Ohio. A brief description of the pollutants, the sources from which the pollutants originate and the adverse health effects of the pollutants and the monitoring methods, precede the tabulated pollutant concentrations.

Ambient air is generally defined as air that is accessible to the general public. The air that is within (over) the fenced in or guarded areas of facility property is not ambient.

Data for this report were collected by the Ohio EPA, local air pollution control agencies and private industry. An indication of the accuracy of data from each reporting organization is located in a separate section on Quality Assurance.

B. Development of the Ohio Air Monitoring System

Society's concern about the pollution of air brought about the first national law, the Clean Air Act of July 14, 1955. This Act and its subsequent amendments first encouraged, then authorized grants to help finance the establishment of state and local air pollution control programs.

In 1963, aided in part by this federal program, the Ohio Department of Health established the Ohio Air Sampling Network (OASN) with 21 sites. The OASN was designed to measure the levels of "Total Suspended Particulate" (TSP) throughout the state.

The Clean Air Act Amendments of 1970 mandated the promulgation of the NAAQS and delegated authority to develop plans for their attainment to the individual states. To oversee the provisions of this Act, the US EPA was formed in February of 1972 by Presidential Order.

After proposing standards for the criteria air pollutants, the US EPA worked with Ohio to set up the State Implementation Plan (SIP) which included a detailed air monitoring program for the original six criteria pollutants: TSP, sulfur dioxide, carbon monoxide, nitrogen dioxide, lead and ozone. The SIP is a state's master plan for achievement of the NAAQS. The SIP contains detailed provisions for reducing concentrations of each of the regulated pollutants, where necessary, to achieve and maintain the NAAQS.

In October 1972, the Ohio EPA was established by State law (Ohio Revised Code Section 3745.01) and the air monitoring program was significantly enlarged. Many local air pollution control agencies and private industries participated in this program. See Figure 1 for the location of the five districts and the nine local air agencies currently supporting the air program.

In 1980, the US EPA and the Ohio EPA established and designated certain portions of Ohio's network to be a part of the National Air Monitoring Station (NAMS) network, created for the purpose of tracking national trends. In 1980, the US EPA also required that all sites produce data of adequate quality to meet monitoring objectives and adequate quantity to meet statistical and trend requirements. All NAMS sites were to meet these requirements beginning with 1981 data, and all other sites beginning with 1983 data.

On March 20, 1984, the US EPA proposed a standard for inhaleable particles of ten micrometers in diameter and smaller. To enable the states to begin collecting data without excessive delay the US EPA provided the states with monitors in late 1984. Ohio's field offices began collecting PM_{10} data during 1985 and a network of sites were primarily located in urban areas. The PM_{10} standard was promulgated on July 1, 1987 and became effective on July 31, 1987. The US EPA promulgated new particulate monitoring regulations and National Ambient Air Quality Standards on July 18, 1997. The new particulate standard is for particulate matter less than or equal to 2.5 micrometers in diameter. The first monitors began to collect data in January 1999. Monitors to determine the chemical makeup of the particulate were added in the year 2000 and in 2001 hourly reading monitors were added.

The one hour ozone standard was supplemented on July 18, 1997 with an eight hour standard. The eight hour standard is a three year average of the fourth highest daily eight hour averages. The level of the standard is 0.8 ppm which is not to be exceeded.

In 2001 The United Stated Supreme Court found USEPA's previously proposed implementation plan for ozone unlawful and further held that, in the setting of a standard for ozone pursuant to Section 109 of the Clean Air Act USEPA must set air quality standards at the level that is "requisite"-no higher or lower than is necessary-to protect the public health with an adequate margin of safety. The Supreme Court then sent the case back to the D.C. Circuit Court of Appeals to review USEPA's subsequent actions. On March 26, 2002, that court upheld USEPA's revision of the ozone NAAQS, which had been published in the Federal Register by USEPA as a proposal on November 14, 2001.

During 2004, more than 220 ambient air monitors were operated in Ohio. Table 2 enumerates the number and type of monitors that were operated in the various Air Quality Control Regions.

The goals of the ambient monitoring program are to determine compliance with the ambient air quality standards, to provide real-time monitoring of air pollution episodes, to provide data for trend analyses, regulation evaluation and planning, and to provide information to the public on a daily basis concerning the quality of the air in high population areas, near major emission sources and in rural areas.

C. Remote Ambient Data Systems

The Remote Ambient-Air Data System (RADS) is a system for the automatic acquisition and transmission of data from a remote monitor to a central computer. Each continuous monitoring site operated by Ohio EPA's district offices is furnished with a data logger that is polled automatically once a day by the central computer in Columbus.

A major benefit of RADS is that the data can now be handled more quickly with fewer chances of error. Formerly the data was manually read from recorder strip charts, handwritten on a computer input form, keyed into the computer and then made available for retrieval. This process took three to four weeks.

The data in the RADS computer is available for review by the district and central office staff on a daily basis. The individual sites can also be contacted through the data logger for instantaneous data and interrogated further by remote testing of zero-span for any parameter. This is particularly valuable when pollutant levels are, or may become, elevated, as during an air stagnation episode.

RADS was installed during the fall of 1985 and went into operation on January 1, 1986. Local air agencies are also automating their continuous monitors and Ohio EPA has expanded RADS to include the automation of the local air agencies' network. Industrial networks will also be added.

D. Data Availability on the Internet

For the past several years Ohio EPA has provided ozone data updates several times a day to the US EPA for a public outreach web site where current data and data forecasts are displayed in the form of tables and maps. This web site can be viewed at: www.epa.gov/airnow/where/. From this site different states can be chosen to view forecasts of ozone levels and to link to animated ozone concentration maps. Data from $PM_{2.5}$ continuous sites were added during 2003.

Historical ambient air quality data can also be found at: www.epa.gov/air/data/. This site is a gateway to maps, reports and user selected data that reside in the US EPA's Air Quality System (AQS) database.

E. Designation of Air Quality Control Regions

The fact that air pollution does not respect state boundaries was recognized in early control efforts. To effectively deal with pollution and attain the NAAQS, US EPA, with advice from local governments and the public, divided the nation into areas called Air Quality Control Regions (AQCR's). Boundaries for each region were set by consideration of air pollution levels, population density, geography, and common meteorological conditions. While AQCR's may consist of parts of more than one state, each state has the authority to implement air quality standards only in its portion of the region. Portions of Ohio are included in a total of fourteen different AQCR's, each labeled numerically and by geographical description. Figure 2 illustrates the boundaries of Ohio's AQCR's.

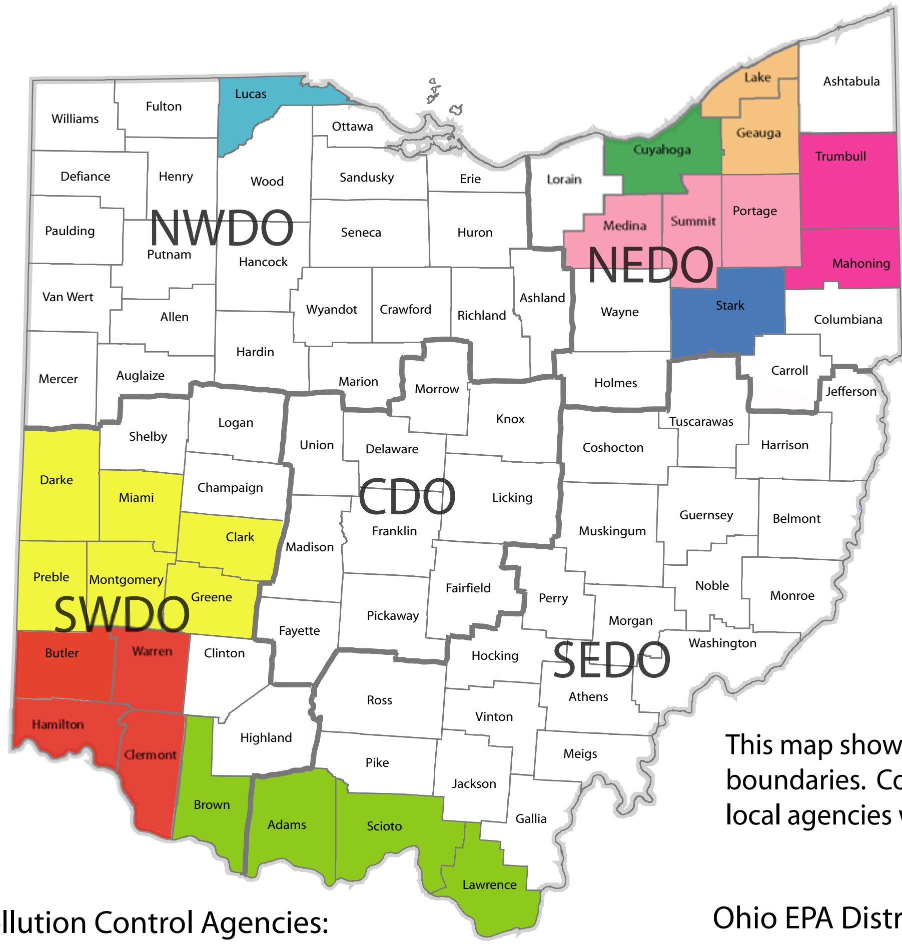
TABLE 1
US EPA & OHIO EPA AMBIENT AIR QUALITY STANDARDS
NATIONAL AMBIENT AIR QUALITY STANDARDS

			MAXIMUM ALLOWABLE CONCENTRATION	
POLLUTANT	DURATION	RESTRICTION	PRIMARY	SECONDARY
$PM_{2.5}$	Annual arithmetic mean	Not to be exceeded Three year average	15 µg/m^3	15 µg/m^3
	24-Hour concentration	Not to be exceeded Three year average of 98th percentile	65 µg/m^3	65 µg/m^3
PM_{10}	Annual arithmetic mean	Not to be exceeded Average over three years	50 µg/m^3	50 µg/m^3
	24-Hr concentration	The 99th percentile value average over three years	150 µg/m^3	150 µg/m^3
SULFUR DIOXIDE	Annual Mean	Not to be exceeded	0.03 ppm (80 µg/m^3)	
	24-Hr mean concentration	Not to be exceeded more than once per year	0.14 ppm (365 µg/m^3)	
	3-Hr mean concentration	Not to be exceeded more than once per year		0.5 ppm (1300 µg/m^3)
CARBON MONOXIDE	8-Hr mean concentration	Not to be exceeded more than once per year	9 ppm (10 mg/m^3)	
	1-Hr concentration	Not to be exceeded more than once per year	35 ppm (40 mg/m^3)	
OZONE	8-Hr concentration	Each year's fourth high averaged over three years Not to be exceeded	0.08 ppm	0.08 ppm
	1-Hr concentration	Not to be exceeded more than three times in three years	0.12 ppm (244 µg/m^3)	0.12 ppm (244 µg/m^3)
NITROGEN DIOXIDE	Annual mean	Not to be exceeded	0.053 ppm (100 µg/m^3)	
LEAD	3-Month mean concentration	Not to be exceeded	1.5 µg/m^3	

Notes:
Primary standards are established for the protection of public health
Secondary standards are established for the protection of public welfare

µg/m^3 = micrograms per cubic meter
ppm = parts per million
mg/m^3 = milligrams per cubic meter

Figure 1



This map shows jurisdictional boundaries. Colored areas represent local agencies within Ohio EPA districts

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6/01/05

Figure 2

Air Quality Control Regions in Ohio

TABLE 2
AMBIENT AIR MONITORING SITES IN OHIO (2004)

AIR QUALITY CONTROL REGION	$PM_{2.5}$	PM_{10}	LEAD	SULFUR DIOXIDE	OXIDES OF NITROGEN	CARBON MONOXIDE	OZONE	TOTAL
079 CINCINNATI	11	5	1	4	2	2	7	33
103 HUNTINGTON ASHLAND PORTSMOUTH IRONTON	3	6/3		4/2			2	15/5
124 TOLEDO	3	2		2		0	5	12
173 DAYTON	5	3	0	2		2	6	18
174 CLEVELAND	16	13	7	10	2	9	14	71
175 MANSFIELD MARION		0/3					1	1/3
176 COLUMBUS	5	3	1	1		2	7	19
177 NORTHWEST OHIO		0/6	2/3	1			1	4/9
178 NORTHWEST PENNSYLVANIA	3	5		2			4	14
179 PARKERSBURG	1	3	1	2			1	8
180 SANDUSKY		0/3						0/3
181 STEUBENVILLE WEIRTON WHEELING	2	7	0/3	4		2	1	16/3
182 WILMINGTON CHILLICOTHE LOGAN							1	1
183 ZANESVILLE				2				2
TOTAL	49	47/15	12/6	33/2	4	18	50	213/23

Sites required by Ohio EPA:
Government Operated/Industry Operated

II. Summary of 2004 Air Quality Data

The following pages, in a series of maps and tables, summarize the data presented in Section V of the report.

Figures 3-13 indicate the highest annual and second highest concentrations for PM_{10}, $PM_{2.5}$, SO_2, CO, and NO_2, respectively, in each county where data were collected. Sites not meeting National Aerometric Data Bank (NADB)[1] requirements were marked with asterisks.

Figure 14 indicates the second highest 1-Hour concentration of ozone recorded in each county, as well as the counties which have had more than three exceedances of the standard in the three most recent years.

FIGURE 15 indicates the counties in which the highest reading ozone monitor recorded a three year average of fourth highest eight hour averages greater than the standard.

Figure 17 indicates the highest three-month average concentration of lead in each county where data were collected.

Table 3 gives a breakdown of air quality standard violations by county.

A more detailed study of air quality can be found in Section V of the report.

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[1]The NADB averaging criteria for PM_{10} and $PM_{2.5}$ monitors requires that at least seventy-five percent of scheduled samples are collected each quarter. Most intermittent monitors in Ohio run on a six-day sampling schedule (one daily reading every six days) yielding up to sixty-one samples per year. To meet NADB averaging criteria for continuous (hourly) monitors, a monitor must have valid data for at least seventy-five percent of each calendar quarter, approximately 1660 hours. For a valid ozone monitoring day (1-Hr standard), the monitor must collect at least seventy-five percent of the hours between 9am and 9pm.

PM-10

Figure 3

2004 PM-10 Highest Annual Mean Concentration
(in counties where data were collected-values in ug/m3)

PM-10

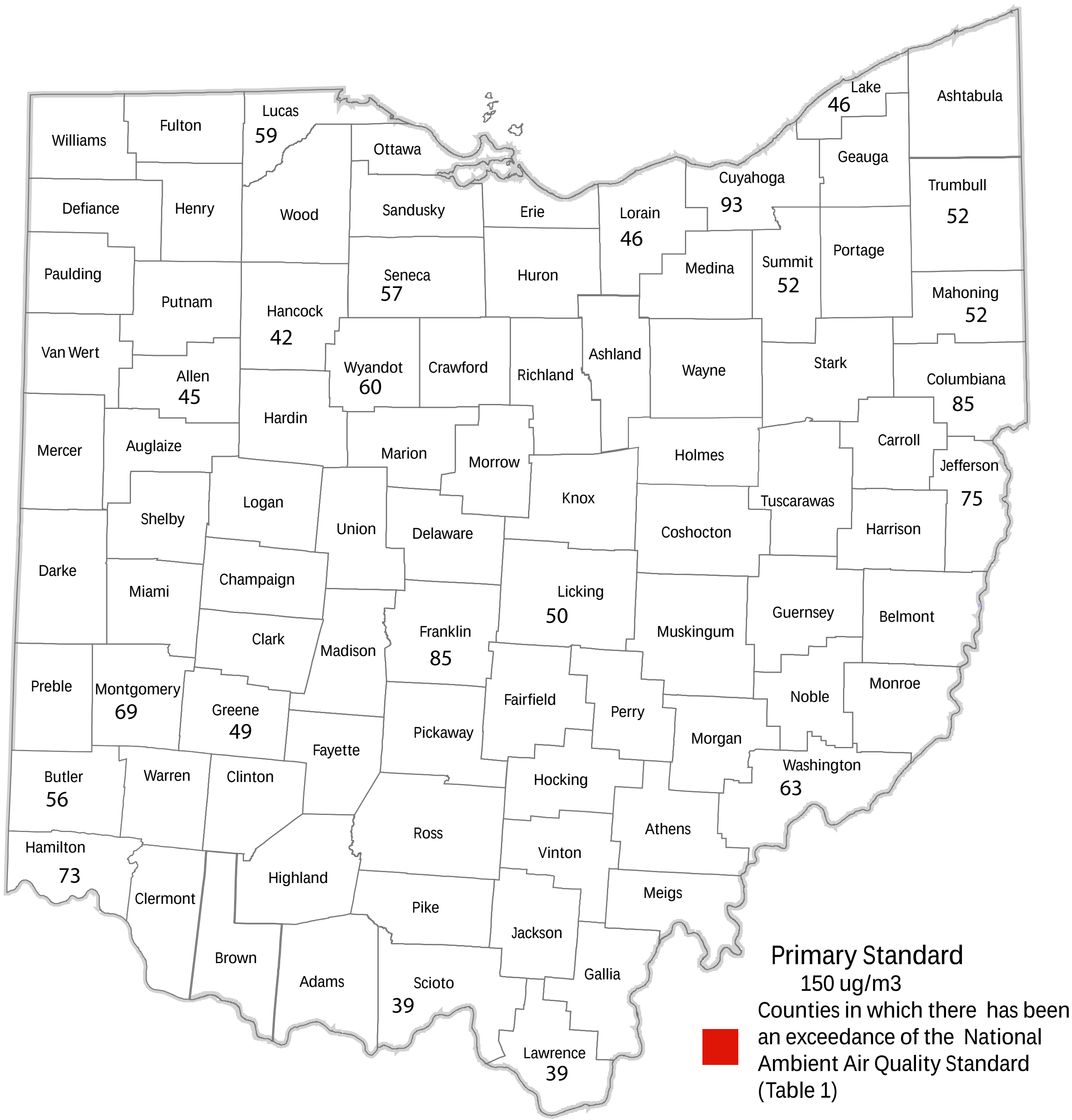


Figure 4

2004 PM-10 99th Percentile 24-Hour Concentration
(In counties where data were collected-values in ug/m3)

PM-2.5

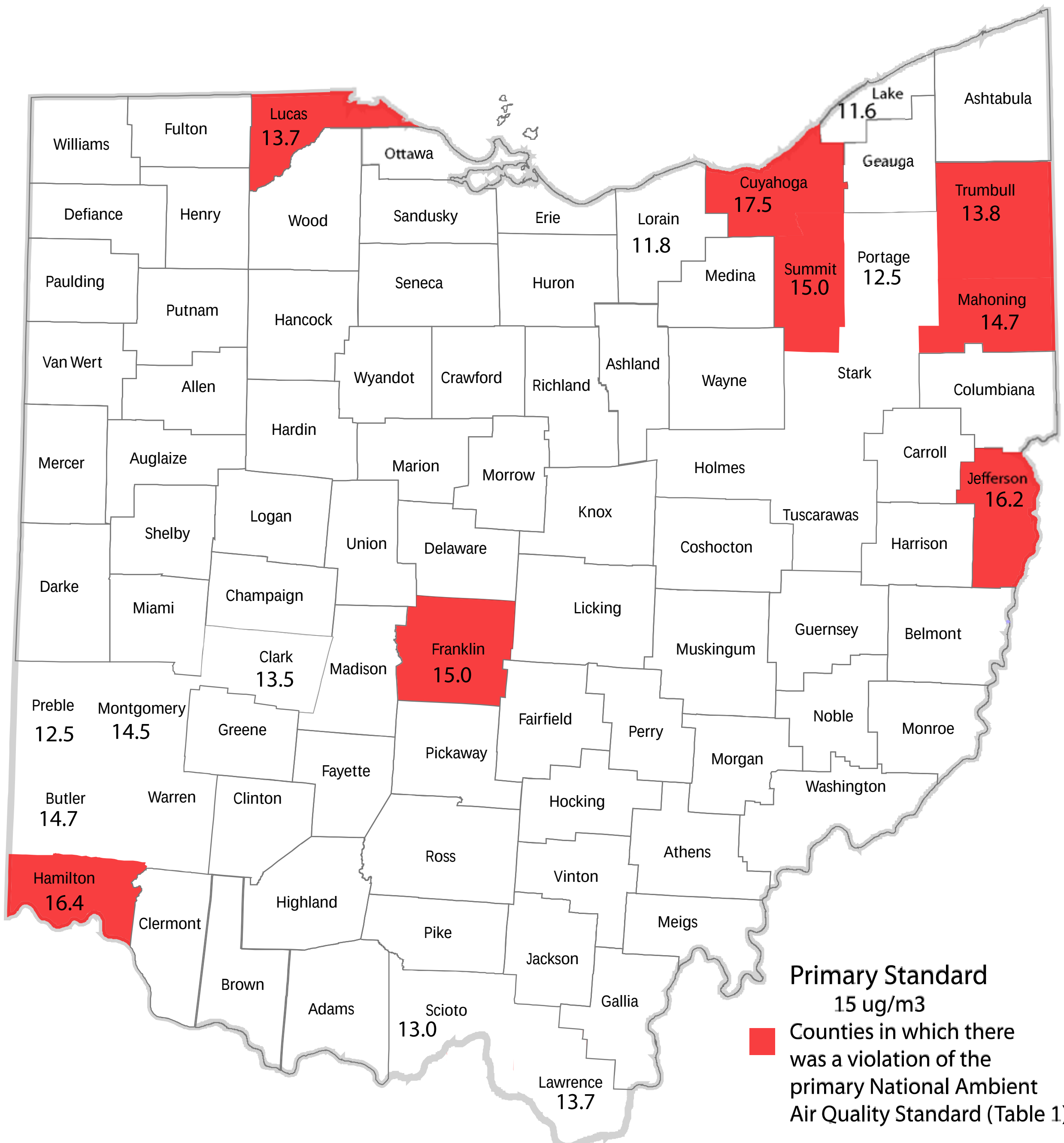


Figure 5

2004 PM-2.5 Highest Annual Concentration
(In counties were data were collected-values in ug/m3)

PM-2.5

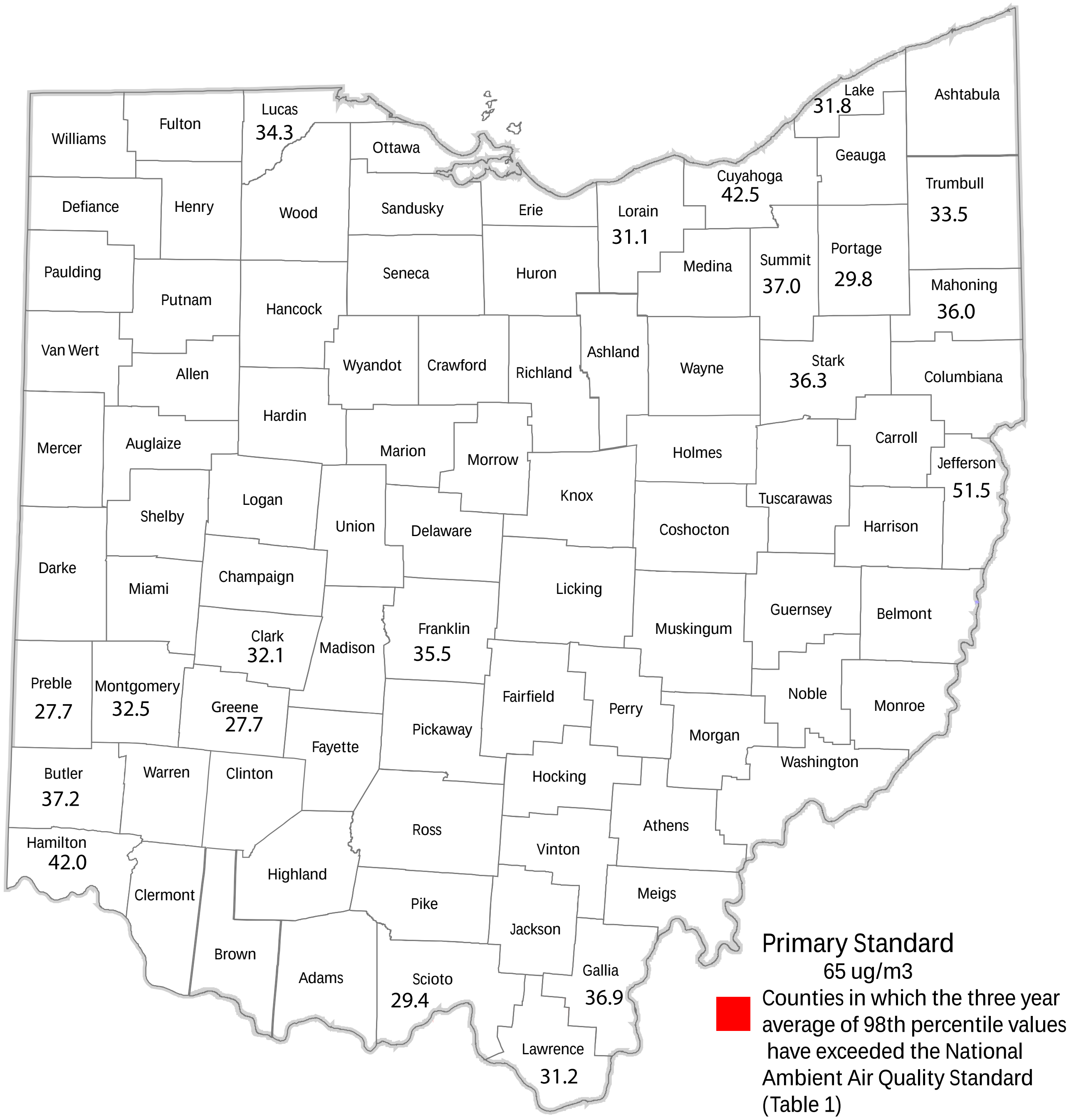


Figure 6

2004 PM-2.5 98th percentile 24-Hour Concentration
(In counties where data were collected-values in ug/m3)

PM-2.5

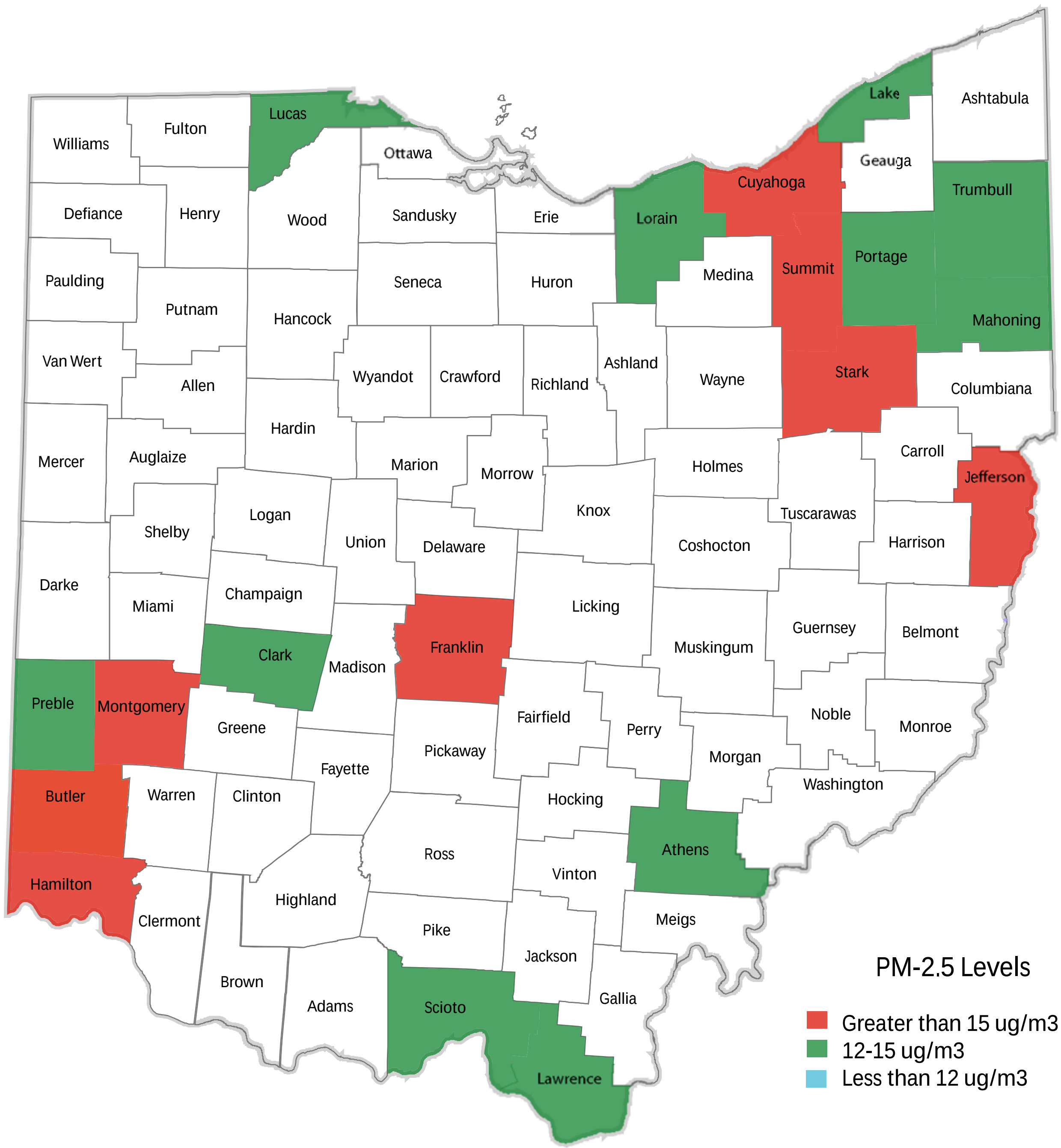


Figure 7

2002-2004 Average of Annual Averages
Highest site in the County used

Sulfur Dioxide

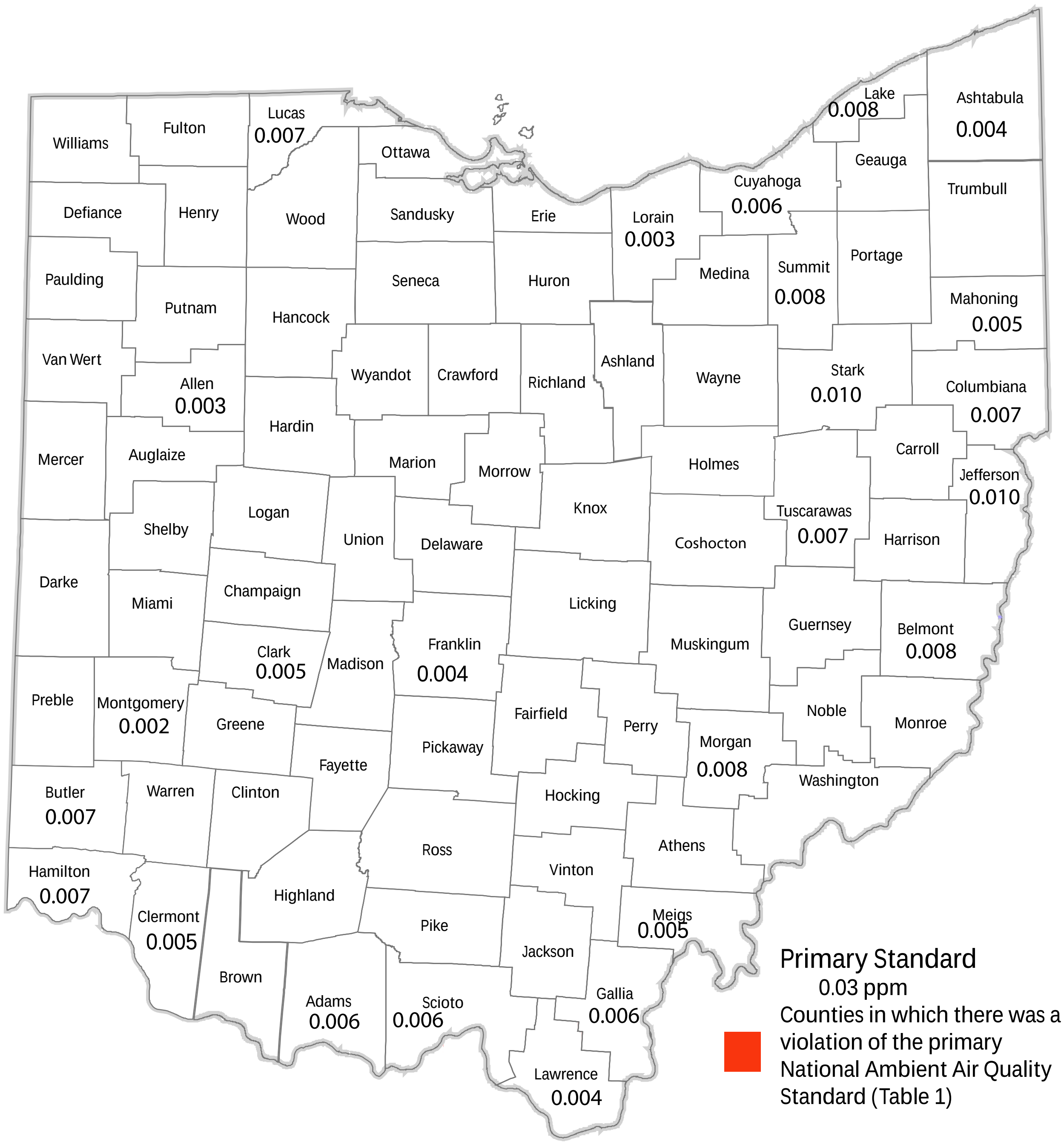


Figure 8

2004 SO2 Highest Annual Arithmetic Mean Concentration
(In counties where data were collected-values in ppm)

Sulfur Dioxide

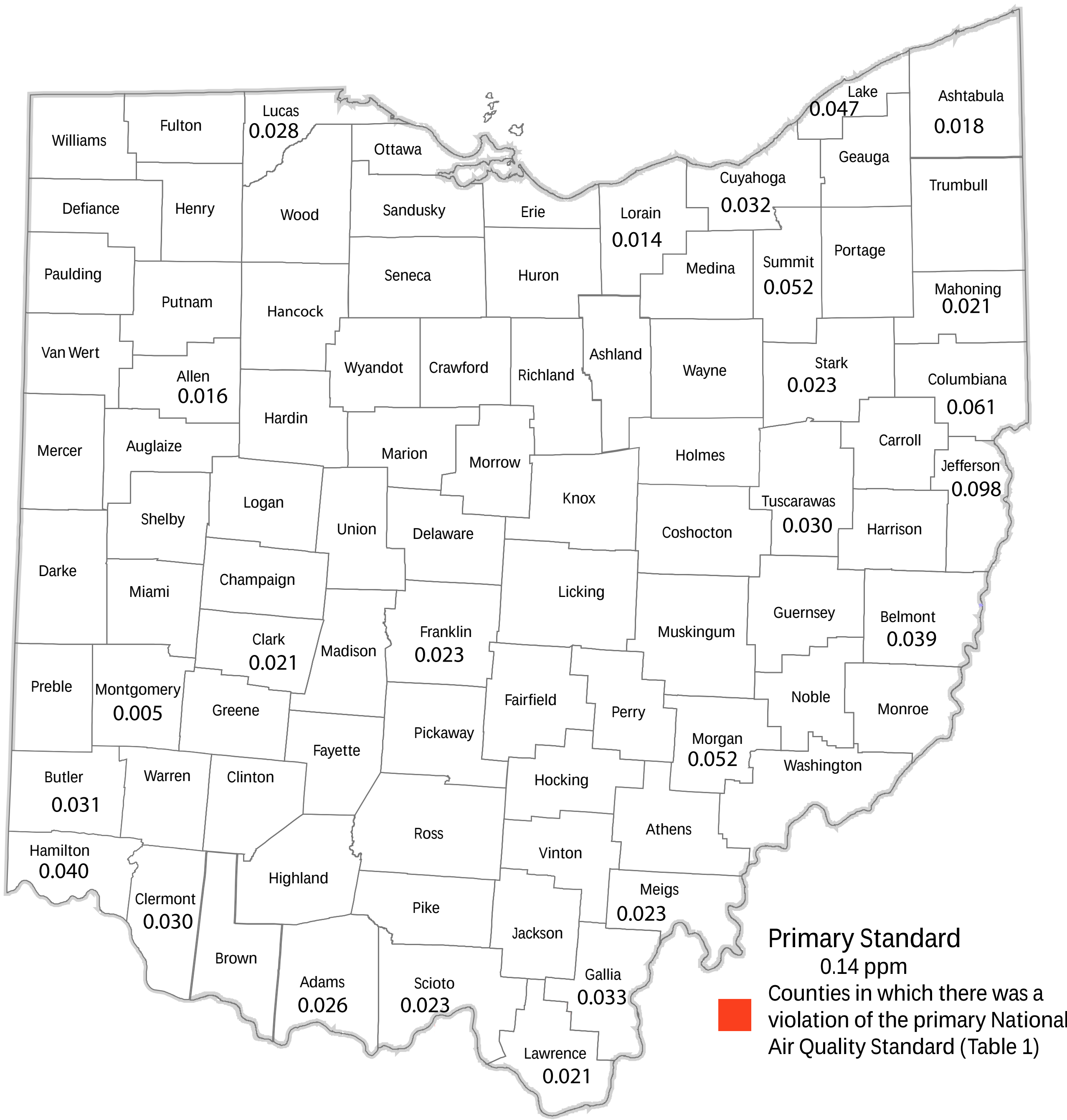


Figure 9

2004 SO2 2nd Highest 24-Hour Concentration
(In counties where data were collected-values in ppm)

Sulfur Dioxide

Figure 10

2004 SO2 2nd Highest 3-Hour Concentration
(In counties where data were collected-values in ppm)

Carbon Monoxide

Figure 11

2004 CO 2nd Highest 8-Hour Concentration
(In counties where data were collected-values in ppm)

Carbon Monoxide

Figure 12

2004 CO 2nd Highest 1-Hour Concentration
(In counties where data were collected-values in ppm)

Nitrogen Dioxide

Figure 13

2004 NO2 Highest Annual Arithmetic Mean Concentration
(In counties where data were collected-values in ppm)

Ozone

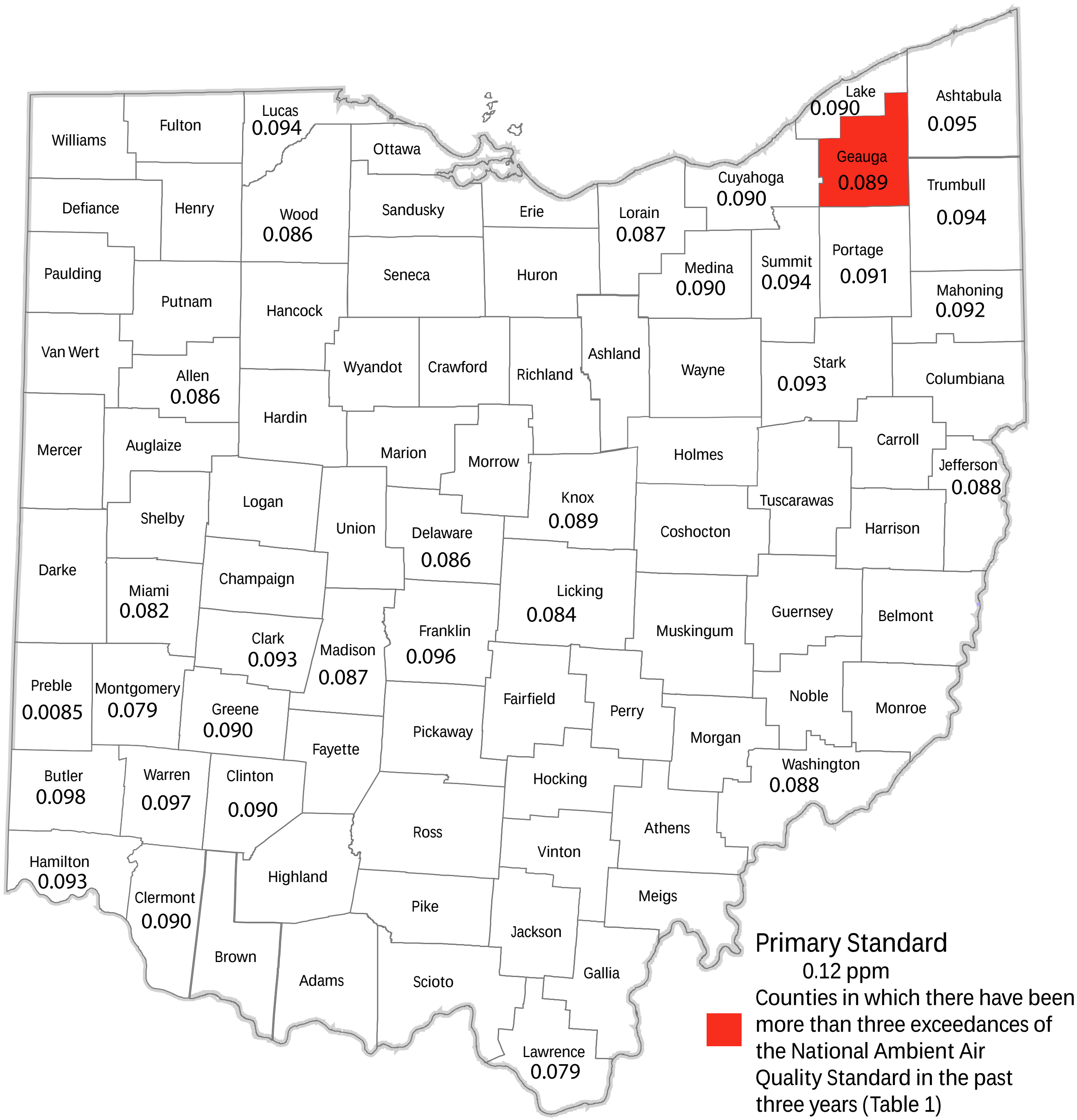


Figure 14

2004 Ozone 2nd Highest 1-Hour Concentration
(In counties where data were collected-values in ppm)

Ozone

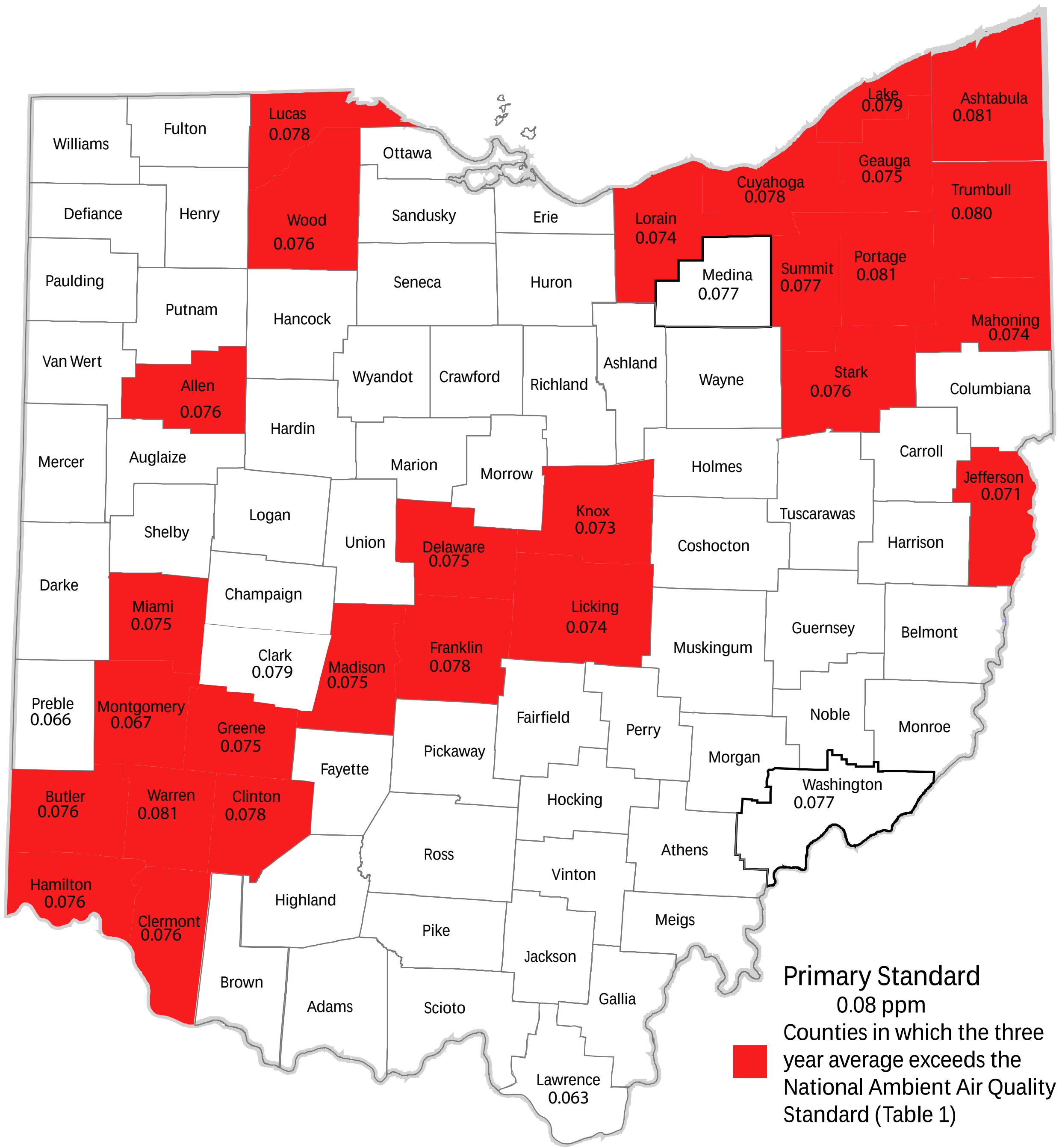


Figure 15

2004 Ozone 4th Highest 8-Hour Concentration
(In counties where data were collected-values in ppm)

Ozone Levels in Ohio

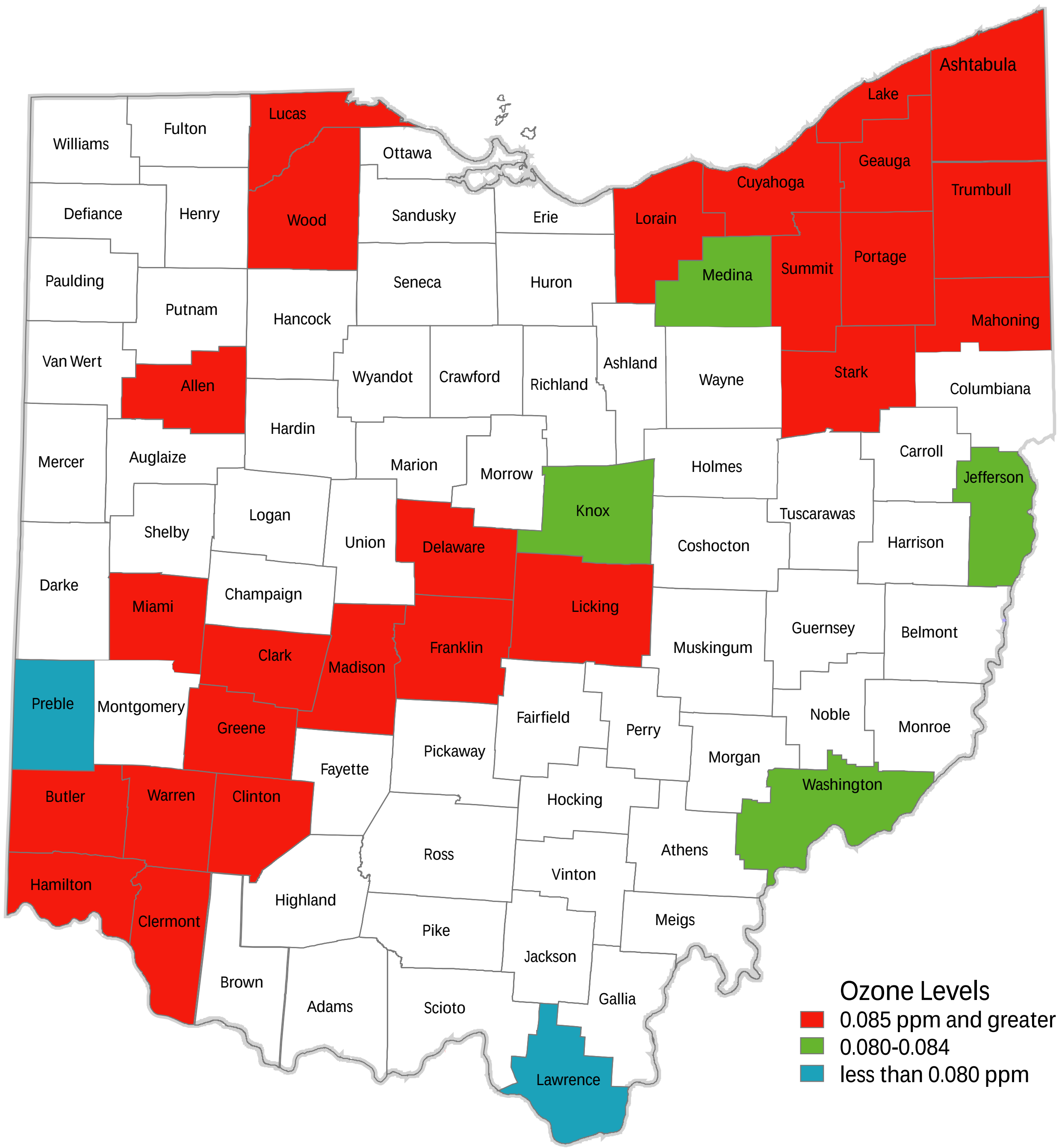


Figure 16

2002-2004 Average of the Fourth High 8-Hour Averages
using the highest reading site in each county

Lead

Figure 17

2004 Lead, Highest Quarterly Mean
(In counties where data were collected-values in ug/m3)

TABLE 3
VIOLATIONS OF AIR QUALITY STANDARDS BY AREA
2004

There were no violations of the PM_{10}[1], NO_2, SO_2, Lead or CO standards

$PM_{2.5}$ 2002-2004 Annual	OZONE (8-Hour) (2002-2004)	OZONE[1] (1-Hour)
Butler	Allen	Geauga
Cuyahoga	Ashtabula	
Franklin	Butler	
Hamilton	Clark	
Jefferson	Clermont	
Montgomery	Clinton	
Stark	Cuyahoga	
Summit	Delaware	
	Franklin	
	Geauga	
	Greene	
	Hamilton	
	Lake	
	Licking	
	Lorain	
	Lucas	
	Madison	
	Mahoning	
	Miami	
	Portage	
	Stark	
	Summit	
	Trumbull	
	Warren	
	Wood	

[1]For a violation of the 1-Hr ozone or PM_{10} standard to occur there must be an average of more than one exceedance per year over a three year period.

III. Air Quality Trends

Federal regulations promulgated in 1980 established a number of urban sites in Ohio as part of a national network for determining trends of the criteria pollutants. This network, called National Air Monitoring Stations (NAMS), requires the exclusion (for purposes of trend studies only) of those urban sites not designated as NAMS. This requirement permits a more accurate comparison of trends in different areas of the nation. The NAMS group was easily integrated into Ohio's monitoring system starting with the 1980 data.

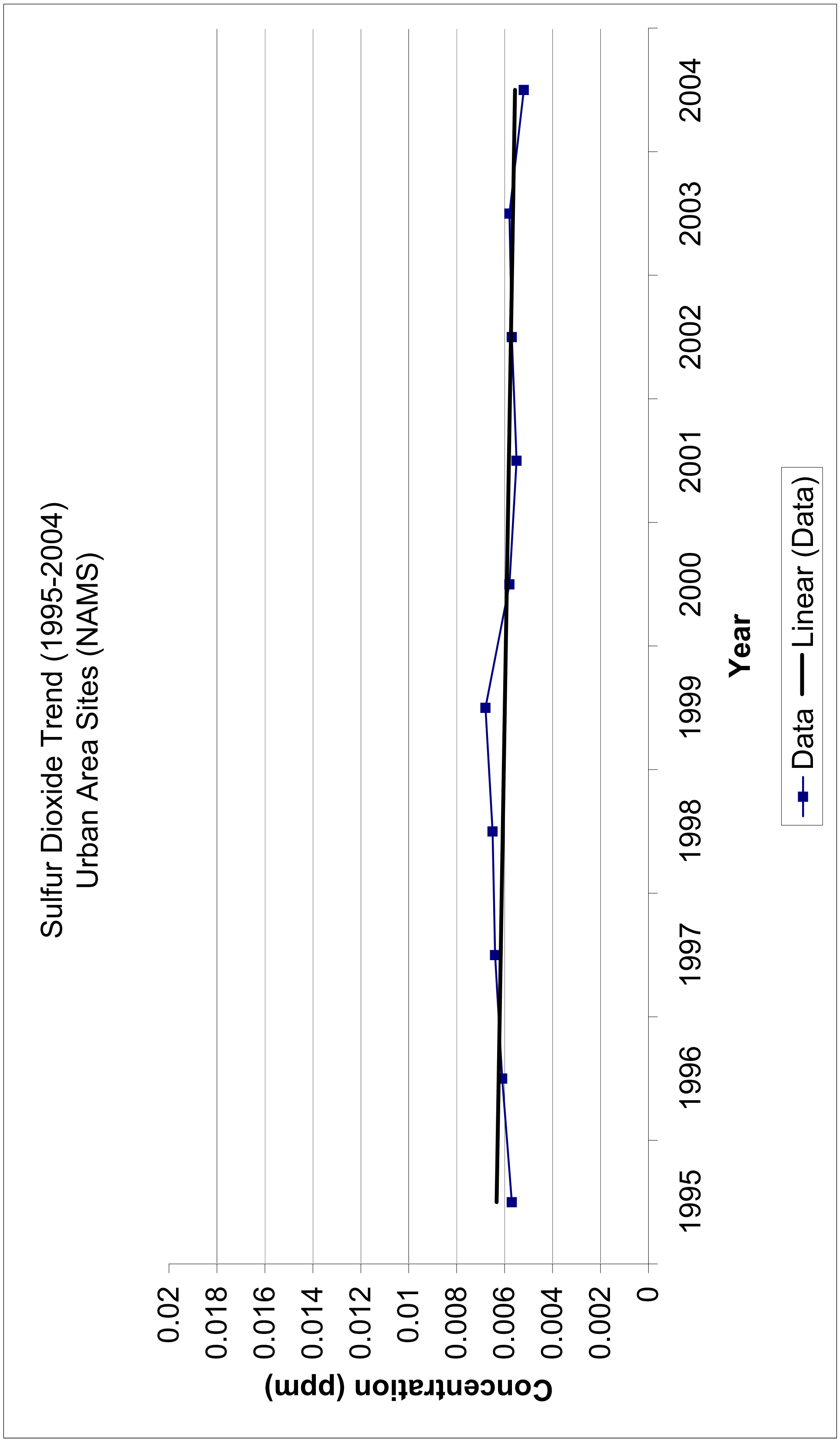
SO_2 TRENDS

Data for SO_2 continuous instruments in urban areas which met the NAMS siting requirements were used to generate an Ohio SO_2 trend study for years 1995 through 2004. The resulting data, based on annual average SO_2 concentrations, are plotted in Figure 18. Percent improvement is calculated using values derived from the method of "least squares".

Table 4

SO_2 TRENDS FOR 1995-2004

SITE CATEGORY	IMPROVEMENT
Urban Area NAMS	12.1%



Sulfur Dioxide Trend (1995-2004)
Urban Area Sites (NAMS)
Concentration (ppm)
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Year
Data
Linear (Data)

FIGURE 18

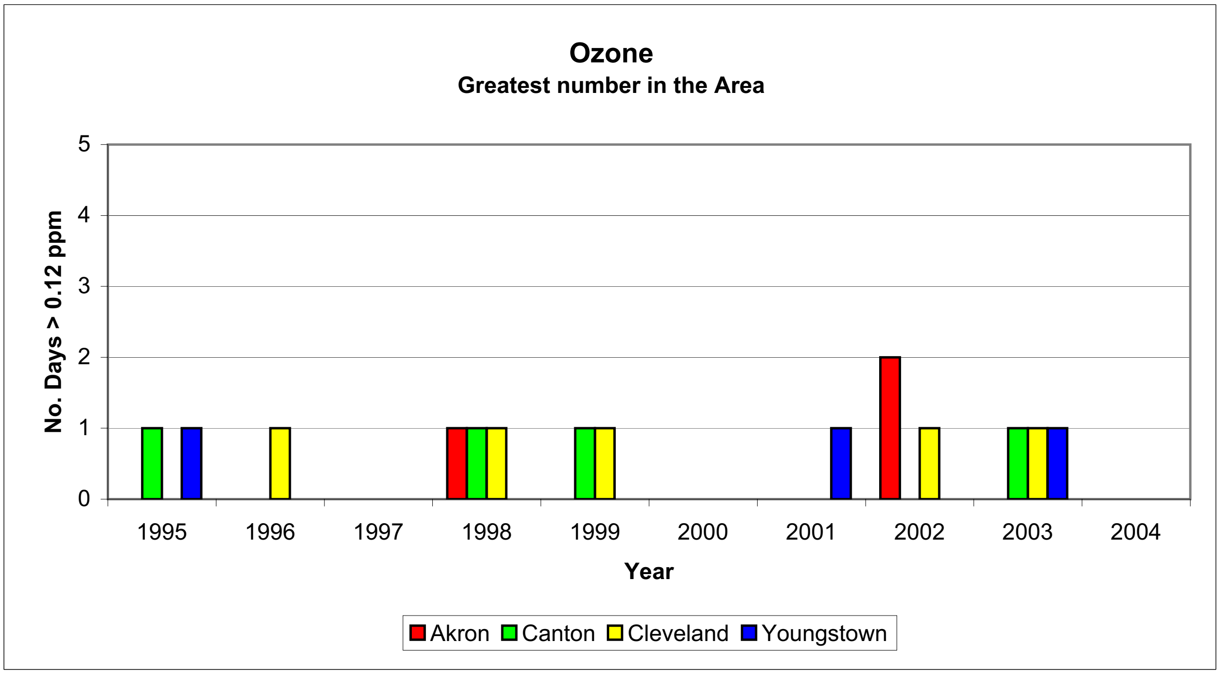
Ozone Trends

One Hour Standard:

Information is presented from eight metropolitan areas in Ohio for the period of 1995 through 2004. Figure 19 is a bar chart which shows, for each year, the number of days during which the ozone ambient air quality standard was exceeded. In a city where ozone is monitored at several sites, all exceedances on any one day, for that area were counted as a single exceedance for that day. This was done because ozone usually "blankets" large areas for periods longer than one hour.

Assessing progress towards the attainment of the ozone air quality standards is difficult because of the influence of meteorology on ozone levels. Differences in weather conditions can cause variations from year to year in both the NAAQS exceedances and the second highest 1-Hour ozone levels.

High temperatures, brilliant sunshine and stagnant air contribute to high levels of evaporation from fuel storage tanks, fuel systems and auto refueling activities emitted by millions of cars and trucks. Also daily emissions of nitrogen oxides and hydrocarbons by millions of cars and trucks are a major contributor to low level ozone pollution during these atmospheric conditions. In the presence of sunlight, hydrocarbons and nitrogen oxides create high levels of ground-level ozone.


Ozone
Greatest number in the Area
No. Days > 0.12 ppm
0
1
2
3
4
5
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Year
Akron
Canton
Cleveland
Youngstown

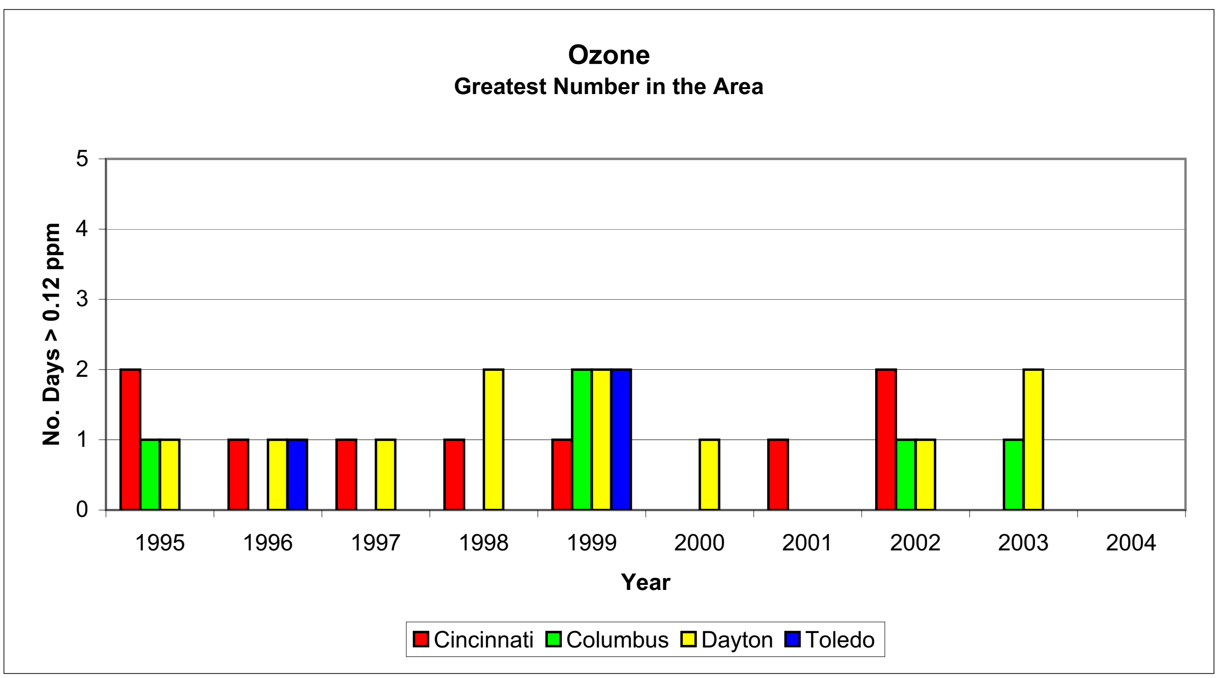
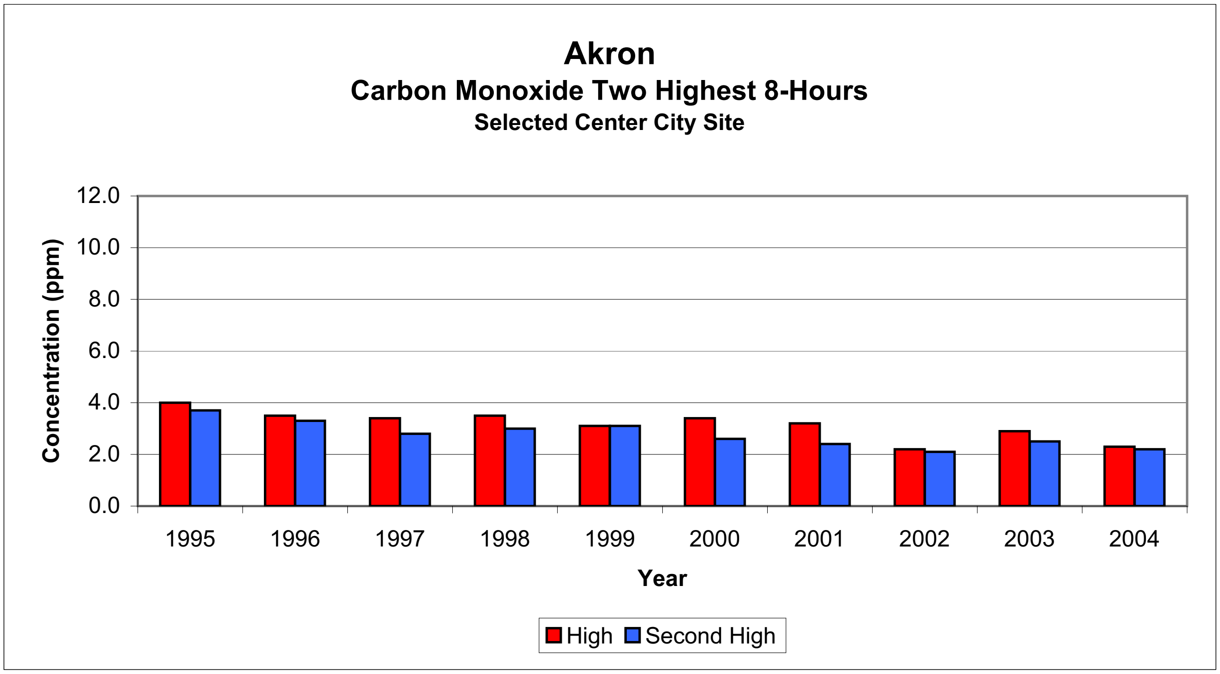

Ozone
Greatest Number in the Area
No. Days > 0.12 ppm
0
1
2
3
4
5
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Year
Cincinnati
Columbus
Dayton
Toledo

Figure 19

CO Trends

The data base for carbon monoxide (CO) is less extensive than for sulfur dioxide or ozone. A comparative plot of changes in CO in past years for ten major Ohio cities is presented. One central-city monitor in each urban area was selected to yield data for a study of 8-hour average CO concentrations. Data for the years 1995-2004 are used in the graphs. See Figure 20 for the results of this study.


Akron
Carbon Monoxide Two Highest 8-Hours
Selected Center City Site
Concentration (ppm)
12.0
10.0
8.0
6.0
4.0
2.0
0.0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Year
High
Second High

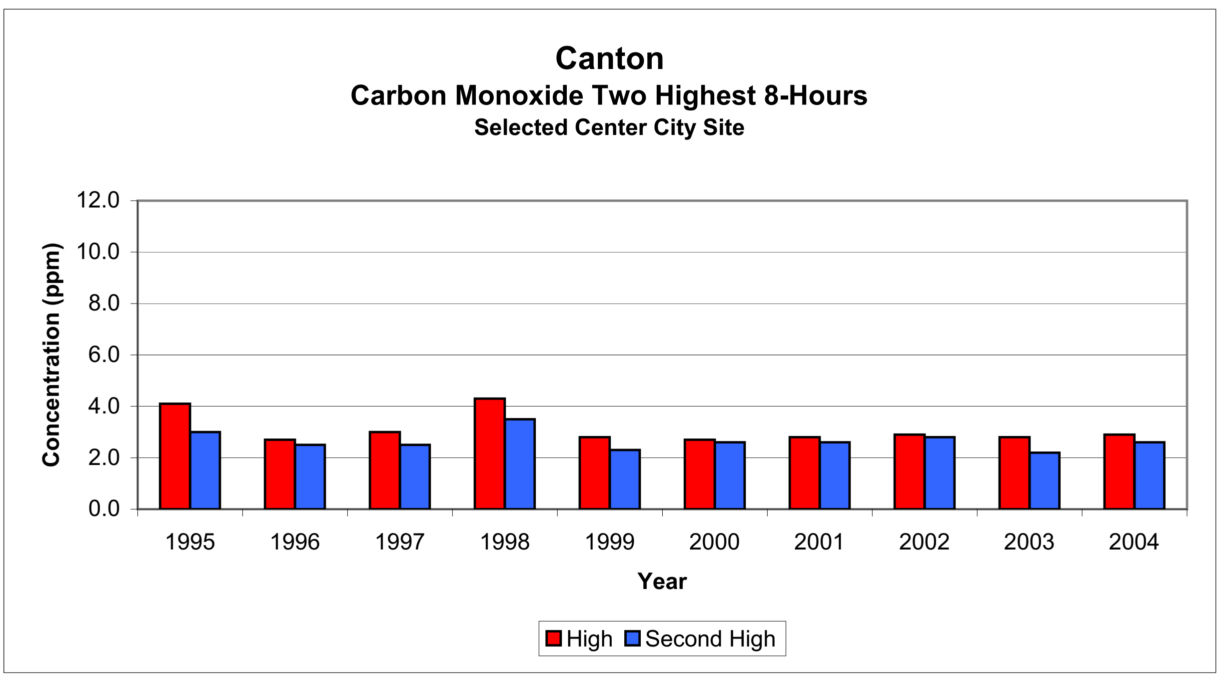
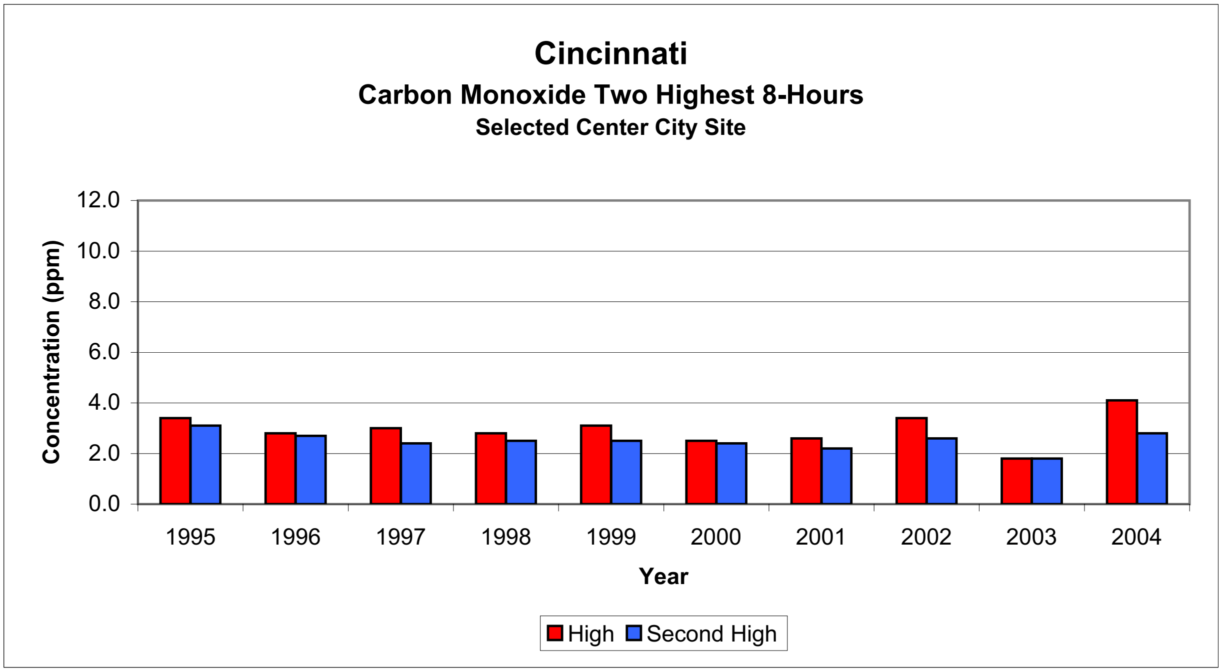

Canton
Carbon Monoxide Two Highest 8-Hours
Selected Center City Site
Concentration (ppm)
12.0
10.0
8.0
6.0
4.0
2.0
0.0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Year
High
Second High

Figure 20



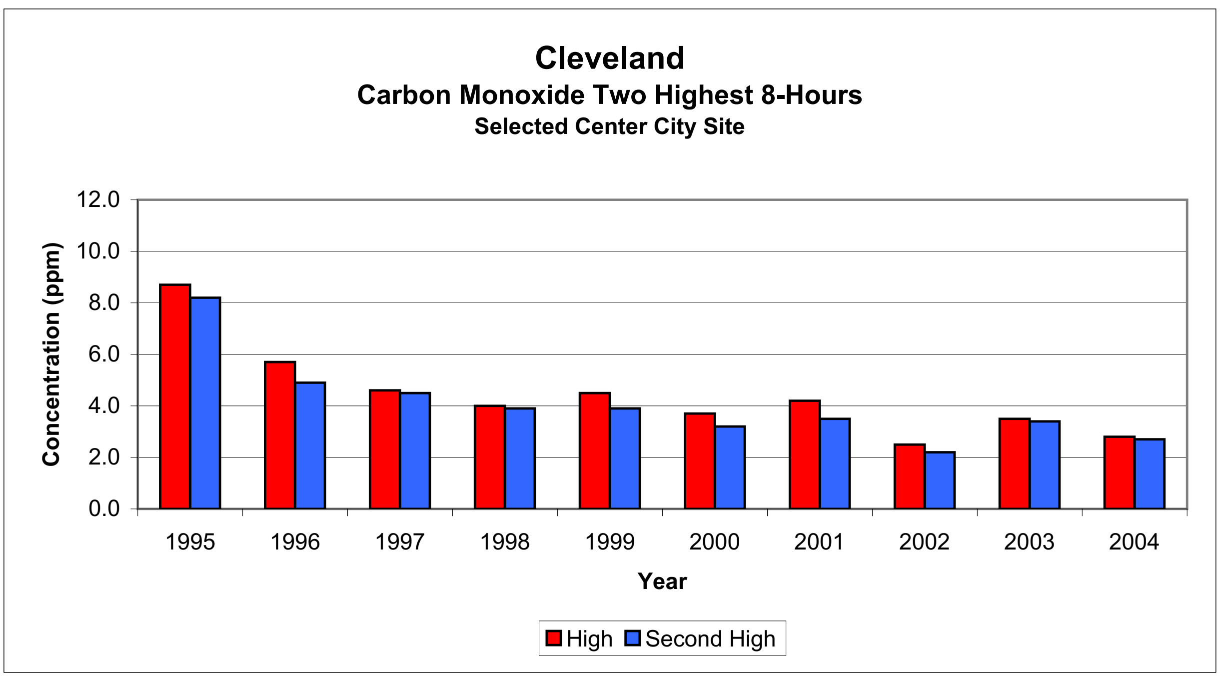
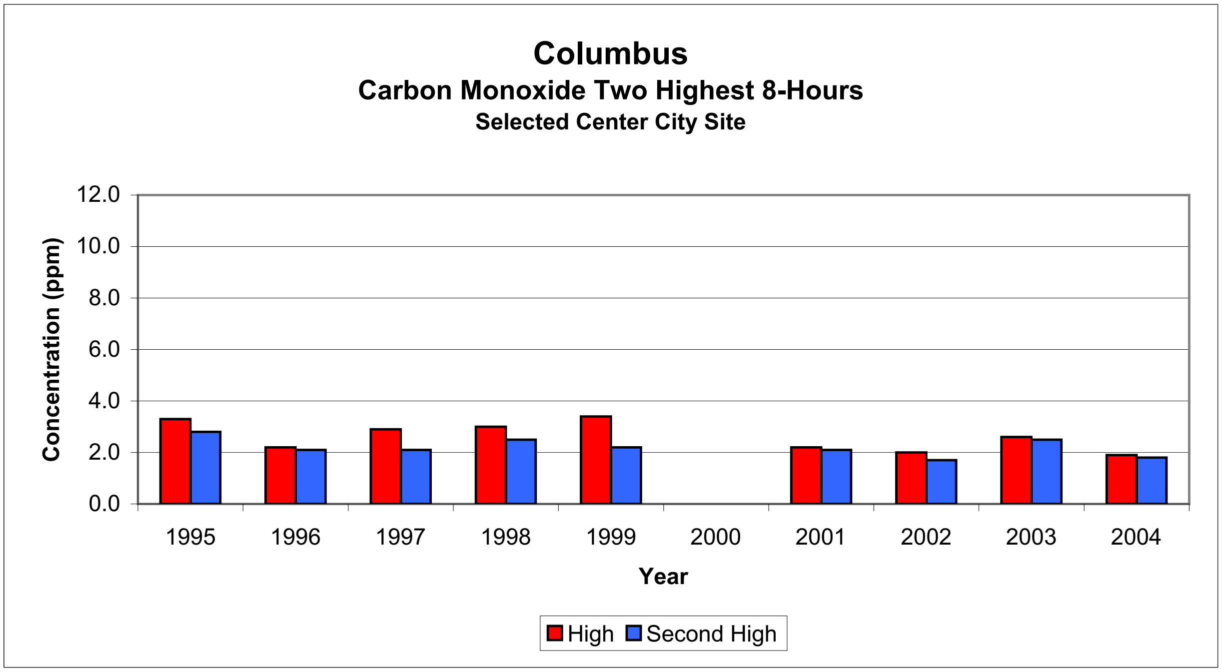


Figure 20 (continued)



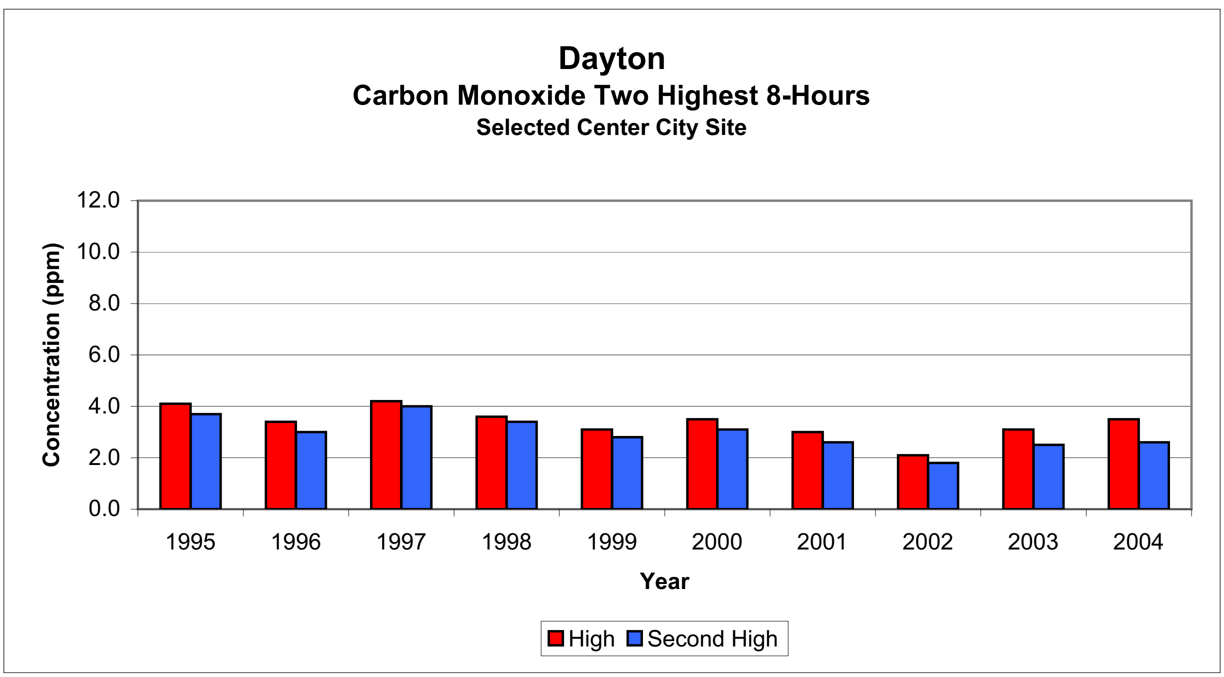
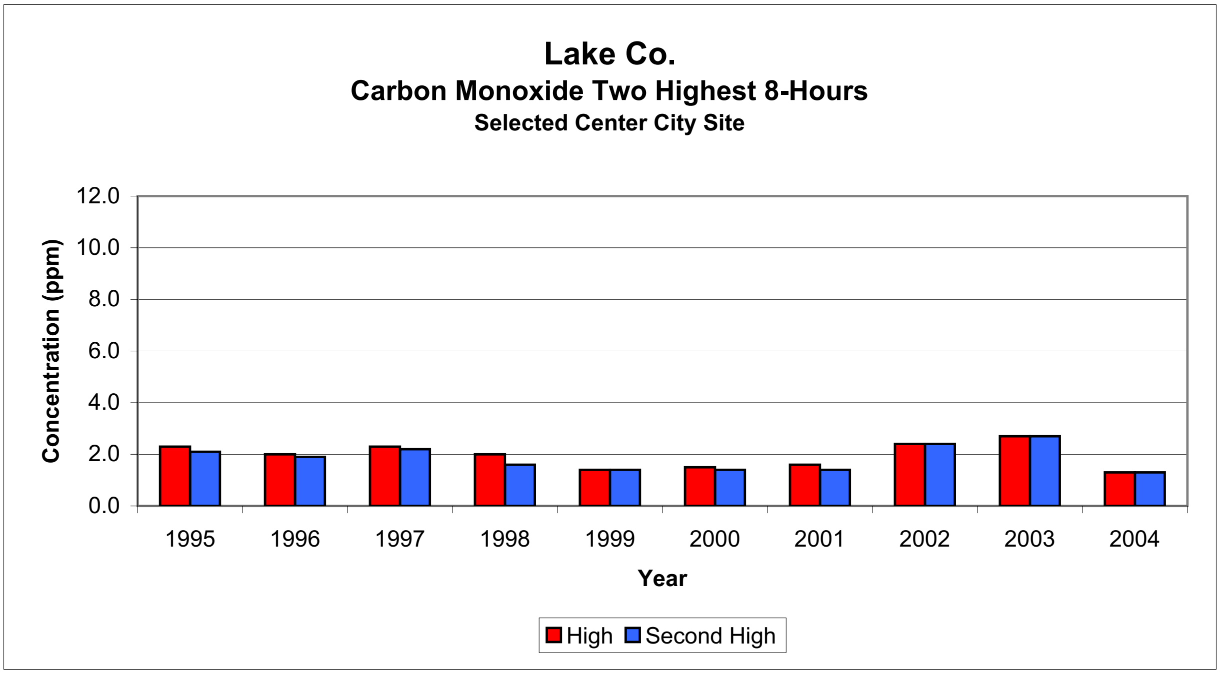


Figure 20 (continued)



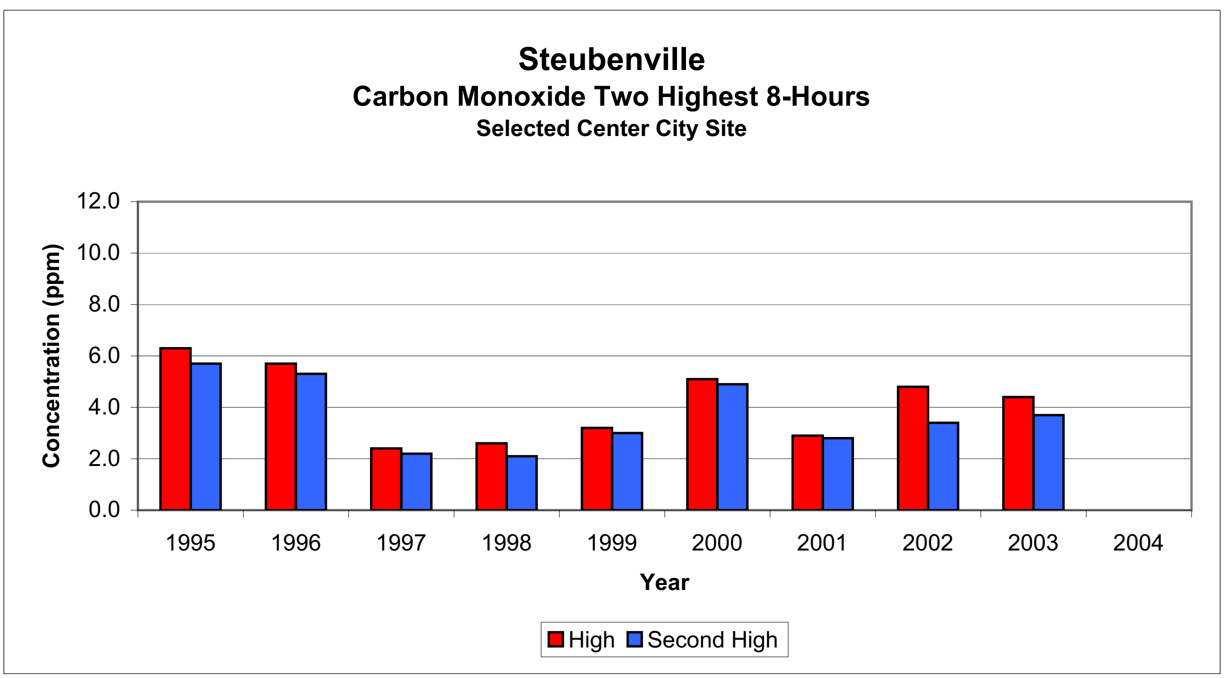


Figure 20 (continued)

IV. QUALITY ASSURANCE PROGRAM

A. GENERAL

In 1981, Ohio established a quality assurance program to detect, evaluate and correct problems in acquiring valid data. This program, which follows the requirements of Appendix A of 40 CFR Part 58, stresses control and assessment of errors in the monitoring process.

Control requirements are met by implementing quality control policies, procedures, and corrective actions. Assessment requirements are met by measuring, calculating and reporting the accuracy and precision of the data.

Quality control starts with the instruments in the network and the organizations which run them. A determination of the precision and accuracy of the instruments is the means by which this is done.

Precision and accuracy measurements are made on all NAMS and SLAMS instruments operated by a local air agency (LAA) or district office (DO). Individual precision and accuracy values are then determined for each LAA or DO and for each pollutant being monitored.

B. Discussion of Accuracy and Precision Procedures

Accuracy requirements for TSP, PM_{10} and Lead samplers include quarterly audits of the flow rate of 25% of the monitoring sites against a known flow rate. Each sampler is audited at least once per year. For SO_2, NO_2, O_3, and CO, quarterly audits of at least 25% of the analyzers are done. During the audits the analyzers are tested with a gas in three specific concentration ranges. Accuracy for $PM_{2.5}$ is determined by collocating samplers at 25% of the sites each calendar quarter.

Precision requirements for TSP, PM_{10}, $PM_{2.5}$ and Lead are met by selecting two sites in an area of expected highest concentration for side-by-side (collocation) sampling. The determination for SO_2, NO_2, O_3, and CO includes a one point precision check against a gas of known concentration at least once every two weeks for each automated analyzer. The analyzers are operated in the normal sampling mode during this check.

A series of calculations is performed to determine the precision and accuracy of each analyzer and reporting organization. Precision values are calculated from the results of individual precision checks, and accuracy estimates are calculated from the results of individual audits. Both precision results and accuracy results are reported at the end of the calendar quarter.

The precision of the reporting organization is determined from the average of the percentage differences between monitors, the pooled standard deviation and the 95% probability limits. The accuracy of the reporting organization is determined from the average of percentage differences, the standard deviation and the 95% probability limits.

C. The Statistics of Accuracy and Precision

Precision is a determination of the repeatability of a measurement. For intermittent samplers this is measured with replicate monitors. For continuous monitors it is measured by challenging the monitor with a known concentration of gas. This concentration is in the range of 0.08-0.10ppm for all monitored pollutants except carbon monoxide (CO), which has a precision concentration range of 8-10ppm. Precision is reported as a percent error in the data reported from the monitor. The precision is reported as a range with a lower (LO) and upper (UP) probability limit. The probability limits have a 95% confidence interval, i.e., the true value of the data will be in the stated probability limit range 95% of the time.

Accuracy is the amount of variation that can be determined between the normal operator with his monitor and an independent auditor using completely independent instrumentation. Accuracy for continuous monitors measured at three different levels or concentration ranges:

Level 1	0.030 to 0.080ppm Carbon Monoxide 3 to 8ppm
Level 2	0.150 to 0.200ppm Carbon Monoxide 15 to 20ppm
Level 3	0.350 to 0.450ppm Carbon Monoxide 35 to 45ppm

Accuracy is reported as a percent error in the data reported from the monitor in each of the calibration ranges. The probability limits have a 95% confidence interval. The interpretation of the confidence intervals is the same as that for precision as stated above.

Tables 5-10 give the probability limits for accuracy and precision for each reporting organization in the state, for each criteria pollutant being measured.

TABLE 5
Continuous Sulfur Dioxide
2004 Precision and Accuracy Data
95% Confidence Limits

Map No.*	LAA/DO	Precision(%)		Accuracy(%) Level 1		Accuracy(%) Level 2		Accuracy(%) Level 3	
		LO	UP	LO	UP	LO	UP	LO	UP
CDO	Central District	-04	05	-10	09	-04	11	-07	15
NEDO	Northeast District	-07	05	-20	17	-23	15	-20	22
NWDO	Northwest District	-04	10	-27	-05	-24	-01	-21	-02
SEDO	Southeast District	-09	07	-16	06	-16	05	-17	05
1.	Akron	-04	02	-09	04	-09	05	-09	06
2.	HCDOES	-07	09	-10	02	-06	02	-04	04
3.	Cleveland	-07	05	-09	06	-04	04	-03	05
4.	RAPCA	-02	05	-20	09	-10	07	-09	10
5.	Lake County	-07	04	-12	04	-10	08	-07	07
6.	Portsmouth	-05	06	-25	16	-23	21	-24	23
7.	Toledo	-02	02	-13	00	-12	01	-13	03
8.	Mahoning Trumbull	-03	02	-16	01	-12	04	-10	05
Estimated Ohio Average		-07	06	-18	08	-16	09	-15	11

*Map No. refers to listing of Air Pollution Control Agencies in Fig.1.

TABLE 6
Continuous Nitrogen Dioxide
2004 Precision and Accuracy Data
95% Confidence Limits

				Accuracy(%)					
Map No.*	LAA/DO	Precision(%)		Level 1		Level 2		Level 3	
		LO	UP	LO	UP	LO	UP	LO	UP
3.	HCDOES	-17	08	-16	07	-09	08	-10	11
4.	Cleveland	-13	08	-41	16	-26	02	-21	-03
Estimated Ohio Average		-14	08	-30	13	-22	10	-22	10

*Map No. refers to listing of Air Pollution Control Agencies in Fig. 1.

TABLE 7
Continuous Carbon Monoxide
2004 Precision and Accuracy Data
95% Confidence Limit

Map No.*	LAA/DO	Precision(%)		Accuracy(%) Level 1		Level 2		Level3	
		LO	UP	LO	UP	LO	UP	LO	UP
CDO	Central District	-02	02	-18	04	-08	-02	-08	-02
SEDO	Southeast District	-02	06	-06	04	-02	03	-04	03
1.	Akron	-04	05	-03	00	-07	03	-06	02
2.	Canton	-13	17	-02	07	-01	07	-03	10
3.	HCDOES	-11	06	-07	07	-11	03	-06	02
4.	Cleveland	-02	10	-10	06	-11	02	-12	01
5.	RAPCA	-03	06	-12	10	-07	02	-11	04
6.	Lake County	-12	01	-14	01	-11	00	-12	02
Estimated Ohio Average		-07	09	-09	05	-09	04	-09	04

*Map No. refers to listing of Air Pollution Control Agencies in Fig.1.

TABLE 8
Continuous Ozone
2004 Precision and Accuracy Data
95% Confidence Limits

Map No.*	LAA/DO	Precision(%)		Accuracy(%) Level 1		Level 2		Level 3	
		LO	UP	LO	UP	LO	UP	LO	UP
CDO	Central District	-04	04	-03	04	-04	02	-05	02
NEDO	Northeast District	-04	07	-05	05	-03	04	-02	03
NWDO	Northwest District	-03	05	-05	03	-02	00	-02	02
SEDO	Southeast District	-02	03	-01	01	-03	00	-06	04
SWDO	Southwest District	-05	07	-04	11	-04	09	-03	08
1.	Akron	-03	02	-01	03	-02	04	-02	05
2.	Canton	-06	04	-08	-01	-05	-01	-04	-01
3.	HCDOES	-05	07	-04	08	-02	04	-02	04
4.	Cleveland	-05	05	-25	07	-30	09	-32	10
5.	RAPCA	-07	10	-07	02	-05	-01	-06	-01
6.	Lake County	-03	03	-09	05	-10	06	-07	03
7.	Portsmouth	-03	07	-15	25	-15	23	-14	22
8.	Toledo	-02	02	-09	05	-11	04	-12	05
9.	Mahoning-Trumbull	-01	01	-03	05	-01	03	-01	03
Estimated Ohio Average		-04	06	-12	08	-11	08	-13	09

*Map No. refers to listing of Air Pollution Control Agencies in Fig.1.

TABLE 9
PM-2.5
2004 Precision and Accuracy Data
95% Confidence Limits

Map No.*	LAA/DO	Precision(%)		Accuracy	
		LO	UP	LO	UP
CDO	Central District	03	04	-01	03
NEDO	Northeast District	07	11	00	02
SEDO	Southeast District	02	04	-02	-01
1.	Akron	04	05	00	01
2.	Canton	06	08	00	02
3.	HCDOES	02	03	-02	00
4.	Cleveland	06	08	01	02
5.	RAPCA	03	05	-01	00
6.	Lake County	04	06	00	03
7.	Portsmouth	04	06	-02	02
8.	Toledo	05	08	-01	00
9.	Mahoning-Trumbull	03	04	-01	00
Estimated Ohio Average		01	09	-02	02

*Map No. refers to listing of Air Pollution Control Agencies in <u>Fig.1.</u>

PM-10
2004 Precision and Accuracy Data
95% Confidence Limits

Map No.*	LAA/DO	Precision(%)		Accuracy	
		LO	UP	LO	UP
CDO	Central District	-03	04	-01	01
NEDO	Northeast District	-10	12	-06	11
NWDO	Northwest District	-23	02	-11	13
SEDO	Southeast District	-15	08	-10	07
1.	Akron	-05	06	-06	06
2.	Canton	None reported		-04	03
3.	HCDOES	-05	02	-02	08
4.	Cleveland	-13	16	-06	16
5.	RAPCA	-08	05	-04	01
6.	Lake County	-01	18	-04	02
7.	Portsmouth	-12	19	-05	08
8.	Toledo	-01	03	-05	03
9.	Mahoning-Trumbull	-08	03	-02	02
Estimated Ohio Average		-12	11	-07	09

*Map No. refers to listing of Air Pollution Control Agencies in <u>Fig.1.</u>

V. AIR QUALITY DATA 2004

Total Suspended Particulate (TSP)

Total suspended particulate matter is defined as any liquid (aerosol) or solid substance found in the atmosphere. Particles larger than approximately 100 microns in diameter settle rapidly due to gravity and are not considered suspended particulates. Fly ash, process dusts, soot and oil aerosols are all common forms of suspended particulate matter. The major sources of particulate pollution are industrial processes, electric power generation, industrial fuel combustion, and dust from plowed fields, roadways, or construction sites. Particulate pollution causes a wide range of damage to materials, as well as limiting visibility and reducing the amount of sunlight reaching the earth. Components of particulates may be harmful, such as sulfates, nitrates and metals. The major adverse health effects on humans are related to damage to the respiratory system through interference with the lung's natural cleansing process.

Such adverse health effects are dependent, in a general sense, upon (1) the concentration, size and chemical composition of the particles of which the TSP consists and (2) the concentration and composition of any pollutant gases in combination with it. Particles greater than 10 microns in diameter can rarely penetrate below the larynx and, therefore, are less likely to damage the respiratory system. Particles less than 6 microns in diameter can penetrate the bronchial passage and those of less than 1 micron in diameter can usually penetrate and be deposited in the capillaries and alveoli of the lungs. (I.M. Campbell, Energy and the Atmosphere: A Physical Chemical Approach, John Wiley & Sons, LTD., 1977).

An inhaled particle may exert a toxic effect in one or more of the following four ways: (1) the particle may be intrinsically toxic because of its inherent chemical or physical characteristics; (2) the particle may interfere with one or more of the mechanisms that normally clear the respiratory track; (3) the particle may act as a carrier of an absorbed toxic substance; or (4) the particle may act as a carrier of an absorbent toxic substance.

It is difficult to obtain direct relationships between exposures to various concentrations of TSP and resulting effects upon human health because of the problems of isolating the effects of TSP from those of other environmental pollutants and of reproducing in the laboratory the exact conditions that prevail in the ambient air. Also, it has been observed that exposure to TSP in combination with other pollutants such as sulfur dioxide (SO_2) produces more severe effects than does exposure to each pollutant separately. Nevertheless, statistical analyses of morbidity and mortality data do indicate a relationship between increased TSP concentrations and increased numbers of hospital and clinic admissions for upper respiratory infections, cardiac diseases, bronchitis, asthma, pneumonia, emphysema and the like. (Air Pollution: Its Origin and Control, Harper & Row, 1976.) TSP ceased to be a criteria pollutant on August 1, 1987, having been replaced by PM_{10}.

Since 1987 TSP sampling has been gradually replaced by ten micron particulate sampling (PM_{10}). There were over 200 TSP monitors in 1987. In 2004 there were 10 monitors reporting TSP data, all are used for lead or other metals monitoring. In July 1997 the US EPA promulgated regulations adding a National Ambient Air Quality Standard for 2.5 micron particulate matter ($PM_{2.5}$). The $PM_{2.5}$ monitors supplement and partially replace the PM_{10} network. They started collecting data in January 1999.

Sampling Method

TSP is measured by the high-volume air sampler method. This instrument draws measured volumes of air through a pre-weighed glass fiber or quartz filter for a specific time (normally 24 hours). Particulate matter in the air is trapped on the filter, which is then re-weighed to determine the mass of the particulates collected. Results are reported as micrograms of particulate matter per cubic meter of air ($\mu g/m^3$). Normal sampling is done intermittently with 24-hour samples taken once every six days.

Suspended particulate (TSP) (11101) Ohio UG/CU METER (25 C) (001)

24-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	# OBS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	ARITH MEAN	GEO. MEAN	GEO. STD	CERT	EDT
39-017-0015	2	1259	Middletown	Butler	3901 LEFFERSON,	2004	091	52	114	97	93	89	43.8*	38.1	1.7	N	0
39-029-0020	1	0807	East Liverpool	Columbiana	2220 MICHIGAN	2004	091	59	154	124	118	117	52.7	43.0	1.9	N	0
39-035-0038	1	0229	Cleveland	Cuyahoga	2547 ST TIKHON	2004	091	61	148	129	127	116	60.2	52.4	1.7	N	0
39-035-0042	1	0229	Cleveland	Cuyahoga	FIRE STATION 4,	2004	091	60	110	92	90	88	47.4	42.9	1.6	N	0
39-035-0049	1	0229	Cleveland	Cuyahoga	E. 56TH ST., FER	2004	091	55	234	181	174	146	75.5	62.6	1.9	N	0
39-035-0050	1	0229	Cleveland	Cuyahoga	GRANT RD., FERRO	2004	091	59	146	137	118	105	54.2	47.6	1.7	N	0
39-035-0061	1	0229	Cleveland	Cuyahoga	South Side of We	2004	091	61	160	152	143	134	65.8	58.1	1.7	N	0
39-035-0068	1	0229	Cleveland	Cuyahoga	7629 BROADWAY,	2004	091	27	108	92	81	67	48.6*	44.0	1.6	N	0
39-035-0069	1	0229	Cleveland	Cuyahoga	7300 SUPERIOR AV	2004	091	30	87	84	67	61	41.3*	37.8	1.5	N	0
39-061-0001	2	1259	Cincinnati	Hamilton	PUBLIC LIBRARY B	2004	091	56	87	78	74	64	41.8	38.5	1.6	N	0

Note: The * indicates that the mean does
not satisfy summary criteria.

Particulate Matter (<10μ, PM_{10})

On July 1, 1987, the US EPA promulgated revisions to the National Ambient Air Quality Standards for particulate matter. The primary standard includes only those particles with an aerodynamic diameter smaller than or equal to a nominal 10 micrometers. This standard is referred to as the PM_{10} standard (particulate matter <10 micrometers). From July 1987 until July 18, 1997 the annual standard was 50μg/m^3 annual arithmetic mean (average over three years' data). The 24-hour standard, not to be exceeded more than once, was 150μg/m^3. Now the standard is that the 24-hour level of 150 μg/m^3 is not to be exceeded as the 99th percentile value averaged over three years. The annual standard was retained.

The standards were changed in July 1997, when the $PM_{2.5}$ standard was promulgated. Changing the standard from TSP to PM_{10} and then adding $PM_{2.5}$ was due to research findings concerning particle size. Particulate matter can harm body tissue such as the linings of the nose and throat and the lungs by simple mechanical irritation. Nasal hairs and sneezing are the body's natural defenses against some of the relatively large particles (15-100 microns). However, small particles can slip past these defenses and penetrate deep into the lungs where they can damage lung tissues.

Because of the final action to set the fine particulate standards by US EPA to replace TSP, the Ohio Air Monitoring Network was expanded to include 21 PM_{10} sites in 1986, to 45 in 1988 and to a high of 91 in 1997. In 2004 monitors were operated at 62 sites.

These monitors were originally run on schedules that were determined by the grouping of the area in which they were located. Some of the monitors have had their schedules changed based upon the data collected.

The groupings can be found in the Federal Register of August 7, 1987 (52 FR 29383). Group I areas were assumed to have a greater than 95 percent chance of violating the standard and Group II areas were assumed to have between a 20 and 95 percent chance of violating the standard. Group III areas had less than a 20 percent chance of violating the standard.

Each Group I area is to have one site that has one sample taken every day with all other samplers to be run every sixth day. Each Group II area is to have one site that has one sample taken every other day. All other samplers run every sixth day. If a Group III area is monitored, the sampler(s) runs every sixth day.

Samples are taken each weekday at urban sites used in reporting the Air Quality Index (AQI).

PM10 Total 0-10um STP (81102) Ohio UG/CU METER (25 C) (001)

24-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	#OBS	NUM REQ	VALID DAYS	%OBS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	DAY MAX >150	EST DAYS >150	WTD ARITH MEAN	CERT	EDT
39-003-0006	1	0743	Lima	Allen	1314 FINDLAY R	2004	062	55	61	55	90	45	44	40	36	0	0	22.3	N	0
39-003-0007	1	0743	Lima	Allen	ROUSCH RD., LI	2004	062	54	61	54	89	31	30	27	26	0	0	18.0*	N	0
39-003-0008	1	0743	Lima	Allen	NORTH STREET,	2004	062	56	61	56	92	40	38	35	34	0	0	20.5	N	0
39-009-0003	1	0809	Not in a city	Athens	GIFFORD STATE	2004	063	5	5	5	100	18	17	12	12	0	0	12.8*	Y	0
39-013-1003	1	0809	Martins Ferry	Belmont	1ST STREET EXT	2004	063	5	5	5	100	21	18	17	14	0	0	15.4*	Y	0
39-017-0003	1	1259	Middletown	Butler	BONITA & ST JO	2004	063	59	61	59	97	50	47	47	44	0	0	20.2	Y	0
39-017-0015	1	1259	Middletown	Butler	3901 LEFFERSON	2004	063	61	61	61	100	56	51	49	48	0	0	22.3	Y	0
39-029-0020	1	0807	East Liverpoo	Columbiana	2220 MICHIGAN	2004	062	57	61	57	93	85	67	64	62	0	0	31.1	Y	0
39-029-0022	1	0807	East Liverpoo	Columbiana	500 MARYLAND A	2004	062	60	61	60	98	55	54	44	42	0	0	23.2	Y	0
39-035-0027	1	0229	Cleveland	Cuyahoga	2200 W 28TH	2004	063	60	61	60	98	67	55	50	48	0	0	24.2	Y	0
39-035-0038	1	0229	Cleveland	Cuyahoga	2547 ST TIKHO	2004	063	357	183	183	100	98	83	80	80	0	0	33.9	Y	0
39-035-0045	1	0229	Cleveland	Cuyahoga	4950 BROADWAY	2004	063	60	61	60	98	64	55	50	47	0	0	29.4	Y	0
39-035-0060	1	0229	Cleveland	Cuyahoga	EAST 14TH AND	2004	063	56	61	56	92	93	66	63	63	0	0	33.5	Y	0
39-035-0060	3	0229	Cleveland	Cuyahoga	EAST 14TH AND	2004	079	8745	366	365	100	83	76	75	72	0	0	28.7	Y	0
39-035-0065	1	0229	Newburgh Heigh	Cuyahoga	4600 HARVARD	2004	063	58	61	58	95	70	64	62	61	0	0	30.1	Y	0
39-035-1002	1	0229	Brook Park	Cuyahoga	16900 HOLLAND	2004	063	61	61	61	100	49	45	39	37	0	0	20.3	Y	0
39-049-0024	1	0805	Columbus	Franklin	OHIO STATE FAI	2004	063	61	61	61	100	85	77	62	61	0	0	28.8	N	0
39-049-0034	1	0805	Columbus	Franklin	STATE FAIRGROU	2004	079	5531	366	227	62	80	75	69	68	0	0	24.5*	N	0
39-057-0005	1	0287	Yellow Spring	Greene	314 DAYTON ST.	2004	062	60	61	60	98	49	40	36	33	0	0	16.4	Y	0
39-061-0014	1	1259	Cincinnati	Hamilton	18 E.	2004	063	58	61	58	95	73	53	53	51	0	0	25.0	Y	0
39-061-0040	1	1259	Cincinnati	Hamilton	250 WM. HOWARD	2004	063	57	61	57	93	55	47	40	38	0	0	21.2	Y	0
39-061-5001	1	1259	Lockland	Hamilton	101 COOPER AVE	2004	063	57	61	57	93	63	50	44	40	0	0	22.0	Y	0
39-063-0002	1	0743	Findlay	Hancock	9860 C.R. 313	2004	062	54	61	54	89	38	34	30	29	0	0	20.6*	N	0
39-063-0003	1	0743	Findlay	Hancock	9860 CR 313 FI	2004	063	54	61	54	89	40	32	32	31	0	0	21.5*	N	0
39-063-0004	1	0743	Findlay	Hancock	C.R. 144 FINDL	2004	062	54	61	54	89	42	34	31	31	0	0	21.1*	N	0
39-081-0001	1	0809	Not in a city	Jefferson	1004 THIRD	2004	063	60	61	60	98	62	49	45	43	0	0	21.3	Y	0
39-081-0017	1	0809	Steubenville	Jefferson	618 LOGAN, STE	2004	063	56	61	56	92	75	66	65	65	0	0	26.5	Y	0
39-081-1001	1	0809	Mingo Junctio	Jefferson	MINGO CITY HAL	2004	063	115	122	115	94	79	73	65	62	0	0	30.1	Y	0

Note: The * indicates that the mean does
not satisfy summary criteria.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

PM10 Total 0-10um STP (81102) Ohio UG/CU METER (25 C) (001)

24-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	#OBS	NUM REQ	VALID DAYS	%OBS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	DAY MAX >150	EST DAYS >150	WTD ARITH MEAN	CERT	EDT
39-085-1001	1	0595	Fairport Harbo	Lake	IQ 325 VINE ST	2004	062	60	61	60	98	46	45	33	32	0	0	16.3	Y	0
39-087-0003	1	0880	Coal Grove	Lawrence	MARION PIKE CO	2004	062	59	61	59	97	37	33	30	30	0	0	18.5	Y	0
39-087-0010	1	0880	Ironton	Lawrence	2128 S. 9TH ST	2004	062	58	61	58	95	39	36	36	33	0	0	18.4	Y	0
39-089-0007	1	0805	Not in a city	Licking	10843 FOUNDATI	2004	063	59	61	59	97	50	46	46	39	0	0	19.8	N	0
39-093-3002	1	0807	Not in a city	Lorain	2180 LAKE	2004	062	57	61	57	93	46	40	36	35	0	0	19.0	Y	0
39-095-0024	1	0220	Toledo	Lucas	348 S. ERIE ST	2004	079	8768	366	366	100	71	69	61	57	0	0	22.3	Y	0
39-095-1003	2	0220	Toledo	Lucas	SEWAGE PUMPING	2004	079	8677	366	362	99	67	63	61	59	0	0	18.6	Y	5
39-099-0005	1	0634	Youngstown	Mahoning	FIRE STATION 7	2004	063	60	61	60	98	52	45	41	38	0	0	19.8	Y	0
39-099-0006	1	0634	Youngstown	Mahoning	FIRE STAION 5,	2004	063	59	61	59	97	51	46	42	40	0	0	20.5	Y	0
39-111-0001	1	0809	Not in a city	Monroe	US POST OFFICE	2004	063	5	5	5	100	20	17	15	15	0	0	15.4*	Y	0
39-113-0008	1	0287	Centerville	Montgomery	7056 MCEWEN RD	2004	062	14	15	14	93	21	19	18	16	0	0	13.3*	Y	0
39-113-7001	1	0287	Moraine	Montgomery	2728 VIKING	2004	062	56	61	56	92	69	53	47	42	0	0	24.5	Y	0
39-145-0001	1	0880	New Boston	Scioto	3940 GALLIA	2004	062	59	61	59	97	37	36	32	30	0	0	18.8	Y	0
39-145-0013	1	0880	Portsmouth	Scioto	4862 GALLIA ST	2004	062	61	61	61	100	32	31	31	30	0	0	18.3	Y	0
39-145-0019	1	0880	Portsmouth	Scioto	605 WASHINGTON	2004	062	57	61	57	93	39	37	34	32	0	0	18.0	Y	0
39-145-0020	1	1299	Franklin Furna	Scioto	2840 BACK ROAD	2004	150	986	42	40	95	31	28	27	24	0	0	15.4*	N	0
39-145-0021	1	1299	Franklin Furna	Scioto	2446 GALLIA PI	2004	150	978	42	40	95	210	169	103	95	2	4.6	37.8*	N	0
39-145-0022	1	1299	Franklin Furna	Scioto	1740 GALLIA PI	2004	150	993	42	41	98	36	33	28	28	0	0	15.8*	N	0
39-145-1006	1	0880	Portsmouth	Scioto	SR. 140, SOUT	2004	062	59	61	59	97	31	29	28	28	0	0	18.2	Y	0
39-147-0003	1	1265	Not in a city	Seneca	FLAT ROCK, WAT	2004	063	176	183	175	96	54	42	39	38	0	0	17.1	N	0
39-147-0005	1	1265	Not in a city	Seneca	15990 MAIN ST.	2004	063	58	61	58	95	57	35	34	32	0	0	17.7	N	0
39-147-0006	1	1265	Not in a city	Seneca	1410 E. TWP 17	2004	063	60	61	60	98	35	33	28	28	0	0	16.2	N	0
39-151-0009	1	0151	Canton	Stark	1901 MIDWAY NE	2004	062	15	46	15	33	89	32	31	28	0	0	22.7*		0
39-151-0017	1	0151	Canton	Stark	1330 DUEBER AV	2004	062	15	46	15	33	75	66	43	28	0	0	25.6*		0
39-151-0020	1	0151	Canton	Stark	420 MARKET AVE	2004	062	21	46	21	46	57	39	33	33	0	0	20.3*		0
39-151-0020	2	0151	Canton	Stark	420 MARKET AVE	2004	062	159	46	46	100	99	82	57	54	0	0	20.6*		0
39-153-0014	1	0012	Akron	Summit	177 S BROADWA	2004	079	8730	366	364	99	54	53	50	49	0	0	19.1	Y	0
39-153-0017	3	0012	Akron	Summit	EAST HIGH SCHO	2004	079	8679	366	362	99	59	53	53	52	0	0	20.7	Y	0

Note: The * indicates that the mean does not satisfy summary criteria.

PM10 Total 0-10um STP (81102) Ohio UG/CU METER (25 C) (001)

24-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	#OBS	NUM REQ	VALID DAYS	%OBS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	DAY MAX >150	EST DAYS >150	WTD ARITH MEAN	CERT	EDT
39-155-0005	1	0634	Warren	Trumbull	540 LAIRD AVE.	2004	062	61	61	61	100	52	39	38	37	0	0	17.6	Y	0
39-155-0006	1	0634	Warren	Trumbull	2323 MAIN AVE	2004	062	60	61	60	98	45	37	36	34	0	0	17.8	Y	0
39-155-0007	1	0634	Warren	Trumbull	2609 DRAPER ST	2004	062	61	61	61	100	47	38	38	37	0	0	16.5	Y	0
39-167-0005	1	0809	Belpre	Washington	OIL WELL	2004	098	5	5	5	100	15	15	11	10	0	0	12.0*	Y	0
39-167-0006	1	0809	Belpre	Washington	EVERREADY BATT	2004	000	59	61	59	97	63	60	52	47	0	0	24.9	Y	0
39-175-0007	1	0743	Carey	Wyandot	WEAVER FARM TO	2004	063	22	25	22	88	54	36	31	27	0	0	22.0*	N	0
39-175-0008	1	0743	Carey	Wyandot	EAST NORTH	2004	063	57	61	57	93	55	54	50	48	0	0	26.7	N	0
39-175-0009	1	0743	Carey	Wyandot	GREER RD	2004	063	165	183	165	90	93	60	55	51	0	0	24.6	N	0

Note: The * indicates that the mean does not satisfy summary criteria.

Particulate Matter <2.5µ ($PM_{2.5}$)

On July 18, 1997, the US EPA promulgated revisions to the National Ambient Air Quality Standards for particulate matter. The primary standard includes only those particles with an aerodynamic diameter smaller than or equal to a nominal 2.5 micrometers. This new standard is referred to as the $PM_{2.5}$ standard (particulate matter <2.5 micrometers).

The annual standard is 15µg/m^3 annual arithmetic mean (average over three consecutive years' data). The 24-hour standard is met when the 98th percentile concentration averaged over three consecutive years, is less than or equal to 65µg/m^3.

This revision to the particulate matter program is due to research findings concerning particle size. Particulate matter can harm body tissue such as the linings of the nose and throat and the lungs by simple mechanical irritation. Nasal hairs and sneezing are the body's natural defenses against some of the relatively large particles (15-100 microns). However, small particles can slip past these defenses and penetrate deep into the lungs where they can damage lung tissues.

Because of the final action to set the fine particulate standards by US EPA to supplement $PM_{2.5}$, the Ohio Air Monitoring Network was expanded to include 49 $PM_{2.5}$ sites in 2004. Those 49 sites have a total of 74 monitors reporting data. There are 13 continuous monitors and 14 speciation monitors in addition to the 46 Federal Reference monitors.

The Federal Reference Monitors are used to determine compliance with the National Ambient Air Quality Standards, the speciation monitors are used for analysis to determine the composition of the particulate and the continuous monitors are primarily used for the Air Quality Index and for “real time” reporting of particulate data to the public.

PM2.5 - Local Conditions (88101) Ohio UG/CU Meter (LC) (105)

24-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	#OBS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	98TH PERCENTILE VALUE	WTD ARITH MEAN	CERT	EDT
39-009-0003	1	0809	Not in a city	Athens	GIFFORD STATE	2004	120	58	36.3	33.1	30.4	25.5	33.1	11.43*	Y	0
39-017-0003	1	1259	Middletown	Butler	BONITA & ST JO	2004	000	60	39.5	37.2	31.6	28.4	37.2	14.06	Y	0
39-017-0016	1	1259	Fairfield	Butler	400 NILLES RD.	2004	120	120	39.9	32.2	32.2	30.6	32.2	14.65	Y	0
39-017-0017	1	1259	Middletown	Butler	3300 WILWOOD R	2004	120	121	37.9	35.6	34.3	32.0	34.3	14.20	Y	0
39-017-1004	1	1259	Middletown	Butler	HOOK FIELD MUN	2004	119	120	36.3	32.3	31.6	29.8	31.6	13.57	Y	0
39-017-1004	3	1259	Middletown	Butler	HOOK FIELD MUN	2004	731	8676	48.5	39.2	38.5	37.8	35.8	15.42	Y	0
39-017-1004	5	1217	Middletown	Butler	HOOK FIELD MUN	2004	810	61	37.8	34.1	33.0	29.3	34.1	14.06	N	0
39-023-0005	1	0287	Springfield	Clark	350 N. FOUNTAI	2004	120	121	43.3	32.5	32.1	29.5	32.1	13.45	Y	0
39-035-0027	1	0229	Cleveland	Cuyahoga	2200 W 28TH	2004	120	323	46.4	44.5	44.2	43.0	39.5	15.63	Y	0
39-035-0034	1	0229	Cleveland	Cuyahoga	891 E. 152	2004	120	115	38.6	33.0	32.9	29.8	32.9	12.56	Y	0
39-035-0038	1	0229	Cleveland	Cuyahoga	2547 ST TIKHO	2004	120	330	55.5	48.4	46.3	46.0	42.5	17.53	Y	0
39-035-0038	6	1217	Cleveland	Cuyahoga	2547 ST TIKHO	2004	810	60	57.5	46.8	42.6	41.9	46.8	17.21	N	0
39-035-0045	1	0229	Cleveland	Cuyahoga	4950 BROADWAY	2004	120	116	43.3	39.3	36.1	36.0	36.1	15.32	Y	0
39-035-0060	1	0229	Cleveland	Cuyahoga	EAST 14TH AND	2004	120	120	46.2	42.4	42.2	35.7	42.2	16.36	Y	0
39-035-0060	5	1217	Cleveland	Cuyahoga	EAST 14TH AND	2004	810	100	42.9	40.2	40.2	36.8	40.2	17.68	N	5
39-035-0060	6	1217	Cleveland	Cuyahoga	EAST 14TH AND	2004	810	87	42.9	40.6	37.6	35.0	40.6	17.21*	N	0
39-035-0065	1	0229	Newburgh Heigh	Cuyahoga	4600 HARVARD	2004	120	117	37.9	36.2	36.1	33.3	36.1	15.17	Y	0
39-035-0066	1	0229	Cleveland	Cuyahoga	3500 EAST	2004	120	31	32.0	30.0	24.8	18.2	32.0	11.74*	Y	0
39-035-1002	1	0229	Brook Park	Cuyahoga	16900 HOLLAND	2004	120	116	35.2	31.5	30.5	29.9	30.5	13.19	Y	0
39-049-0024	1	0805	Columbus	Franklin	OHIO STATE FAI	2004	120	351	40.5	39.6	36.9	36.7	35.1	15.01	Y	0
39-049-0025	1	0805	Columbus	Franklin	1700 ANN STREE	2004	120	354	39.5	39.3	38.4	36.5	35.5	14.63	Y	0
39-049-0025	2	0805	Columbus	Franklin	1700 ANN STREE	2004	120	1	8.9				8.9	8.90*	Y	0
39-049-0028	1	0805	Columbus	Franklin	2521 FAIRWOOD	2004	711	8700	38.9	36.9	36.4	36.2	33.5	12.58	Y	0
39-049-0029	1	0805	Not in a city	Franklin	7600 FODOR RD.	2004	000	6231	39.5	39.2	35.2	32.6	30.7	13.31*	Y	0
39-049-0081	1	0805	Columbus	Franklin	5750 MAPLE CAN	2004	120	119	35.9	35.5	34.1	32.4	34.1	13.57	Y	0
39-049-0081	6	1217	Columbus	Franklin	5750 MAPLE CAN	2004	810	57	35.0	34.0	27.1	26.7	34.0	13.49	N	0

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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PM2.5 - Local Conditions (88101) Ohio UG/CU Meter (LC) (105)

24-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	#OBS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	98TH PERCENTILE VALUE	WTD ARITH MEAN	CERT	EDT
39-053-0003	5	1217	Not in a city	Gallia	8323 STATE ROU	2004	810	29	36.9	34.0	32.7	23.7	36.9	18.28*	Y	0
39-057-0005	1	0287	Yellow Spring	Greene	314 DAYTON ST.	2004	120	108	38.0	27.9	27.7	25.5	27.7	12.10*	Y	0
39-061-0014	1	1259	Cincinnati	Hamilton	18 E.	2004	120	61	47.4	42.0	35.2	27.7	42.0	15.91	Y	0
39-061-0040	1	1259	Cincinnati	Hamilton	250 WM. HOWARD	2004	120	115	41.6	37.3	30.5	29.1	30.5	14.63	Y	0
39-061-0040	3	1259	Cincinnati	Hamilton	250 WM. HOWARD	2004	701	8706	44.7	42.1	40.0	37.1	31.4	14.07	Y	0
39-061-0040	5	1217	Cincinnati	Hamilton	250 WM. HOWARD	2004	810	61	41.9	38.9	33.2	31.5	38.9	14.65	N	5
39-061-0041	1	1259	Cincinnati	Hamilton	5300 WINNESTE	2004	120	108	42.6	42.4	32.2	30.3	32.2	14.63*	Y	0
39-061-0042	1	1259	Cincinnati	Hamilton	2101 W. EIGHTH	2004	120	122	43.0	41.9	31.9	30.7	31.9	15.99	Y	0
39-061-0043	1	1259	Sharonville	Hamilton	3254 E. KEMPER	2004	120	116	42.4	35.8	31.4	30.2	31.4	14.92	Y	0
39-061-7001	1	1259	Norwood	Hamilton	2059 SHERMAN A	2004	120	350	43.4	40.8	39.3	37.3	34.6	15.33	Y	0
39-061-8001	1	1259	St. Bernard	Hamilton	300 MURRAY	2004	120	112	46.8	42.8	33.9	30.3	33.9	16.39	Y	0
39-081-0017	1	0809	Steubenville	Jefferson	618 LOGAN, STE	2004	120	104	44.2	43.9	43.8	41.0	43.8	15.91*	Y	0
39-081-0017	3	0809	Steubenville	Jefferson	618 LOGAN, STE	2004	760	5128	60.7	59.4	55.4	53.1	51.8	21.02*	Y	0
39-081-0017	5	1217	Steubenville	Jefferson	618 LOGAN, STE	2004	810	24	44.9	43.1	33.3	28.6	44.9	17.12*	N	0
39-081-1001	1	0809	Mingo Junctio	Jefferson	MINGO CITY HAL	2004	120	82	52.4	51.5	44.0	37.9	51.5	16.18	Y	0
39-085-1001	1	0595	Fairport Harbo	Lake	IQ 325 VINE ST	2004	120	113	35.8	33.9	31.8	30.2	31.8	11.61	Y	0
39-085-1001	2	0595	Fairport Harbo	Lake	IQ 325 VINE ST	2004	120	2	11.7	6.5			11.7	9.10*	Y	0
39-087-0010	1	0880	Ironton	Lawrence	2128 S. 9TH ST	2004	120	117	33.7	32.7	31.2	28.8	31.2	13.71	Y	0
39-087-0010	5	1217	Ironton	Lawrence	2128 S. 9TH ST	2004	810	59	38.5	33.3	33.2	28.0	33.3	13.82	N	0
39-093-0016	1	0807	Lorain	Lorain	214 EAST 34TH	2004	120	104	38.5	33.7	30.0	29.8	30.0	12.88*	Y	0
39-093-3002	1	0807	Not in a city	Lorain	2180 LAKE	2004	120	110	39.5	31.6	31.1	30.5	31.1	11.76	Y	0
39-093-3002	2	0807	Not in a city	Lorain	2180 LAKE	2004	120	4	14.4	12.4	11.9	8.8	14.4	12.72*	Y	0
39-093-3002	3	0807	Not in a city	Lorain	2180 LAKE	2004	701	4982	40.1	38.7	35.7	35.1	34.6	11.23*	Y	0
39-093-3002	5	1217	Not in a city	Lorain	2180 LAKE	2004	810	53	36.8	36.5	34.0	31.7	36.5	14.49*	N	0
39-095-0024	1	0220	Toledo	Lucas	348 S. ERIE ST	2004	120	124	41.6	35.2	34.3	30.9	34.3	13.68	Y	0
39-095-0024	3	0220	Toledo	Lucas	348 S. ERIE ST	2004	701	8743	37.1	35.3	33.7	32.1	28.2	9.56	Y	0

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

PM2.5 - Local Conditions (88101) Ohio UG/CU Meter (LC) (105)

24-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	#OBS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	98TH PERCENTILE VALUE	WTD ARITH MEAN	CERT	EDT
39-095-0025	1	0220	Toledo	Lucas	600 COLLINS PA	2004	120	117	40.7	34.7	31.6	30.9	31.6	13.33	Y	0
39-095-0026	1	0220	Toledo	Lucas	4208 AIRPORT H	2004	120	124	34.9	34.0	30.6	29.5	30.6	12.98	Y	0
39-095-0026	5	1217	Toledo	Lucas	4208 AIRPORT H	2004	810	60	35.2	34.2	32.9	31.1	34.2	13.10	N	0
39-099-0005	1	0634	Youngstown	Mahoning	FIRE STATION 7	2004	120	351	40.1	37.7	37.2	36.8	34.4	14.16	Y	0
39-099-0014	1	0634	Youngstown	Mahoning	345 OAKHILL AV	2004	120	359	41.3	40.5	39.6	38.8	36.0	14.70	Y	0
39-099-0014	3	0634	Youngstown	Mahoning	345 OAKHILL AV	2004	701	8717	40.7	39.7	37.2	36.3	31.7	11.25	Y	0
39-099-0014	5	1217	Youngstown	Mahoning	345 OAKHILL AV	2004	810	60	38.4	32.2	30.8	30.1	32.2	13.60	N	0
39-113-0031	1	0287	Dayton	Montgomery	1361 HUFFMAN A	2004	120	117	39.2	31.5	31.5	29.9	31.5	13.90	Y	0
39-113-0031	3	0287	Dayton	Montgomery	1361 HUFFMAN A	2004	750	6164	58.5	53.1	52.0	48.5	44.6	16.70*	Y	0
39-113-0031	5	1217	Dayton	Montgomery	1361 HUFFMAN A	2004	810	45	38.2	32.4	29.3	26.5	38.2	14.24*	N	0
39-113-0032	1	0287	Dayton	Montgomery	215 EAST THIRD	2004	120	115	41.8	32.9	32.5	29.1	32.5	14.54	Y	0
39-113-0032	3	0287	Dayton	Montgomery	215 EAST THIRD	2004	750	8765	62.0	52.9	52.6	51.0	40.7	17.30	Y	0
39-133-0002	1	0012	Ravenna	Portage	531 WASHINGTON	2004	120	114	31.6	30.2	29.8	29.2	29.8	12.50	Y	0
39-135-1001	1	0287	Not in a city	Preble	NATIONAL TRAIL	2004	120	118	29.0	28.7	27.7	27.3	27.7	12.50	Y	0
39-135-1001	3	0287	Not in a city	Preble	NATIONAL TRAIL	2004	750	8767	46.2	43.9	43.8	41.3	36.7	13.98	Y	0
39-145-0013	1	0880	Portsmouth	Scioto	4862 GALLIA ST	2004	120	118	37.3	30.5	29.4	27.8	29.4	12.95	Y	0
39-151-0017	1	0151	Canton	Stark	1330 DUEBER AV	2004	120	102	38.3	36.9	36.3	33.7	36.3	15.63*	Y	0
39-151-0017	2	0151	Canton	Stark	1330 DUEBER AV	2004	120	4	16.0	10.8	10.6	8.9	16.0	11.00*	Y	0
39-151-0020	1	0151	Canton	Stark	420 MARKET AVE	2004	120	104	36.9	33.6	32.8	31.8	32.8	14.10*	Y	0
39-151-0020	3	0151	Canton	Stark	420 MARKET AVE	2004	711	8651	40.9	36.5	35.2	34.8	32.3	10.47	Y	0
39-151-0020	5	1217	Canton	Stark	420 MARKET AVE	2004	810	58	39.2	36.0	33.8	31.1	36.0	15.12	N	5
39-153-0017	1	0012	Akron	Summit	EAST HIGH SCHO	2004	120	351	45.2	40.8	39.7	37.9	36.9	15.02	Y	0
39-153-0017	3	0012	Akron	Summit	EAST HIGH SCHO	2004	000	8091	50.8	48.1	48.0	46.4	43.2	15.75*	Y	0
39-153-0023	1	0012	Akron	Summit	660 W. EXCHANG	2004	120	340	43.5	40.6	39.7	38.3	37.0	13.85	Y	0
39-153-0023	5	1217	Akron	Summit	660 W. EXCHANG	2004	810	60	40.6	38.2	32.5	30.2	38.2	13.29	N	0
39-155-0007	1	0634	Warren	Trumbull	2609 DRAPER ST	2004	120	353	39.9	38.0	36.8	35.0	33.5	13.78	Y	0

Note: The * indicates that the mean does not satisfy summary criteria.

Three Year Average of Annual Averages

Site	County	Year 2002	2003	2004	Average
39-009-0003	Athens	12.7	12.3	11.4	12.13
39-017-0003	Butler	16.8	15.4	14.1	15.43
39-017-0016		15.3	15.8	14.7	15.27
39-017-0017		15.5	14.7	14.2	14.80
39-017-1004		13.9	15.0	13.6	14.17
39-017-1004(3)			13.4	15.4	
39-023-0005	Clark	15.1	14.1	13.5	14.23
39-035-0013	Cuyahoga	16.9	16.7		16.80
39-035-0027		16.5	15.4	15.6	15.83
39-035-0034		14.3	13.4	12.6	13.43
39-035-0038		17.7	17.6	17.5	17.60
39-035-0045		16.2	16.4	15.3	15.97
39-035-0060		17.5	17.2	16.4	17.03
39-035-0060 (3)		13.4	18.4		
39-035-0065		15.8	15.6	15.2	15.53
39-035-0066		14.2	13.9	11.7	13.27
39-035-1002		15.1	13.9	13.2	14.07
39-049-0024	Franklin	15.8	16.4	15.1	15.77
39-049-0025		16.1	15.5	14.6	15.40
39-049-0028 (3)		10.3	9.9	12.6	10.93
39-049-0029 (3)		10.8	10.2	13.3	11.43
39-049-0081		16.2	14.9	13.6	14.90
39-057-0005	Greene		9.5	12.1	
39-061-0014	Hamilton	17.9	17.0	15.9	16.93
39-061-0040		15.3	15.5	14.6	15.13
39-061-0040 (3)		14.8	14.6	14.1	14.50
39-061-0041		15.1	15.3	14.6	15.00
39-061-0042		16.8	16.7	16.0	16.50
39-061-0043		15.4	15.7	14.9	15.33
39-061-7001		16.1	16.0	15.3	15.80
39-061-8001		17.0	17.3	16.4	16.90
39-081-0016	Jefferson	17.6	17.7		
39-080-0017			15.2	15.9	
39-081-1001		17.1	17.3	16.2	16.87
39-085-1001	Lake	13.6	12.7	11.7	12.67
39-087-0010	Lawrence	15.5	14.3	13.3	14.37
39-093-0016	Lorain	14.0	13.1	12.9	13.33
39-093-3002		14.0	11.8	11.9	12.57
39-093-3002 (3)				11.2	
39-095-0024	Lucas	15.0	14.5	13.7	14.40
39-095-0024 (3)		7.4	9.8	9.6	8.93
39-095-0025		15.3	14.3	13.3	14.30
39-095-0026		14.9	14.3	13.0	14.07
39-099-0005	Mahoning	14.8	14.4	14.2	14.47
39-099-0014		13.2	15.0	14.7	14.30
39-099-0014 (3)		8.8	11.5	11.3	10.53
39-113-0031	Montgomery	15.2	14.4	13.9	14.50
39-113-0031 (3)		18.4	19.9	16.7	18.33
39-113-0032		16.2	15.9	14.5	15.53
39-113-0032 (3)		17.4	18.6	17.3	17.77
39-133-0002	Portage	14.6	12.7	12.5	13.27
39-135-1001	Preble	13.5	13.6	12.5	13.20
39-135-1001 (3)			11.2	14.0	12.60
39-145-0013	Scioto	16.7	14.7	13.0	14.80
39-145-0013 (3)			19.9		
39-151-0017	Stark	17.4	16.8	15.7	16.63
39-151-0020		15.8	15.0	14.1	14.97
39-151-0020 (3)		11.2	10.9	10.5	10.87
39-153-0017	Summit	16.7	15.4	15.0	15.70
39-153-0017 (3)		9.1	11.3	15.8	12.07
39-153-0023		16.8	14.2	13.9	14.97
39-155-0007	Trumbull	15.0	14.0	13.8	14.27

Sites with less than 75% capture

(3) continuous monitors

Sulfur Dioxide (SO_2)

Sulfur dioxide is a colorless gas formed through the combination of sulfur and oxygen during combustion. The major sources of SO_2 are the burning of sulfur-containing fossil fuels (mainly coal), with lesser amounts caused by industrial processes such as smelting. Over 40% of the SO_2 found in the ambient air is the result of human activities.

The control of SO_2 emissions from these sources is accomplished primarily by burning coal or oil with a relatively low sulfur content. Newer boilers may be equipped with flue gas desulfurization (FGD) systems that use a caustic solution to scrub SO_2 from the exhaust gas stream.

Sulfur dioxide is harmful because it can be converted to sulfuric acid (H_2SO_4) when it comes in contact with moisture, either in the atmosphere, on plants, materials, or in the lungs. The presence of increased levels of SO_2 in the atmosphere has been associated with a higher incidence of respiratory diseases, higher death rates, and property damage.

Sampling Methods

Sulfur dioxide is measured continuously by instruments using flame photometric detectors or pulsed fluorescent techniques.

Flame photometric analyzers draw ambient air through selective scrubbers that remove all sulfur compounds except SO_2. The sample is then burned in a hydrogen flame, and a photodetector senses the number of sulfur atoms present.

Fluorescent analyzers irradiate an ambient air sample with ultraviolet light. Sulfur dioxide gas molecules absorb a portion of this energy, then re-emit the energy at a characteristic wavelength of light. This light energy emitted by SO_2 molecules is sensed by a photomultiplier tube and converted to an electronic signal proportional to the concentration of SO_2 present.

All concentrations for SO_2 are given in parts per million (ppm). Reports for 1995 and earlier used the units 'micrograms per cubic meter' ($\mu g/m^3$) to report data. The primary units to report data were changed by US EPA in May of 1996.

Sulfur dioxide (42401) Ohio PPM (007)

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	# OBS	1ST MAX 24-HR	2ND MAX 24-HR	#OBS >0.14	1ST MAX 3-HR	2ND MAX 3-HR	#OBS >0.5	1ST MAX 1-HR	2ND MAX 1-HR	ARITH MEAN	CERT	EDT
39-001-0001	1	0880	West Union	Adams	ADAMS CO. HO	2004	000	8383	.028	.026	0	.092	.067	0	.188	.128	.0060	Y	0
39-003-0002	1	0808	Not in a city	Allen	2650 BIBLE	2004	061	8334	.019	.016	0	.034	.030	0	.038	.036	.0027	Y	0
39-007-1001	1	0807	Conneaut	Ashtabula	JQ CONNEAUT	2004	061	8144	.022	.018	0	.054	.047	0	.055	.055	.0036	Y	0
39-013-3002	2	0809	Shadyside	Belmont	EAST 40 STRE	2004	061	8311	.042	.039	0	.112	.108	0	.155	.150	.0080	Y	0
39-017-0004	1	1259	Hamilton	Butler	SCHULER AND	2004	060	8725	.035	.031	0	.101	.072	0	.147	.118	.0070	Y	0
39-017-1004	1	1259	Middletown	Butler	HOOK FIELD M	2004	060	8711	.023	.022	0	.062	.052	0	.135	.108	.0052	Y	0
39-023-0003	1	0287	Not in a city	Clark	5400 SPANGLE	2004	061	8731	.031	.021	0	.050	.048	0	.052	.051	.0047	Y	0
39-025-0021	1	1259	Not in a city	Clermont	3079 ANGEL	2004	060	8521	.033	.030	0	.090	.089	0	.276	.178	.0054	Y	0
39-029-0022	1	0807	East Liverpoo	Columbiana	500 MARYLAND	2004	061	8385	.068	.061	0	.141	.118	0	.197	.189	.0068	Y	0
39-035-0038	2	0229	Cleveland	Cuyahoga	2547 ST TIKH	2004	060	8603	.031	.031	0	.082	.053	0	.088	.085	.0063	Y	0
39-035-0045	1	0229	Cleveland	Cuyahoga	4950 BROADWA	2004	060	8679	.017	.013	0	.045	.036	0	.061	.055	.0034	Y	0
39-035-0060	1	0229	Cleveland	Cuyahoga	EAST 14TH AN	2004	000	8617	.032	.032	0	.063	.051	0	.067	.066	.0046	Y	0
39-035-0065	1	0229	Newburgh Heigh	Cuyahoga	4600 HARVAR	2004	000	8405	.022	.019	0	.053	.048	0	.064	.058	.0040	Y	0
39-049-0034	1	0805	Columbus	Franklin	STATE FAIRGR	2004	060	8247	.024	.023	0	.048	.045	0	.081	.076	.0044	Y	0
39-053-0002	1	0809	Not in a city	Gallia	CHESHIRE TOW	2004	061	8388	.041	.033	0	.090	.086	0	.174	.143	.0056	Y	0
39-061-0010	2	1259	Not in a city	Hamilton	6950 RIPPLE	2004	060	8756	.045	.040	0	.163	.109	0	.223	.206	.0071	Y	0
39-081-0017	1	0809	Steubenville	Jefferson	618 LOGAN, S	2004	000	8242	.102	.098	0	.248	.247	0	.337	.309	.0101	Y	0
39-081-1001	1	0809	Mingo Junctio	Jefferson	MINGO CITY H	2004	061	713	.023	.020	0	.050	.048	0	.073	.064	.0068	Y	0
39-085-0003	1	0595	Eastlake	Lake	JEFFERSON EL	2004	061	8355	.019	.019	0	.054	.038	0	.059	.058	.0047	Y	0
39-085-3002	1	0595	Painesville	Lake	71 E HIGH	2004	061	8368	.075	.047	0	.152	.124	0	.182	.175	.0082	Y	0
39-087-0006	2	0880	Ironton	Lawrence	2120 SO. 8T	2004	000	8394	.032	.021	0	.046	.046	0	.068	.062	.0042	Y	0
39-093-0017	1	0807	Elyria	Lorain	601 BROAD ST	2004	061	7197	.019	.014	0	.070	.057	0	.088	.075	.0033	Y	0
39-095-0008	2	0220	Toledo	Lucas	600 COLLINS	2004	061	8681	.029	.028	0	.064	.053	0	.131	.096	.0068	Y	0
39-095-0024	1	0220	Toledo	Lucas	348 S. ERIE	2004	061	8688	.022	.016	0	.056	.051	0	.077	.072	.0044	Y	0
39-099-0013	1	0634	Youngstown	Mahoning	345 OAKHILL	2004	061	8363	.022	.021	0	.060	.047	0	.109	.067	.0051	Y	0
39-105-1001	1	0809	Pomeroy	Meigs	MULBERRY	2004	060	8259	.027	.023	0	.097	.094	0	.150	.146	.0050	Y	0
39-113-0025	2	0287	Dayton	Montgomery	451 WEST THI	2004	061	1435	.006	.005	0	.010	.009	0	.010	.010	.0021	Y	0
39-115-0003	1	0809	Not in a city	Morgan	2600 ST. RT.	2004	061	8090	.062	.052	0	.276	.190	0	.404	.385	.0083	Y	0
39-145-0013	1	0880	Portsmouth	Scioto	4862 GALLIA	2004	000	8382	.023	.023	0	.044	.041	0	.062	.052	.0044	Y	0
39-145-0020	1	1299	Franklin Furna	Scioto	2840 BACK RO	2004	060	986	.019	.013	0	.032	.029	0	.039	.039	.0056	N	0
39-145-0022	1	1299	Franklin Furna	Scioto	1740 GALLIA	2004	060	987	.015	.008	0	.036	.027	0	.038	.035	.0030	N	0

Sulfur dioxide (42401) Ohio PPM (007)

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	# OBS	1ST MAX 24-HR	2ND MAX 24-HR	#OBS >0.14	1ST MAX 3-HR	2ND MAX 3-HR	#OBS >0.5	1ST MAX 1-HR	2ND MAX 1-HR	ARITH MEAN	CERT	EDT
39-151-0016	1	0151	Canton	Stark	MALONE COLLE	2004	060	1432	.033	.023	0	.066	.059	0	.071	.070	.0096	Y	0
39-153-0017	1	0012	Akron	Summit	EAST HIGH SC	2004	092	8391	.075	.052	0	.149	.146	0	.215	.194	.0079	Y	0
39-153-0022	1	0012	Akron	Summit	177 S. BROAD	2004	100	8390	.027	.022	0	.062	.051	0	.092	.074	.0049	Y	0
39-157-0006	1	0809	Not in a city	Tuscarawas	527 CRESCENT	2004	000	8224	.030	.030	0	.109	.058	0	.134	.108	.0073	Y	0

Nitrogen Dioxide (NO_2)

Nitrogen dioxide is a toxic gas formed in high temperature combustion processes, when nitrogen in the air is oxidized to nitric oxide (NO) or nitrogen dioxide (NO_2). The major sources of NO_2 are high temperature fuel combustion, motor vehicles, and certain chemical processes.

Nitrogen dioxide has been associated with a variety of respiratory diseases through its ability to reduce cell immunity or resistance to bacteria and viruses. Nitrogen dioxide is also harmful due to its involvement in the production of photochemical oxidants such as ozone (O_3).

Sampling Methods

Continuous monitoring of NO_2 is based on a chemiluminescent reaction between NO and O_3. When these two gases react, light energy at a specific wavelength is produced. In the monitor, ambient air is drawn along two paths. In the first path, the air is reacted directly with ozone, and the light energy produced is proportional to the amount of NO in the air. In the second path, the air is reacted with ozone after it passes through a catalytic reduction surface. The reduction surface converts NO_2 to NO and the light energy produced is a measure of the total oxides of nitrogen in the air sample. The electronic difference of these two signals yields the concentration of NO_2.

All concentrations for NO_2 are given in parts per million (ppm).

Nitrogen dioxide (42602) Ohio PPM (007)

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	# OBS	1ST MAX 1-HR	2ND MAX 1-HR	ARITH MEAN	CERT	EDT
39-035-0060	1	0229	Cleveland	Cuyahoga	EAST 14TH AND OR	2004	099	8484	.083	.082	.0222	Y	0
39-035-0066	1	0229	Cleveland	Cuyahoga	3500 EAST	2004	099	2533	.055	.055	.0180	Y	0
39-035-0070	1	0229	Cleveland	Cuyahoga	13013 CORTLETT A	2004	099	5497	.070	.070	.0159	Y	0
39-061-0040	1	1259	Cincinnati	Hamilton	250 WM. HOWARD T	2004	074	8728	.076	.070	.0187	Y	0
39-061-4002	1	1259	Norwood	Hamilton	3001 HARRIS AVE	2004	074	7267	.160	.089	.0178	Y	0

Carbon Monoxide (CO)

Carbon monoxide, a colorless and odorless gas, is the most abundant and widely distributed pollutant found in the lower atmosphere. It is produced by the incomplete combustion of carbon containing fuels, primarily in the internal combustion engine. About 95 to 98% of urban carbon monoxide comes from manmade sources, with transportation vehicles ranking as the largest source.

The main effect of CO on human health involves its tendency to reduce the oxygen carrying capacity of the blood by binding chemically to hemoglobin, the substance that carries oxygen to the cells. This may lead to short-term impairment of mental processes. Exposure to concentrations as low as 10-15 ppm for several hours has affected time interval discrimination in test subjects, while exposures of 31 ppm under similar conditions have temporarily altered the function of the brain.

Sampling Method

Carbon monoxide is monitored continuously by analyzers that operate on the infrared absorption principle. Ambient air is drawn into a sample chamber and a beam of infrared light is passed through it. CO absorbs infrared radiation, and any decrease in the intensity of the beam is due to the presence of CO molecules. This decrease is directly related to the concentration of CO in the ambient air. A special detector measures the difference in the radiation between this beam and a duplicate beam passing through a reference chamber with no CO present. This difference in intensity is electronically translated into a reading of the CO present in the ambient air, measured in parts per million.

Carbon monoxide (42101) Ohio PPM (007)

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	# OBS	1ST MAX 1-HR	2ND MAX 1-HR	OBS >35	1ST MAX 8-HR	2ND MAX 8-HR	OBS >9	CERT	EDT
39-035-0048	1	0229	Cleveland	Cuyahoga	2026 EAST NINTH	2004	093	8381	5.3	5.0	0	2.8	2.7	0	Y	0
39-035-0051	1	0229	Cleveland	Cuyahoga	E. 9TH AND ST.	2004	067	8290	21.5	12.8	0	6.0	5.4	0	Y	0
39-035-0053	1	0229	Cleveland	Cuyahoga	4160 PEARL RD.,	2004	000	8548	4.3	4.0	0	1.9	1.9	0	Y	0
39-035-0066	1	0229	Cleveland	Cuyahoga	3500 EAST	2004	093	2563	8.0	3.0	0	2.1	1.8	0	Y	0
39-035-0070	1	0229	Cleveland	Cuyahoga	13013 CORTLETT A	2004	093	5660	3.3	3.3	0	2.5	2.0	0	Y	0
39-049-0005	1	0805	Columbus	Franklin	FIRE STATION 158	2004	067	8617	4.5	4.4	0	2.9	2.6	0	Y	0
39-049-0036	1	0805	Columbus	Franklin	122 SOUTH FRONT	2004	067	8612	2.8	2.7	0	1.9	1.8	0	Y	0
39-061-0021	1	1259	Cincinnati	Hamilton	100 E. FIFTH	2004	000	8691	8.4	5.8	0	4.1	2.8	0	Y	0
39-061-4002	1	1259	Norwood	Hamilton	3001 HARRIS AVE	2004	093	8505	6.6	5.7	0	2.5	2.4	0	Y	0
39-081-0017	1	0809	Steubenville	Jefferson	618 LOGAN, STEUB	2004	067	732	2.5	2.1	0	1.7	1.4	0	N	0
39-081-1001	1	0809	Mingo Junction	Jefferson	MINGO CITY HALL	2004	067	8684	9.2	8.1	0	3.5	3.0	0	N	0
39-085-0006	1	0595	Mentor	Lake	8443 MENTOR AVE.	2004	051	8726	2.6	1.7	0	1.3	1.3	0	Y	0
39-113-0003	1	0287	Dayton	Montgomery	7 EAST FOURTH ST	2004	067	7343	5.5	4.1	0	3.5	2.6	0	Y	0
39-113-0028	1	0287	Dayton	Montgomery	901 WEST FAIRVIE	2004	067	8648	2.1	2.0	0	1.4	1.4	0	Y	0
39-113-0034	1	0287	Dayton	Montgomery	117 SOUTH MAIN S	2004	054	1263	3.5	3.5	0	3.2	2.5	0	Y	0
39-151-0020	1	0151	Canton	Stark	420 MARKET AVE.	2004	054	8498	4.8	3.6	0	2.9	2.6	0	Y	0
39-153-0020	1	0012	Akron	Summit	800 PATTERSON	2004	067	8224	3.6	3.4	0	2.3	2.1	0	Y	0
39-153-0022	1	0012	Akron	Summit	177 S. BROADWAY	2004	000	8350	4.6	3.5	0	2.3	2.2	0	Y	0

Ozone (O_3)

Ozone differs from other pollutants in that it is not directly emitted into the atmosphere from sources. Rather, it is created photochemically in the lower atmosphere by the reaction of volatile organic compounds and oxides of nitrogen in the presence of sunlight. For this reason, it is referred to as a secondary pollutant. Ozone is the predominant oxidant component of photochemical smog.

In urban areas, emissions of nitrogen oxides and volatile organic compounds lead to the formation of ozone and other photochemical oxidants in the lower atmosphere. Nitrogen oxides, important in triggering the sequence of photochemical reactions, are emitted primarily from combustion sources such as the internal combustion engine, electric power generation units, and gas and oil-fired space heaters. Volatile organic compounds, important in sustaining the reactions, are emitted in the exhausts of gasoline, diesel and jet engines, through the evaporation of gasoline and solvents such as dry-cleaning fluids, and from industrial and nonindustrial surface coating operations such as paint booths, from open burning, and other combustion sources.

Although ozone is beneficial in the upper atmosphere, where it screens out ultraviolet rays from the sun, it is harmful in the lower atmosphere. Due to the role of temperature and sunlight in its formation, the largest concentrations occur during the summer months. Ozone irritates mucous membranes of the nose and throat, causes eye irritation, reduces resistance to respiratory infections, damages plants and contributes to the deterioration of materials. Individuals with asthma or disease of the heart or circulatory system experience symptoms often when concentrations are above the air quality standards.

The National Ambient Air Quality Standard for ozone was changed on July 18, 1997. The original standard is a one hour average of 0.12 ppm (see Table 1) with the number of exceedances of that standard totaled. More than three exceedances at a single site in a three year period is a violation of the standard.

The new standard is a three year average of the fourth highest eight hour averages at each monitoring site. If that three year average is greater than 0.08 ppm a violation of the standard has occurred. The first three year period to be covered by the new standard was 1997 through 1999.

In 2001 The United Stated Supreme Court found USEPA's previously proposed implementation plan for ozone unlawful and further held that, in the setting of a standard for ozone pursuant to Section 109 of the Clean Air Act USEPA must set air quality standards at the level that is "requisite"-no higher or lower than is necessary-to protect the public health with an adequate margin of safety. The Supreme Court then sent the case back to the D.C. Circuit Court of Appeals to review USEPA's subsequent actions. On March 26, 2002, that court upheld USEPA's revision of the ozone NAAQS, which had been published in the Federal Register by USEPA as a proposal on November 14, 2001.

This report contains a printout of the one hour data and eight hour average data, as in previous reports, and printouts of the three year average of the fourth high eight hour averages calculated for each site in Ohio for the years 2002 through 2004 and the four highest eight hour averages during 2004. A three year average was not calculated if one or more years had insufficient data.

Sampling Methods

Ozone is monitored continuously using analyzers that operate on chemiluminescence or ultraviolet absorption techniques.

With chemiluminescent analyzers, which are no longer used by Ohio EPA or its Local Air Agencies, ambient air is drawn into a reaction chamber where it is mixed with ethylene gas. Ozone present in the air sample reacts with the ethylene and emits light energy. This light is converted by a photomultiplier to an electronic signal. The signal is proportional to the amount of ozone present in the air sample.

Ozone also absorbs ultraviolet light. Analyzers designed to measure ozone by ultraviolet photometry use this property. An air sample is drawn into the analyzer and irradiated with an ultraviolet light of 253.7 nanometers wavelength. The amount of light absorbed is related to the amount of ozone present. This is the type of monitor used by Ohio EPA and our Local Air Agencies.

All concentrations for ozone are given in parts per million (ppm).

On the following pages are tables of ozone sites with the:

- Highest through fourth highest 1-Hour ozone values
- Highest through fourth highest 8-Hour ozone values
- Three year average of fourth highest 8-Hour ozone values (see NAAQS TABLE 1)
- First day in each year from 1992 that recorded an exceedance of the 1-Hour or 8-Hour standard with the number of sites and the total number of exceedances
- Last day in the year upon which an exceedance of the 1-Hour or 8-Hour standard occurred with the number of sites and values listed

Ozone (44201) Ohio PPM (007)

1-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 1-HR	2ND MAX 1-HR	3RD MAX 1-HR	4TH MAX 1-HR	DAY MAX>/= 0.125	EST DAYS>/= .125	MISS DAYS< 0.125	CERT	EDT
39-003-0002	1	0808	Not in a city	Allen	2650 BIBLE	2004	047	214	214	.091	.086	.082	.081	0	0.0	0	Y	0
39-007-1001	1	0807	Conneaut	Ashtabula	JQ CONNEAUT WATE	2004	047	213	214	.102	.095	.093	.092	0	0.0	1	Y	0
39-017-0004	1	1259	Hamilton	Butler	SCHULER AND BEND	2004	087	214	214	.100	.098	.093	.085	0	0.0	0	Y	0
39-017-1004	3	1259	Middletown	Butler	HOOK FIELD MUNIC	2004	056	213	214	.098	.089	.085	.083	0	0.0	1	Y	0
39-023-0001	1	0287	Springfield	Clark	5171 URBANA	2004	019	214	214	.101	.093	.090	.087	0	0.0	0	Y	0
39-023-0003	1	0287	Not in a city	Clark	5400 SPANGLER	2004	019	213	214	.099	.088	.087	.086	0	0.0	1	Y	0
39-025-0022	1	1259	Not in a city	Clermont	2400 CLERMONT CE	2004	000	212	214	.095	.090	.086	.084	0	0.0	2	Y	0
39-027-1002	1	0810	Not in a city	Clinton	62 LAUREL DR., C	2004	047	214	214	.099	.090	.089	.088	0	0.0	0	Y	0
39-035-0034	1	0229	Cleveland	Cuyahoga	891 E. 152	2004	000	189	214	.075	.072	.072	.070	0	0.0	1		0
39-035-0064	1	0229	Berea	Cuyahoga	390 FAIR ST., BE	2004	019	205	214	.075	.073	.073	.072	0	0.0	1	Y	0
39-035-5002	1	0229	Mayfield	Cuyahoga	6116 WILSON MILL	2004	000	204	214	.099	.090	.088	.088	0	0.0	1	Y	0
39-041-0002	1	0805	Not in a city	Delaware	359 MAIN RD.,	2004	047	213	214	.088	.086	.086	.086	0	0.0	1	Y	0
39-049-0028	1	0805	Columbus	Franklin	2521 FAIRWOOD AV	2004	047	214	214	.101	.095	.092	.087	0	0.0	0	Y	0
39-049-0029	1	0805	Not in a city	Franklin	7600 FODOR RD.,	2004	000	214	214	.096	.096	.090	.089	0	0.0	0	Y	0
39-049-0037	1	0805	Columbus	Franklin	1777 E. BROAD, F	2004	000	214	214	.096	.092	.091	.083	0	0.0	0	Y	0
39-049-0081	1	0805	Columbus	Franklin	5750 MAPLE CANYO	2004	000	212	214	.095	.094	.084	.084	0	0.0	0	Y	0
39-055-0004	1	0595	Not in a city	Geauga	13000 AUBURN	2004	019	213	214	.105	.089	.084	.083	0	0.0	1	Y	0
39-057-0006	1	0287	Xenia	Greene	541 LEDBETTER RD	2004	019	213	214	.094	.090	.089	.087	0	0.0	1	Y	0
39-061-0006	1	1259	Cincinnati	Hamilton	11590 GROOMS RD.	2004	000	211	214	.095	.091	.087	.086	0	0.0	3	Y	0
39-061-0010	1	1259	Not in a city	Hamilton	6950 RIPPLE	2004	019	214	214	.107	.093	.092	.084	0	0.0	0	Y	0
39-061-0040	1	1259	Cincinnati	Hamilton	250 WM. HOWARD T	2004	056	213	214	.098	.093	.091	.087	0	0.0	1	Y	0
39-081-0017	1	0809	Steubenville	Jefferson	618 LOGAN, STEUB	2004	047	213	214	.095	.088	.087	.085	0	0.0	1	Y	0
39-083-0002	1	0805	Not in a city	Knox	WATER PLT, SR. 3	2004	087	209	214	.096	.089	.085	.084	0	0.0	3	Y	0
39-085-0003	1	0595	Eastlake	Lake	JEFFERSON ELEMEN	2004	019	214	214	.090	.090	.086	.086	0	0.0	0	Y	0
39-085-3002	1	0595	Painesville	Lake	71 E HIGH	2004	019	209	214	.088	.086	.084	.083	0	0.0	2	Y	0
39-087-0006	1	0880	Ironton	Lawrence	2120 SO. 8TH	2004	019	207	214	.083	.079	.073	.073	0	0.0	0	Y	0
39-087-0011	1	0880	Not in a city	Lawrence	ST. RT. 775 & ST	2004	019	214	214	.066	.061	.061	.060	0	0.0	0	Y	0
39-089-0005	1	0805	Heath (Fourmile	Licking	300 LICKING VIEW	2004	047	211	214	.089	.084	.084	.084	0	0.0	3	Y	0

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

Ozone (44201) Ohio PPM (007)

1-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 1-HR	2ND MAX 1-HR	3RD MAX 1-HR	4TH MAX 1-HR	DAY MAX>/= 0.125	EST DAYS>/= .125	MISS DAYS< 0.125	CERT	EDT
39-093-0017	1	0807	Elyria	Lorain	601 BROAD STREET	2004	047	214	214	.096	.087	.082	.082	0	0.0	0	Y	0
39-095-0024	1	0220	Toledo	Lucas	348 S. ERIE STRE	2004	056	213	214	.081	.080	.077	.075	0	0.0	1	Y	0
39-095-0027	1	0220	Waterville	Lucas	200 SOUTH BYRNE	2004	019	213	214	.089	.085	.084	.079	0	0.0	1	Y	0
39-095-0034	1	0220	Not in a city	Lucas	306 N. YONDOTA,	2004	056	214	214	.104	.094	.090	.089	0	0.0	0	Y	0
39-095-0081	1	0220	Toledo	Lucas	FRIENDSHIP PK SH	2004	056	212	214	.095	.092	.091	.087	0	0.0	2	Y	0
39-097-0007	1	0805	Not in a city	Madison	9940 SR 38	2004	047	214	214	.091	.087	.086	.084	0	0.0	0	Y	0
39-099-0013	1	0634	Youngstown	Mahoning	345 OAKHILL AVE.	2004	087	214	214	.093	.092	.089	.087	0	0.0	0	Y	0
39-103-0003	1	0012	Not in a city	Medina	6364 DEERVIEW LA	2004	087	208	214	.098	.090	.086	.085	0	0.0	0	Y	0
39-109-0005	1	0287	Not in a city	Miami	3825 NORTH STATE	2004	019	213	214	.092	.082	.082	.081	0	0.0	1	Y	0
39-113-0033	1	0287	Dayton	Montgomery	1404 WEBSTER STR	2004	019	211	214	.081	.079	.077	.077	0	0.0	0	Y	0
39-133-1001	1	0012	Not in a city	Portage	1570 RAVENNA ROA	2004	056	213	214	.093	.091	.090	.090	0	0.0	1	Y	0
39-135-1001	1	0287	Not in a city	Preble	NATIONAL TRAILS	2004	019	212	214	.086	.085	.075	.071	0	0.0	2	Y	0
39-151-0016	1	0151	Canton	Stark	MALONE COLLEGE;	2004	047	198	214	.095	.093	.086	.083	0	0.0	1	Y	0
39-151-0021	1	0151	Brewster	Stark	245 WEST FIFTH	2004	047	212	214	.100	.086	.080	.078	0	0.0	0	Y	0
39-151-1009	1	0151	Not in a city	Stark	6318 HEMINGER AV	2004	047	200	214	.098	.089	.089	.085	0	0.0	1	Y	0
39-151-4005	1	0151	Alliance	Stark	1175 WEST VINE S	2004	047	211	214	.089	.087	.087	.082	0	0.0	0	Y	0
39-153-0020	1	0012	Akron	Summit	800 PATTERSON	2004	087	214	214	.101	.094	.088	.085	0	0.0	0	Y	0
39-155-0009	1	0634	Not in a city	Trumbull	COMMUNITY HALL B	2004	056	214	214	.091	.086	.086	.084	0	0.0	0	Y	0
39-155-0011	1	0634	Not in a city	Trumbull	842 YOUNGSTOWN-K	2004	019	214	214	.097	.094	.094	.091	0	0.0	0	Y	0
39-165-0007	1	1259	Lebanon	Warren	416 SOUTHEAST ST	2004	056	213	214	.098	.097	.094	.089	0	0.0	1	Y	0
39-167-0004	1	0809	Marietta	Washington	2000 FOURTH STRE	2004	047	214	214	.095	.088	.087	.087	0	0.0	0	Y	0
39-173-0003	1	0808	Bowling Green	Wood	347 N DUNBRIDGE	2004	047	214	214	.086	.086	.085	.084	0	0.0	0	Y	0

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

Ozone (44201) — Ohio — PPM (007)

8-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	%OBS	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 8-HR	2ND MAX 8-HR	3RD MAX 8-HR	4TH MAX 8-HR	DAY MAX>/= 0.085	CERT	EDT
39-003-0002	1	0808	Not in a city	Allen	2650 BIBLE	2004	047	100	213	214	.079	.078	.076	.076	0	Y	0
39-007-1001	1	0807	Conneaut	Ashtabula	JQ CONNEAUT WATE	2004	047	100	213	214	.088	.088	.085	.081	3	Y	0
39-017-0004	1	1259	Hamilton	Butler	SCHULER AND BEND	2004	087	100	214	214	.090	.081	.078	.075	1	Y	0
39-017-1004	3	1259	Middletown	Butler	HOOK FIELD MUNIC	2004	056	100	213	214	.087	.079	.078	.076	1	Y	0
39-023-0001	1	0287	Springfield	Clark	5171 URBANA	2004	019	100	214	214	.088	.084	.080	.079	1	Y	0
39-023-0003	1	0287	Not in a city	Clark	5400 SPANGLER	2004	019	99	212	214	.080	.079	.077	.073	0	Y	0
39-025-0022	1	1259	Not in a city	Clermont	2400 CLERMONT CE	2004	000	99	212	214	.082	.077	.076	.076	0	Y	0
39-027-1002	1	0810	Not in a city	Clinton	62 LAUREL DR., C	2004	047	100	214	214	.087	.081	.081	.078	1	Y	0
39-035-0034	1	0229	Cleveland	Cuyahoga	891 E. 152	2004	000	87	186	214	.064	.062	.062	.057	0		0
39-035-0064	1	0229	Berea	Cuyahoga	390 FAIR ST., BE	2004	019	93	198	214	.067	.065	.065	.063	0	Y	0
39-035-5002	1	0229	Mayfield	Cuyahoga	6116 WILSON MILL	2004	000	93	200	214	.086	.079	.079	.078	1	Y	0
39-041-0002	1	0805	Not in a city	Delaware	359 MAIN RD.,	2004	047	99	212	214	.079	.078	.077	.075	0	Y	0
39-049-0028	1	0805	Columbus	Franklin	2521 FAIRWOOD AV	2004	047	100	214	214	.082	.078	.076	.075	0	Y	0
39-049-0029	1	0805	Not in a city	Franklin	7600 FODOR RD.,	2004	000	100	213	214	.081	.080	.078	.078	0	Y	0
39-049-0037	1	0805	Columbus	Franklin	1777 E. BROAD, F	2004	000	99	212	214	.086	.079	.073	.073	1	Y	0
39-049-0081	1	0805	Columbus	Franklin	5750 MAPLE CANYO	2004	000	99	211	214	.077	.075	.075	.074	0	Y	0
39-055-0004	1	0595	Not in a city	Geauga	13000 AUBURN	2004	019	99	212	214	.087	.084	.076	.075	1	Y	0
39-057-0006	1	0287	Xenia	Greene	541 LEDBETTER RD	2004	019	100	213	214	.084	.081	.075	.075	0	Y	0
39-061-0006	1	1259	Cincinnati	Hamilton	11590 GROOMS RD.	2004	000	98	210	214	.084	.078	.076	.076	0	Y	0
39-061-0010	1	1259	Not in a city	Hamilton	6950 RIPPLE	2004	019	100	214	214	.085	.084	.077	.075	1	Y	0
39-061-0040	1	1259	Cincinnati	Hamilton	250 WM. HOWARD T	2004	056	100	213	214	.078	.078	.077	.076	0	Y	0
39-081-0017	1	0809	Steubenville	Jefferson	618 LOGAN, STEUB	2004	047	99	212	214	.087	.075	.074	.071	1	Y	0
39-083-0002	1	0805	Not in a city	Knox	WATER PLT, SR. 3	2004	087	96	205	214	.083	.082	.076	.073	0	Y	0
39-085-0003	1	0595	Eastlake	Lake	JEFFERSON ELEMEN	2004	019	100	213	214	.082	.080	.080	.079	0	Y	0
39-085-3002	1	0595	Painesville	Lake	71 E HIGH	2004	019	96	205	214	.079	.076	.076	.076	0	Y	0
39-087-0006	1	0880	Ironton	Lawrence	2120 SO. 8TH	2004	019	97	207	214	.070	.065	.065	.063	0	Y	0

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

Ozone (44201) Ohio PPM (007)

8-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	%OBS	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 8-HR	2ND MAX 8-HR	3RD MAX 8-HR	4TH MAX 8-HR	DAY MAX>/= 0.085	CERT	EDT
39-087-0011	1	0880	Not in a city	Lawrence	ST. RT. 775 & ST	2004	019	100	214	214	.055	.053	.052	.052	0	Y	0
39-089-0005	1	0805	Heath (Fourmile	Licking	300 LICKING VIEW	2004	047	99	211	214	.077	.075	.074	.074	0	Y	0
39-093-0017	1	0807	Elyria	Lorain	601 BROAD STREET	2004	047	99	212	214	.083	.079	.074	.074	0	Y	0
39-095-0024	1	0220	Toledo	Lucas	348 S. ERIE STRE	2004	056	99	212	214	.072	.072	.072	.067	0	Y	0
39-095-0027	1	0220	Waterville	Lucas	200 SOUTH BYRNE	2004	019	100	213	214	.076	.076	.076	.074	0	Y	0
39-095-0034	1	0220	Not in a city	Lucas	306 N. YONDOTA,	2004	056	100	213	214	.090	.079	.079	.078	1	Y	0
39-095-0081	1	0220	Toledo	Lucas	FRIENDSHIP PK SH	2004	056	99	212	214	.086	.079	.078	.078	1	Y	0
39-097-0007	1	0805	Not in a city	Madison	9940 SR 38	2004	047	100	214	214	.079	.078	.076	.075	0	Y	0
39-099-0013	1	0634	Youngstown	Mahoning	345 OAKHILL AVE.	2004	087	100	214	214	.086	.079	.074	.074	1	Y	0
39-103-0003	1	0012	Not in a city	Medina	6364 DEERVIEW LA	2004	087	97	207	214	.085	.082	.077	.077	1	Y	0
39-109-0005	1	0287	Not in a city	Miami	3825 NORTH STATE	2004	019	99	212	214	.080	.079	.075	.075	0	Y	0
39-113-0033	1	0287	Dayton	Montgomery	1404 WEBSTER STR	2004	019	98	210	214	.073	.071	.068	.067	0	Y	0
39-133-1001	1	0012	Not in a city	Portage	1570 RAVENNA ROA	2004	056	100	213	214	.086	.084	.082	.081	1	Y	0
39-135-1001	1	0287	Not in a city	Preble	NATIONAL TRAILS	2004	019	98	210	214	.072	.070	.068	.066	0	Y	0
39-151-0016	1	0151	Canton	Stark	MALONE COLLEGE;	2004	047	92	197	214	.086	.082	.076	.074	1	Y	0
39-151-0021	1	0151	Brewster	Stark	245 WEST FIFTH	2004	047	99	211	214	.085	.075	.073	.071	1	Y	0
39-151-1009	1	0151	Not in a city	Stark	6318 HEMINGER AV	2004	047	92	196	214	.084	.081	.077	.076	0	Y	0
39-151-4005	1	0151	Alliance	Stark	1175 WEST VINE S	2004	047	98	210	214	.084	.079	.076	.076	0	Y	0
39-153-0020	1	0012	Akron	Summit	800 PATTERSON	2004	087	100	214	214	.087	.087	.080	.077	2	Y	0
39-155-0009	1	0634	Not in a city	Trumbull	COMMUNITY HALL B	2004	056	100	214	214	.082	.080	.078	.078	0	Y	0
39-155-0011	1	0634	Not in a city	Trumbull	842 YOUNGSTOWN-K	2004	019	100	214	214	.089	.086	.080	.080	2	Y	0
39-165-0007	1	1259	Lebanon	Warren	416 SOUTHEAST ST	2004	056	100	213	214	.087	.085	.083	.081	2	Y	0
39-167-0004	1	0809	Marietta	Washington	2000 FOURTH STRE	2004	047	100	213	214	.079	.079	.078	.077	0	Y	0
39-173-0003	1	0808	Bowling Green	Wood	347 N DUNBRIDGE	2004	047	100	214	214	.079	.078	.077	.076	0	Y	0

Three Year Average of Fourth High 8-Hour Ozone Averages in 2002-2004

Site ID	City	County	Address	4th high in Year 2002	2003	2004	3 Year Average
39-003-0002		Allen	2650 Bible Rd.	0.098	0.088	0.076	0.087
39-007-1001	Conneaut	Ashtabula	JQ Conneaut Water Plant	0.103	0.099	0.081	0.094
39-017-0004	Hamilton	Butler	Schuler & Bender Rds.	0.100	0.094	0.075	0.090
39-017-1004	Middletown	Butler	Hook Field Municipal Airport	0.098	0.083	0.076	0.086
39-023-0001		Clark	5171 Urbana Rd.	0.099	0.084	0.079	0.087
39-023-0003		Clark	5400 Spangler Rd.	0.094	0.082	0.073	0.083
39-025-0022		Clermont	2400 Claremont Center Dr.	0.098	0.090	0.076	0.088
39-027-1002		Clinton	62 Laurel Rd.	0.099	0.096	0.078	0.091
39-035-0034	Cleveland	Cuyahoga	891 E. 152nd St.	0.090	0.076	0.057	0.074
39-035-0064	Berea	Cuyahoga	390 Fair St.	0.092	0.079	0.063	0.078
39-035-5002	Mayfield	Cuyahoga	6116 Wilson Mill Rd.	0.098	0.089	0.078	0.088
39-041-0002		Delaware	359 Main Rd.	0.097	0.089	0.075	0.087
39-049-0028	Columbus	Franklin	2521 Fairwood Ave.	0.096	0.085	0.075	0.085
39-049-0029	New Albany	Franklin	7600 Fodor Rd.	0.103	0.094	0.078	0.092
39-049-0037	Columbus	Franklin	1777 E. Broad St.	0.099	0.084	0.073	0.085
39-049-0081	Columbus	Franklin	5750 Maple Canyon	0.095	0.081	0.074	0.083
39-055-0004		Geauga	13000 Auburn Rd.	0.115	0.097	0.075	0.096
39-057-0006	Xenia	Greene	541 Ledbetter Rd.	0.096	0.091	0.075	0.087
39-061-0006		Hamilton	11590 Grooms Rd.	0.100	0.093	0.076	0.090
39-061-0010		Hamilton	6950 Ripple Rd.	0.096	0.087	0.075	0.086
39-061-0040	Cincinnati	Hamilton	250 Wm. Howard Taft	0.095	0.083	0.076	0.085
39-081-0016	Steubenville	Jefferson	227 North 5th St.	0.093	0.079	-------	--------
39-081-0017	Steiubenville	Jefferson	618 Logan	--------	--------	0.071	--------
39-083-0002		Knox	Water Plant SR 3	0.095	0.083	0.073	0.084
39-085-0003	Eastlake	Lake	Jefferson Elementary	0.104	0.092	0.079	0.092
39-085-3002	Painesville	Lake	71 E. High St.	0.088	0.080	0.076	0.081
39-087-0006	Ironton	Lawrence	2120 S. 8th St.	0.092	0.075	0.063	0.077
39-087-0011		Lawrence	SR 775 & SR	0.083	0.074	0.052	0.070
39-089-0005	Heath	Licking	300 Licking View	0.096	0.087	0.074	0.086

Three Year Average of Fourth High 8-Hour Ozone Averages in 2002-2004

Site ID	City	County	Address	4th high in Year 2002	2003	2004	3 Year Average
39-093-0017	Elyria	Lorain	601 Broad St.	0.099	0.085	0.074	0.086
39-095-0024	Toledo	Lucas	348 S. Erie St.	0.092	0.086	0.067	0.082
39-095-0027	Waterville	Lucas	200 S. Byrne	0.086	0.088	0.074	0.083
39-095-0034	Toledo	Lucas	306 N. Yondota	0.096	0.094	0.078	0.089
39-095-0081	Toledo	Lucas	Friendship Park	0.094	0.088	0.078	0.087
39-097-0007		Madison	9940 SR 38 SW	0.097	0.090	0.075	0.087
39-099-0013	Youngstown	Mahoning	345 Oakhill Ave.	0.096	0.085	0.074	0.085
39-103-0003		Medina	6364 Deerview	0.091	0.086	0.077	0.085
39-109-0005		Miami	3825 North State	0.096	0.088	0.075	0.086
39-113-0019	Dayton	Montgomery	2100 Timberlane	0.095	0.086	-------	-------
39-113-0033	Dayton	Montgomery	1404 Webster	-------	-------	0.067	-------
39-133-1001		Portage	1570 Ravenna Rd.	0.097	0.091	0.081	0.090
39-135-1001		Preble	National Trails	0.095	0.071	0.066	0.077
39-151-0016	Canton	Stark	Malone College	0.094	0.087	0.074	0.085
39-151-0021		Stark	245 W. 5th St.	0.092	0.085	0.071	0.083
39-151-1009		Stark	6318 Heminger Ave.	0.094	0.089	0.076	0.086
39-151-4005	Alliance	Stark	1175 West Vine St.	0.098	0.086	0.076	0.087
39-153-0020	Akron	Summit	800 Patterson Av.	0.103	0.089	0.077	0.090
39-155-0009		Trumbull	Community Hall	0.094	0.089	0.078	0.087
39-155-0011		Trumbull	Trumbull Co. Sanitary Engineers	0.102	0.091	0.080	0.091
39-165-0006	Lebanon	Warren	230 Cook Rd.	0.098	-------	-------	-------
39-165-0007	Lebanon	Warren	416 Southeast St.	-------	0.095	0.081	-------
39-167-0004	Marietta	Washington	2000 Fourth St.	0.095	0.080	0.077	0.084
39-173-0003	Bowling Green	Wood	347 N. Dunbridge	0.094	0.091	0.076	0.087

Count of Ozone Exceedances in Each Year
And the Date Upon Which the First Occurred

Year	1-Hr Data Date	Exceedances/Sites	8-Hr Data Date	Exceedances/Sites
1992	30 June	4/43	11 May	115/43
1993	17 June	9/44	1 May	220/44
1994	16 June	13/45	22 May	272/45
1995	19 June	15/45	6 June	381/45
1996	28 June	5/45	1 June	331/45
1997	24 June	5/50	24 May	222/50
1998	13 May	15/49	13 May	478/49
1999	30 May	14/50	4 May	461/50
2000	9 June	1/48	31 May	135/48
2001	14 June	2/50	3 May	250/50
2002	20 June	22/50	8 June	801/50
2003	23 June	22/50	16 April	204/50
2004	None	0/50	12 May	25/50

Last Ozone Exceedance Dates
1982-2004
One Hour Standard

Year	Date	Sites	Maximum Value
1982	9/12	1	125 ppb
1983	9/09	1	170
1984	9/21	1	135
1985	9/22	1	127
1986	9/14	1	127
1987	9/29	1	125
1988	8/18	3	159
1989	8/14	1	129
1990	8/27	2	155
1991	8/29	1	125
1992	7/09	1	218
1993	8/27	1	137
1994	8/25	1	153
1995	8/26	1	125
1996	8/04	1	131
1997	8/01	1	125
1998	9/14	2	139
1999	7/30	1	130
2000	6/09	1	126
2001	8/06	1	125
2002	9/07	1	127
2003	6/25	4	136
2004	none	0	107

Last Ozone Exceedance Dates
1982-2004
Eight Hour Standard

Year	Date	Sites	Maximum Value
1982	10/05	2	87 ppb
1983	10/03	1	88
1984	9/22	5	92
1985	9/22	2	108
1986	9/14	1	87
1987	9/29	1	87
1988	8/18	8	127
1989	9/13	1	93
1990	9/07	1	87
1991	9/08	5	91
1992	9/17	2	89
1993	8/30	8	100
1994	9/14	2	88
1995	9/06	1	86
1996	9/02	2	89
1997	9/02	3	92
1998	9/26	1	89
1999	9/26	17	97
2000	8/15	3	92
2001	9/13	1	85
2002	9/13	1	87
2003	8/26	5	96
2004	9/23	2	90

Lead

Airborne lead in urban areas was once primarily caused by vehicles using leaded fuels. With the elimination of lead from gasoline those concentrations have dropped to unmeasurably low levels using the US EPA reference method. Sources of airborne lead now include lead smelting facilities, lead-acid storage battery manufacturing plants and other manufacturing operations.

In March of 1999 the US EPA promulgated new rules for lead monitoring that eliminate the need for traffic oriented sites and emphasizes monitoring at industrial sources. In the period 1978-1991 lead levels at traffic oriented lead sites dropped by over 90%, reflecting the removal of lead from gasoline. We discontinued monitoring at traffic oriented sites after the first calendar quarter of 1999.

Lead is a stable compound that can accumulate in the human body. Its health related effects include interference with the blood forming process and the normal functions of nervous and renal systems. Young children are the age group most susceptible to the adverse effects of lead.

Sampling Method

Lead concentrations in ambient air are determined by the reference method promulgated by US EPA. The lead sample is collected on a filter using a high-volume air sampler and the TSP method. In this method, two ¾"×8" portions of the TSP filter are washed with hot, dilute nitric acid. The lead compounds are dissolved into the acid solution. The solution is then analyzed by the atomic absorption technique to determine the amount of lead.

Normally a month's collection of filters are analyzed as a composite sample. Most sites collect so little lead that individual sampling days would have lead levels below the detection limit of available methods.

Concentrations are reported in micrograms per cubic meter of air ($\mu g/m^3$).

Lead (TSP) (12128) Ohio UG/CU METER (25 C) (001)

24-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	# OBS	QTR1 ARITH MEAN	QTR2 ARITH MEAN	QTR3 ARITH MEAN	QTR4 ARITH MEAN	# MEANS > 1.5	1ST MAX	2ND MAX	CERT	EDT
39-017-0015	2	1259	Middletown	Butler	3901 LEFFERSON,	2004	803	12	.01	.01	.02	.01	0	.02	.02	N	0
39-029-0019	1	0807	East Liverpool	Columbiana	1250 GEORGE	2004	803	12	.01	.01	.01	.01	0	.02	.01	N	0
39-029-0020	1	0807	East Liverpool	Columbiana	2220 MICHIGAN	2004	803	12	.02	.02	.01	.02	0	.03	.03	N	0
39-029-0022	1	0807	East Liverpool	Columbiana	500 MARYLAND AVE	2004	803	12	.01	.02	.01	.01	0	.03	.02	N	0
39-035-0038	1	0229	Cleveland	Cuyahoga	2547 ST TIKHON	2004	803	12	.02	.03	.02	.02	0	.04	.03	N	0
39-035-0042	1	0229	Cleveland	Cuyahoga	FIRE STATION 4,	2004	803	12	.01	.01	.02	.01	0	.04	.02	N	0
39-035-0049	1	0229	Cleveland	Cuyahoga	E. 56TH ST., FER	2004	803	12	.09	.10	.14	.07	0	.22	.15	N	0
39-035-0050	1	0229	Cleveland	Cuyahoga	GRANT RD., FERRO	2004	803	12	.03	.05	.04	.02	0	.10	.05	N	0
39-035-0061	2	0229	Cleveland	Cuyahoga	South Side of We	2004	803	12	.02	.02	.02	.02	0	.04	.03	N	0
39-035-0068	1	0229	Cleveland	Cuyahoga	7629 BROADWAY,	2004	803	12	.02	.04	.03	.03	0	.05	.05	N	0
39-035-0069	1	0229	Cleveland	Cuyahoga	7300 SUPERIOR AV	2004	803	12	.02	.02	.03	.02	0	.05	.04	N	0
39-049-0025	1	0805	Columbus	Franklin	1700 ANN STREET	2004	803	12	.02	.01	.01	.01	0	.03	.02	N	0
39-051-0001	1	0808	Not in a city	Fulton	200 VAN BUREN	2004	803	12	.04	.06	.11	.25	0	.38	.28	N	0
39-091-0003	1	0810	Bellefontaine	Logan	1222 SUPERIOR AV	2004	803	12	.11	.13	.07	.11	0	.20	.19	N	0
39-091-0005	1	0443	Bellefontaine	Logan	1229 SOUTH MAIN	2004	045	12	.08	.11	.11	.15	0	.21	.13	N	0
39-091-0006	1	0443	Bellefontaine	Logan	320 RICHARD AVEN	2004	045	12	.14	.16	.27	.14	0	.36	.27	N	0
39-091-0007	1	0443	Bellefontaine	Logan	1205 SUPERIOR AV	2004	045	12	.15	.22	.17	.20	0	.26	.25	N	0
39-167-0008	1	0809	Marietta	Washington	STATE RT. 676; W	2004	803	12	.01	.01	.01	.01	0	.01	.01	N	0

VI. Air Toxics Monitoring 2004

AIR TOXICS MONITORING

INTRODUCTION

Over the last several years, Ohio EPA, Division of Air Pollution Control (DAPC) has made a substantial effort to develop and implement a State-wide Air Toxics Monitoring Program (ATMP). These efforts were modeled after programs and methodologies recommended by U.S. EPA. The emphasis has been on urban toxics monitoring for volatile organic compounds and heavy metals. Brief sections describing the sampling and analytical procedures for the pollutants follow the introduction.

1.) Main focus of the ATMP is on urban monitoring, looking for major risk areas where people live. In this effort sampling has concentrated on groups of compounds.

volatile organic compounds (VOC), examples:
benzene, chloroform, styrene, toluene etc.
heavy metals, examples: arsenic, cadmium

The majority of the sampling has been conducted at semi-permanent monitoring sites where monitoring extends beyond a 4 month period. Projects at these types of sites have been dedicated to VOCs and heavy metals. See the list following the description of the volatile organic analysis method for the VOC target compounds. The list of target metals is included in the metals description section.

Semi-permanent monitoring projects have been conducted in:

- Cleveland - VOC-Urban, Metals-Urban
- Cincinnati - VOC-Urban,
- Painesville - VOC-Urban,
- Middletown - VOC-Source, Metals-Source
- New Boston - VOC-Source,
- Columbus - Metals-Urban, limited VOC
- Marietta - VOC-Urban, Metals-Source
- Delta - Metals-Source
- East Liverpool - Metals-Source
- Akron - VOC-Urban
- Dayton - Special VOC study

2.) Throughout 2004 DAPC has worked to expand sampling at semi-permanent sites with an emphasis on smaller urban areas. Future sampling projects will involve additional sampling locations or reallocation of current resources to other locations. Expanded air toxics sampling will involve adding other parameters to existing sites. DAPC's efforts will also include more efficient use of short term sampling.

In the past sampling efforts have included:

Cross Media pollution monitoring	Urban air toxics
Great Lakes deposition monitoring	Source monitoring
Emissions verification	Complaint investigation
Emergency Episode Monitoring	Post Remediation Monitoring

During 2004 DAPC was involved in several minor monitoring projects throughout the state, however due to the emphasis on the expansion of the semi-permanent effort these short term and grab sampling projects were limited in scope and are not included in the data summaries for this year.

The sampling and analytical methods for VOCs and heavy metals are described below.

VOLATILE ORGANIC COMPOUND SAMPLING AND ANALYSIS

SAMPLING

A major component of the Air Toxics Monitoring Program is ambient sampling for volatile organic compounds (VOCs). These are compounds that are generally found in the vapor state. Some organic compounds can be chlorinated, (contain chlorine) or just hydrocarbons, (contain just hydrogen and carbon atoms). Most of the VOC samples were collected using a whole air sampling system that pumped ambient air into a stainless steel canister. The canister, which is evacuated prior to use, is a storage container which allows an air sample to be maintained virtually unchanged until it is analyzed. In addition to the pumped sampling method, a number of samples were collected using the vacuum of the canister to draw in an air sample. These, vacuum-filled “grab” samples usually take only a few minutes to collect and were useful for collecting transient odors or potentially high concentration samples. DAPC is now capable of collecting specific samples for 1, 3, 8 and 24 hours using this grab sampling method.

Initially samples were collected sporadically, however as semi-permanent sites were established the sampling program has become more routine. With that, an attempt has been made to collect samples at least twice a month, with a sampling frequency consistent with the national air toxics monitoring schedule of once every 12^{th} day, over a 24 hour period. The specific procedures for this type of sampling can be found in the U.S. EPA Compendium of Methods for the Determination of Toxic Organic Compound in Ambient Air in the section TO-14

ANALYSIS

The volatile tendency of VOCs allows them to be vaporized when heated, (if not already in that form) and to be injected into an analytical device called a gas chromatograph (GC). As a sample passes through a GC column the various compounds separate out of the sample mixture. As the individual compounds exit the column, a detector records a response. That response is illustrated on a chromatogram as a peak, the area of each peak indicates the concentration of the compound. Compound identification is accomplished by comparing the retention time of the peaks on a chromatogram with those from a chromatogram of a known mixture of compounds. Retention time is the time it takes for a particular compound to reach the detector. As long as the analytical conditions remain the same, a compound from one analysis to the next will have the same retention time.

The typical analytical system used for this study utilized a GC with a special detector called a mass spectrometer (MS). The combination, a GC/MS, can be used to analyze a sample by separating it into its individual components which are then broken down into mass fragments which form a fingerprint by which a compound can be identified.

All of DAPC's canister analyses were conducted at the Ohio EPA Division of Environmental Services (DES). The analytical procedures performed by the laboratory targeted an expanded list of 73 VOCs for identification and quantitation. The following list includes the current 73 parameters of the analytical target compounds list.

DES VOC Target Compound List for TO-14A Analysis

1	acetone	37	trans-1,3-dichloropropene
2	acetonitrile	38	1,2-dichloro-1,1,2,2-tetrafluoroethane
3	acrylonitrile	39	n-dodecane
4	benzene	40	ethylbenzene
5	benzyl chloride	41	4-ethyltoluene
6	bromodichloromethane	42	n-heptane
7	bromoform	43	hexachlorobutadiene
8	bromomethane	44	hexane
9	1,3-butadiene	45	methyl-butyl ether
10	n-butane	46	methylene chloride
11	2-butanone	47	4-methyl-2-pentanone
12	carbon disulfide	48	a-methylstyrene
13	carbon tetrachloride	49	napthalene
14	chlorobenzene	50	n-nonane
15	chlorodifluoromethane	51	n-octane
16	chloroethane	52	n-pentane
17	chloroform	53	propylene
18	chloromethane	54	n-propyl benzene
19	3-chloropropene	55	styrene
20	cumene	56	1,1,2,2-tetrachloroethane
21	cyclohexane	57	tetrachloroethylene
22	decane	58	toluene
23	dibromochloromethane	59	1,2,4-trichlorobenzene
24	1,2-dibromoethane	60	1,1,1-trichloroethane
25	dibromomethane	61	1,1,2-trichloroethane
26	1,2-dichlorobenzene (ortho)	62	trichloroethene
27	1,3-dichlorobenzene (meta)	63	trichlorofluoromethane
28	1,4-dichlorobenzene (para)	64	1,1,2-trichloro-1,2,2-trifluoroethane
29	dichlorodifluoromethane	65	1,2,4-trimethylbenzene
30	1,1-dichloroethane	66	1,3,5-trimethylbenzene
31	1,2-dichloroethane	67	n-undecane
32	1,1-dichloroethene	68	vinyl acetate
33	cis-1,2-dichloroethene	69	vinyl chloride
34	trans-1,2-dichloroethene	70	o-xylene
35	1,2-dichloropropane	71	total m+p-xylene
36	cis-1,3-dichloropropene		

Beyond this list of compounds, additional compounds can be detected and tentatively identified during the analysis of VOC samples. If during the analysis, an unidentified compound of significant quantity, (greater than 0.2 ppb) exist in a sample it can be identified during the MS analysis. However, due to the uncertainty involved with the identification of these additional, non-target, compounds and the vast number of them detected they are not included in this report.

As the technology and the method improves and new technics are developed, it is expected that the target compounds list will be periodically modified. It is also expected that the list will change as USEPA's emphasis on air toxics compounds changes. The following tables summarize the data from all of the canister samples collected during 2004. Throughout 2004 over 200, 24-hour samples were collected. During 2004 there were 10 permanent VOC monitoring sites operating.

SITE IDENTIFICATION AND LOCATION

AQS #	CITY	COUNTY	ADDRESS	TABLE
39-017-0003	Middletown	Butler	Verity school 1900 St. John's Road	A
	Cincinnati	Hamilton	10100 Reading Rd.	B
39-035-0068	Cleveland	Cuyahoga	7629 Broadway	C
39-035-0069	Cleveland	Cuyahoga	7300 Superior Ave.	D
39-049-0034	Columbus	Franklin	Korbel Ave.	E
39-081-0017	Steubenville	Jefferson	618 Logan Street	F
39-085-3002	Painesville	Lake	71 E. High Street	G
39-113-0032	Dayton	Montgomery	215 E. Third Street	H
39-113-0019	Dayton	Montgomery	2100 Timber Lane	I
39-167-0008	Marietta	Washington	Washington County Career Center	J

VOLATILE ORGANIC COMPOUNDS DETECTED IN 2004				
Summary Data of 246 Canister Samples				Frequency
	Maximum	Average	Minimum	Detected
COMPOUND LIST	Concentration: parts per billion			
acetone	59.00	6.43	0.84	245
acetonitrile	1.10	0.37	0.20	164
acrylonitrile	3.40	0.69	0.20	114
benzene	15.00	0.83	0.10	246
bromodichloromethane	0.11	0.11	0.11	1
bromomethane	0.10	0.10	0.10	1
1,3-butadiene	0.31	0.15	0.10	55
n-butane	6.40	1.46	0.22	246
2-butanone	4.90	1.07	0.50	176
carbon disulfide	6.70	1.57	0.50	52
carbon tetrachloride	0.20	0.11	0.10	191
chlorobenzene	1.30	0.27	0.12	15
chlorodifluoromethane	9.60	0.53	0.13	218
chloroethane	0.11	0.11	0.11	1
chloroform	0.13	0.11	0.10	4
chloromethane	1.50	0.47	0.31	244
3-chloropropene	0.26	0.14	0.10	5
cyclohexane	0.21	0.13	0.10	29
decane	0.48	0.17	0.10	18
dibromomethane	0.11	0.11	0.11	1
1,4-dichlorobenzene (para)	0.22	0.17	0.11	2
dichlorodifluoromethane	1.40	0.53	0.35	246
1,1-dichloroethane	0.10	0.10	0.10	1
1,2-dichloroethane	0.11	0.11	0.11	1
1,1-dichloroethene	0.11	0.11	0.10	2
cis-1,2-dichloroethene	0.12	0.12	0.11	4
trans-1,2-dichloroethene	0.11	0.11	0.11	2
ethylbenzene	0.52	0.19	0.10	30
4-ethyltoluene	0.21	0.16	0.12	6
n-heptane	0.47	0.18	0.10	59
hexachlorobutadiene	0.25	0.18	0.11	2
hexane	1.40	0.44	0.20	120
methylene chloride	1.10	0.23	0.10	91
4-methyl-2-pentanone	2.40	0.23	0.10	46
naphthalene	5.30	0.60	0.10	31
n-nonane	0.28	0.18	0.13	6
n-octane	0.49	0.37	0.25	2
n-pentane	4.10	0.66	0.15	246
propylene	5.50	1.52	0.25	168
n-propyl benzene	0.17	0.16	0.15	2
styrene	0.46	0.20	0.10	7
tetrachloroethylene	0.21	0.14	0.10	16
toluene	7.30	0.65	0.10	224
1,1,1-trichloroethane	28.00	6.43	0.10	47
trichloroethene	0.42	0.19	0.10	23
trichlorofluoromethane	10.00	0.62	0.20	239
1,1,2-trichloro-1,2,2-trifluoroethane	0.17	0.11	0.10	69
1,2,4-trimethylbenzene	0.54	0.21	0.00	42
1,3,5-trimethylbenzene	0.22	0.16	0.13	7
n-undecane	0.26	0.15	0.10	11
vinyl acetate	4.40	0.83	0.22	70
o-xylene	0.63	0.21	0.10	33
total m+p-xylene	3.00	0.51	0.20	62
acetaldehyde	10.00	5.00	1.00	7

Table A.

Butler County - 39-017-0003				Frequency
Summary Data of 29 Canister Samples	Maximum	Average	Minimum	Detected
COMPOUND LIST	Concentration: parts per billion			
acetone	14.00	5.63	1.10	29
acetonitrile	0.49	0.33	0.21	19
acrylonitrile	1.30	0.51	0.20	12
benzene	0.84	0.35	0.17	29
bromodichloromethane				
bromomethane				
1,3-butadiene	0.12	0.11	0.11	5
n-butane	4.10	1.25	0.22	29
2-butanone	2.70	1.00	0.53	23
carbon disulfide	0.72	0.65	0.58	2
carbon tetrachloride	0.12	0.11	0.10	21
chlorobenzene				
chlorodifluoromethane	1.20	0.30	0.15	29
chloroethane				
chloroform				
chloromethane	0.54	0.44	0.33	28
3-chloropropene				
cyclohexane	0.20	0.20	0.20	1
decane	0.14	0.12	0.10	3
dibromomethane				
1,4-dichlorobenzene (para)				
dichlorodifluoromethane	0.56	0.50	0.36	29
1,1-dichloroethane				
1,2-dichloroethane				
1,1-dichloroethene				
cis-1,2-dichloroethene				
trans-1,2-dichloroethene				
ethylbenzene	0.30	0.21	0.17	3
4-ethyltoluene				
n-heptane	0.18	0.14	0.12	6
hexachlorobutadiene				
hexane	1.30	0.47	0.20	10
methylene chloride	0.29	0.15	0.11	7
4-methyl-2-pentanone	0.29	0.29	0.29	1
naphthalene	0.10	0.10	0.10	1
n-nonane				
n-octane				
n-pentane	2.70	0.54	0.17	29
propylene	2.20	1.18	0.46	19
n-propyl benzene				
styrene				
tetrachloroethylene				
toluene	5.00	0.52	0.10	26
1,1,1-trichloroethane	0.22	0.14	0.10	17
trichloroethene	0.35	0.35	0.35	1
trichlorofluoromethane	1.90	0.55	0.24	28
1,1,2-trichloro-1,2,2-trifluoroethane	0.11	0.10	0.10	8
1,2,4-trimethylbenzene	0.27	0.22	0.18	4
1,3,5-trimethylbenzene	0.15	0.15	0.15	1
n-undecane	0.12	0.11	0.10	2
vinyl acetate	2.80	0.77	0.27	14
o-xylene	0.27	0.21	0.15	4
total m+p-xylene	0.91	0.53	0.20	5
acetaldehyde	7.00	4.25	2.00	4

Table B.

Hamilton County				Frequency
Summary Data of 27 Canister Samples	Maximum	Average	Minimum	Detected
COMPOUND LIST	Concentration: parts per billion			
acetone	22.00	1.87	2.30	27
acetonitrile	0.72	0.45	0.34	14
acrylonitrile	0.75	0.55	0.24	6
benzene	15.00	3.58	0.20	27
bromodichloromethane				
bromomethane	0.10	0.10	0.10	1
1,3-butadiene	0.12	0.11	0.11	4
n-butane	2.40	1.92	0.33	27
2-butanone	2.70	1.53	0.57	25
carbon disulfide	0.59	0.57	0.54	2
carbon tetrachloride	0.16	0.11	0.10	23
chlorobenzene	0.36	0.24	0.12	12
chlorodifluoromethane	0.43	0.35	0.30	3
chloroethane				
chloroform				
chloromethane	1.00	0.58	0.40	27
3-chloropropene				
cyclohexane	0.12	0.12	0.11	2
decane	0.25	0.17	0.11	9
dibromomethane				
1,4-dichlorobenzene (para)				
dichlorodifluoromethane	0.57	0.51	0.44	27
1,1-dichloroethane				
1,2-dichloroethane				
1,1-dichloroethene	0.10	0.10	0.10	1
cis-1,2-dichloroethene	0.11	0.11	0.11	1
trans-1,2-dichloroethene	0.11	0.11	0.11	1
ethylbenzene	0.17	0.15	0.13	3
4-ethyltoluene	0.16	0.16	0.16	1
n-heptane	0.16	0.13	0.11	3
hexachlorobutadiene	0.25	0.25	0.25	1
hexane	1.00	0.43	0.24	8
methylene chloride	0.50	0.19	0.10	14
4-methyl-2-pentanone	0.21	0.14	0.10	13
naphthalene	0.19	0.14	0.11	3
n-nonane	0.16	0.16	0.16	1
n-octane				
n-pentane	1.70	0.49	0.15	27
propylene	2.30	1.38	0.47	22
n-propyl benzene				
styrene	0.27	0.18	0.12	4
tetrachloroethylene				
toluene	2.30	0.51	0.10	26
1,1,1-trichloroethane	28.00	11.52	3.60	26
trichloroethene				
trichlorofluoromethane	1.40	0.38	0.24	27
1,1,2-trichloro-1,2,2-trifluoroethane	0.14	0.15	0.10	1
1,2,4-trimethylbenzene	0.24	0.19	0.12	7
1,3,5-trimethylbenzene	0.17	0.16	0.15	2
n-undecane	0.26	0.16	0.10	8
vinyl acetate	1.60	0.95	0.48	12
o-xylene	0.18	0.17	0.14	4
total m+p-xylene	0.57	0.39	0.21	5
acetaldehyde				

Table C.

Cuyahoga County - 39-035-0068				Frequency
Summary Data of 27 Canister Samples	Maximum	Average	Minimum	Detected
COMPOUND LIST	Concentration: parts per billion			
acetone	9.80	5.49	1.00	27
acetonitrile	0.66	0.37	0.20	19
acrylonitrile				
benzene	1.20	0.52	0.20	27
bromodichloromethane	0.11	0.11	0.11	1
bromomethane				
1,3-butadiene	0.23	0.16	0.11	12
n-butane	4.70	1.89	0.76	27
2-butanone	2.40	0.98	0.52	22
carbon disulfide	0.50	0.50	0.50	1
carbon tetrachloride	0.19	0.12	0.10	23
chlorobenzene				
chlorodifluoromethane	0.66	0.36	0.15	27
chloroethane	0.11	0.11	0.11	1
chloroform	0.13	0.13	0.13	1
chloromethane	0.55	0.45	0.32	27
3-chloropropene	0.26	0.16	0.11	4
cyclohexane	0.21	0.13	0.10	6
decane	0.10	0.10	0.10	1
dibromomethane	0.11	0.11	0.11	1
1,4-dichlorobenzene (para)	0.11	0.11	0.11	1
dichlorodifluoromethane	1.40	0.60	0.39	27
1,1-dichloroethane	0.10	0.10	0.10	1
1,2-dichloroethane	0.11	0.11	0.11	1
1,1-dichloroethene	0.11	0.11	0.11	1
cis-1,2-dichloroethene	0.12	0.12	0.12	1
trans-1,2-dichloroethene	0.11	0.11	0.11	1
ethylbenzene	0.26	0.17	0.11	8
4-ethyltoluene	0.19	0.19	0.19	1
n-heptane	0.33	0.23	0.13	11
hexachlorobutadiene	0.11	0.11	0.11	1
hexane	0.96	0.49	0.22	19
methylene chloride	1.10	0.38	0.10	21
4-methyl-2-pentanone	0.52	0.22	0.10	9
naphthalene	0.15	0.12	0.10	4
n-nonane	0.16	0.16	0.16	1
n-octane				
n-pentane	2.50	0.98	0.28	27
propylene	3.80	2.43	0.78	19
n-propyl benzene				
styrene				
tetrachloroethylene	0.21	0.15	0.10	6
toluene	2.50	0.83	0.17	27
1,1,1-trichloroethane	0.13	0.13	0.13	1
trichloroethene	0.31	0.19	0.10	9
trichlorofluoromethane	1.60	0.40	0.23	27
1,1,2-trichloro-1,2,2-trifluoroethane	0.16	0.11	0.10	7
1,2,4-trimethylbenzene	0.30	0.17	0.10	11
1,3,5-trimethylbenzene	0.19	0.19	0.19	1
n-undecane				
vinyl acetate				
o-xylene	0.29	0.18	0.12	8
total m+p-xylene	1.10	0.48	0.22	14
acetaldehyde				

Table D.

Cuyahoga County - 39-035-0069				Frequency
Summary Data of 24 Canister Samples	Maximum	Average	Minimum	Detected
COMPOUND LIST	Concentration: parts per billion			
acetone	9.80	5.33	2.20	23
acetonitrile	0.56	0.36	0.20	16
acrylonitrile	0.52	0.40	0.28	2
benzene	1.30	0.58	0.24	24
bromodichloromethane				
bromomethane				
1,3-butadiene	0.25	0.16	0.10	12
n-butane	6.40	2.22	0.44	24
2-butanone	1.50	0.94	0.52	15
carbon disulfide	0.79	0.79	0.79	1
carbon tetrachloride	0.13	0.12	0.10	2
chlorobenzene				
chlorodifluoromethane	1.00	0.33	0.14	22
chloroethane				
chloroform				
chloromethane	0.59	0.48	0.39	24
3-chloropropene				
cyclohexane	0.15	0.12	0.10	5
decane	0.20	0.20	0.20	1
dibromomethane				
1,4-dichlorobenzene (para)	0.22	0.22	0.22	1
dichlorodifluoromethane	0.82	0.55	0.35	24
1,1-dichloroethane				
1,2-dichloroethane				
1,1-dichloroethene				
cis-1,2-dichloroethene				
trans-1,2-dichloroethene				
ethylbenzene	0.29	0.19	0.10	6
4-ethyltoluene	0.21	0.21	0.21	1
n-heptane	0.35	0.21	0.11	9
hexachlorobutadiene				
hexane	1.40	0.52	0.20	21
methylene chloride	0.92	0.23	0.10	11
4-methyl-2-pentanone	0.31	0.17	0.10	5
naphthalene	0.18	0.17	0.16	2
n-nonane	0.18	0.18	0.18	1
n-octane				
n-pentane	4.10	1.18	0.26	24
propylene	3.80	1.69	0.53	19
n-propyl benzene	0.17	0.17	0.17	1
styrene				
tetrachloroethylene	0.16	0.13	0.10	3
toluene	7.30	1.18	0.10	24
1,1,1-trichloroethane				
trichloroethene	0.42	0.19	0.11	5
trichlorofluoromethane	0.64	0.33	0.23	23
1,1,2-trichloro-1,2,2-trifluoroethane	0.11	0.11	0.10	8
1,2,4-trimethylbenzene	0.39	0.25	0.10	6
1,3,5-trimethylbenzene	0.22	0.22	0.22	1
n-undecane				
vinyl acetate				
o-xylene	0.35	0.22	0.10	6
total m+p-xylene	1.10	0.46	0.20	13
acetaldehyde				

Table E.

Franklin County - 39-049-0034				Frequency
Summary Data of 30 Canister Samples	Maximum	Average	Minimum	Detected
COMPOUND LIST	Concentration: parts per billion			
acetone	27.00	7.45	1.20	3
acetonitrile	0.58	0.34	0.20	22
acrylonitrile	0.73	0.38	0.21	1
benzene	0.88	0.35	0.15	3
bromodichloromethane				
bromomethane				
1,3-butadiene	0.29	0.19	0.11	6
n-butane	3.80	1.33	0.31	3
2-butanone	4.90	1.47	0.50	23
carbon disulfide	1.30	1.30	1.30	1
carbon tetrachloride	0.12	0.20	0.10	23
chlorobenzene				
chlorodifluoromethane	0.57	0.27	0.14	3
chloroethane				
chloroform				
chloromethane	0.63	0.45	0.36	3
3-chloropropene				
cyclohexane	0.11	0.11	0.11	1
decane	0.13	0.13	0.13	1
dibromomethane				
1,4-dichlorobenzene (para)				
dichlorodifluoromethane	0.56	0.52	0.45	3
1,1-dichloroethane				
1,2-dichloroethane				
1,1-dichloroethene				
cis-1,2-dichloroethene				
trans-1,2-dichloroethene				
ethylbenzene	0.38	0.19	0.10	5
4-ethyltoluene	0.12	0.12	0.12	1
n-heptane	0.17	0.16	0.14	5
hexachlorobutadiene				
hexane	0.83	0.38	0.21	13
methylene chloride	0.23	0.13	0.10	11
4-methyl-2-pentanone	0.18	0.14	0.10	6
naphthalene	0.20	0.15	0.10	5
n-nonane	0.13	0.13	0.13	1
n-octane				
n-pentane	1.80	0.60	0.19	3
propylene	5.00	1.50	0.25	22
n-propyl benzene				
styrene	0.11	0.11	0.11	1
tetrachloroethylene	0.11	0.11	0.11	1
toluene	2.50	0.53	0.11	29
1,1,1-trichloroethane				
trichloroethene				
trichlorofluoromethane	0.31	0.27	0.22	3
1,1,2-trichloro-1,2,2-trifluoroethane	0.11	0.12	0.10	5
1,2,4-trimethylbenzene	0.42	0.24	0.10	4
1,3,5-trimethylbenzene	0.13	0.13	0.13	1
n-undecane				
vinyl acetate	4.10	0.92	0.36	1
o-xylene	0.42	0.28	0.18	3
total m+p-xylene	1.80	0.63	0.20	7
acetaldehyde	1.00	5.50	1.00	2

Table F.

Jefferson County - 39-081-0017				Frequency
Summary Data of 13 Canister Samples	Maximum	Average	Minimum	Detected
COMPOUND LIST	Concentration: parts per billion			
acetone	59.00	1.12	3.10	13
acetonitrile	0.53	0.39	0.21	13
acrylonitrile	0.62	0.37	0.20	5
benzene	9.00	2.18	0.25	13
bromodichloromethane				
bromomethane				
1,3-butadiene	0.15	0.13	0.10	5
n-butane	4.40	1.97	0.62	13
2-butanone	1.10	0.81	0.57	11
carbon disulfide	0.56	0.56	0.56	1
carbon tetrachloride	0.14	0.12	0.10	9
chlorobenzene				
chlorodifluoromethane	0.38	0.24	0.15	13
chloroethane				
chloroform				
chloromethane	0.48	0.42	0.36	12
3-chloropropene				
cyclohexane	0.11	0.13	0.10	3
decane				
dibromomethane				
1,4-dichlorobenzene (para)				
dichlorodifluoromethane	0.62	0.52	0.44	13
1,1-dichloroethane				
1,2-dichloroethane				
1,1-dichloroethene				
cis-1,2-dichloroethene				
trans-1,2-dichloroethene				
ethylbenzene	0.52	0.28	0.14	3
4-ethyltoluene				
n-heptane	0.47	0.23	0.11	6
hexachlorobutadiene				
hexane	1.20	0.42	0.21	1
methylene chloride	0.16	0.13	0.11	3
4-methyl-2-pentanone	2.40	0.96	0.28	4
naphthalene	5.30	1.45	0.11	11
n-nonane				
n-octane				
n-pentane	1.70	0.76	0.34	13
propylene	2.40	1.53	0.65	13
n-propyl benzene				
styrene				
tetrachloroethylene				
toluene	2.20	0.78	0.21	13
1,1,1-trichloroethane	0.10	0.10	0.10	1
trichloroethene				
trichlorofluoromethane	1.00	4.46	0.45	13
1,1,2-trichloro-1,2,2-trifluoroethane	0.10	0.10	0.10	5
1,2,4-trimethylbenzene	0.30	0.20	0.10	4
1,3,5-trimethylbenzene				
n-undecane				
vinyl acetate	3.00	1.47	0.61	3
o-xylene	0.63	0.35	0.20	3
total m+p-xylene	3.00	0.89	0.21	6
acetaldehyde				

Table G.

Lake County - 39-085-3002				Frequency
Summary Data of 32 Canister Samples	Maximum	Average	Minimum	Detected
COMPOUND LIST	Concentration: parts per billion			
acetone	16.00	5.68	1.30	32
acetonitrile	0.57	0.37	0.26	21
acrylonitrile	0.71	0.43	0.20	25
benzene	0.48	0.27	0.13	32
bromodichloromethane				
bromomethane				
1,3-butadiene	0.10	0.10	0.10	1
n-butane	2.20	1.28	0.42	32
2-butanone	1.30	0.86	0.51	21
carbon disulfide				
carbon tetrachloride	0.16	0.11	0.10	24
chlorobenzene				
chlorodifluoromethane	9.60	1.99	0.19	3
chloroethane				
chloroform	0.10	0.10	0.10	1
chloromethane	0.51	0.44	0.34	32
3-chloropropene	0.10	0.10	0.10	1
cyclohexane				
decane				
dibromomethane				
1,4-dichlorobenzene (para)				
dichlorodifluoromethane	0.57	0.52	0.39	32
1,1-dichloroethane				
1,2-dichloroethane				
1,1-dichloroethene				
cis-1,2-dichloroethene				
trans-1,2-dichloroethene				
ethylbenzene				
4-ethyltoluene	0.17	0.17	0.17	1
n-heptane	0.12	0.12	0.11	3
hexachlorobutadiene				
hexane	0.30	0.27	0.22	9
methylene chloride	0.85	0.26	0.10	5
4-methyl-2-pentanone	0.11	0.11	0.11	1
naphthalene	0.15	0.15	0.15	1
n-nonane				
n-octane				
n-pentane	0.77	0.45	0.16	32
propylene	1.50	0.99	0.57	2
n-propyl benzene	0.15	0.15	0.15	1
styrene				
tetrachloroethylene				
toluene	1.90	0.48	0.10	31
1,1,1-trichloroethane	0.12	0.12	0.12	1
trichloroethene	0.11	0.11	0.11	1
trichlorofluoromethane	0.35	0.28	0.23	28
1,1,2-trichloro-1,2,2-trifluoroethane	0.14	0.11	0.10	5
1,2,4-trimethylbenzene	0.30	0.30	0.30	1
1,3,5-trimethylbenzene				
n-undecane				
vinyl acetate	1.40	0.76	0.31	12
o-xylene	0.16	0.15	0.14	2
total m+p-xylene	0.35	0.28	0.21	4
acetaldehyde	7.00	7.00	7.00	1

Table H.

Montgomery County - 39-113-0019				Frequency
Summary Data of 5 Canister Samples	Maximum	Average	Minimum	Detected
COMPOUND LIST	Concentration: parts per billion			
acetone	3.10	2.30	1.60	5
acetonitrile	0.52	0.52	0.52	1
acrylonitrile	0.29	0.29	0.29	1
benzene	0.16	0.14	0.10	5
bromodichloromethane				
bromomethane				
1,3-butadiene				
n-butane	0.72	0.58	0.42	5
2-butanone	0.57	0.57	0.57	1
carbon disulfide				
carbon tetrachloride				
chlorobenzene				
chlorodifluoromethane	0.20	0.18	0.16	5
chloroethane				
chloroform				
chloromethane	0.39	0.36	0.32	5
3-chloropropene				
cyclohexane				
decane				
dibromomethane				
1,4-dichlorobenzene (para)				
dichlorodifluoromethane	0.45	0.41	0.35	5
1,1-dichloroethane				
1,2-dichloroethane				
1,1-dichloroethene				
cis-1,2-dichloroethene				
trans-1,2-dichloroethene				
ethylbenzene				
4-ethyltoluene				
n-heptane				
hexachlorobutadiene				
hexane				
methylene chloride				
4-methyl-2-pentanone				
naphthalene				
n-nonane				
n-octane				
n-pentane	0.20	0.18	0.16	5
propylene				
n-propyl benzene				
styrene	0.10	0.10	0.10	1
tetrachloroethylene				
toluene	0.10	0.10	0.10	1
1,1,1-trichloroethane				
trichloroethene				
trichlorofluoromethane	0.23	0.22	0.20	4
1,1,2-trichloro-1,2,2-trifluoroethane				
1,2,4-trimethylbenzene				
1,3,5-trimethylbenzene				
n-undecane				
vinyl acetate	0.42	0.42	0.42	1
o-xylene				
total m+p-xylene				
acetaldehyde				

Table I.

Montgomery County - 39-113-0032				Frequency
Summary Data of 31 Canister Samples	Maximum	Average	Minimum	Detected
COMPOUND LIST	Concentration: parts per billion			
acetone	11.00	5.36	0.84	31
acetonitrile	0.49	0.36	0.25	2
acrylonitrile	2.80	0.76	0.20	28
benzene	1.10	0.43	0.18	31
bromodichloromethane				
bromomethane				
1,3-butadiene	0.31	0.17	0.11	8
n-butane	4.40	1.32	0.25	31
2-butanone	2.30	0.98	0.51	2
carbon disulfide	6.70	2.29	0.64	25
carbon tetrachloride	0.14	0.12	0.10	29
chlorobenzene				
chlorodifluoromethane	1.60	0.35	0.18	31
chloroethane				
chloroform	0.10	0.10	0.10	1
chloromethane	0.56	0.45	0.34	31
3-chloropropene				
cyclohexane	0.12	0.11	0.10	3
decane	0.48	0.25	0.10	3
dibromomethane				
1,4-dichlorobenzene (para)				
dichlorodifluoromethane	1.40	0.56	0.37	31
1,1-dichloroethane				
1,2-dichloroethane				
1,1-dichloroethene				
cis-1,2-dichloroethene	0.12	0.12	0.11	2
trans-1,2-dichloroethene				
ethylbenzene	0.26	0.25	0.15	2
4-ethyltoluene	0.13	0.13	0.13	1
n-heptane	0.26	0.15	0.10	7
hexachlorobutadiene				
hexane	0.97	0.44	0.24	17
methylene chloride	0.37	0.17	0.10	16
4-methyl-2-pentanone	0.11	0.13	0.10	3
naphthalene	0.14	0.13	0.11	2
n-nonane	0.28	0.22	0.15	2
n-octane	0.49	0.37	0.25	2
n-pentane	2.80	0.63	0.20	31
propylene	3.30	1.35	0.46	18
n-propyl benzene				
styrene				
tetrachloroethylene	0.17	0.13	0.11	6
toluene	2.90	0.64	0.13	31
1,1,1-trichloroethane				
trichloroethene	0.28	0.18	0.10	7
trichlorofluoromethane	0.84	0.44	0.28	31
1,1,2-trichloro-1,2,2-trifluoroethane	0.14	0.17	0.10	11
1,2,4-trimethylbenzene	0.54	0.23		4
1,3,5-trimethylbenzene	0.13	0.13	0.13	1
n-undecane	0.16	0.16	0.16	1
vinyl acetate	1.40	0.71	0.23	8
o-xylene	0.30	0.24	0.17	2
total m+p-xylene	1.10	0.43	0.20	6
acetaldehyde				

Table J.

Washington County - 39-167-0008				Frequency
Summary Data of 28 Canister Samples	Maximum	Average	Minimum	Detected
COMPOUND LIST	Concentration: parts per billion			
acetone	1.00	4.73	1.20	28
acetonitrile	1.10	0.36	0.21	19
acrylonitrile	3.40	1.21	0.22	25
benzene	0.80	0.28	0.10	28
bromodichloromethane				
bromomethane				
1,3-butadiene	0.16	0.15	0.13	2
n-butane	4.90	1.72	0.51	28
2-butanone	1.40	0.75	0.50	15
carbon disulfide	3.00	1.34	0.60	19
carbon tetrachloride	0.20	0.12	0.10	19
chlorobenzene	1.30	0.52	0.12	3
chlorodifluoromethane	0.74	0.25	0.13	28
chloroethane				
chloroform	0.11	0.11	0.11	1
chloromethane	1.50	0.55	0.31	28
3-chloropropene				
cyclohexane	0.21	0.14	0.11	8
decane				
dibromomethane				
1,4-dichlorobenzene (para)				
dichlorodifluoromethane	0.60	0.49	0.37	28
1,1-dichloroethane				
1,2-dichloroethane				
1,1-dichloroethene				
cis-1,2-dichloroethene				
trans-1,2-dichloroethene				
ethylbenzene				
4-ethyltoluene				
n-heptane	0.19	0.13	0.10	9
hexachlorobutadiene				
hexane	1.00	0.37	0.20	13
methylene chloride	0.16	0.13	0.10	3
4-methyl-2-pentanone	0.27	0.19	0.11	4
naphthalene	0.13	0.12	0.11	2
n-nonane				
n-octane				
n-pentane	1.60	0.60	0.17	28
propylene	5.50	2.13	0.80	16
n-propyl benzene				
styrene	0.46	0.46	0.46	1
tetrachloroethylene				
toluene	1.20	0.45	0.13	16
1,1,1-trichloroethane	0.11	0.11	0.11	1
trichloroethene				
trichlorofluoromethane	4.20	0.74	0.31	28
1,1,2-trichloro-1,2,2-trifluoroethane	0.17	0.13	0.10	1
1,2,4-trimethylbenzene	0.11	0.11	0.11	1
1,3,5-trimethylbenzene				
n-undecane				
vinyl acetate	4.40	0.79	0.22	1
o-xylene	0.11	0.11	0.11	1
total m+p-xylene	0.31	0.31	0.31	2
acetaldehyde				

HEAVY METALS SAMPLING AND ANALYSIS

SAMPLING

Ambient air toxic monitoring on a routine basis for heavy metals (other than lead), by DAPC, was initiated in 1989 and has continued. A summary of the results can be found in the following tables. Sampling for heavy metals is conducted using a high volume total suspended particulate (TSP) sampler. With this sampler, particulate matter in the air is collected on a pre-weighed glass fiber filter. Sampling is done intermittently with 24-hour samples collected once every six days. The operating procedures for lead can be found in the Code of Federal Regulations, 40 CFR, Part 50, Appendix G. These basic procedures are also used for the other metals.

ANALYSIS

Filters collected at each site were analyzed as a monthly composite. The acid extracted samples are analyzed by atomic absorption (AA) spectroscopy. When an element is heated in the flame of this instrument it absorbs light at a characteristic wavelength. By measuring the amount of light absorbed at a particular wavelength the concentration of the element being analyzed can be determined. Mercury analysis for each sample is performed separately from the other metals. Total mercury is determined using a cold vapor method developed by the Division of Environmental Services (DES) Laboratory.

HEAVY METALS PARAMETERS

All particulate filter samples collected by DAPC are routinely analyzed for eight metals.

arsenic	cadmium	chromium	beryllium
lead[1]	nickel	zinc	manganese

Mercury has been added to the parameter list for a number of samples from sites in communities with specific concerns about potential mercury sources.

The following locations identify the sites that were used for the routine metals monitoring program. Two monitoring locations that had been used for a special air toxics study were added to this years report.

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[1]Lead is the only parameter being monitored in the ATMP that has a National Ambient Air Quality Standard. See Section V, page 75, Lead.

SITE IDENTIFICATION AND LOCATION

AQS #	CITY	COUNTY	ADDRESS	TABLE
39-017-0015	Middletown	Butler	3901 Lefferson Rd.	K
39-029-0019	E. Liverpool	Columbiana	1250 St. George St.	L
39-029-0020	E. Liverpool	Columbiana	2220 Michigan Ave.	M
39-029-0022	E. Liverpool	Columbiana	500 Maryland Ave.	N
39-035-0038	Cleveland	Cuyahoga	2547 Tikhon Ave.	O
39-035-0042	Cleveland	Cuyahoga	3136 Lorain Ave.	P
39-035-0049	Cleveland	Cuyahoga	4150 East 56th St.	Q
39-035-0050	Cleveland	Cuyahoga	5777 Grant Ave.	R
39-035-0061	Cleveland	Cuyahoga	West 3rd. St.	S
39-035-0068	Cleveland	Cuyahoga	7629 Broadway	T
39-038-0069	Cleveland	Cuyahoga	7300 Superior Ave.	U
39-049-0025	Columbus	Franklin	1700 Ann St.	V
39-051-0001	Delta	Fulton	200 Van Buren St.	W
39-091-0003	Bellefontaine	Logan	1222 Superior Ave.	X
39-167-0008	Marietta	Washington	Lancaster Rd.	Y
39-123-0012	Elmore	Ottawa		Z
	Marion	Marion	635 Bellfontaine	AA
	Marion	Marion	441 Whitmore	AB

Table K.

Cincinnati Heavy Metals Data 2004								
Ohio Bell								
3901 Lefferson Rd.								
AQS: 39-017-0015				units - ng/m³				
Butler				Parameters				
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	<0.058	<8.6	<12	26.00	<12	200.00	0.83	0.88
FEBRUARY	<0.022	5.60	6.70	50.00	<4.5	76.00	1.10	0.40
MARCH	0.04	<4.4	6.50	25.00	<5.8	28.00	0.95	0.17
APRIL	0.07	4.90	5.30	56.00	<4.9	56.00	1.20	0.24
MAY	0.03	3.90	16.00	48.00	<4.8	140.00	1.10	0.76
JUNE	0.05	3.60	5.70	50.00	<4.9	66.00	1.20	0.74
JULY	0.04	<4.5	8.60	43.00	<6	69.00	1.10	0.40
AUGUST	0.07	4.20	15.00	60.00	<4.9	140.00	1.60	0.71
SEPTEMBER	0.08	3.40	15.00	50.00	<4.6	58.00	1.60	0.34
OCTOBER	0.04	<5.5	8.00	36.00	<7.3	76.00	1.70	0.45
NOVEMBER	0.05	6.90	<8.3	71.00	<8.3	52.00	1.80	0.28
DECEMBER	0.03	5.20	5.40	47.00	<5.1	51.00	0.97	0.36

Table L.

East Liverpool Heavy Metals Data 2004									
Port Authority									
1250 St. George St.									
AQS: 39-029-0019					units - ng/m³				
Columbiana					Parameters				
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	mercury	arsenic	cadmium
JANUARY	0.031	<3.6	<4.8	40.00	<4.8	66.00	0.06	0.62	0.45
FEBRUARY	0.059	5.30	7.90	430.00	<4.9	110.00	0.05	1.60	1.80
MARCH	0.046	4.30	14.00	610.00	<5.1	74.00	0.07	2.30	0.56
APRIL	0.160	<5.2	13.00	260.00	<6.9	43.00	0.06	1.90	0.36
MAY	0.078	<4.3	22.00	350.00	<5.7	52.00	0.07	5.20	0.37
JUNE	0.130	<44	76.00	1400.00	<58	300.00	0.12	2.40	0.33
JULY	0.320	5.80	11.00	550.00	<6.2	66.00	0.09	5.60	0.69
AUGUST	0.085	<2.7	6.20	280.00	<3.6	34.00	0.06	2.60	0.39
SEPTEMBER	0.190	<3.9	9.20	140.00	<5.2	32.00	0.10	2.10	0.65
OCTOBER	0.170	7.90	14.00	800.00	<5.0	110.00	0.09	3.50	0.97
NOVEMBER	0.060	9.10	12.00	990.00	<3.9	69.00	0.04	4.00	1.00
DECEMBER	0.025	4.50	9.70	550.00	<3.8	55.00	0.04	1.10	0.94

Table M.

East Liverpool Heavy Metals Data 2004
Waterplant
2220 Michigan Ave.
AQS: 39-029-0020 units - ng/m³

Columbiana	Parameters								
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	mercury	arsenic	cadmium
JANUARY	<0.02	4.50	<4.1	460.00	<4.1	18.00	0.06	0.68	0.29
FEBRUARY	0.04	17.00	31.00	2800.00	10.00	82.00	0.10	1.60	1.20
MARCH	0.07	29.00	16.00	2800.00	18.00	100.00	0.09	3.90	0.62
APRIL	<0.026	4.50	11.00	640.00	8.50	33.00	0.07	1.80	0.28
MAY	<0.023	11.00	29.00	1400.00	6.40	35.00	0.10	2.80	0.34
JUNE	<0.022	4.70	17.00	2900.00	5.30	28.00	0.10	2.20	0.27
JULY	<0.023	16.00	11.00	2400.00	<4.5	61.00	0.09	4.00	0.58
AUGUST	<0.018	10.00	5.10	3600.00	<3.6	21.00	0.06	1.50	0.24
SEPTEMBER	0.02	16.00	9.10	810.00	9.60	69.00	0.07	2.10	0.69
OCTOBER	0.22	36.00	20.00	3000.00	11.00	130.00	0.10	8.40	1.10
NOVEMBER	0.04	54.00	29.00	3900.00	20.00	68.00	0.06	20.00	0.83
DECEMBER	<0.021	42.00	6.90	800.00	5.00	48.00	0.10	1.60	0.75

Table N.

East Liverpool Heavy Metals Data 2004

500 Maryland Ave.
AQS: 39-029-0022 units - ng/m³

Columbiana	Parameters								
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	mercury	arsenic	cadmium
JANUARY	<.034	5.20	<6.9	19.00	<6.9	38.00	0.03	0.73	1.00
FEBRUARY	0.04	4.50	11.00	450.00	<4.4	93.00	0.05	1.40	2.40
MARCH	0.06	3.80	13.00	350.00	<4.3	78.00	0.06	1.70	0.60
APRIL	0.08	4.60	15.00	120.00	<4.9	39.00	0.04	1.60	0.28
MAY	0.04	<3.9	30.00	190.00	<5.2	37.00	0.07	5.20	0.41
JUNE	0.04	<4.0	9.10	180.00	<5.4	29.00	0.08	1.20	0.33
JULY	0.04	5.50	9.90	250.00	<5.3	62.00	0.05	1.80	0.59
AUGUST	0.03	<3.1	4.20	250.00	<4.2	25.00	0.04	1.20	0.28
SEPTEMBER	0.03	<3.7	7.00	190.00	<5.0	46.00	0.04	1.60	0.49
OCTOBER	0.07	8.50	13.00	500.00	<4.8	100.00	0.06	3.00	1.40
NOVEMBER	0.04	6.00	8.00	300.00	<4.6	54.00	0.05	2.10	0.70
DECEMBER	<0.028	<4.3	8.50	61.00	<5.7	62.00	0.03	1.10	0.97

Table O.

Cleveland Heavy Metals Data 2004 St. Theodosius Church 2547 St. Tikhon Ave. AQS: 39-035-0038				units - ng/m³				
Cuyahoga				Parameters				
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	0.03	<3.6	8.30	14.00	<4.8	44.00	1.00	0.33
FEBRUARY	0.02	<3.7	15.00	24.00	<4.9	64.00	0.96	0.50
MARCH	0.05	4.30	31.00	28.00	<4.9	86.00	1.90	1.10
APRIL	<0.025	5.00	18.00	34.00	<5.0	70.00	2.20	0.39
MAY	0.05	4.10	26.00	49.00	<5.1	70.00	1.80	0.63
JUNE	0.04	<3.9	32.00	28.00	<5.2	52.00	1.60	0.49
JULY	<0.026	<3.9	21.00	40.00	<5.2	62.00	1.20	0.92
AUGUST	0.02	<3.2	14.00	30.00	<4.3	48.00	1.40	0.59
SEPTEMBER	0.06	4.20	19.00	73.00	<5.1	82.00	2.40	1.70
OCTOBER	0.05	5.80	36.00	88.00	5.30	120.00	2.00	2.80
NOVEMBER	0.05	4.00	13.00	59.00	<5.0	70.00	1.50	0.64
DECEMBER	<0.024	<3.7	9.30	16.00	<4.9	42.00	0.70	0.22

Table P.

Cleveland Heavy Metals Data 2004 FIRE "4A" 3136 Lorain Ave. AQS: 39-035-0042				units - ng/m³				
Cuyahoga				Parameters				
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	0.04	<3.8	9.30	10.00	<5.1	34.00	0.82	0.15
FEBRUARY	0.03	<3.9	5.80	13.00	<5.2	48.00	0.72	0.15
MARCH	0.04	<3.9	17.00	16.00	<5.2	54.00	2.00	0.68
APRIL	0.03	4.80	11.00	20.00	<5.4	53.00	1.70	0.28
MAY	<0.034	<5.1	20.00	17.00	<6.8	58.00	1.60	0.52
JUNE	<0.027	<4.1	12.00	14.00	<5.4	47.00	2.90	0.34
JULY	<0.028	<4.1	14.00	16.00	<5.5	51.00	1.30	0.29
AUGUST	<0.023	<3.4	12.00	9.50	<4.6	38.00	1.40	0.33
SEPTEMBER	<0.027	<4.1	43.00	23.00	<5.4	80.00	2.30	1.30
OCTOBER	0.04	<4.0	23.00	23.00	<5.4	93.00	1.90	1.60
NOVEMBER	<0.027	<4.0	9.00	13.00	<5.3	47.00	1.40	0.27
DECEMBER	<0.026	<3.9	7.30	6.50	<5.2	39.00	0.63	0.21

Table Q.

Cleveland Heavy Metals Data 2004 FERRO "A" 4150 EAST 56th STR. AQS: 39-035-0049				units - ng/m³				
Cuyahoga				Parameters				
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	0.10	<6.5	54.00	52.00	<8.6	65.00	1.10	0.36
FEBRUARY	0.04	4.50	64.00	91.00	26.00	81.00	1.20	0.53
MARCH	<0.033	<5.0	150.00	42.00	9.70	97.00	2.00	0.74
APRIL	0.05	6.40	93.00	120.00	30.00	110.00	2.00	0.92
MAY	0.06	7.50	130.00	150.00	49.00	150.00	2.30	0.86
JUNE	0.08	5.40	86.00	140.00	51.00	79.00	2.20	0.64
JULY	0.20	12.00	220.00	330.00	35.00	140.00	2.30	1.40
AUGUST	0.07	7.00	94.00	180.00	26.00	110.00	2.60	1.30
SEPTEMBER	0.07	6.10	100.00	170.00	14.00	88.00	3.10	1.20
OCTOBER	0.09	9.00	100.00	250.00	30.00	120.00	2.40	1.20
NOVEMBER	<0.033	5.00	73.00	71.00	27.00	83.00	2.10	0.71
DECEMBER	0.21	<4.0	26.00	20.00	7.00	52.00	0.89	0.21

Table R.

Cleveland Heavy Metals Data 2004 Fortran Printing Inc. 5777 GRANT AVE. AQS: 39-035-0050				units - ng/m³				
Cuyahoga				Parameters				
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	0.03	4.00	24.00	28.00	<5.1	48.00	1.10	0.40
FEBRUARY	<0.026	<3.9	27.00	27.00	<5.2	60.00	1.10	0.43
MARCH	<0.032	<4.9	50.00	37.00	9.00	94.00	2.20	1.10
APRIL	0.03	5.60	41.00	67.00	15.00	84.00	2.00	0.83
MAY	0.04	4.30	100.00	54.00	10.00	99.00	2.40	0.80
JUNE	0.04	<4.1	22.00	33.00	9.40	40.00	2.10	0.56
JULY	0.09	9.00	48.00	180.00	10.00	81.00	3.30	0.72
AUGUST	0.03	3.40	30.00	62.00	4.80	54.00	2.30	0.92
SEPTEMBER	0.06	5.00	27.00	79.00	<5.4	71.00	2.70	1.00
OCTOBER	0.08	7.50	20.00	110.00	7.70	76.00	3.10	1.50
NOVEMBER	0.04	4.70	20.00	67.00	<5.2	55.00	1.90	0.57
DECEMBER	<0.026	<3.9	9.90	21.00	6.60	46.00	1.00	0.24

Table S.

Cleveland Heavy Metals Data 2004
Asphalt Plant "A"
West 3rd St.
AQS: 39-035-0061 units - ng/m³

Cuyahoga	Parameters							
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	0.06	3.90	17.00	40.00	<4.9	66.00	1.00	0.54
FEBRUARY	0.05	<3.7	13.00	39.00	<4.9	62.00	0.82	0.45
MARCH	0.06	3.70	44.00	45.00	<4.9	100.00	1.70	0.95
APRIL	0.08	5.20	18.00	76.00	<5.1	100.00	1.80	0.57
MAY	0.04	4.20	28.00	65.00	<5.1	92.00	1.20	0.46
JUNE	0.08	3.90	23.00	82.00	<5.2	80.00	1.90	0.58
JULY	0.06	5.00	25.00	81.00	<5.2	97.00	1.50	0.98
AUGUST	0.82	3.80	23.00	70.00	<4.3	80.00	1.50	0.78
SEPTEMBER	0.16	4.70	19.00	110.00	<5.2	120.00	2.20	0.89
OCTOBER	0.17	7.30	30.00	140.00	6.40	150.00	1.90	2.20
NOVEMBER	0.06	3.90	13.00	82.00	<5.0	99.00	2.00	0.63
DECEMBER	0.03	<3.7	12.00	39.00	<4.9	66.00	1.40	0.28

Table T.

Cleveland Heavy Metals Data 2004
FIRE #11
7629 BROADWAY AVE.
AIRS: 39-035-0068 units - ng/m³

Cuyahoga	Parameters							
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	<0.13	<19	<26.0	<6.40	<26	24.00	<1.3	0.36
FEBRUARY	<0.066	<9.8	27.00	18.00	<13	73.00	0.80	0.51
MARCH	<0.044	<6.6	32.00	28.00	<8.8	69.00	2.00	0.93
APRIL	<0.066	<10	15.00	43.00	<13	94.00	2.40	0.91
MAY	<0.045	<6.7	46.00	38.00	<8.9	144.00	1.80	0.80
JUNE	0.14	<20	52.00	64.00	<27	86.00	2.00	1.20
JULY	<0.046	7.00	31.00	70.00	<9.1	130.00	1.80	0.82
AUGUST	<0.045	<6.8	31.00	43.00	<9.1	93.00	1.80	1.30
SEPTEMBER	<0.14	<20	36.00	35.00	<27	170.00	5.60	1.10
OCTOBER	<0.045	<6.7	23.00	34.00	<9.0	86.00	1.90	1.30
NOVEMBER	<0.066	<10	20.00	31.00	<13	73.00	2.10	0.59
DECEMBER	<0.044	<6.5	42.00	27.00	<8.7	81.00	3.30	0.59

Table U.

Cleveland Special Project Heavy Metals Data 2004 FIRE #22 7300 SUPERIOR AVE. AIRS: 39-035-0069				units - ng/m³				
Cuyahoga				Parameters				
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	0.05	<6.4	15.00	9.30	<8.5	45.00	1.30	0.40
FEBRUARY	<0.066	<9.9	<13	15.00	<13	74.00	0.77	0.23
MARCH	<0.044	<6.6	22.00	18.00	<8.8	64.00	1.70	0.99
APRIL	<0.067	<10	21.00	24.00	<13	72.00	1.60	0.62
MAY	<0.045	<6.8	19.00	20.00	<9.0	65.00	0.85	0.33
JUNE	<0.068	<10	22.00	30.00	<14	62.00	1.90	0.40
JULY	<0.069	<10	20.00	23.00	<14	88.00	1.40	0.56
AUGUST	<0.045	<6.8	23.00	30.00	<9.1	66.00	3.50	1.00
SEPTEMBER	<0.068	<10	37.00	37.00	<14	130.00	4.50	1.10
OCTOBER	<0.045	<6.8	47.00	32.00	<9.0	81.00	1.90	1.40
NOVEMBER	<0.066	<9.8	<13	34.00	<13	69.00	1.80	0.48
DECEMBER	<0.043	<6.5	12.00	14.00	<8.7	58.00	2.40	0.43

Table V.

Columbus Heavy Metals Data 2004 Woodrow 1700 Ann St. AQS: 39-049-0025					units - ng/m³				
Franklin					Parameters				
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium	mercury
JANUARY	<0.023	<3.5	11.00	8.80	<4.7	50.00	0.58	0.20	0.03
FEBRUARY	<0.023	<3.5	27.00	14.00	<4.7	120.00	1.10	0.50	0.02
MARCH	<0.025	<3.7	21.00	7.20	<5.0	56.00	0.99	0.26	0.02
APRIL	<0.027	<4.0	18.00	18.00	<5.4	110.00	0.99	0.33	0.03
MAY	<0.028	<4.2	12.00	13.00	<5.6	96.00	0.84	0.30	0.04
JUNE	<0.029	<4.3	10.00	15.00	<5.7	59.00	0.99	0.45	0.03
JULY	<0.029	<4.4	14.00	11.00	<5.8	45.00	1.00	0.38	
AUGUST	<0.024	<3.6	8.00	7.80	<4.8	38.00	0.89	0.27	
SEPTEMBER	<0.027	<4.1	6.90	13.00	<5.5	48.00	1.40	0.38	
OCTOBER	<0.054	<4.1	15.00	18.00	<5.4	98.00	1.30	0.50	
NOVEMBER	<0.027	<4.0	12.00	14.00	<5.4	87.00	1.30	0.66	
DECEMBER	<0.027	<4.1	6.10	12.00	<5.5	65.00	0.97	0.33	

Table W.

NWDO Heavy Metals Data 2004
Delta
200 Van Buren St.
AQS: 39-051-0001 units - ng/m³

Fulton	Parameters							
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	<0.024	<3.5	17.00	2.10	<4.7	16.00	0.60	0.06
FEBRUARY	<0.024	<3.5	52.00	5.20	<4.7	200.00	0.34	0.17
MARCH	<.003	<4.4	47.00	9.80	<5.9	170.00	0.97	0.30
APRIL	<0.024	<3.7	83.00	10.00	<4.9	250.00	0.53	0.32
MAY	<0.025	<3.7	44.00	6.80	<5.0	130.00	0.63	0.24
JUNE	<0.028	<4.2	64.00	12.00	<5.6	210.00	0.78	0.34
JULY	<0.07	<5.2	210.00	14.00	<7.0	320.00	1.10	0.60
AUGUST	<0.044	<6.6	67.00	14.00	<8.8	170.00	1.00	0.30
SEPTEMBER	0.03	<3.7	64.00	21.00	<4.9	240.00	2.20	0.56
OCTOBER	0.06	<3.6	78.00	15.00	<4.8	280.00	1.00	0.34
NOVEMBER	<0.04	<6.0	280.00	19.00	<8.0	970.00	1.10	1.50
DECEMBER	0.16	<5.5	380.00	9.30	<7.4	2100.00	0.65	0.94

Table X.

SWDO Heavy Metals Data 2004
Bellefontaine
1222 Superior Ave.
AQS: 39-091-0003 units - ng/m³

Logan	Parameters							
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	<0.024	<3.7	200.00	7.80	<4.9	28.00	0.72	0.62
FEBRUARY	<0.024	<3.6	110.00	6.50	<4.8	25.00	0.73	0.37
MARCH	<0.024	<3.6	28.00	4.30	<4.8	27.00	1.20	0.18
APRIL	<0.025	<3.8	91.00	11.00	<5.0	34.00	0.83	0.16
MAY	<0.027	<4.1	140.00	6.60	<5.5	21.00	1.10	0.14
JUNE	<0.03	<4.5	170.00	5.80	<6.0	17.00	1.10	0.13
JULY	<0.022	<3.3	110.00	5.00	4.70	16.00	0.70	0.12
AUGUST	<0.019	<2.8	45.00	3.00	<3.8	14.00	0.70	0.09
SEPTEMBER	<0.024	<3.7	40.00	5.60	<4.9	18.00	0.94	0.25
OCTOBER	<0.024	<3.7	63.00	5.10	<4.9	22.00	0.80	0.18
NOVEMBER	<0.025	<3.8	190.00	3.90	<5.0	26.00	1.20	0.23
DECEMBER	<0.025	<3.7	76.00	4.40	<4.9	31.00	1.10	0.16

Table Y.

SEDO Heavy Metals Data 2004
Washington Co. Career Center
Lancaster Rd.
AQS: 39-167-0008 units - ng/m³

Washington	Parameters							
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	0.02	<3.0	4.30	22.00	<3.9	18.00	0.83	0.15
FEBRUARY	<0.02	<3.0	<4.0	120.00	<4.0	20.00	0.65	0.19
MARCH	<0.021	<3.2	5.80	53.00	<4.2	20.00	1.60	1.60
APRIL	<0.024	<3.5	<4.7	49.00	<4.7	24.00	1.00	7.40
MAY	<0.024	<3.6	10.00	170.00	<4.9	22.00	1.00	0.22
JUNE	<0.024	<3.7	5.10	120.00	<4.9	23.00	1.10	3.20
JULY	<0.024	<3.7	<4.9	140.00	<4.9	17.00	1.00	0.41
AUGUST	<0.02	<3.0	<4.0	28.00	<4.0	12.00	0.51	0.27
SEPTEMBER	<0.024	<3.5	<4.7	36.00	<4.7	17.00	0.81	0.34
OCTOBER	<0.029	<4.3	<5.8	120.00	<5.8	32.00	2.60	0.64
NOVEMBER	<0.028	<4.2	13.00	340.00	<5.6	49.00	2.10	1.40
DECEMBER	<0.055	<8.3	<11.0	39.00	<11.0	32.00	1.40	4.00

Table Z.

NWDO Heavy Metals Data 2004
Brush Wellman 32
Route 105
AQS: 39-123-0012 units - ng/m³

Ottwa	Parameters							
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
JANUARY	0.04	<0.5	2.00	1.60	<0.6	9.30	0.30	0.10
FEBRUARY	0.04	<0.6	2.90	1.90	<0.8	13.00	0.41	0.10
MARCH	0.03	<0.5	2.00	1.30	<0.7	8.30	0.34	0.09
APRIL	0.20	<0.4	2.60	4.10	0.90	18.00	0.35	0.07
MAY	0.17	<0.5	3.00	6.20	1.90	14.00	0.36	0.10
JUNE	0.10	<0.6	1.70	3.00	<0.7	7.60	0.35	0.05
JULY	0.09	<0.5	1.60	1.40	<0.6	5.20	0.30	0.05
AUGUST	0.22	<0.6	2.00	2.50	1.40	9.70	0.66	0.09
SEPTEMBER	0.09	<0.6	3.60	2.70	0.80	10.00	0.86	0.12
OCTOBER	0.28	<0.7	3.60	3.60	<0.9	17.00	0.84	0.14
NOVEMBER	0.29	<0.7	3.50	2.30	<0.9	14.00	0.76	0.17
DECEMBER	0.04	<0.5	2.40	1.70	<0.7	12.00	0.42	0.12

Table AA.

NWDO Special Project Heavy Metals Data 2004 Marion Steel 635 Bellfontaine / Gill Ave. AQS:				units - ng/m³					
Marion	Parameters								
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	mercury	arsenic	cadmium
JANUARY	<0.024	<3.7	7.50	19.00	<4.9	30.00	0.03	0.54	0.14
FEBRUARY	<0.025	3.70	35.00	54.00	<4.9	140.00	0.06	1.10	0.85
MARCH	<0.026	<3.9	16.00	48.00	<5.2	120.00	0.05	1.40	0.30
APRIL	<0.028	5.50	25.00	63.00	<5.6	160.00	0.20	1.10	0.44
MAY	<0.028	<4.1	19.00	38.00	<5.5	99.00	0.08	0.87	0.28
JUNE	<0.029	<4.4	16.00	33.00	<5.8	96.00	0.09	0.93	0.36
JULY	<0.029	<4.4	7.00	18.00	<5.8	44.00	0.05	0.67	0.17
AUGUST	<0.024	4.80	26.00	50.00	<4.8	220.00	0.42	1.20	0.62
SEPTEMBER	<0.025	<3.8	31.00	58.00	<5.1	130.00	0.09	1.50	0.53
OCTOBER	<0.025	<3.8	20.00	28.00	<5.1	130.00	0.23	1.20	0.42
NOVEMBER	<0.025	4.00	36.00	68.00	<5.1	210.00	0.28	1.40	0.58
DECEMBER	<0.024	<3.6	8.70	17.00	<4.8	50.00	0.04	0.58	0.20

TableAB.

NWDO Special Project Heavy Metals Data 2004 Marion Steel 441 Whitmore St. AQS:					units - ng/m³				
Marion	Parameters								
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	mercury	arsenic	cadmium
JANUARY									
04-Jan-04	<0.051	<7.7	<10.0	25.00	<10.0	25.00	0.02	<0.51	0.12
10-Jan-04	<0.051	<7.7	33.00	120.00	<10.0	120.00	0.07	0.97	0.39
16-Jan-04	<0.05	<7.5	13.00	42.00	<10.0	50.00	0.03	0.72	0.15
22-Jan-04	<0.051	<7.7	17.00	86.00	<10.0	90.00	0.04	1.10	0.48
28-Jan-04	<0.049	<7.4	54.00	45.00	<9.8	67.00	0.03	1.60	0.30
FEBRUARY									
03-Feb-04	<0.048	<7.3	52.00	76.00	<9.7	220.00	0.07	1.10	0.50
09-Feb-04	<0.049	10.00	480.00	410.00	<9.9	1100.00	0.24	8.20	2.80
15-Feb-04	<0.048	<7.3	<9.7	17.00	<9.7	43.00	0.02	0.53	0.09
21-Feb-04	<0.05	<7.6	<10.0	50.00	<10.0	39.00	0.02	<0.5	0.14
MARCH									
04-Mar-04	<0.054	<8.0	23.00	93.00	<11.0	120.00	0.03	1.40	0.36
10-Mar-04	<0.052	<7.9	46.00	100.00	<10.0	510.00	0.07	3.50	0.81
16-Mar-04	<0.052	<7.9	11.00	35.00	<10.0	96.00	0.02	1.20	0.17
22-Mar-04	<0.051	7.80	35.00	120.00	<10.0	210.00	0.05	0.76	0.44
28-Mar-04	<0.056	<8.4	18.00	26.00	<11.0	62.00	0.02	2.00	0.29

Table AB. cont.

NWDO Special Project Heavy Metals Data 2004 Marion Steel 441 Whitmore St.									
units - ng/m³									
Parameters									
MONTH	beryllium	chromium	lead	manganese	nickel	zinc	mercury	arsenic	cadmium
APRIL	0.04	12.00	100.00	230.00	<4.4	780.00	0.40	3.10	1.40
MAY	<0.023	5.30	100.00	110.00	<4.5	510.00	0.56	2.60	1.10
JUNE	<0.023	5.50	63.00	99.00	<4.7	350.00	0.27	1.90	0.88
JULY	<0.023	4.30	21.00	55.00	<4.6	130.00	0.15	1.10	0.39
AUGUST	<0.019	4.00	38.00	68.00	<3.8	350.00	0.45	1.40	0.60
SEPTEMBER	<0.022	3.60	64.00	84.00	<4.4	280.00	0.12	2.00	0.77
OCTOBER	<0.022	3.60	61.00	100.00	<4.3	360.00	0.45	3.00	0.87
NOVEMBER	<0.021	5.20	48.00	97.00	<4.2	190.00	0.23	2.20	0.57
DECEMBER	<0.02	<3.0	12.00	28.00	<4.1	95.00	0.07	0.87	0.31

FUTURE?

The long term air toxics monitoring goals of DAPC will focus on the requirements of the Clean Air Act (CAA) particularly Section 112 and will support the development of EPA's Integrated Urban Air Toxics Strategy. In addition the air toxics monitoring efforts will incorporate relative elements of the mission and goals of DAPC to protect the environment for the benefit of all and to develop improved air toxics information.

For the present, the current strategy of urban based monitoring will be continued and the number of sites will be expanded. The major emphasis of existing sampling projects is to develop and establish cost effective, routine sampling and analysis procedures. USEPA has update the Compendium of Recommended Methods for the Determination of Toxic Organic Compounds in Ambient Air. New methods have been added to allow for more uniform approaches for sampling and analyzing compounds not previously targeted. Ohio EPA's own air toxics monitoring capacity has been enhanced with the expansion of the air canister sample analysis capability by the Division of Environmental Services (DES).

Future Goals of the division will be modified to be compatible with the National Air Toxics Assessment Network activities. The intent of this network is to provide measurements of ambient concentrations of air toxics at monitoring sites throughout the nation for the estimation of human and environmental exposure to air toxics, and the assessment of risk due to air toxics.

As part of the current grant commitment to USEPA, DAPC will continue its effort to submit future Air Toxics Data to the AQS Database. As part of that effort DAPC will compile all air toxics data collected in previous years so that it may eventually be submitted to AQS. DAPC has already made an effort to have all metals data submitted to AQS.

Modernization:

DAPC will pursue information on new technology such as:

- Continuous gas chromatography, mass spectrometry
- FTIR long-path monitoring
- Updates of the Compendium of Recommended Methods are available at the following website: http://www.epa.gov/ttn/amtic/airtox.html

Evaluate future training needs for Air Toxics Monitoring:

- sampling methods,
- analytical procedures,
- equipment.

REPORTS:

Heavy Metals in Columbus	Summer VOC study
1990-91 VOC monitoring	Mead Sampling
PUF sampling project	Columbus Dioxin Study
Columbus Dioxin Study 1995	Marion Air Quality Study
Cleveland Air Toxics Study	New Boston Coke
Shell Chemical (Belpre, Ohio) Facility Fire Report	Air Toxics Section in the Annual DAPC Ohio Air Quality Report

Future Report: A Compilation of Air Toxics Monitoring 1990-2003, summary data currently available by year.

VII. AIR QUALITY INDEX (AQI)

There has been a daily reporting of ambient air quality in Ohio's major metropolitan areas in some form since 1971. A national Pollution Standards Index (PSI) was established in 1977 to report air quality. This index was adopted by Ohio EPA's District Offices and the local air agencies (LAA's) to inform the public of daily air quality.

In the summer of 1999 the PSI scale was revised and renamed the Air Quality Index (AQI). It was modified to add 2.5 micron particulate matter ($PM_{2.5}$) and to accommodate the 8-Hour ozone standard.

The AQI (see Table 12) is a uniform "scaling" of five pollutants: particulate (PM_{10} and $PM_{2.5}$), sulfur dioxide, ozone, nitrogen dioxide, and carbon monoxide. The level of each of these is calculated every day to determine the AQI. The pollutant with the highest AQI is reported to the media.

When the AQI exceeds 100 in a major city, the agency concerned issues a "health advisory". When pollution levels exceed an AQI of 200 and are projected to persist, an "air pollution episode" exists and the Governor declares an "alert". This initiates mandatory cutbacks of emissions from specified facilities to alleviate the situation. If the AQI were to surpass 300, 400 or 500, progressively greater cutbacks would be implemented to reduce pollutants to an acceptable level.

The AQI trend shows that Ohio's air quality has improved significantly. Although alerts were commonplace in the early 1970's, none have happened in over ten years, and the number of health advisories has been greatly reduced.

TABLE 12

Comparison Of AQI Values With Pollutant Concentrations, Descriptor Words And Associated Colors

INDEX VALUE	PM_{10} µg/m^3	$PM_{2.5}$ µg/m^3	CO ppm	SO_2 ppm	Ozone ppm[1]		NO_2 ppm	Color	Category
	24-Hour	24-Hour	8-Hour	24-Hour	8-Hour	1-Hour	1-Hour		
0-50	0-54	0.0-15.4	0.0-4.4	0.000-0.034	0.000-0.064		(4)	Green	Good
51-100	55-154	15.5-40.4	4.5-9.4	0.035-0.144	0.065-0.084		(4)	Yellow	Moderate
101-150	155-254	40.5-65.4	9.5-12.4	0.145-0.224	0.085-0.104	0.125-0.164	(4)	Orange	Unhealthy for Sensitive Groups
151-200	255-354	65.5-150.4[2]	12.5-15.4	0.225-0.304	0.105-0.124	0.165-0.204	(4)	Red	Unhealthy
201-300	355-424	150.5-250.4[2]	15.5-30.4	0.305-.604	0.125-0.374	0.205-0.404	0.65-1.24	Purple	Very Unhealthy
301-	425-	250.5[2]-	30.5-	0.605	(3)	0.405-	1.25-	Maroon	Hazardous

[1]Areas are generally required to report the AQI based on 8-Hr ozone values. The maximum of the 8-Hr or 1-Hr is used.

[2]If a different Significant Harm Level for $PM_{2.5}$ is promulgated, these numbers will be changed.

[3]8-Hr Ozone values do not define higher AQI values ($\geq$301). AQI values of 301 or higher are calculated with 1-Hr ozone concentrations.

[4]NO_2 has no short-term NAAQS and can generate an AQI only above an AQI value of 200.

AQI Chart

The accompanying table shows the AQI values for selected counties. It should be noted that the daily AQI values that are calculated and reported on a daily basis for cities in these counties may differ from those in the table. The daily AQI is based on a limited number of monitors (particularly PM_{10} and $PM_{2.5}$). This table uses data from all monitors in the county. From those data the highest AQI value is chosen for each day.

The table gives a general representation of the relative air quality in these counties. There were no readings in the "very unhealthy" or "hazardous" category.

TABLE 13

County	Highest AQI Value	Days in each category:			
		Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy
Butler	117	197	167	2	0
Clark	109	304	60	2	0
Cuyahoga	134	172	178	16	0
Franklin	104	186	178	2	0
Hamilton	115	180	181	5	0
Jefferson	141	207	139	20	0
Lake	95	316	50	0	0
Lawrence	96	317	49	0	0
Lucas	114	270	94	2	0
Mahoning	104	215	147	4	0
Montgomery	143	139	218	9	0
Stark	104	265	98	3	0
Summit	121	190	166	10	0
Trumbull	111	238	120	2	0

VIII. MONITORING SITES 2004

Explanation of AQS codes:

The first column is the AQS number which consists of:

39-the state code
NNN-the county code, alphabetical, odd numbers only
NNNN-the site code

The second column is the county in which the monitoring site is located

The third column is a street address or city name

The fourth column lists the pollutants monitored at the site.

The Parameters monitored at each site are:

PB	Lead
PM10	Ten Micron Particulate Matter (PM_{10})
LC25	2.5 Micron Particulate Matter ($PM_{2.5}$)
PT	Total Suspended Particulate (TSP)
O3	Ozone (O_3)
SO2	Sulfur Dioxide
CO	Carbon Monoxide
NO2	Nitrogen Dioxide

Monitoring Network for 2004

AQS Number	County	Site Location	Parameter(s)
39-001-0001	Adams	210 N. Wilson	SO2
39-003-0002	Allen	2650 Bible Rd.	O3, SO2
39-003-0006	Allen	1314 Findlay Rd	PM10
39-003-0007	Allen	Rousch Rd.	PM10
39-003-0008	Allen	North St.	PM10
39-007-1001	Ashtabula	Conneaut	O3, SO2
39-009-0003	Athens	Gifford State Forest	PM10, LC25
39-013-1003	Belmont	1st St. Martins Ferry	PM10
39-013-3002	Belmont	E 40 St., Shadyside	SO2
39-017-0003	Butler	Bonita & St. John	PM10, LC25
39-017-0004	Butler	Schuler & Bender	O3, SO2
39-017-0015	Butler	3901 Lefferson	PM10, PB
39-017-0016	Butler	400 Nilles Rd.	LC25
39-017-0017	Butler	3300 Wilwood Rd.	LC25
39-017-1004	Butler	Hook Field	O3, SO2, LC25
39-023-0001	Clark	5171 Urbana Rd.	O3
39-023-0003	Clark	5400 Spangler Rd.	O3, SO2
39-023-0005	Clark	350 N Fountain Ave.	LC25
39-025-0021	Clermont	3079 Angel Dr., Bethel	SO2
39-025-0022	Clermont	2400 Clermont Center Dr.	O3
39-027-1002	Clinton	62 Laurel Dr., Career Cntr	O3
39-029-0019	Columbiana	1250 George St.	PB
39-029-0020	Columbiana	2220 Michigan Ave	PM10, PB
39-029-0022	Columbiana	500 Maryland Ave.	SO2, PM10, PB
39-035-0027	Cuyahoga	2200 W 28th St.	PM10, LC25
39-035-0034	Cuyahoga	891 E 152 St.	O3, LC25
39-035-0038	Cuyahoga	2547 St. Tikhon Ave.	PB, SO2, PM10, LC25
39-035-0042	Cuyahoga	3136 Lorain	PB
39-035-0045	Cuyahoga	45950 Broadway Ave.	SO2, PM10, LC25
39-035-0048	Cuyahoga	2026 E 9th St.	CO
39-035-0049	Cuyahoga	E 56th St.	PB
39-035-0050	Cuyahoga	Grant Rd.	PB
39-035-0051	Cuyahoga	E 9th & St. Clair	CO
39-035-0053	Cuyahoga	4160 Pearl Rd.	CO
39-035-0060	Cuyahoga	E 14th & Orange	NO2, SO2, PM10, LC25
39-035-0061	Cuyahoga	W 3rd St.	PB
39-035-0064	Cuyahoga	Berea	O3
39-035-0065	Cuyahoga	4600 Harvard Ave.	SO2, PM10, LC25
39-035-0066	Cuyahoga	3500 E 147th	CO, NO2, LC25
39-035-0068	Cuyahoga	7629 Broadway	PB
39-035-0069	Cuyahoga	7300 Superior Ave	PB
39-035-0070	Cuyahoga	130013 Cortlett Ave.	CO, NO2
39-035-1002	Cuyahoga	16900 Holland Rd.	PM10, LC25

AQS Number	County	Site Location	Parameter(s)
39-035-5002	Cuyahoga	6116 Wilson Mills Rd.	O3
39-041-0002	Delaware	359 Main St.	O3
39-049-0005	Franklin	Morse & Karl Rds	CO
39-049-0024	Franklin	Ohio State Fairgrounds	PM10, LC25
39-049-0025	Franklin	580 Woodrow Ave.	PB, LC25
39-049-0028	Franklin	2521 Fairwood Ave.	O3, LC25
39-049-0029	Franklin	7600 Fodor Rd., New Albany	O3, LC25
39-049-0034	Franklin	Korbel Ave.	SO2, PM10
39-049-0036	Franklin	122 S. Front St.	CO
39-049-0037	Franklin	1777 E. Broad St.	O3
39-049-0081	Franklin	5750 Maple Canyon Dr.	O3, LC25
39-051-0001	Fulton	200 Van Buren St.	PB
39-053-0002	Gallia	Cheshire Town Hall	SO2
39-053-0003	Gallia	State Rt 7	LC25
39-055-0004	Geauga	13000 auburn Rd.	O3
39-057-0005	Greene	314 Dayton St.	PM10, LC25
39-057-0006	Greene	541 Ledbetter Rd.	O3
39-061-0006	Hamilton	11590 Grooms Rd.	O3
39-061-0010	Hamilton	6950 Ribble Rd.	O3, SO2
39-061-0014	Hamilton	18 E Seymour	PM10, LC25
39-061-0021	Hamilton	100 E Fifth Ave.	CO
39-061-0040	Hamilton	250 Wm. Howard Taft Rd.	O3, NO2, PM10, LC25
39-061-0041	Hamilton	5300 Winneste Ave.	LC25
39-061-0042	Hamilton	2101 W Eighth St.	LC25
39-061-0043	Hamilton	3254 Kemper Rd.	LC25
39-061-4002	Hamilton	3001 Harris Ave., Norwood	CO, NO2
39-061-5001	Hamilton	101 Cooper Ave	PM10
39-061-7001	Hamilton	2059 Sherman Ave.	LC25
39-061-8001	Hamilton	300 Murray Rd.	LC25
39-063-0002	Hancock	9860 CR 313	PM10
39-063-0003	Hancock	9860 CR 313	PM10
39-063-0004	Hancock	CR 144	PM10
39-081-0001	Jefferson	1004 Third St.	PM10
39-081-0017	Jefferson	618 Logan	CO, SO2, PM10, LC25
39-081-1001	Jefferson	Mingo Junction City Hall	CO, SO2, O3, PM10, LC25
39-083-0002	Knox	Water Plant, SR 314	O3
39-085-0003	Lake	Jefferson Elementary School	O3, SO2
39-085-0006	Lake	8443 Mentor Ave.	CO
39-085-1001	Lake	IQ 325 Vine St.	PM10, LC25
39-085-3002	Lake	71 E High St.	O3, SO2
39-087-0003	Lawrence	Marion Pk, Coal Grove	PM10
39-087-0006	Lawrence	2120 S. 8^{th} St.	O3, SO2
39-087-0010	Lawrence	2128 S. 9^{th} St.	PM10, LC25
39-087-0011	Lawrence	St Rt 775 & St Rt 141	O3

AQS Number	County	Site Location	Parameter(s)
39-089-0005	Licking	300 Licking View Dr., Heath	O3
39-089-0007	Licking	10843 Foundation Rd.	PM10
39-091-0003	Logan	1222 Superior Ave.	PB
39-091-0005	Logan	1229 S. Main St.	PB
39-091-0006	Logan	320 Richard Ave.	PB
39-091-0007	Logan	1205 Superior Ave.	PB
39-093-0016	Lorain	214 E 34th St.	LC25
39-093-0017	Lorain	601 Broad St.	O3, SO2
39-093-3002	Lorain	2180 Lake Breeze	PM10, LC25
39-095-0008	Lucas	600 Collins Ave,	SO2
39-095-0024	Lucas	348 S Erie St.	O3, SO2, PM10, LC25
39-095-0025	Lucas	600 Collins Park	LC25
39-095-0026	Lucas	4208 Airport Highway	LC25
39-095-0027	Lucas	200 S Byrne Rd., Waterville	O3
39-095-0034	Lucas	306 Yondota	O3
39-095-0081	Lucas	Friendship Park	O3
39-095-1003	Lucas	Lee & Front Sts.	PM10
39-097-0007	Madison	9940 SR 38 SW	O3
39-099-0005	Mahoning	Fire Station 7	PM10, LC25
39-099-0006	Mahoning	Fire Station 5	PM10
39-099-0013	Mahoning	345 Oakhill Ave.	O3, SO2
39-099-0014	Mahoning	Oakhill	LC25
39-103-0003	Medina	6364 Deerview	O3
39-105-1001	Meigs	Mulberry Ave., Pomeroy	SO2
39-109-0005	Miami	3825 N SR 589, Castown	O3
39-111-0001	Monroe	Post Office, SR 7	PM10
39-113-0003	Montgomery	7 E Fourth St.	CO
39-113-0008	Montgomery	7056 McEwen Rd.	PM10
39-113-0019	Montgomery	2100 Timberlane	O3
39-113-0025	Montgomery	451 W Third Ave.	SO2
39-113-0028	Montgomery	901 W Fairview Ave.	CO
39-113-0031	Montgomery	1361 Huffman Ave.	LC25
39-113-0032	Montgomery	215 E. Third St.	LC25
39-113-0033	Montgomery	1404 Webster St.	O3
39-113-0034	Montgomery	117 South Main St.	CO
39-113-7001	Montgomery	2728 Vicking Lane	PM10
39-115-0003	Morgan	2600 SR 83, Hackney	SO2
39-133-0002	Portage	531 Washington Ave.	LC25
39-133-1001	Portage	1570 Ravenna Rd.	O3
39-135-1001	Preble	National Trails School	O3, LC25
39-145-0001	Scioto	3940 Gallia St	PM10
39-145-0013	Scioto	4862 Gallia St.,	SO2, PM10, LC25
39-145-0019	Scioto	605 Washington St.	PM10
39-145-1006	Scioto	SR 140 South Webster	PM10

AQS Number	County	Site Location	Parameter(s)
39-147-0003	Seneca	Water St., Flat Rock	PM10
39-147-0005	Seneca	15990 Main St.	PM10
39-147-0006	Seneca	1410 E Twp 178	PM10
39-151-0009	Stark	1901 Midway NE	PM10
39-151-0016	Stark	Malone College	O3, SO2
39-151-0017	Stark	1330 Dueber Ave	PM10, LC25
39-151-0020	Stark	420 Market Ave.	CO, PM10, LC25
39-151-0021	Stark	245 W 5th St., Brewster	O3
39-151-1009	Stark	6318 Heminger Ave. NE	O3
39-151-4005	Stark	1175 W Vine St., Alliance	O3
39-153-0014	Summit	177 S. Broadway	PM10
39-153-0017	Summit	80 Brittain Rd.	SO2, PM10, LC25
39-153-0020	Summit	800 Patterson Ave	O3, CO
39-153-0022	Summit	177 S. Broadway	CO, SO2
39-153-0023	Summit	660 W Exchange St.	LC25
39-155-0005	Trumbull	540 Laird Ave. SE Warren	PM10
39-155-0006	Trumbull	2323 Main Ave. SW	PM10
39-155-0007	Trumbull	2609 Draper St. SE	PM10, LC25
39-155-0009	Trumbull	Community Hall, Kinsman	O3
39-155-0011	Trumbull	Vienna	O3
39-157-0006	Tuscarawas	527 Cresent St.	SO2
39-165-0007	Warren	416 Southeast St.	O3
39-167-0004	Washington	2000 Fourth St., Marietta	O3
39-167-0005	Washington	Oil Well Rd	PM10
39-167-0006	Washington	Everready Battery Rd.	PM10
39-167-0008	Washington	Washington Career Center	PB
39-173-0003	Wood	347 Dunbridge Rd.	O3
39-175-0007	Wyandot	Weaver Farm	PM10
39-175-0008	Wyandot	East Noth St.	PM10
39-175-0009	Wyandot	Greer Rd.	PM10

Acronyms and Abbreviations

AA	Atomic Absorption
AIRS-AQS	Aerometric Information Retrieval System-Air Quality Subsystem (no longer used)
AQCR	Air Quality Control Region
AQI	Air Quality Index
AQS	Air Quality System (replaced AIRS-AQS)
ATMP	Air Toxics Monitoring Program
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DAPC	Division of Air Pollution Control
DES	Division of Environmental Services
DO	District Office
EDT	Exceptional Data Type
FR	Federal Register
GC	Gas Chromatograph or Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LAA	Local Air Agency
NAAQS	National Ambient Air Quality Standard
NADB	National Aerometric Databank
NAMS	National Ambient Monitoring Station
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
O_3	Ozone
OASN	Ohio Air Sampling Network
Org Type	Organization Type
Pb	Lead
POC	Parameter Occurrence Code
ppb	parts per billion
ppm	parts per million
PM_{10} also PM-10	ten micron particulate matter
$PM_{2.5}$ also PM-2.5	2.5 micron particulate matter
PSI	Pollution Standards Index
RADS	Remote Ambient-Air Data System
SLAMS	State/Local Ambient Monitoring Station
SO_2	Sulfur Dioxide
TO-14A	Toxics analysis methods descriptions
TSP	Total Suspended Particulate
VOC	Volatile Organic Carbon
$\mu g/m^3$ also ug/m^3	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
ng/m^3	nanograms per cubic meter
# Obs	Number of observations/samples

Reporting Organizations

Reporting Organization Code	Agency Description
0012	Akron Regional Air Pollution Control Agency
0151	Canton City Health Department Air Pollution Control
0220	City of Toledo, Environmental Services Division
0229	Cleveland Air Pollution Control Agency
0287	Dayton Regional Air Pollution Control Agency
0443	Glacier Daido America
0595	Lake County Health Department Division Air Pollution
0634	Mahoning-Trumbull Air Pollution Control Agency
0743	National Lime and Stone Company
0805	Ohio EPA, Central District Office
0806	Ohio EPA, Division of Environmental Services
0807	Ohio EPA, Northeast District Office
0808	Ohio EPA, Northwest District Office
0809	Ohio EPA, Southeast District Office
0810	Ohio EPA, Southwest District Office
0880	Portsmouth City Health Department Division of Air Pollution Control
1100	US EPA-Region V
1217	Research Triangle Institute RTP, NC
1259	Hamilton County Department of Environmental Services
1265	Hanson Aggregates Midwest, Inc., OH