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Division of Air Pollution Control

All Ohio Air Toxics Report

Statewide Air Toxics Study

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STATE OF OHIO

ALL OHIO AIR TOXICS REPORT

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DIVISION OF AIR POLLUTION CONTROL

OHIO ENVIRONMENTAL PROTECTION AGENCY

EXECUTIVE SUMMARY

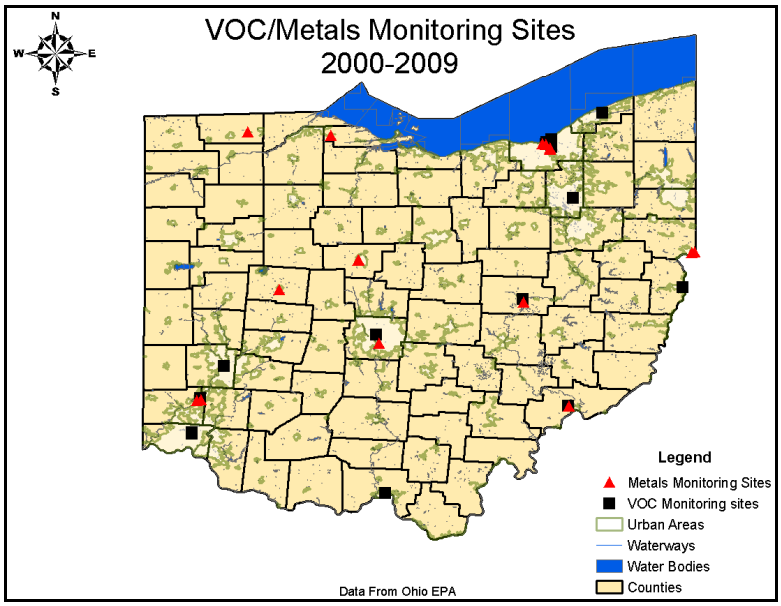
The Ohio EPA, Division of Air Pollution Control (DAPC), has completed the first Ohio statewide air toxics monitoring study. This study presents and summarizes the air monitoring efforts conducted by the division and provides information to the public regarding the levels of volatile organic compounds (VOCs) and heavy metals compounds measured throughout Ohio. For this report, staff evaluated ambient (outdoor) air monitoring data from 34 air toxics monitoring sites located in 16 Ohio counties.

Figure 1 shows the locations of the ambient monitoring sites evaluated in this study. The ambient air measurements were collected over approximately nine years. However, Ohio EPA collected samples for different time frames at various locations within this nine-year period. For example, some sites were sampled for three years (from 2000-2003 or 2004-2007), while other sites, such as the Washington County and Butler County sites were monitored for the entire nine-year period. Air sampling locations for heavy metals are represented by red triangles; locations for VOCs are represented by black squares.

Heavy metal sampling was conducted using a high-volume total suspended particulate (TSP) sampler, with 24-hour samples collected once every six days. Each group of filter samples was analyzed for the following metals: arsenic, beryllium, cadmium, and chromium, lead, nickel, manganese and zinc. Some of the filters were also analyzed for iron.

Most of the VOC samples were collected using a whole-air sampling system that pumps ambient air into an evacuated stainless steel canister. Samples were collected over a 24-hour time period at various intervals, as determined by the goal of each study. The ambient air samples were analyzed by Ohio EPA, Division of Environmental Services. More than 70 VOCs are typically targeted by the analytical system for identification and quantification.

Figure 1. Ohio Air Toxic Monitoring Sites



Air Toxic Risk Summary

In this report, the ambient air monitoring results are evaluated in an inhalation risk assessment. The risk assessment focuses on the direct inhalation of contaminants measured in ambient (outdoor) air for a given sampling period. This process uses U. S. EPA methods to estimate both the cancer and non-cancer health effects that individuals or populations may experience as a result of prolonged (long-term) exposure to toxic compounds. In an air pollution risk assessment, exposure is assumed to be constant inhalation (24 hours per day, 365 days per year, for 30-70 years) at the measured concentrations of air pollutants. This estimate centers on the additional lifetime risk predicted from the exposure being analyzed, beyond that due to any other factors. These estimates are calculated utilizing cancer and non-cancer potency factors that U.S. EPA considers to be plausible upper-bounds (i.e., actual risk may be lower, but sensitive populations and children may be at a higher risk).

Cancer risk is expressed as a probability usually represented in scientific notation as a negative exponent of 10. For example, an additional lifetime risk of contracting cancer of 1 chance in one million (or one additional person in 1,000,000 people) is written as $1x10^{-06}$ or 1.0 E-6. U.S. EPA has established a range of "acceptable" health risk values for carcinogens (cancer) compounds between one in 1,000,000 (1×10^{-06}) and one in 10,000 (1×10^{-04}) based upon feasible risk reduction strategies. While it is not always possible or feasible to remove all traces of a chemical released into the environment, Ohio EPA generally takes action to reduce the health risks associated with exposure to air pollutants that exceed the 1×10^{-04} risk level.

Non-cancer risks are evaluated by estimating the ratio of the individually measured concentrations to the no-effect level, known as the Hazard Quotient (HQ). The Hazard Quotients (HQs) can be added together to yield a total estimate of non-carcinogenic risk known as the Hazard Index (HI). Concentrations below these “no-effect” levels are generally regarded as "safe." Any individual non-cancer chemical that is above 100% (1.0) of the HQ is considered potentially unacceptable and merits further investigation.

The total cancer and non-cancer risks (HI) for each monitoring location are summarized in Tables 1 and 2 below. **Table 1** represents the chronic (long-term) cancer and non-cancer risk for **VOCs** and **Table 2** summarizes the cancer and non-cancer risk for **heavy metals**. Each table contains a list that separates current and historic sites in alphabetical order.

Table 1. Total Cancer and Non-Cancer Risk Estimates for VOCs

Current Sites					
	County	**Year**	**Address**	**Total HI**	**Total Risk**
	Butler/Verity School	2000–2009	1900 St. John's Rd.	0.52	6.03E-05
	Cuyahoga/Fire Station #11	2000–2009	7629 Broadway Ave.	0.56	8.22E-05
	Cuyahoga/Fire Station #22	2000–2009	7300 Superior Ave.	0.50	6.75E-05
	Cuyahoga/St. Theo.	2006- 2009	2547 St. Tikon	0.43	4.43E-05
	Cuyahoga/Tri-C College	2006-2009	2900 Community College Ave.	0.57	7.15E-05
	Franklin/OSU Fairgrounds	2003-2009	Korbel Ave.	0.49	7.33E-05
	Jefferson/SEDO	2004-2009	618 Logan St.	2.74	1.63E-04
	Washington/Washington County Career Center	2000-2009	Rt. 2	1.13	1.37E-04
Historic Sites					
	County	**Year**	**Address**	**Total HI**	**Total Risk**
	Coshocton/Coshocton Health Department	2000-2002	724 South 7th St.	0.59	4.89E-05
	Cuyahoga/G.T. Craig	2000-2003	E. 14th & Orange	0.81	8.383E-05
	Hamilton/Cincinnati State Community College	2003-2007	10100 Reading Rd.	0.55	9.81E-05
	Hamilton/Reading Pool	2000-2002	1601 West. St.	0.79	1.12E-04
	Lake/Lake County Hospital	2000-2004	71 E. High St.	0.49	6.76E-05
	Montgomery/Downtown Dayton Library	2003-2004	215 E. Third St.	0.87	1.13E-04
	Scioto/Portsmouth Water Treatment Plant	2000-2003	4862 Gallia	1.21	1.01E-04
	Summit/Akron Region Air Quality Management District	2000-2003	80 Brittain Rd.	0.59	5.67E-05

Table 2. Total Cancer and Non-Cancer Risk Estimates for Heavy Metals

Current Sites					
	County	**Year**	**Address**	**Total HI**	**Total Risk**
	Butler/Ohio Bell	2004-2009	3901 Jefferson Rd	1.16	5.03 E-05
	Columbiana/Maryland Ave	2001-2009	500 Maryland Ave	4.17	6.04 E-05
	Columbiana/Port Authority	2000-2009*	1250 St. George St	7.53	6.96 E-05
	Columbiana /Water Plant	2000-2009*	2220 Michigan Ave	32.28	2.10 E-04
	Cuyahoga/Ferro "A", Ferro “B”	2000-2009	4150 EAST 56th STR.	3.05	9.17 E-05
	Cuyahoga/Asphalt Plant A	2000-2009	West 3rd STR.	1.26	4.53 E-05
	Cuyahoga /Fortran Printing Inc.	2000-2009	5777 Grant Ave.	1.48	5.61 E-05
	Cuyahoga /St. Theodosius Church	2000-2009	2547 St. Tikhon Ave.	0.92	4.70 E-05
	Cuyahoga/Fire "4A", "4B"	2000-2009	3136 Lorain Ave.	0.44	4.20 E-05
	Franklin/ Woodrow	2000-2009	580 Woodrow	0.35	3.45 E-05
	Fulton	2000-2009	200 Van Buren St.	0.36	3.54 E-05
	Logan/Bellefontaine	2000-2009	1222 Superior Ave.	0.18	3.10 E-05
	Marion/Marion Steel	2000-2009	635 Bellefontaine / Gill Ave.	1.11	4.59 E-05
	Marion/Whitmore	2002-2009	441 Whitmore St.	3.22	1.39 E-04
	Ottawa/Brush Wellman 32	2002-2009	Brush Wellman 32	0.10	6.68 E-06
	Washington/Career Center	2000-2009	Rt. 676 Marietta	2.94	2.94 E-05

Historic Sites					
	County	**Year**	**Address**	**Total HI**	**Total Risk**
	Butler/ Oneida School I	2000-2002	Yankee Rd.	1.65	9.22 E-05
	Coshocton County/ Johnson Plumbing	2000-2002	840 Otsego Ave	1.08	5.76 E-05
	Cuyahoga/IMT	2000-2003	511 West 164th STR.	1.03	6.02 E-05
	Cuyahoga/Gate A	2001-2003	2850 3rd STR.	1.31	6.23 E-05
	Cuyahoga/Fire Station #11	2004-2006	7629 Broadway Ave.	0.76	5.91 E-05
	Cuyahoga/Fire Station #22	2004-2006	7300 Superior Ave.	0.44	8.90 E-06

The cancer risk estimates for most counties are within the 10^{-05} risk range. However, the total risk estimates for the following counties were slightly above the 10^{-04} cancer risk range: Columbiana, Hamilton, Jefferson, Marion, Montgomery, Scioto, and Washington. A detailed review of the cancer risk estimates revealed that the compounds acrylonitrile and benzene contribute to the majority of the risk from VOC compounds, while the chromium concentrations comprise the majority of the risk for the heavy metal compounds at each site.

For 13 out of 16 monitoring sites for VOCs, the total non-cancer risk estimates were below 100 percent. However, the non-cancer risk estimates for over half of the heavy metal monitoring sites were above the 100 percent non-cancer risk level. For each of the counties sampled, manganese comprises the majority of the risk for heavy metal compounds, while naphthalene comprises the majority of the risk for VOCs. Details regarding the air monitoring and risk assessment results are the subject of this Air Toxics Report. These estimates are being used by Ohio EPA to provide additional information to the public regarding Ohio's air quality and to assist the Agency in prioritizing areas in Ohio for further investigation and risk reduction.

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INTRODUCTION

The Ohio EPA, Division of Air Pollution Control (DAPC), has created this first statewide air toxics monitoring summary and analysis report for the State of Ohio. This summary report contains data from air toxics monitoring sites located throughout the state. The data documented in this report was collected by Ohio EPA field offices (five Ohio EPA district offices and nine local air agencies), as well as DAPC Central Office staff. This report is designed to provide information to citizens regarding the measured levels of toxic pollutants in their area, as well as a basic assessment of risk from potential airborne exposure to those pollutants. This report includes ambient air toxics monitoring data results for volatile organic compounds (VOCs) and heavy metal compounds.

This study was compiled and written by the Air Toxics Unit (ATU) of DAPC, with assistance from the Air Monitoring Section (AMS). All laboratory analysis performed on the collected ambient air samples was conducted at Ohio EPA's Division of Environmental Services (DES) laboratory, unless stated otherwise. The creation of this report complements the Ohio EPA's Urban Air Toxic Monitoring Program, initiated by U.S. EPA, to address the potential concerns for high cancer risks from multi-source, multi-pollutant interactions in urban areas. Many of the site results listed here are located in or near Ohio's urban areas that contain numerous industrial sources. These sources, when combined with mobile source emissions, contribute to the total amount of toxic emissions released into Ohio's outdoor air. Heavy metals, VOCs and Polycyclic Aromatic Hydrocarbons (PAHs) are routinely monitored throughout Ohio. Among other things, these measurements provide the opportunity to quantify the concentrations of toxic pollutants in many areas of the state; to assess the general risk to Ohioans from air pollution; to focus study on potential areas of high concentrations; and to document successful reductions of these compounds in Ohio.

In general, the summary of the ambient air measurements presented here span for a period of approximately nine years. Ohio EPA collected samples for different time frames within this nine-year period. For example, some sites were sampled for three years (from 2000-2003 or 2004-2007), while other sites were monitored for the entire time. Most of these sites were chosen either to be representative of a large area being studied as a whole, so as not to be dominated by a single industrial source or sources. Alternatively, some monitoring sites were selected as a result of either citizen requests at or around specific sources of air pollution, and others were selected by DAPC as part of specific air toxic investigations for air pollution research and/or health-study investigations. In some cases, Ohio EPA has provided ambient air monitoring at the request of other state, local and federal health agencies as part of data collection research for specific investigations. Detailed site descriptions will not be addressed in this report, but the information is available by contacting DAPC.

METHODS

VOLATILE ORGANIC COMPOUND SAMPLING AND ANALYSIS

A major component of this Report consists of ambient air sampling for volatile organic compounds (VOCs). These are defined as compounds that are generally found in the vapor (gas) state at normal temperatures. These compounds can be chlorinated or simple hydrocarbons. Most of the VOC samples collected in this study were collected using a whole-air sampling system that pumps ambient air into an evacuated stainless steel canister. The canister acts as a storage container which allows the air sample to be maintained virtually unchanged until it is analyzed. Samples were collected over a 24-hour time period at various intervals between days, as determined by the goal of each study. The specific procedures for VOC sampling and laboratory analysis can be found in the U.S. EPA document *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air* (section TO-14).

During analysis, the volatile tendency of VOC compounds allows them to be vaporized when heated (if not already in that form), and then injected into an analytical device called a gas chromatograph (GC). The typical analytical system used for this study utilized a GC with a special detector called a mass spectrometer (MS). As a sample passes through a GC column, the various compounds separate out of the sample mixture. The compounds exit the column individually, and the concentration of each is detected by the MS. These concentrations are illustrated as peaks on a chromatogram. The area of each peak indicates the concentration of the compound in the sample. Compound identification is accomplished by comparing the retention time of the peaks on 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 combination of 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, forming a fingerprint by which a compound can be identified as described above. Over 70 VOCs are targeted by the analytical system for identification and quantification. As the technology and method improves, additional compounds are added to the standard target list. However, if an unidentified compound of significant quantity exists in a sample, it can be tentatively identified during the MS analysis.

HEAVY METALS SAMPLING AND ANALYSIS

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, although at times different schedules are used. The operating procedures can be found in the *Code of Federal Regulations, 40 CFR, Part 50, Appendix B - Reference Method for Determination of Suspended Particulate Matter in the Atmosphere.* For lead, *40 CFR Part 50, Appendix G* is used.

Filters collected at each site are generally analyzed as a monthly composite. The acid-extracted samples are analyzed by inductively coupled plasma (ICP), which has evolved to include inductively coupled plasma mass spectrometry (ICP-MS) to determine the concentration of the metals parameters in extracted filter sample. The acid extracted droplet of nebulized sample enters the central channel of the ICP, it evaporates and any solids that were dissolved in the liquid vaporize and then break down into atoms. At the temperatures prevailing in the plasma a significant proportion of the atoms of many chemical elements are ionized, each atom losing its most loosely-bound electron to form a singly charged ion. The ions from the plasma are extracted through a series of cones into a mass spectrometer, usually a quadrupole. The ions are separated on the basis of their mass-to-charge ratio and a detector receives an ion signal proportional to the concentration of the parameter to be determined.

METHOD OF ANALYSIS DETECTION LIMITS

The arithmetic mean (average) as listed in these tables contains values for non-detected compounds as half of the detection limit. The detection limit is the lowest measurement the collection and analysis procedure can accurately quantify as a true measurement of the ambient air concentration. Other options for handling values below the detection limit are available, such as using the detection limit itself, or using zero for the measurement result. In this study, the mean (average) concentration used for estimation of long-term exposure contains the value of half the detection limit for results below the lower detection limit of the method (non-detects). Using a value of zero, however, will tend to underestimate the true average, as many values could be well below the detection limit, but greater than zero. Ohio EPA uses the value of half the detection limit as reasonable compromise between overestimating or underestimating the true ambient air concentration of these compounds (which generally follows U.S. EPA guidelines). No values are recorded for compounds that were measured below the detection limit for an entire year (no detected values for 12 consecutive months). Results for non-detected compounds for annual reporting periods are not included in the result data tables.

HUMAN HEALTH RISK ASSESSMENT

Risk assessment is a process which uses current available toxicological information as a basis for estimating the health effects that individuals or populations may experience as a result of prolonged exposure to hazardous substances. Following the risk assessment guidelines provided by the U.S. EPA, Ohio EPA DAPC is providing screening level risk assessment information with selected results for Ohio's data. The risk assessment process consists of four steps: hazard identification, toxicity assessment, exposure assessment, and risk characterization. Detailed explanations of the above steps have been provided in other Ohio EPA and U.S. EPA documents and will not be discussed in detail here. These steps, when combined, produce a numerical prediction of the probability of an adverse health effect, such as carcinogenicity and / or systematic toxicity, which may occur as a result of constant exposure to a single or multiple toxic compounds for a long period of time.

For the purpose of this study, it is assumed that a hypothetical individual is exposed constantly for 24-hours per day and 365-days per year to the average measured airborne concentrations of the measured pollutants. This assumption creates an exposure scenario for a theoretical person known as the "maximally exposed individual" (MEI). Health risks for the MEI are estimated in this study for the inhalation exposure pathway only. The MEI scenario provides the largest safety buffer in evaluating potential human health risks because the exposure assumptions for the MEI are very conservative, meaning the strictest assumptions are used to estimate the highest risk. The actual (real) health risk will be no greater than the estimated inhalation risk; in fact, the actual risk will most likely be less than those estimated in this study.

Ohio EPA risk assessment procedures follow general guidelines provided by the National Academy of Sciences (NAS) and U.S. EPA (*Risk Assessment Guidance for Superfund - Volume 1- Human Health, December 1989*) and the recently revised U.S. EPA Air Toxics Risk Assessment Reference Library (Volumes 1-3, April 2004). Risk-based screening levels are based upon U.S. EPA's integrated Risk Information System (IRIS) unit risk factors for carcinogens and reference concentrations (RfCs) for non-carcinogenic effects. Some chemicals, such as acrylonitrile, benzene, and 1,2-butadiene, are classified as hazardous because they have been implicated as potential carcinogens. Others, such as naphthalene, toluene, and manganese, are believed to potentially cause non-carcinogenic adverse health effects such as developmental, reproductive, neurobehavioral, or cardio-vascular health implications. The heavy metals of nickel compounds, beryllium, arsenic, cadmium and chromium compounds are classified as human carcinogens. Chromium VI is the most carcinogenic form of the chromium compounds measured.

INHALATION TOXICITY OF COMPOUNDS MEASURED

In order to quantify the toxicity of the chemicals detected and measured in Ohio's ambient air, Ohio EPA uses the toxicity classification method developed and used by U.S. EPA. The method and data for this risk assessment process are located in the U.S. EPA's IRIS website database (Integrated Risk Information System). This method defines a reference concentration (RfC) for non-carcinogenic compounds (compounds that are not known to cause cancer), or unit risk factors (URFs) for carcinogenic compounds (compounds known or suspected of causing cancer in animals or humans).

For carcinogens, the excess lifetime cancer risk resulting from the inhalation of toxic compounds is calculated by multiplying the monitored average ambient air concentrations by the appropriate URF. This initial calculation results is an estimate of the individual additional excess risk caused by breathing the compounds at the measured concentrations for a lifetime. Excess cancer risk is defined as the risk of a health event occurring above and beyond the other risk factors experienced by an individual member of the population, or the population as a whole (such as those caused by genetics, diet, lifestyle, etc.).

To depict total risk from a class of compounds (total VOCs, for example) the individual risk results are added (summed) to estimate the "total" risk for the site. The summation is based upon the principle that the addition of each risk produces a combined total risk estimate. This method is recommended by U.S. EPA in the absence of additional information. It has been suggested in scientific literature that exposure to combinations of pollutants may cause greater or lesser risk than can be explained by merely the summation of the risks from exposure to the substances individually. U.S. EPA currently has limited guidance on quantifying effects from exposure to mixtures of compounds measured in this study. Until further guidance is formulated, Ohio EPA will continue to add the risks associated with the compounds measured in a linear fashion. Note that this is potentially an extremely conservative method of assessing risk.

For non-carcinogenic adverse health effects, RfCs are estimates of daily exposure levels to which the human population, including sensitive subpopulations, may be exposed constantly for long periods (chronic exposure) without an appreciable risk of deleterious health effects. Chronic RfCs are especially developed to be protective for long-term exposures to the compounds.

The non-cancer risks are evaluated by the use of a Hazard Quotient (HQ) which is the ratio of the average daily concentrations compared to the RfC for each compound. If the HQ exceeds 100 percent for a compound, there may be cause for concern about potential health effects as a result of exposure to the compound. Hazard Quotients can be added together to yield a total estimate of non-carcinogenic risk called the Hazard Index (HI) (similar to the adding of carcinogenic risk to obtain a theoretical total).

RISK ESTIMATES IN PERSPECTIVE

For an accurate interpretation of the predicted risks, these risks must be placed in perspective with common daily activities. A range of "acceptable" health risk values for carcinogens has been historically proposed by U.S. EPA. Acceptability ranges from a target goal of one in one million (1×10^{-06}) for regulation of certain source categories of individual toxic air pollutants, to some source categories routinely operating in the one in 10,000 (1×10^{-04}) range. The goal of the federal Residual Risk Program of the Maximum Achievable Control Technology (MACT) standards is a maximum risk of 1×10^{-06} (one in one million) per source category. For some source categories, U.S. EPA is finding this goal difficult to achieve. Details of the MACT program are located in the Clean Air Act Amendments of 1990, Title III.

Similarly, non-carcinogenic estimates of the Hazard Indexes (HI), or an individual calculated HQ below one (100 percent) is generally regarded as a "safe" level of exposure. However, since the HI consists of the summation of many individual HQs, the HI can sometimes approach and/or exceed a value of one and still be considered acceptable.

These health effect evaluation numbers have many safety factors included in the calculations in order to present the most conservative estimate of human health risk. The addition of safety factors is designed to provide the most protective estimations in order to protect public health. The actual potential for human health risk will be no greater than the estimated risk(s); in fact, the actual risk will most likely be less than those estimated in this study.

Most large urban areas in Ohio and the United States exhibit aggregate or total carcinogenic risks in the 10^{-04} to 10^{-05} range. It is common for industrial or light industrial areas to have both cancer and non-cancer risks greater than those in urban areas.

Conversely, some smaller suburban and rural areas have combined carcinogenic risks in the 10^{-06} to 10^{-08} range. Areas of higher risk characteristically may also contain large volumes of congested automobile traffic. When considering long-term human risk, one must consider workers in more congested areas routinely are exposed only during working hours, and return to residential areas of decreased exposure concentrations during non-working hours. While it is certainly desirable (and Ohio EPA's goal) to have urban area aggregate risks minimized to the lowest possible level, a no-risk scenario would be impossible to achieve in a major urban area.

The tables in this report contain the calculations of excess cancer risk for each group of compounds or elements. The URFs as of July 2010 from the IRIS database were used in the calculations. For chemicals for which carcinogenicity is currently under review by U.S. EPA, Ohio EPA obtained values from the ATSDR toxicological information databases. Presently IRIS has many RfCs that are under review. For compounds with more limited toxicological evidence, U.S. EPA guidance suggests a general hierarchy for chronic toxicological data, beginning with 1) IRIS; 2) ATSDR toxicological profiles; (3) California Environmental Protection Agency (CalEPA); (4) International Agency for Research on Cancer (IARC) and the ACGIH (American Conference of Governmental and Industrial Hygienists) threshold limit values (TLVs); and finally, (5) other peer-reviewed literature studies.

RESULTS AND DISCUSSION

Ambient air toxics samples were collected over a 24-hour time period at various intervals (days), as determined by the goal(s) of each study. The site names and details of the locations for the ambient air monitoring sites used in this report are included in Figures 2 and 3 below. **Figure 2** contains the locations for the **VOC monitors** and **Figure 3** shows the locations for the **heavy metal (TSP) monitors**.

Figure 2. Ohio EPA VOC Monitoring Locations

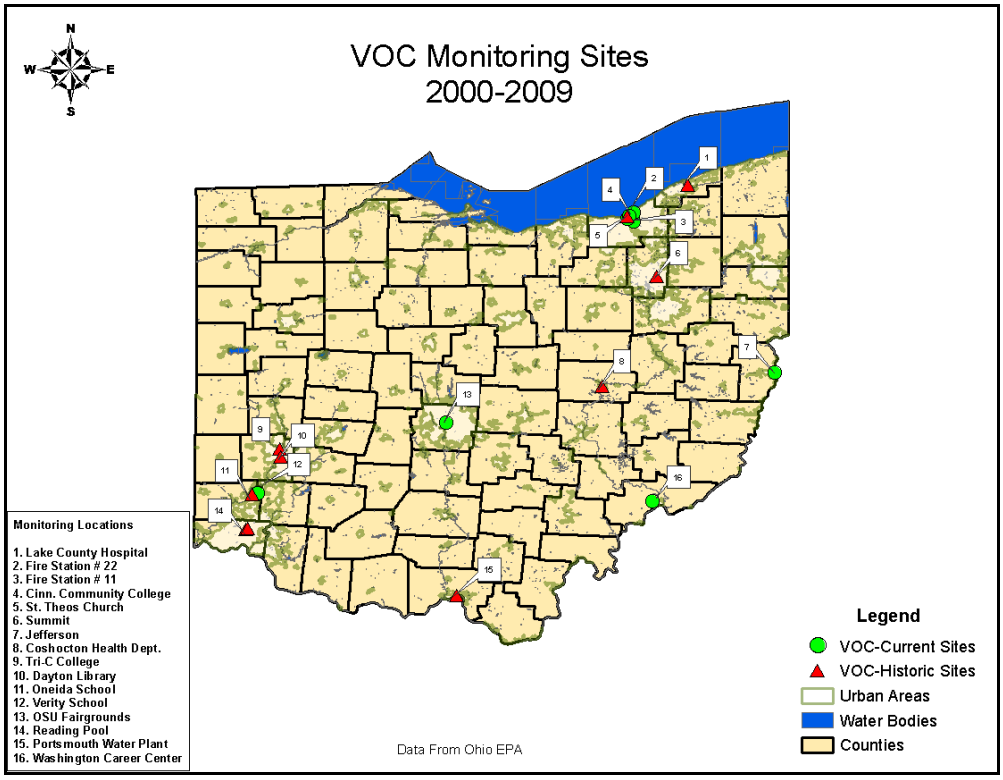
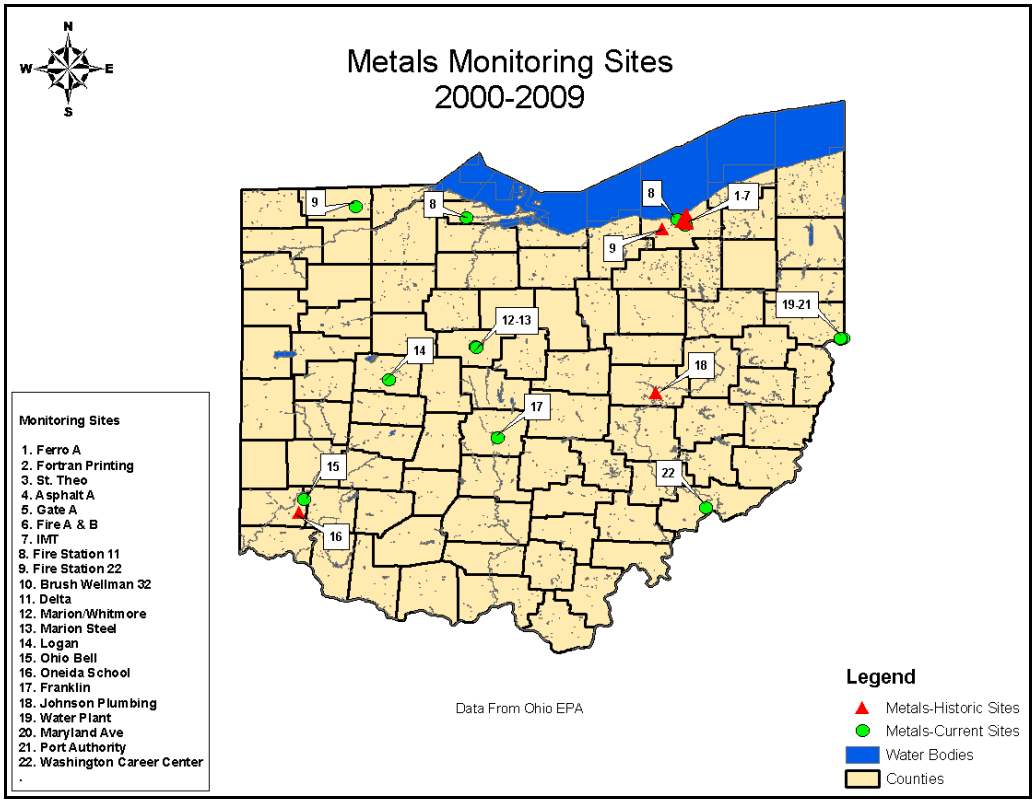


Figure 3. Ohio EPA Heavy Metals (TSP) Monitoring Locations



The general purpose for this report is to characterize the measured concentrations of air toxic pollutants in various areas in Ohio. Some sampling projects included in this report were initiated as a result of special investigations or other compliance-induced activities. Ohio EPA also conducts alternative air toxics sampling studies of shorter duration or sampling times that are not included here. As part of the analysis of the long-term projects included in this report, Ohio EPA created a summary of the resultant risk(s) associated with the average of the measured concentrations (risk assessment was briefly described above). The results are depicted as a breakdown of the risk for each county or sampling location (for counties containing more than one sampling location) for the years sampled. Tables or Figures also include an AIRs number (Aerometric Information Retrieval System - classification method of U.S. EPA) which serves as a specific and distinct identification number for the site location and monitoring data used in the U.S. EPA database. Readers interested in more information may access the database from U.S. EPA's website.

RISK ASSESSMENT RESULTS

The following Tables and Figures summarize and compare the total calculated excess cancer and non-cancer risk(s) from potential exposure to measured concentrations of airborne metals and VOCs for 14 Ohio counties. Figures 4 through Figure 7 (below) compare the cancer and non-cancer risk estimates measured for each county. The figures separate historic monitoring sites from those currently operating in Ohio.

For currently active sites, Jefferson County shows both the highest cancer and non-cancer risk estimates for VOC compounds. Risk estimates for heavy metals are presented in Figures 8 through11. The figures also separate currently active sites from historic measurements. Both figures show that Columbiana County currently represents the highest risk in Ohio for both cancer and non-cancer estimates.

Figure 4. Cancer Risk Estimates for Volatile Organic Compounds

Historic Sites

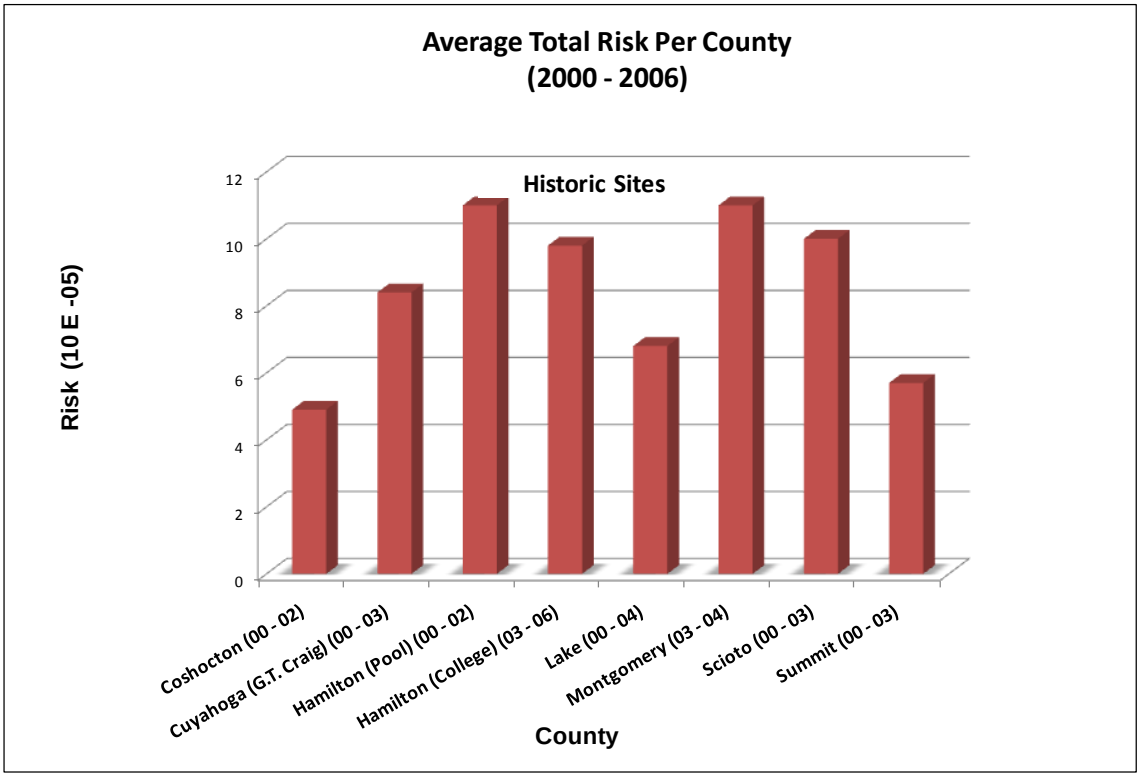


Figure 5. Cancer Risk Estimates for Volatile Organic Compounds

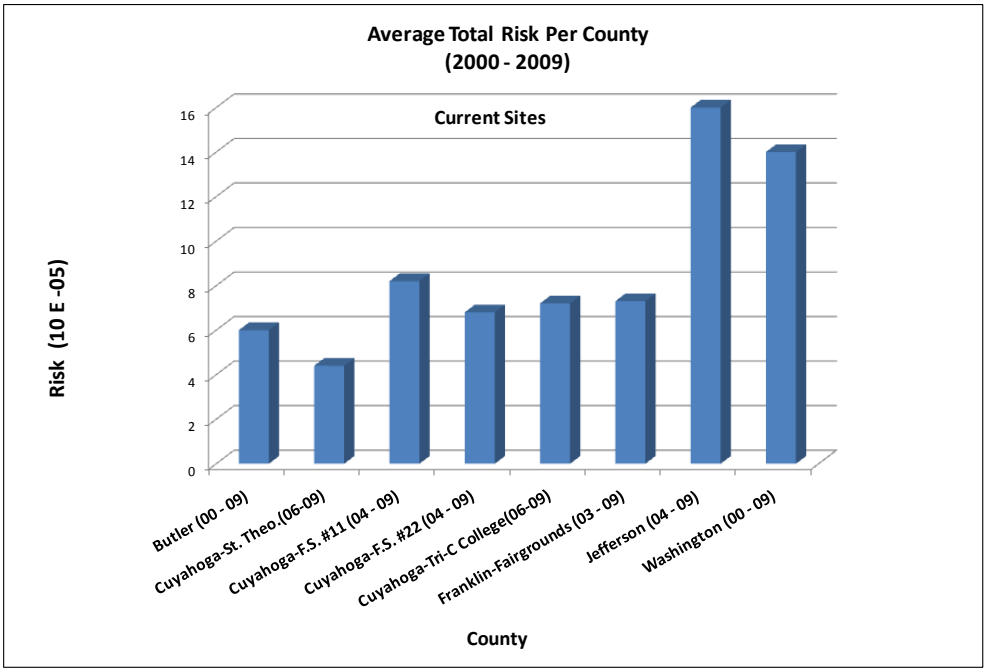


Figure 6. Non-Cancer Risk Estimates for Volatile Organic Compounds

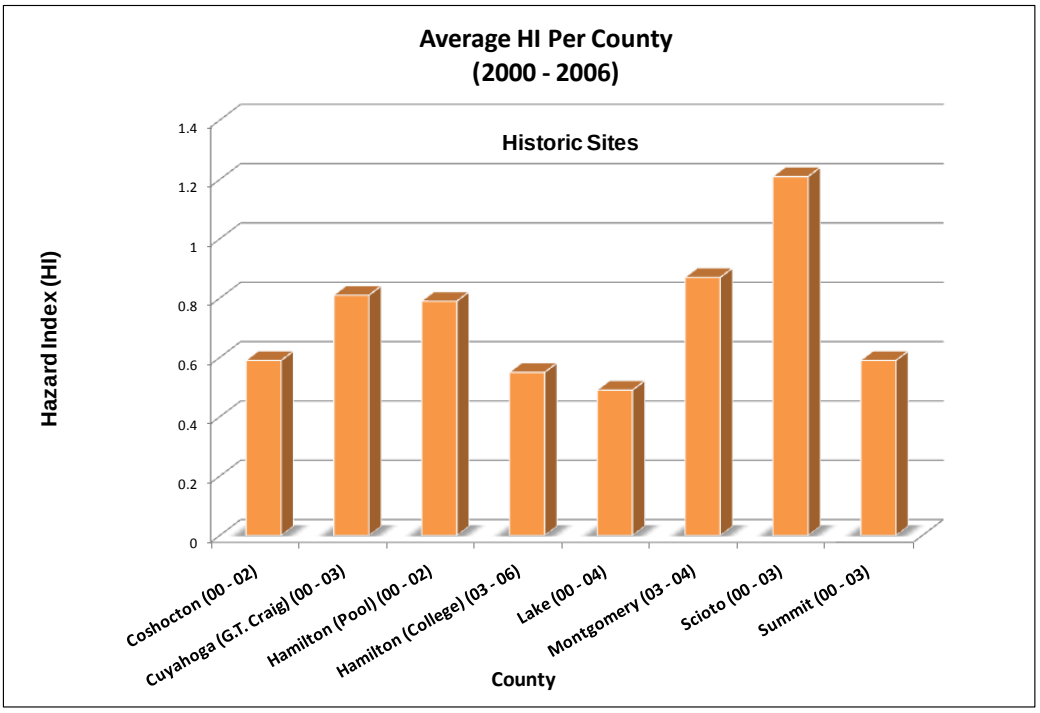


Figure 7. Non-Cancer Risk Estimates for Volatile Organic Compounds

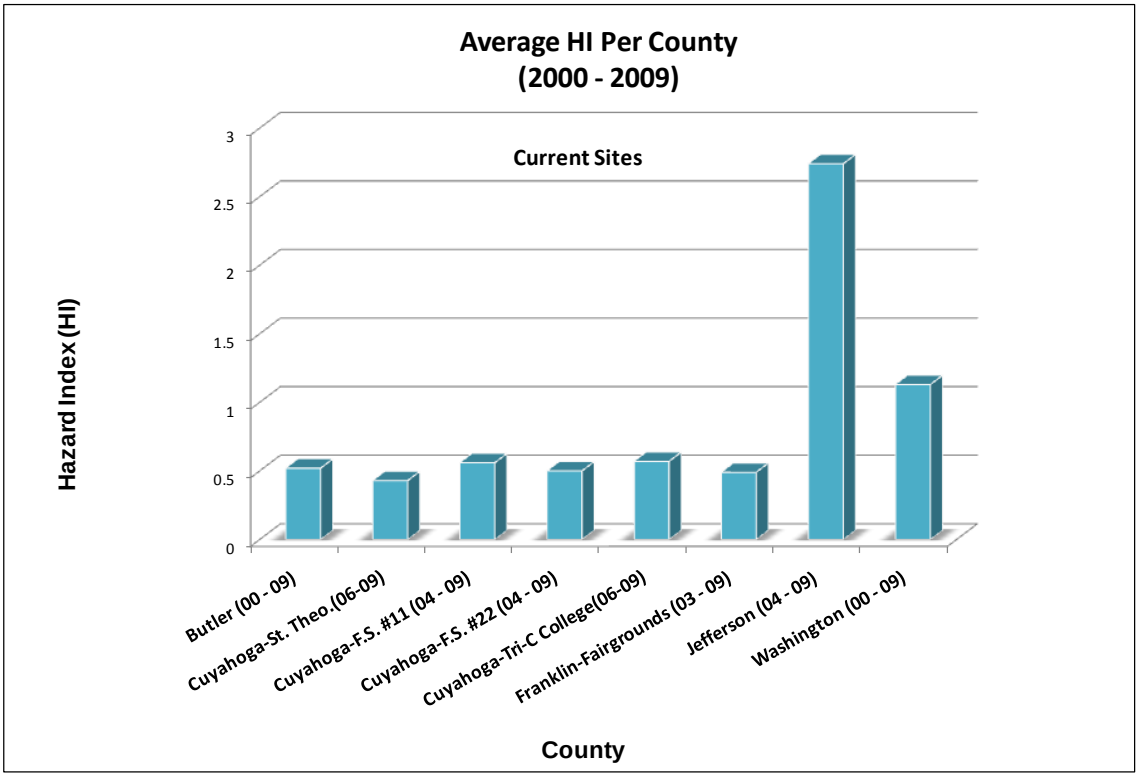


Figure 8. Cancer Risk Estimates for Heavy Metal Compounds

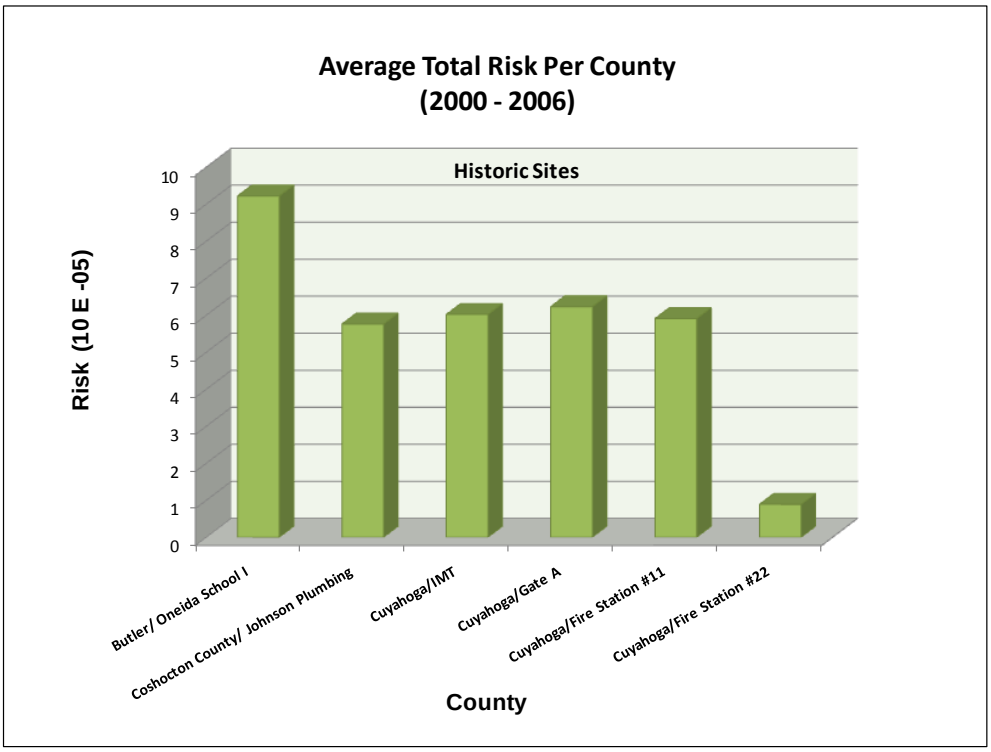


Figure 9. Cancer Risk Estimates for Heavy Metal Compounds

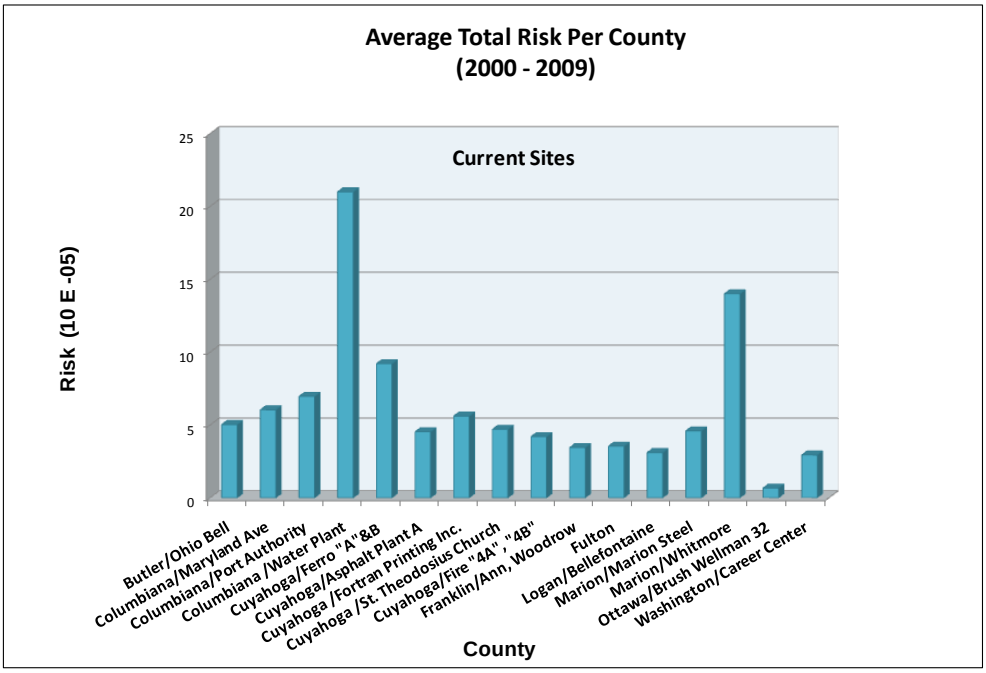


Figure 10. Non-Cancer Risk Estimates for Heavy Metal Compounds

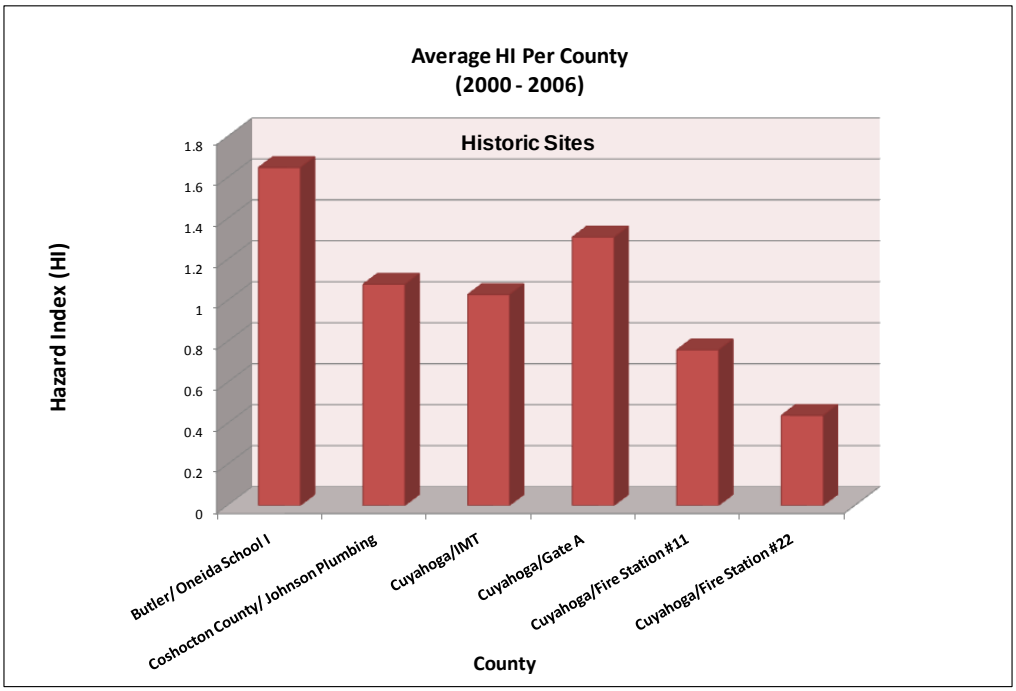
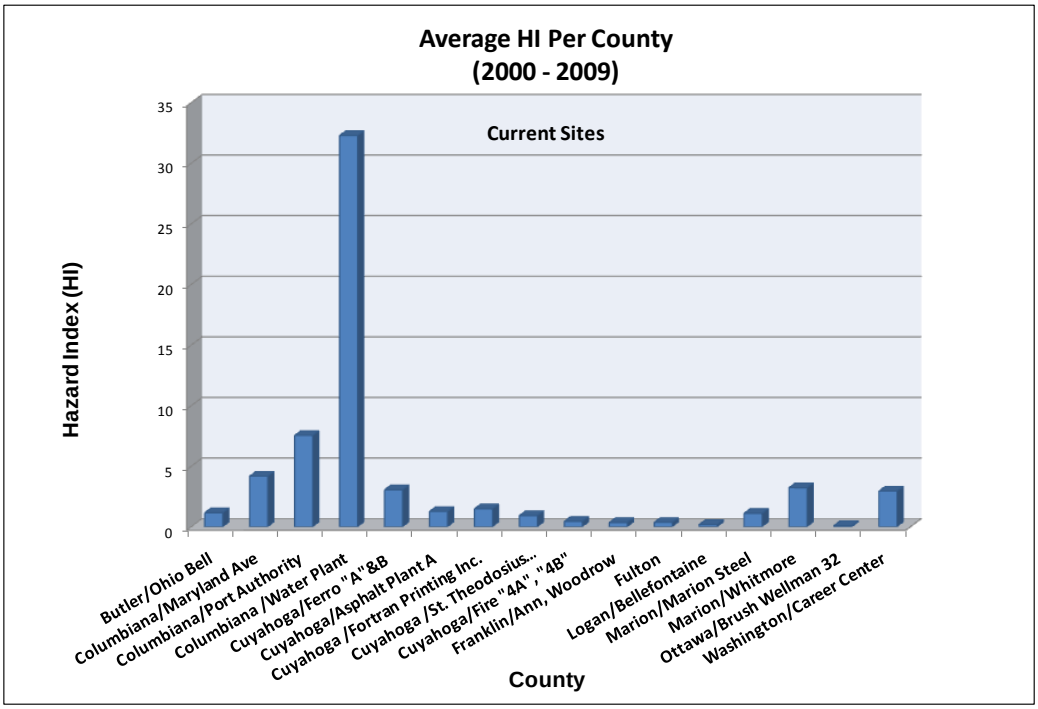


Figure 11. Non-Cancer Risk Estimates for Heavy Metal Compounds



RISK DRIVER SUMMARY

When observing a specific sampling site or geographical area, it frequently becomes apparent that a certain individual compound (or particular group of compounds) dominates risk by contributing the highest concentrations for a specific site or area. Since these compounds dominate or "drive" the risk in this case, they are termed "risk drivers." When the average concentration of these chemicals is detected above risk-based screening levels at a particular site, the chemical is deemed a potential chemical of concern (COC) and warrants additional investigation. For almost every site, the data show that two compounds acrylonitrile and benzene drive the majority of the cancer risk for potential exposure to ambient air concentrations of VOCs. Chromium drives the cancer risk estimates for heavy metals. The non-cancer risk for VOCs is dominated by naphthalene; manganese drives the non-cancer estimates for heavy metals.

A specific breakdown of how the cancer and non-cancer risk drivers impact the results for each monitoring location is summarized below. The information is summarized by county. The counties vary slightly based upon of the years that the specific monitor(s) were operating.

Figure 12a and 12b compares the VOC risk drivers (acrylonitrile and benzene) concentrations for each county. Likewise, **Figure 13a and 13b** compares the non-cancer risk drivers (naphthalene and manganese) for each county. A brief summary of the potential health effects associated with chronic (long-term) exposure to the chemicals of concern is also described below.

Figure 12a. Ohio County Comparison
Cancer Risk Driver, Benzene

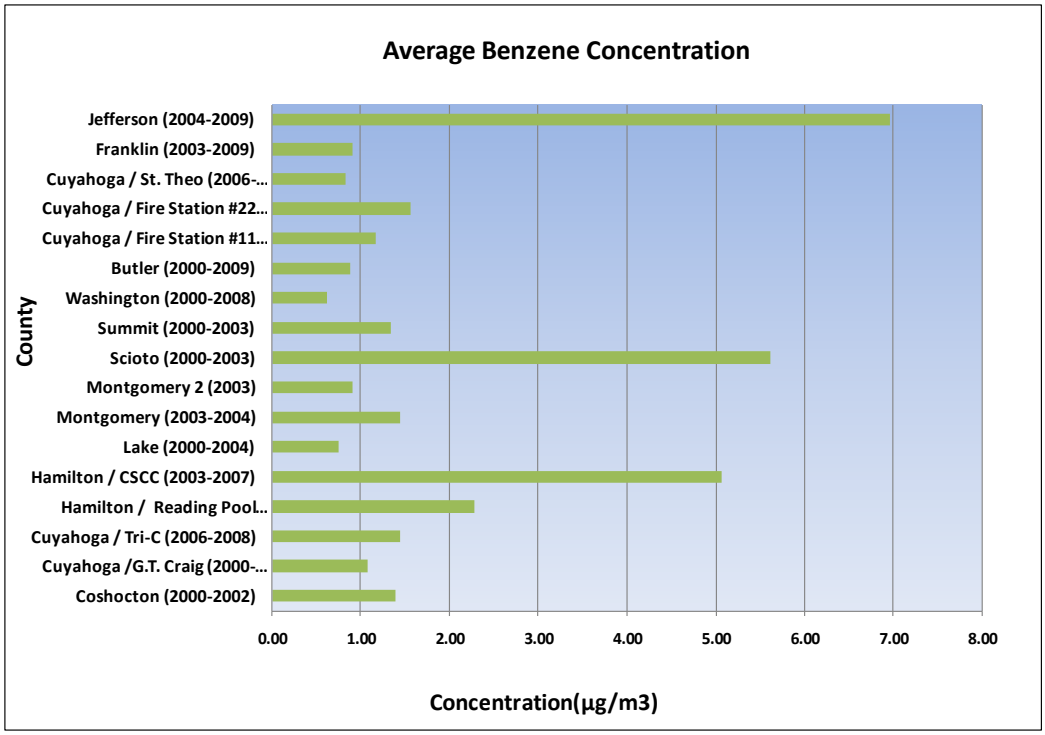


Figure 12b. Ohio County Comparison
Cancer Risk Driver, Acrylonitrile

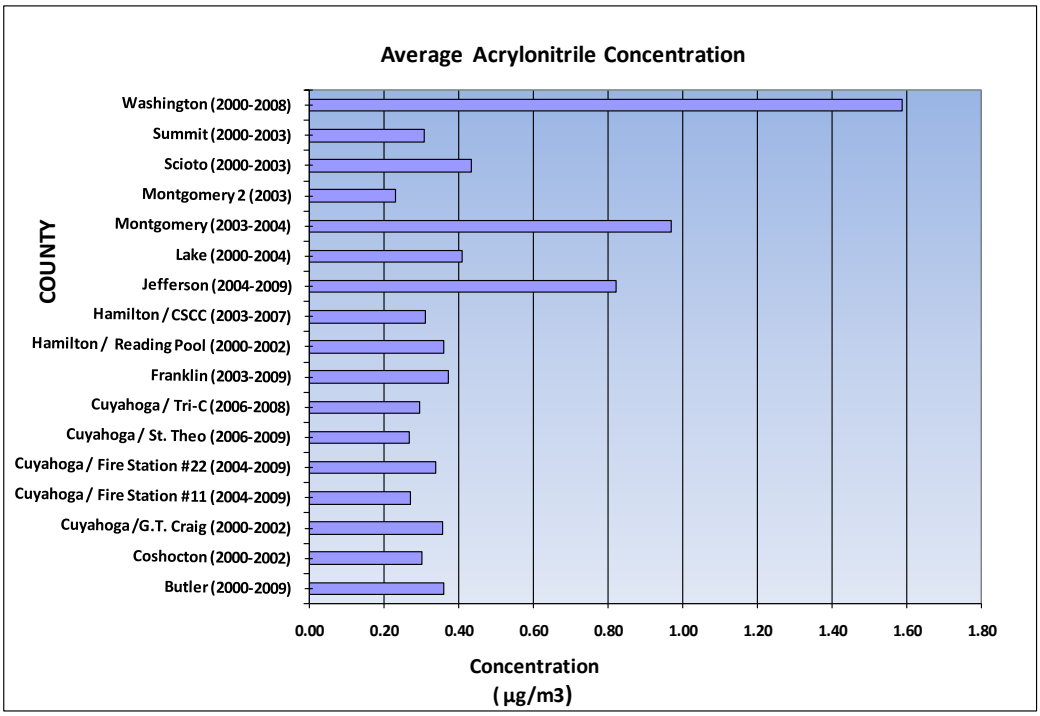


Figure 13a. Ohio County Comparison
Non-Cancer Risk Driver, Naphthalene

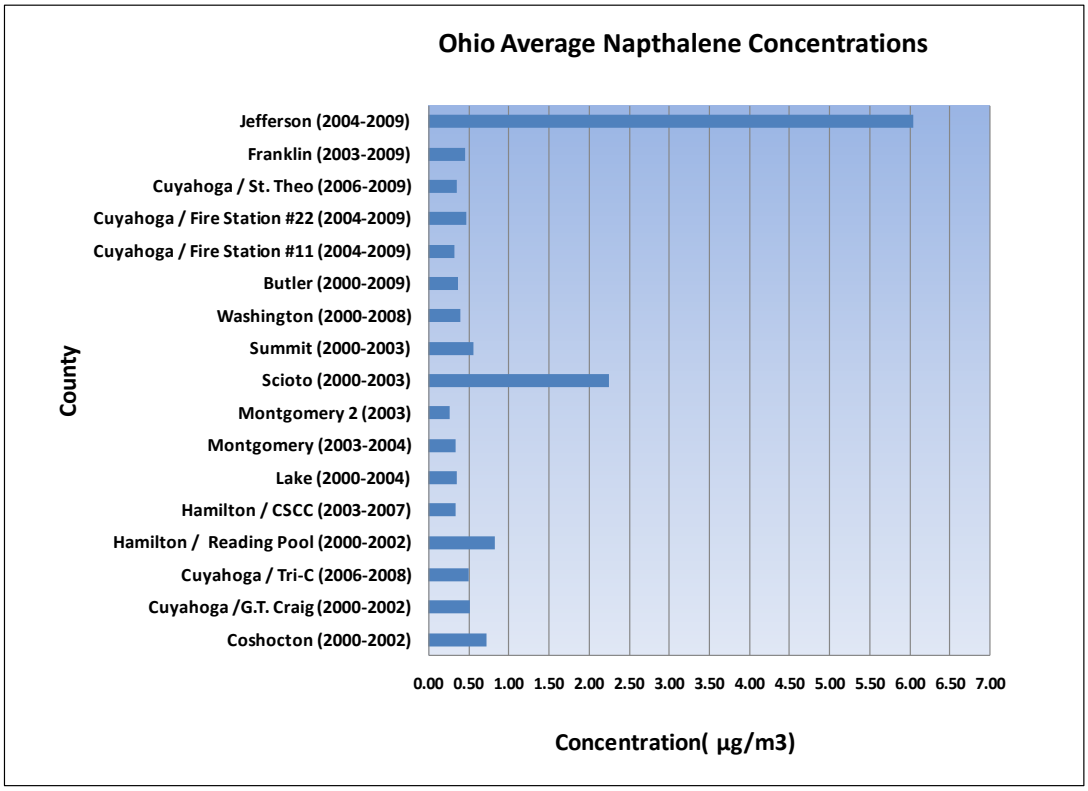
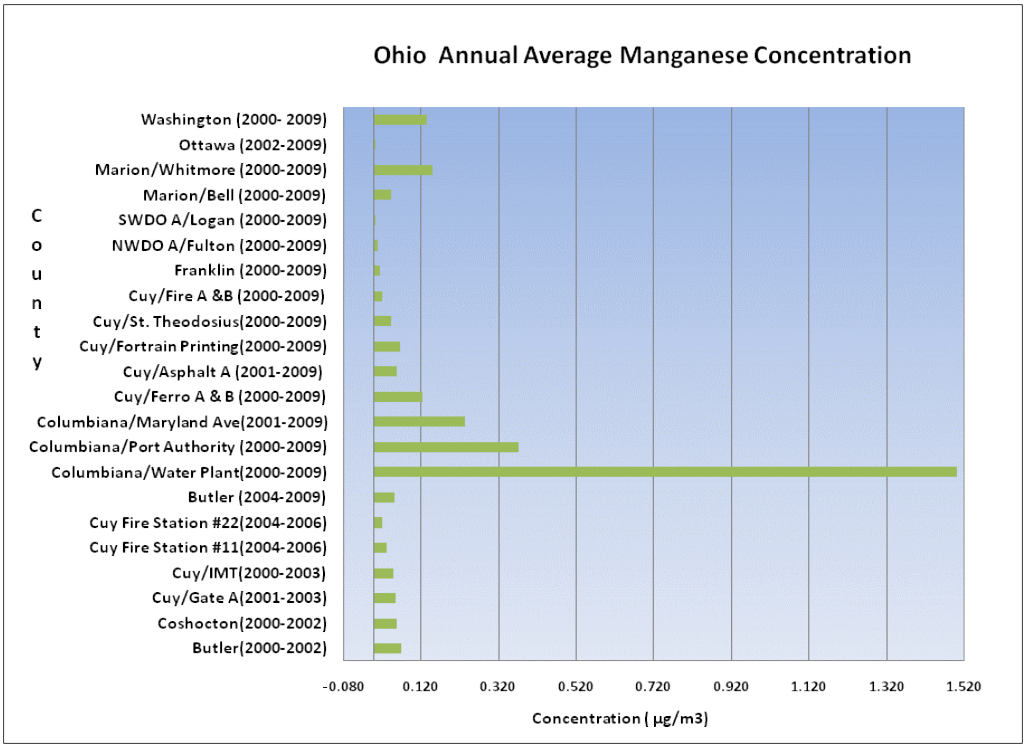


**Figure 13b. Ohio County Comparison/
Non-Cancer Risk Driver, Manganese**



TOXICITY FOR CHEMICALS OF CONCERN

The following health effects information is a brief summary of data collected from U.S. EPA's IRIS and Technology Transfer Network Air Toxics hazard summaries. The Agency for Toxics Substances and Disease Registry (ATSDR - part of the National Center for Disease Control [CDC]) also supplies information concerning the potential health effects caused by toxic air pollutants. Ohio EPA risk assessment procedures follow guidelines provided by the National Academy of Sciences (NAS) and U.S. EPA (*Risk Assessment Guidance for Superfund - Volume 1 - Human Health, December 1989*) and the recently revised U.S. EPA Air Toxics Risk Assessment Reference Library (Volumes 1-3, April 2004).

ACRYLONITRILE

Acrylonitrile is classified as a hazardous air pollutant (HAP) under Title III of the Clean Air Act Amendments. Acute (short-term) exposure to high concentrations of acrylonitrile through inhalation can lead to nose and throat irritation, breathing difficulties, nausea, dizziness, weakness, headaches, and convulsions. Symptoms typically disappear when acute exposure is stopped. Chronic (long-term) non-cancer health effects also include headaches, fatigue and nausea. The primary long-term carcinogenic health effect associated with human exposure to acrylonitrile is lung cancer.

BENZENE

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

The major effect of benzene from long-term exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Long-term exposure to high levels of benzene in the air can cause leukemia, particularly acute myelogenous leukemia, often referred to as AML. This is a cancer of the blood-forming organs. The Department of Health and Human Services (DHHS) has determined that benzene is a known carcinogen. The International Agency for Research on Cancer (IARC) and U.S. EPA have determined that benzene is carcinogenic to humans.

NAPHTHALENE

Exposure to large amounts of naphthalene may damage or destroy some red blood cells. This could cause a person to have too few red blood cells until the body replaces the destroyed cells. This condition is called hemolytic anemia. Some symptoms of hemolytic anemia are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin. Animals sometimes develop cloudiness in their eyes after swallowing high amounts of naphthalene. It is not clear whether this also develops in people. Rats and mice that breathed naphthalene vapors daily for a lifetime developed irritation and inflammation of their nose and lungs. It is unclear if naphthalene causes reproductive effects in animals; most evidence says it does not.

MANGANESE

Chronic (long-term) exposure to high levels of manganese by inhalation in humans may result in central nervous system (CNS) effects. Visual reaction time, hand steadiness, and eye-hand coordination were affected in chronically exposed workers. A syndrome named “manganism” may result from chronic exposure to higher levels. Manganism is characterized by feelings of weakness and lethargy, tremors, a mask-like face, and psychological disturbances. Respiratory effects have also been noted in workers chronically exposed by inhalation.

CHROMIUM

Chromium exists in multiple valence states. Of all possible valences, trivalent (+3) (chromium III), and hexavalent (+6) (chromium VI) are the most relevant in the environmental setting. Natural ores of chromium +3 are the most common natural form, while most sources of chromium VI are man-made and often associated with electroplating and metal finishing, leather tanning, and textile production. It was also used as a corrosion inhibitor and can be a component of fly ash.

It is customary to treat all chromium data as chromium VI (due to its greater toxicity and carcinogenicity) when specific data is not available on the form of the chromium compound collected. This assumption, while protective, may greatly overestimate the potential risk.

Chronic inhalation of chromium VI results in irritation of the respiratory tract and can result in asthma or other signs of respiratory distress with measurable decrease of respiratory function. In addition to the non-cancer effects of chromium VI inhalation, a number of studies have linked inhalation of chromium VI to lung cancer in humans. Studies of the toxic effects of chronic ingestion of chromium VI are not conclusive, but acute effects following ingestion of moderate doses (0.56 milligram per kilogram per day [mg/kg-d]) are associated with oral ulceration, diarrhea, abdominal pain, indigestion, vomiting and blood system damage.

CONCLUSION

Ohio EPA has completed the data compilation and risk assessment summary included in this report to a) provide a summary of the air toxics monitoring activities conducted by the Division of Air Pollution Control; b) make this information available to the public and other governmental agencies; c) potentially prioritize air toxic monitoring sites for risk reduction; and d) document the reductions in airborne concentrations of these compounds in Ohio.

Many air toxic investigations have already resulted in substantial reduction or elimination of potentially high concentrations of chemicals of concern. For example, Ohio EPA recently completed investigations in Butler County and Summit County. Air toxics enforcement actions have been completed in Scioto County and Hamilton County. Ohio EPA is also collaborating with federal and local agencies regarding a variety of air toxics monitoring and reduction projects in Ohio.

Ohio EPA has generated several individual reports that document activities at several sites. The most recent of these individual air toxic reports are available on the Ohio EPA website (www.epa.ohio.gov/dapc/atu/atu.aspx). As additional information becomes available, Ohio EPA will continue to provide updated information to the public regarding air toxics activities being conducted in the State of Ohio.

For more information:

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Air Toxics Unit
P.O. Box 1049, Columbus, Ohio 43216-1049
614-644-2270

Ambient Monitoring & Laboratory Analysis Questions
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P.O. Box 1049, Columbus, Ohio 43216-1049
614-644-2270

TOXICITY (HEALTH EFFECTS) RESOURCES

Ohio EPA relied on the resources identified below to obtain health effects information used for assessing both the cancer and non-cancer risk. The use of each source was prioritized to be consistent with the recommended U.S. EPA hierarchy.

U.S. EPA'S INTEGRATED RISK INFORMATION SYSTEM [IRIS]

U.S. EPA maintains the Integrated Risk Information System (IRIS) database. Health assessment information on a chemical substance is included in IRIS only after a comprehensive review process of chronic toxicity data by both U.S. EPA and external health scientists (www.epa.gov/IRIS/process.htm). Detailed review of the information for each compound is contained in a Toxicological Review section of the database.

The IRIS database contains information on human health effects that may result from exposure to various chemicals in the environment. IRIS was developed to provide consistent information on chemical substances for use in risk assessments, decision making and regulatory activities. The IRIS system is a collection of individual chemical computer files containing descriptive and quantitative information in the following categories: Oral reference doses and inhalation reference concentrations (RfDs and RfCs, respectively) for chronic non-carcinogenic health effects, and hazard identification, oral slope factors, and oral and inhalation unit risks for carcinogenic effects.

This information represents a consensus opinion of U.S. EPA health scientists interpreting the scientific literature applicable to health effects of a chemical, and using established methodologies to develop values for oral reference dose, inhalation reference concentration, carcinogenic slope factor and unit risk. The products of this work, summarized in IRIS and elaborated in chemical-specific Toxicological Profile documents, have been subject to U.S. EPA's peer review policy. Also included in the IRIS information is a Weight of Evidence determination for the classification of a compound as a carcinogen. As new scientific information becomes available, U.S. EPA will review it, as appropriate, may revise IRIS files accordingly. The IRIS database is available online at http://www.epa.gov/iris.

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY [ATSDR]

When IRIS RfC values were not available, ATSDR's inhalation minimum risk levels (MRLs) were used for the non-cancer assessments. Toxicity assessments are performed by ATSDR, which is a branch of the Public Health Service, U.S. Department of Health and Human Services. A Toxicological Profile is prepared by the Division of Toxicology according to ATSDR and U.S. EPA guidelines. The Profile succinctly characterizes the toxicologic and adverse health effects information for the toxic compound. The peer-reviewed profile lists MRLs that are derived when reliable and sufficient data exist to identify the most sensitive health effects from exposure to the compound.

An MRL is an estimate of the daily exposure to a hazardous substance that is likely to be without appreciable risk of adverse non-cancer health effects over a specific duration of exposure. MRLs are derived for acute (1-14 days), intermediate (15-364 days) and chronic (365 days and longer) exposure durations. As such, the MRLs define the depth of toxicological information available for a compound declared toxic by the Profile. MRLs are published in pollutant-specific toxicological profile documents, and also in a table of "comparison values" that ATSDR regularly updates and distributes (available online at http://www.atsdr.cdc.gov/mrls.html).

CALIFORNIA OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT (OEHHA)

The California OEHHA has developed dose-response assessments for many substances, based both on carcinogenicity and health effects other than cancer. The process for developing these assessments is similar to that used by U.S. EPA to develop IRIS values and incorporates significant external scientific peer review. The non-cancer information includes available inhalation health risk guidance values expressed as chronic inhalation reference exposure levels (RELs). OEHHA defines the REL as a concentration level at (or below) which no health effects are anticipated, a concept that is substantially similar to U.S. EPA's non-cancer dose-response assessment perspective. This assessment uses chronic RELs in the same way as RfCs when no IRIS or ATSDR values exist.

OEHHA's quantitative dose-response information on carcinogenicity by inhalation exposure is expressed in terms of the URE, defined similarly to U.S. EPA's URE. This assessment uses specific OEHHA UREs in the same way as U.S. EPA's when no IRIS or values exist. OEHHA's dose response information for carcinogens and non-carcinogens is available online at http://www.oehha.ca.gov/air/hot_spots/index.html.

U.S. EPA HEALTH EFFECTS ASSESSMENT TABLES (HEAST)

HEAST is a comprehensive listing consisting almost entirely of provisional UREs, RfCs, and other risk assessment information for chemicals of interest. Although the assessments summarized in HEAST have undergone review and have the concurrence of individual U.S. EPA program offices, and each is supported by an agency reference, they have not had enough review to be recognized as high-quality, EPA-wide consensus information. Because of these limitations, and the fact that HEAST has not been updated since 1997 and exists only in hard copy (PB97-921199), this assessment uses HEAST information only when no values from the other sources described above are available.

APPENDIX

For a detailed summary of how individual compounds contribute to the overall cancer and non-cancer risk estimates, refer to **Appendices A1** and **A2**. **Appendices A1** and **A2** contains individual summaries of the risk results for the VOC and heavy metal air monitoring sites listed in **Figures 2-5**. **Tables A1-1** to **A1-16** contains the results for the individual VOC monitoring sites. Results for the heavy metal monitoring sites are located in **Tables A 2-1** to **A 2-22**. Listed in each table is the annual average for the compound identified, with the exception of the designation of "ND" which indicates an entire year of non-detected air measurements for the parameter listed. Also listed is the risk estimation information for both the non- cancer (Hazard Index) and excess cancer risk for the site. Risk calculations are only included for measurements exceeding the lower detection limit of the analysis method. As stated previously, some counties contain more than one ambient air monitoring station.

Appendices B1 and B2 contains the yearly average concentration for air toxic compounds at each monitoring site. Yearly averages for individual VOC monitoring sites are listed in **Tables B1-1** to **B1-22.** The yearly average results for the heavy metal monitoring sites are included in **Tables B2-1** to **B2-22**. Each table lists the annual average for the compound identified, with the exception of the designation of "ND" which indicates an entire year of non-detects.

Appendix A1, Average Total VOC Site Risk Per County

A1-1. Butler County (2000-2009)

Source Related VOC Sampling Middletown					**Total Risk**	**2000-2009**		
Location:	HAMILTON							
	Butler County							
	Verity School							
	1900 St. John's Road							
	Middletown							
AIRS#:	39-017-0003							
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	9.28	31000	0.00			260	1.64	42.76
acetonitrile	0.38	60	0.01			96	0.34	1.49
acrylonitrile	0.39	2	0.19	6.80E-05	2.53E-05	36	0.43	4.12
benzene	0.88	30	0.03	7.80E-06	6.88E-06	244	0.32	3.51
1,3-butadiene	0.19	2	0.09	3.00E-05	5.62E-06	24	0.22	0.75
n-butane	2.85					276	0.24	13.55
2-butanone	1.50	5000	0.00			155	0.15	7.96
carbon disulfide	0.98	700	0.00			23	1.56	8.10
carbon tetrachloride	0.51	40	0.01	1.50E-05	7.68E-06	93	0.63	3.40
chlorodifluoromethane	1.16	50000	0.00			249	0.18	6.01
chloroethane	0.17	10000	0.00			1	0.58	0.58
chloroform	0.30	98	0.00	2.30E-05	7.05E-06	3	0.54	1.17
chloromethane	1.07	90	0.01	1.80E-06	1.92E-06	273	0.52	1.84
3-chloropropene	0.18					1	3.07	3.07
cyclohexane	0.20	6000	0.00			5	0.45	1.17
decane	0.41					9	0.58	11.06
dibromochloromethane	0.53					1	6.13	6.13
1,4-dichlorobenzene (para)	0.45	800	0.00	1.00E-05	4.49E-06	9	0.66	1.08
dichlorodifluoromethane	2.68					278	0.00	8.32
trans-1,2-dichloroethene	0.30					1	1.03	7.66
n-dodecane	0.41					1	7.66	1.03
ethanol	1.09					13	0.90	130.01
ethylbenzene	0.32	1000	0.00			22	0.43	1.30
4-ethyltoluene	0.32					1	0.54	0.54
n-heptane	0.34					16	0.41	4.10
hexane	0.60	700	0.00			63	0.42	4.58
methylene chloride	0.33	1000	0.00	4.70E-07	1.57E-07	64	0.35	1.81
4-methyl-2-pentanone	0.29					2	0.48	0.63
a-methylstyrene	0.23					5	0.41	1.19
naphthalene	0.43	3	0.14			9	0.52	2.83
n-nonane	0.46					4	0.58	9.44
n-octane	0.28					1	0.56	0.56
n-pentane	1.38					269	0.35	12.39
propylene	0.78					110	0.09	5.34
toluene	1.23	5000	0.00			225	0.00	18.84
1,1,1-trichloroethane	0.80					130	0.55	3.22
trichloroethene	0.57	60	0.01	2.00E-06	1.13E-06	1	1.88	1.88
trichlorofluoromethane	12.49					277	0.96	230.37
1,1,2-trichloro-1,2,2-trifluoroethar	0.54					30	0.77	1.23
1,2,4-trimethylbenzene	0.43					39	0.49	2.75
1,3,5-trimethylbenzene	0.28					4	0.49	0.74
n-undecane	0.51					6	0.64	11.51
vinyl acetate	1.04	200	0.01			104	0.35	9.86
o-xylene	0.35	100	0.00			28	0.43	1.17
total m+p-xylene	0.72	100	0.01			47	0.43	3.95

A1-2. Coshocton County (2000-2003)

Source Related VOC Sampling Coshocton					Total Risk 2000-2003			
Location:	SEDO							
	Coshocton Co.							
	Coshocton Co. Health Dept.							
	724 South 7th Street							
	Coshocton							
AIRS # :	NA							

Compounds	Average (µg/m3) with half detections	RBC	Hazard Index	UR	RISK	Frequency	Minimum value detected (µg/m3	Maximum value detected (µg/m3)
acetone	6.55	31000	0.00			56	2.38	19.95
acetonitrile	0.19	60	0.00			5	0.00	0.81
acrylonitrile	0.27	2	0.14	6.80E-05	1.86E-05	8	0.00	1.48
benzene	1.39	30	0.05	7.80E-06	1.08E-05	67	0.32	10.54
1,3-butadiene	0.23	2	0.12	3.00E-05	7.00E-06	20	0.22	1.44
n-butane	8.35					70	1.69	33.28
2-butanone	0.69	5000	0.00			38	0.32	3.83
carbon disulfide	3.29	700	0.00			34	0.31	29.27
carbon tetrachloride	0.63	40	0.02	1.50E-05	9.45E-06	20	0.63	10.07
chlorodifluoromethane	1.03	50000	0.00			57	0.46	10.96
chloroethane	0.15	10000	0.00			4	0.00	1.11
chloromethane	1.18	90	0.01	1.80E-06	2.12E-06	70	0.50	2.48
cyclohexane	0.26	6000	0.00			7	0.38	1.65
decane	0.37					6	0.76	1.34
1,3-dichlorobenzene (meta)	0.32					1	0.00	1.68
1,4-dichlorobenzene (para)	0.33	800	0.00	1.00E-05	3.27E-06	4	0.00	1.38
dichlorodifluoromethane	2.94					70	1.29	4.90
1,1-dichloroethene	0.22	200	0.00	1.60E-06	3.52E-07	2	0.00	1.35
ethanol	0.59					6	0.00	5.65
ethylbenzene	0.43	1000	0.00			17	0.48	3.08
4-ethyltoluene	0.27					1	0.00	1.03
n-heptane	0.57					25	0.41	4.92
hexane	1.10	700	0.00			43	0.78	5.29
methylene chloride	0.57	1000	0.00	4.70E-07	2.66E-07	24	0.35	3.30
4-methyl-2-pentanone	0.22					1	0.00	0.86
a-methylstyrene	0.31					5	0.48	1.98
naphthalene	0.57	3	0.19			8	0.00	29.35
n-nonane	0.40					12	0.58	2.68
n-octane	0.51					12	0.47	4.02
n-pentane	3.23					70	0.80	12.98
propylene	1.09					7	0.43	15.49
styrene	0.23	1000	0.00	5.70E-07	1.31E-07	1	0.00	0.77
tetrachloroethylene	0.83			9.50E-07	7.89E-07	19	0.00	13.57
toluene	4.07	5000	0.00			69	0.49	35.04
1,2,4-trichlorobenzene	0.42					4	0.00	1.63
1,1,1-trichloroethane	3.84					63	0.55	27.83
trichlorofluoromethane	10.35					70	2.02	101.14
1,1,2-trichloro-1,2,2-trifluoroethane	0.43					3	0.00	1.00
1,2,4-trimethylbenzene	0.57					25	0.49	4.62
1,3,5-trimethylbenzene	0.29					2	0.00	1.33
n-undecane	0.34					2	0.00	0.96
vinyl acetate	0.36	200	0.00			3	0.00	0.81
o-xylene	0.46	100	0.00			24	0.43	2.47
total m+p-xylene	1.50	100	0.01			48	0.48	13.89

A1-3. Cuyahoga County, Fire Station 11 (2004-2009)

Source Related VOC Sampling Cleveland						Total Risk 2004-2009		
Location:	CLEVELAND							
	Cuyahoga Co.							
	Fire Station #11							
	7629 Broadway Ave.							
	Cleveland							
AIRS#:	39-035-0068							
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	11.15	31000	0.00			141	2.00	47.51
acetonitrile	0.57	60	0.01			80	0.34	3.19
acrylonitrile	0.23	2	0.11	6.80E-05	1.54E-05	1	0.00	1.24
benzene	1.17	30	0.04	7.80E-06	9.10E-06	123	0.38	7.03
bromodichloromethane	0.42					2	0.00	0.80
bromomethane	0.24	5	0.05			1	0.00	0.54
1,3-butadiene	0.17	2	0.09	3.00E-05	5.14E-06	17	0.00	1.00
n-butane	4.32					142	0.55	16.64
2-butanone	1.94	5000	0.00			90	1.47	12.98
carbon disulfide	0.79	700	0.00			2	0.00	1.78
carbon tetrachloride	0.56	40	0.01	1.50E-05	8.40E-06	60	0.00	1.38
chlorodifluoromethane	1.63	50000	0.00			129	0.53	34.66
chloroethane	0.17	10000	0.00			2	0.00	0.42
chloroform	0.32	98	0.00	2.30E-05	7.26E-06	3	0.00	1.17
chloromethane	1.11	90	0.01	1.80E-06	1.99E-06	142	0.54	2.00
3-chloropropene	0.21					5	0.00	0.81
cyclohexane	0.25	6000	0.00			10	0.00	1.79
decane	0.42					12	0.00	1.22
dibromomethane	0.45					2	0.00	0.78
1,4-dichlorobenzene (para)	0.41	800	0.00	1.00E-05	4.07E-06	5	0.00	2.47
dichlorodifluoromethane	2.90					143	1.63	6.92
1,1-dichloroethane	0.26					2	0.00	0.61
1,2-dichloroethane	0.26			2.60E-05	6.66E-06	2	0.00	0.57
1,1-dichloroethene	0.25	200	0.00	1.60E-06	4.03E-07	2	0.00	0.59
cis-1,2-dichloroethene	0.25					2	0.00	0.59
trans-1,2-dichloroethene	0.25					2	0.00	0.56
1,2-dichloropropane	0.29	4	0.07			1	0.00	0.51
1,2-dichloro-1,1,2,2-tetrafluoroethane	0.44					1	0.00	0.77
ethylbenzene	0.41	1000	0.00			32	0.00	1.69
4-ethyltoluene	0.32					6	0.00	0.93
n-heptane	0.48					44	0.00	3.28
hexachlorobutadiene	0.67			2.20E-05	1.47E-05	1	0.00	1.17
hexane	1.03	700	0.00			82	0.70	4.23
methylene chloride	1.62	1000	0.00	4.70E-07	7.62E-07	118	0.17	17.02
4-methyl-2-pentanone	0.32					19	0.00	2.13
naphthalene	0.37	3	0.12			12	0.00	1.57
n-nonane	0.36					9	0.00	1.10
n-octane	0.33					9	0.00	1.26
n-pentane	2.69					143	0.47	11.80
propylene	1.60					83	0.00	8.95
n-propyl benzene	0.31					1	0.00	0.84
styrene	0.27	1000	0.00	5.70E-07	1.55E-07	2	0.00	0.81
tetrachloroethylene	0.52			9.50E-07	4.91E-07	17	0.00	2.92
toluene	2.75	5000	0.00			134	0.38	15.83
1,1,1-trichloroethane	0.35					2	0.00	0.82
1,1,2-trichloroethane	0.34			1.60E-05	5.49E-06	1	0.00	0.55
trichloroethene	0.40	60	0.01	2.00E-06	7.93E-07	14	0.00	1.77
trichlorofluoromethane	2.01					143	0.67	8.99
1,1,2-trichloro-1,2,2-trifluoroethane	0.55					21	0.00	1.61
1,2,4-trimethylbenzene	0.55					41	0.00	2.95
1,3,5-trimethylbenzene	0.33					6	0.00	0.98
n-undecane	0.41					4	0.00	1.21
vinyl acetate	0.73	200	0.00			35	0.00	7.39
vinyl chloride	0.16	100	0.00	8.80E-06	1.41E-06	1	0.00	0.31
o-xylene	0.42	100	0.00			36	0.00	1.74
total m+p-xylene	1.17	100	0.01			52	0.43	6.51

A1-4. Cuyahoga County, Fire Station 22 (2004-2009)

Source Related VOC Sampling Cuyahoga					**Total Risk**	**2004-2009**		
Location:	CLEVELAND							
	Cuyahoga Co.							
	Fire Station #22							
	7629 Broadway Ave.							
	Cleveland							
AIRS#:	39-035-0068							
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	13.15	31000	0.00			138	2.61	54.64
acetonitrile	0.50	60	0.01			76	0.34	2.35
acrylonitrile	0.28	2	0.14	6.80E-05	1.89E-05	21	0.46	1.13
benzene	1.52	30	0.05	7.80E-06	1.18E-05	136	0.16	11.82
1,3-butadiene	0.19	2	0.10	3.00E-05	5.75E-06	29	0.11	1.35
n-butane	6.14					141	0.33	35.66
2-butanone	1.79	5000	0.00			77	0.15	6.49
carbon disulfide	0.81	700	0.00			2	1.87	2.02
carbon tetrachloride	0.55	40	0.01	1.50E-05	8.24E-06	53	0.63	1.20
chlorobenzene	0.30	1000	0.00			1	1.10	1.10
chlorodifluoromethane	1.51	50000	0.00			128	0.50	33.24
chloroethane	0.17	10000	0.00			1	0.29	0.29
chloroform	0.35	98	0.00	2.30E-05	7.98E-06	2	0.63	2.25
chloromethane	1.12	90	0.01	1.80E-06	2.01E-06	143	0.52	2.00
cyclohexane	0.26	6000	0.00			13	0.34	1.62
decane	0.44					10	0.58	2.56
1,4-dichlorobenzene (para)	0.41	800	0.00	1.00E-05	4.10E-06	7	0.60	1.32
dichlorodifluoromethane	2.74					143	1.29	4.25
1,1-dichloroethane	0.26					1	0.49	0.49
1,2-dichloroethane	0.26			2.60E-05	6.67E-06	1	0.40	0.40
1,1-dichloroethene	0.26	200	0.00	1.60E-06	4.09E-07	1	0.56	0.56
cis-1,2-dichloroethene	0.26					1	0.63	0.63
trans-1,2-dichloroethene	0.26					1	0.56	0.56
1,2-dichloro-1,1,2,2-tetrafluoroethane	0.45					1	0.70	0.70
ethylbenzene	0.43	1000	0.00			35	0.43	2.13
4-ethyltoluene	0.34					5	0.79	1.03
n-heptane	0.50					48	0.41	2.79
hexane	1.48	700	0.00			92	0.70	16.21
methylene chloride	0.68	1000	0.00	4.70E-07	3.19E-07	68	0.35	25.36
4-methyl-2-pentanone	0.64					23	0.41	9.83
naphthalene	0.41	3	0.14			11	0.52	3.09
n-nonane	0.36					6	0.58	0.94
n-octane	0.32					6	0.56	0.79
n-pentane	3.59					141	0.68	29.51
propylene	1.50					82	0.09	8.26
n-propyl benzene	0.32					3	0.49	0.84
tetrachloroethylene	0.52			9.50E-07	4.92E-07	16	0.68	2.71
toluene	3.38	5000	0.00			136	0.38	32.03
1,1,1-trichloroethane	0.35					2	0.55	0.65
trichloroethene	0.39	60	0.01	2.00E-06	7.88E-07	12	0.54	2.26
trichlorofluoromethane	1.68					139	0.96	5.39
1,1,2-trichloro-1,2,2-trifluoroethane	0.54					15	0.77	1.38
1,2,4-trimethylbenzene	0.58					33	0.49	3.74
1,3,5-trimethylbenzene	0.35					8	0.64	1.13
n-undecane	0.45					4	0.70	4.41
vinyl acetate	0.73	200	0.00			23	0.74	3.87
o-xylene	0.47	100	0.00			36	0.00	2.61
total m+p-xylene	1.36	100	0.01			52	0.87	10.42

A1-5. Cuyahoga County, G.T. Craig (2000-2003)

Risk Calculations
Air Toxics VOC Sampling Cleveland Area **2000-2003**

	CLEVELAND
Location:	Cuyahoga Co.
	G.T. Craig
	E. 14th & Orange
	Cleveland
AIRS#:	39-035-0060
Sampler:	Xon. 911-J23460

Compounds	Average (µg/m3)	RBC	HI	UR	RISK	Frequency	Minimum value detected (µg/m3)	Maximum value detected (µg/m3)
acetone	9.19	31000	0.00			42	2.23	23.75
acetonitrile	0.73	60	0.01			11	0.34	4.20
acrylonitrile	0.59	2	0.30	6.80E-05	4.02128E-05	10	0.46	1.04
benzene	1.13	30	0.04	7.80E-06	8.81373E-06	73	0.32	3.51
bromomethane	0.39					1	0.78	0.78
1,3-butadiene	0.36	2	0.18	3.00E-05	1.07139E-05	21	0.22	0.75
n-butane	10.77					73	0.29	59.43
2-butanone	2.09	5000	0.00			44	0.44	5.90
carbon disulfide	2.76	700	0.00			19	1.59	8.08
carbon tetrachloride	0.70	40	0.02	1.50E-05	1.04856E-05	23	0.63	1.13
chlorodifluoromethane	0.92	50000	0.00			56	0.35	3.89
chloroethane / ethyl chloride	0.32	10000	0.00			2	0.37	0.40
chloromethane / methyl chloride	1.12	90	0.01	1.80E-06	2.02067E-06	73	0.45	1.86
cyclohexane	0.40	6000	0.00			4	0.34	0.96
decane	0.62					3	0.76	1.11
1,4-dichlorobenzene (para)	0.90	800	0.00	1.00E-05	9.01892E-06	2	0.78	1.92
dichlorodifluoromethane	2.78					73	1.72	3.91
ethanol	1.79					2	3.39	6.41
ethylbenzene	0.88	1000	0.00			19	0.43	2.21
n-heptane	0.85					18	0.41	1.60
hexane	1.52	700	0.00			45	0.74	3.48
methyl-butyl ether	0.73					1	1.84	1.84
methylene chloride / dichloromethane	1.00	1000	0.00	4.70E-07	4.69215E-07	42	0.35	4.17
4-methyl-2-pentanone	1.03					6	0.45	2.62
napthalene	0.61	3	0.20			5	0.58	0.94
n-nonane	0.62					4	0.58	0.94
n-octane	0.44					3	0.51	0.84
n-pentane	3.99					72	0.59	12.39
propylene	1.90					12	0.77	5.51
styrene	0.29	1000	0.00	5.70E-07	1.63971E-07	1	0.51	0.51
tetrachloroethylene	0.82			9.50E-07	7.75903E-07	6	0.75	1.15
toluene	2.56	5000	0.00			72	0.45	8.67
1,1,1-trichloroethane	0.73					30	0.55	1.53
trichloroethene	0.58	60	0.01	2.00E-06	1.15E-06	4	0.59	1.13
trichlorofluoromethane	1.66					68	1.12	2.98
1,1,2-trichloro-1,2,2-trifluoroethane	0.63					9	0.84	1.46
1,2,4-trimethylbenzene	0.86					21	0.49	1.62
1,3,5-trimethylbenzene	0.32					1	0.54	0.54
n-undecane	0.42					1	0.70	0.70
vinyl acetate	1.02	200	0.01			8	0.70	2.64
o-xylene	0.86	100	0.01			24	0.43	2.30
total m+p-xylene	2.35	100	0.02			42	0.56	10.42

A1-6. Cuyahoga County, St. Theodosious (2006-2009)

Source Related VOC Sampling Cleveland					**Total Risk 2006-2009**			
Location:	Cuyahoga Co.							
	St. Theodosious							
	2547 St. Tikon							
	Cleveland							
AIRS#:	39-035-0038							
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	14.50	31000	0.00			69	1.95	114.02
acetonitrile	0.42	60	0.01			42	0.35	2.01
acrylonitrile	0.26	2	0.13	6.80E-05	0.00001734	12	0.43	0.61
benzene	0.82	30	0.03	7.80E-06	6.43061E-06	62	0.35	3.83
1,3-butadiene	0.16	2	0.08	3.00E-05	0.000004875	4	0.31	0.62
n-butane	4.96					85	0.43	23.53
2-butanone	1.52	5000	0.00			46	1.47	7.67
carbon tetrachloride	0.52	40	0.01	1.50E-05	7.73347E-06	18	0.63	1.01
chlorodifluoromethane	1.06	50000	0.00			63	0.60	3.50
chloromethane	1.23	90	0.01	1.80E-06	2.20823E-06	82	0.62	2.68
cumene	0.34	400	0.00			1	1.03	1.03
decane	6.74					38	0.58	51.21
1,4-dichlorobenzene (para)	0.46	800	0.00	1.00E-05	0.0000046	2	3.07	3.07
dichlorodifluoromethane	2.71					74	1.29	4.90
n-dodecane	0.38					13	1.81	1.81
ethylbenzene	0.42	1000	0.00			12	0.52	3.78
4-ethyltoluene	0.50					12	1.08	2.85
n-heptane	0.98					28	0.41	16.80
hexane	1.04	700	0.00			47	0.70	3.88
methylene chloride	0.80	1000	0.00	4.70E-07	3.77346E-07	46	0.35	7.99
4-methyl-2-pentanone	0.47					15	0.53	2.95
naphthalene	0.37	3	0.12			3	0.52	1.10
n-nonane	5.89					26	0.58	44.59
n-octane	0.65					13	0.98	4.53
n-pentane	2.71					70	0.47	10.03
n-propylbenzene	0.52					13	1.03	3.39
propylene	0.94					42	0.52	5.51
toluene	2.63	5000	0.00			78	0.45	15.07
1,1,1-trichloroethane	0.37					2	0.60	0.65
trichloroethene	0.39	60	0.01	2.00E-06	7.79E-07	4	0.70	1.29
trichlorofluoromethane	3.84					82	0.56	78.66
1,1,2-trichloro-1,2,2-trifluoroethane	0.57					20	0.77	1.00
1,2,4-trimethylbenzene	1.67					29	0.54	13.27
1,3,5-trimethylbenzene	0.64					21	0.69	4.28
n-undecane	2.62					23	1.15	17.26
vinyl acetate	0.93	200	0.00			29	0.81	5.28
o-xylene	0.61	100	0.01			26	0.48	3.73
total m+p-xylene	1.56	100	0.02			32	0.87	14.33

A 1-7. Cuyahoga County, Tri-C College (2006-2008)

Source Related VOC Sampling Cleveland					**Total Risk**	**2006-2008**		
Location:	CLEVELAND							
	Cuyahoga Co.							
	Tri-C College							
	2900 Community CollegeAve.							
	Cleveland							
AIRS#:	39-035-0071							
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	87.68	31000	0.00			56	4.04	807.66
acetonitrile	0.58	60	0.01			34	0.35	2.18
acrylonitrile	0.25	2	0.12	6.80E-05	1.67E-05	7	0.46	0.74
benzene	1.44	30	0.05	7.80E-06	1.12E-05	55	0.42	5.75
1,3-butadiene	0.28	2	0.14	3.00E-05	8.38E-06	17	0.22	1.77
n-butane	8.38					54	0.69	64.18
2-butanone	8.63	5000	0.00			50	0.15	82.57
carbon disulfide	0.62	700	0.00			3	1.56	3.11
carbon tetrachloride	0.54	40	0.01	1.50E-05	8.08E-06	15	0.63	1.07
chlorodifluoromethane	1.75	50000	0.00			39	0.78	8.49
chloroethane	0.17	10000	0.00			1	0.34	0.34
chloromethane	1.33	90	0.01	1.80E-06	2.39E-06	56	0.76	2.27
cyclohexane	0.43	6000	0.00			18	0.34	3.34
decane	1.02					22	0.76	12.80
1,4-dichlorobenzene (para)	1.48	800	0.00	1.00E-05	1.48E-05	22	0.66	10.82
dichlorodifluoromethane	3.27					56	1.19	34.62
1,2-dichloroethane	0.30			2.60E-05	7.89E-06	4	1.05	1.94
ethylbenzene	0.63	1000	0.00			15	0.48	14.76
4-ethyltoluene	0.32					2	0.74	1.13
n-heptane	0.79					33	0.45	3.98
hexane	1.39	700	0.00			41	0.70	7.05
methyl-butyl ether	0.31					1	0.94	0.94
methylene chloride	0.66	1000	0.00	4.70E-07	3.10E-07	36	0.35	2.81
4-methyl-2-pentanone	1.54					28	0.49	9.83
a-methylstyrene	0.30					1	0.68	0.68
naphthalene	0.51	3	0.17			9	0.63	3.72
n-nonane	0.40					6	0.63	1.84
n-octane	0.35					6	0.51	1.07
n-pentane	7.95					56	1.30	70.82
propylene	3.97					38	1.03	24.09
n-propyl benzene	0.32					1	1.38	1.38
styrene	0.28	1000	0.00	5.70E-07	1.58E-07	1	1.75	1.75
tetrachloroethylene	0.48			9.50E-07	4.57E-07	5	0.34	2.65
toluene	4.68	5000	0.00			56	0.49	20.72
trichloroethene	0.60	60	0.01	2.00E-06	1.20E-06	12	0.64	11.29
trichlorofluoromethane	1.90					55	0.62	3.82
1,1,2-trichloro-1,2,2-trifluoroethane	0.64					10	0.77	3.68
1,2,4-trimethylbenzene	0.67					16	0.74	2.70
1,3,5-trimethylbenzene	0.32					2	0.69	0.79
n-undecane	1.08					18	0.64	26.85
vinyl acetate	1.60	200	0.01			26	0.88	13.73
o-xylene	0.62	100	0.01			16	0.43	12.16
total m+p-xylene	1.95	100	0.02			23	0.87	47.76

A1-8. Franklin County, Fairgrounds (2003-2009)

Source Related VOC Sampling Franklin					**Total Risk**	**2003-2009**		
	Ohio EPA Central District Office							
Location:	Franklin County							
	Ohio State Fairgrounds							
	Korbel Ave.							
	Columbus							
	39-049-0034							
AQS # :	RM ESI-EPA017587							
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	13.59	31000	0.00			207	2.85	87.89
acetonitrile	0.42	60	0.01			111	0.34	3.02
acrylonitrile	0.37	2	0.19	6.80E-05	2.53E-05	38	0.43	3.91
benzene	0.90	30	0.03	7.80E-06	7.01E-06	178	0.32	4.15
bromodichloromethane	0.42					1	0.67	0.67
1,3-butadiene	0.17	2	0.08	3.00E-05	5.09E-06	18	0.24	1.53
n-butane	3.25					211	0.12	19.25
2-butanone	2.46	5000	0.00			135	0.00	14.45
carbon disulfide	0.83	700	0.00			5	2.86	4.98
carbon tetrachloride	0.49	40	0.01	1.50E-05	7.34E-06	58	0.63	1.26
chlorodifluoromethane	1.23	50000	0.00			195	0.50	4.24
chloroform	0.30	98	0.00	2.30E-05	6.90E-06	1	0.59	0.59
chloromethane	1.07	90	0.01	1.80E-06	1.92E-06	213	0.50	2.07
cyclohexane	0.22	6000	0.00			3	0.38	0.59
decane	0.39					2	0.87	6.40
1,4-dichlorobenzene (para)	0.40	800	0.00	1.00E-05	3.98E-06	7	0.66	2.65
dichlorodifluoromethane	2.62					210	1.38	3.71
cis-1,2-dichloroethene	0.23					1	0.40	0.40
n-dodecane	0.36					1	2.44	2.44
ethylbenzene	0.35	1000	0.00			32	0.43	1.65
4-ethyltoluene	0.31					3	0.59	0.64
n-heptane	0.30					24	0.41	1.11
hexachlorobutadiene	0.66			2.20E-05	1.45E-05	1	1.39	1.39
hexane	0.67	700	0.00			70	0.70	2.93
methylene chloride	0.32	1000	0.00	4.70E-07	1.51E-07	58	0.35	1.49
4-methyl-2-pentanone	0.27					11	0.41	0.74
naphthalene	0.38	3	0.13			18	0.52	2.25
n-nonane	0.33					2	0.68	1.15
n-octane	0.29					2	0.47	0.61
n-pentane	1.75					209	0.41	8.56
propylene	1.04					105	0.43	9.29
styrene	0.26	1000	0.00	5.70E-07	1.51E-07	3	0.47	0.81
tetrachloroethylene	0.42			9.50E-07	4.00E-07	2	0.75	0.95
toluene	1.84	5000	0.00			176	0.19	12.81
1,1,1-trichloroethane	0.34					2	0.93	0.93
trichloroethene	0.33	60	0.01	2.00E-06	6.65E-07	1	0.54	0.54
trichlorofluoromethane	1.47					205	1.01	2.47
1,1,2-trichloro-1,2,2-trifluoroethane	0.50					13	0.77	1.00
1,2,4-trimethylbenzene	0.43					33	0.49	2.61
1,3,5-trimethylbenzene	0.31					2	0.64	0.64
n-undecane	0.42					2	0.70	6.07
vinyl acetate	1.18	200	0.01			93	0.70	14.44
o-xylene	0.37	100	0.00			35	0.43	1.91
total m+p-xylene	0.90	100	0.01			52	0.87	7.82

A1-9. Hamilton County, Reading Pool (2000-2002)

Urban Air Monitoring: VOC Sampling					**Total Risk**	**2000-2002**		
Annual Average Concentrations								
Location:	HAMILTON							
	Hamilton County							
	Reading Pool							
	1601 West St.							
	Reading, Cincinnati							
AIRS #:								
Sampler:								
Concentrations:		µg/m3						
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	7.76	31000	0.00			39	3.56	30.88
acetonitrile	0.26	60	0.00			8	0.42	1.16
acrylonitrile	0.31	2	0.16	6.80E-05	2.13E-05	3	0.46	1.09
benzene	2.27	30	0.08	7.80E-06	1.77E-05	49	0.45	12.14
1,3-butadiene	0.30	2	0.15	3.00E-05	8.90E-06	17	0.24	1.61
n-butane	18.79					50	1.40	309.02
2-butanone	1.57	5000	0.00			40	0.59	6.49
carbon disulfide	1.45	700	0.00			11	1.71	8.10
carbon tetrachloride	0.51	40	0.01	1.50E-05	7.65E-06	15	0.63	1.07
chlorodifluoromethane	0.87	50000	0.00			37	0.46	2.62
chloroethane	0.22	10000	0.00			3	0.29	0.40
chloroform	0.81	98	0.01	2.30E-05	1.87E-05	17	0.54	5.86
chloromethane	1.62	90	0.02	1.80E-06	2.91E-06	50	0.62	2.89
cumene	0.39	400	0.00			3	0.54	1.92
cyclohexane	0.27	6000	0.00			10	0.34	1.27
decane	0.53					3	0.87	5.12
1,4-dichlorobenzene (para)	0.61	800	0.00	1.00E-05	5.33E-06	7	0.66	4.57
dichlorodifluoromethane	3.10					50	1.09	4.30
n-dodecane	0.48					1	0.77	0.77
ethanol	31.66					17	5.65	471.06
ethylbenzene	1.71	1000	0.00			25	0.43	29.53
4-ethyltoluene	0.90					7	0.69	13.77
n-heptane	0.82					14	0.45	9.43
hexane	2.82	700	0.00			41	0.49	26.08
methylene chloride	0.71	1000	0.00	4.70E-07	3.92E-07	27	0.38	3.82
a-methylstyrene	0.47					8	0.48	1.50
4-methyl-2-pentanone	0.51					4	0.57	8.60
naphthalene	0.83	3	0.28			11	0.52	8.39
n-nonane	0.45					4	0.63	5.25
n-octane	0.59					6	0.47	7.94
n-pentane	14.94					50	0.62	171.15
propylene	0.75					13	0.53	7.23
n-propyl benzene	0.69					4	0.49	8.36
styrene	1.16	1000	0.00	5.70E-07	6.59E-07	24	0.47	5.54
1, 1, 2, 2-tetrachloroethane	0.48			5.80E-05	2.80E-05	1	2.75	2.75
tetrachloroethylene	0.46			9.50E-07	4.37E-07	2	0.81	1.09
toluene	7.37	5000	0.00			49	0.64	41.45
1,1,1-trichloroethane	0.38					1	1.58	1.58
trichlorofluoromethane	2.09					38	0.79	32.03
1,1,2-trichloro-1,2,2-trifluoroethane	0.59					7	0.77	1.15
1,2,4-trimethylbenzene	2.85					33	0.49	49.16
1,3,5-trimethylbenzene	0.95					9	0.64	19.17
n-undecane	0.68					3	0.90	1.53
o-xylene	2.04	100	0.02			29	0.43	34.30
total m+p-xylene	4.93	100	0.05			35	0.43	56.44

A1-10. Hamilton County, Cincinnati State (2003-2007)

Source Related VOC Sampling Cuyahoga					**Total Risk**	**2003-2007**		
Location:	HAMILTON							
	Hamilton County							
	Cincinnati State community College							
	10100 Reading Rd.							
	Reading, Cincinnati							
AIRS#:								
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	17.97	31000	0.00			98	5.23	78.39
acetonitrile	0.69	60	0.01			65	0.34	11.42
acrylonitrile	0.29	2	0.14	6.80E-05	1.96E-05	11	0.43	2.02
benzene	5.07	30	0.17	7.80E-06	3.96E-05	98	0.54	47.92
1,3-butadiene	0.13	2	0.06	3.00E-05	3.78E-06	9	0.22	0.55
n-butane	2.51					96	0.71	10.93
2-butanone	2.95	5000	0.00			91	1.47	10.32
carbon disulfide	0.84	700	0.00			3	1.68	2.27
carbon tetrachloride	0.56	40	0.01	1.50E-05	8.40E-06	63	0.63	1.01
chlorobenzene	0.43	1000	0.00			30	0.46	2.49
chlorodifluoromethane	1.03	50000	0.00			45	0.95	21.22
chloroethane	0.14	10000	0.00			2	0.26	1.77
chloroform	0.25	98	0.00	2.30E-05	5.70E-06	2	0.54	0.98
chloromethane	1.19	90	0.01	1.80E-06	2.15E-06	95	0.70	8.26
cyclohexane	0.18	6000	0.00			4	0.34	0.62
decane	1.93					47	0.58	23.28
1,4-dichlorobenzene (para)	0.66	800	0.00	1.00E-05	6.64E-06	19	0.60	18.64
dichlorodifluoromethane	2.17					94	1.58	3.71
1,1-dichloroethane	0.20					1	0.40	0.40
cis-1,2-dichloroethene	0.20					1	0.44	0.44
trans-1,2-dichloroethene	0.20					1	0.44	0.44
n-dodecane	0.36					1	0.70	0.70
ethylbenzene	0.25	1000	0.00			10	0.48	0.82
4-ethyltoluene	0.33					9	0.25	2.26
n-heptane	0.24					14	0.41	0.78
hexachlorobutadiene	0.55			2.20E-05	1.20E-05	1	2.67	2.67
hexane	0.59	700	0.00			25	0.74	4.93
methylene chloride	0.38	1000	0.00	4.70E-07	1.79E-07	54	0.35	1.74
4-methyl-2-pentanone	0.24					16	0.41	0.86
naphthalene	0.33	3	0.11			10	0.52	1.99
n-nonane	1.06					25	0.52	19.93
n-octane	0.26					7	0.56	1.35
n-pentane	1.36					97	0.44	9.15
propylene	1.24					84	0.55	3.96
n-propyl benzene	0.30					6	0.54	1.52
styrene	0.24	1000	0.00	5.70E-07	1.39E-07	8	0.51	1.24
toluene	1.52	5000	0.00			93	0.38	9.80
1,1,1-trichloroethane	43.68					91	18.55	152.79
trichlorofluoromethane	2.27					99	1.24	21.35
1,1,2-trichloro-1,2,2-trifluoroethane	0.49					21	0.77	1.07
1,2,4-trimethylbenzene	1.27					47	0.49	9.83
1,3,5-trimethylbenzene	0.39					11	0.59	3.29
n-undecane	1.18					29	0.64	10.23
vinyl acetate	1.33	200	0.01			46	0.35	8.45
o-xylene	0.30	100	0.00			17	0.56	1.22
total m+p-xylene	0.57	100	0.01			24	0.87	4.34

A1-11. Jefferson County (2004-2009)

Source Related VOC Sampling Steubenville						**Total Risk 2004-2009**		
Location:	SEDO							
	Jefferson County							
	Steubenville Trailer							
	618 Logan Street							
	Steubenville							
AIRS #	39-081-0017							
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	11.70	31000	0.00			194	2.38	140.15
acetonitrile	0.55	60	0.01			119	0.34	4.03
acrylonitrile	0.79	2	0.40	6.80E-05	5.37E-05	77	0.43	6.08
benzene	7.11	30	0.24	7.80E-06	5.55E-05	178	0.32	89.45
1,3-butadiene	0.19	2	0.10	3.00E-05	5.70E-06	23	0.22	0.75
n-butane	3.80					193	0.36	26.15
2-butanone	1.75	5000	0.00			105	0.74	17.10
carbon disulfide	1.29	700	0.00			38	1.56	11.21
carbon tetrachloride	0.53	40	0.01	1.50E-05	7.95E-06	42	0.63	1.01
chlorodifluoromethane	1.03	50000	0.00			172	0.46	3.89
chloroform / trichloromethane	0.34	98	0.00	2.30E-05	7.82E-06	1	0.49	0.49
chloromethane / methyl chloride	1.13	90	0.01	1.80E-06	2.03E-06	193	0.47	2.02
cyclohexane	0.25	6000	0.00			5	0.34	1.10
decane	0.46					6	0.58	6.98
1,4-dichlorobenzene (para)	0.48	800	0.00	1.00E-05	4.80E-06	8	1.08	2.71
dichlorodifluoromethane	2.68					193	1.38	3.81
n-dodecane	0.35					1	0.77	0.77
1,2-Dichloroethane	0.29			2.60E-05	7.54E-06	1	1.09	1.09
ethylbenzene	0.44	1000	0.00			36	0.43	3.21
4-ethyltoluene	0.35					1	0.54	0.54
n-heptane	0.51					55	0.41	7.38
hexachlorobutadiene	0.76			2.20E-05	1.67E-05	1	3.52	3.52
hexane	0.69	700	0.00			68	0.70	5.64
methylene chloride / dichloromethane	0.30	1000	0.00	4.70E-07	1.41E-07	28	0.35	1.81
4-methyl-2-pentanone	0.58					36	0.41	9.83
napthalene	5.80	3	1.93			109	0.52	162.49
n-nonane	0.38					1	2.05	2.05
n-octane	0.33					2	0.47	0.51
n-pentane	1.84					190	0.32	15.05
propylene	1.09					95	0.53	7.06
n-propyl benzene	0.35					1	0.84	0.84
styrene	0.35	1000	0.00	5.70E-07	2.00E-07	17	0.43	1.96
toluene	2.85	5000	0.00			164	0.41	21.48
1,1,1-trichloroethane	0.38					1	0.55	0.55
Trichloroethene	0.39	60	0.01	2.00E-06	7.80E-07	2	1.45	1.77
trichlorofluoromethane	5.00					193	1.12	67.43
1,1,2-trichloro-1,2,2-trifluoroethane	0.57					15	0.77	1.00
1,2,4-trimethylbenzene	0.53					39	0.49	2.70
1,3,5-trimethylbenzene	0.35					5	0.49	0.84
n-undecane	0.48					1	6.01	6.01
vinyl acetate	1.57	200	0.01			112	0.74	14.44
o-xylene	0.46	100	0.00			40	0.48	2.74
total m+p-xylene	1.38	100	0.01			66	0.87	13.03

A1-12. Lake County (2000-2004)

Source Related VOC Sampling Paineville					**Total Risk 2000-2004**			
Location:	E COUNTY GHD							
	Lake County							
	Lake County Hospital							
	71 E. High St							
	Paineville							
AIRS SITE #:	39-085-3002							
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	9.37	31000	0.00			118	2.61	38.01
acetonitrile	0.30	60	0.01			37	0.34	1.16
acrylonitrile	0.41	2	0.21	6.80E-05	2.79E-05	34	0.43	1.54
benzene	0.77	30	0.03	7.80E-06	6.01E-06	124	0.32	2.59
1,3-butadiene	0.14	2	0.07	3.00E-05	4.20E-06	7	0.22	0.73
n-butane	2.89					131	0.64	9.03
2-butanone	1.04	5000	0.00			57	0.65	10.62
carbon disulfide	1.00	700	0.00			18	0.40	4.67
carbon tetrachloride	0.50	40	0.01	1.50E-05	7.50E-06	59	0.63	1.01
chlorodifluoromethane	17.75	50000	0.00			113	0.57	1060.98
chloroethane / ethyl chloride	0.17	10000	0.00			1	0.92	0.92
chloroform / trichloromethane	0.25	98	0.00	2.30E-05	5.75E-06	2	0.49	1.12
chloromethane / methyl chloride	1.06	90	0.01	1.80E-06	1.91E-06	125	0.45	2.07
3-chloropropene	0.16					1	0.31	0.31
decane	0.34					2	0.93	1.45
dichlorodifluoromethane	2.83					131	0.25	5.44
ethanol	1.46					3	1.36	11.49
ethylbenzene	0.27	1000	0.00			10	0.48	1.22
4-ethyltoluene	0.32					2	0.84	1.62
n-heptane	0.25					9	0.41	0.49
hexachlorobutadiene	0.60			2.20E-05	1.32E-05	1	1.07	1.07
hexane	0.56	700	0.00			45	0.39	2.40
methylene chloride / dichloromethane	0.27	1000	0.00	4.70E-07	1.27E-07	21	0.35	2.95
4-methyl-2-pentanone	0.22					2	0.45	1.47
a-methylstyrene	0.27					1	0.63	0.63
napthalene	0.41	3	0.14			7	0.26	5.77
n-pentane	1.53					127	0.41	4.72
propylene	0.53					32	0.55	4.99
n-propyl benzene	0.31					1	0.74	0.74
styrene	0.21	1000	0.00	5.70E-07	1.20E-07	1	0.43	0.43
tetrachloroethylene	0.39			9.50E-07	3.71E-07	3	0.68	1.29
toluene	1.88	5000	0.00			125	0.38	9.80
1,1,1-trichloroethane	0.52					31	0.55	16.92
trichloroethene	0.27	60	0.00	2.00E-06	5.40E-07	1	0.59	0.59
trichlorofluoromethane	1.53					111	1.12	2.98
1,1,2-trichloro-1,2,2-trifluoroethane	0.51					20	0.77	1.84
1,2,4-trimethylbenzene	0.30					11	0.49	1.77
n-undecane	0.45					1	1.53	1.53
vinyl acetate	0.61	200	0.00			17	1.02	4.93
o-xylene	0.31	100	0.00			17	0.22	1.43
total m+p-xylene	0.83	100	0.01			51	0.22	21.71

A1-13. Montgomery County (2003-2004)

Source Related VOC Sampling Dayton					Total Risk 2003-2004			
Location:	RAPCA							
	Montgomery County							
	Downtown Dayton Library							
	215 E. Third Str.							
	Dayton							
AIRS SITE #:	39-113-0032							
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	9.62	31000	0.00			42	26.13	10.91
acetonitrile	0.36	60	0.01			21	0.82	0.60
acrylonitrile	1.13	2	0.57	6.80E-05	7.68E-05	34	6.08	1.51
benzene	1.41	30	0.05	7.80E-06	1.10E-05	48	3.51	1.41
1,3-butadiene	0.18	2	0.09	3.00E-05	5.40E-06	12	0.69	0.37
n-butane	3.41					48	12.84	3.41
2-butanone	1.51	5000	0.00			25	6.78	2.77
carbon disulfide	5.89	700	0.01			41	20.86	6.76
carbon tetrachloride	0.67	40	0.02	1.50E-05	1.01E-05	41	0.88	0.73
chlorodifluoromethane	1.63	50000	0.00			48	15.56	1.63
chloroform / trichloromethane	0.29	98	0.00	2.30E-05	6.67E-06	6	0.78	0.63
chloromethane / methyl chloride	0.92	90	0.01	1.80E-06	1.66E-06	47	1.24	0.94
cyclohexane	0.19	6000	0.00			4	0.41	0.38
decane	0.65					5	13.39	3.76
dichlorodifluoromethane	3.01					47	18.79	3.07
cis-1,2-dichloroethene	0.21					2	0.48	0.46
n-dodecane	0.37					1	1.18	1.18
ethylbenzene	0.29	1000	0.00			7	1.13	0.71
4-ethyltoluene	0.30					3	2.21	1.15
n-heptane	0.31					12	1.07	0.62
hexane	1.11	700	0.00			31	3.42	1.52
methylene chloride / dichloromethane	0.43	1000	0.00	4.70E-07	2.02E-07	27	1.29	0.63
4-methyl-2-pentanone	0.22					3	0.45	0.42
napthalene	0.33	3	0.11			6	1.05	0.79
n-nonane	0.37					4	3.15	1.52
n-octane	0.30					3	2.29	1.32
n-pentane	1.96					48	8.26	1.96
propylene	0.97					19	5.68	2.31
n-propyl benzene	0.26					1	0.93	0.93
tetrachloroethylene	0.45			9.50E-07	4.28E-07	9	1.22	0.93
toluene	2.64	5000	0.00			48	10.93	2.64
trichloroethene	0.37	60	0.00	2.00E-06	7.40E-07	7	1.50	0.96
trichlorofluoromethane	2.99					48	9.55	2.99
1,1,2-trichloro-1,2,2-trifluoroethane	0.48					11	1.07	0.82
1,2,4-trimethylbenzene	0.52					10	5.90	1.56
1,3,5-trimethylbenzene	0.32					3	3.24	1.47
n-undecane	0.58					3	11.51	4.45
vinyl acetate	0.71	200	0.00			8	4.93	2.51
o-xylene	0.33	100	0.00			10	1.61	0.78
total m+p-xylene	0.81	100	0.01			17	4.78	1.88

A1-14. Scioto County (2000-2003)

Source Related VOC Sampling New Boston **Total Risk 2000-2003**

Location: Scioto Co.
Portsmouth Water Treatment Plant
4862 Gallia
New Boston, OH
AIRS # 39-145-0013
Sampler: Xon.J23414

Compounds	Average (µg/m3) with half detections	RBC	Hazard Index	UR	RISK	Frequency	Minimum value detected (µg/m3)	Maximum value detected (µg/m3)
acetone	7.69	31000.00	0.00			80	2.38	9.82
acetonitrile	0.26	60.00	0.00			14	0.34	0.55
acrylonitrile	0.45	2.00	0.23	6.80E-05	3.06E-05	21	0.48	1.17
benzene	4.90	30.00	0.16	7.80E-06	3.82E-05	102	0.42	5.00
1,3-butadiene	0.22	2.00	0.11	3.00E-05	6.60E-06	20	0.27	0.55
n-butane	6.93					101	1.00	7.13
2-butanone	1.46	5000.00	0.00			57	0.56	2.54
carbon disulfide	3.11	700.00	0.00			48	0.78	5.84
carbon tetrachloride	0.48	40.00	0.01	1.50E-05	7.20E-06	36	0.63	0.78
chlorobenzene	0.40	1000.00	0.00			1	11.05	11.05
chlorodifluoromethane	0.63	50000.00	0.00			67	0.42	0.83
chloroethane / ethyl chloride	0.22	10000.00	0.00			1	0.92	0.92
chloroform / trichloromethane	0.49	98.00	0.01	2.30E-05	1.13E-05	14	0.49	2.05
chloromethane / methyl chloride	1.09	90.00	0.01	1.80E-06	1.96E-06	95	0.52	1.17
cumene	0.34	400.00	0.00			6	0.54	0.67
cyclohexane	0.25	6000.00	0.00			3	0.59	2.75
decane	0.41					4	0.76	1.21
1,4-dichlorobenzene (para)	0.40	800.00	0.00	1.00E-05	4.00E-06	1	0.96	0.96
dichlorodifluoromethane	2.67					103	1.04	2.69
1,2-dichloro-1,1,2,2-tetrafluoroethane	0.46					1	0.70	0.70
n-dodecane	0.46					3	0.70	0.95
ethanol	13.59					19	0.96	21.93
ethylbenzene	0.32	1000.00	0.00			12	0.43	0.58
4-ethyltoluene	0.41					1	1.57	1.57
n-heptane	0.28					6	0.45	0.64
hexane	0.54	700.00	0.00			34	0.18	0.98
methylene chloride / dichloromethane	0.29	1000.00	0.00	4.70E-07	1.36E-07	20	0.38	0.80
a-methylstyrene	0.32					1	0.82	0.82
napthalene	1.93	3.00	0.64			47	0.52	3.72
n-octane	0.31					1	0.98	0.98
n-pentane	2.11					99	0.35	2.20
propylene	0.77					14	1.29	4.71
styrene	0.48	1000.00	0.00	5.70E-07	2.74E-07	4	0.47	7.27
toluene	1.73	5000.00	0.00			91	0.45	1.93
1,2,4-trichlorobenzene	0.70					1	0.82	0.82
1,1,1-trichloroethane	0.36					1	1.36	1.36
trichloroethene	0.29	60.00	0.00			2	1.07	1.34
trichlorofluoromethane	40.58					101	1.12	41.77
1,1,2-trichloro-1,2,2-trifluoroethane	0.60					15	0.77	1.09
1,2,4-trimethylbenzene	0.40					26	0.49	0.87
n-undecane	0.63					4	0.77	1.26
vinyl acetate	1.33	200.00	0.01			14	0.77	7.65
o-xylene	0.38	100.00	0.00			20	0.43	0.76
total m+p-xylene	0.79	100.00	0.01			31	0.56	1.60

A1-15. Summit County (2000-2003)

Source Related VOC Sampling	**Akron**				**Total Risk 2000-2003**			
Location:	Akron Region Air Quality Management District							
	Summit County							
	East High School							
	80 Brittain Rd.							
	Akron							
AIRS SITE #:	39-153-0017							
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Minimum value detected (µg/m3)**	**Maximum value detected (µg/m3)**
acetone	9.00	31000	0.00			42	3.80	35.63
acetonitrile	0.27	60	0.00			9	0.34	0.87
acrylonitrile	0.34	2	0.17	6.80E-05	2.31E-05	6	0.50	2.08
benzene	1.33	30	0.04	7.80E-06	1.04E-05	60	0.42	4.15
1,3-butadiene	0.29	2	0.15	3.00E-05	8.70E-06	22	0.24	1.24
n-butane	6.09					57	0.95	52.30
2-butanone	2.50	5000	0.00			46	1.18	20.05
carbon disulfide	6.61	700	0.01			37	1.59	121.45
carbon tetrachloride	0.49	40	0.01	1.50E-05	7.35E-06	24	0.63	1.01
chlorodifluoromethane	1.67	50000	0.00			46	0.35	19.45
chloroethane / ethyl chloride	0.21	10000	0.00			3	0.29	0.58
chloromethane / methyl chloride	0.99	90	0.01	1.80E-06	1.78E-06	51	0.68	1.76
cyclohexane	0.32	6000	0.00			11	0.34	2.44
decane	0.48					6	0.81	3.08
1,4-dichlorobenzene (para)	0.41	800	0.00	1.00E-05	4.10E-06	2	1.20	1.62
dichlorodifluoromethane	3.81					58	1.09	47.97
n-dodecane	0.50					4	0.84	2.44
ethanol	176.86					14	5.46	753.70
ethylbenzene	0.67	1000	0.00			34	0.43	2.95
4-ethyltoluene	0.38					2	0.59	0.79
n-heptane	0.48					13	0.41	4.51
hexane	1.78	700	0.00			51	0.35	10.57
methylene chloride / dichloromethane	0.55	1000	0.00	4.70E-07	2.59E-07	31	0.38	2.54
4-methyl-2-pentanone	0.25					5	0.45	1.47
a-methylstyrene	0.33					4	0.53	0.92
napthalene	0.48	3	0.16			4	0.52	1.21
n-nonane	0.32					5	0.63	1.26
n-octane	0.33					4	0.47	1.68
n-pentane	14.34					58	0.94	268.53
propylene	0.33					4	0.64	4.82
n-propyl benzene	0.38					1	0.69	0.69
styrene	0.98	1000	0.00	5.70E-07	5.59E-07	33	0.47	8.52
tetrachloroethylene	0.44			9.50E-07	4.18E-07	2	0.88	1.02
toluene	3.86	5000	0.00			57	0.45	64.06
1,1,1-trichloroethane	501.21					60	3.98	9822.33
trichlorofluoromethane	24.91					57	1.12	252.85
1,1,2-trichloro-1,2,2-trifluoroethane	0.51					4	0.84	0.92
1,2,4-trimethylbenzene	0.64					24	0.49	5.41
1,3,5-trimethylbenzene	0.27					3	0.64	0.84
n-undecane	0.65					6	0.64	2.43
vinyl acetate	0.45	200	0.00			5	0.70	2.71
o-xylene	0.61	100	0.01			34	0.43	4.34
total m+p-xylene	1.98	100	0.02			46	0.91	14.33

A1-16. Washington County, Washington County Career Center (2000-2008)

Source Related VOC Sampling Marietta					**Total Risk 2000-2008**			
Location:	SEDO							
	Washington County							
	Washington County Career Center							
	Rt 2							
	Marietta							
AIRS # :	39-167-0008							
Compounds	**Average (µg/m3) with half detections**	**RBC**	**Hazard Index**	**UR**	**RISK**	**Frequency**	**Maximum value detected (µg/m3)**	**Minimum value detected (µg/m3)**
acetone	9.32	31000	0.00			234	59.39	1.95
acetonitrile	0.40	60	0.01			73	3.02	0.34
acrylonitrile	1.59	2	0.79	6.80E-05	1.08E-04	162	8.90	0.43
benzene	0.59	30	0.02	7.80E-06	4.57E-06	186	8.31	0.32
bromomethane	0.23	5	0.05			1	0.85	0.85
1,3-butadiene	0.14	2	0.07	3.00E-05	4.32E-06	10	0.80	0.24
n-butane	4.55					253	23.06	0.36
2-butanone	1.29	5000	0.00			131	12.09	0.56
carbon disulfide	3.17	700	0.00			178	29.27	1.59
carbon tetrachloride	0.46	40	0.01	1.50E-05	6.87E-06	74	1.26	0.63
chlorobenzene	0.54	1000	0.00			35	6.45	0.46
chlorodifluoromethane	1.58	50000	0.00			216	45.98	0.39
chloroethane / ethyl chloride	0.18	10000	0.00			3	1.56	0.58
chloroform / trichloromethane	0.26	98	0.00	2.30E-05	5.97E-06	1	0.54	0.54
chloromethane / methyl chloride	1.24	90	0.01	1.80E-06	2.24E-06	247	6.40	0.47
cyclohexane	0.31	6000	0.00			51	3.27	0.34
decane	0.37					5	3.14	0.58
1,4-dichlorobenzene (para)	0.44	800	0.00	1.00E-05	4.43E-06	8	7.22	0.60
dichlorodifluoromethane	2.59					253	6.43	0.99
n-dodecane	0.39					2	0.84	0.77
ethanol	1.04					14	154.51	1.09
ethylbenzene	0.29	1000	0.00			7	3.00	0.61
4-ethyltoluene	0.33					3	1.57	0.64
n-heptane	0.36					42	10.66	0.41
hexane	0.74	700	0.00			98	16.21	0.39
methanol	0.66					1	129.73	129.73
methylene chloride / dichloromethan	0.26	1000	0.00	4.70E-07	1.22E-07	28	3.34	0.35
4-methyl-2-pentanone	0.23					9	1.11	0.45
a-methylstyrene	0.29					1	0.63	0.63
napthalene	0.41	3	0.14			15	3.09	0.52
n-nonane	0.29					4	1.26	0.52
n-octane	0.30					14	1.64	0.47
n-pentane	1.77					247	16.23	0.30
propylene	1.09					84	9.47	0.62
n-propyl benzene	0.32					1	0.79	0.79
styrene	0.32	1000	0.00	5.70E-07	1.83E-07	20	4.09	0.51
toluene	0.98	5000	0.00			133	28.26	0.38
1,2,4-trichlorobenzene	0.52					1	0.89	0.89
1,1,1-trichloroethane	0.33					2	0.93	0.60
trichlorofluoromethane	10.12					253	84.28	1.12
1,1,2-trichloro-1,2,2-trifluoroethane	0.61					67	2.68	0.77
1,2,4-trimethylbenzene	0.35					10	9.83	0.49
1,3,5-trimethylbenzene	0.28					4	2.51	0.54
n-undecane	0.48					4	3.07	0.90
vinyl acetate	1.10	200	0.01			83	16.90	0.70
o-xylene	0.31	100	0.00			9	3.82	0.43
total m+p-xylene	0.59	100	0.01			17	14.76	0.56

Appendix A2, Average Total Heavy Metals Site Risk Per County

A2-1. Butler County (2004-2009)

MIDDLETOWN HEAVY METALS DATA, 2004-2009								
Ohio Bell								
3901 Lefferson Rd.								
AQS: 39-017-0015								
Butler								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.00	2.40E-03	1.30E-07	65	0.000	0.000
chromium	0.004	0.10	0.04	1.00E-02	4.28E-05	71	0.001	0.010
lead	0.007	1.50	0.00	1.20E-05	8.06E-08	72	0.002	0.021
manganese	0.054	0.05	1.09			72	0.012	0.150
nickel	0.004	0.20	0.02	2.40E-04	8.43E-07	22	0.001	0.013
zinc	0.071					72	0.019	0.630
arsenic	0.001			4.30E-03	5.79E-06	71	0.001	0.003
cadmium	0.000			1.80E-03	6.27E-07	72	0.000	0.003
iron	0.254					45	0.120	1.100

A2-2. Butler County, Oneida School (2000-2002)

Middletown Heavy Metals Data, 2000-2002								
Oneida School I								
Yankee Rd.								
AIRS: 39-017-0014, units -- µg/m³								
Butler County, Parameters								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.00	2.40E-03	1.42E-07	30	0.000	0.000
chromium	0.005	0.10	0.05	1.80E-02	8.29E-05	30	0.002	0.009
lead	0.012	1.50	0.01	1.20E-05	1.50E-07	30	0.005	0.077
manganese	0.079	0.05	1.57			30	0.017	0.160
nickel	0.005	0.20	0.03	2.40E-04	1.21E-06	30	0.003	0.008
zinc	0.049					30	0.015	0.121
arsenic	0.002			4.30E-03	7.34E-06	30	0.000	0.004

A2-3. Coshocton County, Johnson Plumbing (2000-2002)

Coshocton County HEAVY METALS DATA, 2000-2002								
1840 Otsego Ave.								
AIRS: 39-031-0005								
Coshocton County, units -- µg/m³								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.00	2.40E-03	8.06E-08	19	0.000	0.000
chromium	0.005	0.10	0.05	1.00E-02	4.81E-05	19	0.003	0.010
lead	0.012	1.50	0.01	1.20E-05	1.48E-07	19	0.006	0.028
manganese	0.050	0.05	0.99			19	0.008	0.590
nickel	0.006	0.20	0.03	2.40E-04	1.54E-06	19	0.004	0.013
zinc	0.095					19	0.045	0.240
arsenic	0.002			4.30E-03	6.99E-06	19	0.001	0.004

A2-4. Columbiana County, Maryland Ave. (2001-2009)

EAST LIVERPOOL HEAVY METALS DATA, 2001 - 2009								
500 Maryland Ave.								
AIRS: 39-029-0022, units -- µg/m³								
Columbiana - designated								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.00	2.40E-03	9.54E-08	82	0.000	0.000
chromium	0.004	0.10	0.04	1.00E-02	4.21E-05	98	0.001	0.031
lead	0.015	1.50	0.01	1.20E-05	1.77E-07	98	0.003	0.081
manganese	0.205	0.05	4.09			98	0.009	1.000
nickel	0.005	0.20	0.03	2.40E-04	1.28E-06	97	0.000	0.028
zinc	0.094					98	0.011	0.490
arsenic	0.003			4.30E-03	1.49E-05	96	0.001	0.150
cadmium	0.001			1.80E-03	1.77E-06	98	0.000	0.005
mercury	0.000	0.30	0.00			96	0.000	0.001
iron	0.148					59	0.011	0.600
potassium	0.324					47	0.125	0.600

A2-5. Columbiana County, Port Authority (2000-2009)

EAST LIVERPOOL HEAVY METALS DATA, 2000 - 2009								
Port Authority								
1250 St. George St.:								
AIRS: 39-029-0019, units -- µg/m³								
Columbiana County, Parameters								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.01	2.40E-03	2.96E-07	94	0.000	0.000
chromium	0.006	0.10	0.06	1.00E-02	5.57E-05	95	0.001	0.043
lead	0.017	1.50	0.01	1.20E-05	2.00E-07	95	0.002	0.076
manganese	0.372	0.05	7.44			95	0.018	1.900
nickel	0.003	0.20	0.02	2.40E-04	7.86E-07	95	0.000	0.024
zinc	0.116					95	0.022	0.540
arsenic	0.002			4.30E-03	1.06E-05	95	0.001	0.009
cadmium	0.001			1.80E-03	2.00E-06	95	0.000	0.007
mercury	0.000	0.30	0.00			92	0.000	0.002
iron	0.211					47	0.075	0.900

A2-6. Columbiana County, Water Plant (2000-2009)

East Liverpool Hetal Metals Data, 2000 - 2009								
Water Plant								
2220 Michigan Ave.								
AIRS: 39-029-0019								
Columbiana								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.00	2.40E-03	1.33E-07	86	0.000	0.001
chromium	0.016	0.10	0.16	1.20E-02	1.93E-04	96	0.001	0.087
lead	0.016	1.50	0.01	1.20E-05	1.94E-07	96	0.002	0.067
manganese	1.602	0.05	32.05			96	0.100	6.800
nickel	0.011	0.20	0.06	2.40E-04	2.65E-06	96	0.002	0.088
zinc	0.109					96	0.018	0.720
arsenic	0.003			4.30E-03	1.21E-05	96	0.001	0.020
cadmium	0.001			1.80E-03	1.94E-06	96	0.000	0.005
mercury	0.000	0.30	0.00			94	0.000	0.001
iron	0.300					47	0.130	1.600

A2-7. Cuyahoga County, St. Theodosius Church (2000-2009)

CLEVELAND, 2000-2009
Cuyahoga County
St. Theodosius Church
2547 St. Tikhon Ave.
AIRS: 39-035-0038

Compound	Average µg/m³	RBC	HI	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	1.03E-07	93	0.000	0.000
chromium	0.003	0.10	0.03	1.20E-02	3.81E-05	91	0.000	0.008
lead	0.018	1.50	0.01	1.20E-05	2.14E-07	119	0.004	0.061
manganese	0.043	0.05	0.86			119	0.006	0.160
nickel	0.003	0.20	0.02	2.40E-04	8.12E-07	77	0.000	0.010
zinc	0.077					119	0.025	0.240
arsenic	0.002			4.30E-03	6.57E-06	119	0.000	0.004

A2-8. Cuyahoga County, Ferro "A"/Ferro “B” (2000-2009)

CLEVELAND, 2000-2009
Cuyahoga County
FERRO "A"
4150 East 56th Street
AIRS: 39-035-0049

Compound	Average µg/m³	RBC	HI	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	1.39E-07	100	0.000	0.000
chromium	0.005	0.10	0.05	1.20E-02	6.59E-05	110	0.000	0.015
lead	0.104	1.50	0.07	1.20E-05	1.25E-06	120	0.015	0.450
manganese	0.129	0.05	2.57			120	0.020	0.710
nickel	0.060	0.20	0.30	2.40E-04	1.43E-05	119	0.002	1.860
zinc	0.116					120	0.044	0.820
arsenic	0.002			4.30E-03	7.58E-06	120	0.001	0.004
cadmium	0.001			1.80E-03	1.24E-06	120	0.000	0.002

CLEVELAND, 2000-2009
Cuyahoga County
FERRO "B"
4150 East 56th Street
AIRS: 39-035-0049

Compound	Average µg/m³	RBC	HI	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	1.53E-07	55	0.000	0.000
chromium	0.006	0.10	0.06	1.20E-02	7.06E-05	58	0.002	0.012
lead	0.106	1.50	0.07	1.20E-05	1.27E-06	60	0.011	0.263
manganese	0.135	0.05	2.70			60	0.009	0.303
nickel	0.052	0.20	0.26	2.40E-04	1.26E-05	60	0.005	0.340
zinc	0.118					60	0.034	0.300
arsenic	0.002			4.30E-03	7.06E-06	60	0.001	0.003
cadmium	0.001			1.80E-03	1.34E-06	60	0.000	0.002

A2-9. Cuyahoga County, Asphalt Plant A (2001-2009)

CLEVELAND, 2001-2009								
Cuyahoga County								
Asphalt Plant								
West 3rd St.								
AIRS: 39-035-0061								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.00	2.40E-03	1.54E-07	91	0.000	0.001
chromium	0.004	0.10	0.04	1.00E-02	3.65E-05	85	0.000	0.014
lead	0.032	1.50	0.02	1.20E-05	3.80E-07	107	0.004	0.560
manganese	0.059	0.05	1.18			107	0.007	0.310
nickel	0.004	0.20	0.02	2.40E-04	8.51E-07	65	0.000	0.014
zinc	0.091					107	0.025	0.500
arsenic	0.001			4.30E-03	6.37E-06	107	0.000	0.004

A2-10. Cuyahoga County, Fortran Printing Inc. (2000-2009)

Cuyahoga County								
Fortran Printing Inc								
5777 GRANT AVE.								
AIRS: 39-035-0050								
Fortran Printing Inc								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.00	2.40E-03	9.36E-08	86	0.000	0.000
chromium	0.004	0.10	0.04	1.00E-02	4.28E-05	100	0.000	0.012
lead	0.033	1.50	0.02	1.20E-05	3.93E-07	119	0.000	0.140
manganese	0.067	0.05	1.35			120	0.010	0.220
nickel	0.013	0.20	0.07	2.40E-04	3.17E-06	112	0.000	0.078
zinc	0.072					120	0.023	0.183
arsenic	0.002			4.30E-03	8.60E-06	120	0.001	0.005
cadmium	0.001			1.80E-03	1.09E-06	120	0.000	0.002

A2-11. Cuyahoga County, Fire "4A", "4B" (2000-2009)

Cuyahoga County, 2000-2009
FIRE "4A"
3136 Lorain Ave.
AIRS: 39-035-0042

Compound	Average µg/m³	RBC	HI	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	5.59E-08	63	0.000	0.000
chromium	0.002	0.10	0.02	1.20E-02	2.95E-05	69	0.000	0.005
lead	0.016	1.50	0.01	1.20E-05	1.91E-07	120	0.000	0.049
manganese	0.019	0.05	0.37			118	0.000	0.050
nickel	0.004	0.20	0.02	2.40E-04	8.99E-07	71	0.000	0.019
zinc	0.060					118	0.000	0.160
arsenic	0.001			4.30E-03	5.93E-06	117	0.000	0.004
cadmium	0.001			1.80E-03	1.03E-06	118	0.000	0.009

CLEVELAND, 2000-2009
Cuyahoga County
FIRE "4B"
3136 Lorain Ave.
AIRS: 39-035-0042

Compound	Average µg/m³	RBC	HI	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	6.68E-08	40	0.000	0.000
chromium	0.003	0.10	0.03	1.20E-02	3.81E-05	56	0.001	0.007
lead	0.016	1.50	0.01	1.20E-05	1.95E-07	71	0.004	0.049
manganese	0.019	0.05	0.38			69	0.003	0.058
nickel	0.007	0.20	0.03	2.40E-04	1.58E-06	56	0.001	0.068
zinc	0.057					69	0.019	0.150
arsenic	0.001			4.30E-03	5.42E-06	68	0.001	0.004
cadmium	0.001			1.80E-03	9.24E-07	69	0.000	0.007

A2-12. Cuyahoga County, IMT (2000-2003)

CLEVELAND, 2000-2003								
Cuyahoga County								
IMT								
511 West 164th								
AIRS: 39-035-1003								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.002	2.40E-03	9.20E-08	36	0.000	0.000
chromium	0.004	0.10	0.041	1.20E-02	4.98E-05	36	0.003	0.007
lead	0.015	1.50	0.010	1.20E-05	1.86E-07	36	0.003	0.036
manganese	0.047	0.05	0.950			36	0.016	0.126
nickel	0.005	0.20	0.027	2.40E-04	1.32E-06	36	0.004	0.009
zinc	0.116					36	0.032	0.439
arsenic	0.002			4.30E-03	7.75E-06	36	0.001	0.005
cadmium	0.001			1.80E-03	1.09E-06	36	0.000	0.002

A2-13. Cuyahoga County, Gate A (2001-2003)

CLEVELAND, 2001-2003								
Cuyahoga County								
Gate "A"								
2850 3rd St.								
AIRS: 39-035-0063								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.00	2.40E-03	2.10E-07	27	0.000	0.000
chromium	0.004	0.10	0.04	1.20E-02	5.07E-05	27	0.000	0.008
lead	0.078	1.50	0.05	1.20E-05	9.33E-07	27	0.010	0.380
manganese	0.060	0.05	1.19			27	0.014	0.180
nickel	0.005	0.20	0.02	2.40E-04	1.10E-06	27	0.000	0.006
zinc	0.114					27	0.032	0.260
arsenic	0.002			4.30E-03	7.67E-06	27	0.001	0.004
cadmium	0.001			1.80E-03	1.77E-06	27	0.000	0.004

A2-14. Cuyahoga County, Fire Station #11 (2004-2006)

CLEVELAND, 2004-2006								
Cuyahoga County								
Fire Station #11								
7629 Broadway Ave.								
AIRS: 39-035-0068								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.00	2.40E-03	7.32E-08	8	0.000	0.000
chromium	0.004	0.10	0.04	1.20E-02	4.76E-05	3	0.004	0.008
lead	0.023	1.50	0.02	1.20E-05	2.77E-07	34	0.007	0.052
manganese	0.033	0.05	0.67			35	0.009	0.070
nickel	0.007	0.20	0.03	2.40E-04	1.58E-06	8	0.005	0.020
zinc	0.083					36	0.024	0.180
arsenic	0.002			4.30E-03	8.22E-06	35	0.001	0.006
cadmium	0.001			1.80E-03	1.38E-06	36	0.000	0.003

A2-15. Cuyahoga County, Fire Station #22 (2004-2006)

CLEVELAND, 2004-2006								
Cuyahoga County								
Fire Station #22								
7300 Superior Ave.								
AIRS: 39-035-0069								
Compound	**Average µg/m³**	**RBC**	**HI**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.0012	2.40E-03	5.76E-08	1	0.000	0.000
lead	0.016	1.50	0.010636	1.20E-05	1.91E-07	28	0.007	0.047
manganese	0.022	0.05	0.431429			35	0.008	0.040
zinc	0.063					35	0.032	0.130
arsenic	0.002			4.30E-03	7.75E-06	35	0.001	0.005
cadmium	0.001			1.80E-03	9.04E-07	35	0.000	0.001

A2-16. Franklin County, Ann/Woodrow (2000-2009)

COLUMBUS, 2000-2009								
Franklin County								
E. Woodrow Ave./Ann St.								
AIRS: 39-049-0025								
Compound	Average µg/m³	RBC	HI	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	4.25E-08	48	0.000	0.000
chromium	0.002	0.10	0.02	1.00E-02	2.40E-05	71	0.000	0.006
lead	0.034	1.50	0.02	1.20E-05	4.03E-07	115	0.004	0.300
manganese	0.014	0.05	0.29			120	0.004	0.130
nickel	0.003	0.20	0.01	2.40E-04	7.17E-07	70	0.000	0.007
zinc	0.063					120	0.024	0.200
arsenic	0.002			4.30E-03	8.64E-06	119	0.001	0.014
cadmium	0.000			1.80E-03	7.21E-07	120	0.000	0.002
mercury	0.000					18	0.000	0.001
iron	0.044					24	0.080	0.400

A2-17. Fulton County, Van Buren St. (2000-2009)

NWDO HEAVY METALS DATA, 2000-2009								
Delta, 200 Van Buren St.								
AIRS: 39-051-0001, units -- µg/m³								
Fulton County, Parameters								
Compound	Average µg/m³	RBC	HAZARD INDEX	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	6.84E-08	96	0.000	0.000
chromium	0.003	0.10	0.03	1.00E-02	2.53E-05	69	0.001	0.016
lead	0.175	1.50	0.12	1.20E-05	2.10E-06	130	0.006	1.100
manganese	0.010	0.05	0.20			130	0.002	0.032
nickel	0.004	0.20	0.02	2.40E-04	9.52E-07	78	0.000	0.130
zinc	1.042					130	0.016	17.000
arsenic	0.001			4.30E-03	4.04E-06	125	0.000	0.003
cadmium	0.002			1.80E-03	2.91E-06	130	0.000	0.019

A2-18. Logan County, Bellefontaine (2000-2009)

SWDO HEAVY METALS DATA, 2000-2009								
Bellefontaine								
1222 Superior Ave.								
AIRS: 39-091-0003, units -- µg/m³								
Logan County, Parameters								
Compound	**Average µg/m³**	**RBC**	**HAZARD INDEX**	**UR**	**RISK**	**Frequency**	**Min µg/m³**	**Max µg/m³**
beryllium	0.000	0.02	0.00	2.40E-03	5.30E-08	45	0.000	0.000
chromium	0.003	0.10	0.03	1.00E-02	2.52E-05	89	0.001	0.021
lead	0.067	1.50	0.04	1.20E-05	8.08E-07	142	0.000	0.368
manganese	0.005	0.05	0.09			140	0.000	0.014
nickel	0.003	0.20	0.02	2.40E-04	7.91E-07	137	0.001	0.017
zinc	0.022					141	0.011	0.063
arsenic	0.001			4.30E-03	3.83E-06	139	0.000	0.008
cadmium	0.000			1.80E-03	3.11E-07	139	0.000	0.003
iron	0.054					66	0.048	0.510

A2-19. Marion County, Marion Steel (2000-2009)

NWDO HEAVY METALS DATA, 2000-2009
Marion Steel
635 Bellfontaine / Gill Ave. RIGHT
designated, units -- µg/m³
Marion County, Parameters

Compound	Average µg/m³	RBC	HAZARD INDEX	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	4.87E-08	27	0.000	0.000
chromium	0.004	0.10	0.04	1.00E-02	3.79E-05	81	0.000	0.012
lead	0.034	1.50	0.02	1.20E-05	4.05E-07	85	0.000	0.430
manganese	0.054	0.05	1.07			85	0.000	0.190
nickel	0.004	0.20	0.02	2.40E-04	8.98E-07	26	0.000	0.011
zinc	0.180					85	0.000	3.200
arsenic	0.001			4.30E-03	5.27E-06	85	0.000	0.004
cadmium	0.001			1.80E-03	1.16E-06	85	0.000	0.010
mercury	0.000	0.30	0.00			86	0.000	0.003

NWDO HEAVY METALS DATA, 2000-2009
Marion Steel
635 Bellfontaine / Gill Ave. LEFT
Left/ co-located, units - µg/m³
Marion County, Parameters

Compound	Average µg/m³	RBC	HAZARD INDEX	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	5.44E-08	26	0.000	0.000
chromium	0.004	0.10	0.04	1.00E-02	3.88E-05	66	0.000	0.011
lead	0.024	1.50	0.02	1.20E-05	2.87E-07	73	0.000	0.140
manganese	0.049	0.05	0.99			73	0.000	0.200
nickel	0.004	0.20	0.02	2.40E-04	1.06E-06	26	0.000	0.013
zinc	0.125					73	0.000	0.550
arsenic	0.001			4.30E-03	5.08E-06	72	0.000	0.003
cadmium	0.000			1.80E-03	8.29E-07	73	0.000	0.003

A2-20. Marion County, Whitmore (2000-2009)

NWDO HEAVY METALS DATA, 2002-2009
Marion Steel
441 Whitmore St. LEFT
AIRS: units - µg/m³
Parameters

Compound	Average µg/m³	RBC	HAZARD INDEX	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	6.55E-08	33	0.000	0.000
chromium	0.007	0.10	0.07	1.00E-02	6.95E-05	72	0.000	0.042
lead	0.076	1.50	0.05	1.20E-05	9.08E-07	126	0.006	0.670
manganese	0.152	0.05	3.03			139	0.007	1.200
nickel	0.004	0.20	0.02	2.40E-04	9.43E-07	40	0.001	0.015
zinc	0.460					139	0.018	9.400
arsenic	0.016			4.30E-03	6.68E-05	136	0.001	0.340
cadmium	0.001			1.80E-03	2.10E-06	138	0.000	0.010
mercury	0.000	0.30	0.00			137	0.000	0.006

NWDO HEAVY METALS DATA, 2002-2009
Marion Steel
441 Whitmore St. RIGHT
AIRS: units - µg/m³
Parameters

Compound	Average µg/m³	RBC	HAZARD INDEX	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	6.18E-08	41	0.000	0.000
chromium	0.007	0.10	0.07	1.00E-02	6.82E-05	89	0.000	0.047
lead	0.081	1.50	0.05	1.20E-05	9.68E-07	135	0.003	0.690
manganese	0.156	0.05	3.11			152	0.006	1.600
nickel	0.004	0.20	0.02	2.40E-04	9.64E-07	56	0.001	0.031
zinc	0.427					152	0.018	3.200
arsenic	0.015			4.30E-03	6.59E-05	149	0.001	0.390
cadmium	0.001			1.80E-03	2.12E-06	152	0.000	0.009
mercury	0.000	0.30	0.00			149	0.000	0.004

A2-21. Ottawa County, Brush Wellman (2000-2009)

NWDO HEAVY METALS DATA, 2002-2009								
Brush Wellman 32								
AIRS: units - µg/m³								
Parameters								
Compounds	Average µg/m³	RBC	HAZARD INDEX	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.01	2.40E-03	7.13E-07	67	0.000	0.013
chromium	0.000	0.10	0.00	1.00E-02	3.18E-06	30	0.000	0.001
lead	0.003	1.50	0.00	1.20E-05	3.77E-08	67	0.001	0.007
manganese	0.004	0.05	0.08			67	0.001	0.022
nickel	0.001	0.20	0.00	2.40E-04	1.58E-07	66	0.000	0.002
zinc	0.013					67	0.005	0.027
arsenic	0.001			4.30E-03	2.40E-06	67	0.000	0.001
cadmium	0.000			1.80E-03	1.93E-07	67	0.000	0.000

A2-22. Washington County, Career Center (2000-2009)

Washington County HEAVY METALS DATA, 2000-2009								
Rt. 676 Marietta, Career Center								
AIRS: 39-167-0008								
Washinton County								
Compounds	Average µg/m³	RBC	HAZARD INDEX	UR	RISK	Frequency	Min µg/m³	Max µg/m³
beryllium	0.000	0.02	0.00	2.40E-03	4.75E-08	50	0.000	0.000
chromium	0.002	0.10	0.02	1.00E-02	2.22E-05	70	0.000	0.009
lead	0.006	1.50	0.00	1.20E-05	6.92E-08	108	0.000	0.056
manganese	0.145	0.05	2.90			108	0.007	1.400
nickel	0.003	0.20	0.01	2.40E-04	6.15E-07	81	0.000	0.012
zinc	0.026					108	0.002	0.110
arsenic	0.001			4.30E-03	4.69E-06	106	0.000	0.003
cadmium	0.001			1.80E-03	1.81E-06	108	0.000	0.014
mercury	0.000	0.30	0.00			44	0.000	0.000

APPENDIX B1, OHIO YEARLY AVERAGES

VOLATILE ORGANIC COMPOUNDS

B-1-1. Butler County (2000-2009)

Urban Air Monitoring: VOC Sampling										
Annual Average Concentrations						**2000-2009**				
Location:	**HAMILTON**									
	Butler County									
	Verity School									
	1900 St. John's Rd.									
	Middletown									
AIRS #:	**39-017-0003**									
Sampler:	**Xon - J23398**									
Concentrations:					$\mu g/m^3$					
Compounds	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
acetone	7.49	8.10	5.39	4.52	13.38	11.84	14.25	9.76	8.79	9.26
acetonitrile	0.36	0.19	0.19	ND	0.42	0.73	0.59	0.68	0.21	0.24
acrylonitrile	ND	0.27	ND	ND	0.58	0.60	0.30	0.82	0.25	0.24
benzene	0.72	0.91	1.01	0.88	1.11	0.88	1.05	0.83	0.66	0.76
1,3-butadiene	0.25	0.19	0.14	0.13	0.13	ND	0.14	0.45	ND	ND
n-butane	3.55	3.83	2.55	2.49	2.96	2.77	2.87	2.84	2.04	2.64
2-butanone	1.32	0.50	0.58	0.84	2.36	2.12	1.99	2.66	1.25	1.33
carbon disulfide	0.88	1.60	1.49	0.82	0.86	ND	1.00	ND	ND	ND
carbon tetrachloride	0.46	0.44	0.59	0.37	0.60	0.48	0.54	0.70	ND	ND
chlorodifluoromethane	0.78	1.09	0.73	0.81	1.06	1.09	1.36	1.73	1.45	1.50
chloroethane	ND	0.15	ND	ND	ND	ND	ND	ND	ND	ND
chloroform	ND	ND	ND	ND	ND	0.25	0.28	0.59	ND	ND
chloromethane / methyl chloride	0.84	1.18	1.29	0.93	0.88	0.93	1.09	1.10	1.17	ND
3-chloropropene	ND	ND	0.25	ND	ND	ND	ND	ND	ND	ND
cyclohexane	0.24	0.20	ND	ND	0.19	ND	ND	ND	ND	ND
decane	1.03	0.36	0.30	ND	0.33	ND	0.31	ND	ND	ND
dibromochloromethane	ND	0.62	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene (para)	ND	0.37	ND	0.32	ND	ND	0.36	0.80	0.54	ND
dichlorodifluoromethane	2.28	3.10	3.24	2.30	2.47	2.44	2.74	2.63	2.64	2.98
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	1.03	ND	ND
n-dodecane	ND	0.59	ND	ND	ND	ND	ND	ND	ND	ND
ethanol	7.47	ND	ND	ND	ND	ND	ND	ND	ND	ND
ethylbenzene	0.44	0.30	0.26	ND	0.29	ND	ND	0.63	ND	ND
4-ethyltoluene	0.73	ND	ND	ND	0.25	0.26	0.26	ND	ND	ND
n-heptane	0.61	0.22	ND	ND	0.28	0.22	0.23	0.80	ND	ND
hexane	0.64	0.61	0.41	0.41	0.80	0.58	0.49	1.38	0.19	0.43
methylene chloride / dichloromethane	0.48	0.23	0.21	0.21	0.26	0.23	0.24	0.82	0.17	0.50
a-methylstyrene	ND	ND	0.26	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	0.22	ND	ND	ND	0.24	0.22	0.21	ND	ND	ND
naphthalene	ND	0.29	0.34	0.27	0.27	ND	0.35	0.68	ND	ND
n-nonane	0.65	ND	0.27	ND	ND	ND	ND	1.60	ND	ND
n-octane	ND	ND	ND	0.25	ND	ND	ND	ND	ND	ND
n-pentane	1.74	1.64	1.20	1.19	1.59	1.69	1.26	1.53	0.59	1.40
propylene	0.61	0.13	0.48	0.33	1.36	1.22	1.62	1.27	0.55	0.28
toluene	1.32	1.99	1.33	0.95	1.78	0.76	1.30	1.34	0.38	1.21
1,1,1-trichloroethane	1.02	1.29	1.33	0.94	0.55	0.53	0.74	0.82	ND	ND
trichloroethene	ND	ND	ND	ND	0.32	ND	ND	2.93	ND	ND
trichlorofluoromethane	25.34	54.86	29.05	2.19	2.99	2.29	2.63	2.93	0.89	1.77
1,1,2-trichloro-1,2,2-trifluoroethane	0.77	0.40	0.52	ND	0.49	ND	0.46	0.84	ND	ND
1,2,4-trimethylbenzene	0.48	0.45	0.32	0.29	0.36	0.27	0.41	0.96	ND	ND
1,3,5-trimethylbenzene	0.28	ND	ND	ND	0.26	ND	ND	ND	ND	ND
n-undecane	1.65	0.54	ND	ND	0.35	ND	0.33	ND	ND	ND
vinyl acetate	ND	ND	0.51	0.37	1.49	1.30	1.66	2.55	0.54	1.32
o-xylene	0.45	0.31	0.27	0.24	0.31	0.25	0.28	0.72	ND	ND
total m+p-xylene	0.94	0.66	0.45	0.34	0.58	0.35	0.55	1.98	ND	0.91

B-1-2. Coshocton County (2000-2002)

Urban Air Monitoring: VOC Sampling **2000-2002**
Annual Average Concentrations

Location: SEDO
Coshocton County
Coshocton Co. Health Dept.
724 South 7th Street
Coshocton
AIRS#: N/A
Sampler: Xon - J23388
Concentrations: µg/m3

Compounds	2000	2001	2002
acetone	6.21	7.36	6.08
acetonitrile	0.22	0.18	ND
acrylonitrile	0.36	0.24	ND
benzene	0.71	0.92	2.53
1,3-butadiene	0.14	0.21	0.35
n-butane	5.45	7.03	12.56
2-butanone	1.03	0.49	0.55
carbon disulfide	5.85	1.77	2.25
carbon tetrachloride	0.79	0.39	0.71
chlorodifluoromethane	0.65	1.61	0.83
chloroethane	0.18	0.15	ND
chloromethane	1.01	0.99	1.53
cyclohexane	0.19	0.19	0.39
decane	0.39	0.32	0.40
1,3-dichlorobenzene (meta)	0.35	ND	ND
1,4-dichlorobenzene (para)	0.35	0.33	ND
dichlorodifluoromethane	2.48	2.56	3.79
1,1-dichloroethene	ND	ND	ND
ethanol	1.02	ND	ND
ethylbenzene	0.32	0.34	0.62
4-ethyltoluene	ND	ND	0.32
n-heptane	0.41	0.40	0.89
hexane	1.02	1.00	1.27
methylene chloride	1.13	0.23	0.34
4-methyl-2-pentanone	ND	ND	0.27
a-methylstyrene	0.34	0.25	0.34
naphthalene	0.28	1.18	ND
n-nonane	0.43	0.39	0.39
n-octane	0.52	0.37	0.65
n-pentane	2.39	2.95	4.34
propylene	0.21	0.20	2.85
styrene	ND	ND	0.27
tetrachloroethylene	1.40	0.75	ND
toluene	2.46	3.50	6.25
1,2,4-trichlorobenzene	0.52	ND	ND
1,1,1-trichloroethane	6.97	3.27	1.27
trichlorofluoromethane	8.44	12.59	10.01
1,1,2-trichloro-1,2,2-trifluoroethane	0.40	ND	0.50
1,2,4-trimethylbenzene	0.35	0.55	0.81
1,3,5-trimethylbenzene	0.26	ND	0.35
n-undecane	0.33	ND	0.38
vinyl acetate	0.38	0.36	ND
o-xylene	0.36	0.40	0.63
total m+p-xylene	1.09	1.17	2.23

B1-3. Cuyahoga County, G. T. Craig (2000-2003)

Urban Air Monitoring: VOC Sampling				**2000-2003**
Annual Average Concentrations				
Location:	**CLEVELAND**			
	Cuyahoga County			
	G.T. Craig			
	E. 14th & Orange			
AIRS #:	**39-035-0060**			
Sampler:	**Xon. 911-J23460**			
Concentrations:		µg/m^3		
Compounds	**2000**	**2001**	**2002**	**2003**
acetone	10.47	12.42	9.30	4.56
acetonitrile	0.76	0.96	1.03	ND
acrylonitrile	0.63	0.77	0.75	ND
benzene	1.08	1.02	1.30	1.12
bromomethane	ND	ND	ND	0.78
1,3-butadiene	0.36	0.28	0.50	0.29
n-butane	9.14	9.94	15.52	8.48
2-butanone	1.51	2.02	2.57	2.25
carbon disulfide	3.69	3.36	2.15	1.82
carbon tetrachloride	0.63	0.70	0.81	0.65
chlorodifluoromethane	0.84	0.87	1.12	0.86
chloroethane	ND	0.40	0.37	ND
chloromethane	1.11	1.15	1.23	1.00
cyclohexane	0.76	ND	0.34	0.34
decane	0.78	ND	ND	1.11
1,4-dichlorobenzene (para)	ND	1.92	0.78	ND
dichlorodifluoromethane	2.49	3.05	3.10	2.50
ethanol	4.90	ND	ND	ND
ethylbenzene	1.13	0.77	0.76	0.86
n-heptane	1.17	0.78	0.83	0.61
hexane	1.85	1.33	1.50	1.39
methyl-butyl ether	1.84	ND	ND	ND
methylene chloride	1.61	0.72	0.86	0.79
4-methyl-2-pentanone	0.70	0.61	ND	2.62
naphthalene	0.60	ND	0.63	0.94
n-nonane	0.60	0.68	ND	0.94
n-octane	0.68	ND	ND	0.61
n-pentane	4.52	3.52	4.07	3.84
propylene	1.07	1.17	3.45	1.92
styrene	0.51	ND	ND	ND
tetrachloroethylene	0.98	1.15	0.79	ND
toluene	3.22	2.35	2.52	2.16
1,1,1-trichloroethane	0.64	0.89	0.74	0.64
trichloroethene	0.91	ND	0.86	ND
trichlorofluoromethane	1.63	1.59	2.08	1.33
1,1,2-trichloro-1,2,2-trifluoroethane	ND	ND	0.99	ND
1,2,4-trimethylbenzene	1.00	0.67	0.94	0.82
1,3,5-trimethylbenzene	ND	ND	0.54	ND
n-uNDecane	0.70	ND	ND	ND
vinyl acetate	0.70	1.46	1.55	ND
o-xylene	0.92	0.70	0.83	0.98
total m+p-xylene	3.46	1.62	1.89	2.42

B1-4. Cuyahoga County, Fire Station #11 (2004-2009)

Urban Air Monitoring: VOC Sampling			**2004-2009**			
Annual Average Concentrations						
Location:	**CLEVELAND**					
	Cuyhoga County					
	Fire Station #11					
	7629 Broadway Ave.					
AIRS#:	**39-035-0068**					
Sampler:	**1201-651**					
Concentrations:	**µg/m^3**					
Compounds	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
acetone	13.04	13.07	16.55	7.19	7.36	9.73
acetonitrile	0.49	1.12	0.88	0.33	0.20	0.41
acrylonitrile	ND	ND	0.27	0.22	ND	ND
benzene	1.66	1.24	1.75	0.78	0.85	0.72
bromodichloromethane	0.35	0.35	ND	ND	ND	ND
bromomethane	ND	0.21	ND	ND	ND	ND
1,3-butadiene	0.22	0.13	0.16	0.13	ND	ND
n-butane	4.49	4.94	4.40	4.11	3.77	4.20
2-butanone	2.37	2.49	2.47	1.56	1.48	1.26
carbon disulfide	0.81	ND	0.83	ND	ND	ND
carbon tetrachloride	0.67	0.61	0.58	0.35	0.52	ND
chlorodifluoromethane	1.08	1.60	1.64	1.02	1.47	2.98
chloroethane	0.14	0.14	ND	ND	ND	ND
chloroform	0.26	0.29	ND	ND	ND	ND
chloromethane	0.94	0.97	1.19	1.01	ND	1.30
3-chloropropene	0.21	0.18	ND	ND	ND	ND
cyclohexane	0.23	0.19	0.20	0.24	ND	ND
decane	ND	0.38	0.49	0.34	0.46	ND
dibromomethane	0.37	0.37	ND	ND	ND	ND
1,4-dichlorobenzene (para)	0.31	0.44	0.34	ND	ND	ND
dichlorodifluoromethane	2.96	2.64	2.91	2.66	3.12	3.10
1,1-dichloroethane	0.21	0.22	ND	ND	ND	ND
1,2-dichloroethane	0.21	0.22	ND	ND	ND	ND
1,1-dichloroethene	0.21	0.21	ND	ND	ND	ND
cis-1,2-dichloroethene	0.21	0.21	ND	ND	ND	ND
trans-1,2-dichloroethene	0.21	0.21	ND	ND	ND	ND
1,2-dichloropropane	ND	0.24	ND	ND	ND	ND
1,2-dichloro-1,1,2,2-tetrafluoro	ND	0.37	ND	ND	ND	ND
ethylbenzene	0.37	0.39	0.52	0.32	0.43	0.43
4-ethyltoluene	0.27	0.28	0.26	0.27	0.37	0.49
n-heptane	0.50	0.43	0.60	0.41	0.56	0.41
hexachlorobutadiene	0.56	ND	ND	ND	ND	1.07
hexane	1.32	1.36	1.15	0.82	0.86	0.66
methylene chloride	1.08	1.74	2.68	1.16	1.93	1.15
4-methyl-2-pentanone	0.43	0.21	0.23	0.28	0.38	ND
naphthalene	0.31	0.29	0.44	0.28	ND	ND
n-nonane	0.28	0.33	0.33	0.27	ND	ND
n-octane	ND	0.25	0.41	0.25	0.38	ND
n-pentane	2.86	3.01	2.81	2.66	2.61	2.20
propylene	2.50	2.18	2.74	0.98	1.05	ND
n-propyl benzene	ND	0.27	ND	ND	ND	ND
styrene	ND	0.24	0.22	ND	ND	ND
tetrachloroethylene	0.48	0.46	0.46	0.35	0.67	ND
toluene	3.12	2.47	4.08	2.42	2.71	1.71
1,1,1-trichloroethane	0.29	0.29	ND	ND	ND	ND
1,1,2-trichloroethane	ND	0.28	ND	ND	ND	ND
trichloroethene	0.52	0.35	0.30	0.28	ND	ND
trichlorofluoromethane	2.25	1.88	2.31	1.87	1.64	2.13
1,1,2-trichloro-1,2,2-trifluoroeth	0.51	0.47	0.49	0.48	0.62	ND
1,2,4-trimethylbenzene	0.49	0.54	0.89	0.39	0.49	ND
1,3,5-trimethylbenzene	0.27	0.31	0.27	ND	ND	ND
n-uNDecane	ND	0.36	0.34	0.32	0.50	ND
vinyl acetate	ND	0.46	1.01	0.88	0.83	0.85
vinyl chloride	ND	0.13	ND	ND	ND	ND
o-xylene	0.38	0.43	0.57	0.33	0.39	ND
total m+p-xylene	1.18	1.18	1.71	0.93	1.08	0.92

B1-5. Cuyahoga County, Fire Station #22 (2004-2009)

Urban Air Monitoring: VOC Sampling					**2004-2009**	
Annual Average Concentrations						
Location:	**CLEVELAND**					
	Cuyahoga County					
	Fire Station #22					
	7300 Superior Ave.					
	Cleveland					
AIRS #:	**39-035-0069**					
Sampler:	**302-652**					
Concentrations:			µg/m^3			
Compounds	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
acetone	12.17	15.14	15.17	9.49	10.52	16.44
acetonitrile	0.46	1.03	0.57	0.27	0.36	0.33
acrylonitrile	0.27	ND	ND	ND	0.32	0.42
benzene	1.84	1.92	1.81	1.20	0.99	1.35
1,3-butadiene	0.23	0.16	ND	0.18	0.25	ND
n-butane	5.28	6.36	6.52	7.34	5.51	5.86
2-butanone	1.79	2.62	1.80	1.89	1.55	1.11
carbon disulfide	0.85	ND	0.84	ND	0.82	ND
carbon tetrachloride	0.63	0.57	0.52	0.38	0.56	ND
chlorobenzene	ND	ND	0.27	ND	ND	ND
chlorodifluoromethane	1.07	2.70	1.44	1.25	1.49	1.1
chloroethane	ND	0.14	ND	ND	ND	ND
chloroform	ND	0.26	0.34	ND	ND	ND
chloromethane	0.99	0.98	1.14	1.10	1.20	1.3
cyclohexane	0.23	ND	0.25	0.25	0.34	ND
decane	0.33	0.37	0.50	0.35	0.50	ND
1,4-dichlorobenzene (para)	0.34	0.32	0.38	0.32	0.50	ND
dichlorodifluoromethane	2.74	2.56	2.67	2.66	2.85	2.96
1,1-dichloroethane	ND	0.21	ND	ND	ND	ND
1,2-dichloroethane	ND	0.21	ND	ND	ND	ND
1,1-dichloroethene	ND	0.21	ND	ND	ND	ND
cis-1,2-dichloroethene	ND	0.22	ND	ND	ND	ND
trans-1,2-dichloroethene	ND	0.21	ND	ND	ND	ND
1,2-dichloro-1,1,2,2-tetrafluor	ND	0.36	ND	ND	ND	ND
ethylbenzene	0.37	0.48	0.46	0.42	0.45	ND
4-ethyltoluene	0.28	0.30	ND	0.28	0.42	ND
n-heptane	0.46	0.55	0.57	0.51	0.50	ND
hexane	1.65	1.65	2.16	1.73	0.94	0.74
methylene chloride	0.45	0.45	1.70	0.41	0.50	0.55
4-methyl-2-pentanone	0.31	0.22	0.23	0.24	2.44	ND
naphthalene	0.31	0.27	0.36	0.31	0.66	ND
n-nonane	0.29	0.31	0.29	0.29	0.44	ND
n-octane	ND	0.27	0.28	0.26	0.39	ND
n-pentane	3.48	3.72	4.64	3.65	3.31	2.73
propylene	2.32	1.86	2.36	1.13	1.15	ND
n-propyl benzene	0.27	0.26	ND	0.26	ND	ND
tetrachloroethylene	0.41	0.53	0.40	0.44	0.65	ND
toluene	4.45	3.21	4.03	4.44	2.61	1.55
1,1,1-trichloroethane	ND	0.30	ND	ND	ND	ND
trichloroethene	0.42	0.29	0.34	0.31	0.46	ND
trichlorofluoromethane	1.80	1.89	1.64	1.71	1.45	1.62
1,1,2-trichloro-1,2,2-trifluoroet	0.51	0.45	0.44	0.40	0.65	ND
1,2,4-trimethylbenzene	0.49	0.68	0.82	0.46	0.53	ND
1,3,5-trimethylbenzene	0.28	0.36	0.27	0.27	0.41	ND
n-undecane	ND	0.34	0.41	ND	0.66	ND
vinyl acetate	ND	0.43	0.60	1.51	0.79	0.69
o-xylene	0.40	0.54	0.55	0.43	0.45	ND
total m+p-xylene	1.19	1.57	2.09	1.25	1.17	ND

B1-6. Cuyahoga County, Tri-C College (2006-2008)

			2006-2008
Annual Average Concentrations			
Location:	**CLEVELAND**		
	Cuyahoga Co.		
	Tri-C College		
	2900 Community College Ave.		
	Cleveland		
AIRS #:	**39-035-0071**		
Sampler:	**AVOCS-0102-652**		
Concentrations:	µg/m^3		
Compounds	**2006**	**2007**	**2008**
acetone	32.26	192.84	37.94
acetonitrile	0.59	0.22	0.94
acrylonitrile	**ND**	**ND**	0.30
benzene	1.82	1.08	1.42
1,3-butadiene	0.22	0.12	0.50
n-butane	7.07	4.12	13.94
2-butanone	10.10	12.07	3.71
carbon disulfide	**ND**	**ND**	0.92
carbon tetrachloride	0.65	0.42	0.55
chlorodifluoromethane	2.14	1.06	2.04
chloroethane	**ND**	0.15	**ND**
chloromethane	1.40	1.21	1.37
cyclohexane	0.20	0.20	0.90
decane	1.05	0.63	1.37
1,4-dichlorobenzene (para)	2.27	0.40	1.76
dichlorodifluoromethane	3.00	2.55	4.27
1,2-dichloroethane	**ND**	**ND**	0.51
ethylbenzene	0.50	0.30	1.09
4-ethyltoluene	**ND**	0.28	0.44
n-heptane	0.66	0.58	1.14
hexane	1.35	0.90	1.92
methyl-butyl ether	**ND**	**ND**	0.38
methylene chloride	0.74	0.58	0.66
4-methyl-2-pentanone	0.88	1.50	2.24
a-methylstyrene	0.27	**ND**	**ND**
naphthalene	0.42	0.29	0.81
n-nonane	0.34	0.34	0.51
n-octane	0.34	0.31	0.40
n-pentane	5.03	3.82	15.01
propylene	2.33	6.74	2.83
n-propyl benzene	**ND**	**ND**	0.45
styrene	**ND**	**ND**	0.41
tetrachloroethylene	0.41	0.38	0.65
toluene	4.91	2.63	6.51
trichloroethene	0.47	0.32	1.01
trichlorofluoromethane	1.98	1.75	1.98
1,1,2-trichloro-1,2,2-trifluoro	0.76	0.49	0.67
1,2,4-trimethylbenzene	0.92	0.54	0.56
1,3,5-trimethylbenzene	**ND**	0.28	0.43
n-undecane	0.67	0.45	2.12
vinyl acetate	0.55	2.93	1.32
o-xylene	0.52	0.31	1.04
total m+p-xylene	1.53	0.96	3.37

B1-7. Cuyahoga County, St. Theodosius (2006-2009)

Urban Air Monitoring: VOC Sampling			**2006-2009**	
Annual Average Concentrations				
Location:	**CLEVELAND**			
	Cuyahoga Co.			
	St. Theodosious			
	2547 St. Tikon			
	Cleveland			
AIRS #:	**39-035-0038**			
Sampler:				
Concentrations:	µg/m^3			
Compounds	**2006**	**2007**	**2008**	**2009**
acetone	20.03	8.26	6.04	23.67
acetonitrile	0.42	0.33	0.18	0.76
acrylonitrile	0.32	0.23	**ND**	0.25
benzene	1.22	0.75	0.63	0.70
1,3-butadiene	**ND**	0.12	**ND**	0.27
n-butane	4.57	5.00	4.64	5.65
2-butanone	1.48	1.57	1.18	1.85
carbon tetrachloride	0.59	0.35	0.49	**ND**
chlorodifluoromethane	1.24	0.58	1.38	1.06
chloromethane	1.37	1.10	1.09	1.35
cumene	**ND**	**ND**	**ND**	0.52
decane	0.80	0.40	0.58	25.20
1,4-dichlorobenzene (para)	0.53	**ND**	**ND**	**ND**
dichlorodifluoromethane	2.83	2.43	2.73	2.87
n-dodecane	0.47	**ND**	**ND**	**ND**
ethylbenzene	0.35	0.39	0.35	0.59
4-ethyltoluene	**ND**	**ND**	**ND**	1.18
n-heptane	1.79	0.37	0.32	1.46
hexane	0.95	0.90	0.67	1.63
methylene chloride	0.98	0.54	0.63	1.06
4-methyl-2-pentanone	0.23	**ND**	**ND**	1.18
naphthalene	0.35	**ND**	**ND**	**ND**
n-nonane	0.39	0.28	0.51	22.36
n-octane	**ND**	**ND**	**ND**	1.83
n-pentane	2.70	2.82	2.67	2.63
n-propylbenzene	**ND**	**ND**	**ND**	1.25
propylene	1.71	0.88	0.98	**ND**
toluene	4.23	1.74	1.23	3.32
1,1,1-trichloroethane	**ND**	0.30	**ND**	**ND**
trichloroethene	**ND**	0.31	0.41	0.57
trichlorofluoromethane	8.21	4.30	1.27	1.58
1,1,2-trichloro-1,2,2-trifluoroethane	0.47	0.47	0.56	**ND**
1,2,4-trimethylbenzene	0.66	0.28	**ND**	5.42
1,3,5-trimethylbenzene	0.28	**ND**	**ND**	1.69
n-undecane	1.04	0.35	**ND**	8.64
vinyl acetate	0.94	0.83	0.42	1.52
o-xylene	0.41	0.33	0.31	1.39
total m+p-xylene	1.07	1.25	0.66	3.25

B1-8. Franklin County (2003-2009)

Urban Air Monitoring: VOC Sampling					**2003-2009**		
Annual Average Concentrations							
Location:	Ohio EPA Central District Office						
	Franklin County						
	Ohio State Fairgrounds						
	Korbel Ave.						
	Columbus						
	39-049-0034						
AQS # :	RM ESI-EPA017587						
Concentrations:	µg/m^3						
Compounds	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
acetone	8.31	17.71	16.35	22.18	9.10	11.07	10.45
acetonitrile	0.19	0.46	0.89	0.48	0.30	0.36	0.29
acrylonitrile	0.28	0.42	0.65	0.40	0.25	0.34	0.26
benzene	1.03	1.13	0.99	1.07	0.62	0.64	0.81
bromodichloromethane	0.35	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
1,3-butadiene	0.16	0.17	0.12	0.19	0.12	0.20	**ND**
n-butane	3.51	3.16	3.53	3.25	2.76	2.87	3.66
2-butanone	1.70	3.35	2.90	2.98	2.32	2.41	1.54
carbon disulfide	0.85	0.89	**ND**	**ND**	0.98	**ND**	**ND**
carbon tetrachloride	0.45	0.60	0.40	0.49	0.35	**ND**	**ND**
chlorodifluoromethane	1.05	0.97	1.37	1.16	1.06	1.46	1.51
chloroform	0.26	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
chloromethane	1.04	0.92	0.93	1.06	1.00	1.15	1.37
cyclohexane	0.18	0.18	0.18	0.19	**ND**	**ND**	**ND**
decane	0.52	0.31	**ND**	0.31	**ND**	**ND**	**ND**
1,4-dichlorobenzene (para)	0.32	**ND**	0.33	0.37	0.32	**ND**	0.66
dichlorodifluoromethane	2.74	2.56	2.50	2.53	2.34	2.75	2.90
cis-1,2-dichloroethene	0.21	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
n-dodecane	0.43	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
ethylbenzene	0.35	0.32	0.31	0.38	0.26	**ND**	0.45
4-ethyltoluene	0.27	0.26	**ND**	**ND**	**ND**	**ND**	**ND**
n-heptane	0.28	0.28	0.28	0.30	0.21	**ND**	**ND**
hexachlorobutadiene	0.56	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
hexane	0.78	0.78	0.78	0.73	0.48	0.56	0.60
methylene chloride	0.25	0.27	0.28	0.29	0.23	0.40	0.52
4-methyl-2-pentanone	0.23	0.27	**ND**	0.23	**ND**	**ND**	**ND**
naphthalene	0.53	0.35	**ND**	0.30	0.29	**ND**	**ND**
n-nonane	0.30	0.28	**ND**	**ND**	**ND**	**ND**	**ND**
n-octane	0.25	**ND**	**ND**	0.24	**ND**	**ND**	**ND**
n-pentane	1.83	1.77	1.93	1.85	1.40	1.59	1.89
propylene	**ND**	1.91	1.69	2.19	0.67	0.59	**ND**
styrene	**ND**	0.22	0.23	**ND**	**ND**	**ND**	**ND**
tetrachloroethylene	**ND**	0.35	**ND**	0.36	**ND**	**ND**	**ND**
toluene	2.32	1.94	1.66	2.26	1.37	1.48	1.80
1,1,1-trichloroethane	0.28	**ND**	**ND**	**ND**	0.29	**ND**	**ND**
trichloroethene	0.28	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
trichlorofluoromethane	1.22	1.51	1.54	1.46	1.46	1.38	1.71
1,1,2-trichloro-1,2,2-trifluoroethane	0.40	0.45	**ND**	0.47	0.41	**ND**	**ND**
1,2,4-trimethylbenzene	0.52	0.37	0.39	0.56	0.26	**ND**	**ND**
1,3,5-trimethylbenzene	0.26	0.26	**ND**	**ND**	**ND**	**ND**	**ND**
n-undecane	0.53	**ND**	0.33	**ND**	**ND**	**ND**	**ND**
vinyl acetate	0.40	1.31	0.94	1.53	1.56	1.36	1.17
o-xylene	0.42	0.32	0.35	0.40	0.26	0.36	0.46
total m+p-xylene	1.05	0.81	0.91	1.01	0.68	0.83	1.02

B1-9. Hamilton County, Reading Pool (2000-2002)

Urban Air Monitoring: VOC Sampling			**2000-2002**
Annual Average Concentrations			
Location:	**HAMILTON**		
	Hamilton County		
	Reading Pool		
	1601 West St.		
	Reading, Cincinnati		
AIRS #:			
Sampler:			
Concentrations:	µg/m^3		
Compounds	**2000**	**2001**	**2002**
acetone	10.86	6.14	6.27
acetonitrile	0.43	0.19	**ND**
acrylonitrile	0.44	0.28	**ND**
benzene	1.36	3.88	1.58
1,3-butadiene	0.35	0.36	0.18
n-butane	8.98	42.35	5.03
2-butanone	2.03	1.20	1.48
carbon disulfide	1.57	0.95	1.82
carbon tetrachloride	**ND**	0.42	0.80
chlorodifluoromethane	0.88	1.06	0.66
chloroethane	0.39	0.15	**ND**
chloroform	0.84	0.88	0.72
chloromethane	1.38	1.66	1.81
cumene	**ND**	0.43	**ND**
cyclohexane	0.26	0.37	**ND**
decane	0.59	0.72	**ND**
1,4-dichlorobenzene (para)	0.63	0.91	**ND**
dichlorodifluoromethane	2.39	3.17	3.75
n-dodecane	**ND**	0.38	**ND**
ethanol	94.22	**ND**	**ND**
ethylbenzene	0.68	4.01	0.44
4-ethyltoluene	0.76	1.70	**ND**
n-heptane	0.65	1.62	**ND**
hexane	2.19	5.48	0.80
methylene chloride	0.85	0.79	0.48
a-methylstyrene	0.52	0.37	0.53
4-methyl-2-pentanone	**ND**	**ND**	1.14
naphthalene	1.05	1.00	0.45
n-nonane	0.28	0.81	**ND**
n-octane	0.48	1.06	**ND**
n-pentane	8.27	33.51	3.05
propylene	0.75	0.56	0.94
n-propyl benzene	0.73	1.08	**ND**
styrene	1.08	1.88	0.51
1, 1, 2, 2-tetrachloroethane	0.77	**ND**	**ND**
tetrachloroethylene	0.70	**ND**	**ND**
toluene	3.80	13.03	5.28
1,1,1-trichloroethane	0.59	**ND**	**ND**
trichlorofluoromethane	2.43	1.68	2.15
1,1,2-trichloro-1,2,2-trifluoroet	0.77	**ND**	0.61
1,2,4-trimethylbenzene	1.01	6.73	0.81
1,3,5-trimethylbenzene	0.35	2.20	0.29
n-undecane	1.26	0.47	**ND**
o-xylene	0.82	4.79	**ND**
total m+p-xylene	2.19	11.04	1.55

B1-10. Hamilton County, Cincinnati State Community College (2003-2007)

Urban Air Monitoring: VOC Sampling					**2003-2007**
Annual Average Concentrations					
Location:	**HAMILTON**				
	Hamilton County				
	Cincinnati State community College				
	10100 Reading Rd.				
	Reading, Cincinnati				
AIRS #:					
Sampler:					
Concentrations:	µg/m^3				
Compounds	**2003**	**2004**	**2005**	**2006**	**2007**
acetone	9.24	24.92	23.04	21.93	10.74
acetonitrile	0.20	0.46	1.56	0.96	0.26
acrylonitrile	**ND**	0.42	0.31	0.24	0.25
benzene	1.03	11.04	3.33	6.24	3.72
1,3-butadiene	**ND**	0.13	0.12	0.14	0.13
n-butane	2.10	2.51	2.67	2.80	2.47
2-butanone	1.63	4.05	3.87	3.27	1.94
carbon disulfide	1.03	0.85	**ND**	**ND**	**ND**
carbon tetrachloride	0.62	0.64	0.53	0.51	0.50
chlorobenzene	**ND**	0.53	0.24	0.59	0.58
chlorodifluoromethane	**ND**	0.29	2.40	1.39	0.89
chloroethane	**ND**	**ND**	0.20	**ND**	**ND**
chloroform	**ND**	**ND**	0.27	0.25	0.24
chloromethane	0.67	1.14	1.19	1.68	1.28
cyclohexane	**ND**	0.19	0.18	0.19	**ND**
decane	4.01	0.52	0.55	2.94	1.63
1,4-dichlorobenzene (para)	**ND**	**ND**	1.90	0.52	**ND**
dichlorodifluoromethane	0.67	2.46	2.44	2.70	2.60
1,1-dichloroethane	**ND**	0.21	**ND**	**ND**	**ND**
cis-1,2-dichloroethene	**ND**	0.21	**ND**	**ND**	**ND**
trans-1,2-dichloroethene	**ND**	0.21	**ND**	**ND**	**ND**
n-dodecane	0.41	**ND**	**ND**	**ND**	**ND**
ethylbenzene	**ND**	0.26	0.29	0.25	**ND**
4-ethyltoluene	0.49	0.27	**ND**	0.41	**ND**
n-heptane	**ND**	0.24	0.27	0.26	0.23
hexachlorobutadiene	**ND**	0.61	**ND**	**ND**	**ND**
hexane	0.47	0.69	0.66	0.68	0.44
methylene chloride	0.31	0.42	0.47	0.33	0.37
4-methyl-2-pentanone	**ND**	0.38	**ND**	0.24	**ND**
naphthalene	0.42	0.31	0.34	0.31	**ND**
n-nonane	1.70	0.28	0.35	2.11	0.87
n-octane	**ND**	**ND**	0.25	0.37	**ND**
n-pentane	0.93	1.39	1.73	1.62	1.12
propylene	**ND**	1.88	1.58	1.73	0.94
n-propyl benzene	0.40	**ND**	**ND**	0.34	**ND**
styrene	**ND**	0.29	0.25	0.26	**ND**
toluene	1.33	1.80	1.69	1.66	1.11
1,1,1-trichloroethane	**ND**	58.41	45.42	61.66	52.66
trichlorofluoromethane	1.50	2.08	3.09	2.73	1.97
1,1,2-trichloro-1,2,2-trifluorc	**ND**	0.53	**ND**	0.50	0.64
1,2,4-trimethylbenzene	2.91	0.42	0.47	1.79	0.75
1,3,5-trimethylbenzene	0.61	0.28	**ND**	0.53	0.28
n-undecane	2.69	0.51	0.44	1.30	0.98
vinyl acetate	**ND**	1.63	1.30	1.86	1.52
o-xylene	0.30	0.29	0.34	0.34	**ND**
total m+p-xylene	0.52	0.48	0.71	0.67	0.49

B1-11. Jefferson County (2004-2008)

Urban Air Monitoring: VOC Sampling					**2004-2009**	
Annual Average Concentrations						
Location:	**SEDO**					
	Jefferson Co.					
	Steubenville trailer					
	618 Logan Street					
	Steubenville					
AIRS #:						
Sampler:						
Concentrations:	**µg/m^3**					
Compounds	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
acetone	24.03	13.10	13.83	7.83	9.60	10.53
acetonitrile	0.65	1.18	0.81	0.35	0.28	0.35
acrylonitrile	0.44	0.55	1.91	1.21	0.46	0.36
benzene	6.97	7.39	4.64	3.46	9.01	9.35
1,3-butadiene	0.18	0.14	0.20	0.14	0.20	ND
n-butane	4.53	2.78	4.14	3.08	3.81	4.37
2-butanone	2.06	2.62	1.90	1.44	1.38	1.56
carbon disulfide	0.85	0.84	1.58	2.58	1.05	0.86
carbon tetrachloride	0.62	0.59	0.46	0.34	ND	ND
chlorodifluoromethane	0.83	0.88	1.02	0.83	1.09	1.23
chloroform	ND	ND	0.25	ND	ND	ND
chloromethane	0.81	0.97	1.08	1.02	1.13	1.36
cyclohexane	0.21	ND	0.18	0.20	ND	ND
decane	ND	0.55	0.38	ND	ND	ND
1,4-dichlorobenzene (para)	ND	0.43	ND	0.34	ND	0.70
dichlorodifluoromethane	2.57	2.45	2.58	2.43	2.62	3.03
n-dodecane	ND	0.36	ND	ND	ND	ND
1,2-dichloroethane	ND	ND	ND	ND	ND	0.42
ethylbenzene	0.44	0.45	0.62	0.27	0.44	0.45
4-ethyltoluene	ND	0.26	ND	ND	ND	ND
n-heptane	0.55	0.32	0.53	0.58	0.50	0.54
hexachlorobutadiene	ND	ND	ND	ND	0.95	ND
hexane	1.23	0.66	0.83	0.61	0.68	0.56
methylene chloride	0.24	0.20	0.22	0.24	0.31	0.43
4-methyl-2-pentanone	1.35	0.71	0.89	0.40	0.36	ND
naphthalene	6.48	9.97	5.87	3.92	4.95	5.07
n-nonane	ND	0.32	ND	ND	ND	ND
n-octane	ND	0.24	ND	0.24	ND	ND
n-pentane	2.23	1.55	1.85	1.57	2.16	1.89
propylene	2.64	1.74	1.93	0.74	1.13	0.21
n-propyl benzene	ND	ND	0.27	ND	ND	ND
styrene	ND	0.33	0.27	0.24	0.45	0.45
toluene	2.94	2.13	3.01	1.93	3.65	3.24
1,1,1-trichloroethane	0.29	ND	ND	ND	ND	ND
trichloroethene	ND	ND	ND	ND	ND	0.57
trichlorofluoromethane	22.50	5.95	6.20	3.91	1.94	2.27
1,1,2-trichloro-1,2,2-trifluoroethane	0.53	0.40	0.47	0.44	ND	ND
1,2,4-trimethylbenzene	0.47	0.51	0.88	0.33	0.50	ND
1,3,5-trimethylbenzene	ND	0.28	0.27	ND	ND	ND
n-undecane	ND	0.52	ND	ND	ND	ND
vinyl acetate	1.47	1.57	1.62	1.67	1.34	1.62
o-xylene	0.52	0.46	0.65	0.28	0.46	0.46
total m+p-xylene	1.90	1.58	2.16	0.82	1.33	1.14

B1-12. Lake County (2000-2004)

Urban Air Monitoring: VOC Sampling					**2000-2004**
Annual Average Concentrations					
Location:	**PAINESVILLE**				
	Lake County				
	Lake County Hospital				
	71 E. High St				
AIRS #:	**39-085-3002**				
Sampler:	**Xontech-J23462**				
Concentrations:			**µg/m^3**		
Compounds	**2000**	**2001**	**2002**	**2003**	**2004**
acetone	8.12	10.79	6.53	6.99	13.50
acetonitrile	0.37	0.25	0.21	0.21	0.46
acrylonitrile	0.49	0.23	0.28	0.27	0.78
benzene	0.61	0.63	0.88	0.80	0.83
1,3-butadiene	0.31	0.12	ND	ND	0.11
n-butane	2.51	3.47	3.38	2.58	2.44
2-butanone	1.36	0.36	0.65	1.20	1.61
carbon disulfide	0.89	1.40	1.06	0.88	ND
carbon tetrachloride	0.44	0.40	0.59	0.42	0.60
chlorodifluoromethane	0.73	0.92	2.15	69.58	6.61
chloroethane	ND	0.16	ND	ND	ND
chloroform	ND	ND	ND	0.27	0.25
chloromethane	1.08	1.10	1.28	0.95	0.91
3-chloropropene	ND	ND	ND	ND	0.16
decane	ND	ND	ND	0.35	ND
dichlorodifluoromethane	2.38	3.32	3.31	2.69	2.37
ethanol	1.46	ND	ND	ND	ND
ethylbenzene	0.45	0.28	0.24	0.27	ND
4-ethyltoluene	ND	ND	ND	0.29	0.26
n-heptane	0.41	0.23	0.22	0.23	0.23
hexachlorobutadiene	ND	ND	ND	0.55	ND
hexane	0.92	0.46	0.55	0.51	0.52
methylene chloride	0.42	0.24	0.26	0.20	0.29
4-methyl-2-pentanone	ND	ND	ND	0.25	0.21
a-methylstyrene	ND	ND	ND	0.26	ND
naphthalene	ND	0.53	ND	0.27	0.26
n-pentane	1.80	1.89	1.40	1.41	1.33
propylene	0.42	0.13	0.73	0.11	1.10
n-propyl benzene	ND	ND	ND	ND	0.26
styrene	ND	ND	0.22	ND	ND
tetrachloroethylene	0.71	0.35	0.37	ND	ND
toluene	2.03	2.11	1.99	1.63	1.74
1,1,1-trichloroethane	0.81	1.03	0.40	0.30	0.28
trichloroethene	ND	ND	ND	ND	0.28
trichlorofluoromethane	1.49	1.77	1.72	1.26	1.43
1,1,2-trichloro-1,2,2-trifluoroethane	ND	0.49	0.56	0.42	0.46
1,2,4-trimethylbenzene	0.29	0.36	0.27	0.31	0.28
n-undecane	ND	ND	ND	0.36	ND
vinyl acetate	ND	ND	0.50	0.50	1.15
o-xylene	0.46	0.31	0.25	0.37	0.24
total m+p-xylene	1.09	1.60	0.52	0.83	0.34

B1-13. Montgomery County (2003-2004)

Location: RAPCA (VANDALIA / TIPP CITY)		
	Montgomery County	
	Downtown Dayton Library	
	215 E. Third St.	
	Dayton	
AIRS#:	**39-113-0032**	
Sampler:	**Xontech - J23413**	
Concentrations:	**µg/m³**	
Compounds	**2003**	**2004**
acetone	3.93	12.74
acetonitrile	0.19	0.45
acrylonitrile	0.42	1.52
benzene	1.51	1.36
1,3-butadiene	0.17	0.18
n-butane	3.90	3.14
2-butanone	0.77	1.92
carbon disulfide	7.06	5.25
carbon tetrachloride	0.59	0.71
chlorodifluoromethane	2.33	1.25
chloroform	0.36	0.25
chloromethane	0.91	0.92
cyclohexane	0.18	0.19
decane	1.10	0.41
dichlorodifluoromethane	3.44	2.77
cis-1,2-dichloroethene	ND	0.21
n-dodecane	0.40	ND
ethylbenzene	0.34	0.26
4-ethyltoluene	0.38	0.26
n-heptane	0.33	0.30
hexane	1.29	1.00
methylene chloride	0.49	0.39
4-methyl-2-pentanone	ND	0.23
naphthalene	0.40	0.29
n-nonane	0.46	0.32
n-octane	0.25	0.33
n-pentane	2.11	1.87
propylene	0.20	1.38
n-propyl benzene	0.29	ND
tetrachloroethylene	0.46	0.44
toluene	3.11	2.38
trichloroethene	ND	0.42
trichlorofluoromethane	3.96	2.46
1,1,2-trichloro-1,2,2-trifluoroethane	ND	0.54
1,2,4-trimethylbenzene	0.80	0.36
1,3,5-trimethylbenzene	0.44	0.26
n-undecane	1.01	0.34
vinyl acetate	ND	0.91
o-xylene	0.45	0.27
total m+p-xylene	1.30	0.54

B1-14. Scioto County (2000-2003)

Urban Air Monitoring: VOC Sampling				2000-2003
Annual Average Concentrations				
Location:	PORTSMOUTH			
	Scioto County			
	Portsmouth Water Treatment Plant			
	4862 Gallia			
	New Boston, OH			
AIRS #	39-145-0013			
Sampler:	N/A			
Concentrations:	µg/m^3			
Compounds	**2000**	**2001**	**2002**	**2003**
acetone	11.17	8.51	7.11	4.33
acetonitrile	0.41	0.26	0.19	0.17
acrylonitrile	0.87	0.36	0.27	0.24
benzene	6.77	10.01	4.33	1.34
bromodichloromethane	ND	ND	0.35	0.46
1,3-butadiene	0.33	0.36	0.15	0.12
n-butane	7.99	8.81	7.30	4.63
2-butanone	1.58	0.19	1.61	1.73
carbon disulfide	5.56	3.75	1.96	1.46
carbon tetrachloride	0.33	0.34	0.72	0.44
chlorobenzene	ND	ND	ND	0.59
chlorodifluoromethane	0.63	0.73	0.56	0.66
chloroethane / ethyl chloride	0.41	ND	ND	ND
chloroform	0.26	ND	0.35	0.97
chloromethane / methyl chlor	0.84	1.07	1.53	0.92
cumene	ND	0.28	0.29	0.27
cyclohexane	0.42	ND	ND	ND
decane	0.6	ND	0.37	0.31
1,4-dichlorobenzene (para)	ND	ND	ND	0.32
dichlorodifluoromethane	1.87	2.91	3.61	2.46
1,2-dichloro-1,1,2,2-tetrafluor	ND	ND	0.36	ND
n-dodecane	0.71	ND	ND	0.37
ethanol	13.59	ND	ND	ND
ethylbenzene	0.44	0.23	0.27	0.28
4-ethyltoluene	ND	ND	ND	0.29
n-heptane	0.45	ND	0.22	0.21
hexane	0.76	0.42	0.46	0.45
methylene chloride / dichloro	0.43	0.25	0.29	ND
a-methylstyrene	0.49	ND	ND	ND
naphthlene	2.45	4.22	1.97	0.36
n-octane	ND	ND	ND	0.26
n-pentane	2.86	2.15	2.10	1.31
propylene	0.9	0.29	1.49	0.14
styrene	ND	2.37	0.22	ND
toluene	1.93	2.73	1.73	1.07
1,2,4-trichlorobenzene	1.46	ND	ND	ND
1,1,1-trichloroethane	0.57	ND	ND	ND
trichloroethene	ND	ND	ND	0.34
trichlorofluoromethane	112.87	31.29	6.16	4.33
1,1,2-trichloro-1,2,2-trifluoroe	0.82	ND	0.67	ND
1,2,4-trimethylbenzene	0.37	0.63	0.37	0.36
n-undecane	1.31	ND	0.36	0.33
vinyl acetate	0.38	ND	0.58	3.50
o-xylene	0.46	0.31	0.28	0.42
total m+p-xylene	0.95	0.80	0.53	0.87

B1-15. Summit County (2000-2003)

Urban Air Monitoring: VOC Sampling				**2000-2003**
Annual Average Concentrations				
Location:	**Akron**			
	Summit County			
	Akron Region Air Quality			
	Management District			
	East High School			
	80 Brittain Rd.			
AIRS #:	**39-153-0017**			
Sampler:	**SIS 0799-01**			
Concentrations:	**µg/m³**			
Compounds	**2000**	**2001**	**2002**	**2003**
acetone	9.56	14.36	5.72	5.00
acetonitrile	0.38	0.31	0.20	ND
acrylonitrile	ND	0.28	0.35	0.29
benzene	1.28	1.27	1.37	1.42
1,3-butadiene	0.35	0.32	0.21	0.28
n-butane	6.83	8.82	3.28	5.23
2-butanone	2.83	2.46	2.64	1.90
carbon disulfide	4.37	16.44	2.32	1.12
carbon tetrachloride	ND	0.59	0.59	0.41
chlorodifluoromethane	0.63	1.24	1.38	4.21
chloroethane	ND	0.16	0.16	ND
chloromethane	0.76	1.19	1.03	0.91
cyclohexane	0.30	0.41	0.24	0.35
decane	0.76	0.52	0.33	ND
1,4-dichlorobenzene (para)	ND	0.43	ND	ND
dichlorodifluoromethane	2.32	5.97	3.04	3.68
n-dodecane	0.85	0.43	ND	ND
ethanol	176.86	ND	ND	ND
ethylbenzene	0.45	0.78	0.87	0.49
4-ethyltoluene	ND	0.28	0.27	ND
n-heptane	0.51	0.58	0.39	0.43
hexane	1.68	2.44	1.28	1.68
methylene chloride	0.47	0.57	0.82	0.24
4-methyl-2-pentanone	0.25	0.26	0.28	ND
a-methylstyrene	ND	0.26	0.33	ND
naphthalene	1.06	0.33	ND	0.29
n-nonane	0.33	0.38	0.29	ND
n-octane	0.50	0.32	0.26	0.25
n-pentane	3.29	4.67	39.58	5.36
propylene	0.36	0.60	0.18	ND
n-propyl benzene	ND	0.27	ND	ND
styrene	0.24	0.96	1.92	0.57
tetrachloroethylene	ND	ND	0.37	0.40
toluene	2.11	4.09	5.79	2.94
1,1,1-trichloroethane	47.66	1249.11	438.12	61.35
trichlorofluoromethane	1.61	42.08	39.19	8.09
1,1,2-trichloro-1,2,2-trifluoroet	ND	ND	0.50	ND
1,2,4-trimethylbenzene	0.55	1.02	0.39	0.54
1,3,5-trimethylbenzene	0.28	0.30	ND	ND
n-undecane	1.31	0.61	0.34	ND
vinyl acetate	ND	0.40	0.64	ND
o-xylene	0.49	0.82	0.53	0.56
total m+p-xylene	1.15	2.84	1.96	1.81

B1-16. Washington County (2000-2008)

Urban Air Monitoring: VOC Sampling						2000-2008			
Annual Average Concentrations									
Location:	**SEDO**								
	Washington County								
	Washington County Career Center								
	Rt 2								
	Marietta								
AIRS # :	**39-167-0008**								
Sampler:	**Xon - J23416**								
Concentrations:	**µg/m³**								
Compounds	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
acetone	7.54	8.06	9.10	3.72	11.24	14.15	14.46	7.66	7.97
acetonitrile	0.34	0.22	**ND**	**ND**	0.46	1.01	0.71	0.30	**ND**
acrylonitrile	0.83	0.49	0.82	0.46	2.37	2.74	3.19	1.99	1.40
benzene	0.51	0.42	0.55	0.56	0.89	0.55	1.08	0.37	0.34
bromomethane	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	0.21	**ND**
1,3-butadiene	0.23	0.17	0.13	0.12	0.13	**ND**	**ND**	0.12	**ND**
n-butane	4.90	5.61	4.50	4.83	4.10	3.31	5.66	3.94	4.10
2-butanone	1.31	0.32	0.84	0.67	1.26	2.53	1.70	1.70	1.24
carbon disulfide	5.89	4.34	2.60	1.69	3.07	2.27	2.64	3.43	2.61
carbon tetrachloride	0.38	0.39	0.55	0.37	0.60	0.50	0.47	0.34	0.53
chlorobenzene	0.60	0.41	0.45	0.82	0.46	0.40	0.27	0.52	0.91
chlorodifluoromethan	1.17	1.95	0.93	0.68	0.90	0.93	5.82	0.93	0.89
chloroethane	**ND**	0.19	0.15	**ND**	**ND**	0.15	**ND**	**ND**	**ND**
chloroform	**ND**	**ND**	**ND**	**ND**	0.25	**ND**	**ND**	**ND**	**ND**
chloromethane	1.06	1.22	1.50	1.46	1.04	1.09	1.12	1.26	1.45
cyclohexane	0.51	0.36	0.20	0.28	0.26	0.25	0.27	0.33	0.30
decane	0.60	0.37	0.31	0.39	**ND**	**ND**	0.30	**ND**	**ND**
1,4-dichlorobenzene	**ND**	0.53	0.46	**ND**	**ND**	0.40	0.60	**ND**	**ND**
dichlorodifluorometha	2.14	2.97	2.98	2.46	2.45	2.37	2.68	2.46	2.77
n-dodecane	**ND**	0.37	**ND**	0.37	**ND**	**ND**	**ND**	**ND**	**ND**
ethanol	6.29	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
ethylbenzene	0.47	0.24	0.26	**ND**	**ND**	**ND**	0.44	**ND**	**ND**
4-ethyltoluene	0.76	**ND**	**ND**	**ND**	**ND**	**ND**	0.28	**ND**	**ND**
n-heptane	0.46	0.31	0.25	0.30	0.31	0.27	0.46	0.56	0.35
hexane	1.16	0.73	0.55	0.59	0.80	0.63	1.18	0.54	0.50
methanol	3.86	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
methylene chloride / (	0.43	0.22	0.25	0.19	0.20	0.19	0.32	0.20	0.34
4-methyl-2-pentanon	**ND**	**ND**	0.22	**ND**	0.29	0.22	0.24	0.21	**ND**
a-methylstyrene	**ND**	**ND**	0.26	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
naphthalene	1.04	0.29	0.28	0.37	0.29	0.31	0.41	0.27	**ND**
n-nonane	0.27	0.30	**ND**	0.29	**ND**	**ND**	**ND**	**ND**	**ND**
n-octane	0.47	0.28	0.25	0.34	**ND**	**ND**	0.27	0.26	**ND**
n-pentane	1.95	2.15	1.63	1.40	1.76	1.40	2.57	1.49	1.61
propylene	**ND**	0.20	**ND**	**ND**	2.13	2.03	3.02	1.06	0.81
n-propyl benzene	0.74	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
styrene	0.26	0.23	0.26	0.67	0.28	0.27	0.24	0.26	0.42
toluene	1.05	0.83	0.95	0.67	1.05	0.47	2.66	0.62	0.48
1,2,4-trichlorobenzen	1.47	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
1,1,1-trichloroethane	**ND**	0.30	**ND**	**ND**	0.28	**ND**	**ND**	**ND**	**ND**
trichlorofluoromethan	12.46	24.57	16.46	5.28	4.17	3.18	2.14	14.45	8.37
1,1,2-trichloro-1,2,2-t	0.87	0.93	0.64	0.48	0.59	0.40	0.47	0.46	**ND**
1,2,4-trimethylbenzer	0.52	0.41	0.26	**ND**	0.26	0.27	0.53	**ND**	**ND**
1,3,5-trimethylbenzer	0.31	0.27	**ND**	**ND**	**ND**	**ND**	0.27	**ND**	**ND**
n-undecane	**ND**	0.43	**ND**	0.40	**ND**	**ND**	0.34	**ND**	0.58
vinyl acetate	**ND**	0.38	0.62	0.98	1.22	2.19	1.18	1.88	1.09
o-xylene	0.51	0.26	0.25	0.22	0.23	**ND**	0.51	**ND**	**ND**
total m+p-xylene	1.10	0.39	0.47	0.37	0.30	**ND**	1.29	**ND**	**ND**

APPENDIX B2, OHIO YEARLY Averages

Heavy Metals

B 2-1. Butler/Ohio Bell, Heavy Metals (2004-2009)

MIDDLETOWN HEAVY METALS DATA,
Ohio Bell **2004-2009**
3901 Lefferson Rd.
AQS: 39-017-0015, units -- µg/m³
Butler - designated, Parameters

Year	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium	iron
2004	0.0000	0.0041	0.0085	0.0468	0.0043	0.0843	0.0013	0.0005	0.0025
2005	0.0001	0.0054	0.0080	0.0595	0.0043	0.0848	0.0017	0.0005	0.0025
2006	0.0001	0.0051	0.0070	0.0678	0.0043	0.1070	0.0014	0.0005	0.4029
2007	0.0001	0.0041	0.0056	0.0582	0.0043	0.0527	0.0012	0.0002	0.4325
2008	0.0001	0.0041	0.0065	0.0564	0.0027	0.0555	0.0013	0.0003	0.3860
2009	0.0001	0.0046	0.0071	0.0578	0.0040	0.0769	0.0014	0.0004	0.2453

B 2-2. Butler/Oneida, Heavy Metals (2000-2002)

Middletown Heavy Metals Data,
Oneida School I **2000-2002**
Yankee Rd.
AIRS: 39-017-0014, units -- µg/m³
Butler County, Parameters

Year	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
2000	0.0001	0.0042	0.0156	0.0677	0.0052	0.0482	0.0016	0.0002
2001	0.0001	0.0050	0.0117	0.0919	0.0050	0.0542	0.0020	0.0003
2002	0.0001	0.0045	0.0078	0.0737	0.0049	0.0400	0.0012	0.0002

B 2-3. Columbia/Maryland Ave, Heavy Metals (2001-2009)

EAST LIVERPOOL HEAVY METALS DATA,
500 Maryland Ave. **2001 - 2009**
AIRS: 39-029-0022, units -- µg/m³
Columbiana - designated

Year	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium	mercury	iron	potassium
2001	0.0001	0.0285	0.0180	0.6800	0.0175	0.0445	0.0023	0.0004	0.0000	0.0025	0.3300
2003	0.0001	0.0039	0.0192	0.1438	0.0228	0.0916	0.0022	0.0010	0.0000	0.0025	0.3300
2004	0.0000	0.0038	0.0110	0.2383	0.0025	0.0553	0.0019	0.0008	0.0000	0.0025	0.3300
2005	0.0000	0.0041	0.0117	0.1848	0.0027	0.1026	0.0018	0.0009	0.0000	0.0025	0.3300
2006	0.0000	0.0039	0.0180	0.3198	0.0031	0.1327	0.0145	0.0013	0.0000	0.2777	0.2854
2007	0.0000	0.0053	0.0178	0.3585	0.0051	0.1498	0.0020	0.0017	0.0001	0.3300	0.2979
2008	0.0000	0.0033	0.0163	0.1666	0.0019	0.0893	0.0019	0.0011	0.0001	0.0893	0.3438
2009	0.0000	0.0026	0.0116	0.0731	0.0013	0.0696	0.0018	0.0006	0.0000	0.2523	0.3375

B 2-4. Columbia/Port Authority, Heavy Metals (2000-2009)

EAST LIVERPOOL HEAVY METALS DATA,
Port Authority **2000 - 2009**
1250 St. George St.
AIRS: 39-029-0019, units -- µg/m³
Columbiana County, Parameters

Year	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium	mercury	iron	potassium
2000	0.0002	0.0123	0.0166	0.6690	0.0076	0.0644	0.0038	0.0009	0.0004	0.0025	0.2438
2001	0.0002	0.0123	0.0166	0.6690	0.0076	0.0644	0.0038	0.0009	0.0004	0.0025	0.2438
2003	0.0001	0.0045	0.0182	0.2996	0.0020	0.1973	0.0026	0.0014	0.0001	0.0025	0.2438
2004	0.0001	0.0057	0.0165	0.5333	0.0020	0.0843	0.0027	0.0007	0.0001	0.0025	0.2438
2005	0.0002	0.0049	0.0135	0.3009	0.0020	0.1132	0.0021	0.0010	0.0001	0.0025	0.2438
2006	0.0002	0.0050	0.0203	0.4882	0.0034	0.1585	0.0023	0.0015	0.0001	0.4119	0.2940
2007	0.0001	0.0051	0.0184	0.4326	0.0040	0.1367	0.0023	0.0013	0.0001	0.4142	0.2758
2008	0.0001	0.0030	0.0165	0.2074	0.0023	0.0945	0.0023	0.0014	0.0001	0.4206	0.3025
2009	0.0001	0.0030	0.0130	0.1351	0.0017	0.0788	0.0022	0.0007	0.0001	0.4171	0.3213

B 2-5. Columbia/Columbia/Water Plant Heavy Metals (2000-2009)

2220 Michigan Ave.						**2000 - 2009**					
AIRS: 39-029-0020, units -- µg/m³											
Columbiana County, Parameters											
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**	**mercury**	**iron**	**potassium**
2000	0.0001	0.0170	0.0204	1.5277	0.0104	0.0881	0.0037	0.0008	0.0003	0.0025	0.1969
2001	0.0009	0.0235	0.0235	0.6500	0.0180	0.0940	0.0025	0.0011	0.0000	0.0025	0.1969
2003	0.0001	0.0262	0.0159	0.9576	0.0090	0.1215	0.0021	0.0010	0.0001	0.0025	0.1969
2004	0.0000	0.0204	0.0156	2.1258	0.0083	0.0578	0.0042	0.0006	0.0001	0.0025	0.1969
2005	0.0003	0.0218	0.0188	1.3153	0.0114	0.0904	0.0031	0.0009	0.0001	0.0025	0.1969
2006	0.0000	0.0162	0.0223	2.2158	0.0185	0.1878	0.0028	0.0017	0.0001	0.6277	0.2132
2007	0.0002	0.0208	0.0194	1.4654	0.0126	0.1066	0.0031	0.0010	0.0001	0.1067	0.1996
2008	0.0000	0.0086	0.0124	1.4508	0.0185	0.0945	0.0020	0.0012	0.0001	0.5850	0.3158

B 2-6. Coshocton County Heavy Metals (2000-2002)

Coshocton County HEAVY METALS DATA								
1840 Otsego Ave.								
AIRS: 39-031-0005				**2000-2002**				
Coshocton County, units -- µg/m³								
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**
2000	0.0000	0.0056	0.0100	0.0107	0.0076	0.0910	0.0010	0.0007
2001	0.0000	0.0042	0.0118	0.0170	0.0056	0.0865	0.0015	0.0004
2002	0.0000	0.0059	0.0147	0.1436	0.0079	0.1188	0.0021	0.0005

B 2-7. Cuyahoga/Ferro A & Ferro B, Heavy Metals (2000-2009)

CLEVELAND
Cuyahoga County **2000-2009**
FERRO "A"
4150 East 56th Street
AIRS: 39-035-0049 units -- µg/m³

YEAR	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
2000	0.0001	0.0063	0.1218	0.1624	0.1977	0.1563	0.0018	0.0011
2001	0.0001	0.0055	0.0928	0.1136	0.0255	0.1260	0.0015	0.0008
2002	0.0001	0.0054	0.0988	0.1030	0.0175	0.0887	0.0014	0.0006
2003	0.0001	0.0040	0.1528	0.1203	0.0239	0.1128	0.0018	0.0008
2004	0.0001	0.0058	0.0992	0.1347	0.0258	0.0979	0.0020	0.0008
2005	0.0001	0.0063	0.1026	0.1192	0.0249	0.1088	0.0023	0.0007
2006	0.0000	0.0051	0.0703	0.1045	0.0666	0.1027	0.0021	0.0005
2007	0.0000	0.0056	0.0990	0.1770	0.1008	0.1590	0.0016	0.0004
2008	0.0000	0.0058	0.1111	0.1380	0.0610	0.1139	0.0019	0.0007
2009	0.0000	0.0052	0.0898	0.1138	0.0542	0.0986	0.0013	0.0003

CLEVELAND
Cuyahoga County **2000-2008**
FERRO "B"
4150 East 56th Street
AIRS: 39-035-0049 units -- µg/m³

YEAR	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
2000	0.0001	0.0065	0.1182	0.1665	0.0565	0.1553	0.0017	0.0011
2001	0.0001	0.0056	0.0983	0.1199	0.0272	0.1341	0.0016	0.0008
2002	0.0001	0.0056	0.0951	0.1107	0.0170	0.0902	0.0015	0.0006
2007	0.0000	0.0058	0.1019	0.1318	0.0992	0.0976	0.0016	0.0004
2008	0.0001	0.0058	0.1147	0.1458	0.0619	0.1125	0.0018	0.0007

B 2-8. Cuyahoga/Asphalt A Heavy Metals (2000-2009)

CLEVELAND
Cuyahoga County
Asphalt Plant **2001-2009**
West 3rd St.
AIRS: 39-035-0061 units -- µg/m³

Year	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
2001	0.0001	0.0047	0.0425	0.0728	0.0050	0.1363	0.0015	0.0007
2002	0.0000	0.0038	0.0339	0.0295	0.0051	0.0814	0.0013	0.0007
2003	0.0001	0.0018	0.1046	0.0477	0.0009	0.0959	0.0019	0.0011
2004	0.0001	0.0041	0.0221	0.0724	0.0030	0.0927	0.0016	0.0008
2005	0.0001	0.0041	0.0149	0.0712	0.0032	0.0967	0.0016	0.0007
2006	0.0001	0.0028	0.0176	0.0592	0.0036	0.0807	0.0017	0.0004
2007	0.0000	0.0036	0.0186	0.0592	0.0041	0.0733	0.0013	0.0003

B 2-9 Cuyahoga/Fortran Printing, Heavy Metals (2000-2009)

Cuyahoga County **2000 - 2009**
Fortran Printing Inc
5777 GRANT AVE.
AIRS: 39-035-0050 units -- µg/m³

Year	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
2000	0.0000	0.0045	0.0527	0.0677	0.0102	0.0923	0.0019	0.0006
2001	0.0001	0.0051	0.0299	0.0591	0.0071	0.0825	0.0018	0.0007
2002	0.0000	0.0054	0.0390	0.0735	0.0067	0.0602	0.0017	0.0006
2003	0.0000	0.0023	0.0303	0.0556	0.0026	0.0629	0.0018	0.0006
2004	0.0000	0.0043	0.0349	0.0638	0.0069	0.0673	0.0021	0.0008
2005	0.0000	0.0052	0.0429	0.0790	0.0103	0.0857	0.0027	0.0007
2006	0.0000	0.0042	0.0218	0.0723	0.0195	0.0693	0.0026	0.0005
2007	0.0000	0.0046	0.0286	0.0848	0.0342	0.0713	0.0019	0.0006
2008	0.0000	0.0037	0.0223	0.0673	0.0178	0.0669	0.0018	0.0005
2009	0.0000	0.0035	0.0253	0.0521	0.0169	0.0629	0.0017	0.0004

B 2-10. Cuyahoga/St. Theodosius, Heavy Metals (2000-2009)

CLEVELAND, 2000-2009								
Cuyahoga County					**2000-2009**			
St. Theodosius Church								
2547 St. Tikhon Ave.								
AIRS: 39-035-0038		**units -- µg/m³**						
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**
2000	0.0001	0.0041	0.0202	0.0603	0.0050	0.0910	0.0015	0.0006
2001	0.0001	0.0044	0.0207	0.0526	0.0051	0.1127	0.0015	0.0008
2002	0.0000	0.0037	0.0168	0.0262	0.0050	0.0604	0.0013	0.0006
2003	0.0000	0.0007	0.0195	0.0388	0.0000	0.0779	0.0016	0.0009
2004	0.0000	0.0033	0.0202	0.0403	0.0028	0.0675	0.0016	0.0009
2005	0.0000	0.0036	0.0196	0.0553	0.0031	0.0963	0.0021	0.0012
2006	0.0000	0.0035	0.0193	0.0480	0.0035	0.0884	0.0020	0.0006
2007	0.0000	0.0029	0.0155	0.0365	0.0036	0.0656	0.0015	0.0004
2008	0.0000	0.0030	0.0164	0.0513	0.0034	0.0656	0.0012	0.0005
2009	0.0000	0.0026	0.0103	0.0191	0.0024	0.0468	0.0010	0.0003

B 2-11. Cuyahoga/Fire Station 11, Heavy Metals (2004-2006)

CLEVELAND,								
Cuyahoga County					**2004-2006**			
Fire Station #11								
7629 Broadway Ave.								
AIRS: 39-035-0068		**units -- µg/m³**						
YEAR	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**
2004	0.0000	0.0040	0.0304	0.0362	0.0053	0.0936	0.0022	0.0009
2005	0.0000	0.0041	0.0230	0.0341	0.0088	0.0891	0.0019	0.0009
2006	0.0000	0.0037	0.0159	0.0300	0.0058	0.0677	0.0016	0.0005

B 2-12. Cuyahoga/Fire “4A” & “4B”, Heavy Metals (2000-2009)

CLEVELAND,								
Cuyahoga County					**2000-2009**			
FIRE "4A"								
3136 Lorain Ave.								
AIRS: 39-035-0042		**units -- µg/m³**						
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**
2000	0.0000	0.0038	0.0235	0.0249	0.0061	0.0650	0.0012	0.0004
2001	0.0000	0.0040	0.0212	0.0261	0.0054	0.0825	0.0015	0.0006
2002	0.0000	0.0041	0.0132	0.0144	0.0055	0.0588	0.0012	0.0012
2003	0.0000	0.0000	0.0124	0.0156	0.0034	0.0533	0.0013	0.0005
2004	0.0000	0.0024	0.0153	0.0151	0.0029	0.0535	0.0016	0.0005
2005	0.0000	0.0022	0.0191	0.0200	0.0029	0.0774	0.0018	0.0010
2006	0.0000	0.0022	0.0143	0.0192	0.0033	0.0660	0.0016	0.0005
2007	0.0000	0.0022	0.0174	0.0207	0.0035	0.0608	0.0013	0.0004
2008	0.0000	0.0021	0.0141	0.0185	0.0023	0.0473	0.0012	0.0004
2009	0.0000	0.0016	0.0088	0.0120	0.0022	0.0372	0.0010	0.0003

CLEVELAND,								
Cuyahoga County					**2000-2009**			
FIRE "4B"								
3136 Lorain Ave.								
AIRS: 39-035-0042		**units -- µg/m³**						
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**
2000	0.0000	0.0038	0.0225	0.0198	0.0142	0.0555	0.0011	0.0006
2001	0.0000	0.0044	0.0205	0.0255	0.0058	0.0802	0.0016	0.0006
2002	0.0000	0.0045	0.0152	0.0182	0.0060	0.0683	0.0013	0.0011
2007	0.0000	0.0027	0.0171	0.0204	0.0088	0.0585	0.0014	0.0003
2008	0.0000	0.0022	0.0136	0.0181	0.0025	0.0461	0.0011	0.0003
2009	0.0000	0.0016	0.0087	0.0117	0.0022	0.0365	0.0011	0.0002

B 2-13. Cuyahoga/Fire 22 , Heavy Metals (2004-2006)

CLEVELAND,								
Cuyahoga County				**2004-2006**				
Fire Station #22								
7300 Superior Ave.								
AIRS: 39-035-0069		**units -- µg/m³**						
YEAR	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**
2004	0.0000	0.0035	0.0210	0.0239	0.0045	0.0728	0.0020	0.0007
2005	0.0000	0.0035	0.0133	0.0213	0.0045	0.0615	0.0018	0.0005
2006	0.0000	0.0035	0.0133	0.0195	0.0045	0.0532	0.0016	0.0003

B 2-14. Cuyahoga/Gate A , Heavy Metals (2001-2003)

CLEVELAND								
Cuyahoga County								
Gate "A"					**2001-2003**			
2850 3rd St.								
AIRS: 39-035-0063		**units -- µg/m³**						
YEAR	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**
2001	0.0001	0.0047	0.0536	0.0863	0.0052	0.1392	0.0017	0.0008
2002	0.0000	0.0040	0.0630	0.0366	0.0051	0.0908	0.0016	0.0008
2003	0.0001	0.0031	0.2333	0.0443	0.0000	0.1087	0.0028	0.0023

B 2-15. Fulton /Delta, Heavy Metals (2000-2009)

NWDO HEAVY METALS DATA,
Delta **2000-2009**
200 Van Buren St.
AIRS: 39-051-0001, units -- µg/m³
Fulton County, Parameters

Year	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
2000	0.0000	0.0040	0.2047	0.0101	0.0054	0.4669	0.0011	0.0006
2001	0.0000	0.0053	0.1278	0.0086	0.0064	0.4008	0.0011	0.0008
2002	0.0000	0.0042	0.0966	0.0107	0.0056	0.2422	0.0010	0.0013
2003	0.0000	0.0022	0.1506	0.0122	0.0024	0.3825	0.0010	0.0006
2004	0.0000	0.0022	0.1155	0.0115	0.0024	0.4213	0.0009	0.0005
2005	0.0000	0.0022	0.1946	0.0088	0.0024	1.0223	0.0011	0.0015
2006	0.0000	0.0022	0.1681	0.0075	0.0024	1.0931	0.0007	0.0026
2007	0.0000	0.0022	0.3879	0.0115	0.0138	3.8624	0.0011	0.0057
2008	0.0000	0.0014	0.2788	0.0102	0.0012	2.4883	0.0008	0.0031
2009	0.0000	0.0012	0.0918	0.0098	0.0010	0.4751	0.0008	0.0006

B 2-16. Cuyahoga /IMT (2000-2002)

CLEVELAND, 2000-2002
Cuyahoga County
IMT **2000-2002**
511 West 164th
AIRS: 39-035-1003 **units -- µg/m³**

YEAR	beryllium	chromium	lead	manganese	nickel	zinc	arsenic	cadmium
2000	0.0000	0.0041	0.0189	0.0598	0.0055	0.1629	0.0016	0.0009
2001	0.0000	0.0043	0.0156	0.0518	0.0057	0.1065	0.0022	0.0005
2002	0.0000	0.0040	0.0120	0.0309	0.0053	0.0795	0.0017	0.0004

B 2-17. Franklin/Woodrow, Heavy Metals (2000-2009)

COLUMBUS, 2000-2002										
Franklin County						**2000-2009**				
580 E. Woodrow Ave.										
AIRS: 39-049-0025		**units -- µg/m³**								
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**	**mercury**	**iron**
2000	0.0000	0.0039	0.0264	0.0130	0.0052	0.0602	0.0013	0.0003	0.0000	0.0025
2001	0.0000	0.0037	0.0222	0.0133	0.0049	0.0503	0.0013	0.0003	0.0000	0.0025
2002	0.0000	0.0045	0.0183	0.0146	0.0059	0.0563	0.0013	0.0003	0.0000	0.0025
2003	0.0000	0.0000	0.0136	0.0212	0.0000	0.0583	0.0011	0.0003	0.0000	0.0025
2004	0.0000	0.0021	0.0134	0.0127	0.0028	0.0727	0.0010	0.0004	0.0000	0.0025
2005	0.0000	0.0021	0.0074	0.0137	0.0028	0.0720	0.0021	0.0004	0.0000	0.0025
2006	0.0000	0.0024	0.0080	0.0160	0.0028	0.0753	0.0012	0.0004	0.0000	0.0025
2007	0.0000	0.0021	0.2088	0.0143	0.0028	0.0603	0.0084	0.0010	0.0003	0.0025
2008	0.0000	0.0018	0.0089	0.0136	0.0017	0.0662	0.0011	0.0004	0.0000	0.2175
2009	0.0000	0.0014	0.0092	0.0105	0.0010	0.0624	0.0012	0.0002	0.0000	0.1983

B 2-18. Logan/Bellfontaine, Heavy Metals (2000-2009)

SWDO HEAVY METALS DATA,									
Bellefontaine						**2000-2009**			
1222 Superior Ave.									
AIRS: 39-091-0003, units -- µg/m³									
Logan County, Parameters									
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**	**iron**
2000	0.0000	0.0058	0.1814	0.0056	0.0056	0.0259	0.0008	0.0002	0.0025
2001	0.0000	0.0054	0.1135	0.0054	0.0084	0.0245	0.0010	0.0003	0.0025
2002	0.0001	0.0040	0.0808	0.0045	0.0053	0.0185	0.0012	0.0001	0.0025
2003	0.0000	0.0019	0.0001	0.0000	0.0039	0.0257	0.0008	0.0004	0.0025
2004	0.0000	0.0019	0.1053	0.0058	0.0027	0.0233	0.0009	0.0002	0.0025
2005	0.0000	0.0019	0.0783	0.0055	0.0043	0.0218	0.0009	0.0002	0.0025
2006	0.0000	0.0019	0.0472	0.0046	0.0030	0.0201	0.0008	0.0001	0.1049
2007	0.0000	0.0019	0.0799	0.0066	0.0025	0.0247	0.0011	0.0001	0.1438
2008	0.0000	0.0013	0.0348	0.0048	0.0013	0.0198	0.0008	0.0001	0.0908
2009	0.0000	0.0016	0.0287	0.0045	0.0009	0.0225	0.0008	0.0001	0.0943

B 2-19. Marion/Marion Steel (Left and Right), Heavy Metals (2002-2009)

NWDO HEAVY METALS DATA,									
Marion Steel						**2002-2009**			
441 Whitmore St. LEFT									
AIRS: units - µg/m³									
Parameters									
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**	**mercury**
2002	0.0000	0.0093	0.1211	0.1778	0.0089	0.6073	0.0028	0.0012	0.0008
2003	0.0000	0.0066	0.0782	0.1505	0.0035	0.5005	0.0027	0.0011	0.0003
2004	0.0000	0.0077	0.0630	0.1483	0.0030	0.3209	0.0021	0.0008	0.0002
2005	0.0000	0.0060	0.0532	0.1287	0.0033	0.3356	0.0023	0.0009	0.0004
2007	0.0000	0.0030	0.0078	0.0979	0.0031	0.5500	0.1703	0.0010	0.0017
2008	0.0000	0.0094	0.1424	0.2183	0.0039	0.5928	0.0023	0.0030	0.0004
2009	0.0000	0.0058	0.0365	0.1290	0.0027	0.1663	0.0015	0.0006	0.0002

NWDO HEAVY METALS DATA, 2002-2009									
Marion Steel									
441 Whitmore St. RIGHT									
AIRS: units - µg/m³									
Parameters									
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**	**mercury**
2002	0.0000	0.0089	0.0619	0.1178	0.0090	0.3623	0.0018	0.0008	0.0005
2003	0.0000	0.0081	0.1215	0.2270	0.0042	0.5529	0.0038	0.0015	0.0003
2004	0.0000	0.0054	0.0564	0.0920	0.0027	0.2520	0.0019	0.0006	0.0001
2005	0.0000	0.0057	0.0435	0.1015	0.0030	0.2773	0.0019	0.0007	0.0002
2006	0.0000	0.0067	0.0862	0.1323	0.0028	0.4517	0.0021	0.0018	0.0006
2007	0.0000	0.0022	0.0083	0.0977	0.0037	0.5583	0.1797	0.0005	0.0018
2008	0.0000	0.0069	0.0659	0.1308	0.0026	0.3533	0.0019	0.0019	0.0003
2009	0.0000	0.0053	0.0515	0.1108	0.0023	0.2269	0.0015	0.0008	0.0002

B 2-20. Marion/Bellfontaine (Left and Right), Heavy Metals (2000-2007)

NWDO HEAVY METALS DATA,									
Marion Steel					**2000-2007**				
635 Bellfontaine / Gill Ave. RIGHT									
designated, units -- µg/m³									
Marion County, Parameters									
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**	**mercury**
2000	0.0000	0.0056	0.0195	0.0349	0.0059	0.0909	0.0013	0.0003	0.0002
2001	0.0000	0.0037	0.0310	0.0461	0.0049	0.1319	0.0012	0.0004	0.0004
2002	0.0000	0.0039	0.0250	0.0457	0.0047	0.1586	0.0010	0.0004	0.0007
2003	0.0000	0.0028	0.0451	0.0622	0.0031	0.1608	0.0012	0.0008	0.0002
2004	0.0000	0.0028	0.0206	0.0412	0.0031	0.1191	0.0010	0.0004	0.0001
2005	0.0000	0.0030	0.0200	0.0502	0.0031	0.1380	0.0015	0.0004	0.0002
2006	0.0000	0.0036	0.0329	0.0542	0.0031	0.1678	0.0012	0.0006	0.0002
2007	0.0000	0.0055	0.0709	0.0885	0.0031	0.4617	0.0012	0.0016	0.0002

NWDO HEAVY METALS DATA									
Marion Steel					**2000-2007**				
635 Bellfontaine / Gill Ave. LEFT									
Left/ co-located, units - µg/m³									
Marion County, Parameters									
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**	**mercury**
2000	0.0000	0.0057	0.0218	0.0509	0.0066	0.1150	0.0012	0.0004	0.0002
2001	0.0000	0.0038	0.0281	0.0444	0.0050	0.1144	0.0012	0.0004	0.0003
2002	0.0000	0.0039	0.0189	0.0382	0.0049	0.0909	0.0010	0.0003	0.0000
2003	0.0000	0.0033	0.0191	0.0389	0.0038	0.0931	0.0010	0.0004	0.0001
2004	0.0000	0.0034	0.0230	0.0468	0.0038	0.1386	0.0014	0.0005	0.0001
2005	0.0000	0.0032	0.0217	0.0512	0.0038	0.1449	0.0013	0.0004	0.0002
2007	0.0000	0.0044	0.0326	0.0726	0.0038	0.1643	0.0010	0.0008	0.0002

B 2-21. Ottawa/Brush Wellman 32, Heavy Metals (2002-2009)

NWDO HEAVY METALS DATA,								
Brush Wellman 32					**2002-2009**			
AIRS: units - µg/m³								
Parameters								
	beryllium	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**
2002	0.0001	0.0007	0.0034	0.0045	0.0011	0.0137	0.0006	0.0001
2004	0.0001	0.0003	0.0026	0.0027	0.0007	0.0115	0.0005	0.0001
2005	0.0001	0.0003	0.0035	0.0038	0.0007	0.0152	0.0007	0.0001
2006	0.0001	0.0003	0.0034	0.0036	0.0008	0.0137	0.0006	0.0001
2008	0.0012	0.0004	0.0033	0.0056	0.0006	0.0147	0.0005	0.0001
2009	0.0000	0.0003	0.0028	0.0032	0.0004	0.0098	0.0005	0.0001

B 2-22. Washington/Career Center, Heavy Metals (2000-2009)

Washington County HEAVY METALS DATA,									
Rt. 676 Marietta, Career Center						**2000-2009**			
AIRS: 39-167-0008									
Washinton County, units -- µg/m³									
Parameters									
Year	**beryllium**	**chromium**	**lead**	**manganese**	**nickel**	**zinc**	**arsenic**	**cadmium**	**mercury**
2000	0.0000	0.0033	0.0056	0.0635	0.0044	0.0310	0.0012	0.0020	0.0000
2001	0.0000	0.0045	0.0123	0.3164	0.0057	0.0430	0.0016	0.0010	0.0000
2002	0.0000	0.0045	0.0075	0.1596	0.0060	0.0272	0.0011	0.0005	0.0000
2003	0.0000	0.0024	0.0072	0.2141	0.0023	0.0302	0.0017	0.0037	0.0000
2004	0.0000	0.0020	0.0048	0.1031	0.0026	0.0238	0.0012	0.0017	0.0000
2005	0.0000	0.0013	0.0035	0.1235	0.0022	0.0257	0.0010	0.0008	0.0000
2006	0.0000	0.0013	0.0042	0.0711	0.0013	0.0186	0.0009	0.0003	0.0000
2007	0.0000	0.0013	0.0044	0.1063	0.0013	0.0227	0.0008	0.0003	0.0000
2008	0.0000	0.0014	0.0038	0.1288	0.0006	0.0199	0.0007	0.0005	0.0000
2009	0.0000	0.0009	0.0039	0.0827	0.0006	0.0181	0.0007	0.0002	0.0000