1996 Inventory of Toxic Air Emissions:

A Product of the Great Lakes Regional Air Toxic Emissions Project

Part 1: Point and Area Sources

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Acronyms and Abbreviations

AIRS	Aerometric Information Retrieval System
AMS	Area and Mobile Source
BTU	British Thermal Unit
CAA	Clean Air Act
CAR	California Air Resources Board
CAS	Chemical Abstract Service
CEP	Cumulative Exposure Program
DVMT	Daily Vehicle Miles Traveled
EET	Emission Estimating Techniques
EIIP	Emission Inventory Improvement Program
EIS	Emission Inventory System
ESP	Electrostatic Precipitator
FIRE	Factor Information Retrieval System
FPRT	Fuel Process Rate
GIS	Geographic Information Systems
GLC	Great Lakes Commission
GLEI	Great Lakes Emissions Inventory
GLIN	Great Lakes Information Network
GLNPO	Great Lakes National Program Office, U.S. Environmental Protection Agency
GLPF	Great Lakes Protection Fund
HAP	Hazardous Air Pollution
IDEM	Indiana Department of Environmental Management
IEPA	Illinois Environmental Protection Agency
IJC	International Joint Commission
IMS	Information Management System
INDOT	Indiana Department of Transportation
MACT	Maximum Achievable Control Technology
MCEI	Minnesota Criteria Pollutant Emission Inventory
MDEQ	Michigan Department of Environmental Quality
MPCA	Minnesota Pollution Control Agency
MSDS	Material Safety Data Sheet
n.e.c.	Not Elsewhere Classified
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NO_x	Nitrogen Oxides
NTI	National Toxic Inventory
NYDEC	New York Department of Environmental Conservation
OEPA	Ohio Environmental Protection Agency
PAH	Polycyclic Aromatic Hydrocarbons
PDEP	Pennsylvania Department of Environmental Protection
PM	Particulate Matter
POTW	Publicly Owned Treatment Works
QA/QC	Quality Assurance/Quality Control
RAPIDS	Regional Air Pollutant Inventory Development System
SAMS	SIP Air Pollutant Inventory Management System
SCC	Source Classification Code
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SSD	Source Summary Database
STEPS	State Environmental Programs Systems
TANKS	Storage Tank Emissions Software

TOG	Total Organic Gases
TRI	Toxic Release Inventory
U.S. EPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture
VOC	Volatile Organic Compound
WDNR	Wisconsin Department of Natural Resources

Preface

The Great Lakes Regional Toxic Air Emissions Inventory project conducts a regional emissions inventory of toxic air contaminants which are significant contributors to the contamination of the waters and urban areas of the Great Lakes.

The Inventory Project is an important step in meeting the goals of the 1986 Great Lakes Toxic Substances Control Agreement (signed by the Great Lakes governors and Premier of Ontario), and sections 112(c)(6), 112(k) and 112(m) of the 1990 U.S. Clean Air Act Amendments.

This project is a partnership between the eight Great Lakes states, the province of Ontario and the U.S. Environmental Protection Agency (U.S. EPA). The objective of this ongoing initiative is to present researchers and policy makers with detailed, basin wide data on the source and emission levels of toxic contaminants. The initial report focused on 49 toxic air pollutants from point and area sources using 1993 data; this inventory database consists 1996 data, also includes mobile sources, and has been expanded to include 82 toxic air pollutants.

The air toxic emission estimates contained in this report represent the best single compilation of such estimates, however, this inventory project has also identified the limitations which still exist in making such estimates. Results should therefore be viewed as an initial step for use by policy-makers, modelers and others involved in air quality management. These data can support regulatory decisions if used in conjunction with other sources of quality assured data.

The Great Lakes Commission, together with the eight Great Lakes states and the province of Ontario is now compiling inventories for 1997 and 1998, and eventually, 1999 data. Through this continuing effort, a mechanism has been established to support sound regulatory decisions.

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The Great Lakes Regional Air Toxic Emissions Inventory has been a challenging endeavor for all involved. As an unprecedented effort to compile a regional inventory of toxic air emissions, a multitude of complex issues had to be resolved to ensure that the priorities of all Great Lakes jurisdictions - federal, state, and provincial - were adequately addressed.

This unique effort has benefited from the leadership of Orlando Cabrera-Rivera, chair of the Steering Committee for the Great Lakes Regional Air Toxic Emissions Inventory Project, Julie Wagemakers, project manager, Great Lakes Commission, and Dave Asselmeier and Chun Yi Wu for administering the quality assurance and quality control checks on the inventory data. Emission inventory specialists from the Great Lakes states, U.S. EPA and the province of Ontario worked together closely, making the project a team effort.

This report was written, compiled, and reviewed by all of the above project participants in addition to their staff. Editorial, report compilation and technical assistance was provided by Great Lakes Commission staff member Derek Moy. Project administration and oversight was provided by Dr. Michael J. Donahue, Commission Executive Director, and Julie Wagemakers, Program Manager, Communications and Information Management. Contractual support for software development was provided by Windsor Technologies, Inc.

Executive Summary

Introduction and Inventory Objective

This report, a product of the Great Lakes Regional Air Toxic Emissions Inventory Project, presents a multijurisdictional inventory of point and area sources (mobile to be published early next year) of toxic air emissions that have the potential to impact environmental quality in the Great Lakes basin. This initiative was undertaken through an intergovernmental partnership involving the eight Great Lakes states, the province of Ontario, and the U.S. Environmental Protection Agency (U.S. EPA). The objective of this ongoing initiative is to present researchers and policy makers with detailed, basin wide data on the source and emission levels of 82 toxic contaminants.

The development and release of the inventory is an important step in meeting the goals of the 1986 Great Lakes Toxic Substances Control Agreement (signed by the Great Lakes governors and Premier of Ontario), and sections 112(c)(6), 112(k) and 112(m) of the 1990 U.S. Clean Air Act Amendments (see http://www.cglg.org/pub/toxics/index.html and http://earth1.epa.gov/oar/caa.html for further details).

The inventory project presents a compilation of the best available data for calendar year 1996 emissions from point and area sources. The data will be updated annually and the level of detail will increase year to year. This project also released version 2.0 of the *Regional Air Pollutant Inventory Development System (RAPIDS)* to calculate emissions for 82 pollutants (which include mobile sources). The Great Lakes jurisdictions believe this work will provide a strong foundation upon which to build national and binational strategies to reduce toxic air emissions affecting the Great Lakes.

The inventory effort focused on the identification of point and area source categories that contribute to the total emissions of toxic contaminants listed in Table 1-1. This list of 82 contaminants was compiled using the International Joint Commission's list of Great Lakes critical pollutants, U.S. EPA's list of targeted toxic chemicals and compounds defined in the U.S. Clean Air Act Amendments of 1990, section 112 (c)(6), and those pollutants suggested by the Great Lakes states. This project also identified significant number of small point and area sources not currently regulated under the Clean Air Act (CAA) and collectively release large amounts of one or more toxic air pollutants of concern. These sources include many traditionally unregulated sites with relatively small gas-fired, coal-fired, or oil-fired boilers, traffic markings, woodburning stoves and fireplaces and generally any facility with an incinerator. These are sources within one county or urban area that collectively release large amounts of one or more toxic air pollutants of concern.

The inventory project is strengthening decision making capabilities in the basin by promoting interjurisdictional consistency in data collection and analysis, establishing standard procedures and protocols, developing and testing an automated emission estimation and inventory system, and demonstrating the value of client/server technology via the Internet to transmit and exchange environmental data among the Great Lakes jurisdictions and inform the larger Great Lakes community.

Inventory Scope and Findings

The 1996 emissions inventory effort began in September 1998 with primary funding provided by the U.S. EPA. In August 1998, the 1993 point and area source inventory was released. Over the four previous years, the Great Lakes states, with support from the U.S. EPA and the Great Lakes Protection Fund developed and tested (through a Southwest Lake Michigan Inventory), the regional infrastructure and tools for emissions inventory compilation including the *Regional Air Pollutant Inventory Development System* (RAPIDS) versions 1.0 and 2.0 and the *Air Toxic Emissions Inventory Protocol for the Great Lakes States.*

In compiling the inventory, challenges were encountered in the area of data breadth, quality, availability and consistency from one jurisdiction to the next. Given variances in staffing resources and data management from one jurisdiction to the next, project staff received data in varied forms that needed to be standardized before being incorporated into the inventory.

The 1996 inventory should not be used for jurisdictional comparisons, but rather to demonstrate the potential of such a complete and comprehensive inventory as a decision support tool. Key findings associated with the inventory effort, as expressed by the federal, state, and provincial members of the project Steering Committee, are as follows:

- A comprehensive, multijurisdictional inventory of toxic air pollutants, sources and emission levels within the Great Lakes basin provides an important decision-making tool for environmental protection efforts.

- Air emissions data varies significantly from one Great Lakes jurisdiction to the next in terms of breadth, quality and availability. Greater consistency in data acquisition, compilation and analysis is needed to ensure meaningful basin wide assessment and interjurisdictional comparison.

- Great Lakes jurisdictions are well advised to develop and maintain the program and staffing infrastructure needed to participate in basin wide emissions inventory efforts over the long term. Continuity in inventory development and updating will provide a much-needed benchmark for trend identification and analysis.

Inventory Methodology

The Regional Toxic Air Emissions Inventory effort focuses on significant sources of air emissions of 82 toxic air pollutants in the jurisdictions bordering the Great Lakes. Working cooperatively through the Great Lakes Commission, inventory work is undertaken by the air quality departments of the state and provincial governments in the region. Staff at each agency followed the *Regional Toxic Air Emissions Inventory Protocol* they developed jointly and finalized in June 1994. The protocol provides instructions to accomplish the regional inventory development effort so the inventory is complete, accurate, and consistent from one jurisdiction to the next. The protocol:

- Assigns responsibilities and procedures to the states, Great Lakes Commission, U.S. EPA Great Lakes National Program Office (GLNPO);
- Outlines procedures to identify and locate emission sources of target compounds;
- Guides selection of specific emission estimation techniques;
- Instructs states on compiling and updating the regional repository at GLNPO;
- Outlines quality assurance/quality control procedures for emission data and estimates; and
- Identifies and explains the full suite of automated tools available for developing the regional inventory.

Because the inventory was a multi-state, regional effort, a high level of coordination and communication was necessary to ensure consistency among the states and province of Ontario in terms of data management, methodology, calculation methods and other issues. During the course of the inventory development effort, a Great Lakes Regional Air Toxic Emissions Inventory Technical Steering Committee communicated via daily e-mail exchanges, weekly or biweekly conference calls, and bimonthly in-person meetings. The committee oversaw contractor development of the inventory software and resolved outstanding issues and inconsistencies among the eight states and Ontario. The Steering Committee is composed of representatives from each of the air management programs from the eight Great Lakes states as well as Ontario and observers from U.S. EPA. A complete list of members with contact information can be found in Appendix BB**.**

The Steering Committee worked closely with the project software development contractor, Windsor Technologies Inc., to develop and test RAPIDS. Following on the success of the 1993 inventory, RAPIDS was enhanced to include a mobile source module to estimate emissions from on-road and non-road mobile sources; the addition of growth factors algorithm to project emissions; controlled emission factor functionality; development of mobile sources emission factors for the Great Lakes region; and improved emissions estimation and reporting capabilities. This effort represents the first attempt to prepare software for estimating toxic pollutant emissions on a multi-state basis. RAPIDS is a client/server system developed in PowerBuilder® with an ORACLE® back-end database. The software takes full advantage of Internet/Great Lakes Information Network (GLIN) connections between the states, the Great Lakes Commission and the U.S. EPA GLNPO office in Chicago.

Finally, a Quality Assurance/Quality Control (QA/QC) Committee reviewed the inventory report, established QA/QC criteria for use by all states and the province of Ontario, and ensured the report provides an accurate and useful summary of toxic air emissions at the regional level.

Report Organization and Content

Following completion of the *Air Toxic Emissions Inventory Protocol* and development and testing of RAPIDS, version 1.0 and 2.0, collection of the best available inventory data commenced using 1996 records. An intensive process of quality control/quality assurance efforts ensured accuracy as 1996 data were compiled and analyzed.

Emissions estimates for the 82 target compounds are presented in the first half of this report. Definitions of source categories, and the level of detail in emissions estimates, are state/province specific and are outlined in the state/provincial reports in Appendices A through I.

Next steps

This project is releasing its inaugural toxic mobile source emissions inventory using 1996 data early next year. This inventory will serve as a template for future mobile source inventories for both this project and on an individual state and provincial basis, both within and beyond the Great Lakes region.

Through the continued efforts of the Steering Committee, the inventory will become more comprehensive over time and become an increasingly valuable tool for decision making within the Great Lakes basin. The Steering Committee will continue to meet on a regular basis to discuss inventory enhancements, both through defining data collection and refining and testing the RAPIDS software to accommodate continued expansion of this project.

The Steering Committee has developed RAPIDS to include a mobile source estimation module which is used by each Great Lakes jurisdiction to estimate emissions from cars, trucks, trains, recreation vehicles, airplanes, marine vessels, farm equipment, construction equipment and other non-road engines. This expansion of RAPIDS provides a complete profile for air toxic emissions and expands the list of toxic compounds of concern to 82. The complete 1996 point, area and mobile source emissions inventory is available on the Great Lakes Information Network (GLIN) at http://great-lakes.net/envt/air/airtox.html.

Collection of 1997 and 1998 data for point and area sources is already underway. For the 1999 inventory, the Steering Committee is also planning to expand its list from 82 pollutants to match the 188 hazardous air pollutants designated by the U.S. EPA.

This bridges the gap between the science of inventorying toxic air emissions and the public policy debate concerning how these emissions affect human health and the environment and how they should be addressed. Follow-up by state, provincial and federal environmental protection agencies is necessary to make further progress toward these goals. The Steering Committee recommends that regulatory decisions not be based on this data alone.

1. Introduction

The Great Lakes Regional Air Toxic Emissions Inventory represents a unique milestone in the continuing effort to quantify and manage the toxic air emissions that impact the waters of the Great Lakes Basin. The air management programs in all eight Great Lakes states, Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin, and the province of Ontario, cooperated in compiling an emissions inventory of toxic air contaminants from point and area sources.

The emission inventory effort was developed in support of the Great Lakes Toxic Substances Control Agreement signed in 1986 by the governors of eight Great Lakes states, and in 1989 by the premier of Ontario. This agreement contains a provision ensuring cooperation toward "quantifying the loadings of toxic substances originating from all sources, with the purpose of developing the most environmentally and economically sound control programs". Sharing emissions information of comparable and compatible quality across jurisdictions will ensure sound regulatory and policy decisions in the region.

Since 1989, the Great Lakes states and Ontario have been working together, through the Great Lakes Commission (GLC), to develop a regional database of toxic air emissions. In 1994, the Southwest Lake Michigan Air Toxics Pilot Inventory project was developed. This pilot inventory, led by the states of Michigan, Illinois, Indiana and Wisconsin, served to test the infrastructure for regional emissions inventory compilation and to develop the Regional Air Pollutant Inventory Development System, RAPIDS. The pilot inventory focused on emissions of 49 compounds from small point and area sources. In late 1995, the eight Great Lakes states and Province of Ontario began compiling the first full inventory of toxic air emissions from point and area sources for the year 1993. That pilot inventory was completed in 1998 while the states and province began work on the base year 1996 inventory. Compilation of the 1997 and 1998 inventories are currently underway. The GLC will continue working with state and provincial agencies, organizations and industrial sectors in developing and implementing the latest emission estimation procedures.

In 1996, work began on the mobile source module for RAPIDS. RAPIDS 2.0 was designed with the ability to estimate emissions from on-road vehicles and non-road engines. This major addition, along with other enhancements, has made RAPIDS one of the most comprehensive multimedia inventory systems available. With the addition of mobile sources to the inventory, the database has been expanded to include 82 toxic air pollutants. The states and province began estimating mobile source emissions using RAPIDS 2.0 in late 1998.

Table 1-1: Great Lakes Commission's list of 82 targeted toxic air pollutants.

Non-Metal Compounds (Excluding PAHs)	
Acetaldehyde	Methyl chloroform (1,1,1-Trichloroethane)
Acrolein	Methylene chloride (Dichloromethane)
Acrylamide	Methylene diphenyl diisocyanate (MDI)
Acrylonitrile	Parathion
Atrazine	Pentachloronitrobenzene (quintobenzene)
Benzene (including benzene from gasoline)	Pentachlorophenol
1,3-Butadiene	Phenol
Carbon tetrachloride	Phosgene
Chlordane	Styrene
Chloroform	2,3,7,8 -tetrachlorodibenzo -furan (TCDF)
Coke oven emissions	2,3,7,8 -tetrachlorodibenzo -p-dioxin (TCDD)
Di-n-butyl phthalate	Tetrachloroethylene (Perchloroethylene)
Di-n-octyl phthalate	Toluene
Dichloroethyl ether (bis(2-chloroethyl) ether)	2,4-Toluene diisocyanate
Diethylhexyl phthalate (Bis(2-ethylhexyl)phthalate) (DEHP)	Total polychlorinated biphenyls (PCBs)
Ethylbenzene	Total polychlorinated dibenzodioxins (PCDDs)
Ethylene dibromide (Dibromoethane)	Total polychlorinated dibenzofurans (PCDFs)
Ethylene dichloride (1,2-Dichloroethane)	Trichloroethylene
Ethylene oxide	2,4,5-Trichlorophenol
Formaldehyde	2,4,6-Trichlorophenol
Glycol ethers	Trifluralin
Heptachlor	Vinyl chloride
Hexachlorobenzene	Xylenes (Meta)
Hexachlorobutadiene	Xylenes (Ortho)
Hexachloroethane	Xylenes (Para)
Hydrazine	Xylenes (Iso)
Methoxychlor	
16 PAHs (POM)	
Acenaphthene	Chrysene
Acenaphthylene	Dibenz(a,h)anthracene
Anthracene)	Fluoranthene
Benz(a)anthracene	Fluorene
Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene
Benzo(b)fluoranthene	Naphthalene
Benzo(ghi)perylene	Phenanthrene
Benzo(k)fluoranthene	Pyrene
Metal Compounds	
Antimony	Copper
Arsenic	Lead
Beryllium	Alkylated lead
Cadmium	Maganese
Chromium	Mercury
Chromium (6)	Nickel
Cobalt	

The 1996 reports are available as a printed document or online via the Great Lakes Information Network (GLIN, http://www.great-lakes.net). Additional information, including background documents, GIS maps depicting air emissions across the basin, the emissions protocol document and list of products for the project are located on the emission inventory project's web site (http://www.glc.org/air/air3.html).

The air emissions inventory project is funded primarily by the U.S. EPA under the auspices of the urban area sources program, Section 112(k), and the Great Waters program, Section 112(m).

The eight states and Ontario will continue to work collaboratively to improve and refine the toxics inventory and strengthen its ability to support sound regulatory decisions at all levels of government.

2. Methodology

The Great Lakes Air Toxic Emissions Inventory Project focuses on locating, evaluating, and estimating emissions from sources regulated under each of the state and provincial air management programs. The inventory process also includes a number of small point and area sources not currently regulated under the Clean Air Act (CAA) and that collectively release large amounts of one or more toxic air pollutants of concern. These sources include small coal-fired boilers, consumer solvents, residential fuel combustion, wood burning stoves, and fireplaces. Summaries of the methodologies for area source emission estimations are shown in Appendices J through Y. These area source methodologies were based on the U.S. EPA's Emissions Inventory Improvement Program (EIIP) and the Great Lakes States methods for estimation emissions from area sources. For a detailed discussion on the inventory methodology, see *The 1993 Great Lakes Regional Air Toxic Emissions Inventory* report and the *Air Toxic Emissions Inventory Protocol for the Great Lakes States* online at http://great-lakes.net/envt/air/airtox.html.

Air Toxic Emissions Inventory Protocol for the Great Lakes States

The *Air Toxic Emissions Inventory Protocol for the Great Lakes States*, finalized in June 1994, provides instructions for the states to follow to ensure the completeness, accuracy, consistency and quality of the regional toxic emissions inventory. Each jurisdiction prepared its portion of the Great Lakes Regional Air Toxic Inventory in the manner outlined in the protocol, and performed a quality assurance check on their emissions data and estimates to ensure the highest possible quality database.

Inventory completeness, one of the most important objectives of the protocol, has been addressed by identifying all source categories that have the potential to emit one of the target toxic air pollutants within the Great Lakes basin. The accuracy of the inventory is addressed by using the most recent information available to identify and locate emission sources and estimate emissions. The QA/QC plan outlines procedures to maximize the quality and accuracy of the inventory's data and estimates.

The protocol does not contain specific, detailed information on estimating emissions for each type of device/process expected to be encountered in the Great Lakes basin. Instead, acceptable generic emission estimating techniques (EETs) are identified for the emission sources that produce toxic pollutants. A generic discussion of each EET and a list of technical references are provided in the protocol for those who require more detailed information.

By focusing on the procedures that the participating jurisdictions must follow to compile their portion of the database, the protocol assigns responsibilities and procedures (joint, state/provincial, Great Lakes Commission, U.S. EPA, Great Lakes National Program Office (GLNPO)); outlines procedures to identify and locate emission sources of target compounds; guides selection of specific emission estimation techniques; instructs jurisdictions on compiling and updating the regional repository at GLNPO; outlines quality assurance/quality control procedures for emission data and estimates; and identifies and explains the full suite of automated tools available for developing the regional inventory (RAPIDS, FIRE, SPECIATE and others).

Since the participating states envision that the full regional database of air toxic emissions data and estimates will be updated periodically, the protocol also provides the procedures to update the regional inventory and an estimated schedule for such updates. Procedures to resolve differences of opinion among the participating states regarding various aspects of the regional inventory development effort is a significant component of the protocol.

The protocol outlines the major steps and checkpoints that the Great Lakes jurisdictions followed in developing their portion of the inventory. These include the completion of: staff resource development; device/process identification in the study area; data collection requirements; emission calculation and area source reconciliation; QA/QC activities and upload to the regional repository at GLNPO.

Two important issues for the inventory development effort are the appropriate level of detail and the use of facility versus area approach for calculating emissions. For the inventory, the protocol defines the following level of detail as being appropriate for meeting the goals of the project:

- **Emittants included:** Include all target compounds listed in Table 1-1;
- **Spatial resolution:** By county for area and mobile sources, and to the nearest 100 meters for facility sources and associated devices;
- **Temporal resolution:** Annual emissions estimates and annual activity data; and
- **Source/device/process categorization:** By the most detailed source/device/process as identified in U.S. EPA's Source Classification Codes (SCC) and Area and Mobile Source (AMS) coding systems of process codes plus a further breakdown by Standard Industrial Classification (SIC), as appropriate, to better categorize a given source (required to prevent the problem of inconsistent aggregation of sources/devices/processes among the participating states).

The protocol describes the two emission calculation approaches as follows:

- **Facility source approach:** Separately identify each device/process at each facility source and calculate its emissions (often referred to as a facility/point source approach); and
- **Area source approach:** Aggregate all similar or identical device/processes within a defined area and calculate their total emissions directly using the appropriate surrogate activity data (the source in this case is the area in which all of the devices are found, usually an entire county).

The area source approach is generally used for sources that are small and numerous, such as gasoline stations and dry cleaning establishments. They are not included as facility sources because the effort required to gather and estimate emissions for each individual facility is beyond the resources available for inventory development efforts. Some area sources, such as consumer products, have no analog as a facility source.

The protocol refers to certain software tools (e.g. the Regional Air Pollutant Inventory Development System, discussed below) that can be used to prepare a state or province's portion of the regional inventory. However, the protocol procedures, if followed, will result in emissions data and estimates that are compatible and consistent, whether or not these software tools are used.

Developing and Testing Client/Server Emission Estimation and Inventory Software: RAPIDS

Development of the Regional Air Pollutant Inventory Development System (RAPIDS) has been the key to the effort to develop a comprehensive, accurate and consistent air toxic emissions inventory across eight states and one province of Ontario.

During the course of this inventory, the regional Steering Committee worked closely with the project software development contractor, Windsor Technologies Inc., to enhance and test RAPIDS. The RAPIDS enhancements during this phase of the project included: the incorporation of a mobile source module to estimate emissions from on-road and non-road mobile sources, growth factors algorithm to project emissions, controlled emission factor functionality, development of mobile sources emission factors, and improvement of emissions estimation and reporting capabilities. This effort represents the first attempt to prepare software for estimating toxic pollutant emissions on a multi-state basis. RAPIDS is a client/server system developed in PowerBuilder® with an ORACLE® back-end database. The software takes full advantage of new Internet/Great Lakes Information Network (GLIN) connections between the states, the Great Lakes Commission and the U.S. EPA GLNPO office in Chicago. For a more detailed discussion on RAPIDS, please see http://great-lakes.net/envt/air/airtox.html.

Collecting and Compiling Data from Eight States and One Province

Each state and province based emission estimates on the best available inventory data. The states and province promoted consistency among their respective inventories by following the *Air Toxics Emissions Inventory Protocol for the Great Lakes States* and by using emission factors from FIRE Version 6.0 or later.

Rather than comparing emissions from one jurisdiction to the next, the emphasis of this project was to prepare a reliable and technically accurate inventory for the region as a whole and to outline areas where improvements are needed in overall methodology and implementation.

Coordination Methods

As a regional effort, a high level of coordination and communication was necessary to ensure consistency among the eight states and province in terms of data management, methodology, calculation methods and other issues. The Great Lakes Commission provided project management and secretariat services.

During the course of the inventory, Steering Committee members and associates communicated via daily e-mail exchanges, conference calls on a weekly or biweekly basis, and monthly or bimonthly in-person meetings to oversee contractor development of the inventory software, and to resolve outstanding issues and inconsistencies among the eight states and one province contributing to the regional inventory.

The Steering Committee developed an Internet group mailing service, airtoxics@great-lakes.net, which facilitates transmittal of thousands of messages between members, contractors, and with a larger group of peer reviewers, university and industry researchers, other Great Waters/Urban Area Source states (including Texas and Louisiana), and federal agency representatives. The Great Lakes Commission holds a complete archive of all airtoxics@great-lakes.net messages, including minutes for all conference calls and in-person meetings at http://great-lakes.net/lists/airtoxics/.

Finally, the Steering Committee established Quality Assurance/Quality Control (QA/QC) criteria for use by the states and province to ensure the report provides an accurate and useful summary of toxic air emissions at the regional level. The committee then made a QA/QC review of the regional inventory to identify and correct any remaining differences. Details of the Steering Committee QA/QC efforts and all related e-mail transactions have been archived by the Great Lakes Commission.

3. Results

The following results represent emissions from point and area sources in the Great Lakes region. These results are based on 1996 data. Mobile sources for 1996 will be released early next year.

Definitions of point and area sources are dependent on data collection methods, as reporting requirements for air toxics emissions are different from state to state, one emission source defined as an area source in one state may be covered as a point source in other states.

The regional emission inventory, using 1996 data, includes emissions from 16 area source categories:

- Agricultural Pesticide Application
- Architectural Surface Coatings
- Auto Body Refinishing
- Chromium Electroplating
- Consumer and Commercial Solvent Use
- Dry Cleaning
- Gasoline Marketing
- Graphic Arts
- Industrial Surface Coating
- Landfills
- Marine Vessel Loading, Ballasting, and Transit
- Public Owned Treatment Works
- Residential Fuel Combustion
- Residential Wood Combustion
- Solvent Cleaning
- Traffic Markings

Although these categories are covered by all states, some states and the province of Ontario may not estimate emissions for some area source categories due to the coverage of point sources and resource restrictions. For example, the Marine Vessel Loading, Ballasting, and Transit category is covered in point sources for IL, IN, and WI. No emissions were estimated for this area source category from these states.

Overall

The 1996 emissions were estimated for 82 target compounds, however, data were only available to obtain emissions for 77 air toxins, including 16 polycyclic aromatic hydrocarbons (PAHs), 49 non-metal compounds and 12 metal compounds. Table 2 shows pollutant names and estimated emissions from point and/or area sources. Among the 77 pollutants, 76 pollutants are emitted from point sources, and 62 pollutants are emitted from area sources. Area sources contribute more than two thirds of total emissions for 15 PAHs, 16 non-metal compounds, and 1 metal compound. Point sources are responsible for more than two thirds of total emissions for 1 PAH, 29 non-metal compounds and 10 metal compounds. The contributions of point and area sources to the remaining four non-metal compounds and one metal compound are relatively even.

Among the 77 pollutants, toluene was estimated to have the highest emissions at 265,156,995 pounds, while 2,4,5-Trichlorophenol emissions are the lowest recorded at about 0.02 pounds. Point and area source emissions are from 641 distinct standard industrial classification (SIC) codes and 1143 distinct source classification codes (SCC).

It should be noted that this project has demonstrated that area sources are significant contributors to the total emissions of certain toxic air pollutants; further improvement on emissions estimation techniques and development of emission factors are needed for some source categories.

Specific Pollutants

A closer look was taken at the top five non-metal compounds and the top five metal compounds according to the emission totals. The selected pollutants are toluene, xylenes (includes o, m, and p), tetrachloroethylene, benzene, methyl chloroform, manganese, chromium, copper, lead, and nickel.

The source contribution of emissions for the selected 10 pollutants was analyzed by category for area sources and the first two digits of the SIC codes for point sources. The most significant source categories and their contributions are shown in Tables 3 and 4. More than 90% of emissions of tetrachloroethylene, benzene, and methyl chloroform are attributed to area sources. Dry Cleaning and Solvent Cleaning account for about 75% and 17% of tetrachloroethylene emissions, respectively. Residential Wood Combustion and Gasoline Marketing contribute approximately 71% and 9% of benzene emissions, respectively. Solvent Cleaning is responsible for about 62% of methyl chloroform emissions while Consumer and Commercial Solvent Use accounts for 35% of the total contribution. Although more than 73% of emissions are from area sources for toluene and xylenes, the source distribution is more scatted. The contributions from Solvent Cleaning, Consumer and Commercial Solvent Use, Gasoline Marketing, Architectural Surface Coatings, and Industrial Surface Coating ranged from 6.3% to 20.4% of toluene emissions.   Consumer and Commercial Solvent Use, Gasoline Marketing, SIC 37xx (Manufacturing of Transportation Equipment), Industrial Surface Coating, and Auto Body Refinishing contribute from 8.5% to 22.6% of xylenes emissions.

In contrast with the top five non-metal compounds, point sources dominate the emissions of the top five metal compounds, accounting for more than 91% contributions. The most significant source category for all five metal compounds is Primary Metal Industries (SIC code 33xx) which contribute 33% to nickel emissions and up to 82% to copper emissions. Other significant sources include SIC 32xx (Stone, Clay, and Glass Products) with a 27.5% contribution to manganese; SIC 49xx (Electric, Gas, and Sanitary Services) with a 36.3% contribution to chromium, 19.4% contribution to lead and a 27.6% contribution to nickel; and SIC 10xx (Metal Mining) with a 17.3% contribution to lead.

Detailed analyses of source contributions for each pollutant are shown in pie charts and tables following Table 3-3.

Please note that the above analysis is based on point and area source emissions only. Mobile sources have been identified as significant sources for benzene, 1,3-butadiene, formaldehyde, and acrolein. Therefore, the source contributions are expected to change for these pollutants when mobile source emissions become available for analysis.

Table 3-1: Summary of 1996 air toxics emissions from point and area sources

Pollutant Name	Cas No.	Point (lb)	Area (lb)	Total (lb)	Point (%)	Area (%)
PAHs						
Acenaphthene	83329	41,084.78	204,768.52	245,853.29	16.71	83.29
Acenaphthylene	208968	202,998.49	2,431,824.74	2,634,823.24	7.70	92.30
Anthracene	120127	46,755.30	264,590.97	311,346.27	15.02	84.98
Benz(a)anthracene	56553	50,968.99	661,651.54	712,620.53	7.15	92.85
Benzo(a)pyrene	50328	76,738.75	141,360.76	218,099.51	35.19	64.81
Benzo(b)fluoranthene	205992	59,799.58	127,953.99	187,753.57	31.85	68.15
Benzo(ghi))perylene	191242	20,794.49	111,024.70	131,819.19	15.78	84.22
Benzo(k)fluoranthene	207089	10.53	58,418.72	58,429.24	0.02	99.98
Chrysene	218019	2,190,653.64	310,437.15	2,501,090.79	87.59	12.41
Dibenz(a,h)anthracene	53703	8,185.16	65,348.74	73,533.90	11.13	88.87
Fluoranthene	206440	128,848.67	380,021.52	508,870.19	25.32	74.68
Fluorene	86737	135,258.56	457,233.95	592,492.51	22.83	77.17
Indeno(1,2,3-cd)pyrene	193395	22,351.77	165,706.30	188,058.07	11.89	88.11
Naphthalene	91203	1,219,148.27	12,553,337.60	13,772,485.87	8.85	91.15
Phenanthrene	85018	477,278.15	5,967,147.96	6,444,426.11	7.41	92.59
Pyrene	129000	147,545.66	343,174.43	490,720.09	30.07	69.93
Non-Metal Compounds (Excluding PAHs)						
Acetaldehyde	75070	1,571,519.37	348,654.85	1,920,174.23	81.84	18.16
Acrolein	67641	138,296.73	328,869.10	467,165.83	29.60	70.40
Acrylamide	107028	1,280.42		1,280.42	100.00	0.00
Acrylonitrile	107131	2,283,472.45	59,233.12	2,342,705.57	97.47	2.53
Atrazine	1912249		9,540,401.15	9,540,401.15	0.00	100.00
Benzene	71432	6,014,889.67	58,665,453.39	64,680,343.05	9.30	90.70
1,3-Butadiene	106990	439,831.30	6,339,210.89	6,779,042.19	6.49	93.51
Carbon tetrachloride	56235	93,942.94	44,269.11	138,212.06	67.97	32.03
Chlordane	57749	0.94		0.94	100.00	0.00
Chloroform	67663	1,426,701.99	135,142.77	1,561,844.76	91.35	8.65
Coke oven emissions		1,926,830.47		1,926,830.47	100.00	0.00
Dichloroethyl ether (bis(2-chloroethyl) ether)	111444	923.15		923.15	100.00	0.00
Diethylhexyl phthalate (DEHP)	117817	44,639.50		44,639.50	100.00	0.00
Di-n-butyl phthalate	84742	37,211.44	5,325,509.66	5,362,721.10	0.69	99.31
Di-n-octyl phthalate	117840	8,047.87		8,047.87	100.00	0.00
Ethylbenzene	100414	5,110,659.72	14,482,016.31	19,592,676.04	26.08	73.92
Ethylene dibromide (Dibromoethane)	106934	5,599,448.51	34,686.05	5,634,134.56	99.38	0.62
Ethylene dichloride (1,2-Dichloroethane)	107062	165,314.33	21,012.56	186,326.90	88.72	11.28

Table 3-1: Summary of 1996 air toxics emissions from point and area sources (continued)

Pollutant Name	Cas No.	Point (lb)	Area (lb)	Total (lb)	Point (%)	Area (%)
Ethylene oxide	75218	221,827.24	4,611,661.75	4,833,488.99	4.59	95.41
Formaldehyde	50000	36,563,726.38	2,318,026.63	38,881,753.01	94.04	5.96
Glycol ethers		6,975,364.72	3,411,537.60	10,386,902.31	67.16	32.84
Hexachlorobenzene	118741	8.74	1.20	9.94	87.91	12.09
Hexachlorobutadiene	87683	8.00		8.00	100.00	0.00
Hexachloroethane	67721	876.00		876.00	100.00	0.00
Hydrazine	302012	479.84		479.84	100.00	0.00
Methyl chloroform (1,1,1-Trichloroethane)	71556	2,023,001.12	59,448,624.19	61,471,625.32	3.29	96.71
Methylene chloride (Dichloromethane)	74873	17,272, 959.83	15,194,320.25	32,467,280.08	53.20	46.80
Methylene diphenyl diisocyanate (MDI)	101688	44,345.27		44,345.27	100.00	0.00
Pentachlorophenol	87865	20,886.33		20,886.33	100.00	0.00
Phenol	108952	4,669,230.11	20,382.40	4,689,612.51	99.57	0.43
Phosgene	75445	194.76		194.76	100.00	0.00
Styrene	100425	11,148,935.34	7,736,438.47	18,885,373.81	59.03	40.97
2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)	1746016	0.32	0.01	0.33	96.57	3.43
2,3,7,8-tetrachlorodibenzo-furan (TCDF)	51207319	31.99	0.65	32.64	98.02	1.98
Tetrachloroethylene (Perchloroethylene)	127184	4,247,924.91	67,150,057.95	71,397,982.85	5.95	94.05
Toluene	108883	53,908,691.46	211,248,303.45	265,156,994.91	20.33	79.67
2,4-Toluene diisocyanate	584849	6,451.52	4,468.28	10,919.81	59.08	40.92
Total polychlorinated biphenyls (PCBs)	1336363	35.31	0.09	35.39	99.76	0.24
Total polychlorinated dibenzodioxins (PCDDs)		31.96	4.15	36.11	88.50	11.50
Total polychlorinated dibenzofurans (PCDFs)		22.46	22.91	45.37	49.51	50.49
Trichloroethylene	79016	16,414,463.40	34,856,735.12	51,271,198.52	32.01	67.99
2,4,5-Trichlorophenol	95954	0.02		0.02	100.00	0.00
2,4,6-Trichlorophenol	188062	12,784.14		12,784.14	100.00	0.00
Trifluralin	1582098	6,322.00	656,024.08	662,346.08	0.95	99.05
Vinyl chloride	75014	737,092.83	147,149.19	884,242.02	83.36	16.64
Xylenes (includes o, m, and p)	1330207	38,207,919.87	102,788,432.94	140,996,352.81	27.10	72.90
m-Xylenes	108383	71,488.43	739,420.28	810,908.71	8.82	91.18
o-Xylenes	95476	227,738.28	19,754,291.74	19,982,030.01	1.14	98.86
p-Xylenes	106423	3,086.21	483,519.35	486,605.56	0.63	99.37
Metal Compounds						
Antimony	7440360	59,601.20		59,601.20	100.00	0.00
Arsenic	7440382	164,679.94	1,011.69	165,691.63	99.39	0.61
Beryllium	7440417	15,745.90	432.71	16,178.61	97.33	2.67

Table 3-1: Summary of 1996 air toxics emissions from point and area sources (continued)

Pollutant Name	Cas No.	Point (lb)	Area (lb)	Total (lb)	Point (%)	Area (%)
Cadmium	7440439	222,966.16	282,829.91	505,796.07	44.08	55.92
Chromium	7440473	901,994.07	53,946.91	955,940.96	94.36	5.64
Chromium (6)	18540299	21,449.67	6,355.48	27,805.15	77.14	22.86
Cobalt	7440484	34,365.57	146,249.71	180,615.28	19.03	80.97
Copper	7440508	816,456.85	4,613.39	821,070.24	99.44	0.56
Lead	7439921	806,038.29	6,269.92	812,308.21	99.23	0.77
Manganese	7439965	3,230,807.56	20,869.23	3,251,676.81	99.36	0.64
Mercury	7439976	208,321.25	6,805.56	215,126.80	96.85	3.15
Nickel	7440020	557,257.45	53,735.05	610,992.50	91.20	8.80

Table 3-2: The most significant source categories for the top five non-metal compounds

Pollutant Name	Cas No.	Emissions (lb)	*Most Significant Source Category*	% of Contribution
Toluene	108883	265,156,994.91	Industrial Surface Coating	20.40
Xylenes (includes o, m, and p)	1330207	140,996,352.81	Auto Body Refinishing	22.63
Tetrachloroethylene	127184	71,397,982.85	Dry Cleaning	74.26
Benzene	71432	64,680,343.05	Residential Fuel Combustion	70.87
Methyl chloroform	71556	61,471,598.26	Solvent Cleaning	61.70

Table 3-3: The most significant source categories for the top five metal compounds

Pollutant Name	Cas No.	Emissions (lb)	*Most Significant Source Category*	% of Contribution
Manganese	7439965	3,251,676.81	Primary Metal Industries (SIC code 33xx)	58.93
Chromium	7440473	955,940.96	Primary Metal Industries (SIC code 33xx)	40.11
Copper	7440508	821,070.24	Primary Metal Industries (SIC code 33xx)	82.04
Lead	7439921	812,308.21	Primary Metal Industries (SIC code 33xx)	38.56
Nickel	7440020	610,992.50	Primary Metal Industries (SIC code 33xx)	32.61

Table 3-4: Summary of 1996 air toxics emissions by SCC. (Those represented contribute more than 5% to the regional total)

SCC	Material Code	IL	IN	MI	MN	NY	OH	PA	WI	ON	Emissions	Regional Percentage
2104008051	ACENAPHTHENE				x		x		x	x	165690.5273163060	67.39406
30300302	ACENAPHTHENE									x	25444.2339324800	10.34936
2104008000	ACENAPHTHENE	x									17694.0353900000	7.19699
2104008030	ACENAPHTHENE		x	x					x	x	14451.3203061701	5.87803
Other	ACENAPHTHENE	x	x	x	x	x	x		x	x	22573.1730550439	9.18156
2104008051	ACENAPHTHYLENE				x		x		x	x	2182780.014411660	82.84351
2104008030	ACENAPHTHYLENE		x	x					x	x	163754.500136991	6.21501
Other	ACENAPHTHYLENE	x	x	x	x	x	x		x	x	288288.725451349	10.94148
0	ACETALDEHYDE		x		x	x	x		x		778513.17000000	40.54388
2630020000	ACETALDEHYDE	x							x		340310.27804580	17.72289
39999992	ACETALDEHYDE									x	226363.91880000	11.78872
30700221	ACETALDEHYDE								x		125582.42000000	6.54016
Other	ACETALDEHYDE	x	x	x	x	x	x	x	x	x	449404.44315420	23.40435
2630020000	ACROLEIN	x							x		318987.36351940	68.28140
39000989	ACROLEIN				x						55225.22453200	11.82133
30700707	ACROLEIN				x						23622.32059500	5.05652
Other	ACROLEIN	x	x	x	x	x	x	x	x		69330.92135360	14.84075
39999992	ACRYLAMIDE									x	564.37760000	44.07743
30199999	ACRYLAMIDE	x									390.00000000	30.45868
0	ACRYLAMIDE						x		x		326.00000000	25.46033
Other	ACRYLAMIDE	x							x		0.04240000	0.00356
50100506	ACRYLONITRILE		x	x	x	x		x			2059968.854254270	87.93119
0	ACRYLONITRILE		x			x	x		x		171252.000000000	7.31001
Other	ACRYLONITRILE	x	x	x	x	x		x	x	x	110484.715745730	4.75880
2104008051	ANTHRACENE				x		x		x	x	222981.434247237	71.61847
2104008030	ANTHRACENE		x	x					x	x	19265.367075731	6.18776
30300302	ANTHRACENE									x	18559.711698000	5.96112
2104008000	ANTHRACENE	x									15924.631860000	5.11477
Other	ANTHRACENE	x	x	x	x	x	x		x	x	34615.125119032	11.11788
0	ANTIMONY		x		x	x	x		x		37237.8634943830	62.47838
50100515	ANTIMONY			x	x	x				x	7387.0460818745	12.39412
Other	ANTIMONY	x	x	x	x	x	x		x	x	14976.2904237425	25.12750
30300813	ARSENIC									x	59634.8488740000	35.99135
10100202	ARSENIC	x	x	x	x	x		x	x	x	43837.7813115835	26.45737
30302399	ARSENIC				x						8837.9473150120	5.33396
Other	ARSENIC	x	x	x	x	x	x	x	x	x	53381.0524994045	32.21732
2461800000	ATRAZINE	x	x	x	x	x	x		x		9540401.14521032	100.00000
2104008051	BENZ(A)ANTHRACENE				x		x		x	x	600949.6045245860	84.32954
2104008030	BENZ(A)ANTHRACENE		x	x					x	x	57803.8112316030	8.11144
Other	BENZ(A)ANTHRACENE	x	x	x	x	x			x	x	53867.1142438109	7.55902
2104008051	BENZO(A)PYRENE				x		x		x	x	102218.4269309310	46.86779
30600201	BENZO(A)PYRENE	x	x	x	x					x	39193.1383860660	17.97030
2630020000	BENZO(A)PYRENE								x		14734.9600000000	6.75607
30300308	BENZO(A)PYRENE	x	x	x						x	13806.5421882200	6.33039
30300302	BENZO(A)PYRENE	x	x							x	12236.4873073800	5.61051
Other	BENZO(A)PYRENE	x	x	x	x	x			x	x	35909.9531216728	16.46494
2104008051	BENZENE				x		x		x	x	38881352.09159000	60.11309
2104008030	BENZENE		x	x					x	x	3525861.97103931	5.45121
2104008000	BENZENE	x									3432642.86527000	5.30709
Other	BENZENE	x	x	x	x	x	x	x	x	x	18840486.12210070	29.12861
2104008051	BENZO(B)FLUORANTHENE				x		x		x	x	108399.8504096250	57.73517
30300302	BENZO(B)FLUORANTHENE									x	37075.8829869200	19.74710
30300308	BENZO(B)FLUORANTHENE									x	17517.9257634000	9.33028
2104008030	BENZO(B)FLUORANTHENE		x	x					x	x	9631.4835381081	5.12985
Other	BENZO(B)FLUORANTHENE	x	x	x	x	x			x	x	15128.4320379262	8.05760
2104008051	BENZO(GHI)PERYLENE				x		x		x	x	57536.7369309317	43.64822
2104008000	BENZO(GHI)PERYLENE	x									35388.0707800000	26.84592
2104008050	BENZO(GHI)PERYLENE								x	x	13288.6341820460	10.08096
30300302	BENZO(GHI)PERYLENE									x	13085.6059027400	9.92694
Other	BENZO(GHI)PERYLENE	x	x	x	x	x			x	x	12520.1330710536	9.49796

Table 3-4: Summary of 1996 air toxics emissions by SCC. (continued)

SCC	Material Code	IL	IN	MI	MN	NY	OH	PA	WI	ON	Emissions	Regional Percentage
2104008051	BENZO(K)FLUORANTHENE				x		x		x	x	51109.0534524588	87.47170
2104008030	BENZO(K)FLUORANTHENE		x	x					x	x	4811.0767676429	8.23402
Other	BENZO(K)FLUORANTHENE	x	x		x	x			x	x	2509.1154092104	4.29428
10100202	BERYLLIUM	x	x	x	x	x		x	x	x	6074.7461916712	37.54800
30500706	BERYLLIUM		x	x		x		x			3573.2830301510	22.08646
0	BERYLLIUM		x		x	x	x				1659.4097269998	10.25681
Other	BERYLLIUM	x	x	x	x	x		x	x	x	4871.1752741303	30.10873
50100791	DIETHYLHEXYL PHT								x		457.860000	49.59757
50182599	DIETHYLHEXYL PHT								x		388.120000	42.04300
50100702	DIETHYLHEXYL PHT								x		77.170000	8.35942
2501060052	1,3-BUTADIENE			x	x						5404741.650749510	80.05614
2501060050	1,3-BUTADIENE								x		661233.000000000	9.79432
Other	1,3-BUTADIENE	x	x	x	x	x	x	x	x	x	685214.659521701	10.14954
2104006000	CADMIUM		x						x	x	276056.9433746140	54.57870
50100102	CADMIUM	x	x	x	x	x		x			176759.6293534030	34.94682
Other	CADMIUM	x	x	x	x	x	x	x	x	x	52979.5094706867	10.47448
0	CARBON TETRACHLORIDE		x		x	x	x				86655.7540000028	62.69768
2401008000	CARBON TETRACHLORIDE	x	x			x	x		x		21245.9948000000	15.37203
2630020000	CARBON TETRACHLORIDE	x			x					x	20779.6112335049	15.03459
Other	CARBON TETRACHLORIDE	x	x	x	x	x			x	x	9530.6882107815	6.89570
50100515	CHLORDANE									x	0.9387627720	100.00000
50300701	CHLOROFORM							x	x		730154.9260000000	46.74952
30700199	CHLOROFORM				x			x	x		137238.7731000000	8.78697
30700102	CHLOROFORM					x			x		97362.8000000000	6.23383
0	CHLOROFORM		x		x	x	x		x		81372.3916900000	5.21002
39999992	CHLOROFORM									x	81025.6638000000	5.18782
2630020000	CHLOROFORM	x			x					x	78842.2574747398	5.04802
Other	CHLOROFORM	x	x	x	x	x		x	x	x	355847.8842990790	22.78382
50100506	CHROMIUM		x	x	x	x		x			271942.864328013	28.45459
30300904	CHROMIUM	x	x		x			x			252164.172390018	26.38506
0	CHROMIUM		x		x	x	x		x		196767.858800000	20.58870
Other	CHROMIUM	x	x	x	x	x	x	x	x	x	234833.263971115	24.57165
30901018	CHROMIUM VI	x			x						12363.3728520000	44.46432
2309100010	CHROMIUM VI				x	x					6320.4514217152	22.73122
10100202	CHROMIUM VI	x	x								1737.9951219892	6.25062
30901028	CHROMIUM VI	x			x						1684.1765832000	6.05707
Other	CHROMIUM VI	x	x	x	x	x			x	x	5699.1585775890	20.49677
10300209	CHRYSENE	x	x	x	x	x		x			2165765.8300445900	86.59285
2104008051	CHRYSENE				x		x		x	x	261728.0708324770	10.46456
Other	CHRYSENE	x	x	x	x	x		x	x	x	73596.8462148523	2.94259
2104006000	COBALT		x		x				x	x	141974.3016618010	78.62888
0	COBALT		x		x		x		x		11638.2098200000	6.44553
Other	COBALT	x	x	x	x	x			x	x	26950.0236939363	14.92559
30300308	COKE OVEN GS	x	x	x							1364678.986270000	70.82507
30300302	COKE OVEN GS	x	x								536863.680059999	27.86253
Other	COKE OVEN GS	x	x	x							25287.807284000	1.31240
30400215	COPPER	x									455125.246340000	55.43842
0	COPPER		x		x	x	x		x		189176.260000000	23.04340
30400224	COPPER	x							x		50041.100000000	6.09546
Other	COPPER	x	x	x	x	x		x	x	x	126613.809307323	15.42272
2104008051	DIBENZAHAN				x		x		x		50687.1605937501	68.93033
2104008000	DIBENZAHAN	x									7077.6141600000	9.62497
30300302	DIBENZAHAN									x	4825.8998234800	6.56282
2104008030	DIBENZAHAN		x	x					x	x	4811.0767676429	6.54267
Other	DIBENZAHAN	x	x	x	x	x			x	x	6132.1461317612	8.33921
2401030000	ETHYLENE DIBROMIDE								x		9842.8848000000	28.17641
2401990000	ETHYLENE DIBROMIDE				x						6856.5053302735	19.62755
2401055000	ETHYLENE DIBROMIDE								x		2953.4412000000	8.45457
2401015000	ETHYLENE DIBROMIDE								x		2654.6262000000	7.59918
2401040000	ETHYLENE DIBROMIDE								x		1906.6860000000	5.45811
Other	ETHYLENE DIBROMIDE	x	x	x	x	x	X		x	x	10718.9259050639	30.68418

Table 3-4: Summary of 1996 air toxics emissions by SCC. (continued)

SCC	Material Code	IL	IN	MI	MN	NY	OH	PA	WI	ON	Emissions	Regional Percentage
2425000000	DI-N-BUTYL PHTHALATE		x	x		x	x	x	x	x	5310077.8374121300	99.01835
Other	DI-N-BUTYL PHTHALATE	x	x	x	x	x	x	x	x	x	52643.1505786115	0.98165
50200505	1,2-DICHLORETHANE	x	x	x	x			x		x	3604368.070399270	62.29972
30101891	1,2-DICHLORETHANE							x			1961187.760000000	33.89816
Other	1,2-DICHLORETHANE	x	x	x	x	x		x	x	x	219972.738836632	3.80212
0	DIEYLHEXYL PHTHALATE		x		x	x			x		16234.205328000	36.36735
39999992	DIEYLHEXYL PHTHALATE									x	9060.906000000	20.29795
40200710	DIEYLHEXYL PHTHALATE					x					3863.000000000	8.65377
40201901	DIEYLHEXYL PHTHALATE					x					3421.730000000	7.66525
40202132	DIEYLHEXYL PHTHALATE		x								2540.000000000	5.69003
Other	DIEYLHEXYL PHTHALATE	x	x	x	x	x			x		9519.664849045	21.32565
0	DIOCTYL PHTHALATE		x								6280.0000000000	78.03304
40299995	DIOCTYL PHTHALATE					x					1582.0000000000	19.65737
Other	DIOCTYL PHTHALATE		x	x		x					185.8728669477	2.30959
2401001000	ETHYLBENZENE	x	x	x	x	x	x	x	x	x	6938684.35272171	35.41468
2501060100	ETHYLBENZENE	x						x	x		4163718.40945468	21.25140
0	ETHYLBENZENE		x		x	x	x		x		1751450.33599998	8.93931
40500501	ETHYLBENZENE	x									1071591.60000000	5.46935
2505020120	ETHYLBENZENE					x					1047510.00000000	5.34644
39999992	ETHYLBENZENE									x	1043185.85560000	5.32437
Other	ETHYLBENZENE	x	x	x	x	x	x	x	x	x	3576535.19894212	18.25445
2401030000	ETHYLENE OXIDE								x		1092560.050000000	22.60396
2460000000	ETHYLENE OXIDE	x	x	x	x	x			x		836736.505700000	17.31123
2401990000	ETHYLENE OXIDE				x						761072.091660352	15.74581
2401055000	ETHYLENE OXIDE								x		327831.770000000	6.78251
2401015000	ETHYLENE OXIDE								x		294663.220000000	6.09628
Other	ETHYLENE OXIDE	x	x	x	x	x	x		x	x	1520625.985762730	31.46021
2104008051	FLUORANTHENE				x		x		x	x	331381.6645245860	65.12106
30300308	FLUORANTHENE									x	42173.9448691400	8.28776
30300101	FLUORANTHENE	x	x								42158.0783999999	8.28464
2104008030	FLUORANTHENE		x	x					x	x	28901.2306101799	5.67949
Other	FLUORANTHENE	x	x	x	x	x		x	x	x	64255.2964668360	12.62705
2104008051	FLUORENE				x		x		x	x	388672.4517090470	65.59956
30300302	FLUORENE									x	87237.3734198000	14.72379
30300308	FLUORENE									x	38529.2849374000	6.50292
2104008030	FLUORENE		x	x					x	x	33723.6973842381	5.69184
Other	FLUORENE	x	x	x	x	x			x	x	44329.6326247446	7.48189
20200202	FORMALDEHYDE				x	x					10254406.59579960	26.37331
50200505	FORMALDEHYDE	x	x	x	x			x			8556343.46384877	22.00606
30600201	FORMALDEHYDE	x	x								5968460.28145340	15.35029
20200252	FORMALDEHYDE	x									2444139.73301000	6.28608
0	FORMALDEHYDE		x		x	x	x		x		2020157.26284000	5.19564
Other	FORMALDEHYDE	x	x	x	x	x		x	x	x	9638251.43007493	24.78862
0	GLYCOL ETHRS		x		x				x		4258901.27000000	41.00261
2460000000	GLYCOL ETHRS	x	x	x	x	x			x		2241197.20870000	21.57715
2425000000	GLYCOL ETHRS		x							x	984493.09038214	9.47822
Other	GLYCOL ETHRS		x		x	x	x		x	x	2902310.15794676	27.94202
0	HEXCHLORETH		x				x				849.0000000000	96.91781
Other	HEXCHLORETH		x								27.0000000000	3.08219
30500623	HEXCLBENZENE									x	6.8253128514	68.69144
2461800000	HEXCLBENZENE	x			x				x		1.2011408990	12.08854
10200902	HEXCLBENZENE				x						1.0451618100	10.51874
30500614	HEXCLBENZENE									x	0.8187200974	8.23978
Other	HEXCLBENZENE							x		x	0.0458555223	0.46150
30904001	HYDRAZINE					x					398.0000000000	82.94355
30112199	HYDRAZINE					x					33.0000000000	6.87723
Other	HYDRAZINE					x	x		x	x	48.8444190754	10.17922

Table 3-4: Summary of 1996 air toxics emissions by SCC. (continued)

SCC	Material Code	IL	IN	MI	MN	NY	OH	PA	WI	ON	Emissions	Regional Percentage
2104008051	INDENO(1,2,3-CD)PYR				x		x		x		118651.8029687500	63.09317
2104008000	INDENO(1,2,3-CD)PYR	x									35388.0707800000	18.81763
30300302	INDENO(1,2,3-CD)PYR									x	14539.5623101200	7.73142
2104008030	INDENO(1,2,3-CD)PYR		x	x					x	x	9631.4835381081	5.12155
Other	INDENO(1,2,3-CD)PYR	x	x	x	x	x			x	x	9847.1532266106	5.23623
0	LEAD		x		x	x	x		x		175512.809900016	21.60668
30300813	LEAD		x							x	144291.997276000	17.76321
30400301	LEAD	x	x	x	x				x		52868.959130900	6.50849
Other	LEAD	x	x	x	x	x		x	x	x	439634.267034532	54.12162
0	MANGANESE		x		x	x	x		x		1203210.134700000	37.00307
30500606	MANGANESE	x	x	x				x			526851.201089680	16.20258
30300908	MANGANESE	x	x	x		x		x		x	390027.487599000	11.99476
30400701	MANGANESE	x	x	x				x	x		210878.971361667	6.48529
30500613	MANGANESE	x	x	x				x			183351.865614590	5.63873
30500706	MANGANESE		x	x				x			177263.132726260	5.45148
Other	MANGANESE	x	x	x	x	x	x	x	x	x	560067.104918015	17.22409
50100102	MERCURY	x	x	x	x	x		x		x	99502.9222629122	46.09929
30499999	MERCURY							x			59746.3216000000	27.68022
Other	MERCURY	x	x	x	x	x	x	x	x	x	56595.5670648267	26.22049
0	METHYLENE DIPHENYL DIISOCYANATE		x		x						33557.2830000000	75.67275
39999992	METHYLENE DIPHENYL DIISOCYANATE									x	3741.2062000000	8.43654
30999999	METHYLENE DIPHENYL DIISOCYANATE		x								3462.0000000000	7.80692
Other	METHYLENE DIPHENYL DIISOCYANATE	x	x		x	x			x	x	3584.7782996064	8.08379
0	METHYLENE CHLORIDE		x		x	x			x		6438143.27049999	19.82998
2401001000	METHYLENE CHLORIDE	x	x	x	x	x	x		x	x	5187767.64486405	15.97872
2415000000	METHYLENE CHLORIDE	x		x				x			4863365.90214050	14.97954
39999992	METHYLENE CHLORIDE									x	3421444.40220000	10.53831
2460000000	METHYLENE CHLORIDE	x	x	x	x	x			x		2016996.73380000	6.21250
Other	METHYLENE CHLORIDE	x	x	x	x	x			x	x	10539007.52383710	32.46095
2104008051	NAPHTHALENE				x		x		x	x	5068425.188780160	36.80109
2460000000	NAPHTHALENE	x	x	x	x	x			x		2554555.310140000	18.54825
2401005000	NAPHTHALENE	x	x	x	x	x	x	x	x		2253594.153266500	16.36302
2501060100	NAPHTHALENE	x						x	x		840507.138979097	6.10280
0	NAPHTHALENE		x		x		x		x		821169.640000000	5.96239
Other	NAPHTHALENE	x	x	x	x	x	x	x	x	x	2234234.671812620	16.22245
30300904	NICKEL	x	x		x			x			137012.1435122420	22.43919
0	NICKEL		x		x	x	x		x		104326.0438999970	17.08602
10100401	NICKEL	x	x	x	x	x		x		x	47368.2260339698	7.75774
2104006000	NICKEL		x		x				x	x	36613.1936699458	5.99633
10200401	NICKEL	x	x	x	x	x			x		33585.3470492600	5.50045
Other	NICKEL	x	x	x	x	x	x	x	x	x	251688.1094049940	41.22027
50100101	PCBs					x				x	10.3197925740	29.15677
50100516	PCBs					x					9.4449600000	26.68508
50100515	PCBs			x	x	x				x	8.3784043114	23.67171
50100506	PCBs			x	x	x					2.2110792038	6.24702
30399999	PCBs		x								2.0000000000	5.65065
50200506	PCBs								x		1.9300000000	5.45288
Other	PCBs		x	x	x	x			x	x	1.1099218597	3.13589
10200903	PCDD	x	x	x	x	x				x	24.5945663282	68.11419
2104008051	PCDD				x						4.1465956276	11.48392
10300903	PCDD		x		x	x					3.9004606179	10.80225
Other	PCDD	x	x	x	x	x				x	3.4662232067	9.59964
2104008051	PCDF				x						22.8926633602	50.46047
10200903	PCDF	x	x	x	x	x				x	14.8265586235	32.68100
50100103	PCDF			x	x						3.4881421624	7.68863
Other	PCDF	x	x	x	x	x				x	4.1601562531	9.16990

Table 3-4: Summary of 1996 air toxics emissions by SCC. (continued)

SCC	Material Code	IL	IN	MI	MN	NY	OH	PA	WI	ON	Emissions	Regional Percentage
50182599	PENTACHLOROPHENOL								x		10715.750000	51.30509
50100791	PENTACHLOROPHENOL								x		9960.100000	47.68717
Other	PENTACHLOROPHENOL								x		210.480000	1.00774
2420020055	TETRACHLOROETHYLENE	x		x		x	x		x		24945196.87000000	33.86095
2420010055	TETRACHLOROETHYLENE	x	x	x		x					22840165.33000000	31.00355
2415000000	TETRACHLOROETHYLENE	x		x				x			8017222.37445008	10.88269
2420000000	TETRACHLOROETHYLENE									x	6295030.22259650	8.54496
Other	TETRACHLOROETHYLENE	x	x	x	x	x	x	x	x	x	11571896.29864450	15.70785
2104008051	PHENANTHRENE				x		x		x	x	4500248.614818060	69.83164
2104008030	PHENANTHRENE		x	x					x	x	1177742.299580150	18.27536
Other	PHENANTHRENE	x	x	x	x	x	x	x	x	x	766435.651479881	11.89300
0	PHENOL		x		x	x	x		x		2604606.141569000	55.53990
30120201	PHENOL	x									465320.593920000	9.92237
30599999	PHENOL	x									340214.000000000	7.25463
39999992	PHENOL									x	292096.272400000	6.22858
Other	PHENOL	x	x	x	x	x		x	x		987375.377631995	21.05452
0	PHOSGENE		x				x				193.0000000000	99.09632
Other	PHOSGENE	x				x					1.7600072334	0.90368
2104008051	PYRENE				x		x		x	x	298816.4517090470	60.89346
30300302	PYRENE									x	94507.1565590000	19.25887
30300308	PYRENE									x	42173.9448691400	8.59430
Other	PYRENE	x	x	x	x	x			x	x	55222.5487271733	11.25337
2401990000	STYRENE							x			7112743.40981244	37.66271
0	STYRENE		x		x	x	x		x		6495805.08289999	34.39596
30101817	STYRENE	x	x	x		x		x	x		995835.89705236	5.27305
Other	STYRENE	x	x	x	x	x	x	x	x	x	4280989.41255693	22.66828
10200903	TCDD,2378	x	x	x	x	x					0.2885936076	87.96967
Other	TCDD,2378	x	x	x	x	x			x	x	0.0394667427	12.03033
10200902	TCDF,2378			x	x						31.7214059420	97.19671
Other	TCDF,2378	x	x	x	x	x			x	x	0.9148900211	2.80329
2415000000	METHYL CHLOROFORM	x		x				x			24919898.61460430	40.53888
2460000000	METHYL CHLOROFORM	x	x	x	x	x			x		21453891.50490000	34.90049
2415050000	METHYL CHLOROFORM								x		3616937.84000000	5.88392
2415360000	METHYL CHLOROFORM		x								3473156.00000000	5.65002
Other	METHYL CHLOROFORM	x							x		8007714.57975367	13.02669
2401001000	TOLUENE	x	x	x	x	x	x	x	x	x	42099012.8838213	15.87701
2401990000	TOLUENE			x	x			x			38098027.4573700	14.36810
2460000000	TOLUENE	x	x	x	x	x			x		23774241.1350700	8.96610
2501060100	TOLUENE	x						x	x		14997652.4813106	5.65614
2401005000	TOLUENE	x	x	x	x	x	x	x	x		13351772.6388396	5.03542
Other	TOLUENE	x	x	x	x	x	x	x	x	x	132836330.9716660	50.09723
2425000000	2,4-TOLUENE DIISOCYANATE					x					4468.280900000	40.91905
0	2,4-TOLUENE DIISOCYANATE		x				x		x		2721.400000000	24.92169
40299995	2,4-TOLUENE DIISOCYANATE					x					2648.000000000	24.24952
40706404	2,4-TOLUENE DIISOCYANATE	x									611.520000000	5.60010
Other	2,4-TOLUENE DIISOCYANATE	x			x	x			x		470.604292498	4.30964
2415000000	TRICHLORETHYLENE	x		x				x			21544891.15877080	42.02143
40100205	TRICHLORETHYLENE	x	x	x	x	x		x	x		8167594.62166599	15.93018
2415050000	TRICHLORETHYLENE								x		3422217.08000000	6.67474
2415360000	TRICHLORETHYLENE		x								3286177.00000000	6.40940
Other	TRICHLORETHYLENE	x	x	x	x	x	x	x	x	x	14850317.89623750	28.96425
50100101	2,4,5-TRICHLORPHENOL									x	0.0217334759	100.00000
50100791	2,4,6-TRICHLORPHENOL								x		7655.3600000000	59.88169
50182599	2,4,6-TRICHLORPHENOL								x		4901.8200000000	38.34297
Other	2,4,6-TRICHLORPHENOL								x	x	226.9619863403	1.77534

Table 3-4: Summary of 1996 air toxics emissions by SCC. (continued)

SCC	Material Code	IL	IN	MI	MN	NY	OH	PA	WI	ON	Emissions	Regional Percentage
2461800000	TRIFLURALIN	x		x	x						656024.0821191450	99.04551
Other	TRIFLURALIN	x	x				x				6322.0273805638	0.95449
30101864	VINYL CHLORIDE			x							567293.4121090000	64.15590
64630001	VINYL CHLORIDE	x									138000.0000000000	15.60659
2630020000	VINYL CHLORIDE	x			x					x	131078.8564672990	14.82387
Other	VINYL CHLORIDE	x	x	x	x	x	x		x	x	47869.6755859449	5.41364
2501060101	XYLENE,M				x					x	281368.223644146	34.69789
2415000000	XYLENE,M			x	x						151594.080099535	18.69435
2501060100	XYLENE,M								x		70041.000000000	8.63735
0	XYLENE,M		x			x	x				46527.040000000	5.73764
Other	XYLENE,M		x	x	x	x		x	x	x	549530.343743681	67.76723
2104008051	XYLENE,O				x		x		x	x	5162048.98052351	25.83346
2401990000	XYLENE,O			x	x			x			4378803.21208584	21.91371
2401001000	XYLENE,O							x		x	4035705.32256469	20.19667
2501060100	XYLENE,O							x	x		3645945.58447933	18.24612
Other	XYLENE,O		x	x	x	x		x	x	x	2759526.24535778	13.81004
2415000000	XYLENE,P			x	x						151594.0800995350	31.15338
2501060101	XYLENE,P				x					x	108929.1322233990	22.38551
2415050000	XYLENE,P								x		37321.1600000000	7.66969
2415360000	XYLENE,P		x								35842.0000000000	7.36572
2501060100	XYLENE,P								x		27116.0000000000	5.57248
Other	XYLENE,P		x	x	x	x			x	x	125803.2123335190	25.85322
2401005000	XYLENES ISO	x	x	x	x	x	x	x	x		31905350.79628750	22.62849
0	XYLENES ISO		x		x	x	x		x		14913922.44950010	10.57752
2401990000	XYLENES ISO			x	x			x			13340462.22360290	9.46157
2460000000	XYLENES ISO	x	x	x	x	x			x		11956326.76360000	8.47988
39999992	XYLENES ISO									x	11273843.79720000	7.99584
2501060100	XYLENES ISO	x							x		8588474.50757999	6.09127
2401001000	XYLENES ISO	x	x	x	x	x	x	x	x	x	7248807.20746767	5.14113
Other	XYLENES ISO	x	x	x	x	x	x	x	x	x	41769189.90391940	29.62430

Figure 3-1:

ACENAPHTHENE
1996 Estimated Emissions* by Source Category for Point and Area Sources

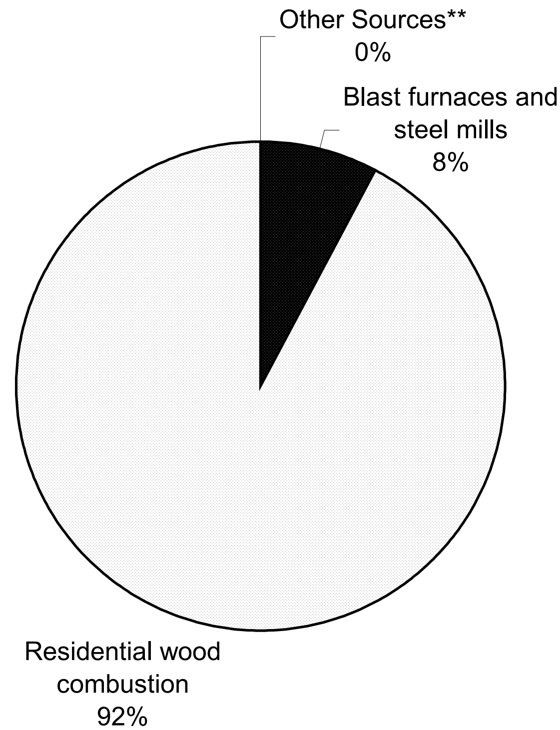
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	40,954.26	X	X					X		
-------	Residential wood combustion	204,768.23	X	X	X	X		X	X		X
-------	Other Sources**	130.80	X	X	X	X	X		X		

Total Estimated Emissions: 245,853.29 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-2:

ACENAPHTHYLENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



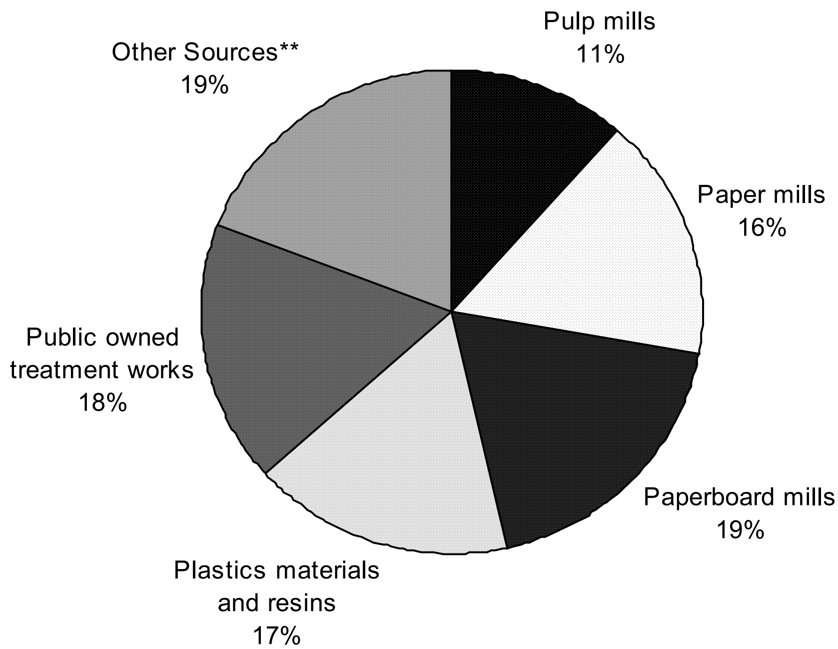
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	202,537.59	X	X					X		
-------	Residential wood combustion	2,431,824.46	X	X	X	X		X	X		X
-------	Other Sources**	461.18	X	X	X	X	X		X		

Total Estimated Emissions: 2,634,823.24 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-3:

ACETALDEHYDE
1996 Estimated Emissions* by Source Category for Point and Area Sources



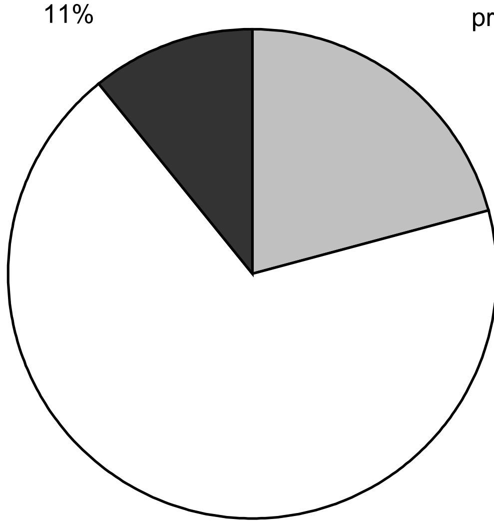
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2611	Pulp mills	216,620.35			X		X	X	X		X
2621	Paper mills	315,350.10	X		X	X	X			X	X
2631	Paperboard mills	358,254.24	X	X				X		X	X
2821	Plastics materials and resins	323,387.26	X	X			X	X			
-------	Public owned treatment works	340,310.28	X								X
-------	Other Sources**	366,251.99	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 1,920,174.23 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-4:

ACROLEIN
1996 Estimated Emissions* by Source Category for Point and Area Sources



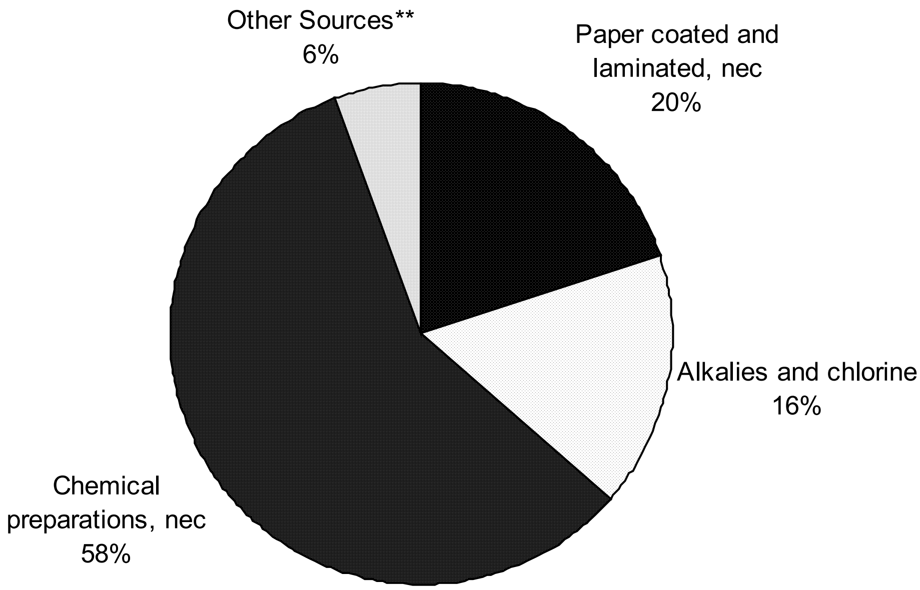
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2493	Reconstituted wood products	97,692.07	X		X	X					
-------	Public owned treatment works	318,987.36	X								X
-------	Other Sources**	50,486.39	X	X	X	X	X	X		X	X

Total Estimated Emissions: 467,165.83 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-5:

ACRYLAMIDE
1996 Estimated Emissions* by Source Category for Point and Area Sources



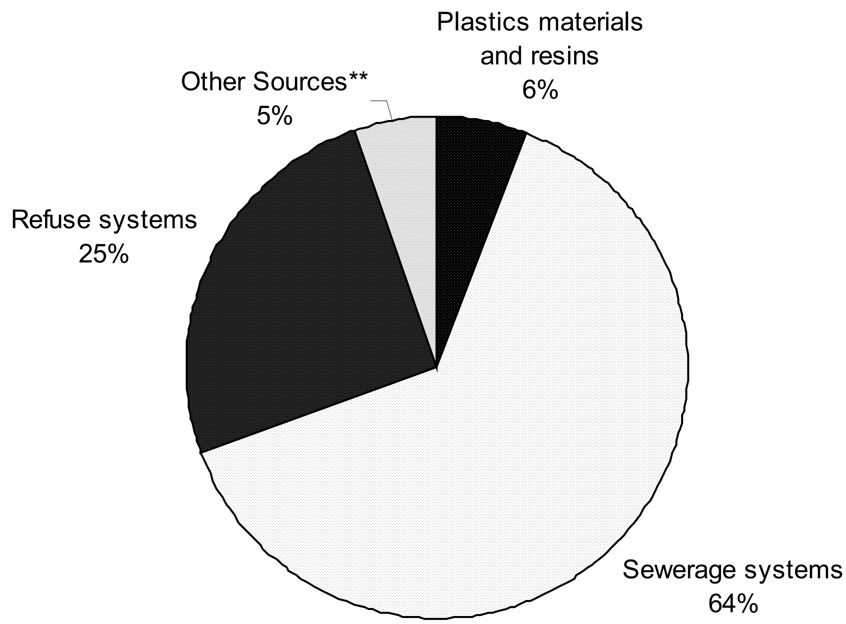
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2672	Paper coated and laminated, nec	255.00									X
2812	Alkalies and chlorine	209.44							X		
2899	Chemical preparations, nec	744.98	X						X		
-------	Other Sources**	71.00						X			X

Total Estimated Emissions: 1,280.42 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-6:

ACRYLONITRILE
1996 Estimated Emissions* by Source Category for Point and Area Sources



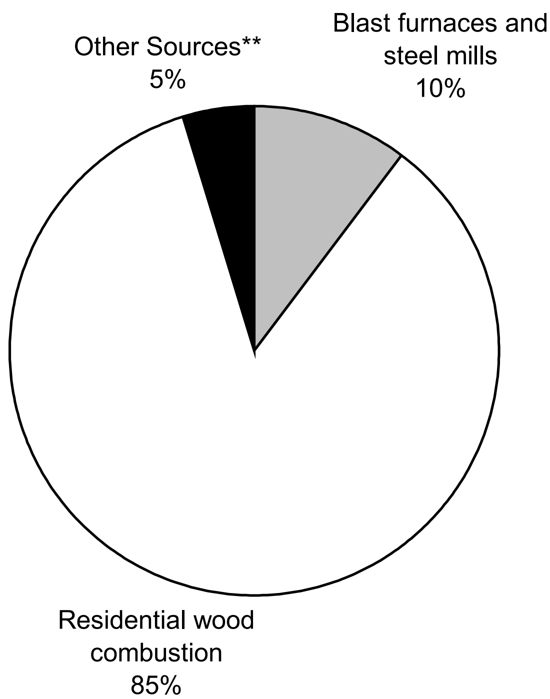
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2821	Plastics materials and resins	133,602.00		X			X	X			
4952	Sewerage systems	1,494,271.10			X	X	X			X	
4953	Refuse systems	591,566.44	X	X			X			X	X
-------	Other Sources**	123,266.03	X	X	X	X	X	X	X		X

Total Estimated Emissions: 2,342,705.57 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-7:

ANTHRACENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



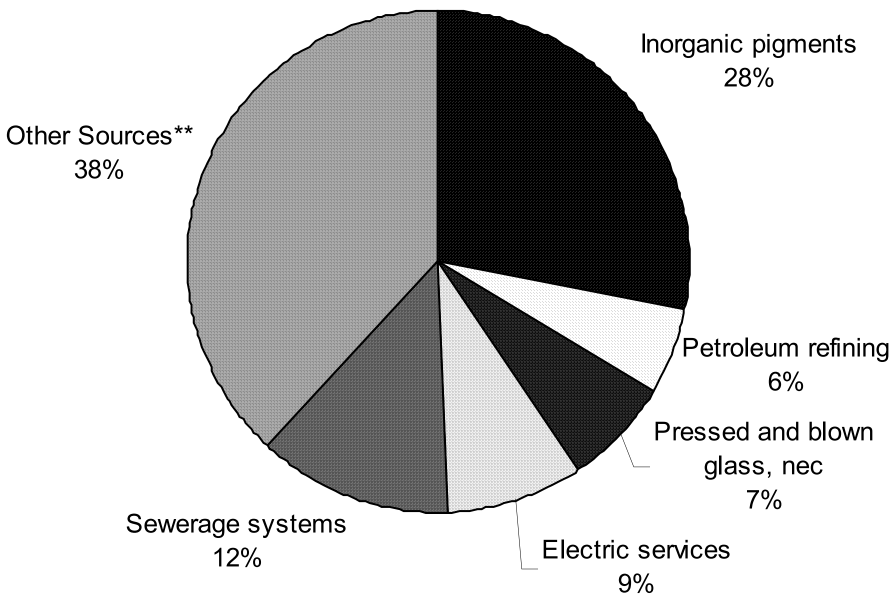
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	32,227.88	X	X					X		
-------	Residential wood combustion	264,590.61	X	X	X	X		X	X		X
-------	Other Sources**	14,527.79	X	X	X	X	X	X	X		

Total Estimated Emissions: 311,346.27 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-8:

ANTIMONY
1996 Estimated Emissions* by Source Category for Point and Area Sources



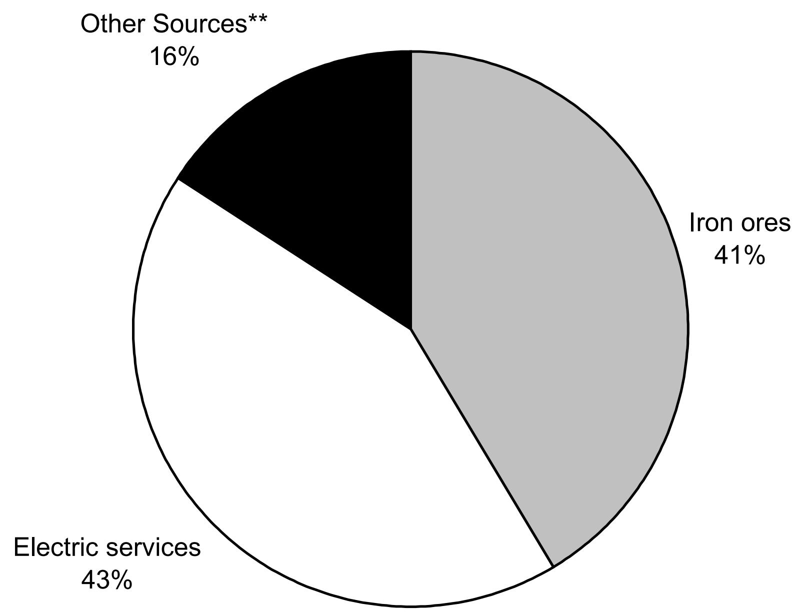
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2816	Inorganic pigments	16,718.00						X			X
2911	Petroleum refining	3,301.73	X	X		X		X			
3229	Pressed and blown glass, nec	4,132.00						X			
4911	Electric services	5,375.04	X	X	X	X	X		X	X	
4952	Sewerage systems	7,403.12	X		X	X	X		X		
-------	Other Sources**	22,671.31	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 59,601.20 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-9:

ARSENIC
1996 Estimated Emissions* by Source Category for Point and Area Sources



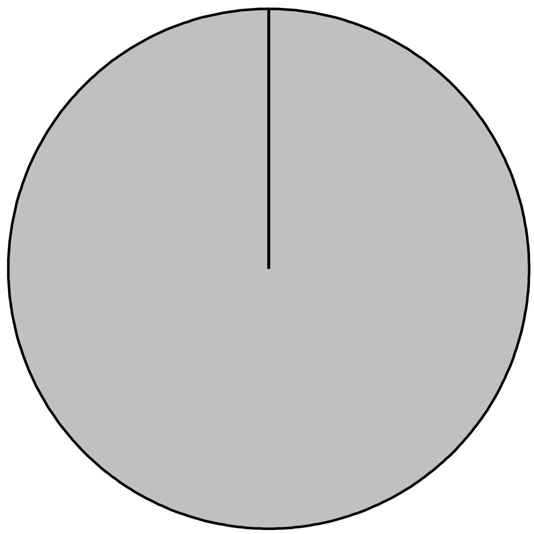
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
1011	Iron ores	68,367.33			X	X			X		
4911	Electric services	70,889.06	X	X	X	X	X		X	X	X
-------	Other Sources**	26,435.23	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 165,691.63 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-10:

ATRAZINE
1996 Estimated Emissions* by Source Category for Point and Area Sources



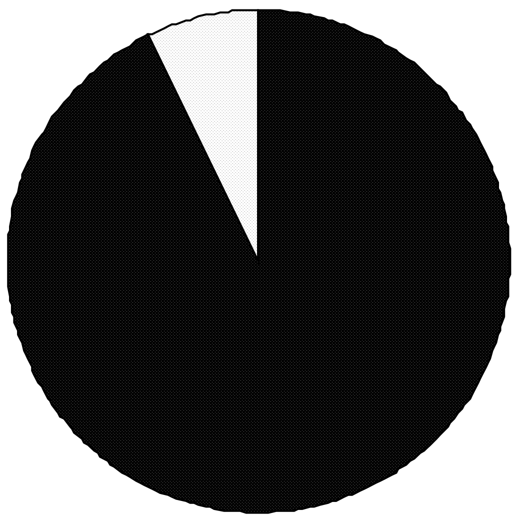
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Agricultural pesticide application	9,540,401.15	X	X	X	X	X	X			X

Total Estimated Emissions: 9,540,401.15 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-11:

BENZ(A)ANTHRACENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



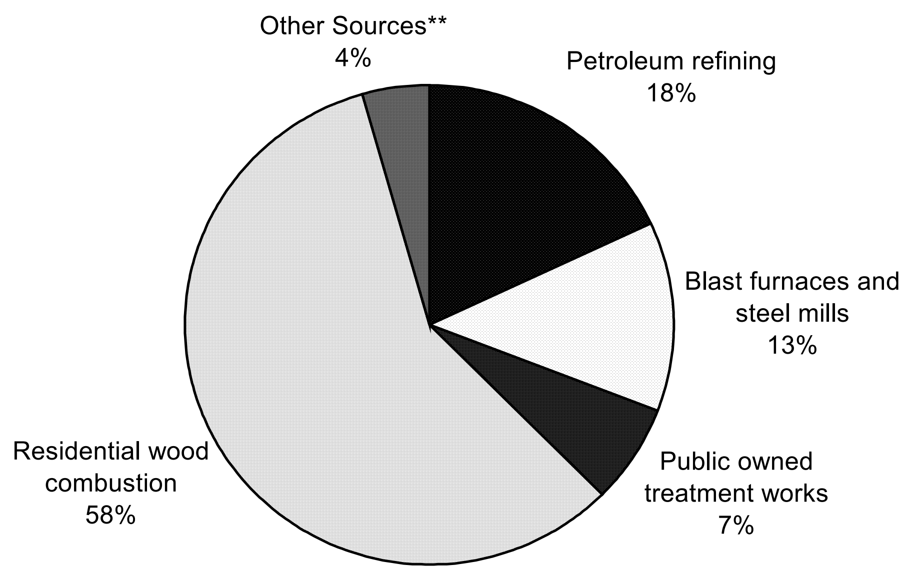
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Residential wood combustion	661,215.70	X	X	X	X		X	X		X
-------	Other Sources**	51,404.84	X	X	X	X	X		X		X

Total Estimated Emissions: 712,620.53 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-12:

BENZO(A)PYRENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



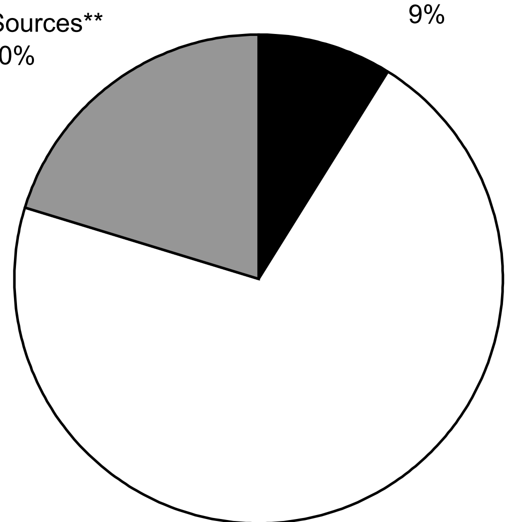
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2911	Petroleum refining	39,272.37	X	X	X	X	X		X		
3312	Blast furnaces and steel mills	28,054.35	X	X	X				X		
-------	Public owned treatment works	14,734.96									X
-------	Residential wood combustion	126,625.57	X	X	X	X		X	X		X
-------	Other Sources**	9,412.26	X	X	X	X	X		X		X

Total Estimated Emissions: 218,099.51 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-13:

BENZENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



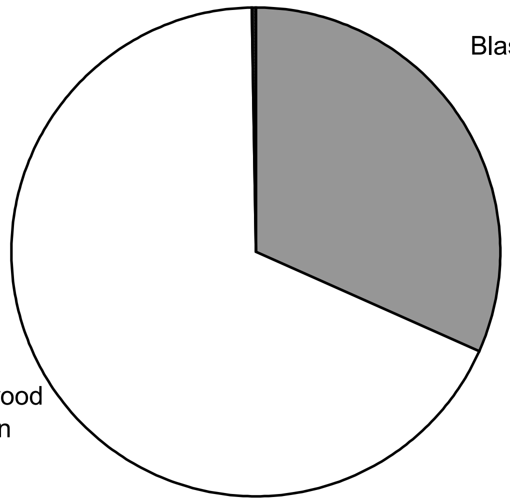
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Gasoline marketing	5,695,485.39	X	X	X	X			X	X	X
-------	Residential wood combustion	45,839,856.93	X	X	X	X		X	X		X
-------	Other Sources**	13,145,000.74	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 64,680,343.05 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-14:

BENZO(B)FLUORANTHENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



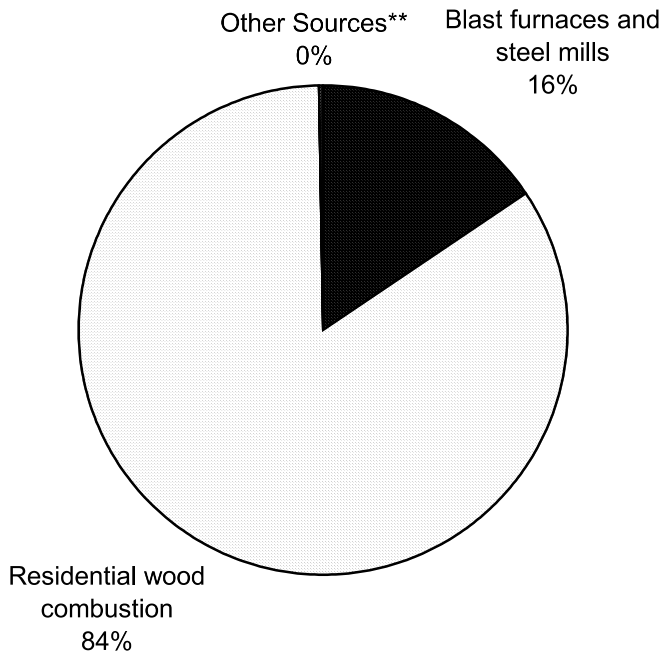
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	59,321.22							X		
-------	Residential wood combustion	127,953.70	X	X	X	X		X	X		X
-------	Other Sources**	478.65	X	X	X	X	X		X		X

Total Estimated Emissions: 187,753.57 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-15:

BENZO(GHI)PERYLENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



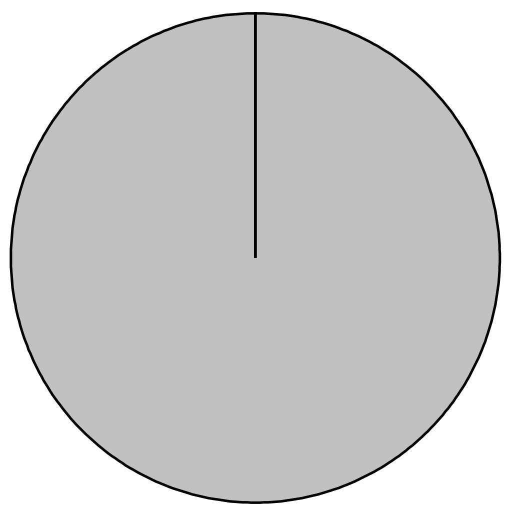
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	20,495.07	X	X					X		
-------	Residential wood combustion	111,024.52	X	X	X	X		X	X		X
-------	Other Sources**	299.61	X	X	X	X	X		X		

Total Estimated Emissions: 131,819.19 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-16:

BENZO(K)FLUORANTHENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



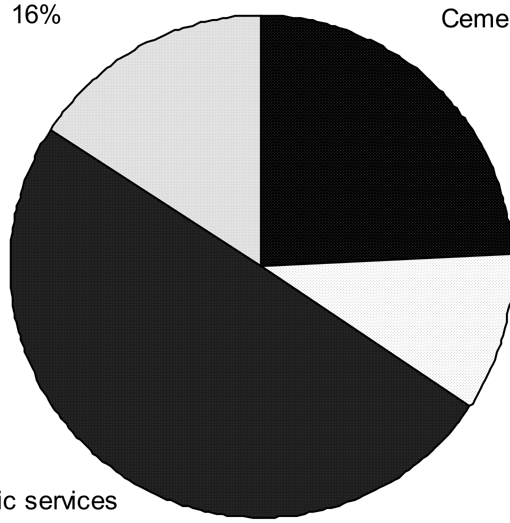
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Residential wood combustion	58,418.44	X	X	X	X		X	X		X
-------	Other Sources**	10.81	X	X		X	X		X		

Total Estimated Emissions: 58,429.24 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-17:

BERYLLIUM
1996 Estimated Emissions* by Source Category for Point and Area Sources



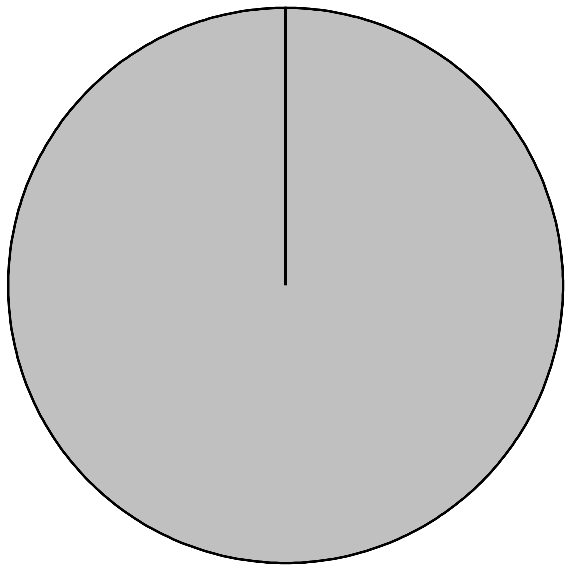
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3241	Cement, hydraulic	3,914.47	X	X	X		X			X	
3351	Copper rolling and drawing	1,653.02	X					X			
4911	Electric services	8,037.34	X	X	X	X	X		X	X	X
-------	Other Sources**	2,573.78	X	X	X	X	X		X	X	X

Total Estimated Emissions: 16,178.61 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-18:

DICHLOROETHYL ETHER
1996 Estimated Emissions* by Source Category for Point and Area Sources



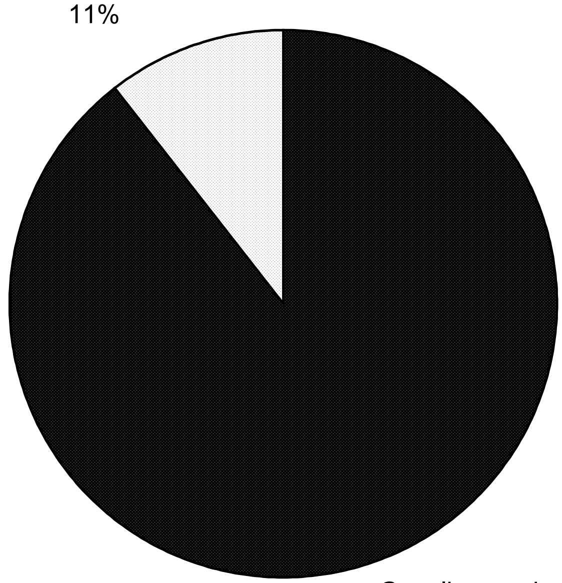
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
4952	Sewerage systems	923.15									X

Total Estimated Emissions: 923.15 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-19:

1,3-BUTADIENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



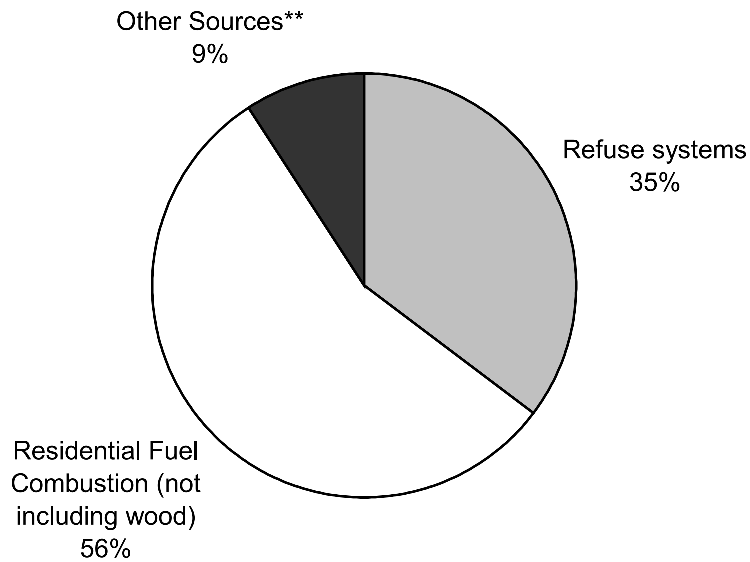
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Gasoline marketing	6,065,974.65			X	X					X
-------	Other Sources**	713,067.54	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 6,779,042.19 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-20:

CADMIUM
1996 Estimated Emissions* by Source Category for Point and Area Sources



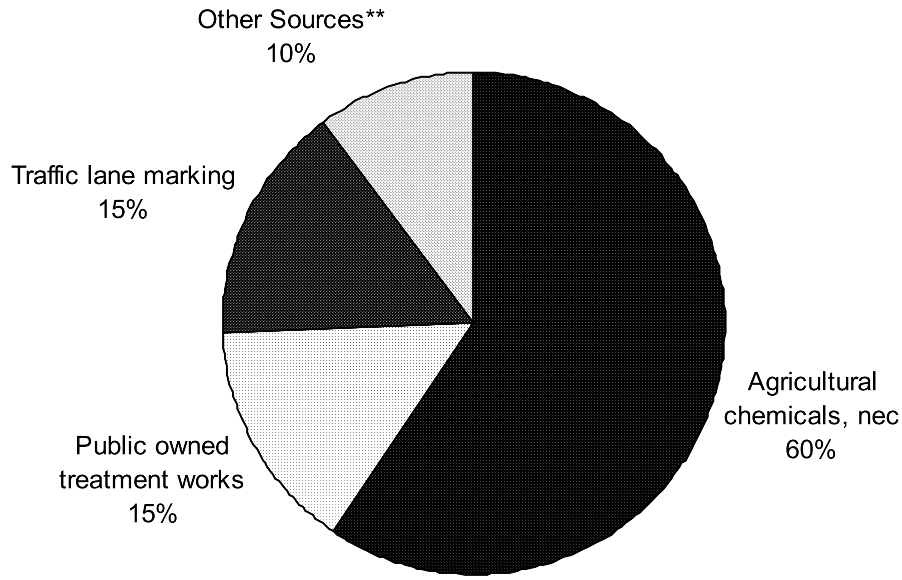
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
4953	Refuse systems	177,941.42	X	X	X	X	X			X	
-------	Residential Fuel Combustion	281,568.32	X	X		X			X		X
-------	Other Sources**	46,286.33	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 505,796.07 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-21:

CARBON TETRACHLORIDE
1996 Estimated Emissions* by Source Category for Point and Area Sources



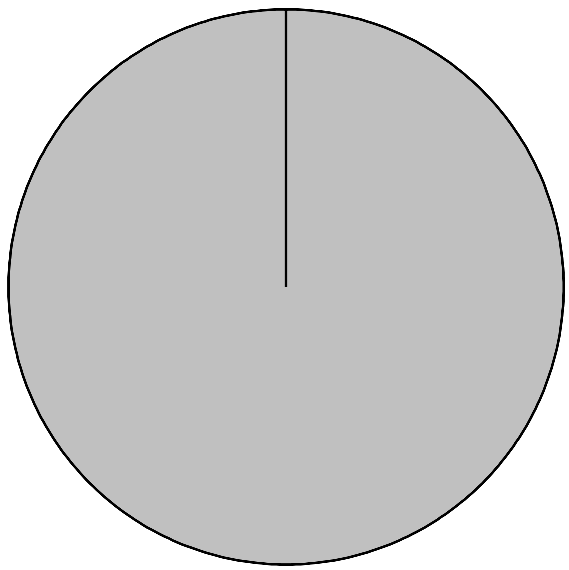
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2879	Agricultural chemicals, nec	82,080.50					X	X			
-------	Public owned treatment works	20,779.61	X			X			X		
-------	Traffic markings	21,245.99	X	X			X	X			X
-------	Other Sources**	14,105.95	X	X	X	X	X	X	X		X

Total Estimated Emissions: 138,212.06 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-22:

CHLORDANE
1996 Estimated Emissions* by Source Category for Point and Area Sources



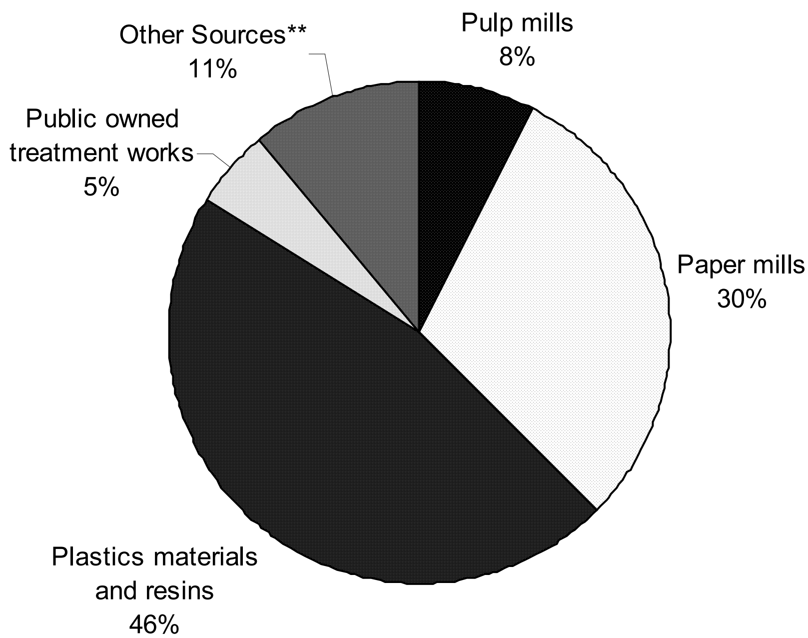
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
4952	Sewerage systems	0.94							X		

Total Estimated Emissions: 0.94 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-23:

CHLOROFORM
1996 Estimated Emissions* by Source Category for Point and Area Sources



SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2611	Pulp mills	118,092.30							X	X	X
2621	Paper mills	466,235.98				X	X			X	X
2821	Plastics materials and resins	724,189.82		X			X			X	
-------	Public owned treatment works	78,842.26	X			X			X		
-------	Other Sources**	174,484.41	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 1,561,844.76 lbs.

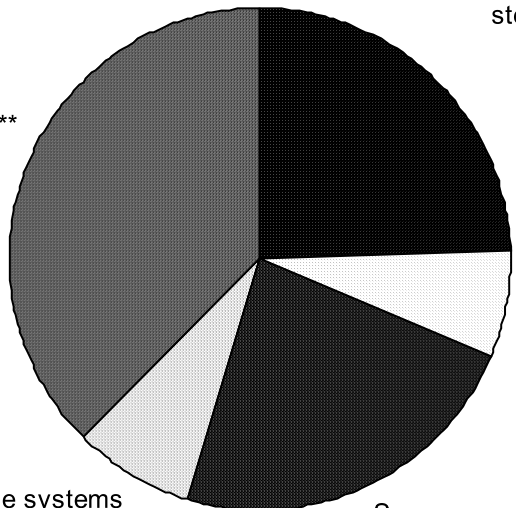
* Each jurisdiction estimated emissions for those sources for which they had data available.

** Other Sources: Individually less than five percent of the total.

(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-24:

CHROMIUM
1996 Estimated Emissions* by Source Category for Point and Area Sources



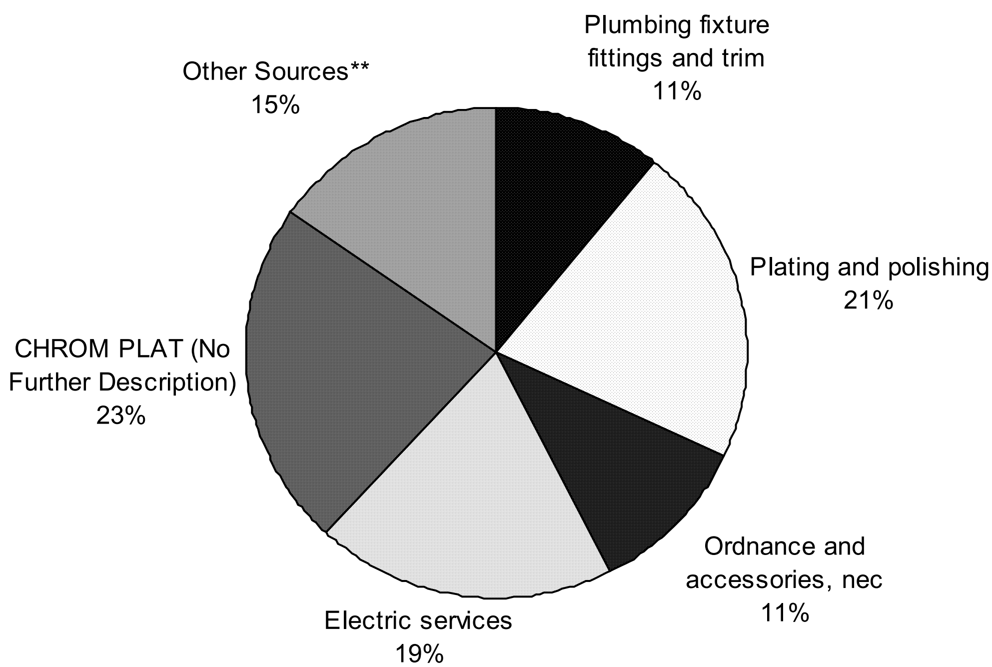
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	232,817.54	X	X	X	X	X	X		X	X
3313	Electrometallurgical products	68,001.60						X	X		
4952	Sewerage systems	221,454.43	X		X	X	X		X	X	X
4953	Refuse systems	75,332.00	X	X	X	X	X			X	
-------	Other Sources**	358,335.41	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 955,940.96 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-25:

CHROMIUM VI
1996 Estimated Emissions* by Source Category for Point and Area Sources



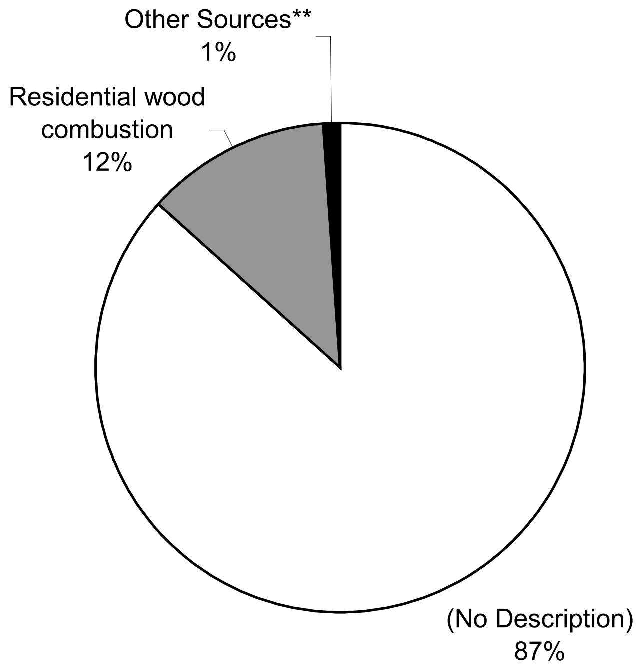
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3432	Plumbing fixture fittings and trim	3,003.05	X								
3471	Plating and polishing	5,889.73	X			X					X
3489	Ordnance and accessories, nec	2,960.47	X			X					
4911	Electric services	5,364.15	X	X	X	X	X				
-------	Chromium electroplating	6,355.48				X	X				
-------	Other Sources**	4,232.27	X	X	X	X	X		X		X

Total Estimated Emissions: 27,805.15 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-26:

CHRYSENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



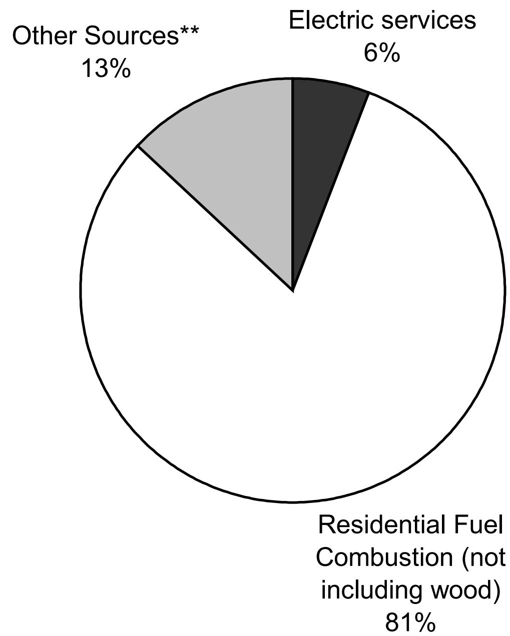
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
8299	Schools and Educational Sevices	2,165,301.60								X	
-------	Residential wood combustion	310,436.77	X	X	X	X		X	X		X
-------	Other Sources**	25,352.42	X	X	X	X	X		X		X

Total Estimated Emissions: 2,501,090.79 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-27:

COBALT
1996 Estimated Emissions* by Source Category for Point and Area Sources



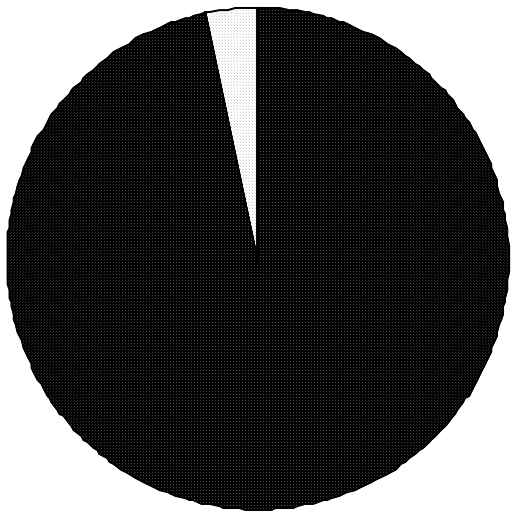
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
4911	Electric services	10,638.89	X	X	X	X	X		X		X
-------	Residential Fuel Combustion	146,249.71		X		X			X		X
-------	Other Sources**	23,726.68	X	X	X	X	X	X	X		X

Total Estimated Emissions: 180,615.28 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-28:

COKE OVEN GS
1996 Estimated Emissions* by Source Category for Point and Area Sources



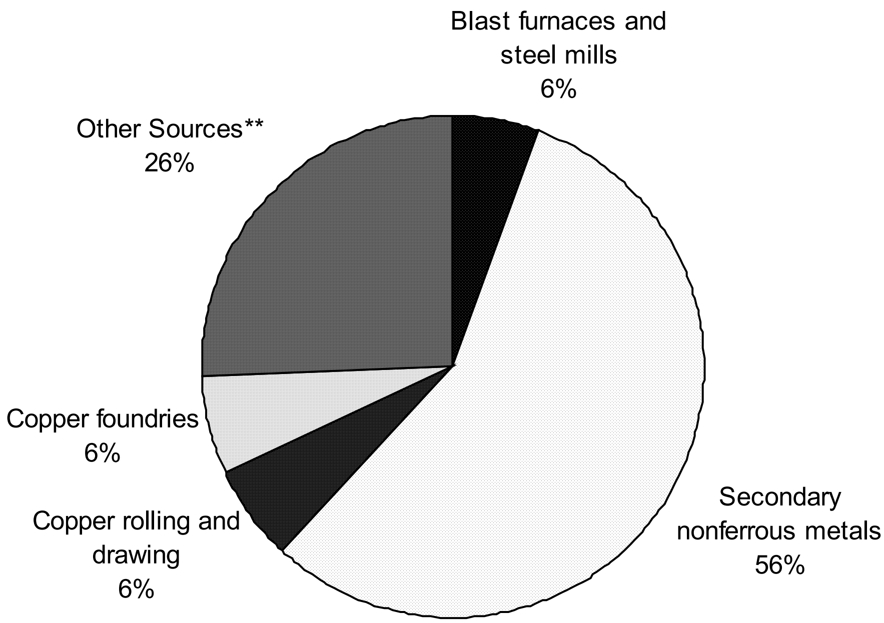
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	1,861,934.47	X	X	X						
-------	Other Sources**	64,896.00		X							

Total Estimated Emissions: 1,926,830.47 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-29:

COPPER
1996 Estimated Emissions* by Source Category for Point and Area Sources



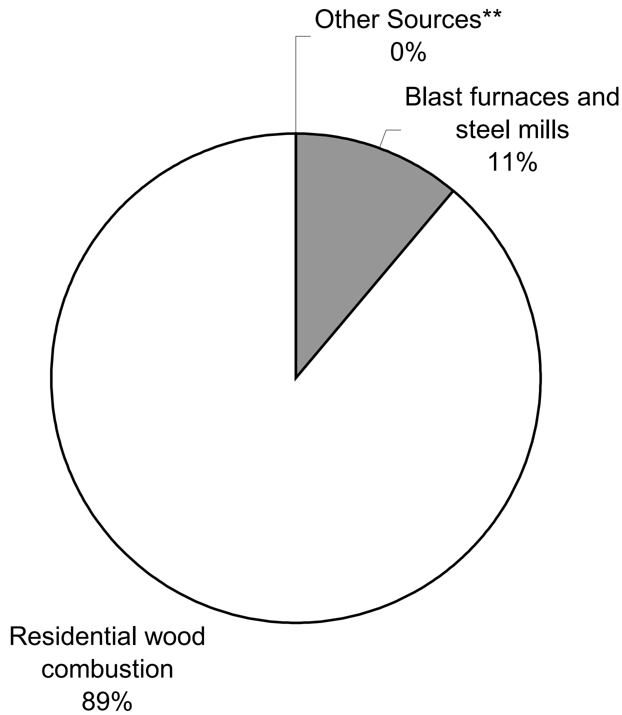
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	46,277.35	X	X	X	X	X	X	X	X	X
3341	Secondary nonferrous metals	461,886.06	X	X		X	X	X		X	X
3351	Copper rolling and drawing	50,177.00	X	X				X		X	X
3366	Copper foundries	52,544.76	X	X				X			X
-------	Other Sources**	210,185.08	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 821,070.24 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-30:

DIBENZ(A,H)ANTHRACENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



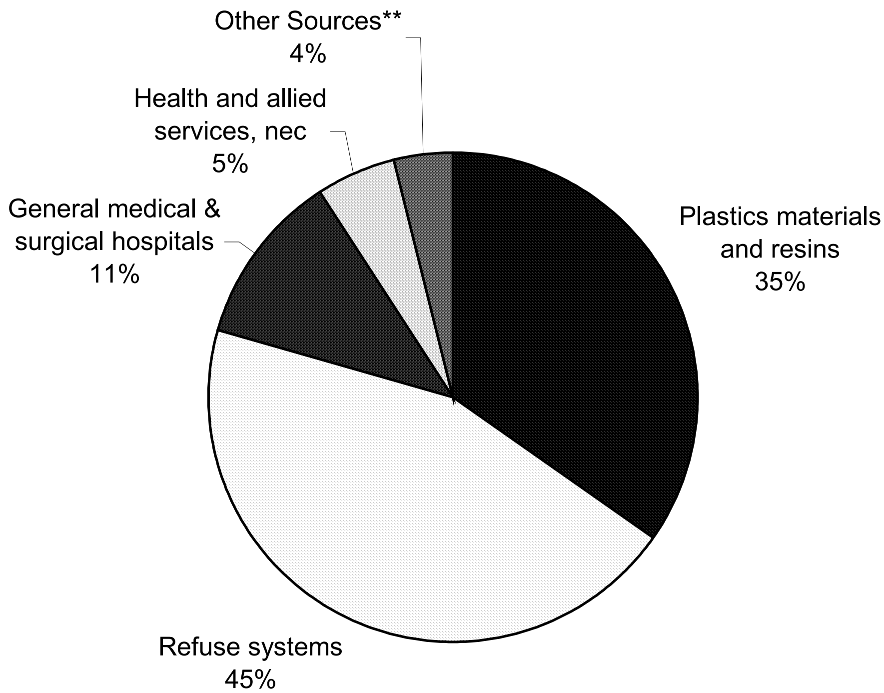
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	8,169.44	X						X		
-------	Residential wood combustion	65,348.56	X	X	X	X		X	X		X
-------	Other Sources**	15.91	X	X	X	X	X		X		

Total Estimated Emissions: 73,533.90 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-31:

ETHYLENE DIFBROMIDE
1996 Estimated Emissions* by Source Category for Point and Area Sources



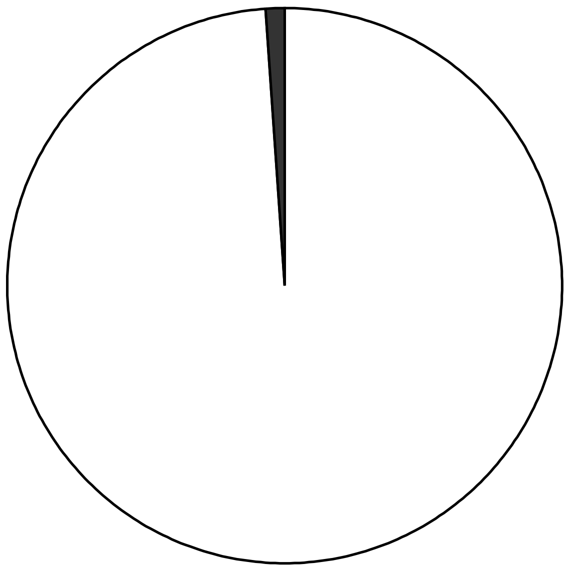
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2821	Plastics materials and resins	1,953,826.19		X						X	
4953	Refuse systems	2,522,021.83	X	X	X					X	
8062	General medical & surgical hospitals	637,635.45	X	X		X				X	
8099	Health and allied services, nec	301,258.45	X							X	
-------	Other Sources**	219,392.63	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 5,634,134.56 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-32:

DI-N-BUTYL PHTHALATE
1996 Estimated Emissions* by Source Category for Point and Area Sources



SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Graphic arts	5,310,077.84		X	X		X	X	X	X	X
-------	Other Sources**	52,643.27	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 5,362,721.10 lbs.

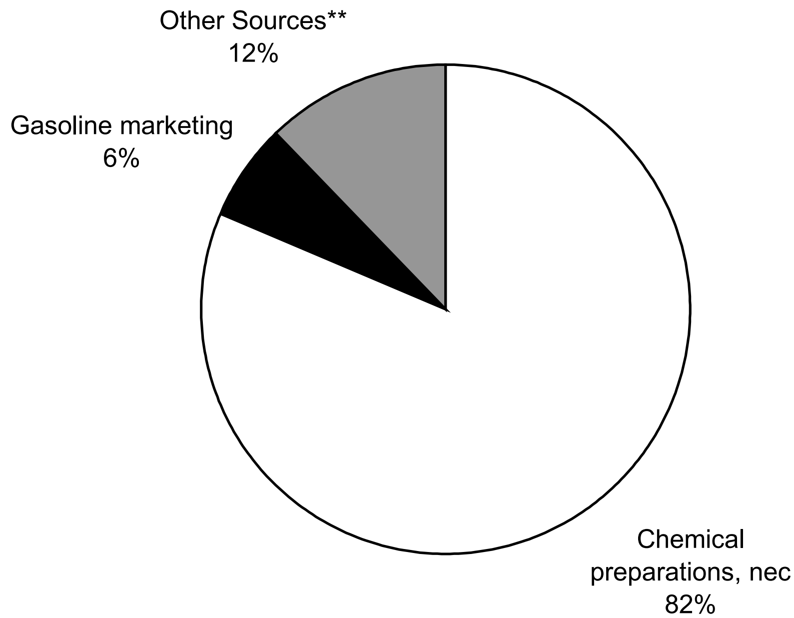
* Each jurisdiction estimated emissions for those sources for which they had data available.

** Other Sources: Individually less than five percent of the total.

(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-33:

ETHYLENE DICHLORIDE
1996 Estimated Emissions* by Source Category for Point and Area Sources



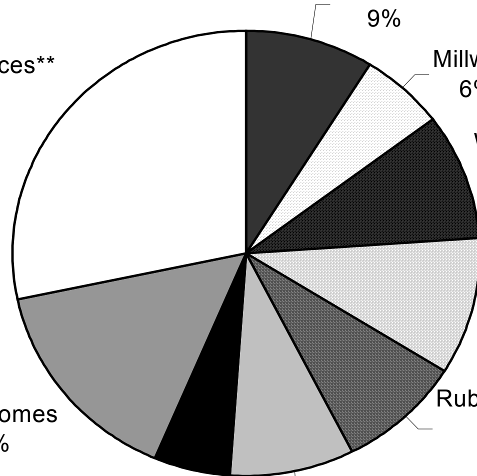
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2899	Chemical preparations, nec	151,822.05		X					X		
-------	Gasoline marketing	11,882.77			X	X			X		X
-------	Other Sources**	22,622.08	X	X	X	X	X		X		X

Total Estimated Emissions: 186,326.90 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-34:

DIETHYLHEXYL PHTHALATE
1996 Estimated Emissions* by Source Category for Point and Area Sources



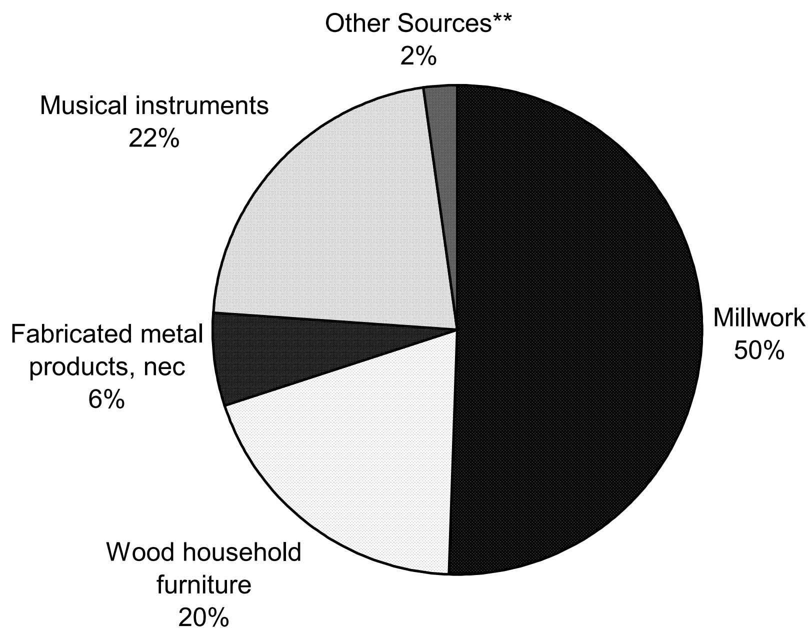
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
0	Unknown	3,954.21	X			X	X				
2431	Millwork	2,660.80		X		X					
2499	Wood products, nec	4,080.00		X			X				
2899	Chemical preparations, nec	4,409.20							X		
3021	Rubber and plastics footwear	3,863.00					X				
3086	Plastics foam products	3,873.48							X		
3089	Plastics products, nec	2,308.51		X		X			X		X
3716	Motor homes	6,878.00		X							
-------	Other Sources**	12,612.31	X	X	X	X	X		X		X

Total Estimated Emissions: 44,639.50 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-35:

DI-N-OCTYL PHTHALATE
1996 Estimated Emissions* by Source Category for Point and Area Sources



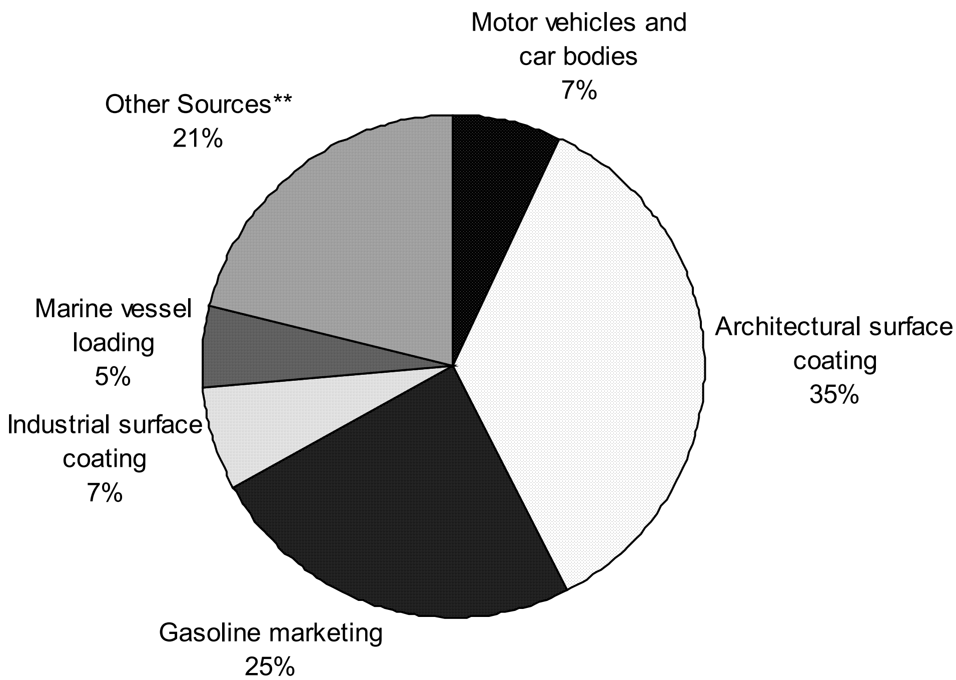
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2431	Millwork	4,060.00		X							
2511	Wood household furniture	1,582.00					X				
3499	Fabricated metal products, nec	480.00		X							
3931	Musical instruments	1,740.00		X							
-------	Other Sources**	185.87		X	X		X				

Total Estimated Emissions: 8,047.87 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-36:

ETHYLBENZENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



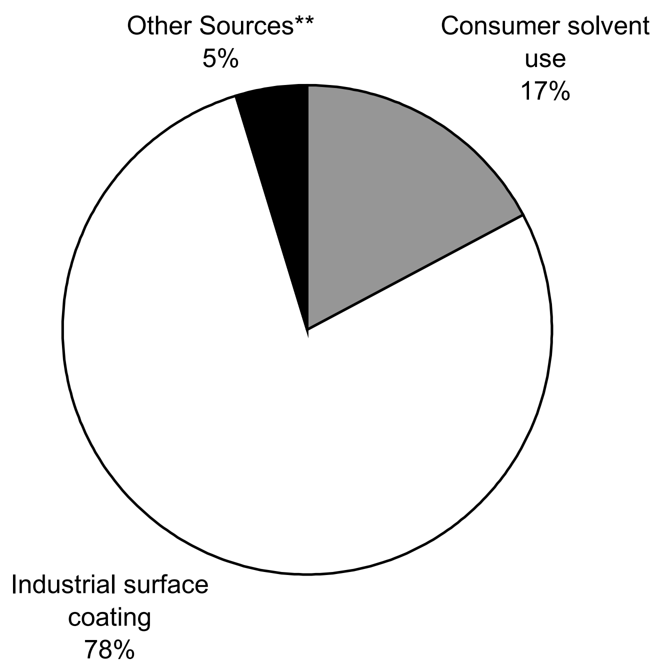
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3711	Motor vehicles and car bodies	1,372,366.31	X	X	X	X	X	X	X		X
-------	Architectural surface coatings	6,938,684.35	X	X	X	X	X	X	X	X	X
-------	Gasoline marketing	4,810,030.13	X	X	X	X			X	X	X
-------	Industrial surface coating	1,312,203.46	X	X	X	X				X	X
-------	Marine vessel loading, ballasting, & transit	1,047,585.60					X			X	
-------	Other Sources**	4,111,806.19	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 19,592,676.04 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-37:

ETHYLENE OXIDE
1996 Estimated Emissions* by Source Category for Point and Area Sources



SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Consumer and Commercial Solvent Use	836,736.51	X	X	X	X	X				X
-------	Industrial surface coating	3,774,925.24				X					X
-------	Other Sources**	221,827.24	X	X	X	X	X	X	X		X

Total Estimated Emissions: 4,833,488.99 lbs.

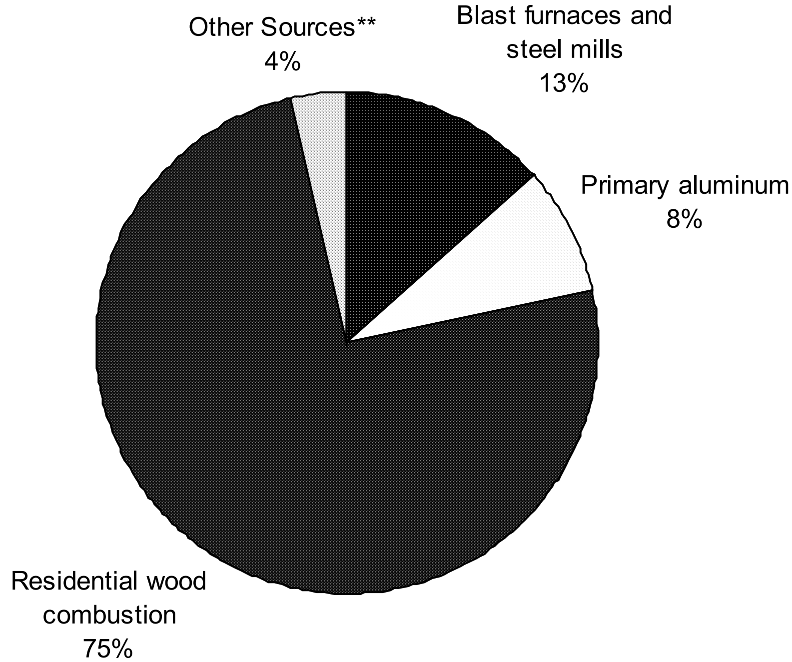
* Each jurisdiction estimated emissions for those sources for which they had data available.

** Other Sources: Individually less than five percent of the total.

(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-38:

FLUORANTHENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



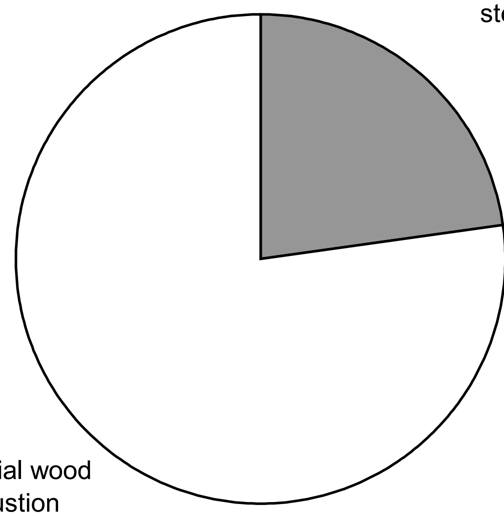
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	68,044.95	X	X					X	X	
3334	Primary aluminum	42,155.03		X			X				
-------	Residential wood combustion	379,983.92	X	X	X	X		X	X		X
-------	Other Sources**	18,686.29	X	X	X	X	X		X	X	X

Total Estimated Emissions: 508,870.19 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-39:

FLUORENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



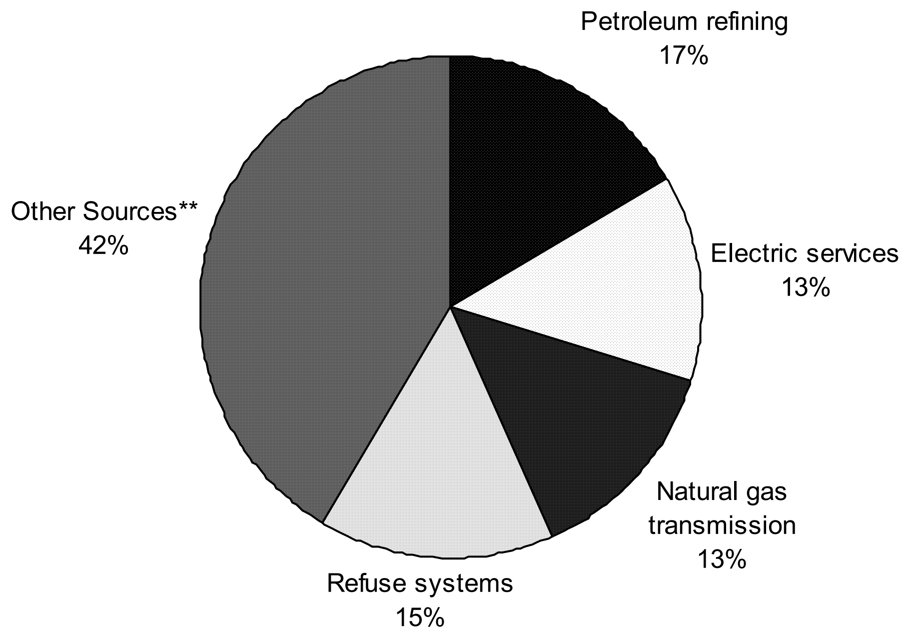
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	134,929.05	X	X					X		
-------	Residential wood combustion	457,233.49	X	X	X	X		X	X		X
-------	Other Sources**	329.96	X	X	X	X	X		X		

Total Estimated Emissions: 592,492.51 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-40:

FORMALDEHYDE
1996 Estimated Emissions* by Source Category for Point and Area Sources



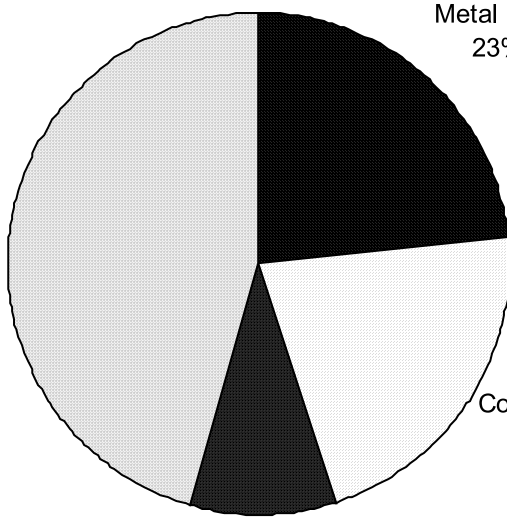
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2911	Petroleum refining	6,342,952.17	X	X		X	X			X	X
4911	Electric services	5,244,306.44	X	X	X	X	X			X	X
4922	Natural gas transmission	5,227,530.91	X	X	X	X	X			X	
4953	Refuse systems	5,997,810.38	X	X	X	X	X			X	
-------	Other Sources**	16,069,153.13	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 38,881,753.01 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-41:

GLYCOL ETHERS
1996 Estimated Emissions* by Source Category for Point and Area Sources



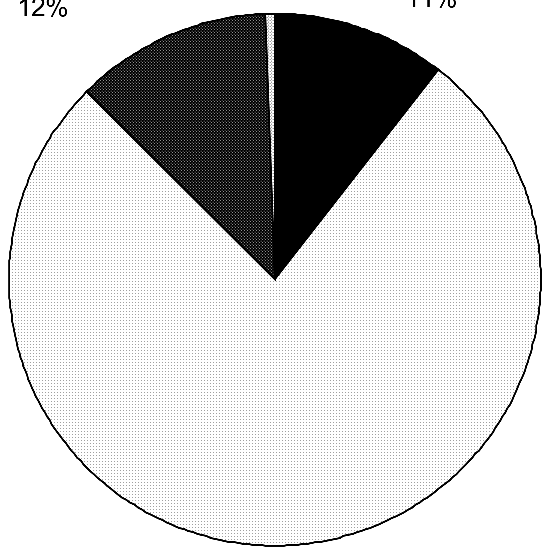
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3411	Metal cans	2,420,895.00		X		X	X				X
-------	Consumer and Commercial Solvent Use	2,241,197.21	X	X	X	X	X				X
-------	Graphic arts	984,493.09		X					X		
-------	Other Sources**	4,740,317.01		X		X	X	X	X		X

Total Estimated Emissions: 10,386,902.31 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-42:

HEXACHLOROBENZENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



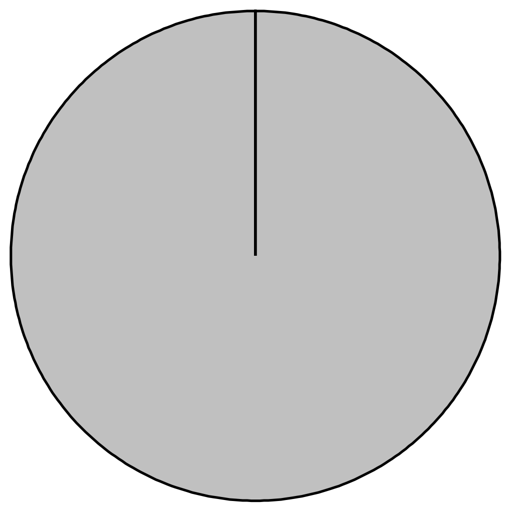
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2621	Paper mills	1.05				X					
3241	Cement, hydraulic	7.64							X		
-------	Agricultural pesticide application	1.20	X			X					X
-------	Other Sources**	0.05							X		

Total Estimated Emissions: 9.94 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-44:

HEXACHLOROBUTADIENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3011	Tires and inner tubes	8.00		X							

Total Estimated Emissions: 8.00 lbs.

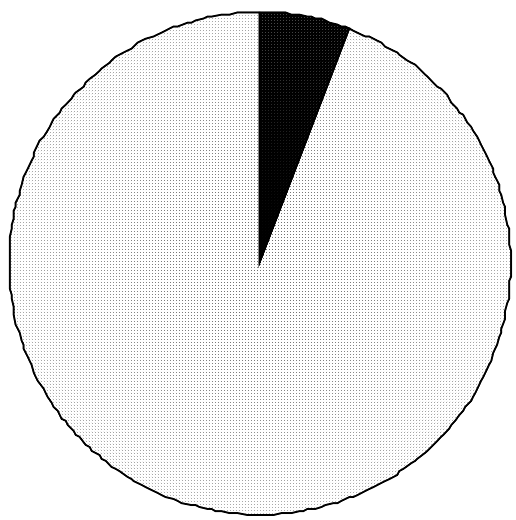
* Each jurisdiction estimated emissions for those sources for which they had data available.

** Other Sources: Individually less than five percent of the total.

(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-44:

HEXACHLOROETHANE
1996 Estimated Emissions* by Source Category for Point and Area Sources



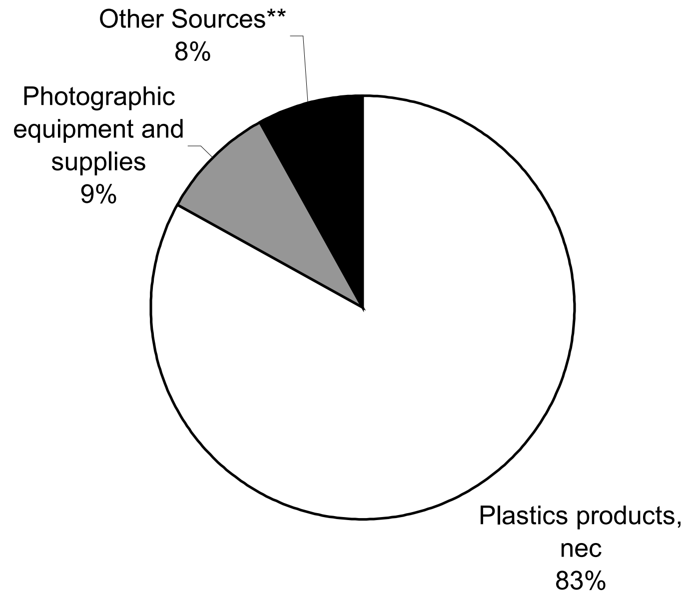
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2899	Chemical preparations, nec	50.00						X			
3365	Aluminum foundries	826.00		X							

Total Estimated Emissions: 876.00 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-45:

HYDRAZINE
1996 Estimated Emissions* by Source Category for Point and Area Sources



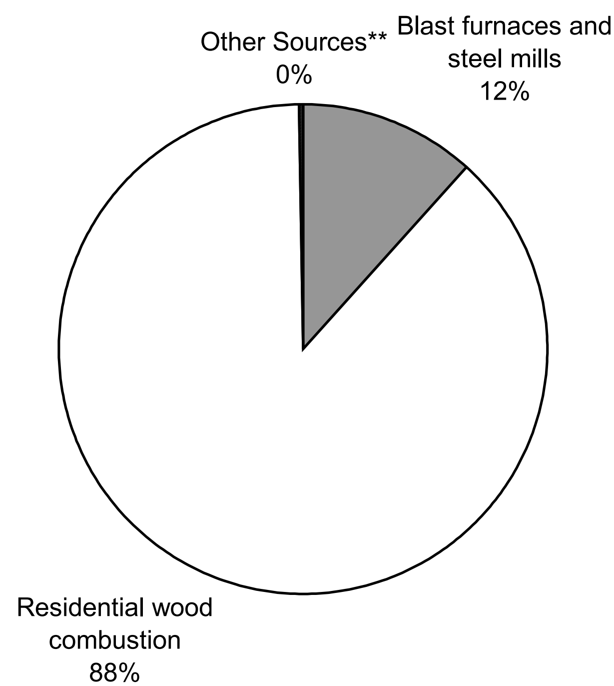
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3089	Plastics products, nec	398.00					X				
3861	Photographic equipment and supplies	43.00					X				
-------	Other Sources**	38.84					X	X	X		X

Total Estimated Emissions: 479.84 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-46:

INDENO(1,2,3-CD)PYRENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



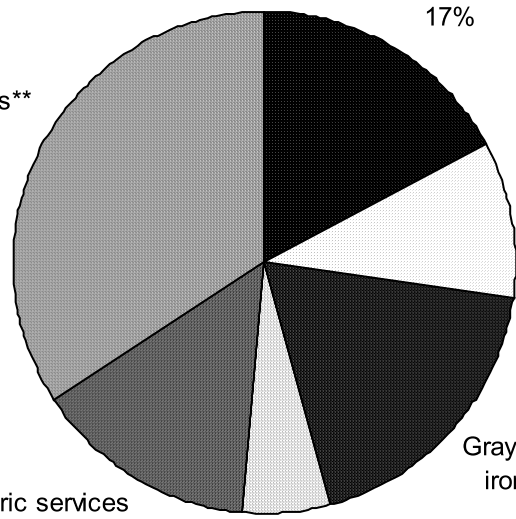
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	21,924.24	X	X					X		
-------	Residential wood combustion	165,706.02	X	X	X	X		X	X		X
-------	Other Sources**	427.81	X	X	X	X	X		X		X

Total Estimated Emissions: 188,058.07 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-47:

LEAD
1996 Estimated Emissions* by Source Category for Point and Area Sources



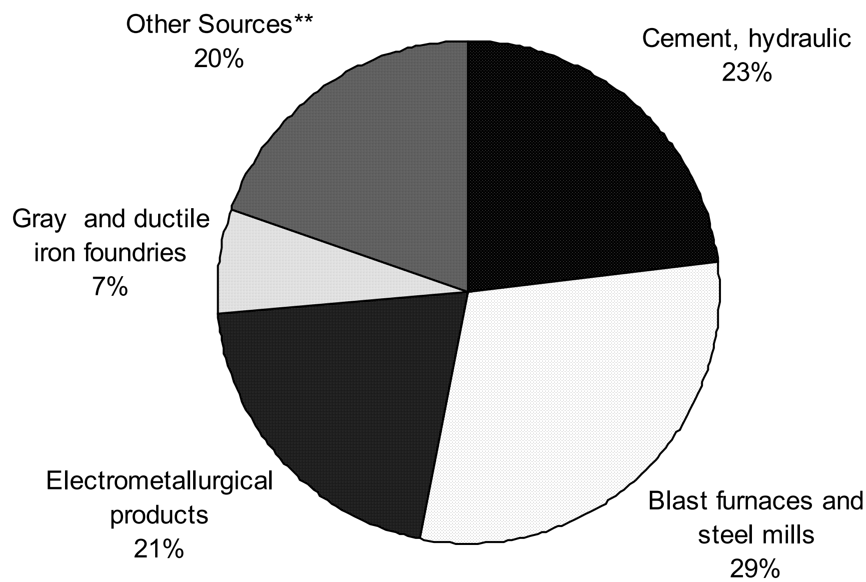
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
1011	Iron ores	140,249.73			X	X			X		
3312	Blast furnaces and steel mills	80,929.68	X	X	X	X	X	X			X
3321	Gray and ductile iron foundries	152,167.76	X	X	X	X		X			X
3341	Secondary nonferrous metals	42,970.50	X	X	X	X	X	X	X	X	X
4911	Electric services	117,813.18	X	X	X	X	X		X		X
-------	Other Sources**	278,177.35	X	X	X	X	X	X	X		X

Total Estimated Emissions: 812,308.21 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-48:

MANGANESE
1996 Estimated Emissions* by Source Category for Point and Area Sources



SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3241	Cement, hydraulic	752,891.65	X	X	X		X			X	
3312	Blast furnaces and steel mills	976,500.90	X	X	X	X	X	X	X	X	X
3313	Electrometallurgical products	668,204.00						X			
3321	Gray and ductile iron foundries	214,689.86	X	X	X	X		X		X	X
-------	Other Sources**	639,390.39	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 3,251,676.81 lbs.

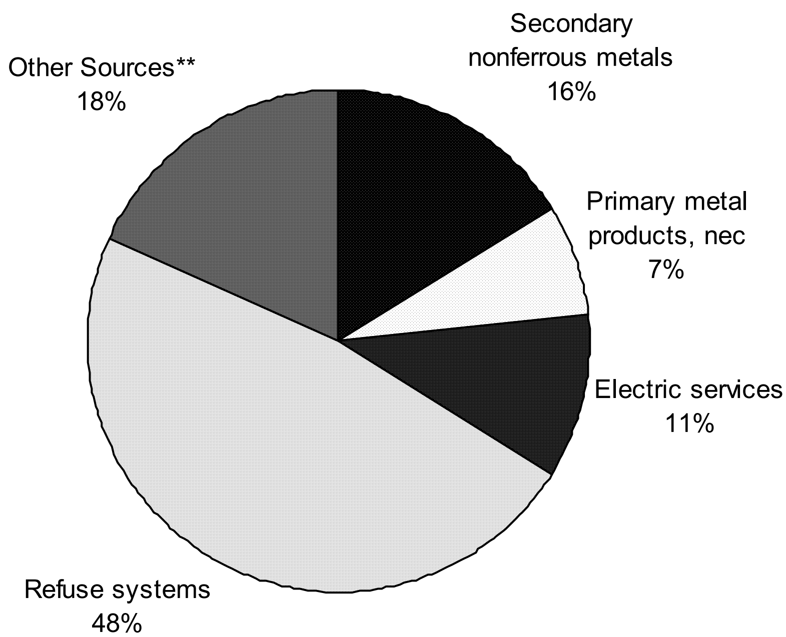
* Each jurisdiction estimated emissions for those sources for which they had data available.

** Other Sources: Individually less than five percent of the total.

(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-49:

MERCURY
1996 Estimated Emissions* by Source Category for Point and Area Sources



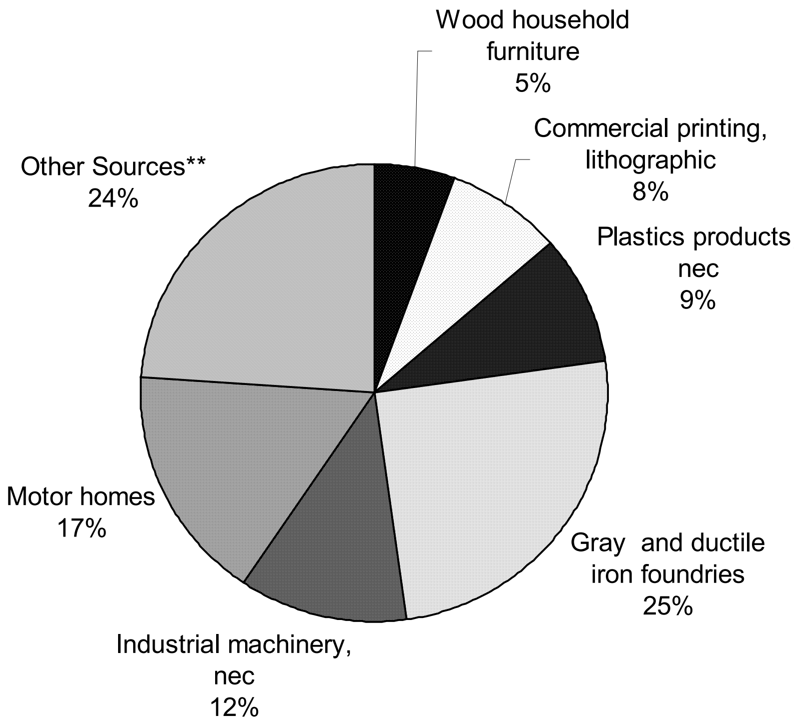
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3341	Secondary nonferrous metals	34,692.04	X	X		X				X	X
3399	Primary metal products, nec	15,397.64	X							X	
4911	Electric services	22,776.81	X	X	X	X	X		X	X	X
4953	Refuse systems	103,328.76	X	X	X	X	X		X	X	
-------	Other Sources**	38,731.56	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 215,126.80 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-50:

METHYLENE DIPHENYL DIISOCYANATE
(MDI)
1996 Estimated Emissions* by Source Category for Point and Area Sources



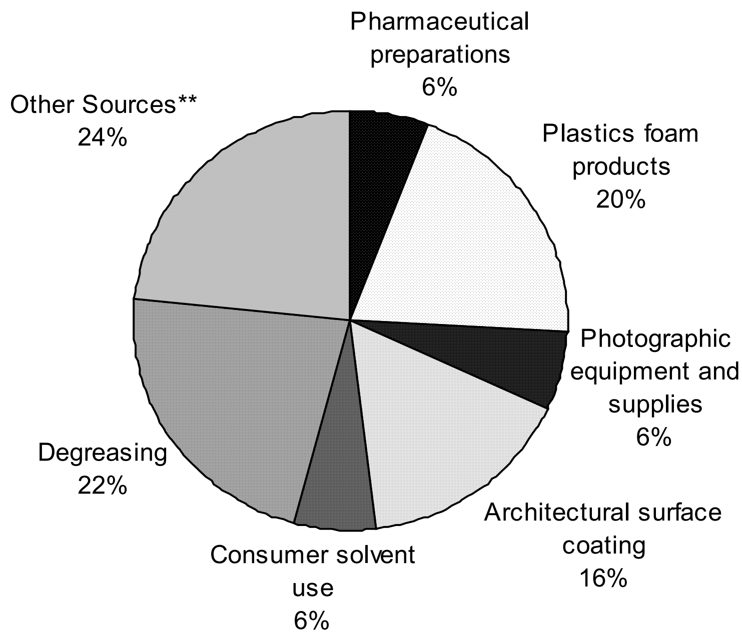
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2511	Wood household furniture	2,408.00		X							
2752	Commercial printing, lithographic	3,575.00		X							
3089	Plastics products, nec	4,158.23		X					X		
3321	Gray and ductile iron foundries	11,033.00		X							X
3599	Industrial machinery, nec	5,193.50		X							X
3716	Motor homes	7,440.00		X							
-------	Other Sources**	10,537.53	X	X		X	X		X		X

Total Estimated Emissions: 44,345.27 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-51:

METHYLENE CHLORIDE
1996 Estimated Emissions* by Source Category for Point and Area Sources



SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2834	Pharmaceutical preparations	1,912,930.56	X	X	X		X		X		X
3086	Plastics foam products	6,509,023.07	X	X	X	X			X		X
3861	Photographic equipment and supplies	1,994,064.70					X				
-------	Architectural surface coatings	5,187,767.64	X	X	X	X	X	X	X		X
-------	Consumer and Commercial Solvent Use	2,016,996.73	X	X	X	X	X				X
-------	Solvent cleaning	7,278,216.56	X	X	X	X				X	X
-------	Other Sources**	7,568,280.80	X	X	X	X	X		X		X

Total Estimated Emissions: 32,467,280.08 lbs.

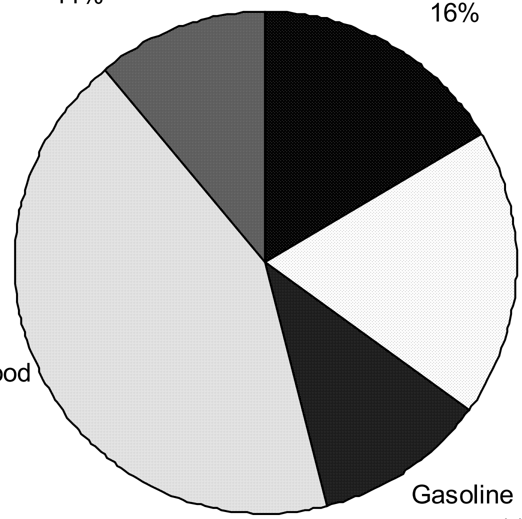
* Each jurisdiction estimated emissions for those sources for which they had data available.

** Other Sources: Individually less than five percent of the total.

(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-52:

NAPHTHALENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



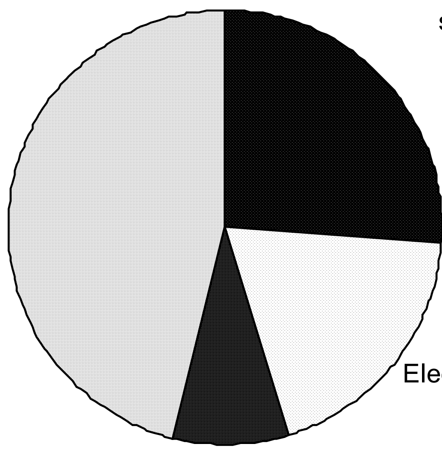
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Autobody refinishing	2,253,594.15	X	X	X	X	X	X		X	X
-------	Consumer and Commercial Solvent Use	2,554,555.31	X	X	X	X	X				X
-------	Gasoline marketing	1,554,947.09	X		X	X			X	X	X
-------	Residential wood combustion	5,871,027.19	X	X	X	X		X	X		X
-------	Other Sources**	1,538,362.12	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 13,772,485.87 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-53:

NICKEL
1996 Estimated Emissions* by Source Category for Point and Area Sources



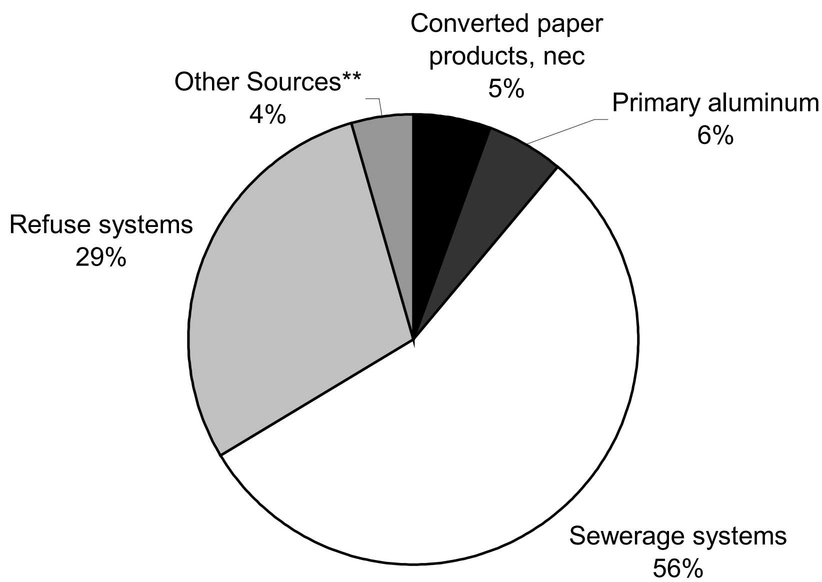
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	159,155.32	X	X	X	X	X	X		X	X
4911	Electric services	116,721.05	X	X	X	X	X		X	X	X
-------	Residential Fuel Combustion	53,588.68	X	X		X			X		X
-------	Other Sources**	281,527.46	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 610,992.50 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-54:

POLYCHLORINATED BIPHENYLS
(PCBs)
1996 Estimated Emissions* by Source Category for
Point and Area Sources



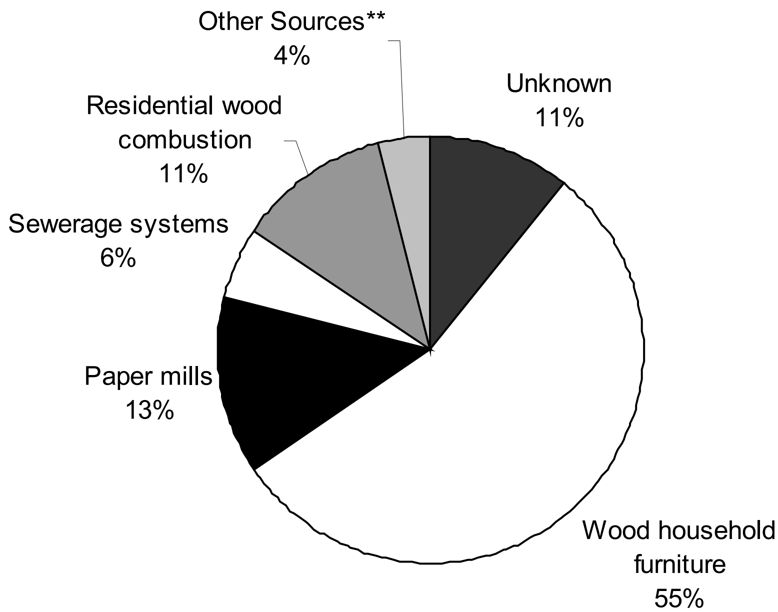
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2679	Converted paper products, nec	1.93									X
3334	Primary aluminum	2.00		X							
4952	Sewerage systems	19.57			X	X	X		X		
4953	Refuse systems	10.37			X		X				
-------	Other Sources**	1.53		X	X	X	X		X		X

Total Estimated Emissions: 35.39 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-55:

POLYCHLORINATED DIBENZODIOXINS (PCDD)
1996 Estimated Emissions* by Source Category for Point and Area Sources



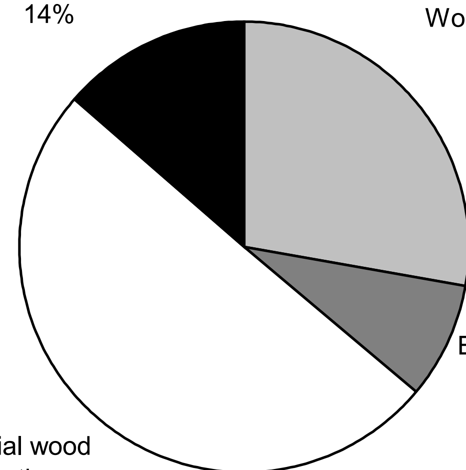
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
0	Unknown	3.90	X			X	X				
2511	Wood household furniture	19.76	X	X	X		X				
2621	Paper mills	4.83			X	X	X				
4952	Sewerage systems	2.02			X	X	X		X		
-------	Residential wood combustion	4.15				X					
-------	Other Sources**	1.45	X	X	X	X	X		X		

Total Estimated Emissions: 36.11 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-56:

POLYCHLORINATED DIBENZOFURANS
(PCDF)
1996 Estimated Emissions* by Source Category for Point and Area Sources



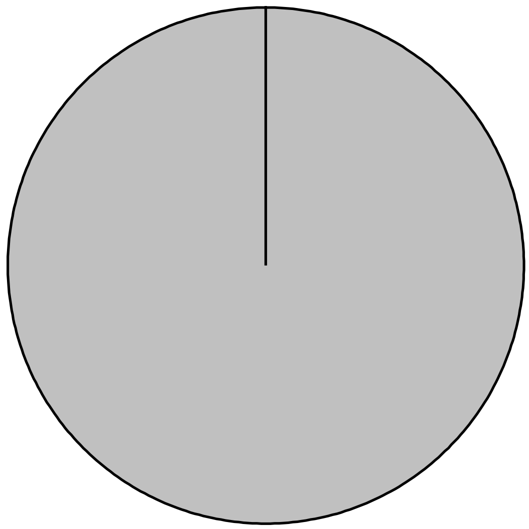
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2511	Wood household furniture	12.62	X	X	X		X				
4911	Electric services	3.72	X	X	X	X	X		X		
-------	Residential wood combustion	22.89				X					
-------	Other Sources**	6.14	X	X	X	X	X		X		

Total Estimated Emissions: 45.37 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-57:

PENTACHLOROPHENOL
(PCP)
1996 Estimated Emissions* by Source Category for Point and Area Sources



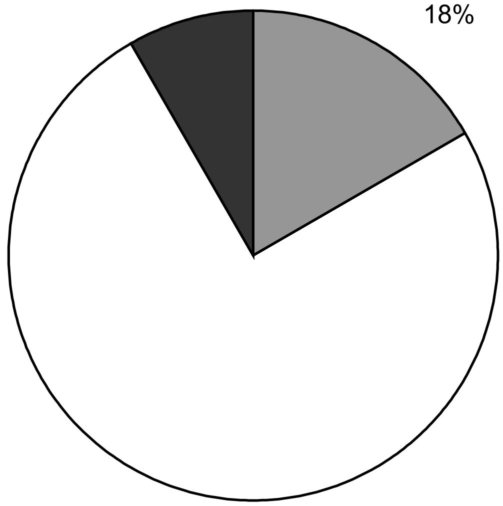
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
4952	Sewerage systems	20,886.33									X

Total Estimated Emissions: 20,886.33 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-58:

TETRACHLOROETHYLENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



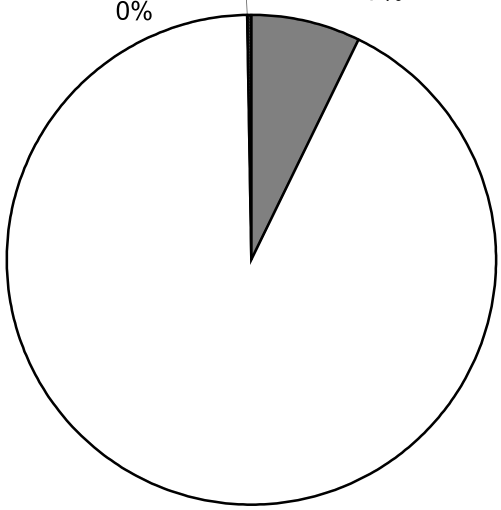
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Solvent cleaning	12,335,579.10	X	X	X	X				X	X
-------	Dry cleaning	53,020,598.12	X	X	X	X	X	X	X		X
-------	Other Sources**	6,041,805.64	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 71,397,982.85 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-59:

PHENANTHRENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



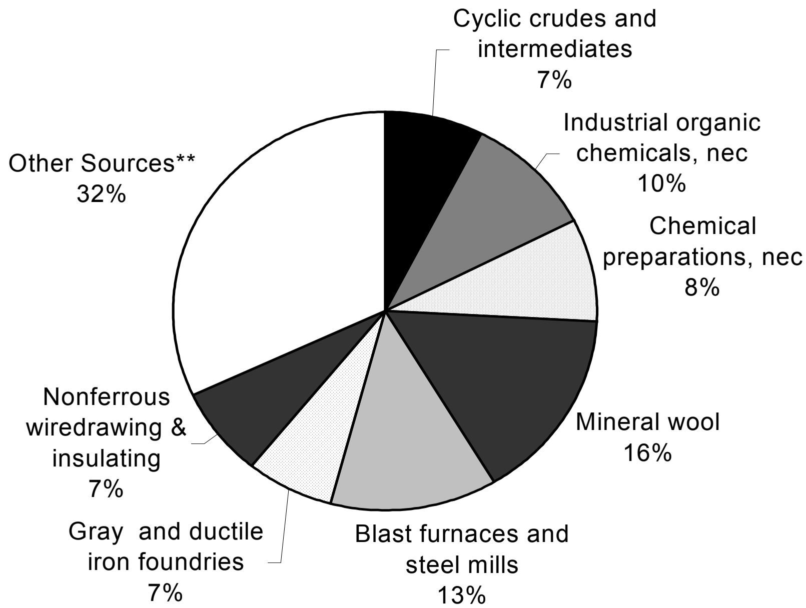
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	459,767.27	X	X					X		
-------	Residential wood combustion	5,967,145.20	X	X	X	X		X	X		X
-------	Other Sources**	17,513.64	X	X	X	X	X	X	X	X	

Total Estimated Emissions: 6,444,426.11 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-60:

PHENOL
1996 Estimated Emissions* by Source Category for Point and Area Sources



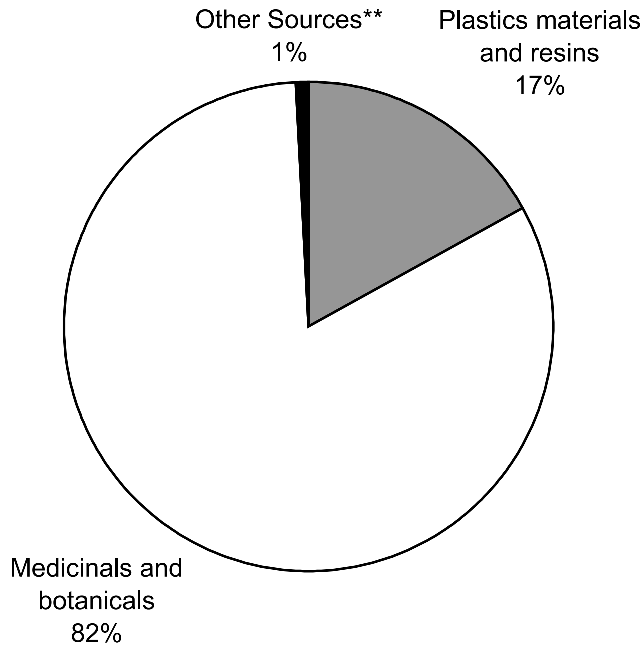
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2865	Cyclic crudes and intermediates	348,095.00						X			
2869	Industrial organic chemicals, nec	472,777.41	X	X	X		X	X	X		X
2899	Chemical preparations, nec	389,838.54	X		X				X		
3296	Mineral wool	730,988.06		X	X		X	X			
3312	Blast furnaces and steel mills	602,499.30		X			X	X	X		
3321	Gray and ductile iron foundries	306,640.56	X	X	X	X		X		X	X
3357	Nonferrous wiredrawing & insulating	336,487.57	X	X					X		
-------	Other Sources**	1,502,286.07	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 4,689,612.51 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-61:

PHOSGENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



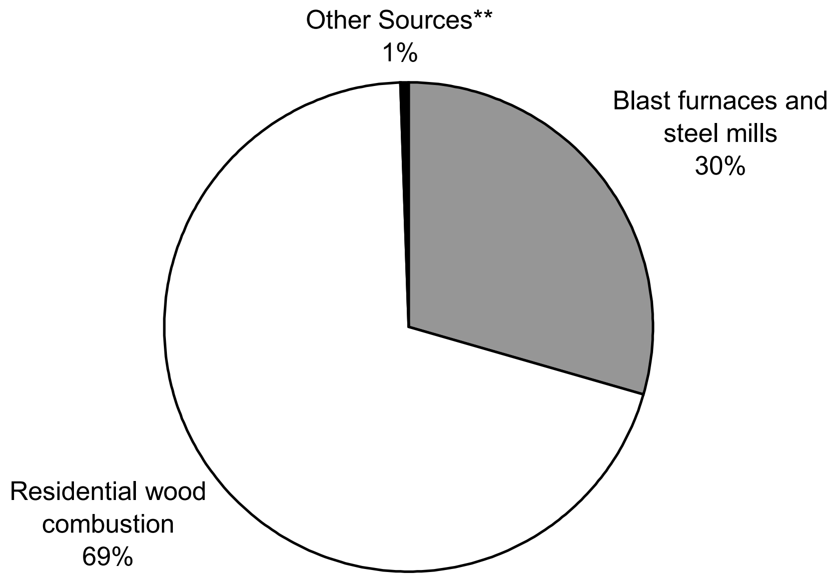
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2821	Plastics materials and resins	33.00		X				X			
2833	Medicinals and botanicals	160.00		X							
-------	Other Sources**	1.76	X				X				

Total Estimated Emissions: 194.76 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-62:

PYRENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



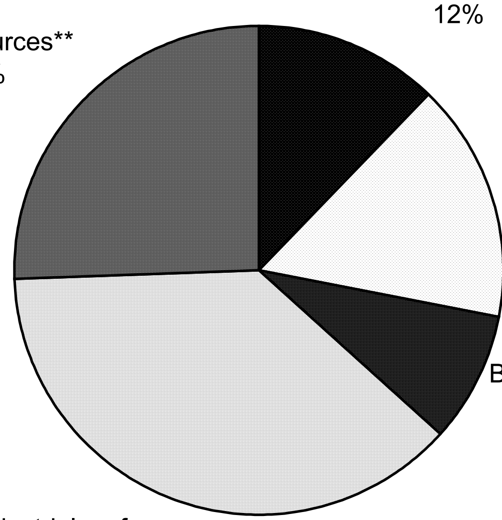
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3312	Blast furnaces and steel mills	144,959.85	X	X					X		
-------	Residential wood combustion	343,173.69	X	X	X	X		X	X		X
-------	Other Sources**	2,586.55	X	X	X	X	X		X		

Total Estimated Emissions: 490,720.09 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-63:

STYRENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



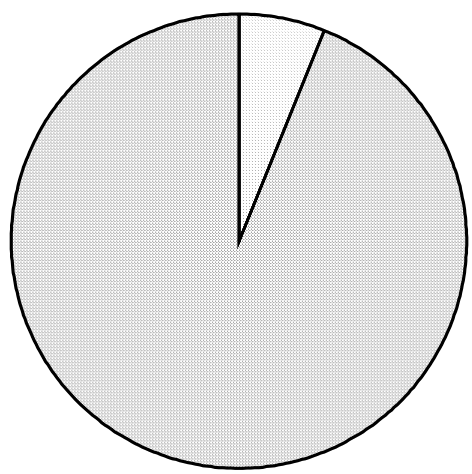
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2821	Plastics materials and resins	2,316,316.31	X	X	X	X	X	X	X	X	X
3089	Plastics products, nec	2,966,341.84	X	X	X	X		X	X	X	X
3732	Boat building and repairing	1,651,395.89	X	X	X	X					X
-------	Industrial surface coating	7,112,743.41								X	
-------	Other Sources**	4,838,576.37	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 18,885,373.81 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-64:

2,3,7,8-TETRACHLORODIBENZO--P-DIOXIN (TCDD)
1996 Estimated Emissions* by Source Category for Point and Area Sources



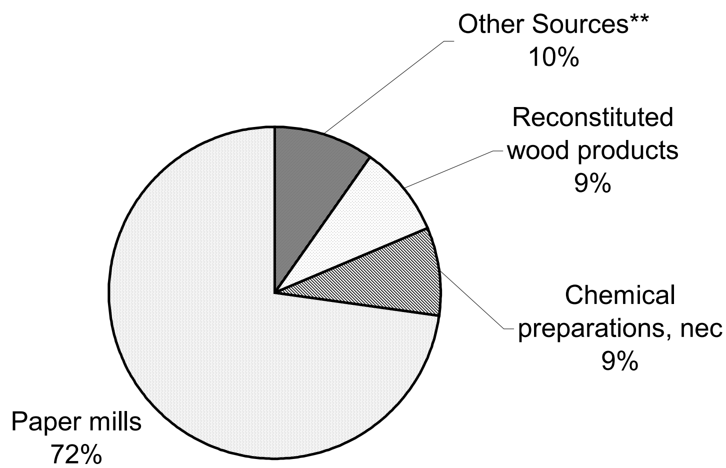
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
4911	Electric services	0.31	X	X	X	X	X				X
-------	Other Sources**	0.02	X	X	X	X	X		X		X

Total Estimated Emissions: 0.33 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-65:

2,3,7,8-TETRACHLORODIBENZO-FURAN (TCDF)
1996 Estimated Emissions* by Source Category for Point and Area Sources



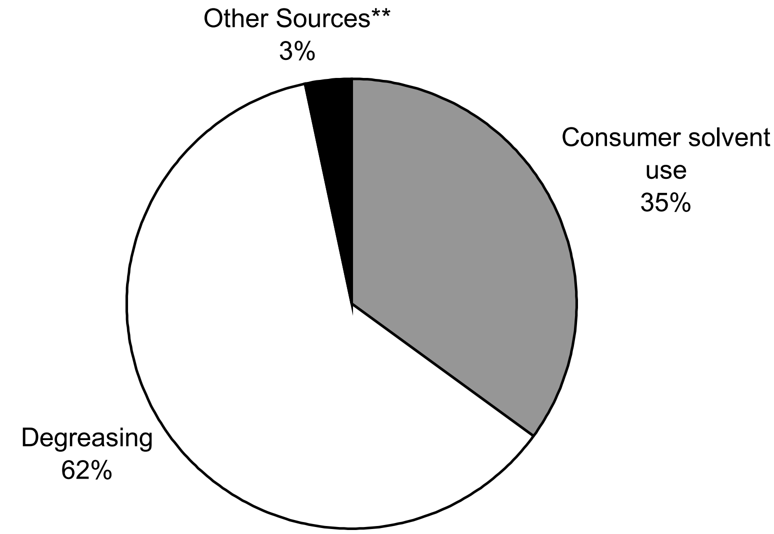
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2621	Paper mills	23.72			X						
-------	Other Sources**	3.21	X	X	X	X	X		X		X
2899	Chemical preparations, nec	2.87	X		X						
2493	Reconstituted wood products	2.80			X	X					

Total Estimated Emissions: 32.64 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-66:

METHYLENE CHLOROFORM
(111,TCE)
1996 Estimated Emissions* by Source Category for Point and Area Sources



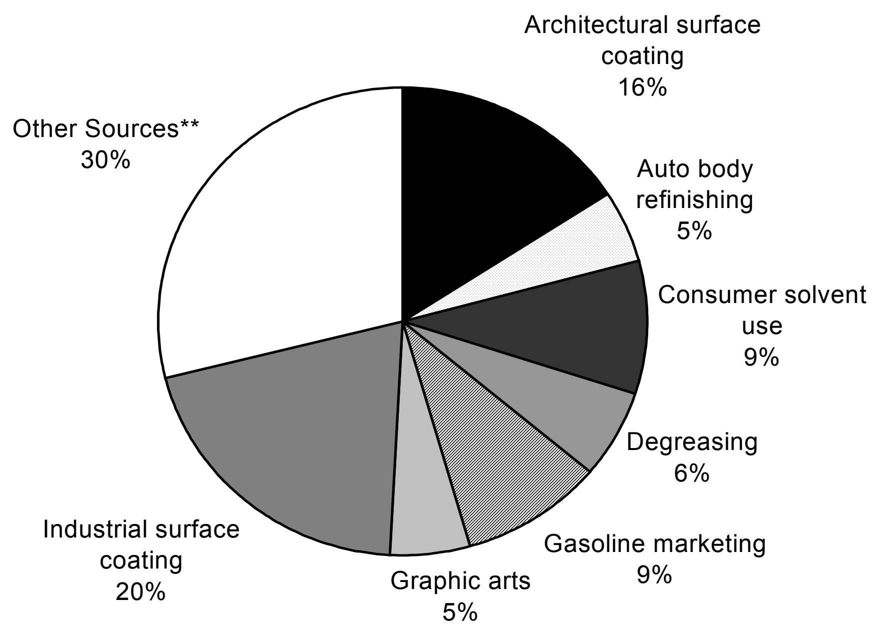
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Consumer and Commercial Solvent Use	21,453,891.50	X	X	X	X	X				X
-------	Solvent cleaning	37,926,911.12	X	X	X	X				X	X
-------	Other Sources**	2,090,768.57	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 61,471,625.32 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-67:

TOLUENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



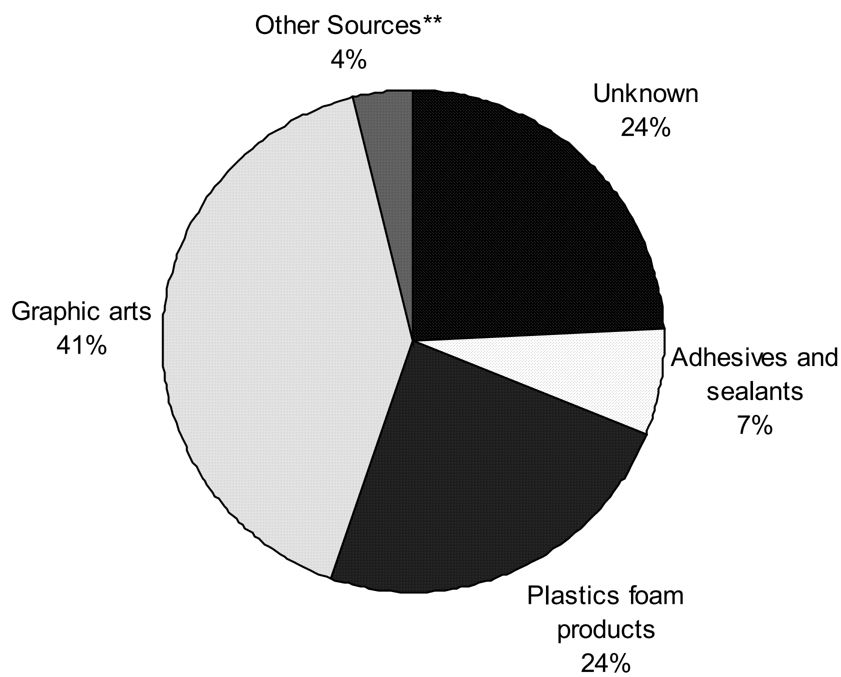
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Architectural surface coatings	42,099,012.88	X	X	X	X	X	X	X	X	X
-------	Autobody refinishing	13,351,772.64	X	X	X	X	X	X		X	X
-------	Consumer and Commercial Solvent Use	23,774,241.14	X	X	X	X	X				X
-------	Solvent cleaning	16,770,811.23	X	X	X	X				X	X
-------	Gasoline marketing	24,996,870.56	X	X	X	X			X	X	X
-------	Graphic arts	13,823,283.96		X	X	X	X	X	X		X
-------	Industrial surface coating	54,103,261.14	X	X	X	X				X	X
-------	Other Sources**	76,237,741.36	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 265,156,994.91 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-68:

2,4-TOLUENE DIISOCYANATE
1996 Estimated Emissions* by Source Category for Point and Area Sources



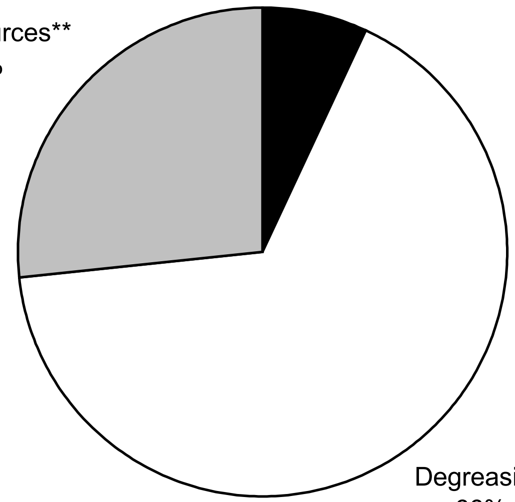
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
0	Unknown	2,638.00					X				
2891	Adhesives and sealants	750.00						X			
3086	Plastics foam products	2,641.52	X	X							X
-------	Graphic arts	4,468.28					X				
-------	Other Sources**	422.00		X		X	X	X			X

Total Estimated Emissions: 10,919.81 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-69:

TRICHLOROETHYLENE
1996 Estimated Emissions* by Source Category for Point and Area Sources



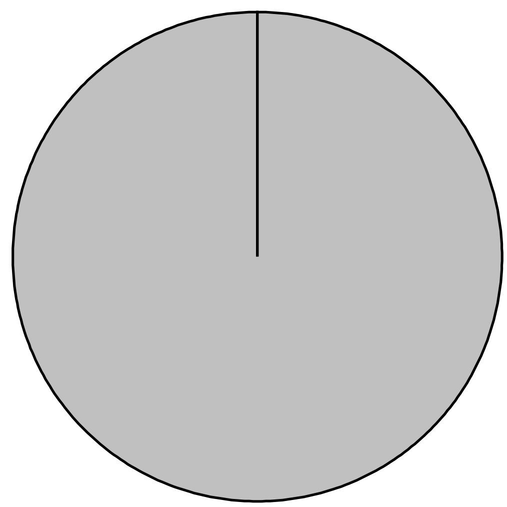
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3494	Valves and pipe fittings, nec	3,574,025.00	X							X	X
-------	Solvent cleaning	34,011,437.84	X	X	X	X				X	X
-------	Other Sources**	13,685,735.68	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 51,271,198.52 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-70:

2,4,5-TRICHLOROPHENOL
1996 Estimated Emissions* by Source Category for Point and Area Sources



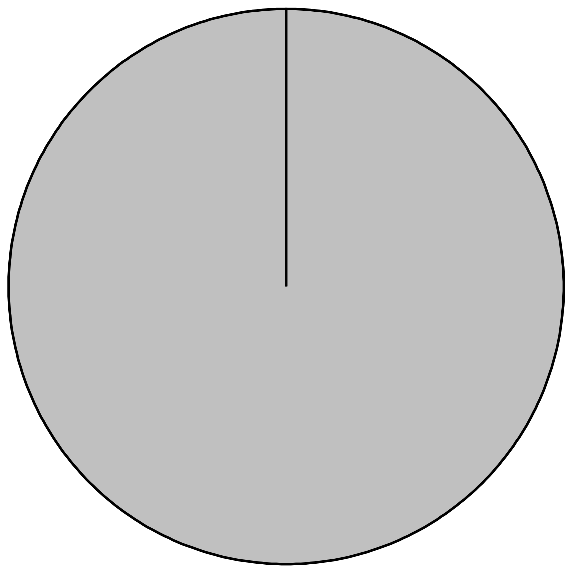
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
9511	Air, water, & solid waste management	0.02							X		

Total Estimated Emissions: 0.02 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-71:

2,4,6-TRICHLOROPHENOL
1996 Estimated Emissions* by Source Category for Point and Area Sources



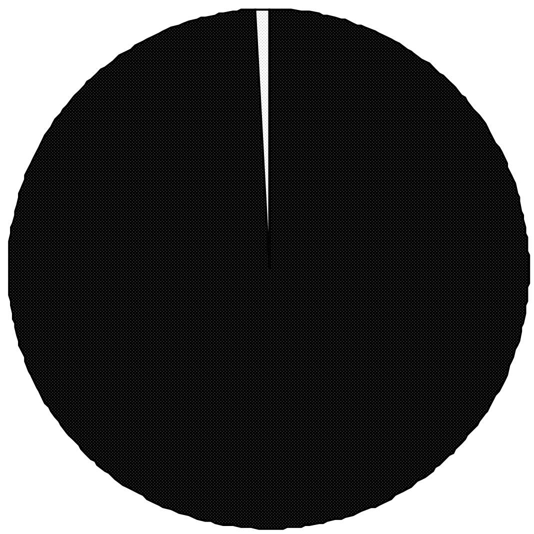
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
4952	Sewerage systems	12,784.14							X		X

Total Estimated Emissions: 12,784.14 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-72:

TRIFLURALIN
1996 Estimated Emissions* by Source Category for Point and Area Sources



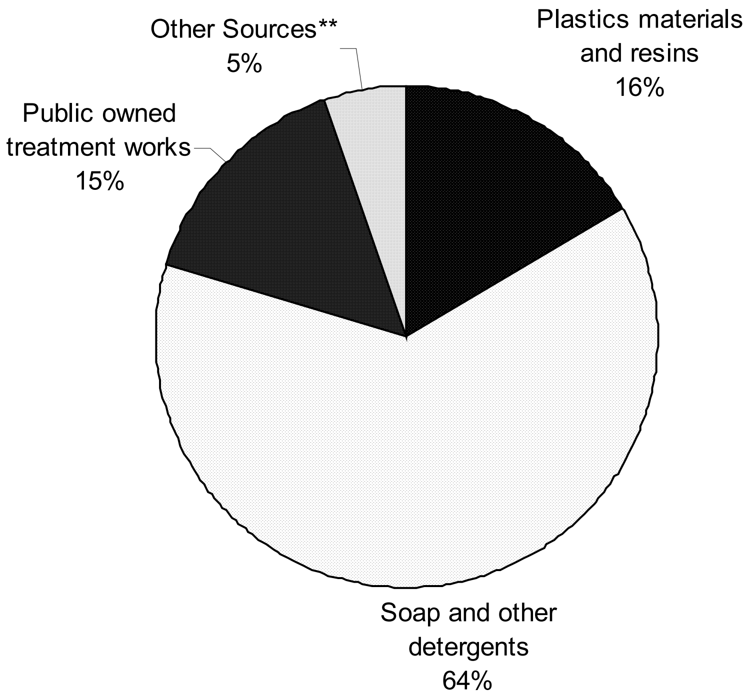
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Pesticide application	656,024.08	X		X	X					
-------	Other Sources**	6,322.00	X	X				X			

Total Estimated Emissions: 662,346.08 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-73:

VINYL CHLORIDE
1996 Estimated Emissions* by Source Category for Point and Area Sources



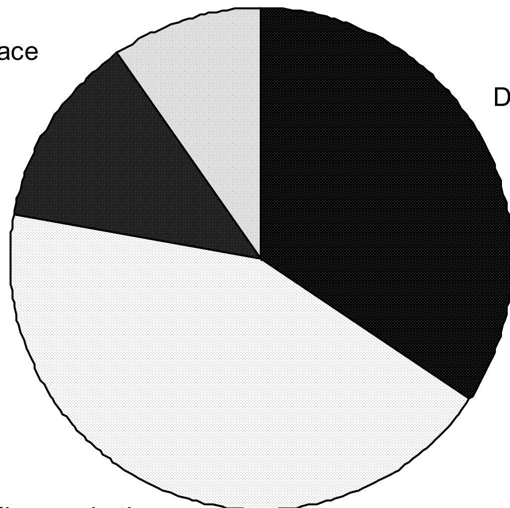
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
2821	Plastics materials and resins	145,875.06	X						X		
2841	Soap and other detergents	560,000.00			X						
-------	Public owned treatment works	131,078.86	X			X			X		
-------	Other Sources**	47,288.10		X	X	X	X	X	X		X

Total Estimated Emissions: 884,242.02 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-74:

XYLENES(META)
1996 Estimated Emissions* by Source Category for Point and Area Sources



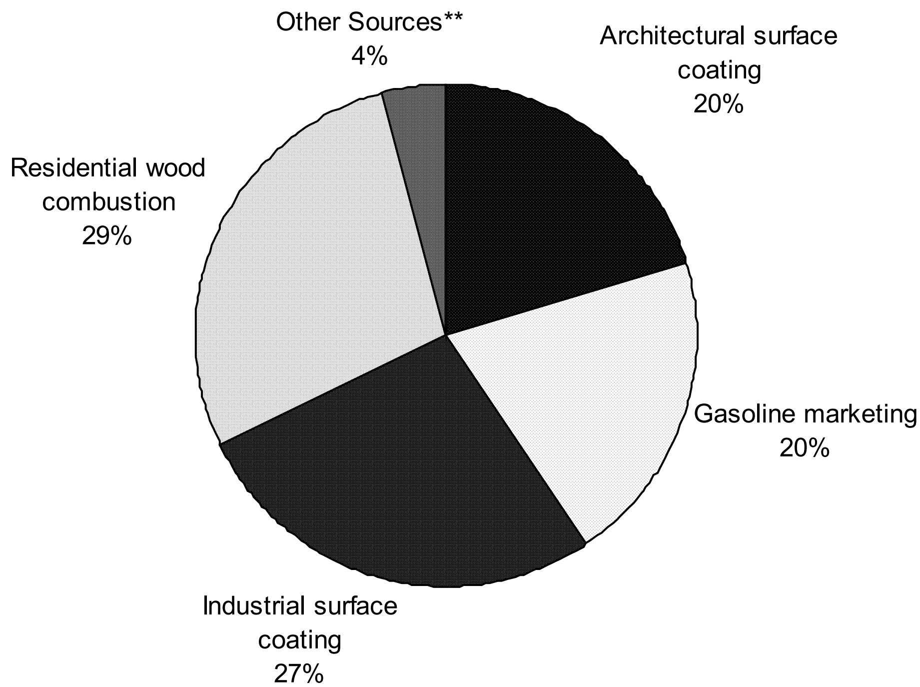
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Degreasing	279,266.48		X	X	X					X
-------	Gasoline marketing	351,409.22				X			X		X
-------	Industrial surface coating	102,280.13		X		X					X
-------	Other Sources**	77,952.87		X	X	X	X	X	X	X	

Total Estimated Emissions: 810,908.71 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-75:

XYLENES(ORTHO)
1996 Estimated Emissions* by Source Category for Point and Area Sources



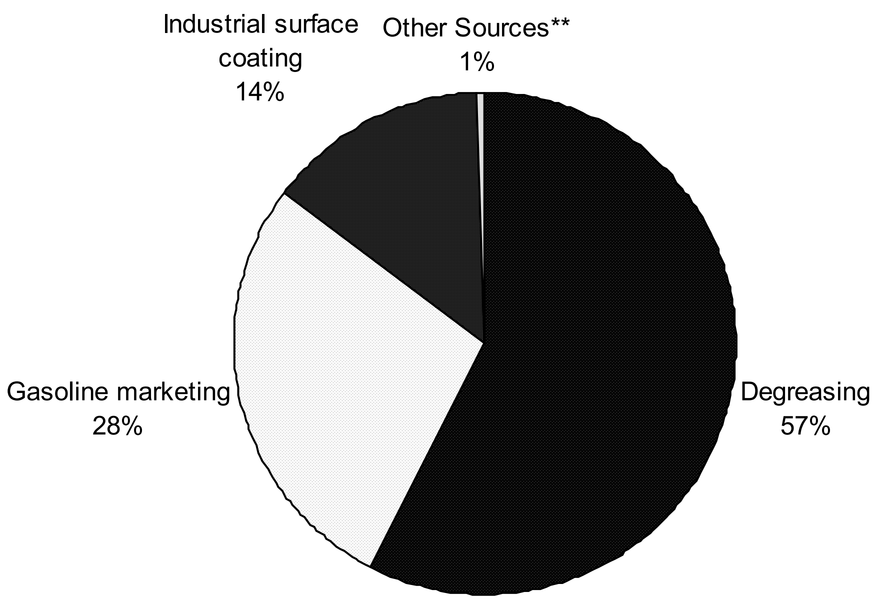
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Architectural surface coating	4,035,705.32							X	X	
-------	Gasoline marketing	4,090,117.72				X			X	X	X
-------	Industrial surface coating	5,427,070.30		X	X	X				X	X
-------	Residential wood combustion	5,610,026.07		X	X	X		X	X		X
-------	Other Sources**	819,110.60		X	X	X	X		X	X	X

Total Estimated Emissions: 19,982,030.01 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-76:

XYLENES(PARA)
1996 Estimated Emissions* by Source Category for Point and Area Sources



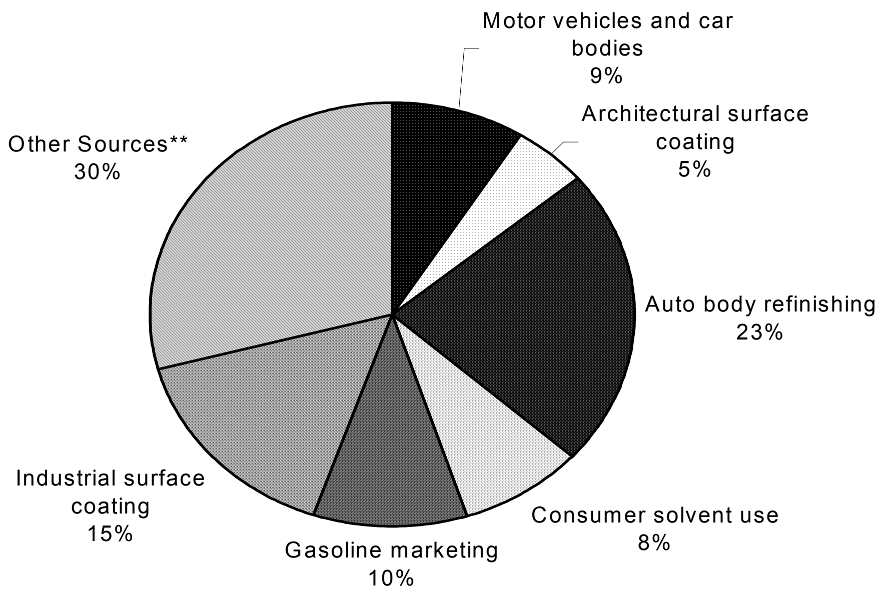
SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
-------	Degreasing	279,266.48		X	X	X					X
-------	Gasoline marketing	136,045.13				X			X		X
-------	Industrial surface coating	68,207.74		X		X					X
-------	Other Sources**	3,086.21		X	X	X	X		X		

Total Estimated Emissions: 486,605.56 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

Figure 3-77:

XYLENES(ISO)
1996 Estimated Emissions* by Source Category for Point and Area Sources



SIC	DESCRIPTION	EMISSIONS (LB)	IL	IN	MI	MN	NY	OH	ON	PA	WI
3711	Motor vehicles and car bodies	12,506,168.82	X	X	X	X	X	X	X		X
-------	Architectural surface coating	7,248,807.21	X	X	X	X	X	X	X	X	X
-------	Auto body refinishing	31,905,350.80	X	X	X	X	X	X		X	X
-------	Consumer solvent use	11,956,326.76	X	X	X	X	X				X
-------	Gasoline marketing	14,473,695.11	X	X	X	X			X		X
-------	Industrial surface coating	21,769,246.60	X	X	X	X				X	X
-------	Other Sources**	41,136,757.52	X	X	X	X	X	X	X	X	X

Total Estimated Emissions: 140,996,352.81 lbs.

* Each jurisdiction estimated emissions for those sources for which they had data available.
** Other Sources: Individually less than five percent of the total.
(X) Denotes jurisdictions that have contributed emissions data for this pollutant.

4. Conclusion

Air regulatory agencies in the eight Great Lakes states and province of Ontario agree that a collaborative effort is vital to successfully implementing a compatible database of airborne toxic pollutant emissions for the Great Lakes region. They have been working cooperatively toward this goal since 1987. As quality controlled and quality assured emissions inventories are developed and refined, the states, province of Ontario and the U.S. Environmental Protection Agency can work separately and in concert to define and regulate sources; evaluate control technology; establish guidelines for siting new facilities; and reduce airborne deposition of persistent toxic chemicals to the Great Lakes.

Realizing that mobile sources are a critically important category of air toxic emission sources relevant to human activities in industrialized societies, a mobile source emissions estimation module is now integrated into RAPIDS. This expansion of RAPIDS provides a more complete profile for toxic air emissions and will expand the list of toxic compounds of concern from 49 to 82.

Annual Great Lakes Toxic Air Emissions Inventories are available online through the Great Lakes Information Network. Also available through GLIN is AirMapper, where users can view a geographic representation of the inventory of pollutant concentrations and eventually point sources. Using GLIN's dissemination functions as a tool, decision makers and the general public will be able to make better informed decisions that help reduce toxic pollution, protect and restore habitats and support intergovernmental partnerships. Timely access to a comprehensive inventory will provide the foundation for sound public policy decisions.

This emissions inventory will assist in the successful implementation of key provisions of the Great Lakes Toxic Substances Control Agreement, signed by the Great Lakes governors and Premier of Ontario in 1986. In addition, this work is consistent with the state activities for the implementation of the Urban Area Source Program required under sections 112(c) and 112(k) of the Clean Air Act Amendments of 1990, and the assessment of atmospheric deposition to the Great Lakes under the efforts of U.S. EPA's Great Waters Program.

Further Refinements and Cooperative Efforts

The air regulatory agencies in the eight Great Lakes states and the province of Ontario have developed a system that can create a reliable and technically accurate inventory of estimated air toxic emissions. These inventories are to be used by the air agencies in coordination with ambient air quality data collected by the Great Lakes Monitoring Network to assess the contribution to airborne toxic impacts on the Great Waters and support the development of remedial action and other management plans.

While the states and Ontario are committed to compiling periodic inventories to assess and analyze the contribution of toxic air emissions on the Great Waters, these inventories can also serve a number of other very important purposes as well.

The Inventory, for example, can assist the U.S. EPA in assessing the impact of hazardous air pollutants (HAPs). U.S. EPA has prepared a National Toxic Inventory (NTI), in order to perform a risk-based assessment associated with the exposure to HAPs. This assessment, also known as the Cumulative Exposure Project (CEP), can be enhanced by the use of state specific inventories. The Great Lakes air toxic inventory can provide better spatial and temporal resolution of emissions through the use of more representative activity data from the survey of point sources, the use of county level data for area and non-road sources, and the use of local traffic data. The list of contaminants for the Great Lakes air toxic inventory would need to be expanded to the full list of HAPs as delineated in Section 112(b) of the Clean Air Act to support the CEP. In addition, the Great Lakes air toxic inventory could be used as a national model for preparing state-specific air toxic inventories.

The Great Lakes air toxic inventory can also be used to assist the states and Ontario in completing their other air emissions inventory needs. States with ozone nonattainment areas are required to complete annual point source ozone and comprehensive periodic (every 3 years) inventories for those areas. Some states have expanded this annual effort to support the emission fee effort of Title V of the Clean Air Act and some states have expanded the periodic inventory to the entire state. Much of the information collected for the ozone effort is directly transferable to the Great Lakes air toxic inventory, as well as other inventory efforts.

The data collected from the Great Lakes air toxic inventory can also be used to assist in other ongoing assessments. These include regional ozone, particulate matter and haze; urban air toxic programs; mercury deposition; and, acid deposition studies. The U.S. EPA is currently developing a national database that will contain a state's comprehensive emission inventory (air toxic and criteria pollutant emissions). If a state does not provide its own inventory, the U. S. EPA will estimate emissions for that state. It is preferable for a state to complete this effort on its own to provide a more accurate picture of its air emissions profile. Ontario would benefit from these efforts and is encouraged to do the same as the Great Lakes states.

The U. S. EPA does not have the authority to require states to submit a comprehensive emissions inventory. In addition, there is no similar requirement for Ontario. The Great Lakes States and Ontario have tried to overcome this obstacle through the use of inventory protocols. These have had limited success because of the differences in resources available to states and in the authority to ask for information needed to complete the inventory. A comprehensive federal emissions reporting rule that consolidates all emissions inventory requirements could provide consistency for the states and Ontario.

In summary, the Great Lakes states and the province of Ontario have successfully implemented a system, The Great Lakes Regional Air Toxic Emissions Inventory, to compile and analyze air toxic emissions for the Great Lakes region. Beyond the periodic air toxic inventory work that the States and Ontario will be compiling, this system can be utilized for many other important air quality assessments. These include:

1. The NTI and the CEP;
2. Regional inventories for ozone, particulate matter and haze;
3. The urban air toxic program;
4. Mercury deposition studies; and,
5. Acid deposition studies.

The Great Lakes Regional Air Toxic Emissions Inventory is an example of regional cooperation of eight states and the province of Ontario. It can be used as a model for states compiling inventories for input into the National Toxics Inventory (NTI) or National Emissions Trends Inventory. It also serves as a model for the regional inventory efforts underway as part of a regional assessment of various toxic pollutants.

5. Appendices

Appendix A: Illinois Toxic Emissions Inventory

BACKGROUND

The State of Illinois conducted its statewide air toxic emission inventory for the Great Lakes Air Toxic Emission Inventory Project for calendar year 1996. This inventory was an extension of the 1993 inventory by including additional pollutants of concern and additional area source categories. With a 1990 population of 11,430,602, Illinois represents approximately 13.1 percent of the total population of the overall Great Lakes region. The table below provides a brief demographic overview of Illinois.

Demographic Characteristics for the Illinois Area of the Great Lakes Region Air Toxic Emissions Inventory

	Illinois
Total Population, 1990	11,430,602
Urban Population, 1990	969,076
Rural Population, 1990	1,761,526

Source: U.S. Bureau of the Census

Illinois inventoried both point and area sources. In developing its inventory, Illinois followed the Air Toxic Emissions Inventory Protocol. Illinois did not perform the emission calculations in RAPIDS. Rather, Illinois used the data from the Factor Information Retrieval System (FIRE) and the reference tables of RAPIDS to calculate emissions outside of RAPIDS. The emission estimates calculated were then imported into RAPIDS.

DATA SOURCES

Illinois maintains a criteria pollutant emission inventory known as the EIS (Emission Inventory System). This system was just recently replaced with an Oracle-based system known as ISSIS (Illinois Stationary Source Inventory System). The stationary source inventory includes points sources which require a permit. In Illinois, permitting exemptions are based upon physical characteristics of a device (e.g., boilers with less than one million BTU per hour heat input) or throughput (e.g., less than 5,000 gallons of coating/solvent use per year). There are no exemptions for permitting for de minimis emission rates so the point source inventory has a large number of sources as compared to other states.

In 1993, Illinois had adopted annual emission reporting rule which could have been used to compile the inventory. Data obtained by use of this rule was not used to compile the inventory since many sources were still learning about the rule and data and calculations weren’t consistent. Because of this, Illinois used data contained in EIS, the active system at the time.

CALCULATION METHODS

Point Source Emissions

Point source emissions were calculated using the emission factors found in FIRE and RAPIDS using operating rate data from EIS. Since no control efficiencies existed in EIS for the pollutants of interest, Illinois applied the EIS removal efficiency value for particulate matter to particulate toxic pollutants and the VOC value to organic toxic pollutants.

Illinois also extended the use of emission factors. In performing its calculations external to RAPIDS, Illinois discovered that SCC codes that were similar didn't necessarily have the same number of pollutants/emission factors associated with them. For example, the SCC (10100601) for electric generating natural gas fired boilers over 100 million BTU/hr had an emission factor for mercury emissions while the SCC (10200601) for industrial natural gas fired boilers over 100 million BTU/hr did not. In cases such as this, the emission factor was applied to all similar SCCs. The majority of these substitutions occurred for fuel combustion and incinerating devices.

The QA/QC process of the regional inventoried identified shortcomings in the emission rates for some organic materials (e.g., methylene chloride, dibutyl phthalate, etc.). To address this shortcoming, Illinois supplemented its emission data with TRI reported data from 1993. Emission sources obtained through TRI had to be match by address to match emission sources from EIS. Sources that couldn't be matched were not included in the inventory. Where matches were established, a further analysis was done to associate the emissions with a specific device at the source.

Two source categories typically identified as area sources were inventoried as point sources. One of these sources was chrome plating. Due to time constraints, emissions were calculated from permitted allowable amp-hours and standard emission factors.

The second area source inventoried as a point source were landfills. Data was obtained from the Illinois EPA's "Nonhazardous Solid Waste Management and Landfill Capacity in Illinois" report dated August 1998. Emissions were then calculated using the EIIP/AP-42 methodology. For sources with flaring and gas-to-energy systems, a capture percent of 75% and a destruction efficiency of 90% was assumed.

Area Source Emissions

Several new area source categories were included in the 1996 inventory that were not in the 1993 inventory. A description of the calculation methods, assumptions and data sources for each area source inventoried follows.

Architectural Coating

The EIIP methodology was followed. Nationwide production estimates were obtained from the Census Bureau report "MA28F – Paint and Allied Products", August 1997 (www.census.gov/cir/www/ma28f.html). These values were then apportioned to county level using population. Emissions were then calculated by using per capita factors.

Autobody Refinishing

Employment data was obtained from the Census Bureau report “1996 County Business Patterns”, November 19, 1998 (www.census.gov/prod/www/abs/cbptotal.html). RAPIDS had an emission factor of 0.84 lb VOC/person. The EIIP section had factors of 3519 lb VOC/employee and 2.3 lb VOC/person. These numbers were then used to obtain a per employee factor, to be consistent with other RAPIDS users, that was based upon RAPIDS data. This value was 1285.2 lb VOC/employee. Emissions were then speciated using profile 1194.

Chrome Plating

Inventoried as a point source.

Consumer Solvent Use

County population was multiplied by the overall emission factor, from EIIP, to obtain emissions. Emission factors for individual categories (e.g., personal care products, household products, etc.) was not used.

Dry Cleaning

Employment data was obtained from the Census Bureau report “1996 County Business Patterns”, November 19, 1998 (www.census.gov/prod/www/abs/cbptotal.html). The EIIP emission factors were then used to calculate perchloroethylene emissions.

Gasoline Marketing

The amount of gasoline and gasohol sold in Illinois was obtained from *Monthly Gasoline Reported by States 1996* (Federal Highway Administration Highway Statistics, Table MF-33GA, October 1997) . Use was apportioned to county by VMT (vehicle miles traveled). Emissions were calculated as follows:

Tank Filling (Stage I) – Used EIIP calculation methodology assuming balanced operation in combination with speciation profile 1190.

Vehicle Refueling (Stage II) – Multiplied monthly gasoline use times the monthly emission factor obtained from MOBILE 5b in combination with speciation profile 1190.

Underground Tank Breathing – Used EIIP calculation methodology in combination with speciation profile 1190.

Gasoline Trucks in Transit – Used EIIP calculation methodology in combination with speciation profile 1190.

Graphic Arts

Inventoried as a point source.

Industrial Surface Coating

Employment data was obtained from the Census Bureau report "1996 County Business Patterns", November 19, 1998 (www.census.gov/prod/www/abs/cbptotal.html) for the SIC categories of 25, 34, 35 and 37. The per employee EIIP emission factors were then used to calculate TOG emissions. Emissions were speciated by using profile 1003.

The calculated emissions were then converted to controlled emissions by assuming 90% control efficiency, 90% rule effectiveness and 90% rule penetration. The point source inventory values for solvent cleaning were then subtracted from the calculated emissions to obtain area source emissions.

Landfills

Inventoried as a point source.

Pesticides

Obtained pesticide use and application by county from *Agricultural Chemical Usage 1996 Field Crops Summary* (National Agricultural Statistics Service, September 1997 (www.ann.usda.gov/il/ctyest/estimates.htm and www.agr.state.il.us/agstats.htm). Emission factors from EIIP were then used to calculate emissions.

Publicly Owned Treatment Works (POTWs)

Data from USEPA's 1996 NTI inventory was used.

Residential Fuel Combustion

The amount of fuel burned in Illinois was obtained from the *State Energy Data Report 1996* (Department of Energy, Energy Information Administration, DOE/EIA-2014(96), February 1999). Use by county was apportioned by the number of houses in a county (1990 census) divided by the total number of houses in the state in the following manner:

Natural gas – apportioned to county level by residences in county
Fuel oil – apportioned to county level by residences burning wood in county
Kerosene – apportioned to county level by residences burning wood in county
Coal – apportioned to county level by residences burning wood in county

The county-wide fuel use was then multiplied by the emission factors for commercial/institutional natural gas fired boilers < 10 million BTU/hr to obtain emissions for the county.

Residential Wood Combustion

The amount of wood burned in Illinois was obtained from the *State Energy Data Report 1996* (Department of Energy, Energy Information Administration, DOE/EIA-2014(96), February 1999). Use by county was apportioned by the number of houses in a county (1990 census) that burned wood.

EIIP emission factors for non-catalytic stoves were then used to calculate emissions.

Solvent Cleaning

Employment data was obtained from the Census Bureau report "1996 County Business Patterns", November 19, 1998 (www.census.gov/prod/www/abs/cbptotal.html) for the SIC categories of 25, 33, 34, 35, 36, 37, 38, 39 and 55. The per employee EIIP emission factors were then used to calculate TOG emissions. Emissions were speciated by using profile 1195.

The calculated emissions were then converted to controlled emissions by assuming 90% control efficiency, 80% rule effectiveness and 90% rule penetration. The point source inventory values for solvent cleaning were then subtracted from the calculated emissions to obtain area source emissions.

Traffic Lane Markings

Coating specifications and use were obtained from the Illinois Department of Transportation. Coating use was available by district so coating use was apportioned at the county level by the percentage of miles of roads in the county compared to the total miles of roads in the district. This data was obtained for the previous 1993 inventory. Since the source category did not comprise a significant portion of the 1993 inventory, it was assumed that coating use was the same for 1996 as it was in 1993.

Table A-1: Illinois Emissions by County in pounds/year

	Adams	Alexander	Bond	Boone	Brown
ACENAPHTHEN	356.33	114.08	178.57	44.35	70.94
ACENAPHTHYL	1140.23	365.10	571.42	141.92	226.99
ACETALDEHYDE	94.27	16.91	17.39	53.36	5.95
ACROLEIN	112.20	14.79	20.73	50.51	7.10
ACRYLAMIDE					
ACRYLONITRIL			91.33		
ANTHRACENE	320.69	102.72	160.71	39.92	63.84
ANTIMONY				0.13	
ARSENIC	268.01	0.58	0.26	6.78	0.08
ATRAZINE	23811.12	1718.36	8296.70	10558.28	6377.78
BENZ(A)ANTHR	64.20	14.33	22.05	13.57	8.76
BENZ(GHI)PE	712.64	228.15	357.14	88.68	141.87
BENZENE	82064.40	24239.95	39907.06	17708.19	15104.87
BENZO(A)PYRE	219.69	68.44	107.14	30.64	42.56
BENZO(B)FLUO	142.53	45.63	71.43	17.74	28.37
BENZO(K)FLUO	35.63	11.41	17.86	4.44	7.09
BERYLLIUM	2.58	0.08	0.13	0.06	0.05
BUTADIENE,13	0.88	0.13	0.22	0.72	0.08
CADMIUM	35.40	0.65	1.08	4.75	0.37
CARBON TETRA	59.18	24.14	41.28	38.84	15.06
CHLOROFORM	284.65	30.98	56.80	150.62	25.85
CHROMIUM	60.93	6.39	3.18	615.18	1.18
CHROMIUM VI	0.12	0.07		518.41	
CHRYSENE	401.91	114.18	178.57	50.56	70.94
COBALT	negl	0.20	negl	0.06	
COKE OVEN GS					
COPPER	15.59	2.08	2.80	38.31	1.11
DIBENZAHAN	142.53	45.63	71.43	17.74	28.37
DIBROMOET,12	negl			negl	
DIBUTYL PHTH	10.92				2.83
DICHLORETH12	1.10	0.05	11.11	0.24	0.03
DIEYLHEX PHT					
ETHYLBENZENE	28770.46	3887.32	7926.88	28675.16	1803.84
ETHYLENE OXI	2993.57	167.29	241.21	469.51	89.09
FLUORANTHENE	452.74	91.45	142.92	56.17	56.77
FLUORENE	498.85	159.72	249.99	62.26	99.31
FORMALDEHYDE	4634.94	552.84	509.21	1579.37	173.02
GLYCOL ETHRS	2633.47	447.59	645.35	1248.04	238.36
HEXCLBENZENE	0.01	negl	negl	0.01	negl
INDN(123CDPY	712.64	228.15	357.14	88.68	141.87
LEAD	203.55	1.40	8.17	39.81	0.18
MANGANESE	1011.42	15.42	3.22	37.32	1.28
MERCURY	73.73	8.16	11.66	33.24	3.74
METHENE(B)4-					
METHYLENE CL	18418.36	615242.38	2640.88	10213.58	682.68
NAPHTHALENE	11748.12	2647.91	4388.92	3802.02	1922.23
NICKEL	19.23	1.67	1.64	58.70	0.51
PCDD		negl			
PCDF		0.0008			
PERC	64592.24	332.43	1426.35	21742.46	180.48
PHENANTHRENE	4204.70	1346.15	2107.10	523.40	837.04
PHENOL	35.63	11.99	17.86	9.87	7.09
PHOSGENE					
PYRENE	285.06	91.28	142.85	35.50	56.75
STYRENE	483.41	118.12	247.39	395.33	54.63
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	0.0001	negl	negl	negl	negl
TCE,111	83941.32	4290.55	8576.98	47759.22	2285.16
TOLUENE	364663.24	23686.23	44790.57	1183457.58	14923.82
TOLUENE24DII					
TRICHLORETHY	55577.49	7.00	2356.13	33887.13	3.88
TRIFULURALIN	7358.40	2102.40	4263.20	2686.40	1635.20
VINYL CHLOR	0.24	0.04	0.06	0.13	0.02
XYLENES ISO	0.24	19347.52	39329.30	305887.70	15135.23

Table A-1: Illinois Emissions by County in pounds/year

	Bureau	Calhoun	Carroll	Cass	Champaign
ACENAPHTHEN	79.73	132.62	107.63	128.58	108.97
ACENAPHTHYL	244.00	424.37	344.41	411.47	348.73
ACETALDEHYDE	40.50	6.33	26.22	18.54	472.75
ACROLEIN	48.10	7.54	24.12	21.14	485.22
ACRYLAMIDE					
ACRYLONITRIL					
ANTHRACENE	69.55	119.35	96.87	115.73	98.14
ANTIMONY	negl		0.19		5.98
ARSENIC	0.15	0.16	0.86	0.18	497.54
ATRAZINE	38963.84	3269.46	22038.40	13053.00	42691.34
BENZ(A)ANTHR	10.23	16.38	13.96	15.88	473.55
BENZ(GHI)PE	151.57	265.23	215.23	257.16	217.72
BENZENE	25743.66	26398.42	23949.77	27148.14	53438.64
BENZO(A)PYRE	45.78	79.57	64.58	77.15	91.38
BENZO(B)FLUO	31.06	53.05	43.05	51.43	43.54
BENZO(K)FLUO	7.58	13.26	10.76	12.86	10.90
BERYLLIUM	0.86	0.10	0.49	0.09	0.57
BUTADIENE,13	0.46	0.06	0.56	0.17	5.44
CADMIUM	2.22	0.68	2.54	0.67	54.51
CARBON TETRA	72.22	16.75	33.90	20.74	135.25
CHLOROFORM	135.22	22.04	56.77	53.00	709.32
CHROMIUM	4.73	2.20	11.66	2.17	5878.59
CHROMIUM VI	0.04			0.01	0.57
CHRYSENE	78.09	132.62	107.62	128.59	343.26
COBALT	negl		0.08	0.03	5.62
COKE OVEN GS					
COPPER	1.81	2.08	14.12	2.07	219.75
DIBENZAHAN	30.31	53.05	43.05	51.43	43.58
DIBROMOET,12	negl				0.01
DIBUTYL PHTH			9.83		15.68
DICHLORETH12	0.20	0.02	0.08	0.06	3.15
DIEYLHEX PHT	39.00				
ETHYLBENZENE	16277.70	1419.10	5249.36	3776.09	52655.27
ETHYLENE OXI	570.96	82.19	255.51	198.13	9267.73
FLUORANTHENE	69.45	106.12	86.17	102.95	571.78
FLUORENE	106.34	185.66	150.91	180.02	154.82
FORMALDEHYDE	202816.26	198.00	660.24	533.86	10783.07
GLYCOL ETHRS	1435.78	219.90	683.61	530.09	6896.97
HEXCLBENZENE	0.02	negl	0.01	0.01	0.02
INDN(123CDPY	151.57	265.23	215.23	257.16	217.70
LEAD	8.10	0.34	65.74	0.45	777.31
MANGANESE	18.91	2.39	7.19	4.65	89.89
MERCURY	28.73	4.25	20.54	11.79	300.59
METHENE(B)4-					
METHYLENE CL	9781.58	631.35	3490.10	1818.44	30636.32
NAPHTHALENE	6322.68	2317.33	2940.64	2895.44	18122.67
NICKEL	262.06	0.95	14.13	1.07	260.84
PCDD				negl	negl
PCDF				negl	negl
PERC	25255.42	164.51	3257.84	903.89	127730.26
PHENANTHRENE	930.77	1564.88	1270.11	1517.29	1286.77
PHENOL	7.58	13.26	10.76	12.96	13.80
PHOSGENE					
PYRENE	60.63	106.09	86.13	102.87	87.48
STYRENE	441.82	40.02	149.63	110.13	35327.41
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	negl	negl	negl	negl	0.0002
TCE,111	30799.19	2107.90	14868.94	6629.57	124170.02
TOLUENE	205263.47	15583.64	44152.99	25678.98	342046.50
TOLUENE24DII					
TRICHLORETHY	53628.92	3.44	7878.81	1473.02	32370.26
TRIFULURALIN	8876.8	1051.20	1868.80	4204.80	15125.60
VINYL CHLOR	0.12	0.02	0.06	0.05	0.58
XYLENES ISO	98962.77	8727.48	28344.66	19261.49	287364.53

Table A-1: Illinois Emissions by County in pounds/year

	Christian	Clark	Clay	Clinton	Coles
ACENAPHTHEN	116.90	280.54	306.74	223.76	208.38
ACENAPHTHYL	374.05	897.72	981.58	716.04	666.83
ACETALDEHYDE	62.14	17.01	15.34	92.05	41.06
ACROLEIN	67.70	20.28	18.27	76.32	47.94
ACRYLAMIDE					
ACRYLONITRIL	274.53	252.48	276.07		122.53
ANTHRACENE	105.21			201.40	187.54
ANTIMONY	5.13	negl		0.79	0.01
ARSENIC	150.17	0.34	0.69	152.23	1.41
ATRAZINE	30126.08	13687.30	12350.80	13139.22	17393.92
BENZ(A)ANTHR	15.80	34.64	37.89	28.25	27.12
BENZ(GHI)PE	233.77	561.08	613.49	447.43	416.76
BENZENE	32848.06	62416.90	63492.34	51080.79	52807.38
BENZO(A)PYRE	70.63	168.32	184.06	135.83	125.16
BENZO(B)FLUO	46.76	112.22	122.70	89.48	83.35
BENZO(K)FLUO	11.69	28.05	30.67	22.38	20.84
BERYLLIUM	6.07	0.20	0.29	0.20	4.14
BUTADIENE,13	0.45	0.23	0.19	1.86	0.69
CADMIUM	18.17	1.44	2.79	15.09	16.38
CARBON TETRA	54.29	34.49	28.86	58.69	46.80
CHLOROFORM	273.38	55.98	54.69	135.17	213.42
CHROMIUM	76.38	4.66	6.86	180.52	63.90
CHROMIUM VI	22.53	negl	negl	negl	32.07
CHRYSENE	120.75	280.54	306.74	223.71	209.39
COBALT	1.52	negl		0.32	0.01
COKE OVEN GS					
COPPER	1.88	4.42	4.85	326.81	9.94
DIBENZAHAN	46.75	112.22	122.70	89.50	83.35
DIBROMOET,12	2.77	negl			negl
DIBUTYL PHTH					146.27
DICHLORETH12	125.59	0.07	0.07	0.16	15.06
DIEYLHEX PHT	168.27				
ETHYLBENZENE	12195.33	9248.00	5085.95	13505.49	204217.55
ETHYLENE OXI	524.91	243.50	223.83	535.90	794.11
FLUORANTHENE	107.89	224.49	245.45	179.47	170.36
FLUORENE	163.66	392.75	429.44	314.23	291.75
FORMALDEHYDE	2650.61	533.94	742.87	1978.36	65646.20
GLYCOL ETHRS	1404.38	651.49	598.85	1433.80	2124.64
HEXCLBENZENE	0.02	0.01	0.01	0.01	0.01
INDN(123CDPY	233.77	561.08	613.49	447.42	416.76
LEAD	219.91	125.63	57.29	119.97	916.34
MANGANESE	143.50	75.62	6.40	39.91	82.98
MERCURY	227.76	11.04	14.58	53.17	28.79
METHENE(B)4-					
METHYLENE CL	8978.13	5280.80	12190.05	5551.05	17051.37
NAPHTHALENE	4609.35	6115.89	5831.81	6382.52	15511.90
NICKEL	81.22	2.32	17.95	219.92	1177.33
PCDD	negl				
PCDF	negl				
PERC	7515.16	6592.49	8982.59	23664.43	35181.18
PHENANTHRENE	1379.39	3310.35	3619.57	2640.77	2458.93
PHENOL	48.89	28.06	30.67	24.96	20.84
PHOSGENE					
PYRENE	93.52	224.43	245.39	179.14	166.71
STYRENE	369.64	295.47	150.72	356.02	504.89
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	negl	0.0001	0.0002	0.0001	0.0001
TCE,111	31243.37	24673.49	31478.35	21382.59	60465.91
TOLUENE	116243.41	71163.41	58691.34	164788.96	580115.04
TOLUENE24DII					
TRICHLORETHY	17055.22	17446.16	24361.53	7249.34	22913.21
TRIFULURALIN	10103.2	6832.80	6073.60	4788.80	6307.20
VINYL CHLOR	0.12	0.06	0.05	0.12	0.18
XYLENES ISO	65272.00	51338.11	33919.23	80184.17	142120.71

Table A-1: Illinois Emissions by County in pounds/year

	Cook	Crawford	Cumberland	DeKalb	DeWitt
ACENAPHTHEN	219.54	167.04	179.36	49.98	32.25
ACENAPHTHYL	699.50	532.70	573.96	159.95	103.19
ACETALDEHYDE	7422.66	47.25	10.17	94.40	32.08
ACROLEIN	8229.36	40.84	12.14	112.48	33.27
ACRYLAMIDE	390.04				
ACRYLONITRIL	1680.48			79.78	296.87
ANTHRACENE	197.09	149.86	161.43	44.99	29.02
ANTIMONY	228.24	146.39			0.13
ARSENIC	405.19	143.32	0.44	4.05	0.23
ATRAZINE	931.20	11223.36	10415.86	32747.20	15520.00
BENZ(A)ANTHR	316.96	22.54	22.15	6.30	242.92
BENZ(GHI)PE	435.68	332.99	358.73	99.97	64.48
BENZENE	996536.31	37134.68	39748.12	25127.37	10607.68
BENZO(A)PYRE	5391.58	12093.83	107.63	30.19	106.59
BENZO(B)FLUO	87.16	66.59	71.74	19.99	12.90
BENZO(K)FLUO	21.85	16.65	17.94	5.00	3.22
BERYLLIUM	53.40	6.38	0.15	0.36	0.08
BUTADIENE,13	100.13	0.33	0.14	1.07	0.45
CADMIUM	4948.32	25.21	1.72	15.22	43.53
CARBON TETRA	3214.02	31.80	23.85	80.02	29.07
CHLOROFORM	22339.29	107.40	30.45	336.61	60.86
CHROMIUM	12547.47	102.63	4.08	72.77	25.73
CHROMIUM VI	6689.46	27.44		52.00	1.74
CHRYSENE	920.90	170.92	179.36	50.27	707.29
COBALT	310.16	188.65	negl	negl	0.05
COKE OVEN GS	932084.44				
COPPER	22116.53	51.33	2.82	1.00	507.37
DIBENZAHAN	87.32	66.63	71.74	19.99	12.90
DIBROMOET,12	2.24	0.56		negl	0.06
DIBUTYL PHTH	2131.31			57.84	
DICHLORETH12	312.65	18.95	0.05	10.00	47.83
DIEYLHEX PHT	132.73	34.30			
ETHYLBENZENE	1402264.44	7453.91	7542.45	25804.82	10406.81
ETHYLENE OXI	172259.49	299.78	159.27	1254.19	258.75
FLUORANTHENE	2783.14	146.87	143.53	41.36	2505.40
FLUORENE	321.64	233.22	251.11	69.98	45.31
FORMALDEHYDE	736546.46	1349574.85	300.87	8470.92	853.98
GLYCOL ETHRS	214987.59	802.06	426.14	3088.46	692.29
HEXCLBENZENE	negl	0.01	0.01	0.02	0.01
INDN(123CDPY	435.61	332.99	358.73	99.97	64.48
LEAD	19072.08	151.37	40.19	712.25	14.59
MANGANESE	7196.90	214.17	3.23	9.18	2.88
MERCURY	5478.81	65.49	8.27	93.96	28.88
METHENE(B)4-	31.2				
METHYLENE CL	2438025.35	4609.58	1399.30	21389.59	5710.51
NAPHTHALENE	521712.63	4059.78	4194.78	7969.60	2238.72
NICKEL	17706.44	2363.98	3.11	33.21	12.60
PCDD	negl	negl			
PCDF	negl	negl			
PERC	3368796.44	4524.76	632.53	58484.31	5821.64
PHENANTHRENE	2587.73	1964.65	2116.50	589.83	380.59
PHENOL	497887.30	27.85	17.94	1648.82	3.22
PHOSGENE					
PYRENE	177.04	133.30	143.49	39.99	25.82
STYRENE	226419.38	176.23	253.76	624.08	191.36
TCDD,2378	0.0003	negl	negl	negl	negl
TCDF,2378	0.0091	0.0039	0.0001	0.0012	negl
TCE,111	3395199.95	19466.60	5034.38	73119.33	21065.17
TOLUENE	10632778.01	264778.13	42352.04	422422.27	291055.81
TOLUENE24DII	611.52				
TRICHLORETHY	1742952.66	11141.38	904.86	132800.44	13936.67
TRIFULURALIN	1051.20	5723.20	4029.60	7650.40	5372.80
VINYL CHLOR	17.64	0.07	0.04	0.29	0.06
XYLENES ISO	8073351.32	53840.65	38324.22	183362.19	87322.36

Table A-1: Illinois Emissions by County in pounds/year

	Douglas	DuPage	Edgar	Edwards	Effingham
ACENAPHTHEN	89.48	67.40	164.05	120.51	336.96
ACENAPHTHYL	286.33	215.40	525.02	385.64	1078.29
ACETALDEHYDE	27.56	885.43	45.60	7.26	30.95
ACROLEIN	27.19	952.70	31.04	8.66	36.93
ACRYLAMIDE					
ACRYLONITRIL		3765.70			76.24
ANTHRACENE	80.53	60.59	147.72	108.46	303.27
ANTIMONY	4.40	22.33			
ARSENIC	100.39	17.82	15.88	0.21	0.48
ATRAZINE	20488.20	1086.40	24540.14	6400.64	14487.60
BENZ(A)ANTHR	11.40	95.94	22.80	14.88	41.61
BENZ(GHI)PE	178.96	134.63	328.08	241.03	673.93
BENZENE	25991.28	182706.39	35505.65	24979.62	79194.70
BENZO(A)PYRE	53.94	109.37	104.96	72.31	202.18
BENZO(B)FLUO	35.79	26.92	65.62	48.20	134.78
BENZO(K)FLUO	8.95	6.73	16.40	12.05	33.70
BERYLLIUM	5.20	0.44	0.14	0.09	0.25
BUTADIENE,13	0.26	11.27	0.26	0.09	0.43
CADMIUM	13.44	62.54	8.57	0.84	2.01
CARBON TETRA	650.50	574.48	38.63	13.47	43.30
CHLOROFORM	96.88	3735.89	79.86	28.21	133.17
CHROMIUM	105.22	327.79	15.29	2.30	5.97
CHROMIUM VI	19.31	89.75	0.10		negl
CHRYSENE	90.53	243.06	164.13	120.51	336.96
COBALT	24.43	25.57	0.27	negl	negl
COKE OVEN GS					
COPPER	71.82	4389.94	61.05	1.89	5.29
DIBENZAHAN	35.79	26.93	65.62	48.20	134.78
DIBROMOET,12	0.37	0.02			
DIBUTYL PHTH		242.95			6.81
DICHLORETH12	12.32	461.90	0.09	0.04	9.36
DIEYLHEX PHT	22.29				
ETHYLBENZENE	9541.51	306617.63	6355.66	2659.97	17724.54
ETHYLENE OXI	287.41	25081.75	302.60	125.07	493.09
FLUORANTHENE	75.45	704.73	132.52	96.44	269.68
FLUORENE	125.28	94.34	229.68	168.72	471.75
FORMALDEHYDE	2309311.98	99762.04	1078.78	219.20	299472.53
GLYCOL ETHRS	768.97	34062.69	809.62	334.63	1319.26
HEXCLBENZENE	0.01	negl	0.01	negl	0.01
INDN(123CDPY	178.96	134.63	328.08	241.03	673.93
LEAD	125.92	384.36	43.50	11.24	14.35
MANGANESE	123.67	873.96	88.98	2.17	6.30
MERCURY	41.28	574.18	24.19	5.18	32.77
METHENE(B)4-					
METHYLENE CL	3732.09	738376.86	3444.78	950.33	10230.81
NAPHTHALENE	3257.65	88557.71	3980.72	2419.42	9823.88
NICKEL	105.15	1063.08	100.02	1.37	3.13
PCDD	negl		negl		
PCDF	negl		0.0011		
PERC	3163.02	645798.59	73817.13	249.33	23256.47
PHENANTHRENE	1055.88	794.38	1935.80	1422.06	3976.18
PHENOL	14.28	7895.49	27.87	12.05	33.70
PHOSGENE					
PYRENE	71.59	53.88	131.27	96.41	269.57
STYRENE	16097.74	14589.85	161.96	73.62	553.25
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	negl	0.0005	0.0001	negl	0.0001
TCE,111	15128.70	772395.59	13817.25	3207.60	46082.23
TOLUENE	57028.15	1909309.81	95538.63	27371.73	138730.51
TOLUENE24DII		61.00			
TRICHLORETHY	7345.79	266439.03	5742.81	5.16	30213.22
TRIFULURALIN	6365.60	408.80	8526.40	2861.60	5548.00
VINYL CHLOR	0.07	2.98	0.07	0.02	0.12
XYLENES ISO	43654.16	1555311.71	38644.34	15265.50	110680.10

Table A-1: Illinois Emissions by County in pounds/year

	Fayette	Ford	Franklin	Fulton	Gallatin
ACENAPHTHEN	369.22	40.31	275.23	249.10	60.46
ACENAPHTHYL	1181.51	128.98	866.15	797.11	193.47
ACETALDEHYDE	33.29	23.12	85.19	45.84	7.07
ACROLEIN	38.23	27.50	101.22	53.85	8.43
ACRYLAMIDE					
ACRYLONITRIL				55.19	
ANTHRACENE	332.30	36.28	244.81	224.19	54.41
ANTIMONY				0.71	
ARSENIC	2.34	0.07	1.39	16.76	0.07
ATRAZINE	13298.20	21107.20	6559.44	21898.32	10749.66
BENZ(A)ANTHR	47.56	4.98	34.14	60.90	7.49
BENZ(GHI)PE	738.44	80.61	540.13	498.19	120.92
BENZENE	78958.69	11339.19	64252.86	56319.05	13231.34
BENZO(A)PYRE	222.69	24.18	162.07	160.48	36.28
BENZO(B)FLUO	147.69	16.12	109.00	99.64	24.18
BENZO(K)FLUO	36.92	4.03	27.01	24.91	6.05
BERYLLIUM	0.36	0.04	0.22	1.07	0.04
BUTADIENE,13	0.28	0.18	0.53	0.50	0.09
CADMIUM	5.63	0.35	1.94	10.09	0.31
CARBON TETRA	43.40	39.50	69.23	70.69	26.33
CHLOROFORM	81.56	54.26	161.00	213.34	27.22
CHROMIUM	56.27	0.81	18.14	19.26	1.00
CHROMIUM VI	0.01	negl	negl	3.32	
CHRYSENE	373.76	40.31	270.23	334.27	60.46
COBALT	negl	negl	negl	3.92	negl
COKE OVEN GS					
COPPER	83.39	0.66	4.30	3.94	0.95
DIBENZAHAN	147.69	16.12	108.02	99.64	24.18
DIBROMOET,12	negl			1.18	
DIBUTYL PHTH					
DICHLORETH12	0.18	0.07	0.19	47.57	0.03
DIEYLHEX PHT				71.61	
ETHYLBENZENE	11546.51	5085.14	14966.85	11061.80	2467.23
ETHYLENE OXI	328.50	217.21	624.81	1894.99	109.96
FLUORANTHENE	312.27	32.33	216.83	512.30	48.46
FLUORENE	516.91	56.43	378.40	348.74	84.64
FORMALDEHYDE	1252.31	760.82	265205.58	1564.84	207.97
GLYCOL ETHRS	878.90	581.15	1671.67	1418.00	294.19
HEXCLBENZENE	0.01	0.01	negl	0.01	0.01
INDN(123CDPY	738.44	80.61	540.13	498.19	120.92
LEAD	10.60	3.27	21.74	83.40	0.16
MANGANESE	15.10	1.44	5.12	40.75	1.09
MERCURY	26.38	16.28	60.28	114.86	4.53
METHENE(B)4-					
METHYLENE CL	2886.45	3307.09	7961.45	5218.43	837.90
NAPHTHALENE	7967.85	1884.12	7969.05	6594.19	1511.10
NICKEL	53.95	2.63	5.71	29.17	0.43
PCDD				negl	
PCDF				negl	
PERC	1272.40	3370.12	6903.23	2316.45	220.21
PHENANTHRENE	4356.83	475.65	3234.52	2939.34	713.43
PHENOL	37.85	4.03	27.01	40.60	6.05
PHOSGENE					
PYRENE	295.38	32.24	216.05	199.28	48.37
STYRENE	366.50	148.82	582640.71	335.13	73.62
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	0.0001	negl	0.0001	0.0002	negl
TCE,111	10289.64	14440.31	33063.14	16946.47	2820.10
TOLUENE	71033.05	36188.80	86734.86	65200.58	14416.48
TOLUENE24DII					
TRICHLORETHY	1777.82	8400.95	16147.26	3226.98	4.60
TRIFULURALIN	7066.40	8117.60	4088.00	6657.60	4029.60
VINYL CHLOR	0.07	0.05	0.14	0.13	0.02
XYLENES ISO	59787.21	26236.32	74494.49	53404.10	12054.76

Table A-1: Illinois Emissions by County in pounds/year

	Greene	Grundy	Hamilton	Hancock	Hardin
ACENAPHTHEN	186.21	29.17	168.89	207.59	167.18
ACENAPHTHYL	595.88	87.73	540.46	664.28	503.39
ACETALDEHYDE	15.29	141.30	10.40	28.49	6.55
ACROLEIN	18.24	166.63	10.80	33.92	7.80
ACRYLAMIDE					
ACRYLONITRIL		1218.04			
ANTHRACENE	167.59	24.77	152.00	186.83	144.19
ANTIMONY		437.23	0.04		
ARSENIC	0.22	109.99	0.21	0.31	0.19
ATRAZINE	15702.74	17072.00	8755.46	22691.06	311.66
BENZ(A)ANTHR	24.03	3.72	20.86	26.34	19.36
BENZ(GHI)PE	372.42	55.00	337.78	415.17	311.98
BENZENE	38648.41	15440.80	34755.44	45060.96	34347.52
BENZO(A)PYRE	112.11	16.45	101.33	124.81	93.65
BENZO(B)FLUO	74.48	10.96	67.56	83.03	64.51
BENZO(K)FLUO	18.62	2.74	16.89	20.76	15.60
BERYLLIUM	0.13	2.34	0.12	0.15	0.12
BUTADIENE,13	0.20	0.51	0.19	0.28	0.06
CADMIUM	1.15	33.48	0.88	1.40	0.82
CARBON TETRA	44.17	48.42	23.86	46.84	14.59
CHLOROFORM	55.00	140.78	28.84	82.38	21.96
CHROMIUM	3.20	71.01	2.90	3.79	2.62
CHROMIUM VI	0.01	20.65		0.01	negl
CHRYSENE	189.15	27.61	168.89	209.57	156.09
COBALT	negl	501.34	0.02	negl	
COKE OVEN GS					
COPPER	2.92	147.70	5.18	3.26	2.45
DIBENZAHAN	74.48	11.10	67.56	83.03	62.40
DIBROMOET,12	negl			negl	
DIBUTYL PHTH		3.21			
DICHLORETH12	0.12	89.31	0.04	0.14	0.02
DIEYLHEX PHT					
ETHYLBENZENE	4305.55	16117.16	2868.98	7110.45	1530.30
ETHYLENE OXI	228.45	528.33	134.75	340.96	78.11
FLUORANTHENE	159.80	22.88	135.14	173.47	125.75
FLUORENE	260.70	38.78	236.50	290.62	219.06
FORMALDEHYDE	449.02	24028.42	271.18	755.42	570612.76
GLYCOL ETHRS	611.21	1341.76	360.53	912.23	208.99
HEXCLBENZENE	0.01	0.01	negl	0.01	negl
INDN(123CDPY	372.42	54.99	337.78	415.17	311.98
LEAD	0.48	129.90	0.56	10.52	0.43
MANGANESE	3.36	250.77	3.70	3.78	2.99
MERCURY	9.76	110.48	5.77	19.41	5.56
METHENE(B)4-					
METHYLENE CL	1994.14	7866.57	1042.33	6088.08	601.02
NAPHTHALENE	3985.32	4586.42	3190.79	4956.43	3037.52
NICKEL	1.35	7039.13	3.55	1.96	3.94
PCDD					
PCDF					
PERC	870.49	24370.77	270.59	6907.02	157.02
PHENANTHRENE	2197.30	324.32	1992.95	2449.51	1944.17
PHENOL	18.62	2.74	16.89	20.76	15.60
PHOSGENE					
PYRENE	148.97	22.29	135.12	166.07	124.79
STYRENE	122.80	7177.54	85.02	197.21	44.23
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	negl	negl	negl	0.0001	negl
TCE,111	7136.20	20130.47	3456.09	27511.24	2003.42
TOLUENE	32018.11	73315.48	24108.41	56206.80	17768.10
TOLUENE24DII					
TRICHLORETHY	1217.81	7559.97	5.70	17770.60	3.31
TRIFULURALIN	5256.00	5606.40	4730.40	8351.20	292.00
VINYL CHLOR	0.05	0.12	0.03	0.07	0.02
XYLENES ISO	22604.30	79163.76	15980.69	39197.10	9749.88

Table A-1: Illinois Emissions by County in pounds/year

	Henderson	Henry	Iroquois	Jackson	Jasper
ACENAPHTHEN	90.70	136.30	76.17	401.05	173.72
ACENAPHTHYL	290.24	436.17	243.75	1283.37	555.90
ACETALDEHYDE	10.54	48.25	33.22	76.32	15.94
ACROLEIN	12.55	27.73	39.60	89.31	14.80
ACRYLAMIDE					
ACRYLONITRIL		44.68		708.92	
ANTHRACENE	81.63	122.69	68.56	360.95	156.35
ANTIMONY		1.04		1.48	3.90
ARSENIC	0.11	0.61	0.22	96.93	89.02
ATRAZINE	14594.20	35389.74	47976.96	4713.60	12923.72
BENZ(A)ANTHR	11.20	16.83	9.91	57.61	21.45
BENZ(GHI)PE	181.40	272.50	152.34	802.10	347.44
BENZENE	19496.02	39516.32	24200.37	88562.43	38883.88
BENZO(A)PYRE	54.42	81.79	45.89	243.59	104.23
BENZO(B)FLUO	36.28	54.50	30.47	160.42	69.49
BENZO(K)FLUO	9.07	13.63	7.62	40.10	17.37
BERYLLIUM	0.06	0.15	0.07	2.05	4.67
BUTADIENE,13	0.11	2.10	0.41	0.79	0.14
CADMIUM	0.47	1.82	0.95	13.78	11.94
CARBON TETRA	26.17	71.41	90.69	68.98	27.80
CHLOROFORM	28.83	210.39	130.76	280.34	122.90
CHROMIUM	1.51	439.83	1.96	30.59	59.21
CHROMIUM VI		0.01	negl	6.55	17.11
CHRYSENE	90.70	136.25	77.59	423.82	173.72
COBALT	negl	0.61		8.22	21.66
COKE OVEN GS					
COPPER	1.42	714.09	1.20	6.34	2.73
DIBENZAHAN	36.28	54.52	30.47	160.42	69.49
DIBROMOET,12			negl	0.27	1.87
DIBUTYL PHTH			0.17	5.53	
DICHLORETH12	0.04	5.63		95.19	62.39
DIEYLHEX PHT				16.19	113.77
ETHYLBENZENE	5075.18	20978.06	14450.46	100442.93	4260.73
ETHYLENE OXI	134.57	856.87	468.64	1455.28	166.90
FLUORANTHENE	72.60	109.08	66.27	404.75	139.02
FLUORENE	126.98	191.81	106.64	561.48	243.22
FORMALDEHYDE	315.31	1166.13	14482.52	2357.68	664.57
GLYCOL ETHRS	360.04	2034.87	1253.85	2432.77	446.54
HEXCLBENZENE	0.01	0.02	0.02	negl	0.01
INDN(123CDPY	181.40	272.50	152.34	802.10	347.44
LEAD	0.23	39.92	23.23	139.28	87.35
MANGANESE	1.63	33.85	1.41	47.58	109.27
MERCURY	6.93	37.37	22.99	69.82	135.53
METHENE(B)4-					
METHYLENE CL	1040.98	11433.09	6901.19	11590.01	3292.07
NAPHTHALENE	2167.56	6858.00	4467.96	11156.51	3542.93
NICKEL	0.65	441.31	2.14	28.56	61.90
PCDD				negl	negl
PCDF				negl	negl
PERC	270.09	25334.52	6846.65	38683.32	3211.89
PHENANTHRENE	1070.25	1608.83	898.84	4732.43	2049.92
PHENOL	9.07	13.65	7.62	43.65	42.31
PHOSGENE					
PYRENE	72.56	109.17	60.94	320.84	138.98
STYRENE	107.23	587.17	444.00	459.34	163.27
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	negl	0.0001	negl	0.0002	negl
TCE,111	3451.42	38383.54	12020.11	33889.77	12785.54
TOLUENE	135446.30	223879.55	94664.66	205737.62	32813.06
TOLUENE24DII					
TRICHLORETHY	5.68	27726.54	16866.16	10687.89	8024.63
TRIFULURALIN	3036.80	8059.20	16527.20	3854.40	7241.60
VINYL CHLOR	0.03	0.18	0.11	0.21	0.04
XYLENES ISO	41960.94	109711.87	73514.96	92896.34	23155.23

Table A-1: Illinois Emissions by County in pounds/year

	Jefferson	Jersey	Jo Daviess	Johnson	Kane
ACENAPHTHEN	444.27	273.69	250.71	222.10	86.69
ACENAPHTHYL	1421.41	875.81	802.26	710.70	277.33
ACETALDEHYDE	52.86	18.80	43.48	10.83	375.05
ACROLEIN	62.93	22.44	49.96	12.93	449.56
ACRYLAMIDE					
ACRYLONITRIL		65.41			753.51
ANTHRACENE	399.78	246.32	225.64	199.88	78.00
ANTIMONY	20.20				6.12
ARSENIC	12.53	0.33	0.39	174.68	7.02
ATRAZINE	7659.88	9192.44	14123.20	2333.58	14909.82
BENZ(A)ANTHR	69.91	33.80	31.24	27.43	119.18
BENZ(GHI)PE	888.39	547.38	501.41	444.19	173.33
BENZENE	98220.28	56522.16	53457.32	46950.00	75176.87
BENZO(A)PYRE	270.01	164.22	151.14	133.26	183.63
BENZO(B)FLUO	177.68	109.48	100.28	88.84	34.67
BENZO(K)FLUO	44.42	27.37	25.07	22.21	8.67
BERYLLIUM	0.44	0.20	0.19	0.16	2.98
BUTADIENE,13	0.51	0.27	0.28	0.17	4.83
CADMIUM	6.32	1.41	2.55	15.02	2088.03
CARBON TETRA	48.15	38.17	44.18	31.25	247.54
CHLOROFORM	158.42	81.06	82.86	51.98	1575.72
CHROMIUM	105.47	4.55	5.83	3.69	766.27
CHROMIUM VI	1.02	negl	negl	negl	572.75
CHRYSENE	472.15	273.69	250.71	222.10	182.44
COBALT	23.17	negl	negl		7.00
COKE OVEN GS					
COPPER	11.77	4.30	10.39	3.49	214.09
DIBENZAHAN	177.68	109.48	100.28	88.84	34.67
DIBROMOET,12	negl				0.01
DIBUTYL PHTH	2.70				533.68
DICHLORETH12	0.66	8.00	0.11	0.06	94.34
DIEYLHEX PHT					
ETHYLBENZENE	18488.09	6271.41	7942.93	6463.41	142219.09
ETHYLENE OXI	606.90	310.21	348.30	182.56	14872.96
FLUORANTHENE	455.07	219.02	200.83	177.71	422.88
FLUORENE	621.88	383.17	350.99	310.93	121.35
FORMALDEHYDE	1789.78	548.73	1992.78	454.62	26070.26
GLYCOL ETHRS	1565.34	829.98	931.87	488.44	14170.10
HEXCLBENZENE	negl	negl	0.01	negl	0.01
INDN(123CDPY	888.39	547.38	501.41	444.19	173.33
LEAD	26.45	0.70	5386.10	116.76	693.50
MANGANESE	19.62	4.93	3633.43	4.02	72.23
MERCURY	38.28	11.76	30.39	7.45	267.98
METHENE(B)4-					509.00
METHYLENE CL	6764.24	3126.18	6186.28	1417.93	96346.71
NAPHTHALENE	11166.46	5621.31	5553.14	4678.31	34440.46
NICKEL	329.70	1.96	13.06	1.94	309.69
PCDD					
PCDF					
PERC	16241.14	1610.02	6999.50	360.94	381685.73
PHENANTHRENE	5241.48	3229.55	2958.33	2620.72	1022.68
PHENOL	44.42	27.37	26.24	22.21	6887.22
PHOSGENE					
PYRENE	355.37	218.95	200.56	177.68	69.34
STYRENE	579.15	174.08	198.62	213.34	102623.33
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	0.0002	0.0001	0.0001	0.0001	0.0002
TCE,111	27141.44	10590.39	27936.71	4682.59	306647.30
TOLUENE	113041.07	46800.26	112966.20	40327.57	844091.46
TOLUENE24DII					
TRICHLORETHY	11506.19	2565.60	17995.40	7.92	89501.67
TRIFULURALIN	4204.80	3095.20	1284.80	876.00	4146.40
VINYL CHLOR	0.14	0.07	0.08	0.04	1.28
XYLENES ISO	99995.84	55998.08	51996.50	33569.17	571787.93

Table A-1: Illinois Emissions by County in pounds/year

	Kankakee	Kendall	Knox	Lake	LaSalle
ACENAPHTHEN	97.17	37.09	150.36	93.64	175.01
ACENAPHTHYL	310.89	118.68	481.11	299.20	570.26
ACETALDEHYDE	196.80	50.02	100.90	1033.96	215.25
ACROLEIN	207.84	59.64	119.84	827.34	218.84
ACRYLAMIDE					
ACRYLONITRIL	112.43		106.25	1352.97	151.36
ANTHRACENE	87.43	33.38	135.31	84.42	157.53
ANTIMONY	1.80		3.73	12.72	0.90
ARSENIC	1.02	6.06	1.31	136.59	35.57
ATRAZINE	27953.46	13192.00	24375.58	939.30	44232.00
BENZ(A)ANTHR	21.05	4.74	18.70	72.20	27.32
BENZ(GHI)PE	194.28	74.17	300.69	185.64	349.91
BENZENE	37133.27	15921.36	40362.68	132599.77	62877.75
BENZO(A)PYRE	70.71	22.48	90.21	61.39	107.73
BENZO(B)FLUO	38.86	14.83	60.134	37.17	70.03
BENZO(K)FLUO	9.72	3.71	15.03	9.34	17.51
BERYLLIUM	0.14	0.50	0.92	9.22	3.13
BUTADIENE,13	1.32	0.62	0.72	26.70	44402.99
CADMIUM	15.07	22.93	3.16	55.92	13.17
CARBON TETRA	89.96	41.20	318.22	401.44	138.59
CHLOROFORM	415.16	179.08	234.49	2524.23	464.23
CHROMIUM	267.85	207.74	7.79	1549.41	2242.80
CHROMIUM VI	0.13	82.37	0.21	579.11	0.06
CHRYSENE	111.34	37.11	150.35	141.33	188.18
COBALT	2.06	negl	4.28	21.97	0.38
COKE OVEN GS					
COPPER	493.06	143.39	4.01	8097.13	65.60
DIBENZAHAN	38.86	14.83	60.14	37.31	70.05
DIBROMOET,12	negl			0.90	negl
DIBUTYL PHTH	1557.46	3.98	6.04	155.94	60.24
DICHLORETH12	1761.47	0.18	13.08	196.36	19.00
DIEYLHEX PHT				54.22	96.69
ETHYLBENZENE	31027.83	15189.23	28861.82	184486.08	66117.80
ETHYLENE OXI	1697.14	595.45	2728.26	12095.24	1679.81
FLUORANTHENE	132.09	29.85	120.66	235.10	190.15
FLUORENE	136.06	51.92	210.49	144.10	247.71
FORMALDEHYDE	6193.93	1372.69	2996.47	52205.27	7443.59
GLYCOL ETHRS	3829.76	1593.13	2175.30	21440.76	4182.69
HEXCLBENZENE	0.01	0.01	0.01	negl	0.02
INDN(123CDPY	194.28	74.17	300.69	185.58	349.90
LEAD	6286.03	1142.22	22.11	1002.94	10336.70
MANGANESE	3808.07	79.52	23.38	3089.91	10473.88
MERCURY	138.17	86.32	70.63	541.74	157.18
METHENE(B)4-					
METHYLENE CL	18954.81	8585.29	18501.74	308895.70	69209.06
NAPHTHALENE	11301.82	4622.17	9041.94	59127.86	16281.23
NICKEL	287.54	130.50	298.71	501.85	1146.98
PCDD				negl	
PCDF				negl	
PERC	85911.62	24360.27	31485.65	568022.59	71719.54
PHENANTHRENE	1146.44	437.62	1774.09	1110.34	2098.93
PHENOL	27.15	3.70	15.03	63537.09	34957.10
PHOSGENE					
PYRENE	77.73	29.67	120.28	76.51	140.52
STYRENE	8201.90	409.80	499.82	6143.90	801379.21
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	0.0001	0.0018	negl	0.0015	0.0001
TCE,111	80692.76	36673.96	49741.60	603848.37	87657.78
TOLUENE	301160.39	201472.04	439966.53	1166648.22	439810.10
TOLUENE24DII					
TRICHLORETHY	36094.21	234526.73	27465.40	183082.99	37630.51
TRIFULURALIN	8292.80	3971.20	7300.00	1518.40	14658.40
VINYL CHLOR	0.35	0.16	0.19	2.02	0.38
XYLENES ISO	194932.37	99360.15	366710.62	1088293.40	249860.23

Table A-1: Illinois Emissions by County in pounds/year

	Lawrence	Lee	Livingston	Logan	McDonough
ACENAPHTHEN	141.92	71.75	46.87	44.75	102.78
ACENAPHTHYL	451.76	229.75	150.04	143.21	328.91
ACETALDEHYDE	18.47	46.01	129.78	34.52	35.76
ACROLEIN	21.62	54.65	81.67	39.86	42.22
ACRYLAMIDE					
ACRYLONITRIL		173.80	1781.82		217.17
ANTHRACENE	127.26	64.57	42.24	40.28	92.51
ANTIMONY	0.36	negl	1.95	0.94	0.06
ARSENIC	45.72	3.81	1.02	55.62	41.23
ATRAZINE	9663.08	33678.40	44860.90	28717.22	21114.22
BENZ(A)ANTHR	60.97	11.65	7.00	35.33	47.60
BENZ(GHI)PE	282.15	143.50	93.54	89.50	205.57
BENZENE	57980.08	26329.93	21403.92	18696.84	25588.60
BENZO(A)PYRE	850.68	43.08	28.41	27.30	62.14
BENZO(B)FLUO	56.59	28.70	18.71	17.90	41.11
BENZO(K)FLUO	14.11	7.18	4.69	4.47	10.28
BERYLLIUM	27.59	1.91	0.34	1.18	2.39
BUTADIENE,13	0.21	0.46	3.99	0.41	0.44
CADMIUM	121.08	12.04	2.38	9.78	10.49
CARBON TETRA	26.63	63.08	90.79	45.86	61.41
CHLOROFORM	57.08	134.32	178.48	130.65	136.60
CHROMIUM	626.63	108.52	116.58	492.67	564.60
CHROMIUM VI	0.06	negl	0.01	0.13	0.11
CHRYSENE	150.02	71.77	49.19	52.78	111.80
COBALT	0.41	negl	0.81	1.12	0.07
COKE OVEN GS					
COPPER	72.42	6.95	277.71	1.65	3.23
DIBENZAHAN	56.43	28.70	18.75	17.90	41.11
DIBROMOET,12	negl		negl	negl	negl
DIBUTYL PHTH		24.83	0.11		
DICHLORETH12	0.23	21.15	215.47	0.20	26.45
DIEYLHEX PHT		46.82			
ETHYLBENZENE	9082.03	19660.50	20871.74	15168.00	11737.06
ETHYLENE OXI	260.19	3198.71	601.54	630.71	1452.78
FLUORANTHENE	144.55	57.62	46.65	48.85	96.04
FLUORENE	197.56	100.47	68.04	62.65	143.90
FORMALDEHYDE	688403.73	14100.72	71625.18	1471.95	1336.69
GLYCOL ETHRS	696.13	1323.58	1609.41	1249.21	1397.68
HEXCLBENZENE	0.01	0.02	0.02	0.02	0.01
INDN(123CDPY	282.15	143.50	93.53	89.50	205.57
LEAD	95.14	455.03	32.73	226.28	193.53
MANGANESE	163.48	319.75	35.58	27.20	51.49
MERCURY	44.66	46.35	52.62	31.17	29.53
METHENE(B)4-					
METHYLENE CL	2359.16	9622.69	17627.97	6202.49	8332.96
NAPHTHALENE	7960.27	5183.94	4812.62	6212.98	8328.22
NICKEL	342.58	32.67	216.09	377.60	736.80
PCDD				negl	
PCDF				negl	
PERC	1162.33	10171.11	30302.21	5605.61	21787.84
PHENANTHRENE	1672.53	847.14	554.23	528.06	1212.86
PHENOL	14.23	61.46	4.67	4.60	10.28
PHOSGENE					
PYRENE	112.86	57.40	37.82	35.80	82.23
STYRENE	160.26	440.29	496.70	468.07	246.75
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	0.0024	negl	negl	0.0002	0.0002
TCE,111	8650.26	39431.78	51267.87	26053.39	32477.74
TOLUENE	68396.90	450360.07	240842.35	95380.11	225219.33
TOLUENE24DII					
TRICHLORETHY	1881.66	25484.70	35579.54	13339.88	18274.56
TRIFULURALIN	4905.60	7767.20	17578.40	9052.00	7300.00
VINYL CHLOR	0.06	0.12	0.14	0.11	0.12
XYLENES ISO	44600.85	170020.55	115840.30	75909.10	81560.37

Table A-1: Illinois Emissions by County in pounds/year

	McHenry	McLean	Macon	Macoupin	Madison
ACENAPHTHEN	114.81	119.35	133.97	366.39	524.86
ACENAPHTHYL	366.46	381.93	428.24	1172.45	1679.48
ACETALDEHYDE	192.72	180.42	326.80	48.58	482.81
ACROLEIN	243.59	187.51	358.18	57.94	438.86
ACRYLAMIDE					
ACRYLONITRIL	928.00	106.78	538.13		990.98
ANTHRACENE	103.14	107.43	120.46	329.75	472.67
ANTIMONY	0.12	0.60	53.70		11.17
ARSENIC	2.09	7.90	590.03	0.48	411.55
ATRAZINE	16471.72	51531.62	23593.64	25366.54	14559.78
BENZ(A)ANTHR	23.62	46.13	27.96	46.62	113.96
BENZ(GHI)PE	228.96	238.63	267.65	732.78	1049.62
BENZENE	63106.39	55307.37	52532.86	80453.20	263121.42
BENZO(A)PYRE	72.01	83.06	84.10	220.33	2604.46
BENZO(B)FLUO	45.85	47.73	53.53	146.56	209.92
BENZO(K)FLUO	11.45	11.94	13.38	36.64	52.48
BERYLLIUM	4.21	0.18	31.06	0.27	16.58
BUTADIENE,13	3.00	2.89	1.50	0.64	4.16
CADMIUM	17.50	12.16	106.86	2.27	494.19
CARBON TETRA	160.88	162.02	96.47	58.49	234.56
CHLOROFORM	946.06	591.80	510.87	208.29	1141.57
CHROMIUM	34.00	10.13	436.86	6.54	567.17
CHROMIUM VI	0.22	0.23	111.84	0.01	35.25
CHRYSENE	138.76	207.80	160.99	370.23	657.99
COBALT	0.14	0.25	172.51	negl	45.90
COKE OVEN GS					219464.18
COPPER	141.70	37.80	44039.17	5.78	446305.65
DIBENZAHAN	45.79	47.74	53.54	146.56	209.93
DIBROMOET,12	negl	0.01	0.09	negl	0.82
DIBUTYL PHTH	103.79	14.65	13.62	0.29	32.22
DICHLORETH12	1.30	15.07	69.20		149.95
DIEYLHEX PHT			5.10		79.63
ETHYLBENZENE	68773.92	58827.60	39716.23	15308.13	155918.77
ETHYLENE OXI	3155.58	3616.12	3311.84	735.70	5251.71
FLUORANTHENE	181.50	421.08	207.67	307.39	902.66
FLUORENE	160.29	167.84	187.44	512.94	735.36
FORMALDEHYDE	31958.89	4912.27	21214.90	2838.82	1866514.65
GLYCOL ETHRS	7584.21	5323.06	4931.06	1968.37	10243.06
HEXCLBENZENE	0.01	0.03	0.01	0.01	0.01
INDN(123CDPY	228.96	238.63	267.66	732.78	1049.62
LEAD	377.02	109.70	3260.02	6.13	911.32
MANGANESE	2416.77	11.96	4965.80	6.70	16123.97
MERCURY	142.01	116.14	273.88	31.03	357.96
METHENE(B)4-					
METHYLENE CL	51253.64	31090.72	30749.02	6625.55	67810.24
NAPHTHALENE	28666.86	16558.63	13573.60	9335.84	36725.90
NICKEL	1091.23	40.73	921.68	3.03	682.54
PCDD			negl		negl
PCDF			negl		negl
PERC	139937.68	152118.77	196456.69	3158.12	212970.46
PHENANTHRENE	1353.92	1408.67	1579.36	4323.40	6193.37
PHENOL	11.71	11.93	8061.50	36.64	112.30
PHOSGENE					
PYRENE	91.58	95.58	107.10	293.11	419.95
STYRENE	8618.42	1446.30	970.09	439.42	2442.71
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	0.0003	0.0002	0.0024	0.0001	0.0024
TCE,111	136986.07	134037.58	126370.40	23942.70	229729.88
TOLUENE	539738.47	376681.98	544625.15	98715.29	591266.49
TOLUENE24DII					
TRICHLORETHY	117649.05	78720.66	116230.19	4831.32	186699.78
TRIFULURALIN	4380.00	17987.20	7942.40	8643.2	6774.40
VINYL CHLOR	0.80	0.48	0.40	0.17	0.89
XYLENES ISO	401916.58	293528.98	294240.36	76232.74	494288.40

Table A-1: Illinois Emissions by County in pounds/year

	Marion	Marshall	Mason	Massac	Menard
ACENAPHTHEN	468.77	66.70	153.59	217.68	64.49
ACENAPHTHYL	1500.05	210.23	491.41	696.69	206.38
ACETALDEHYDE	61.04	37.01	25.11	44.31	10.69
ACROLEIN	72.64	43.94	29.51	34.81	12.77
ACRYLAMIDE					
ACRYLONITRIL	41.72				
ANTHRACENE	421.89	59.13	138.21	195.90	58.04
ANTIMONY	negl		6.31	16.06	
ARSENIC	1.08	0.10	10.03	370.56	0.08
ATRAZINE	9554.86	14750.30	17573.60	4356.22	11959.40
BENZ(A)ANTHR	73.77	8.11	19.38	27.04	7.96
BENZ(GHI)PE	937.53	131.40	307.14	435.31	128.99
BENZENE	103560.13	16129.90	32298.72	52194.71	14253.54
BENZO(A)PYRE	287.05	39.42	92.15	131.01	38.70
BENZO(B)FLUO	187.51	26.28	61.43	87.06	25.80
BENZO(K)FLUO	46.88	6.57	15.36	21.76	6.45
BERYLLIUM	0.42	0.05	0.81	19.27	0.05
BUTADIENE,13	0.55	0.16	0.22	0.20	0.16
CADMIUM	7.09	0.43	4.17	61.10	0.33
CARBON TETRA	49.10	30.35	30.56	42.22	19.64
CHLOROFORM	183.86	52.58	65.29	193.62	51.52
CHROMIUM	27.64	1.22	15.40	491.90	1.07
CHROMIUM VI	15.30		1.76	70.47	
CHRYSENE	513.45	65.70	153.57	217.66	64.49
COBALT	negl	negl	8.72	89.20	negl
COKE OVEN GS					
COPPER	7.49	1.03	5.12	34.01	1.01
DIBENZAHAN	187.51	26.28	61.43	87.06	25.80
DIBROMOET,12	negl		0.19	2.82	
DIBUTYL PHTH	5.14			43.33	
DICHLORETH12	6.03	0.06	6.32	93.97	0.05
DIEYLHEX PHT			11.40	271.76	
ETHYLBENZENE	673006.99	5409.08	4844.44	6436.04	3291.90
ETHYLENE OXI	834.79	191.72	244.85	230.38	175.48
FLUORANTHENE	539.35	52.70	122.95	174.27	51.63
FLUORENE	656.27	91.98	215.00	304.78	90.29
FORMALDEHYDE	21381.96	736.40	853.53	1618.36	301.68
GLYCOL ETHRS	1768.11	512.96	655.09	616.38	469.49
HEXCLBENZENE	0.01	0.01	0.01	negl	0.01
INDN(123CDPY	937.53	131.40	307.13	435.31	129.99
LEAD	83.92	4.66	52.96	2045.49	0.17
MANGANESE	8.97	1.18	53.30	1483.77	1.16
MERCURY	46.23	26.39	31.86	264.72	6.57
METHENE(B)4-					
METHYLENE CL	24280.67	50468.11	2832.65	3604.02	1345.25
NAPHTHALENE	11543.84	2261.61	3450.58	4664.52	1841.68
NICKEL	12.82	0.68	107.31	319.51	0.46
PCDD			negl	negl	
PCDF			negl	negl	
PERC	24081.66	378.06	2119.38	3059.47	347.71
PHENANTHRENE	5531.45	775.23	1812.10	2569.04	761.04
PHENOL	46.88	6.57	17.86	176.00	6.45
PHOSGENE					
PYRENE	375.01	52.56	122.86	174.14	51.60
STYRENE	85261.56	25505.08	123.92	253.21	96.86
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	0.0003	negl	0.0001	0.0013	negl
TCE,111	36978.01	4917.46	11209.57	9390.57	4500.91
TOLUENE	144312.91	260635.05	69322.54	42681.44	18317.23
TOLUENE24DII					
TRICHLORETHY	19016.85	8.19	4671.42	3259.63	7.60
TRIFULURALIN	5372.80	4438.40	4788.80	2160.80	3504.00
VINYL CHLOR	0.15	53000.04	0.06	0.05	0.04
XYLENES ISO	112691.86	25450.03	30646.36	32809.26	15589.77

Table A-1: Illinois Emissions by County in pounds/year

	Mercer	Monroe	Montgomery	Morgan	Moultrie
ACENAPHTHEN	116.09	185.05	199.55	154.27	43.18
ACENAPHTHYL	371.51	592.16	638.47	465.48	138.18
ACETALDEHYDE	18.15	42.09	71.11	77.28	44.33
ACROLEIN	19.67	27.82	57.79	89.24	21.07
ACRYLAMIDE					
ACRYLONITRIL			340.88		17.46
ANTHRACENE	104.50	166.56	179.58	133.24	38.88
ANTIMONY		0.60	24.94	17.30	0.74
ARSENIC	0.19	0.51	568.60	194.23	0.24
ATRAZINE	19404.14	7077.60	23654.12	20041.68	13354.94
BENZ(A)ANTHR	15.94	22.85	25.22	49.97	5.79
BENZ(GHI)PE	232.18	370.03	399.04	288.60	86.26
BENZENE	25691.81	40638.94	50921.58	38581.79	11510.46
BENZO(A)PYRE	70.24	111.02	119.90	93.05	26.04
BENZO(B)FLUO	46.44	74.01	79.81	59.59	17.25
BENZO(K)FLUO	11.61	18.50	19.95	14.43	4.32
BERYLLIUM	0.08	0.15	29.32	3.00	0.06
BUTADIENE,13	0.23	1.39	0.40	0.47	1.70
CADMIUM	1.12	1.62	645.98	23.42	0.50
CARBON TETRA	44.59	40.09	52.52	45.37	23.95
CHLOROFORM	57.94	103.23	259.36	186.10	54.48
CHROMIUM	2.16	5.11	365.43	283.25	39.71
CHROMIUM VI	0.04		109.49	11.40	negl
CHRYSENE	120.66	185.01	200.94	196.49	44.34
COBALT	0.07	0.25	7.30	30.45	0.31
COKE OVEN GS					
COPPER	501.00	38.33	3.40	7.37	100.40
DIBENZAHAN	46.44	74.02	79.81	57.72	17.27
DIBROMOET,12	negl		2.52	0.61	negl
DIBUTYL PHTH				3.08	
DICHLORETH12	0.16	0.11	125.49	21.16	2.20
DIEYLHEX PHT			153.55	36.71	
ETHYLBENZENE	4803.22	8384.90	15218.80	12979.83	7583.79
ETHYLENE OXI	273.31	353.96	481.81	762.24	217.71
FLUORANTHENE	109.66	148.10	164.99	299.55	39.09
FLUORENE	162.53	259.81	279.39	202.63	61.50
FORMALDEHYDE	502.77	611.66	1458.51	542190.27	457.39
GLYCOL ETHRS	731.24	947.02	1289.08	1482.88	582.49
HEXCLBENZENE	0.01	negl	0.01	0.01	0.01
INDN(123CDPY	232.18	370.03	399.04	288.60	86.26
LEAD	0.60	29.51	922.45	187.66	2.15
MANGANESE	7.05	12.60	684.30	76.89	13.79
MERCURY	10.42	14.26	195.02	94.02	11.57
METHENE(B)4-					
METHYLENE CL	2861.18	3242.02	8650.70	6646.57	2889.74
NAPHTHALENE	3044.74	4814.22	6337.05	6219.60	1894.06
NICKEL	1.17	35.29	391.86	281.55	73.27
PCDD	negl		negl	negl	negl
PCDF	0.0003		negl	negl	negl
PERC	1880.75	49752.01	18284.38	21162.96	2529.25
PHENANTHRENE	1369.90	2183.90	2354.49	1794.35	509.96
PHENOL	13.28	18.50	53.61	22.48	4.32
PHOSGENE					
PYRENE	92.88	148.14	159.64	115.45	34.68
STYRENE	131.96	244.73	508.62	338.33	145.15
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	negl	0.0001	negl	negl	negl
TCE,111	11077.22	11847.16	29231.22	26281.48	11823.96
TOLUENE	31649.20	47613.64	87217.82	177296.06	49194.47
TOLUENE24DII					
TRICHLORETHY	3860.01	2634.48	16260.53	11429.93	5929.47
TRIFULURALIN	6073.60	3445.60	8234.40	6891.20	4672.00
VINYL CHLOR	0.06	0.09	0.11	0.12	0.05
XYLENES ISO	23989.32	41160.15	74168.22	84910.21	64632.66

Table A-1: Illinois Emissions by County in pounds/year

	Ogle	Peoria	Perry	Piatt	Pike
ACENAPHTHEN	170.12	282.62	224.52	13.71	303.53
ACENAPHTHYL	544.38	904.19	718.46	43.88	971.31
ACETALDEHYDE	88.69	360.71	22.32	14.42	44.54
ACROLEIN	91.77	413.26	26.61	17.22	25.89
ACRYLAMIDE					
ACRYLONITRIL	280.73	3006.33			254.94
ANTHRACENE	153.12	254.31	202.07	12.34	273.19
ANTIMONY	0.37	20.14			0.81
ARSENIC	0.73	344.92	0.47	1.03	9.94
ATRAZINE	31672.86	16616.12	7053.48	19089.60	22391.46
BENZ(A)ANTHR	21.92	176.65	28.04	2.53	204.88
BENZ(GHI)PE	340.19	565.12	449.04	27.42	607.02
BENZENE	45393.10	96291.77	47485.32	6673.81	63872.86
BENZO(A)PYRE	102.39	205.49	134.73	8.23	247.28
BENZO(B)FLUO	68.04	113.02	89.81	5.48	121.40
BENZO(K)FLUO	17.01	28.26	22.45	1.37	30.35
BERYLLIUM	0.33	11.22	0.28	0.61	0.73
BUTADIENE,13	1.30	10.16	0.28	0.21	0.96
CADMIUM	2.47	69.46	1.70	2.73	38.14
CARBON TETRA	66.74	161.72	44.99	29.44	43.16
CHLOROFORM	208.71	867.03	81.97	55.77	64.58
CHROMIUM	541.78	33957.26	6.45	178.42	38.09
CHROMIUM VI	535.92	323.96	negl		2.95
CHRYSENE	172.56	565.78	224.68	13.72	771.51
COBALT	0.15	63.02	negl		2.38
COKE OVEN GS					
COPPER	24.87	1521.28	3.97	252.73	70.82
DIBENZAHAN	68.04	113.03	89.81	5.48	121.41
DIBROMOET,12	negl	2.04	negl		0.13
DIBUTYL PHTH	4.11	19.92			
DICHLORETH12	34.17	148.61	0.10	0.07	42.07
DIEYLHEX PHT		105.12			5.38
ETHYLBENZENE	120230.49	73220.08	7366.19	6715.22	7816.91
ETHYLENE OXI	696.52	9620.26	334.75	240.35	259.40
FLUORANTHENE	145.41	1243.74	180.28	11.02	1962.62
FLUORENE	238.62	395.65	314.33	19.20	425.46
FORMALDEHYDE	39343.55	77897.62	680.30	476.02	837.35
GLYCOL ETHRS	1863.53	7103.61	895.63	643.05	694.03
HEXCLBENZENE	0.02	0.01	negl	0.01	0.01
INDN(123CDPY	340.19	565.12	449.04	27.42	607.02
LEAD	53.87	9179.33	1.66	1.97	84.58
MANGANESE	1037.41	531.17	4.70	10.52	70.94
MERCURY	54.01	383.41	14.47	19.01	33.10
METHENE(B)4-					
METHYLENE CL	13070.62	48587.64	4682.75	2762.18	3308.07
NAPHTHALENE	7474.40	22252.65	5044.34	1836.04	6271.76
NICKEL	40.36	1670.93	2.48	149.47	106.24
PCDD		negl			negl
PCDF		negl			negl
PERC	13928.21	317367.81	4442.33	2119.26	1607.64
PHENANTHRENE	2007.60	3334.28	2649.33	161.81	3581.92
PHENOL	333357.01	51.68	22.45	1.37	39.16
PHOSGENE					
PYRENE	136.15	226.07	179.62	10.97	242.89
STYRENE	530.63	5770.14	183.08	209.97	231.96
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	0.0001	0.0002	0.0001	negl	0.0002
TCE,111	54096.57	199316.95	19963.09	11135.90	8601.91
TOLUENE	1316134.56	590237.55	102300.72	29757.74	54806.88
TOLUENE24DII					
TRICHLORETHY	155530.80	131244.43	10779.10	4713.95	2088.54
TRIFULURALIN	5898.40	4905.60	3270.40	6716.00	6073.60
VINYL CHLOR	0.17	0.64	0.07	0.06	0.06
XYLENES ISO	517296.33	482917.20	46869.47	31202.22	41255.49

Table A-1: Illinois Emissions by County in pounds/year

	Pope	Pulaski	Putnam	Randolph	Richland
ACENAPHTHEN	128.18	145.52	41.92	285.11	259.98
ACENAPHTHYL	410.16	465.65	134.14	912.03	831.93
ACETALDEHYDE	4.79	7.56	24.57	173.57	19.06
ACROLEIN	5.72	9.02	25.24	111.99	22.72
ACRYLAMIDE					
ACRYLONITRIL				71.35	
ANTHRACENE	115.36	130.96	37.73	256.54	233.98
ANTIMONY			3.64	84.64	
ARSENIC	0.15	0.24	83.08	2135.23	0.34
ATRAZINE	1398.60	2655.50	5742.40	9111.58	10288.02
BENZ(A)ANTHR	15.83	18.01	5.18	40.82	37.86
BENZ(GHI)PE	256.35	291.03	83.83	569.97	519.96
BENZENE	25686.14	30283.44	11484.79	67298.95	54125.52
BENZO(A)PYRE	76.90	87.31	25.15	173.28	158.08
BENZO(B)FLUO	51.27	58.21	16.77	113.99	103.99
BENZO(K)FLUO	12.82	14.55	4.19	28.50	26.00
BERYLLIUM	0.09	0.14	4.28	97.10	0.20
BUTADIENE,13	0.06	0.09	0.07	0.70	0.22
CADMIUM	0.66	0.92	10.54	270.14	2.45
CARBON TETRA	21.63	20.58	12.98	59.57	27.76
CHLOROFORM	20.06	28.24	67.70	428.52	57.22
CHROMIUM	2.13	3.33	53.35	1220.38	44.71
CHROMIUM VI			16.00	363.45	39.44
CHRYSENE	128.18	145.52	41.92	300.82	276.16
COBALT		negl	20.25	43.34	negl
COKE OVEN GS					
COPPER	2.01	2.36	0.66	13.54	4.13
DIBENZAHAN	51.27	58.21	16.77	114.00	103.99
DIBROMOET,12			0.88	5.95	negl
DIBUTYL PHTH					
DICHLORETH12	0.02	0.04	29.19	207.43	0.36
DIEYLHEX PHT			53.23	362.02	
ETHYLBENZENE	1499.16	3629.23	2159.28	10237.02	14420.94
ETHYLENE OXI	66.56	125.53	84.65	578.65	347.97
FLUORANTHENE	102.56	116.44	33.61	286.39	267.49
FLUORENE	179.44	203.72	58.69	399.38	363.97
FORMALDEHYDE	148.21	234.46	579.71	23021.78	577.82
GLYCOL ETHRS	178.08	335.84	226.48	1432.99	701.42
HEXCLBENZENE	negl	negl	negl	negl	0.01
INDN(123CDPY	256.35	291.03	83.83	569.98	519.96
LEAD	0.33	0.48	54.88	8855.53	0.74
MANGANESE	2.31	2.84	100.89	2278.28	4.79
MERCURY	3.13	4.95	73.92	467.48	12.72
METHENE(B)4-					
METHYLENE CL	515.10	953.70	2419.78	7879.07	5663.77
NAPHTHALENE	2235.52	2972.35	1301.98	6845.76	5216.07
NICKEL	0.92	1.33	57.01	1356.06	2.10
PCDD			negl	0.0001	
PCDF			negl	negl	
PERC	134.70	250.56	3015.29	16124.56	7103.72
PHENANTHRENE	1512.47	1717.08	494.65	3363.58	3067.74
PHENOL	12.82	14.55	15.86	107.84	26.00
PHOSGENE					
PYRENE	102.54	116.41	33.54	228.09	207.98
STYRENE	46.05	114.84	78.64	391.99	155.29
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	negl	negl	negl	0.0013	0.0001
TCE,111	1707.27	3219.26	10659.54	24933.43	26586.49
TOLUENE	15304.99	24496.72	15460.50	68105.47	89563.70
TOLUENE24DII					
TRICHLORETHY	2.89	5.20	8021.21	10588.36	18804.29
TRIFULURALIN	642.40	1927.20	1635.20	4672.00	5256.00
VINYL CHLOR	0.02	0.02	0.02	0.12	0.06
XYLENES ISO	9138.67	19106.18	11568.42	49923.68	36953.65

Table A-1: Illinois Emissions by County in pounds/year

	Rock Island	St. Clair	Saline	Sangamon	Schuyler
ACENAPHTHEN	154.80	400.33	199.52	159.61	139.46
ACENAPHTHYL	495.48	1280.94	638.46	510.61	446.28
ACETALDEHYDE	220.35	309.86	28.05	757.33	9.33
ACROLEIN	242.26	344.24	33.43	309.69	11.11
ACRYLAMIDE					
ACRYLONITRIL	1041.43	963.22	127.33	45.05	
ANTHRACENE	139.43	360.27	179.56	143.97	125.52
ANTIMONY	0.09	6.68		17.74	
ARSENIC	58.39	63.57	0.40	58.94	0.19
ATRAZINE	10868.50	13628.40	7164.04	31824.82	9650.12
BENZ(A)ANTHR	53.46	58.83	25.23	111.90	17.22
BENZ(GHI)PE	309.58	800.52	399.04	317.18	278.93
BENZENE	58003.01	234563.02	43444.60	70368.00	29140.68
BENZO(A)PYRE	104.59	243.65	119.93	128.44	83.68
BENZO(B)FLUO	61.92	160.11	79.81	63.47	55.78
BENZO(K)FLUO	15.48	40.03	19.95	15.95	13.95
BERYLLIUM	0.46	3.73	0.18	1.78	0.10
BUTADIENE,13	2.12	4.14	0.34	30.44	0.10
CADMIUM	19.49	43.48	1.74	31.44	0.88
CARBON TETRA	1215.42	224.28	51.50	150.02	21.58
CHLOROFORM	644.36	1157.86	109.30	857.85	27.16
CHROMIUM	4184.12	76.31	4.40	166.71	2.44
CHROMIUM VI	4131.83	12.22	0.01	1.75	negl
CHRYSENE	245.63	425.11	201.14	414.34	139.46
COBALT	0.44	7.37	negl	9.11	
COKE OVEN GS					
COPPER	10.68	35.72	3.17	1074.60	2.21
DIBENZAHAN	61.92	160.12	79.81	63.50	55.78
DIBROMOET,12	0.01	negl	negl	1.18	
DIBUTYL PHTH	15.81	38.17		31.49	
DICHLORETH12	128.12	118.05	15.54	49.32	0.03
DIEYLHEX PHT				70.31	
ETHYLBENZENE	67109.45	101070.72	8568.12	62829.87	2926.03
ETHYLENE OXI	9697.90	7218.55	425.71	8075.80	109.17
FLUORANTHENE	456.70	412.68	165.67	1067.98	111.60
FLUORENE	216.88	560.93	279.32	242.67	195.25
FORMALDEHYDE	7732.99	12092.25	948.27	15853.59	302.88
GLYCOL ETHRS	6243.70	10907.64	1139.00	7349.45	292.09
HEXCLBENZENE	0.01	0.01	negl	0.02	0.01
INDN(123CDPY	309.58	800.52	399.04	317.10	278.93
LEAD	183.97	6807.57	27.20	131.52	4.75
MANGANESE	1634.08	2379.23	4.04	304.87	2.52
MERCURY	185.22	255.97	20.14	237.09	6.51
METHENE(B)4-	3.49				
METHYLENE CL	39843.97	47210.40	4150.25	30467.18	832.06
NAPHTHALENE	16649.50	38124.00	5193.46	22858.28	2728.55
NICKEL	17.41	949.36	8.76	985.54	1.29
PCDD	negl			negl	
PCDF	0.0002			negl	
PERC	137392.63	167286.00	1797.21	231993.20	220.78
PHENANTHRENE	1826.81	4723.75	2354.31	1891.95	1645.68
PHENOL	17.44	28539.02	19.95	31.25	13.95
PHOSGENE		negl			
PYRENE	123.90	320.31	159.61	130.15	111.57
STYRENE	56817.54	12594.71	226.85	1829.94	92.16
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	0.0003	0.0023	0.0001	0.0001	negl
TCE,111	140839.38	170848.46	13134.57	117708.44	2800.24
TOLUENE	424399.96	687434.75	51163.86	366401.80	21835.88
TOLUENE24DII					
TRICHLORETHY	93927.11	201233.75	2232.23	26580.44	4.72
TRIFULURALIN	2920.00	6132.00	3153.60	11563.20	3504.00
VINYL CHLOR	0.52	0.92	0.09	85210.33	0.03
XYLENES ISO	376437.59	531814.03	41253.96	353033.18	15825.25

Table A-1: Illinois Emissions by County in pounds/year

	Scott	Shelby	Stark	Stephenson	Tazewell
ACENAPHTHEN	56.90	243.86	32.64	119.31	245.55
ACENAPHTHYL	182.02	780.35	104.46	381.79	785.56
ACETALDEHYDE	27.81	21.74	6.36	75.24	228.56
ACROLEIN	9.23	25.94	7.59	89.51	247.22
ACRYLAMIDE					
ACRYLONITRIL				68.42	578.38
ANTHRACENE	51.21	219.47	29.38	107.38	220.98
ANTIMONY	0.64			0.08	15399
ARSENIC	0.21	0.46	0.07	0.41	467.93
ATRAZINE	8083.18	25828.00	14278.40	22355.82	23447.08
BENZ(A)ANTHR	7.02	31.30	4.03	26.00	128.04
BENZ(GHI)PE	113.68	487.72	65.29	238.62	490.94
BENZENE	12889.31	51753.55	7514.97	32881.54	79838.16
BENZO(A)PYRE	34.11	146.75	19.59	75.70	153.80
BENZO(B)FLUO	22.74	97.54	13.06	47.72	98.20
BENZO(K)FLUO	5.69	24.38	3.26	11.93	24.55
BERYLLIUM	0.05	0.19	0.04	0.11	20.23
BUTADIENE,13	1.21	0.29	0.08	0.64	1.67
CADMIUM	0.42	2.07	0.26	3.51	63.54
CARBON TETRA	13.04	48.25	21.57	57.70	116.03
CHLOROFORM	24.43	82.92	25.98	209.79	766.64
CHROMIUM	2.31	5.07	0.67	4.44	1655.81
CHROMIUM VI	negl	0.01	negl	0.08	70.34
CHRYSENE	56.84	247.18	32.64	151.11	308.95
COBALT	0.26	negl	0.53	0.09	5.24
COKE OVEN GS					
COPPER	38.76	3.84	0.53	1.92	457.24
DIBENZAHAN	22.75	97.54	13.06	47.72	98.19
DIBROMOET,12		negl		negl	4.51
DIBUTYL PHTH				5.53	14.52
DICHLORETH12	0.03	0.17	0.03	9.05	221.63
DIEYLHEX PHT					274.32
ETHYLBENZENE	2647.64	8283.41	2072.94	15573.11	47015.45
ETHYLENE OXI	88.24	349.22	91.20	807.87	1808.80
FLUORANTHENE	45.52	207.38	26.14	212.52	385.05
FLUORENE	80.42	341.40	45.70	167.03	343.71
FORMALDEHYDE	1439.72	721.27	182.78	2299.14	10213.96
GLYCOL ETHRS	236.10	934.33	244.02	1998.67	4839.44
HEXCLBENZENE	negl	0.01	0.01	0.01	0.01
INDN(123CDPY	113.68	487.72	65.29	238.62	490.94
LEAD	1.83	29.47	4.58	41.60	815.42
MANGANESE	42.24	4.42	69.34	2.29	455.38
MERCURY	3.50	15.54	4.23	53.40	453.33
METHENE(B)4-					
METHYLENE CL	676.39	3508.13	698.40	14493.15	34805.66
NAPHTHALENE	1448.04	5543.69	1007.54	6364.64	15876.88
NICKEL	35.37	3.18	0.48	4.99	270.06
PCDD					negl
PCDF					negl
PERC	177.14	2155.04	184.37	36974.10	88751.01
PHENANTHRENE	671.72	2877.54	385.22	1407.86	2899.30
PHENOL	5.68	24.38	3.26	11.93	85.26
PHOSGENE					
PYRENE	45.60	195.09	26.12	95.45	196.40
STYRENE	82.96	222.40	63.59	371.16	1219.31
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	negl	negl	negl	0.0001	0.0001
TCE,111	2263.26	13363.10	2339.33	41950.56	142079.73
TOLUENE	14558.51	52380.19	10707.88	222736.06	338685.87
TOLUENE24DII					
TRICHLORETHY	3.72	4183.96	5359.94	21658.56	78867.65
TRIFULURALIN	2102.40	8935.20	3562.40	3328.80	7592.00
VINYL CHLOR	0.02	0.08	0.02	0.17	0.44
XYLENES ISO	12970.05	52434.22	12527.56	112611.58	271384.93

Table A-1: Illinois Emissions by County in pounds/year

	Union	Vermilon	Wabash	Warren	Washington
ACENAPHTHEN	344.63	247.51	84.25	104.41	190.24
ACENAPHTHYL	1102.80	792.13	269.57	334.07	608.79
ACETALDEHYDE	16.79	380.75	12.98	25.07	16.25
ACROLEIN	20.04	204.37	15.48	29.85	19.37
ACRYLAMIDE		584.84			
ACRYLONITRIL					
ANTHRACENE	310.16	222.92	75.82	93.96	171.22
ANTIMONY		10.63			
ARSENIC	23.56	28.21	0.20	0.86	0.23
ATRAZINE	2191.52	35403.96	7014.60	23281.80	14589.12
BENZ(A)ANTHR	42.56	2771.94	11.02	13.62	28.32
BENZ(GHI)PE	689.25	494.30	168.48	208.79	380.49
BENZENE	70628.44	66221.90	18542.97	23900.04	43772.74
BENZO(A)PYRE	206.78	592.42	50.74	62.64	115.91
BENZO(B)FLUO	137.85	98.86	33.70	41.76	76.10
BENZO(K)FLUO	34.46	24.75	8.42	10.44	19.02
BERYLLIUM	0.25	2.62	0.11	0.51	0.14
BUTADIENE,13	0.23	12.50	0.16	0.24	0.20
CADMIUM	3.62	26.24	0.82	2.46	1.85
CARBON TETRA	39.56	85.33	16.85	47.63	47.47
CHLOROFORM	78.01	397.71	53.95	79.08	55.24
CHROMIUM	5.74	67.28	13.95	11.77	3.64
CHROMIUM VI	negl	5.14	11.24	negl	0.04
CHRYSENE	344.63	2511.37	85.76	104.40	203.87
COBALT	negl	12.05	negl	negl	negl
COKE OVEN GS					
COPPER	5.41	417.51	1.46	2.89	2.99
DIBENZAHAN	137.85	99.00	33.70	41.76	76.10
DIBROMOET,12		0.52	negl		negl
DIBUTYL PHTH		9.12			
DICHLORETH12	0.08	90.87	0.09	0.09	0.31
DIEYLHEX PHT		30.63			
ETHYLBENZENE	6672.22	31665.75	5266.92	6602.30	23508.02
ETHYLENE OXI	274.44	1835.52	212.61	290.68	232.06
FLUORANTHENE	275.76	850.83	73.00	83.61	202.31
FLUORENE	482.48	354.43	117.94	146.15	266.34
FORMALDEHYDE	666.36	7380.10	752.41	1679.49	483.15
GLYCOL ETHRS	734.27	3528.01	568.83	777.70	620.87
HEXCLBENZENE	negl	0.02	negl	0.01	0.01
INDN(123CDPY	689.25	494.27	168.48	208.79	380.49
LEAD	16.36	148.23	3.68	1.94	0.80
MANGANESE	6.24	3121.82	1.82	7.36	3.43
MERCURY	11.36	148.07	9.11	17.10	10.69
METHENE(B)4-					
METHYLENE CL	2360.38	42791.17	2296.88	2541.39	2430.53
NAPHTHALENE	6659.51	12175.96	2268.26	3223.97	4842.90
NICKEL	2.95	483.32	1.31	3.89	1.46
PCDD		negl			
PCDF		negl			
PERC	963.89	73357.86	1636.10	1122.98	1616.17
PHENANTHRENE	4066.59	2924.11	994.10	1232.01	2244.90
PHENOL	34.46	39414.11	8.42	10.44	19.02
PHOSGENE					
PYRENE	275.70	199.06	67.39	83.52	152.20
STYRENE	200.60	783.50	102.16	194.97	312.77
TCDD,2378	negl	negl	negl	negl	negl
TCDF,2378	0.0001	0.0002	negl	negl	negl
TCE,111	8338.30	87704.61	9124.62	9082.19	9454.34
TOLUENE	52490.65	568002.68	136360.09	34516.40	90324.86
TOLUENE24DII					
TRICHLORETHY	1241.05	20467.13	3483.13	1551.71	3323.81
TRIFULURALIN	1635.20	12344.40	3270.40	6248.80	7008.00
VINYL CHLOR	0.06	0.30	0.04	0.06	0.05
XYLENES ISO	36675.44	218689.27	42454.71	31441.46	60026.46

Table A-1: Illinois Emissions by County in pounds/year

	Wayne	White	Whiteside	Will	Williamson
ACENAPHTHEN	328.52	164.54	144.33	151.54	376.96
ACENAPHTHYL	1051.26	516.06	461.81	484.98	1206.01
ACETALDEHYDE	28.87	22.80	49.04	1337.50	169.53
ACROLEIN	27.88	21.97	49.13	990.93	130.12
ACRYLAMIDE					
ACRYLONITRIL	160.50		31.87	1235.02	87.08
ANTHRACENE	295.67	146.01	129.87	136.64	339.22
ANTIMONY	0.17	0.13		51.34	66.52
ARSENIC	1.12	0.32	20.60	808.45	1523.46
ATRAZINE	14669.08	12358.72	33838.82	15539.62	3266.04
BENZ(A)ANTHR	41.74	19.96	26.12	70.89	52.52
BENZ(GHI)PE	657.02	321.64	288.59	301.76	753.73
BENZENE	68624.06	36613.80	41637.44	226387.33	88495.33
BENZO(A)PYRE	197.52	96.61	90.40	3689.44	228.32
BENZO(B)FLUO	131.40	65.03	57.72	60.35	150.74
BENZO(K)FLUO	32.85	16.08	14.43	15.15	37.69
BERYLLIUM	0.39	0.14	1.77	43.51	77.93
BUTADIENE,13	0.53	0.44	0.88	69.96	0.79
CADMIUM	4.24	1.29	78.17	403.00	193.75
CARBON TETRA	41.34	32.42	63.30	305.20	68.51
CHLOROFORM	59.65	57.26	280.06	1915.26	280.46
CHROMIUM	73.00	3.92	3499.01	633.95	972.48
CHROMIUM VI	0.01	negl	0.06	163.40	294.18
CHRYSENE	331.55	160.86	167.51	267.16	393.68
COBALT	0.07	0.05	negl	38.56	20.13
COKE OVEN GS					
COPPER	112.02	11.28	5733.05	905.51	5.96
DIBENZAHAN	131.41	64.33	57.72	60.40	150.75
DIBROMOET,12	negl		negl	2.30	0.42
DIBUTYL PHTH			8.22	52.69	1093.60
DICHLORETH12	19.53	0.08	4.54	229.17	25.16
DIEYLHEX PHT				139.28	25.69
ETHYLBENZENE	7603.12	6913.40	23260.54	124726.99	24020.25
ETHYLENE OXI	273.34	262.94	1055.24	6521.76	981.27
FLUORANTHENE	274.07	129.05	200.81	553.76	363.56
FLUORENE	460.14	225.55	202.10	225.82	527.78
FORMALDEHYDE	959.72	189562.88	1282.18	2512819.47	4349.52
GLYCOL ETHRS	731.32	703.48	2433.74	15059.87	2394.99
HEXCLBENZENE	0.01	0.01	0.02	0.01	negl
INDN(123CDPY	657.02	321.64	288.59	301.70	753.74
LEAD	99.80	12.08	5972.30	3692.75	2484.46
MANGANESE	386.57	6.04	75260.02	3314.16	1817.79
MERCURY	23.54	12.46	194.78	814.53	74.56
METHENE(B)4-					
METHYLENE CL	4561.96	2302.59	21686.84	135138.56	12116.81
NAPHTHALENE	6550.34	4145.12	8191.09	44682.39	11414.66
NICKEL	72.63	10.47	639.94	2088.48	1041.49
PCDD				negl	0.0001
PCDF				negl	negl
PERC	4198.12	1028.67	51101.36	262706.27	49664.60
PHENANTHRENE	3876.66	1932.16	1702.96	1793.93	4447.50
PHENOL	32.85	16.23	14.43	35217.07	43.32
PHOSGENE					
PYRENE	262.84	128.68	115.46	123.04	301.55
STYRENE	224.58	210.76	14724.08	420337.42	3456.54
TCDD,2378	negl	negl	0.0002	negl	negl
TCDF,2378	0.0003	negl	0.0064	0.0012	0.0003
TCE,111	30541.04	8302.60	148523.25	331824.12	48867.97
TOLUENE	60774.07	39429.58	537532.84	948402.10	295091.20
TOLUENE24DII					
TRICHLORETHY	9798.93	1486.19	32757.95	97448.91	24625.48
TRIFULURALIN	6716.00	7066.40	5431.20	8818.40	1168.00
VINYL CHLOR	0.06	0.05	0.24	1.49	0.21
XYLENES ISO	42057.53	34133.15	198755.59	829738.04	144233.05

Table A-1: Illinois Emissions by County in pounds/year

	Winnebago	Woodford	State Total
ACENAPHTHEN	189.94	122.12	17,738.77
ACENAPHTHYL	607.83	390.80	56,661.97
ACETALDEHYDE	414.33	32.60	17,373.01
ACROLEIN	419.30	38.89	16,981.94
ACRYLAMIDE			390.04
ACRYLONITRIL	169.97		24,799.43
ANTHRACENE	170.99	109.91	15,943.57
ANTIMONY	2.85		1,320.94
ARSENIC	2.07	0.20	10,402.53
ATRAZINE	14444.58	21114.22	1,710,115.46
BENZ(A)ANTHR	47.47	15.51	7,219.44
BENZ(GHI)PE	379.71	244.25	35,390.08
BENZENE	101158.47	31667.71	2,742,206.46
BENZO(A)PYRE	126.07	73.43	35,565.85
BENZO(B)FLUO	75.94	48.85	7,084.77
BENZO(K)FLUO	18.99	12.21	1,769.91
BERYLLIUM	0.84	0.09	521.04
BUTADIENE,13	5.96	0.45	52,308.73
CADMIUM	77.52	1.88	5,238.50
CARBON TETRA	200.50	53.59	5,725.73
CHLOROFORM	1131.15	132.35	13,636.38
CHROMIUM	334.53	2.31	77,967.67
CHROMIUM VI	277.30	negl	15,342.60
CHRYSENE	251.52	123.34	24,035.78
COBALT	2.29	negl	1,733.93
COKE OVEN GS			1,151,548.62
COPPER	2643.97	2.25	542,844.92
DIBENZAHAN	75.96	48.85	7,079.11
DIBROMOET,12	negl	negl	35.30
DIBUTYL PHTH	52.18		6,539.36
DICHLORETH12	22.79	0.17	6,097.20
DIEYLHEX PHT			2,420.02
ETHYLBENZENE	88297.90	14571.51	4,959,804.98
ETHYLENE OXI	4404.93	492.94	343,709.99
FLUORANTHENE	380.35	102.28	29,324.14
FLUORENE	267.66	170.97	24,870.06
FORMALDEHYDE	12859.10	923.24	12,288,429.91
GLYCOL ETHRS	10162.22	1318.86	477,171.87
HEXCLBENZENE	0.01	0.01	0.90
INDN(123CDPY	379.70	244.25	35,389.71
LEAD	2313.40	9.30	164,231.48
MANGANESE	2830.03	2.23	391,690.51
MERCURY	246.36	20.76	14,891.66
METHENE(B)4-			543.69
METHYLENE CL	111540.25	7798.11	5,478,114.19
NAPHTHALENE	30952.61	4902.12	1,480,170.02
NICKEL	199.08	1.28	49,195.93
PCDD	negl		0.0007
PCDF	negl		0.0032
PERC	277674.46	8148.58	8,459,811.81
PHENANTHRENE	2242.02	1441.06	209,256.95
PHENOL	25.98	12.21	1,059,661.41
PHOSGENE			negl
PYRENE	152.19	97.70	14,172.07
STYRENE	2105.91	380.11	2,448,131.43
TCDD,2378	negl	negl	0.0014
TCDF,2378	0.0001	negl	0.0497
TCE,111	213015.67	34234.88	9,242,640.36
TOLUENE	809799.08	217673.98	33,092,769.53
TOLUENE24DII			672.52
TRICHLORETHY	311354.02	20450.14	5,215,323.07
TRIFULURALIN	2920.00	6774.40	578,182.00
VINYL CHLOR	0.92	0.12	138,209.66
XYLENES ISO	573947.99	93928.04	22,258,162.85

Code	Pollutant Name
ACENAPHTHEN	Acenapthene
ACENAPHTHYL	Acenaphthylene
ACETALDEHYDE	Acetaldehyde
ACROLEIN	Acrolein
ACRYLAMIDE	Acrylamide
ACRYLONITRIL	Acrylonitrile
ANTHRACENE	Anthracene
ANTIMONY	Antimony
ARSENIC	Arsenic
ATRAZINE	Atrazine
BENZ(A)ANTHR	Benz(a)anthracene
BENZ(GHI)PE	Benz(g,h,i)perylene
BENZENE	Benzene
BENZO(A)PYRE	Benzo(a)pyrene
BENZO(B)FLUO	Benzo(b)fluoranthene
BENZO(K)FLUO	Benzo(k)fluoranthene
BERYLLIUM	Beryllium
BUTADIENE,13	1,2-Butadiene
CADMIUM	Cadmium
CARBON TETRA	Carbon Tetrachloride
CHLOROFORM	Chloroform
CHROMIUM	Chromium
CHROMIUM VI	Hexavalent Chromium
CHRYSENE	Chrysene
COBALT	Cobalt
COKE OVEN GS	Coke Oven Gas
COPPER	Copper
DIBENZAHAN	Dibenzo(a,h)anthracene
DIBROMOET,12	1,2-Dibromoethane
DIBUTYL PHTH	Dibutyl Phthalate
DICHLORETH12	1,2-Dichloroethane
DIEYLHEX PHT	Diethylhexyl Phthalate
ETHYLBENZENE	Ethylbenzene
ETHYLENE OXI	Ethylene Oxide
FLUORANTHENE	Fluoranthene
FLUORENE	Fluorene
FORMALDEHYDE	Formaldehyde
GLYCOL ETHRS	Glycol Ethers
HEXCLBENZENE	Hexachlorobenzene
INDN(123CDPY	Indeno(1,2,3-c,d)pyrene
LEAD	Lead
MANGANESE	Manganese
MERCURY	Mercury
METHENE(B)4-	Methylene(b)4-phenylisocyanate (MDI)
METHYLENE CL	Methylene Chloride
NAPHTHALENE	Naphthalene
NICKEL	Nickel
PCDD	Polychlorinated Dibenzo-p-dioxins
PCDF	Polychlorinated Dibenzofurans
PERC	Perchloroethylene (Tetrachloroethylene)
PHENANTHRENE	Phenanthrene
PHENOL	Phenol
PHOSGENE	Phosgene
PYRENE	Pyrene
STYRENE	Styrene
TCDD,2378	2,3,7,8-Tetrachlorodibenzo-p-dioxin
TCDF,2378	2,3,7,8-Tetrachlorodibenzofuran
TCE,111	1,1,1-Trichloroethane
TOLUENE	Toluene
TOLUENE24DII	Toluene-2,4-diisocyanate (TDI)
TRICHLORETHY	Trichoroethylene
TRIFULURALIN	Trifluralin
VINYL CHLOR	Vinyl Chloride
XYLENES ISO	Xylene (all isomers)

Appendix B: Indiana Toxic Emissions Inventory

BACKGROUND

The Indiana Department of Environmental Management, Office of Air Management, has developed a statewide inventory of the target air toxic compounds for the Great Lakes Air Toxic Emissions Inventory Project for calendar year 1996. With a 1996 population of 5,840,528, Indiana represents approximately 6.4% of the total population of the overall Great Lakes region. The table below provides a brief demographic overview of Indiana.

Demographic Characteristics for the Indiana Area of the Great Lakes Region Air Toxics Emissions Inventory

	Indiana
Total Population, 1996	5,840,528
Urban Population, 1996	3,656,764
Rural Population, 1996	2,183,764

Source: Indiana Business Research Center, Indiana University[7]

The inventory includes estimates and emissions data for point, area and mobile sources. Point source estimates were made using information from the state criteria pollutant inventory database and the Factor Information Retrieval System (FIRE 6.0)[1]. Point source emissions data from other databases were also included. Area source estimates were made using published data, FIRE emission factors, speciation profiles, and reported information. Mobile source estimates were made using various United States Environmental Protection Agency (U.S.EPA) mobile source models, and data supplied by the Indiana Department of Transportation. This report documents the point and area source inventories. The mobile source portion of the inventory will be released under a separate report.

DATA SOURCES

Large point sources throughout the state are required to submit an annual emissions report under the state emission statement rule, Title 326 Indiana Administrative Code, Article 2, Rule 6 (326 IAC 2-6)[2]. The data submitted by sources are managed using the State Environmental Programs System (STEPS). The information from STEPS was used for making estimates for point sources included in the toxics inventory. Other data contained in the point source inventory include voluntarily reported toxics emissions data, and data from the U.S.EPA Community Right to Know Toxic Release Inventory (TRI)[3].

The area source inventory includes estimates for smaller emitting sources which typically are not included in the point source inventory. The area source inventory was developed using readily available information, including housing and census data, employment information, state fuel consumption data, and information reported to IDEM.

The mobile source inventory includes estimates for both on-road and non-road mobile sources. Non-road mobile source estimates were made using U.S.EPA's non-road model issued June 1998, and Hazardous Air Pollutant (HAP) speciation profiles obtained from the Regional Air Pollutant Inventory Development System (RAPIDS). On-road mobile source HAP estimates were made using U.S.EPA's mobile 5b and part 5 models, data supplied by the Indiana Department of Transportation (INDOT), and speciation profiles from RAPIDS.

CALCULATION METHODS

POINT SOURCE

Point source emission estimates were generally made using a generic emission factor approach. Source specific stack test information were used where available. The emission estimates were made using STEPS information, U.S.EPA FIRE (v 6.0) emission factors or stack test information, and information from AP-42[4]. Data used for making emission estimates include source classification codes (SCC) codes, fuel process rates (FPRT), conversion factors, emission factors and the efficiencies of any capture and control equipment used. Speciation profiles were not used in making point source estimates. All estimated emissions are at the process level.

$$\frac{37{,}000\ tons\ coal}{year} \times \frac{2000\ lb}{ton} \times \frac{13{,}000\ Btu}{lb\ coal} \times \frac{4.1E-4\ lbs\ Arsenic}{10^6\ Btu} = 0.2\ lbs\ \frac{Arsenic}{year}$$

Below is an example of a point source emission estimation calculation.
SCC - 10100202 (from STEPS)
FPRT - 37,000 tons coal (from STEPS)
Pollutant - Arsenic (from FIRE 6.0)
Emission Factor - 4.1 e -4 lb/MMbtu heat input, MISC CONTROL DEVICES (from FIRE, version 6.0), quality rating A
Conversion factor (heat content of coal) - 13,000 Btu/lb (from AP-42)

Because of the uncertainty associated with the effectiveness of various control devices in controlling hazardous air pollutants (HAPS), controlled emission factors were given priority and used wherever they best matched the source control devices, with consideration also given to U.S.EPA's emission factor quality rating.

Source Reported Emissions

As part of the annual emissions reporting package Indiana requests information on hazardous air pollutant emissions from point sources required to report to STEPS. For the 1996 Great Lakes Toxics Inventory, extra effort was made to identify the 82 pollutants of particular concern to the Great Lakes inventory and request those data. Indiana has included this voluntarily reported information, and information from the TRI database, for many point sources. The voluntarily reported emissions and TRI data are primarily source totals, however some sources did report process level HAPs in STEPS.

AREA SOURCES

The area source inventory covers sources typically too small and too numerous to be inventoried as individual point sources. These source categories are grouped in such a way that emissions can be estimated collectively using one methodology. The main reason not to treat them as point sources is that the effort required to gather data and estimate emissions for each individual facility is very great and the emissions per facility are generally small. However given the large numbers of some source categories, especially in densely populated, urbanized areas, the overall contribution to air pollutant loading can be significant.

Categories inventoried by IDEM for the 1996 Great Lakes Inventory include architectural surface coating, automobile refinishing, consumer and commercial solvent use, traffic markings, agricultural pesticide use, perchloroethylene dry cleaners, industrial surface coating and metal cleaning operations, gasoline dispensing facilities, graphic arts activities, landfills, public owned treatment works and residential fossil fuel consumption, including wood, coal, natural gas and distillate oil.

The emission estimation methodology followed for each area source category typically follows guidance compiled by the Great Lakes Air Toxics Emission Inventory Steering Committee[5], or guidance provided by U.S EPA as part of the Emission Inventory Improvement Program[6]. The documentation which follows provides further details on how emissions from each area source category were estimated.

Architectural Surface Coating

SOURCE IDENTIFICATION
There are no SIC codes for this category.

AMS-SCC CODES
The following AMS-SCC code was used: 2401001000.

METHODOLOGY
Preferred emission calculation method 2 from the Great Lakes Technical Steering Committee area source document was followed[5]. This method utilizes population based usage factors, an average volatile organic compound (VOC) content, and toxic speciation profiles. 1996 population data were obtained from the Indiana University School of Business Research Center[7].

POLLUTANTS AND EMISSION FACTORS

Coating Type	Pollutant	EF (lb/lb VOC)
Water based	Ethylbenzene	0.043
Water based	Xylene Isomers	0.026
Water based	Toluene	0.052
Solvent based	Methylene Chloride	0.055
Solvent based	Benzene	0.003

USAGE FACTORS AND VOC CONTENT

Paint Type	VOC Emission Factor (lb/gal)	Usage Factors (gal/person/yr)
Solvent-Based Paint	3.87	0.59
Water-Based Paint	0.74	1.82

SAMPLE CALCULATION

Adams County

32,680 persons Adams County * 1.82 gal water based ctg/person/yr * 0.74 lbs VOC/gal * 0.055 lbs methylene chloride/lb VOC = 2,421 lbs methylene chloride

Auto Body Refinishing

SOURCE IDENTIFICATION

The SIC code for this category is 7532.

AMS-SCC CODES

The following AMS-SCC code was used: 2401005000.

METHODOLOGY

Alternative method 2 from the Great Lakes Steering Committee document was followed[5]. This method utilizes employment data, a lb VOC/employee emission factor, and toxic speciation profiles to estimate emissions. The number of employees in SIC 7532 was obtained from County Business Patterns[8].

POLLUTANTS AND EMISSION FACTORS

Pollutant	Emission Factor	E. F. Units
Benzene	0.0151	lb/lb VOC
Dibutyl phthalate	0.0001	lb/lb VOC
Naphthalene	0.0146	lb/lb VOC
Toluene	0.0865	lb/lb VOC
Xylene isomers	0.2067	lb/lb VOC
VOC	3519	lb/employee

SAMPLE CALCULATION

Adams County

(15 employees in SIC 7532 * 3519 lbs VOC/employee SIC 7532/yr) * (0.2067 lbs Xylene isomers/lb VOC) = 10911 lbs Xylene isomers

Consumer and Commercial Solvent Use

SOURCE IDENTIFICATION

There are no SIC codes for this category.

AMS-SCC CODES

The following AMS-SCC code was used: 2465000000.

METHODOLOGY

The method used for this category is population based. 1996 population data was obtained from the Indiana University School of Business Research Center[7]. The toxic emission factors were obtained from Emission Inventory Improvement Program, Volume 3, Chapter 5, Consumer and Commercial Solvent Use[8].

POLLUTANTS AND EMISSION FACTORS

Pollutant	EF (lb/person)	Pollutant	EF (lb/person)
Benzene	4.72e-06	Glycol ethers	4.04e-02
Carbon tetrachloride	4.10e-10	Methylene chloride	3.64e-02
Chloroform	9.91e-04	Naphthalene	4.61e-02
1,2-Dichloroethane	4.65e-06	Perchloroethylene	2.82e-02
Ethylbenzene	2.07e-03	Toluene	4.29e-01
Ethylene oxide	1.51e-02	1,1,1-Trichloroethane	3.87e-01
Formaldehyde	1.26e-03	Trichloroethylene	4.86e-04
		Xylene isomers	2.03e-01

SAMPLE CALCULATION

Adams County

(32,680 persons Adams County * 1.26e-03 lbs formaldehyde/person/yr) = 41 lbs formaldehyde

Traffic Markings

SOURCE IDENTIFICATION

There are no SIC codes for this category.

AMS-SCC CODES

The following AMS-SCC code was used: 2401008000.

METHODOLOGY

Alternative method 1 from the Great Lakes Steering Committee document was followed[5]. A lb VOC/mile emission factor was developed using national traffic marking sales data, national and state roadway spending expenditures data, and average VOC content of traffic markings. The lb VOC/mile was then multiplied by the county roadway miles to estimate VOC emissions, which were then speciated into toxics. The average VOC content of traffic markings (3.36 lb/gallon) was obtained from EIIP Chapter 14, Traffic Markings [8]. National sales of traffic markings were obtained from the U.S. Census Bureau[9]. The amount of money spent on roadways was obtained from the Federal Highway Administration[10]. County roadway miles were obtained from the Indiana Department of Transportation[11].

POLLUTANTS AND EMISSION FACTORS

Pollutant	Volume %	EF Units
Carbon tetrachloride	0.009	lb/lb VOC
Ethylbenzene	0.009	lb/lb VOC
Glycol ethers	0.040	lb/lb VOC
Naphthalene	0.002	lb/lb VOC
Styrene	0.277	lb/lb VOC
Toluene	6.914	lb/lb VOC
Xylene isomers	0.499	lb/lb VOC
VOC	24.54	lb/mile

SAMPLE CALCULATION
Emission Factor Determination

36,944,000 gals traffic markings used nationally in 1996
$68,247,791,000 spent nationally on road maintenance in 1996
$1,252,256,000 spent in Indiana on road maintenance in 1996
Average VOC content of traffic marking is 3.36 lbs/gallon
92779 total highway miles in Indiana

(36,944,000 gals traffic markings used nationally * 3.36 lbs VOC/gal * $1,252,256,000 spent in Indiana/$68,247,791,000 spent nationally)/ (92779 state total highway miles) = 24.55 lbs VOC/mile

<u>Adams County</u>
883.24 miles * 24.54 lb VOC/mile * 0.06914 lbs toluene/lb VOC = 1,498 lbs toluene

Agricultural Pesticide Use

SOURCE IDENTIFICATION
There are no SIC codes for this category.

AMS-SCC CODES
The following AMS-SCC code was used: 2461800000.

POLLUTANTS AND EMISSION FACTORS
The following pollutant was inventoried: Atrazine.

METHODOLOGY
The method used to estimate atrazine emissions uses published state total pesticide use, acres of corn planted in each county, and an emission factor. The amount of atrazine used in the state of Indiana was obtained from the United States Department of Agriculture (USDA) economics and statistics system web site[12]. The emission factor for atrazine was obtained from EIIP Chapter 9: Pesticides[8]. Land acreage planted per county with corn was obtained from Purdue University's agricultural statistics web site[13].

EMISSION FACTOR
An emission factor of 700 lbs atrazine per ton applied was used[4].

SAMPLE CALCULATION
<u>Adams County</u>
6,672,000 lbs atrazine applied in state in 1996
40,900 acres planted Adams County in 1996
5,600,000 total acres planted state in 1996
700 lbs of atrazine released/ton applied

(40,900 acres corn Adams County /5,600,000 acres corn in state)* (6,672,000 lbs atrazine/2000 lb/ton) * 700 lbs/ton = 17,055 lbs atrazine

Commercial/Industrial Dry Cleaning Operations

SOURCE IDENTIFICATION
The primary SIC code for this category is 7212.

AMS-SCC CODES
The following AMS-SCC code was used: 2420010055.

METHODOLOGY
The emissions for 1996 were estimated using 1993 total perchloroethylene consumption data[14] from the initial notification report filed by dry cleaners under the NESHAP[15]. U.S.EPA stated in the preamble to the dry cleaning NESHAP that a 44% reduction is expected from the rule. The rule took affect November 1, 1996. This is 1/6th of the year, therefore, a rule effectiveness of 7.3% was assumed for 1996.

POLLUTANTS AND EMISSION FACTORS
The following pollutant was inventoried: Perchloroethylene.

SAMPLE CALCULATION
Marion County
1993 emissions = 655,074 lbs of perchloroethylene
7.3% rule effectiveness reduction

655,074 lbs *(1-0.073) = 607,254 lbs perchloroethylene

Industrial Surface Coatings

SOURCE IDENTIFICATION
There are many different SIC codes associated with this area source category.

AMS-SCC CODES
The following AMS-SCC codes were used:

2401015000 - Factory Finished Wood
2401020000 - Wood Furniture
2401030000 - Paper Coating
2401040000 - Metal Cans
2401045000 - Metal Coils
2401055000 - Machinery and Equipment
2401060000 - Appliances
2401065000 - Electronic and Other Electrical
2401075000 - Other Transportation
2401080000 - Marine Coatings
2401090000 - Misc. Manufacturing
2401100000 - Industrial Maintenance
2401200000 - Other Special Purpose

METHODOLOGY
The industrial surface coating inventory is based on SIC employment data, except SCC Codes 2401090000, 2401100000, 2401200000, which are based on population. VOC were estimated by developing state specific lb VOC/employee emission factors and using employment information from County Business Patterns[8]. Point source employment data were subtracted from county employment totals to eliminate double counting of emissions. Speciation profiles from RAPIDS were used to determine toxic emissions.

POLLUTANTS AND EMISSION FACTORS

Employment Based VOC Emission Factors Used for Industrial Surface Coatings						
SCC	**Description**	**SICs**	**Statewide Employment**	**Point Source Employment**	**Point Source Emissions (tons VOC)**	**Emission Factor (ton VOC/Emp)**
2401015000	Factory Finished Wood	2426-2429, 243-245, 2492, 2499	22,596	14,339	3,593	0.251
2401020000	Wood Furniture	25	25,259	19,558	5,694	0.291
2401030000	Paper Coating	26	15,524	6,389	2,506	0.392
2401040000	Metal Cans (National Default)*	341	829	511	NA	3.015
2401045000	Metal Coils (National Default)*	3479	3,243	2,586	NA	1.439
2401055000	Machinery and Equipment	35	63,862	27,780	1,594	0.058
2401060000	Appliances	363	9,433	7,838	934	0.119
2401065000	Electronic and Other Electrical	3612, 3357	5,740	2,737	1,231	0.450
2401075000	Other Transportation	37 (not 3711, 373)	102,347	63,491	6,570	0.108
2401080000	Marine Coatings (National Default)*	373	3,483	1,975	NA	0.154

* Due to the low percentage of reporting sources, the national default emission factor was used.
** Point sources accounted for all of the employment for these categories.

Population Based Emission Factors Used for Industrial Surface Coatings		
SCC	**Description**	**E F (lb/person)**
2401090000	Miscellaneous Manufacturing	0.600
2401100000	Industrial Maintenance	0.800
2401200000	Other Special Purpose	0.800

RAPIDS SPECIATION PROFILES

Pollutant	Emission Factor (lb/lb VOC)	Pollutant	Emission Factor (lb/lb VOC)
Ethylbenzene	4.2e-03	Xylene, m	6.0e-04
Glycol ether	1.0e-03	Xylene, o	7.1e-03
Toluene	6.72e-02	Xylene, p	4.0e-04
Xylene isomers	4.82e-02		

SAMPLE CALCULATION

Adams County (2401055000 - machinery and equipment)

321 employees in SIC 35xx * 0.058 tons VOC/ employee * 2,000 lb/ton * 4.2e-03 lbs ethylbenzene/ lb VOC = 156 lbs ethylbenzene

Gasoline Dispensing

SOURCE IDENTIFICATION

The primary SIC code for this category is 5541.

AMS-SCC CODES

The following AMS-SCC codes were used:

Uncontrolled splash fill: stage I	2501060052 (40600301)
Submerged fill: stage I	2501060053 (40600306)
Uncontrolled vehicle refueling: stage II	2501060101 (40600401)
Controlled vehicle refueling: stage II	2501060102 (40600403)
Spillage losses	2501060103 (40600402)
Transport losses	2505030120 (40600131)

METHODOLOGY

The methodology for estimating emissions from gasoline dispensing facilities utilizes state total gasoline sales, county retail sales information in SIC 554, and FIRE emission factors. Information on statewide total fuel use was obtained from the Federal Highway Administration's 1996 Highway Statistics[10]. According to this report the amount of gasoline used in Indiana was 2,985,460,000 gallons. Gallons per county were determined by county sales[16] in SIC 554 divided by state totals sales in SIC 554. All emission factors were from FIRE 6.01[1].

POLLUTANTS AND EMISSION FACTORS

(All EF's are in lb/1000 gal)	Uncontrolled splash fill	Controlled submerge fill	Displacement losses form vehicle refueling	Controlled displacement losses from vehicle refueling	Tank truck transit losses	Spillage losses
Benzene	6.93e-2	1.67e-3	6.59e-2	N/a	7.18e-2	N/a
Ethylbenzene	1.98e-2	N/a	N/a	N/a	N/a	N/a
Toluene	1.76e-1	3.5e-2	9.94e-2	1.16e-1	N/a	7.42e-2
Xylene (Mixed isomers)	7.34e-2	7.5e-1	3.38e-2	3.74e-3	N/a	2.5e-3

N/a = not available

RULES AND REGULATIONS

State rule 326 IAC 8-4[2] requires Stage I and Stage II controls at gasoline dispensing facilities in certain areas of the state.

The following counties have controlled submerge-fill (stage I controls) requirements: Boone, Clark, Dearborn, Elkhart, Floyd, Hamilton, Hancock, Harrison, Hendricks, Johnson, Lake, Marion, Morgan, Porter, St. Joseph and Shelby Counties. Stage I controls are also in place at service stations constructed after July 1, 1989, located anywhere in the state, however no estimate was made to consider the rule effectiveness due to a lack of information. Therefore, controlled submerge fill emission factors were used only for the above counties.

The following counties have controlled vehicle refueling (stage II controls) requirements: Clark, Floyd, Lake and Porter Counties.

SAMPLE CALCULATION
Crawford County (uncontrolled splash fill)
2,985,460,000 gallons gas sold in the state in 1996
$9,331,000 in sales in SIC 554 in Crawford County
$3,682,088,000 in sales in SIC 554 in the state

($9,331,000 sales SIC 554 in Crawford County/$3,682,088,000 sales in SIC 554 statewide) * 2,985,460,000 gallons gas sold statewide = 7,565,633 gallons sold in Crawford County
7,565,633 gallons* 6.93e-2 lbs benzene/1000 gal of gas = 524 lbs benzene.

Graphic Arts

SOURCE IDENTIFICATION
The SIC code for this category is 2752.

AMS-SCC CODES
The following AMS-SCC code was used: 2425000000

METHODOLOGY
State specific lb/employee air toxic emission factors were developed from data reported by graphic arts sources in the point source inventory. County employment data for the SIC 2752 was obtained from the 1996 County Business Patterns[8]. Point source employment data were subtracted from the county totals. Calculations are based on remaining county employment data for SIC 2752.

POLLUTANTS AND EMISSION FACTORS

Pollutant	E.F. (Lbs/employee)
Di-n-butyl phthalate	1.00e-01
Ethylbenzene	1.37e+00
Ethylene glycol	1.66e+00
Glycol ethers	2.35e+01
Methylene chloride	3.41e+00
Naphthalene	1.11e+00
Toluene	3.73e+01
Xylene isomers	5.00e+00

SAMPLE CALCULATION

Adams County

136 employees in SIC 2752 * 3.73e+01 lbs toluene/employee = 5,069 lbs toluene

Solvent Metal Cleaning

SOURCE IDENTIFICATION

There are many possible SIC codes for this category.

AMS-SCC CODES

The following AMS-SCC codes were used:
2415130000 - electrical equipment vapor cleaning
2415100000 - other vapor cleaning
2415345000 - miscellaneous manufacturing cold cleaning
2415360000 - automobile repair shops cold cleaning

METHODOLOGY

The solvent metal cleaning inventory is based on employment data. Employment data for specific SIC Codes was obtained from County Business Patterns[8]. The point source employment data were subtracted from county total employment data for each SIC to eliminate double counting of emissions. The VOC emission factors came from EIIP Chapter 6- Solvent Cleaning[8]. Speciation profiles were obtained from RAPIDS.

SOLVENT METAL CLEANING SCCs AND ASSOCIATED INDUSTRIES

SCC	SIC	Description
2415130000	36	Electronic and other electronic equipment
2415199000	25	Furniture and fixtures
	33	Primary metal industries
	34	Fabricated metal products
	35	Industrial machinery and equipment
	37	Transportation equipment
	38	Instruments and related products
	39	Miscellaneous manufacturing industries

	417	Bus Terminal and Service Facilities
	423	Trucking terminal facilities
	551	New and used car dealers
	552	Used car dealers
	554	Gasoline service stations
	555	Boat dealers
	556	Recreational vehicle dealers
	753	Automotive repair shops
2415345000	25	Furniture and fixtures
	33	Primary metal industries
	34	Fabricated metal products
	35	Industrial machinery and equipment
	36	Electronic and other electronic equipment
	37	Transportation equipment
	38	Instruments and related products
	39	Miscellaneous manufacturing industries
2415360000	417	Bus Terminal and Service Facilities
	423	Trucking terminal facilities
	551	New and used car dealers
	552	Used car dealers
	554	Gasoline service stations
	555	Boat dealers
	556	Recreational vehicle dealers
	753	Automotive repair shops

POLLUTANTS AND EMISSION FACTORS

Pollutant	Emission Factor and units	Pollutant	Emission Factor and units
VOC (2415130000) VOC (2415100000) VOC (2415345000) VOC (2415360000)	29 lbs/employee/yr 9.8 lbs/employee/yr 24 lbs/employee/yr 270 lbs/employee/yr	1,1,1-Trichloroethane Trichloroethylene Perchloroethylene Methylene chloride	2.223e-01 (lb/lb VOC) 2.109e-01 (lb/lb VOC) 7.4e-02 (lb/lb VOC) 4.1e-02 (lb/lb VOC)
Benzene*	1.0e-02 (lb/lb VOC)	Xylene, m*	2.3e-03 (lb/lb VOC)
Toluene*	8.29e-02 (lb/lb VOC)	Xylene, o*	1.7e-03 (lb/lb VOC)
Naphthalene*	3.0e-04 (lb/lb VOC)	Xylene, p*	2.3e-03 (lb/lb VOC)
		Xylene isomers*	3.4e-02 (lb/lb VOC)

* Estimates for these pollutants are for cold cleaning processes only. These toxics would not typically be used in vapor cleaners.

SAMPLE CALCULATION

Boone County automobile repair shops

420 employees * 270 lbs VOC/employee/yr = 113400 lbs of VOC

122,580 lbs of VOC * 1.0e-02 lbs benzene/lb VOC = 1134 lbs benzene

Municipal Solid Waste Landfills

SOURCE IDENTIFICATION
The SIC code for this category is 4953.

AMS-SCC CODES
The following AMS-SCC code were used: 262003000.

METHODOLOGY
U.S. EPA's landfill air emissions estimation model software was used to calculate landfill emissions[17]. Specifications for each landfill were obtained from the IDEM landfill compliance database[14]. Not all counties in Indiana have landfills therefore; some counties do not have estimates. Some of the landfills did not have either their total waste in place or amount accepted per year. In those cases, the information given was interpolated to obtain the missing data. Still others had no data available. These landfills are not represented in the inventory. All landfills, closed or open, that had data available, were included in the inventory.

POLLUTANTS
The following pollutants were inventoried: 1,1,1 - trichloroethane, 1,2 - dichloroethane, acrylonitrile, benzene, carbon tetrachloride, chloroform, methylene chloride, ethylbenzene, mercury, perchloroethylene, toluene, trichloroethylene, vinyl chloride and xylene isomers.

SAMPLE CALCULATION
No sample calculations are available for this category because the landfill emissions model was used.

Public Owned Treatment Works (Potws)

SOURCE IDENTIFICATION
The SIC code for this category is 4952.

AMS-SCC CODES
The following AMS-SCC code was used: 2630020000.

METHODOLOGY
The methodology followed for POTWs was obtained from reference 18. To calculate VOC emissions the annual flow for the treatment plant was multiplied by a default industrial flow rate of 16% to obtain an estimate of industrial wastewater flow. The estimated amount of industrial flow is then multiplied by the emission factor 110 lb of VOC per million gallons of industrial wastewater treated. Speciation profiles from RAPIDS were then applied to estimate air toxic emissions.

POLLUTANTS AND EMISSION FACTORS

Pollutant	Emission Factor	EF Units
Benzene	2.57e-02	lb/lb VOC
Perchloroethylene	1.00e-03	lbs/lb VOC
Toluene	3.00e-04	lbs/lb VOC
Xylene isomers	3.00e-04	lbs/lb VOC
VOC	1.10e+02	lbs/million gallon

SAMPLE CALCULATION

Porter County

4,200.7 million gallons/year *0.16 * 110 lb VOC/million gals * 0.0257 lbs benzene/lb VOC = 1900 lbs benzene

Residential Coal Combustion

SOURCE IDENTIFICATION

There are no SIC codes for this category.

AMS-SCC CODES

The following AMS-SCC code was used: 2104002000.

METHODOLOGY

County number of house hold using coal as their primary heating source was obtained from Census of Housing, Detailed Housing Characteristic[19]. The amount of coal used by residential units was obtained from Energy Information Administration[20], using 1995 numbers. All emission factors were taken from AP-42 Section 1: Bituminous and Sub bituminous Coal Combustion[4].

POLLUTANTS AND EMISSION FACTORS

Pollutant	Emission Factor (lbs/$10e^{12}$ btu)
Beryllium	73
Chromium	300
Manganese	2170
Mercury	16
Nickel	1290

Other emission factors were available from FIRE 6.01, however the factors available had an ‘U’ rating. These emission factors were not used.

SAMPLE CALCULATION

Adams County

98,000 tons of coal used in Indiana by residential homes.

116 residential homes in Adams County using coal

3,912 residential homes in Indiana using coal

13,000 btu/lb of coal

(116 homes Adams County/3,912 homes in state) * 98,000 tons coal state = 2,905.9 tons coal used in Adams County

(13,000 btu/lb * 2000lb/ton)* 2,905.9 tons = $7.55e^{-2}$ trillion btu

$7.55e^{-2}$ trillion btu * 73 lbs beryllium/trillion btu = 6 lbs beryllium

Residential Distillate Oil Combustion

SOURCE IDENTIFICATION

There are no SIC codes for this category.

AMS-SCC CODES

The following AMS-SCC code was used: 2104004000.

METHODOLOGY

County number of households using distillate oil as their primary heating source was obtained from Census of Housing, Detailed Housing Characteristic[19]. The amount of distillate oil used by residential units was obtained from Energy Information Administration[20], using 1995 numbers. In order to allow a representation of kerosene as a fraction of distillate oil, kerosene totals and distillate oil totals were added together. All emission factors were taken from FIRE version 6.01[1].

POLLUTANTS AND EMISSION FACTORS

Emission factors obtained from FIRE for point source SCC 10300501			
Pollutant	Emission Factor (lbs/MMbtu)	Pollutant	Emission Factor (Lbs/MMbtu)
Arsenic	4.2e-6	Manganese	1.4e-5
Beryllium	2.5e-6	Mercury	3.0e-6
Cadmium	1.1e-5	Nickel	1.8e-5
Chromium	6.7e-5	Formaldehyde	6.1e-2
Lead	8.93e-6		

MMbtu = million BTU

SAMPLE CALCULATION

<u>Adams County</u>

1,810,000 barrels distillate oil * 42 gallons/barrel = 76,020,000 gallons distillate oil used in Indiana by residential homes.

1,193 residential homes in Adams County using distillate oil

127,072 residential homes in Indiana using distillate oil

140,000 btu/gallon of distillate oil

(1,193 homes Adams County using distillate oil/127,072 homes in Indiana using distillate oil) * 76,020,000 gallons distillate oil used in Indiana = 713,704.5 gallons used in Adams County

713,704.5 gallons * 140,000 btu/gal * 3.0e-6 lbs/MMbtu mercury = 0.3 lbs mercury

SOURCE IDENTIFICATION
There are no SIC codes associated with residential wood combustion.

AMS-SCC CODES
The following AMS-SCC Code was used: 2104008030.

METHODOLOGY
County number of households using wood as their primary heating source was obtained from Census of Housing, Detailed Housing Characteristic[19]. The average amount of wood used (in cords) for each house hold was obtained from EIA State Energy Data Report 1995[20]. A conversion factor of 1.25 tons/cord was obtained from the Department of Energy. All emission factors were obtained from EIIP Volume III; Chapter 2, Residential Wood Combustion[8].

POLLUTANTS AND EMISSION FACTORS
Below are the pollutants and emission factors for conventional, catalytic and non-catalytic wood stoves. Indiana used factors for catalytic woodstoves for all wood burned for primary heating purposes.

Pollutant	Emission Factor (lbs/ton)			Pollutant	Emission Factor (lb/ton)		
	Conv	Cat	Non-cat		Conv	Cat	Non-cat
Acenaphthene	1.0e-2	6.0e-3	1.0e-2	Chrysene	1.2e-2	1.0e-2	1.0e-2
Acenaphthylene	2.12e-1	6.8e-2	3.2e-2	Dibenz(ah)anthracene	BDL	2.0e-3	4.0e-3
Anthracene	1.4e-2	8.0e-3	9.0e-3	Fluoranthene	2.0e-2	1.2e-2	8.0e-3
Benz(a)anthracene	2.0e-2	2.4e-2	1.0e-3	Fluorene	2.4e-2	1.4e-2	1.4e-2
Benzene	1.938	1.464	NA	Indeno(123-cd) pyrene	BDL	4.0e-3	2.0e-3
Benzo(a)pyrene	4.0e-3	4.0e-3	6.0e-3	Manganese	1.4e-4	2.2e-4	1.4e-4
Benzo(b)fluoranthene	6.0e-3	4.0e-3	4.0e-3	Naphthalene	2.88e-1	1.86e-1	1.44e-1
Benzo(ghi)perylene	4.0e-3	2.0e-3	2.0e-2	Nickel	1.4e-5	2.2e-6	2.0e-5
Benzo(k)fluoranthene	2.0e-3	2.0e-3	1.0e-3	Phenanthrene	7.8e-2	4.89e-1	1.18e-1
Cadmium	2.2e-5	4.6e-5	2.2e-5	Pyrene	2.4e-2	1.0e-2	8.0e-3
Chromium	1.0e-6	1.0e-6	1.0e-6	Toluene	7.30e-1	5.2e-1	NA
Xylene, ortho	2.02e-1	1.86e-1	NA				

For the 1996 inventory fireplaces were dropped due to lack of emission factors. All emission factors associated with fireplaces were deleted from FIRE 6.0.

SAMPLE CALCULATION
Adams County
499,000 cords wood burned in the state
850 households in Adams County burning wood as primary heat source
86,977 households in the state burning wood as primary heat source
1.25 tons/cord of wood

(850 households using wood as primary heat source in Adams County/
86,977 total houses in state using wood as primary heat source) * (499,000 cords used in state) * 1.25 tons/cord * 1.464 lbs benzene/ ton of wood burned = 8924 lbs benzene

Residential Natural Gas Combustion

SOURCE IDENTIFICATION
There are no SIC codes for this category.

AMS-SCC CODES
The following AMS-SCC code was used: 2104006000.

METHODOLOGY
County number of households using natural gas was obtained from Census of Housing, Detailed Housing Characteristic[19]. The amount of natural gas used by residential units was obtained from Energy Information Administration[20], using 1995 numbers. All emission factors are from AP- 42, Section 1.4 "Natural Gas Combustion"[4]. No "U" rated emission factors were used.

POLLUTANTS AND EMISSION FACTORS

Pollutant	Emission Factor (lbs/10E6 scf)	Pollutant	Emission Factor (lbs/10E6 scf)
Acenaphthene	1.8E-6	Naphthalene	6.1E-4
Acenaphthylene	1.8E-6	Phenanthrene	1.7E-5
Anthracene	2.4E-6	Pyrene	5.0E-6
Benz(a)anthracene	1.8E-6	Toluene	3.4E-3
Benzene	2.1E-3	Arsenic	2.0E-4
Benzo(a)pyrene	1.2E-6	Beryllium	1.2E-5
Benzo(b)fluoranthene	1.8E-6	Cadmium	1.1E-3
Benzo(g,h,i)perylene	1.2E-6	Chromium	1.4E-3
Benzo(k)fluoranthene	1.8E-6	Cobalt	8.4E-5
Chrysene	1.8E-6	Copper	8.5E-4
Dibenzo(a,h)anthracene	1.2E-6	Lead	5.0E-4
Fluoranthene	3.0E-6	Manganese	3.8E-4

Fluorene	2.8E-6	Mercury	2.6E-4
Formaldehyde	7.5E-2	Nickel	2.1E-3
Indeno(1,2,3-cd)pyrene	1.8E-6		

scf = standard cubic foot

SAMPLE CALCULATION

Adams County

161 billion cubic feet natural gas used in the state

4880 homes in Adams County use natural gas

1,303,489 homes in the state use natural gas

(4,880 residential homes in Adams County using natural gas/1,303,489 residential homes in Indiana using natural gas)*(161,000,000,000 scf of natural gas used in Indiana by residential homes) * (6.1E-4 lbs Naphthalene/million scf). = 0.4 lbs Naphthalene

QUALITY ASSURANCE (QA) ACTIVITIES

During the development of the 1996 air toxics inventory, many state specific QA activities were performed. All air toxic point source estimates were checked against reported criteria pollutant totals for volatile organic compounds (VOC) and particulate matter (PM). Point source estimates were made using the best information available, however they have not been reviewed by individual sources for accuracy. Area source category totals were compared to area source VOC and PM totals obtained from IDEM's 1996 ozone inventory.

In the annual emissions statement mail out IDEM requested that sources voluntarily report toxics data, and informed the sources that this information would be used as part of the Great Lakes Regional Inventory effort. Internal checks on the voluntarily reported data and the emission estimates were made. Knowledge of existing source emissions of various air toxics led to the decision to use the TRI data when sources did not voluntarily report data and there were no FIRE emission factors available to estimate emissions for their processes. Additional QA efforts on the TRI data have been initiated by IDEM Office of Pollution Prevention and Technical Assistance so confidence in these data is improving.

Another QA check included listing out all estimates by SCC and Standard Industrial Classification (SIC) Codes from greatest to least and evaluating the top emitters of each pollutant. Parameters evaluated included missing control equipment, incorrectly reported fuel process rates, incorrect SCCs and emission factors. Regional QA efforts also identified errors and resulted in changes to certain source categories.

INFORMATION

If more information is needed, please contact Jon Bates at the Indiana Department of Environmental Management, 100 North Senate Avenue, Indianapolis, IN 46204, or at (317)233-4266 (outside Indiana) or1-800-451-6027 (in Indiana), or e-mail jbates@dem.state.in.us.

RESULTS

The attached table provides point and area source emission totals by county.

REFERENCES

1. FIRE Version 6.01 Source Classification Codes and Emission Factor Listing for Criteria and Hazardous Air Pollutants, electronic database, available from U.S.EPA technology transfer network (TTN), at http://www.epa.gov/ttn/chief/software.html

2. Title 326 Indiana Administrative Code, Indiana Department of Environmental Management, Office of Air Management, 1993, Rules 2-6 (emissions statement) and 8-4 (VOC rules). http://www.state.in.us/legislative/iac/V6.html#T326

3. Toxic Release Inventory (by State)- Diskettes, GPO (Superintendent of Documents, U.S. Government Printing Office, Attn: Electronic Products, P.O. Box 37082, Washington, DC 20013-7082, telephone number (202) 512-1530. http://www.epa.gov/opptintr/tri/index.html

4. AP-42, Compilation of Air Pollution Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, January 1995 and supplements. http://www.epa.gov/ttn/chief/

5. Great Lakes Air Toxic Emission Inventory Steering Committee, Area Source Methodology Documents, 1999.

6. Emission Inventory Improvement Program, Area Sources. http://www.epa.gov/ttn/chief/eiip/

7. Indiana Business Research Center, Indiana University, Kelley School of Business, 1998. http://www.iupui.edu/it/ibrc/Stats/pop_estimates_topic_page.html

8. County Business Patterns, U.S. Bureau of the Census. http://www.census.gov/prod/www/abs/cbptotal.html

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10. 1996 Highway Statistics, Federal Highway Administration, Office of Highway Information Management, August 24, 1998, http://www.fhwa.dot.gov/ohim/1996/index.html

11. Indiana Department of Transportation, County Highway miles, 1998.

12. USDA Economics and Statistics System Document; Agricultural Chemical Usage - 1996 Field Crops Summary.
http://www.usda.mannlib.cornell.edu/data-sets/inputs/9x171/97171/agch0997.txt

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14. Indiana Department of Environmental Management, Office of Air Management, Dry Cleaning and Landfill Data Bases, 1996.

15. Code of Federal Regulations, Title 40, Part 63, Subpart M, Perchloroethylene Dry Cleaning NESHAP, (58 FR 49376), September 22, 1993. http://www.epa.gov/ttn/oarpg/t3pfpr.html

16. U.S. Bureau of the Census, Census of Retail Trade, Indiana
http://govinfo.library.orst.edu/cgi-bin/econ-state?Indiana

17. Landfill Air Emission Estimation Model. Version 1.1. Prepared by Radian International (as of this writing version 2.01 is available), http://www.epa.gov/ttn/catc/products.html#software

18. Procedures for the Preparation of Emissions Inventories for Carbon Monoxide and Precursors of Ozone, Volume 1, EPA-450/4-91-016, U.S.EPA, Office of Air Quality Planning and Standards, May 1991.

19. U.S. Bureau of the Census, 1990 Census of Housing, Detailed Housing Characteristics - Table 67 - Fuel, Occupancy and Social Characteristics.

20. U.S. Department of Energy, Energy Information Administration, Table 102 - Residential Energy Consumption Estimates, 1960, 1970 - 1995, Indiana (as of this writing 1996 is available).
http://www.eia.doe.gov/emeu/sep/in/frame.html

Table B-1: Indiana Emissions by County in pounds/year

	Adams	Allen	Bartholomew	Benton	Blackford
1,1,1-TRICHLOROETHANE	112350	476807.1	138524	3742	19523
1,2-DIBROMOETHANE					
1,2-DICHLOROETHANE	29.2	133.09	0.3	0.05	0.07
1,3-BUTADIENE		58	21.9		
TCDD,2378	0.00002				
TCDF,2378	0.0000008				
ACENAPHTHENE	37	65.02	69.03	4	16
ACENAPHTHYLENE	415	731.02	778.1	48	176
ACETALDEHYDE		0.09	462		
ACROLEIN	4	0.03	87		
ACRYLONITRILE	237	1112			
ANTHRACENE	49	86.02	92.04	6	21
ANTIMONY		14			0.01
ARSENIC	0.6	29.06	1.6	0.25	0.28
ATRAZINE	17055	23561	32985	54210	9633
BENZ(A)ANTHRACENE	146.1	258.02	275.24	17	62
BENZENE	14434.2	74722.04	43641.3	2145.55	5649.87
BENZO(A)PYRENE	24.04	43.01	46.02	3	10
BENZO(B)FLUORANTHENE	24	43.02	46	3	10
BENZO(G,H,I)PERYLENE	12	22.01	23.01	1	5
BENZO(K)FLUORANTHENE	12	22.02	23.01	1	5
BERYLLIUM	6.21	10.82	1.29	0.4	0.3
CADMIUM	9.07	68.94	16.76	0.73	0.83
CARBON TETRACHLORIDE	2.4	8	2	2	1
CHLOROFORM	34	317.02	68	10	14
CHROMIUM	199.84	7376.06	4677.57	3.3	3.44
CHROMIUM (VI)		0.02	0.02		
CHRYSENE	61.02	108.08	114.09	7	26
COBALT	0.05	45.3	0.1	0.02	0.06
COKE OVEN EMISSIONS					
COPPER	2.5	4226.19	2226	0.2	0.3
DIBENZO(A,H)ANTHRACENE	12	22.01	23.01	1	5
DIBUTYL PHTHALATE	8	107	22	1	2
DIETHYLHEXYL PHTHALATE	4	306			
DIOCTYL PHTHALATE					
ETHYLBENZENE	20323	282298	16045	1992	9191
ETHYLENE GLYCOL	524	2093	1541		844
ETHYLENE OXIDE	494	4693	1033	146	213
FLUORANTHENE	73.1	129.13	137.8	8	31.01
FLUORENE	85	151.03	160.7	10	36
FORMALDEHYDE	409	38142.34	1134	13507	3956
GLYCOL ETHERS (MISC.)	5417	398885	139692	609	883
HEXACHLORO-1,3-BUTADIENE		8			
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	24	43.02	46.01	3	10
LEAD	727.1	3538.19	200.01	0.4	0.51
MANGANESE	1015.2	4060.12	10911.98	8.79	8.22
MERCURY	4.54	393.73	13.22	4.02	0.73
METHYLENE CHLORIDE	21696	370111	172581	1068	4096
METHYLENE(B)4-PHENYLISOCYANATE		14			
M-XYLENE	704	5354	2700	130	303
NAPHTHALENE	3688.4	48724.21	8907	739.1	1475.2
NICKEL	360.01	9524.78	2844.53	9.7	5.71
O-XYLENE	5906	25445.5	15160	1674	2720
PHENANTHRENE	2981.01	5260.25	5597.73	344	1266.01
PHENOL	604	263018	5500.02		
PHOSGENE					
PCBS	0.1				
PCDD	0.0003	0.07			
PCDF	0.0009	0.23			
P-XYLENE	577	4342	1698	86	243
PYRENE	61	108.05	114.11	7	26
STYRENE	606151	152395.7	70	57	28030
TETRACHLOROETHYLENE	14966	250050	67307	280	14120
TOLUENE	146012	1135242	254607	25662.8	233598
TOLUENE-2,4-DIISOCYANATE		264			
TRICHLOROETHYLENE	95920	473173	106038	5	19047
TRIFLURALIN					
VINYL CHLORIDE	323	1488			
XYLENES (MIXED ISOMERS)	125007	2070575	234735	15901	61108

Table B-1: Indiana Emissions by County in pounds/year

	Boone	Brown	Carroll	Cass	Clark
1,1,1-TRICHLOROETHANE	53989	5996	26374	86302	134717
1,2-DIBROMOETHANE					
1,2-DICHLOROETHANE	0.2	2.07	0.09	59.2	0.4
1,3-BUTADIENE					
TCDD,2378				0.00000028	0.00000008
TCDF,2378					
ACENAPHTHENE	15	67	26	30.03	81.02
ACENAPHTHYLENE	173	758	290	341.3	950.1
ACETALDEHYDE			0.02	20	323.76
ACROLEIN			0.02	0.03	0.64
ACRYLONITRILE		17		488	
ANTHRACENE	20	89	34	40.28	109.09
ANTIMONY			12		
ARSENIC	0.9	0.21	0.38	98.58	12.43
ATRAZINE	42451	1168	46454	42451	6672
BENZ(A)ANTHRACENE	61	268	102	120.01	327.02
BENZENE	9685.2	17255.17	8142.89	14207.8	40326.13
BENZO(A)PYRENE	10	45	17	20	60.04
BENZO(B)FLUORANTHENE	10	45	17	20	58.2
BENZO(G,H,I)PERYLENE	5	22	9	10.01	35.03
BENZO(K)FLUORANTHENE	5	22	9	10	27.05
BERYLLIUM	0.71	0.1	0.5	344.84	1.73
CADMIUM	2.9	1.25	1.3	58.16	8.18
CARBON TETRACHLORIDE	2	1.03	2	2.9	2
CHLOROFORM	42	15.2	19	65	92
CHROMIUM	15.02	3.14	4.63	45.79	167.73
CHROMIUM (VI)				0.02	0.18
CHRYSENE	25	112	43	50.3	139.08
COBALT	0.06	0.004	0.03	0.26	0.47
COKE OVEN EMISSIONS					
COPPER	0.7	0.04	8546.3	3031.28	1653.56
DIBENZO(A,H)ANTHRACENE	5	22	9	10	27.2
DIBUTYL PHTHALATE	10	2	2	26	82
DIETHYLHEXYL PHTHALATE					
DIOCTYL PHTHALATE				37	49
ETHYLBENZENE	5095	1793	5360	16901	44025
ETHYLENE GLYCOL	208				1803
ETHYLENE OXIDE	641	234	297	586	1397
FLUORANTHENE	30	134	51	60.63	320.12
FLUORENE	36	156	60	70.07	194.03
FORMALDEHYDE	183	49	82.02	1134	10263.1
GLYCOL ETHERS (MISC.)	4812	659	1579	2771	24926
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	10	45	17	20	65.03
LEAD	1.4	0.52	2205.7	2273.33	801.89
MANGANESE	15.9	2.82	12.1	388.7	6729.91
MERCURY	0.76	0.21	0.37	124.74	141.63
METHYLENE CHLORIDE	12024	1774	6004	16262	29851.1
METHYLENE(B)4-PHENYLISOCYANATE				16	
M-XYLENE	416	20	607	646	1907
NAPHTHALENE	3905.5	3100.03	2035.2	4377.7	16514.2
NICKEL	8.61	3.02	77.11	95.15	162
O-XYLENE	1835	2316	6465	4092	9110
PHENANTHRENE	1241.01	5453	2087.01	2455.44	6725.22
PHENOL				44.9	57.9
PHOSGENE					
PCBS					
PCDD				0.000075	0.004027
PCDF				0.00032	0.01
P-XYLENE	387	14	450	564	1500
PYRENE	25	112	43	50.11	159.05
STYRENE	75	31	63	77.6	62.86
TETRACHLOROETHYLENE	28712	471	6796	35615	82802
TOLUENE	76978	21384.7	444036	282560	374808.3
TOLUENE-2,4-DIISOCYANATE					
TRICHLOROETHYLENE	35559	27	17771	52993	93576.52
TRIFLURALIN					
VINYL CHLORIDE		24		666	1.06
XYLENES (MIXED ISOMERS)	56336	10591.5	214243	164200	362861.1

Table B-1: Indiana Emissions by County in pounds/year

	Clay	Clinton	Crawford	Daviess	Dearborn
1,1,1-TRICHLOROETHANE	42428	42592	13752	20500	45541
1,2-DIBROMOETHANE					1.96
1,2-DICHLOROETHANE	0.1	12.2	0.05	8.1	92.2
1,3-BUTADIENE					
TCDD,2378					0.0000327
TCDF,2378					0.000092
ACENAPHTHENE	37	16	57	43	58.93
ACENAPHTHYLENE	418	182	650	484	654.5
ACETALDEHYDE		8		43	2735
ACROLEIN		9			567
ACRYLONITRILE		148		65	33
ANTHRACENE	49	21	76	57	77.37
ANTIMONY					35.9
ARSENIC	0.69	16.7	0.21	0.6	803.18
ATRAZINE	21142	49039	1334	37363	11885
BENZ(A)ANTHRACENE	148	64.01	229	171	231.16
BENZENE	14580	8193.2	15597.15	13816.1	20758
BENZO(A)PYRENE	25	11	38	28	39.07
BENZO(B)FLUORANTHENE	25	11	38	28	39
BENZO(G,H,I)PERYLENE	12	5	19	14	19.05
BENZO(K)FLUORANTHENE	12	5	19	14	19
BERYLLIUM	4.4	0.71	0.3	9.33	44.68
CADMIUM	2.8	3.01	0.86	2.1	103.81
CARBON TETRACHLORIDE	2	2.2	1	2.1	2.06
CHLOROFORM	26	33.8	10	29.6	161.3
CHROMIUM	25.64	61.07	2.94	41.94	1421.89
CHROMIUM (VI)					154
CHRYSENE	61	27	96	71	96.2
COBALT	0.04	0.07	0.005	0.05	197.05
COKE OVEN EMISSIONS					
COPPER	0.4	15.7	0.05	0.5	276
DIBENZO(A,H)ANTHRACENE	12	5	19	14	19
DIBUTYL PHTHALATE	4.7	6	1	5	7.5
DIETHYLHEXYL PHTHALATE					
DIOCTYL PHTHALATE					143
ETHYLBENZENE	4039	7493	1307	4224	5558
ETHYLENE GLYCOL	108				85
ETHYLENE OXIDE	400	496	159	434	683
FLUORANTHENE	74	36.03	115	85	116.43
FLUORENE	86	38	134	100	136.64
FORMALDEHYDE	128	21878.3	34	185	694
GLYCOL ETHERS (MISC.)	2787	3076	449	1355	85209
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	25	11	38	28	39.13
LEAD	8.2	508.4	0.33	1.3	824
MANGANESE	136.29	263.91	8.52	263.25	1594.21
MERCURY	1.5	0.69	0.15	2.81	173.91
METHYLENE CHLORIDE	9067	22177	2944	5132	11007
METHYLENE(B)4-PHENYLISOCYANATE					
M-XYLENE	419	386	110	202	365.2
NAPHTHALENE	2999.3	2931.5	2387.03	3441.4	5078.16
NICKEL	87.01	9.93	5.72	156.12	1720.33
O-XYLENE	2711	2465	2014	2756	3201.08
PHENANTHRENE	3005.01	1312.01	4675	3479.01	4711.21
PHENOL					30.8
PHOSGENE					
PCBS					
PCDD					0.00063
PCDF					0.00105
P-XYLENE	380	337	105	164	329.08
PYRENE	61	27	96	71	96.68
STYRENE	60	233	40	67	96
TETRACHLOROETHYLENE	15220	17960	3507.4	4060	16769
TOLUENE	63520	61750	21589.3	48628	172783
TOLUENE-2,4-DIISOCYANATE					
TRICHLOROETHYLENE	30457	28366	9151	8938	41421
TRIFLURALIN					
VINYL CHLORIDE		131		88	45
XYLENES (MIXED ISOMERS)	68028	53821	7668.1	30887	70946.4

Table B-1: Indiana Emissions by County in pounds/year

	Decatur	Dekalb	Delaware	Dubois	Elkhart
1,1,1-TRICHLOROETHANE	52486	74842	189638	96980	566129.7
1,2-DIBROMOETHANE					
1,2-DICHLOROETHANE	0.1	0.2	0.6	0.2	53.8
1,3-BUTADIENE			28.01		0.03
TCDD,2378				0.00000108	0.00000021
TCDF,2378					
ACENAPHTHENE	46.01	36	45.01	55.1	79.12
ACENAPHTHYLENE	516	407	505.01	627.21	901.25
ACETALDEHYDE			0.2	117.5	17.53
ACROLEIN			0.03	29.11	0.09
ACRYLONITRILE				28	437
ANTHRACENE	61	48	59.01	75.1	106.24
ANTIMONY		30	265.17		75
ARSENIC	0.28	7.72	256.73	68.17	107.19
ATRAZINE	2752	36488	20850	29399	22643
BENZ(A)ANTHRACENE	182.01	144	178.01	221.06	318.07
BENZENE	16597	15736.6	33986.09	21511	91484.4
BENZO(A)PYRENE	30	24	30	37.91	53.01
BENZO(B)FLUORANTHENE	30	24	30.01	37	53.02
BENZO(G,H,I)PERYLENE	15	12	15	18.04	26.02
BENZO(K)FLUORANTHENE	15	12	15.01	18	26.01
BERYLLIUM	0.81	3.32	2.48	13.31	120.46
CADMIUM	1.9	193.25	19.27	13.38	95.32
CARBON TETRACHLORIDE	2	2	3	2	5.2
CHLOROFORM	25	38	118	39	171
CHROMIUM	96.85	276.21	51.88	413.88	5631.72
CHROMIUM (VI)	0.04	6		0.52	1.1
CHRYSENE	76	60	74.01	94.19	132.25
COBALT	0.03	0.94	0.8	189.62	2107.13
COKE OVEN EMISSIONS					
COPPER	6.5	1915.7	753.04	12.25	347.72
DIBENZO(A,H)ANTHRACENE	15	12	15	18	26.01
DIBUTYL PHTHALATE	5	10	84	146	10507.22
DIETHYLHEXYL PHTHALATE				4224.8	9436
DIOCTYL PHTHALATE					1740
ETHYLBENZENE	6461	53484.01	25249	100023	69819.55
ETHYLENE GLYCOL		6023	730	181	8207.8
ETHYLENE OXIDE	379	578	1791	590	2552
FLUORANTHENE	91.03	72.01	89.01	113.85	160.34
FLUORENE	106	84	104.02	129.29	185.11
FORMALDEHYDE	529	156.2	646.84	6894.55	3840.04
GLYCOL ETHERS (MISC.)	1852	203391	17121	30476	89659.2
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE		27			799
INDENO(1,2,3-C,D)PYRENE	30	24	30.01	37.01	53.02
LEAD	11.8	5795.44	13671.16	83.69	1693.96
MANGANESE	60.2	8299.97	112.32	881.21	1711.7
MERCURY	0.41	71.11	65.32	35.85	74.24
METHYLENE CHLORIDE	10642	204216	41041	47297	2721067.1
METHYLENE(B)4-PHENYLISOCYANATE			1600	1558	10012.6
M-XYLENE	878	974	2473	1315	6326.2
NAPHTHALENE	3298.5	4443.54	12560.92	5765.91	54495.67
NICKEL	60.92	74.86	218.17	488.41	1072.32
O-XYLENE	7639	6895	16417	8211	30282.48
PHENANTHRENE	3710.09	2925.01	3633.07	4500.8	6477.86
PHENOL		6525		572.09	5962.11
PHOSGENE					
PCBS					
PCDD			0.01	0.000357	0.01
PCDF			0.04	0.00155	0.04
P-XYLENE	710	821	2076	1150	5631.08
PYRENE	76	60	74.02	92.5	132.17
STYRENE	55	35859	25660	62	1722508.85
TETRACHLOROETHYLENE	18231	21373	74669	35529.2	245797
TOLUENE	103087	295556.1	345540.4	629924	1535590.52
TOLUENE-2,4-DIISOCYANATE		840		28	682
TRICHLOROETHYLENE	206479	56818	136060	77520	799643
TRIFLURALIN					
VINYL CHLORIDE					597
XYLENES (MIXED ISOMERS)	76178	165531.02	233876.28	644254	1522132.65

Table B-1: Indiana Emissions by County in pounds/year

	Fayette	Floyd	Fountain	Franklin	Fulton
1,1,1-TRICHLOROETHANE	37622	71333	24015	10773	38655
1,2-DIBROMOETHANE		1.4			
1,2-DICHLOROETHANE	0.1	48.3	0.09	0.1	26.09
1,3-BUTADIENE					
TCDD,2378		0.0000161			0.0000002
TCDF,2378		0.00006			0.000005
ACENAPHTHENE	28	67.71	25	56	19
ACENAPHTHYLENE	314	754.49	286	636	220
ACETALDEHYDE		671.7			
ACROLEIN		337.51	2		
ACRYLONITRILE					216
ANTHRACENE	37	89.35	34	75	26
ANTIMONY	0.16	21			
ARSENIC	0.64	475.81	0.53	0.63	0.32
ATRAZINE	14220	834	41992	15137	37655
BENZ(A)ANTHRACENE	111	266.11	101.08	225	78.01
BENZENE	10359.3	23832.3	8343.89	14797.4	7375.1
BENZO(A)PYRENE	18	44.04	17	37	13
BENZO(B)FLUORANTHENE	18	44	17	37	13
BENZO(G,H,I)PERYLENE	9	22.04	8	19	6
BENZO(K)FLUORANTHENE	9	22	8	19	6
BERYLLIUM	0.31	26.13	0.5	0.3	0.11
CADMIUM	2.13	63.53	6.2	1.5	1.9
CARBON TETRACHLORIDE	1	1	2	2	2.4
CHLOROFORM	26	138	18	21	22
CHROMIUM	7.29	321.26	511.63	6.26	4.42
CHROMIUM (VI)		92			
CHRYSENE	46	111.32	42.03	94	32
COBALT	0.14	116.1		0.03	0.01
COKE OVEN EMISSIONS					
COPPER	16	10.62	3.9	0.3	0.5
DIBENZO(A,H)ANTHRACENE	9	22	8	19	6
DIBUTYL PHTHALATE	6.4	55	2	2	3.8
DIETHYLHEXYL PHTHALATE					
DIOCTYL PHTHALATE		85			
ETHYLBENZENE	5211	11458	3575	2513	3465
ETHYLENE GLYCOL	85	752.6			125
ETHYLENE OXIDE	396	1068	275	325	305
FLUORANTHENE	55	134.11	51.2	112	39.03
FLUORENE	65	156.13	59	131	45
FORMALDEHYDE	138.8	3233.6	80	94	85
GLYCOL ETHERS (MISC.)	108921	11100	1131	935	9638
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	18	44.08	17	37	13
LEAD	4.7	502.85	812.2	1.07	841.7
MANGANESE	7.4	594.64	2334.3	4.2	520.55
MERCURY	6.42	118.52	3.69	0.5	0.77
METHYLENE CHLORIDE	9943	59122	5134	2828	9103
METHYLENE(B)4-PHENYLISOCYANATE					
M-XYLENE	548	793	389	60	355
NAPHTHALENE	2968.4	8201.6	1966.2	3104.08	2118.3
NICKEL	22.01	340.09	512.01	2.82	1.31
O-XYLENE	4880	7415	3690	2217	2294
PHENANTHRENE	2258.01	5425.43	2059.01	4576	1585.01
PHENOL		20	112.01		0.001
PHOSGENE					
PCBS					
PCDD	0.0009	0.00444			
PCDF	0.003	0.01			
P-XYLENE	439	651	290	47	313
PYRENE	46	111.45	42	94	32
STYRENE	53	24817	60	52	34665
TETRACHLOROETHYLENE	15094	20628	10059	1417	13545
TOLUENE	99745	255682	49908	27435.5	50600
TOLUENE-2,4-DIISOCYANATE					
TRICHLOROETHYLENE	612972	41600	16064	2319	29379
TRIFLURALIN					
VINYL CHLORIDE					295
XYLENES (MIXED ISOMERS)	53754	103364	30723	14717	27510.2

Table B-1: Indiana Emissions by County in pounds/year

	Gibson	Grant	Greene	Hamilton	Hancock
1,1,1-TRICHLOROETHANE	47230	136506	29809	143441.01	60523.01
1,2-DIBROMOETHANE	10			0.0009	0.0009
1,2-DICHLOROETHANE	306.1	0.3	0.2	0.73	2.33
1,3-BUTADIENE					0.09
TCDD,2378	0.00011			0.0000009	
TCDF,2378	0.00039			0.000003	
ACENAPHTHENE	26.9	39	67	29.01	19.01
ACENAPHTHYLENE	264.9	439	758	334.01	216.01
ACETALDEHYDE	4366			0.3	2.2
ACROLEIN	2221			0.19	0.22
ACRYLONITRILE					13
ANTHRACENE	32.7	52	89	39.01	25.01
ANTIMONY	139	0.03		0.01	
ARSENIC	3144.11	26.15	0.6	1.78	0.72
ATRAZINE	46621	26188	21684	25103	26563
BENZ(A)ANTHRACENE	93.51	155	267	118.01	83.01
BENZENE	28311.2	24380.32	20513.2	24000.6	10884.4
BENZO(A)PYRENE	15.29	26	45	20	14.2
BENZO(B)FLUORANTHENE	15	26	45	20	13
BENZO(G,H,I)PERYLENE	8.21	13	22	10	6
BENZO(K)FLUORANTHENE	8	13	22	10.01	6
BERYLLIUM	167.22	1.13	6.21	0.95	0.92
CADMIUM	395.28	264.03	2.3	12.23	4.84
CARBON TETRACHLORIDE	3	3	3	3	2.03
CHLOROFORM	484	73	33	146.03	52.11
CHROMIUM	2023.19	10.78	31.07	307.32	95.58
CHROMIUM (VI)	605			0.06	0.02
CHRYSENE	39.8	65	111	49.01	42
COBALT	766.04	0.15	0.2	0.11	0.2
COKE OVEN EMISSIONS					
COPPER	250.42	32.71	2	11.5	12
DIBENZO(A,H)ANTHRACENE	8	13	22	10	6
DIBUTYL PHTHALATE	6	29	5	44	8.6
DIETHYLHEXYL PHTHALATE					
DIOCTYL PHTHALATE	560			0.06	
ETHYLBENZENE	6387	11980	4799	17861.06	10680.36
ETHYLENE GLYCOL		163		710	2709
ETHYLENE OXIDE	484	1109	497	2231	785
FLUORANTHENE	52.61	78.01	134	59.01	74.03
FLUORENE	61	90.01	156	69.01	44.07
FORMALDEHYDE	2105	7604.78	156	497.19	210.26
GLYCOL ETHERS (MISC.)	1395	6178	1632	16619	106217
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	15.46	26	45	20	13
LEAD	3543.03	486.05	1.36	996.05	1.61
MANGANESE	3909.14	1216.58	167.8	4511.54	89.75
MERCURY	648.2	11.86	1.8	53.06	1.34
METHYLENE CHLORIDE	90140	34329	6777	33939.19	13409.12
METHYLENE(B)4-PHENYLISOCYANATE				31	
M-XYLENE	332	1479	325	1126	670.9
NAPHTHALENE	3270.09	8944.1	4290.4	14173.01	13655.32
NICKEL	2238.06	18.59	103.02	3383.24	124.14
O-XYLENE	5087	8326	4325	5649	4148.6
PHENANTHRENE	1915.01	3160.03	5450.01	2399.04	1554.09
PHENOL	122			11.02	
PHOSGENE					
PCBS					
PCDD	0.01	0.002		0.01	
PCDF	0.02	0.01		0.03	
P-XYLENE	313	1301	266	1007	578.07
PYRENE	41.5	65.01	111	49.01	32.02
STYRENE	277	38712	78	42240.03	60
TETRACHLOROETHYLENE	41806	50596	9694	238388.03	24902.01
TOLUENE	69060	250721.14	61528	230344.15	108366.92
TOLUENE-2,4-DIISOCYANATE					
TRICHLOROETHYLENE	44820	102291	16158	81701	38262.01
TRIFLURALIN					
VINYL CHLORIDE					17
XYLENES (MIXED ISOMERS)	37097	141625.14	36178	177427.03	87444.06

Table B-1: Indiana Emissions by County in pounds/year

	Harrison	Hendricks	Henry	Howard	Huntington
1,1,1-TRICHLOROETHANE	38139	87678	66368	168507	145882
1,2-DIBROMOETHANE					
1,2-DICHLOROETHANE	0.2	107.4	12.2	0.4	0.2
1,3-BUTADIENE				146	
TCDD,2378	0.0000004				
TCDF,2378					
ACENAPHTHENE	126.03	39	33	15	16
ACENAPHTHYLENE	1430.4	445	374	166	185
ACETALDEHYDE	31			127	
ACROLEIN	0.04				
ACRYLONITRILE		888	101		
ANTHRACENE	168.4	52	44	20.01	22
ANTIMONY					
ARSENIC	2.44	33.3	1.23	205.2	1.21
ATRAZINE	10091	27063	26980	30233	18557
BENZ(A)ANTHRACENE	505.03	157	132	59.02	65
BENZENE	33488.6	18358.4	18325.2	21399.4	11340.2
BENZO(A)PYRENE	84	26	22	10	11
BENZO(B)FLUORANTHENE	84	26	22	10.01	11
BENZO(G,H,I)PERYLENE	42.01	13	11	5	5
BENZO(K)FLUORANTHENE	42	13	11	5	5
BERYLLIUM	2.2	1	1.52	0.12	0.85
CADMIUM	4	118.5	49.35	5.1	4.14
CARBON TETRACHLORIDE	2	4	2.2	2	2
CHLOROFORM	33	97	49.9	83	37
CHROMIUM	16.41	16.84	412.03	286.91	52.43
CHROMIUM (VI)	0.06				
CHRYSENE	210.4	65	55	24	27
COBALT	0.1	0.01	19.1	11.1	0.3
COKE OVEN EMISSIONS					
COPPER	1.33	0.1	2	1224	1895
DIBENZO(A,H)ANTHRACENE	42	13	11	5	5
DIBUTYL PHTHALATE	4	15	9.07	170	10
DIETHYLHEXYL PHTHALATE					
DIOCTYL PHTHALATE					
ETHYLBENZENE	6319	11342	7728	23609	21971
ETHYLENE GLYCOL		181	12	804	227
ETHYLENE OXIDE	504	1349	742	1270	559
FLUORANTHENE	253.04	78	66	34.01	33
FLUORENE	294.1	92	77	34.01	38
FORMALDEHYDE	978	403	271	3579	171.2
GLYCOL ETHERS (MISC.)	1789	6395	2590	21420	16212
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	84	26	22	10.01	11
LEAD	2.34	25.7	986.78	139.1	501.44
MANGANESE	74.1	18.06	23404.5	693.8	312.65
MERCURY	1.18	4.07	73.24	10.6	1.31
METHYLENE CHLORIDE	9926	23192	14523	31173	29905
METHYLENE(B)4-PHENYLISOCYANATE					
M-XYLENE	495	642	718	2723	1316
NAPHTHALENE	6086.1	7538.8	4649.8	8442	3794.5
NICKEL	43.11	9.41	904.01	109.01	34.26
O-XYLENE	7215	3180	4484	20325	9241
PHENANTHRENE	10286.6	3198.02	2686.02	1192.05	1329.01
PHENOL	60				
PHOSGENE					
PCBS					
PCDD	0.00012		0.01	0.002	
PCDF	0.0006		0.05	0.01	
P-XYLENE	407	598	629	2188	1089
PYRENE	210.15	65.01	55.01	24.01	27
STYRENE	69	75	16574	67	26267
TETRACHLOROETHYLENE	10587	38689	19227	76280	65843
TOLUENE	95399.6	131409	108800	323461	352225
TOLUENE-2,4-DIISOCYANATE					
TRICHLOROETHYLENE	431890	51107	44921	163198	102977
TRIFLURALIN					
VINYL CHLORIDE		1213	137		
XYLENES (MIXED ISOMERS)	57896	99880	63960	245885	260016

Table B-1: Indiana Emissions by County in pounds/year

	Jackson	Jasper	Jay	Jefferson	Jennings
1,1,1-TRICHLOROETHANE	86275	48028	29841	42232	31738
1,2-DIBROMOETHANE		5			
1,2-DICHLOROETHANE	54.2	170.1	0.1	0.1	8.1
1,3-BUTADIENE	4				
TCDD,2378					
TCDF,2378					
ACENAPHTHENE	83	21.2	30	54	67
ACENAPHTHYLENE	944	219	335	616	760
ACETALDEHYDE	65	2523			
ACROLEIN	3	1235			
ACRYLONITRILE	447				67
ANTHRACENE	111	26.9	39	73	89
ANTIMONY		77			
ARSENIC	0.7	1816.3	0.3	2831.5	76.59
ATRAZINE	30983	65678	19682	6255	14887
BENZ(A)ANTHRACENE	333	77.31	118	218	268
BENZENE	32243.2	19363.1	10154.1	18205.1	20153.7
BENZO(A)PYRENE	56	13.16	20	988	45
BENZO(B)FLUORANTHENE	56	13	20	36	45
BENZO(G,H,I)PERYLENE	28	6.09	10	18	22
BENZO(K)FLUORANTHENE	28	6	10	18	22
BERYLLIUM	0.71	90.51	2.11	426.71	0.81
CADMIUM	2.5	225.1	1.3	1592.88	8.3
CARBON TETRACHLORIDE	2.8	3	2	2	2.1
CHLOROFORM	44	279	22	31	27.6
CHROMIUM	263.08	1112.92	24.73	7863	8.67
CHROMIUM (VI)		337			
CHRYSENE	139	32.47	49	1148	112
COBALT	0.07	425.06	0.04	0.04	0.04
COKE OVEN EMISSIONS					
COPPER	5.7	0.6	254.4	10.4	1024.4
DIBENZO(A,H)ANTHRACENE	28	6	10	18	22
DIBUTYL PHTHALATE	10.9	6	4	9	7
DIETHYLHEXYL PHTHALATE					
DIOCTYL PHTHALATE		311			
ETHYLBENZENE	9640	4809.05	4942	26650	4264
ETHYLENE GLYCOL	469	20			
ETHYLENE OXIDE	611	428	328	469	404
FLUORANTHENE	167.01	41.9	59	941	134
FLUORENE	194	48.4	69	127	157
FORMALDEHYDE	248	3034	104	127	152
GLYCOL ETHERS (MISC.)	18733	1294	15957	1789	1378
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	56	13.26	20	36	45
LEAD	15.3	1835.6	0.7	2120.08	60.09
MANGANESE	39.3	2100.5	70.9	9968.23	1152.2
MERCURY	0.66	367.49	9.71	2029.36	1.61
METHYLENE CHLORIDE	78137	11169	6343	8987	7130
METHYLENE(B)4-PHENYLISOCYANATE					
M-XYLENE	1002	443	271	604	369
NAPHTHALENE	6117.2	2863.5	2568.3	5250.36	4373.12
NICKEL	32.03	1201.81	42.91	5902.24	12.02
O-XYLENE	8602	1904	2034	5684	4338
PHENANTHRENE	6789.01	1582.01	2406.01	4475.01	5467.01
PHENOL		69		80	
PHOSGENE					
PCBS					
PCDD					
PCDF					
P-XYLENE	843	414	244	497	310
PYRENE	139	33.4	49	91	112
STYRENE	70	5207	3294	1366	52
TETRACHLOROETHYLENE	43062	15810	11410	13878	10824
TOLUENE	177092	103300.6	51093	129598	61919
TOLUENE-2,4-DIISOCYANATE					
TRICHLOROETHYLENE	50592	34989	36460	28608	20310
TRIFLURALIN					
VINYL CHLORIDE	610				92
XYLENES (MIXED ISOMERS)	118526	53663.1	34068	235512	48963

Table B-1: Indiana Emissions by County in pounds/year

	Johnson	Knox	Kosciusko	Lagrange	Lake
1,1,1-TRICHLOROETHANE	117679	56936.2	170961	52444	707361.24
1,2-DIBROMOETHANE		0.13			3.2
1,2-DICHLOROETHANE	0.5	11.2	10.3	14.1	151959
1,3-BUTADIENE	0.01			0.03	176.01
TCDD,2378	0.0000001	0.0000016			0.00001
TCDF,2378		0.000006			0.000129
ACENAPHTHENE	30.01	15.06	44	56.02	27.43
ACENAPHTHYLENE	345.11	175.03	503	635.01	294.62
ACETALDEHYDE	8.1	63		6.6	1597.6
ACROLEIN	0.02	32		0.08	760.01
ACRYLONITRILE		57	83	114	420
ANTHRACENE	41.11	21.03	59	75.01	525.59
ANTIMONY	5	2	2.4		599.17
ARSENIC	10.53	56.93	1.4	0.8	1420.9
ATRAZINE	23060	49456	38447	52542	23352
BENZ(A)ANTHRACENE	122.01	62.01	177	224	104.38
BENZENE	18693.6	10908.2	21771.38	23433.9	176902.79
BENZO(A)PYRENE	20	10.01	30	37	1625.42
BENZO(B)FLUORANTHENE	20	10	30	37	17.03
BENZO(G,H,I)PERYLENE	10.01	5	15	19	9.09
BENZO(K)FLUORANTHENE	10.01	5	15	19	9.03
BERYLLIUM	0.3	5.88	3.36	24.22	73.17
CADMIUM	12.4	13.4	3.3	3.7	531.95
CARBON TETRACHLORIDE	2	3.1	3.2	2.2	10.8
CHLOROFORM	103	45.5	69.7	33	644
CHROMIUM	1176.28	63.12	3099.86	108.06	7925.84
CHROMIUM (VI)		9			208.44
CHRYSENE	51.1	26.01	74.01	93	53.95
COBALT	330.06	12.2	160.1	174.2	685.2
COKE OVEN EMISSIONS					192888
COPPER	1079.18	11173.35	1911.09	2	5075.45
DIBENZO(A,H)ANTHRACENE	10	5	15	19	9.02
DIBUTYL PHTHALATE	26	14.5	1316	4	162
DIETHYLHEXYL PHTHALATE					
DIOCTYL PHTHALATE		9			253
ETHYLBENZENE	15694	7355	12550.6	8798.2	72390.88
ETHYLENE GLYCOL	18508	85	1186	19	1179
ETHYLENE OXIDE	1575	599	1056	485	7248
FLUORANTHENE	61.21	31.09	89.01	112.01	84.22
FLUORENE	71.04	36.1	104.01	131.03	62.51
FORMALDEHYDE	414.2	405	303	870	16203.6
GLYCOL ETHERS (MISC.)	51974	2926	22712	2247	66899
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	20.01	10.01	30	37	17.16
LEAD	518.2	70.5	2.2	5	16755.86
MANGANESE	768.07	410.5	706	731.9	125538.96
MERCURY	5.67	49.87	1.41	12.91	596.17
METHYLENE CHLORIDE	26213	12443	222273	93987	182056
METHYLENE(B)4-PHENYLISOCYANATE			1392	0.04	
M-XYLENE	1244	463	1320	909	8014
NAPHTHALENE	9660.01	4433.62	7777.7	3890.57	359005.94
NICKEL	557.61	100.11	3816.02	439.02	25580.06
O-XYLENE	7964	1638	7056	8678	18456.06
PHENANTHRENE	2483.2	1259.34	3616.02	4569.16	2117.62
PHENOL	10201	32132.8	4074		652448.02
PHOSGENE					
PCBS					
PCDD	0.00003	0.01		0.001	0.0001
PCDF	0.0001	0.02		0.004	0.0007
P-XYLENE	1059	441	1175	723	6115
PYRENE	51.04	26.04	74.01	93.01	43.95
STYRENE	65	84.8	254977	45065	5688.2
TETRACHLOROETHYLENE	55346	24667	60604	14331	365823.88
TOLUENE	1255556.66	74686	1737247.7	163135.9	1163567.26
TOLUENE-2,4-DIISOCYANATE			0.4		
TRICHLOROETHYLENE	73211	39417	118937	37803	503965
TRIFLURALIN					
VINYL CHLORIDE		78	113	156	574
XYLENES (MIXED ISOMERS)	146317.04	73820	235332.6	85999.6	675876.42

Table B-1: Indiana Emissions by County in pounds/year

	Laporte	Lawrence	Madison	Marion	Marshall
1,1,1-TRICHLOROETHANE	185165	67577	175257	1195475.5	82701
1,2-DIBROMOETHANE	2			1.75	
1,2-DICHLOROETHANE	58.5	0.2	19.6	420.08	0.2
1,3-BUTADIENE	2.3			2.35	
TCDD,2378	0.00002			3.32E-05	
TCDF,2378	0.00007			3.10E-05	
ACENAPHTHENE	44.89	115	44.01	40.02	45
ACENAPHTHYLENE	500.76	1299	494.01	446.24	514
ACETALDEHYDE	876	126.09		3296.89	360
ACROLEIN	428.8			501.59	
ACRYLONITRILE			153	3009	
ANTHRACENE	59.42	153	58.01	52.85	60
ANTIMONY	31	0.4		447.51	0.1
ARSENIC	711.56	10.09	177.9	807.52	92.31
ATRAZINE	27105	9091	37488	3962	38322
BENZ(A)ANTHRACENE	177.2	459.01	175.01	168.8	181
BENZENE	30585.5	34601.8	35990.63	178602	21122.2
BENZO(A)PYRENE	29.08	76	29	620.11	30
BENZO(B)FLUORANTHENE	29.01	76	29.01	26.07	30
BENZO(G,H,I)PERYLENE	15.07	38	15	13.12	15
BENZO(K)FLUORANTHENE	15.02	38	15.01	13.06	15
BERYLLIUM	32.94	1.15	1.21	44.25	2.5
CADMIUM	143.5	12.8	17.5	242.06	73.5
CARBON TETRACHLORIDE	4	2	3.3	10.01	3
CHLOROFORM	195	45	133	2411.01	45
CHROMIUM	2776.14	52.6	8489.04	6310.96	113.75
CHROMIUM (VI)	115	0.06	161	130.19	
CHRYSENE	74.23	191.01	73.01	77.13	76
COBALT	332	0.3	767.08	892.24	434.2
COKE OVEN EMISSIONS				64896	
COPPER	1168	162.3	1471.8	15495.57	37.6
DIBENZO(A,H)ANTHRACENE	15.04	38	15	13.07	15
DIBUTYL PHTHALATE	29	39.7	51	218.04	11
DIETHYLHEXYL PHTHALATE	515.4				
DIOCTYL PHTHALATE	107	69		179	40
ETHYLBENZENE	20967	7527	18960	115825.2	15737
ETHYLENE GLYCOL	349	108	5350	10328.8	158
ETHYLENE OXIDE	1655	685	2005	12345	682
FLUORANTHENE	89.47	229.03	87	138.02	91.08
FLUORENE	105.34	267.01	102	95.65	106.08
FORMALDEHYDE	5225	1086	1177.4	120008.14	5633.04
GLYCOL ETHERS (MISC.)	309476	3942	132184	203335	52091
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	29.14	76.01	29	26.13	30.05
LEAD	4237.38	844.2	415	17709.56	924.91
MANGANESE	19425.3	27995.6	6866.33	15081.11	7537.2
MERCURY	158.58	168.87	0.92	914.87	7.7
METHYLENE CHLORIDE	145976	14790	38481	401232.06	38731
METHYLENE(B)4-PHENYLISOCYANATE	5280			3576	1120
M-XYLENE	1851	795	1727	14624.87	2138
NAPHTHALENE	17503.8	7214	15083.6	75559.94	5428
NICKEL	4456.42	55.14	1565.02	2771.29	198.1
O-XYLENE	14058	8010	7675	44012.53	8048
PHENANTHRENE	3603.59	9342.07	3556.02	3209.79	3696.5
PHENOL	33129	80		5784.49	1200
PHOSGENE					
PCBS					
PCDD	0.004	0.0015		0.08	0.002
PCDF	0.01	0.01		0.21	0.01
P-XYLENE	1620	679	1576	10480.27	877
PYRENE	74.84	191.02	73	66.05	76.1
STYRENE	729	64.2	107	16304.9	761123
TETRACHLOROETHYLENE	95292	34578	189789	1085788.01	36158
TOLUENE	265396	116135	366836	1638658.94	376341
TOLUENE-2,4-DIISOCYANATE	46				
TRICHLOROETHYLENE	118088	47351	121809	956181	79230
TRIFLURALIN					
VINYL CHLORIDE			221	1153.2	
XYLENES (MIXED ISOMERS)	236295.9	83449	322293	1086927.01	200297

Table B-1: Indiana Emissions by County in pounds/year

	Martin	Miami	Monroe	Montgomery	Morgan
1,1,1-TRICHLOROETHANE	14665	43970.02	150447	59861	76653
1,2-DIBROMOETHANE		0.0012			0.44
1,2-DICHLOROETHANE	0.05	0.25	23.5	0.2	14.3
1,3-BUTADIENE	20				
TCDD,2378		0.000000042			
TCDF,2378		0.00000007			
ACENAPHTHENE	36	27	92	33	91.16
ACENAPHTHYLENE	411	306.02	1039	372	1035.09
ACETALDEHYDE	300	2.69	243	0.02	199
ACROLEIN	40	0.35		0.02	101
ACRYLONITRILE			192		
ANTHRACENE	48	36.02	122.01	44	122.07
ANTIMONY		0.02			10.99
ARSENIC	13.3	1.04	35.8	7.22	173.4
ATRAZINE	7089	30399	2502	50040	20183
BENZ(A)ANTHRACENE	145	108.01	788	131	365.03
BENZENE	10620.35	12997.41	40192.5	14910.3	28720.4
BENZO(A)PYRENE	24	18	61	22	66.02
BENZO(B)FLUORANTHENE	24	18	61	22	61
BENZO(G,H,I)PERYLENE	12	9	31	11	30.01
BENZO(K)FLUORANTHENE	12	9	31	11	30
BERYLLIUM	0.8	0.63	11.31	0.94	13.12
CADMIUM	2.7	1.98	12.9	6.64	25.26
CARBON TETRACHLORIDE	1	2	2.4	2	2.02
CHLOROFORM	10	32.08	117	36	84.02
CHROMIUM	9.04	795.88	254.19	320.23	130.71
CHROMIUM (VI)		0.16	0.01		27
CHRYSENE	60	45.03	223	55	158.03
COBALT	0.13	0.2	0.09	0.2	35.5
COKE OVEN EMISSIONS					
COPPER	1	0.4	207.5	882	10.89
DIBENZO(A,H)ANTHRACENE	12	9	31	11	30
DIBUTYL PHTHALATE	1	5.4	35	27	8.4
DIETHYLHEXYL PHTHALATE					
DIOCTYL PHTHALATE		0.09			28
ETHYLBENZENE	1410	6169.22	34386	9009	7725
ETHYLENE GLYCOL		1769	417	18171	68
ETHYLENE OXIDE	160	494	1754	549	955
FLUORANTHENE	73	54.08	183	66.01	188.28
FLUORENE	85	63.01	214	77.01	213.3
FORMALDEHYDE	582	628.44	1815	457.03	335.5
GLYCOL ETHERS (MISC.)	455	12430	57213	102705	3819
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	24	18	61	22	61.02
LEAD	27872.38	2.28	137.2	291.41	185.98
MANGANESE	31	18.65	375.4	7039.95	302.82
MERCURY	0.6	0.54	17.53	18.11	61.42
METHYLENE CHLORIDE	3116	9511.35	33781	18145	16824.2
METHYLENE(B)4-PHENYLISOCYANATE					
M-XYLENE	120	595	1144	734	622
NAPHTHALENE	1836.8	3187.11	13242.6	6054.02	7099.1
NICKEL	17.61	1809.97	196.03	58.07	162.8
O-XYLENE	1367	5234	5449	5065	5289
PHENANTHRENE	2956.02	2202.04	7473.02	2672.05	7442.91
PHENOL		0.22		1496	12.8
PHOSGENE					
PCBS					
PCDD		0.0000068	0.0016	0.003	
PCDF		0.0000312	0.005	0.01	
P-XYLENE	115	477	1091	631	563
PYRENE	60.01	45.01	153	55.01	152.12
STYRENE	6032	67.03	66	86	398.02
TETRACHLOROETHYLENE	3812	20856.06	99067	38270	28385.02
TOLUENE	20884	267893.84	217377.1	176898.04	111544
TOLUENE-2,4-DIISOCYANATE			40		
TRICHLOROETHYLENE	10006	29645	100040	279667	49391
TRIFLURALIN					
VINYL CHLORIDE			262		
XYLENES (MIXED ISOMERS)	9518	93040.05	269909	89397.03	56642

Table B-1: Indiana Emissions by County in pounds/year

	Newton	Noble	Ohio	Orange	Owen
1,1,1-TRICHLOROETHANE	15039	85527	2125	23424	13449
1,2-DIBROMOETHANE					
1,2-DICHLOROETHANE	0.77	0.2	0.03	0.09	0.09
1,3-BUTADIENE		0.2			
TCDD,2378				0.00000011	
TCDF,2378					
ACENAPHTHENE	17	52.01	9	74.01	72
ACENAPHTHYLENE	188	594.02	105	838.14	821
ACETALDEHYDE		3		9.6	
ACROLEIN		0.4		0.01	
ACRYLONITRILE	5				
ANTHRACENE	22	70.01	12	99.13	97
ANTIMONY	2	5			
ARSENIC	0.3	0.36	0.3	0.53	0.36
ATRAZINE	52125	19391	1710	7256	7089
BENZ(A)ANTHRACENE	66	210.01	37	296.01	290
BENZENE	5607.67	19427.2	2855.13	21295.39	19271.4
BENZO(A)PYRENE	11	35	6	49	48
BENZO(B)FLUORANTHENE	11	35	6	49	48
BENZO(G,H,I)PERYLENE	6	17	3	25	24
BENZO(K)FLUORANTHENE	6	17	3	25	24
BERYLLIUM	0.1	3.2	0.41	0.15	1.2
CADMIUM	1.5	8.9	1.37	1.31	1.8
CARBON TETRACHLORIDE	2.01	2	0.4	2	2
CHLOROFORM	14.05	41	5	19	20
CHROMIUM	13.02	23.53	4.01	3.78	9.47
CHROMIUM (VI)		0.01		0.14	
CHRYSENE	28	87	15	123.14	121
COBALT	2.07	1.02	0.06	0.44	0.02
COKE OVEN EMISSIONS					
COPPER	0.8	44.28	0.6	255.69	0.2
DIBENZO(A,H)ANTHRACENE	6	17	3	25	24
DIBUTYL PHTHALATE	1	11.6	1	27	1
DIETHYLHEXYL PHTHALATE					
DIOCTYL PHTHALATE					
ETHYLBENZENE	12931	17579	666.4	20659	2365
ETHYLENE GLYCOL		203		2580	
ETHYLENE OXIDE	221	626	83	290	304
FLUORANTHENE	33	105.04	19	148.3	145
FLUORENE	39	122.1	22	172.03	169
FORMALDEHYDE	312	117	78	12362	82
GLYCOL ETHERS (MISC.)	19323	20407	233	1128	858
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	11	35	6	49	48
LEAD	0.4	4073.08	0.43	1.99	0.76
MANGANESE	1.4	4846.6	11.2	32.82	42.1
MERCURY	0.3	42.98	0.37	4.04	0.58
METHYLENE CHLORIDE	3340.01	17554	607	5074	3266
METHYLENE(B)4-PHENYLISOCYANATE					
M-XYLENE	126	937	8	226	68
NAPHTHALENE	3240.5	5219.6	645.4	3877.53	3393.2
NICKEL	2.91	308.62	7.8	3.53	24.63
O-XYLENE	1466	6965	372	3507	2593
PHENANTHRENE	1350.02	4271.11	754.01	6025.16	5906
PHENOL		19034		155.28	
PHOSGENE					
PCBS					
PCDD		0.0008		0.000032	
PCDF		0.003		0.00016	
P-XYLENE	102	796	5	196	58
PYRENE	28	87.02	15	123.05	121
STYRENE	57	135528	12	52	50
TETRACHLOROETHYLENE	7322	26584	155.9	5857	3519
TOLUENE	27171	175736	7373.3	100779.2	28631.7
TOLUENE-2,4-DIISOCYANATE					
TRICHLOROETHYLENE	8892	65765	3	15133	5354
TRIFLURALIN					
VINYL CHLORIDE	7				
XYLENES (MIXED ISOMERS)	112164	206357	3862.3	109257	11899.7

Table B-1: Indiana Emissions by County in pounds/year

	Parke	Perry	Pike	Porter	Posey
1,1,1-TRICHLOROETHANE	15256	24064	5045	202064.19	24246
1,2-DIBROMOETHANE			6.4	1.51	1.49
1,2-DICHLOROETHANE	0.08	0.09	267.06	51.2	52.1
1,3-BUTADIENE				250.01	7.5
TCDD,2378		0.000000048	0.000007	0.00001715	0.000016
TCDF,2378			0.00003	0.0000705	0.000068
ACENAPHTHENE	31	51	23.9	22.72	15.72
ACENAPHTHYLENE	350	580.04	238.43	245.31	169.44
ACETALDEHYDE		3	3199	716.11	6754.05
ACROLEIN		0.004	1626	679.01	374.32
ACRYLONITRILE		0.2	362	298	
ANTHRACENE	41	68.04	29.2	279.31	20.27
ANTIMONY		0.03	101.3	22.88	100.7
ARSENIC	0.13	0.34	2299.78	549.34	534.4
ATRAZINE	26646	4295	14303	25020	32276
BENZ(A)ANTHRACENE	123	205	84.19	87.13	60.22
BENZENE	9076.68	14765.99	13804.46	43934.77	24855.4
BENZO(A)PYRENE	21	34	14.23	1355.05	1054.06
BENZO(B)FLUORANTHENE	21	34	14	14	10.01
BENZO(G,H,I)PERYLENE	10	17	7.15	7.03	5.05
BENZO(K)FLUORANTHENE	10	17	7	7	5.01
BERYLLIUM	1.08	1.06	123.33	27.48	29.37
CADMIUM	0.7	1.04	290.27	92.31	76.7
CARBON TETRACHLORIDE	2	2	1.7	3	2
CHLOROFORM	16	19	346	215.71	103
CHROMIUM	6.23	6.67	1489.94	2975.34	615.01
CHROMIUM (VI)		0.05	442	98.91	102
CHRYSENE	51	85.04	35.62	36.13	25.15
COBALT	0.01	0.17	560.14	303.08	134.7
COKE OVEN EMISSIONS				174324	
COPPER	0.1	0.5	37.96	3224.02	45.4
DIBENZO(A,H)ANTHRACENE	10	17	7	7	5.01
DIBUTYL PHTHALATE	2	2.07	2	43	4
DIETHYLHEXYL PHTHALATE				451	
DIOCTYL PHTHALATE		0.3	409	91.8	95
ETHYLBENZENE	2193	2491.09	2555	20749	43630
ETHYLENE GLYCOL		255		368	2
ETHYLENE OXIDE	247	290	190	2150	400
FLUORANTHENE	62	102.1	46	44.29	58.06
FLUORENE	72	119.01	54.1	52.22	36.68
FORMALDEHYDE	44465	578.2	1539	2677.32	1546.2
GLYCOL ETHERS (MISC.)	763	5759	536	157631	3079
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	21	34	14.34	14.08	10.09
LEAD	0.5	1.04	2356.28	8398.44	562.4
MANGANESE	32.55	61.21	2922.01	35384.38	929.3
MERCURY	16.33	0.54	471.89	107.87	110.67
METHYLENE CHLORIDE	3448	5181.08	4325	44316	1244869
METHYLENE(B)4-PHENYLISOCYANATE					
M-XYLENE	137	224	17	1854	180
NAPHTHALENE	1984.08	2866.6	1566.57	19952.89	2320.9
NICKEL	18.91	22.73	1706.62	4378.22	757.81
O-XYLENE	1747	2440.04	843	6767	984
PHENANTHRENE	2514	4170.06	1716.31	1767.05	1220.96
PHENOL		1.2	93	85.17	88021
PHOSGENE					1
PCBS					
PCDD		0.00001	0.0004	0.000307	0.0007
PCDF		0.00005	0.0012	0.000204	0.00147
P-XYLENE	116	205	11	1714	166
PYRENE	51	85.02	36.87	36.41	25.56
STYRENE	60	47	187	8998.4	91
TETRACHLOROETHYLENE	3431	7338	1266	78931.52	8610
TOLUENE	27581.4	34656.05	22031	264988.84	367011.6
TOLUENE-2,4-DIISOCYANATE					
TRICHLOROETHYLENE	8460	15744	228	140768.01	13224
TRIFLURALIN					
VINYL CHLORIDE			495	1.2	
XYLENES (MIXED ISOMERS)	14776	69294.3	10897	218642.5	29032.4

Table B-1: Indiana Emissions by County in pounds/year

	Pulaski	Putnam	Randolph	Ripley	Rush
1,1,1-TRICHLOROETHANE	26844	31890	37852	31329	17669
1,2-DIBROMOETHANE					
1,2-DICHLOROETHANE	0.06	0.2	34.1	9.1	0.09
1,3-BUTADIENE					
TCDD,2378			0.00000001		
TCDF,2378					
ACENAPHTHENE	21	57	41	64	22
ACENAPHTHYLENE	243	647	460.01	723	245
ACETALDEHYDE			0.6		
ACROLEIN			0.0008		10
ACRYLONITRILE		80	283	78	
ANTHRACENE	29	76	54.01	85	29
ANTIMONY					
ARSENIC	0.2	8.56	0.49	0.6	0.56
ATRAZINE	50749	30358	28106	19641	43577
BENZ(A)ANTHRACENE	86	228	162	255	86
BENZENE	7040.06	18313.4	13704.7	19001.1	9922.69
BENZO(A)PYRENE	14	38	27	43	14
BENZO(B)FLUORANTHENE	14	38	27	43	14
BENZO(G,H,I)PERYLENE	7	19	14	21	7
BENZO(K)FLUORANTHENE	7	19	14	21	7
BERYLLIUM	0.18	71.3	0.9	0.61	1.3
CADMIUM	1.2	6.9	1.8	2.1	1.5
CARBON TETRACHLORIDE	2	2	2.5	2.1	2
CHLOROFORM	13	33	29	27.7	18
CHROMIUM	17.22	40.46	7.64	1006.86	18.42
CHROMIUM (VI)			0.0009		
CHRYSENE	36	95	68.01	106	36
COBALT	0.05	0.02	0.04	1000.05	0.02
COKE OVEN EMISSIONS					
COPPER	0.5	0.2	0.4	2000.5	6.2
DIBENZO(A,H)ANTHRACENE	7	19	14	21	7
DIBUTYL PHTHALATE	2	36	4	6.9	3
DIETHYLHEXYL PHTHALATE			120		
DIOCTYL PHTHALATE		62			
ETHYLBENZENE	12024	4274	5074	20736	2913
ETHYLENE GLYCOL	180	628		154	
ETHYLENE OXIDE	198	505	416	407	276
FLUORANTHENE	43	114	81.02	128	43
FLUORENE	50	133	95	149	50
FORMALDEHYDE	74	117	106	868	105
GLYCOL ETHERS (MISC.)	1513	23614	75946	95815	1461
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	14	38	27	43	14
LEAD	15.3	610.2	1.11	1.1	3051.1
MANGANESE	4.4	604.1	27.4	1012.2	70.9
MERCURY	0.3	147.77	0.54	0.47	0.67
METHYLENE CHLORIDE	5453	7499	9057	7418	3969
METHYLENE(B)4-PHENYLISOCYANATE					
M-XYLENE	225	220	428	359	368
NAPHTHALENE	1687.4	4820.2	3086.8	4182.3	2112.2
NICKEL	3.51	173.62	19.92	1008.02	31.61
O-XYLENE	1532	2615	3442	3845	2406
PHENANTHRENE	1746.01	4650	3307.02	5201.01	1760
PHENOL		72	0.08	126	1000
PHOSGENE					
PCBS					
PCDD		0.0008	0.000002		
PCDF		0.003	0.00001		
P-XYLENE	205	201	372	312	194
PYRENE	36	95	68	106	36
STYRENE	149	947	74	64	61
TETRACHLOROETHYLENE	12130	18612	18947	12950	4041
TOLUENE	41742.5	101075.9	566712	114172	38971
TOLUENE-2,4-DIISOCYANATE					
TRICHLOROETHYLENE	20607	17940	26008	19865	10032
TRIFLURALIN					
VINYL CHLORIDE			387	107	
XYLENES (MIXED ISOMERS)	63966.5	45627	449053	160531	23774

Table B-1: Indiana Emissions by County in pounds/year

	Scott	Shelby	Spencer	St. Joseph	Starke
1,1,1-TRICHLOROETHANE	24046	52457	20069	354481.91	22980
1,2-DIBROMOETHANE			13	0.06	
1,2-DICHLOROETHANE	0.1	60.2	430.1	95	0.1
1,3-BUTADIENE				1	
TCDD,2378			0.00016	0.0000007	
TCDF,2378			0.0008	0.00000704	
ACENAPHTHENE	56	27	48	39.1	28
ACENAPHTHYLENE	634.02	310	473	437.17	323
ACETALDEHYDE			6132	24383	
ACROLEIN			3120	44	
ACRYLONITRILE		373		726	
ANTHRACENE	75.02	36	57	51.09	38
ANTIMONY			194	167.8	
ARSENIC	2.3	0.96	4411.45	118.26	0.17
ATRAZINE	6297	39240	24603	32192	27939
BENZ(A)ANTHRACENE	224.02	109	166.8	453.07	114
BENZENE	17115.1	22405.8	26364.1	53521.78	9489.9
BENZO(A)PYRENE	37.01	18	28.4	26.02	19
BENZO(B)FLUORANTHENE	37.02	18	28	26.01	19
BENZO(G,H,I)PERYLENE	19.01	9	14.3	13.02	9
BENZO(K)FLUORANTHENE	19.02	9	14	13	9
BERYLLIUM	0.9	1.1	230.16	5.74	0.08
CADMIUM	12.2	2.5	549.91	24	0.9
CARBON TETRACHLORIDE	21	2.3	2	5	2
CHLOROFORM	22	62	654	270	23
CHROMIUM	19.06	52.43	2822.98	715.47	2.53
CHROMIUM (VI)			850	12.02	
CHRYSENE	93.02	46	70.1	114.03	47
COBALT	0.8	0.02	1076.07	24.62	0.03
COKE OVEN EMISSIONS					
COPPER	8	0.2	0.91	500.52	0.3
DIBENZO(A,H)ANTHRACENE	19.01	9	14	13.02	9
DIBUTYL PHTHALATE	23.4	9	1297	102.02	3
DIETHYLHEXYL PHTHALATE				1816	
DIOCTYL PHTHALATE			785	4030	
ETHYLBENZENE	4080	13945	3755	40042	3764
ETHYLENE GLYCOL	66	222	277	1140	
ETHYLENE OXIDE	342	649	310	3892	353
FLUORANTHENE	112.03	55	91.01	77.33	57
FLUORENE	131.03	64	107	90.93	66
FORMALDEHYDE	786	36252	2791	2401.4	21231
GLYCOL ETHERS (MISC.)	2226	8645	42402	31052.1	1418
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	37.02	18	28.6	26.02	19
LEAD	0.8	252.4	4519.51	4833.4	0.5
MANGANESE	24	21.1	5438.11	1815.51	1.5
MERCURY	3.3	18.91	895.18	41.82	3.89
METHYLENE CHLORIDE	5449	12905	8571	131578.01	5147
METHYLENE(B)4-PHENYLISOCYANATE			10	10387	
M-XYLENE	363	670	163	3983	300
NAPHTHALENE	3314	4259.2	2893.19	28093	2397.2
NICKEL	31.02	14.61	3112.13	715.42	0.61
O-XYLENE	4341	5482	1859	22150	3053
PHENANTHRENE	4559.2	2230	3413.01	3147.46	2322.01
PHENOL		76289	172	3020.82	
PHOSGENE					
PCBS				0.03	
PCDD			0.0014	0.005	
PCDF			0.01	0.02	
P-XYLENE	292	546	151	3441	243
PYRENE	93.05	46	73	64.2	47
STYRENE	31	5970	333	151027	58
TETRACHLOROETHYLENE	29633	23543	4999	177753	5290
TOLUENE	87401	194669	76776	883933.4	49012
TOLUENE-2,4-DIISOCYANATE				18	
TRICHLOROETHYLENE	14468	42946	11274	275539	13186
TRIFLURALIN					
VINYL CHLORIDE		461		992	
XYLENES (MIXED ISOMERS)	33468	154466	17187	549562.2	34379

Table B-1: Indiana Emissions by County in pounds/year

	Steuben	Sullivan	Switzerland	Tippecanoe	Tipton
1,1,1-TRICHLOROETHANE	111630	16470	4559	200432	10594
1,2-DIBROMOETHANE		4			
1,2-DICHLOROETHANE	0.1	134.09	0.04	1000.6	0.08
1,3-BUTADIENE				4.31	
TCDD,2378		0.00004			
TCDF,2378		0.0002			
ACENAPHTHENE	33	29.7	33	36.15	7.01
ACENAPHTHYLENE	369	319.8	376	402.56	77.01
ACETALDEHYDE		1817.2		60555.2	
ACROLEIN		924		10.33	
ACRYLONITRILE		52			
ANTHRACENE	43	38.7	44	47.25	9.01
ANTIMONY	2900	57		0.6	
ARSENIC	0.5	1307.6	0.29	173.43	0.9
ATRAZINE	13136	27272	1710	48956	32609
BENZ(A)ANTHRACENE	130	113.23	133	841.22	27.01
BENZENE	17193.1	13680.1	8761.94	34340.22	3157.08
BENZO(A)PYRENE	22	19.13	22	24.03	5
BENZO(B)FLUORANTHENE	22	19	22	24.01	5.01
BENZO(G,H,I)PERYLENE	11	9.09	11	12.06	2
BENZO(K)FLUORANTHENE	11	9	11	12.02	2.01
BERYLLIUM	1.21	71.3	0.11	12.29	0.24
CADMIUM	2	165.47	1.4	21.83	4.65
CARBON TETRACHLORIDE	2	2.1	1	3	1
CHLOROFORM	31	209.4	8	637	16
CHROMIUM	5341.93	854.93	3.63	678.95	10.61
CHROMIUM (VI)		252		0.05	
CHRYSENE	54	47.4	55	176.09	11.01
COBALT	0.05	319.05	0.04	1.3	0.3
COKE OVEN EMISSIONS					
COPPER	0.6	1.7	0.4	255.48	5
DIBENZO(A,H)ANTHRACENE	11	9	11	12.07	2
DIBUTYL PHTHALATE	10	3	1	40	2
DIETHYLHEXYL PHTHALATE				1.6	
DIOCTYL PHTHALATE		233		480	
ETHYLBENZENE	8361	2971	1021	62511	1997
ETHYLENE GLYCOL	261			49818	
ETHYLENE OXIDE	466	304	127	2089	248
FLUORANTHENE	65	58.01	66	87.85	14.01
FLUORENE	76	69	78	85.91	16.01
FORMALDEHYDE	130	3367	67	9203.1	305
GLYCOL ETHERS (MISC.)	31108	888	367	86064	723
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	22	19.19	22	24.04	5.01
LEAD	1.2	1340.5	0.7	327.27	2.5
MANGANESE	10085.2	1692	2	7393	6
MERCURY	0.8	266.67	0.3	81.61	1.13
METHYLENE CHLORIDE	14107	4918	1168	370292	2596
METHYLENE(B)4-PHENYLISOCYANATE				0.09	
M-XYLENE	830	128	26	2021	70
NAPHTHALENE	3850.4	2272.64	1525.3	24084.25	1342
NICKEL	5770.81	971.51	2.01	523.02	11
O-XYLENE	6003	1464	1232	9379	647
PHENANTHRENE	2651.01	2302.01	2707.01	3419.91	554.06
PHENOL		2532.1	56	69335	
PHOSGENE					
PCBS					
PCDD		0.002		0.01	
PCDF		0.004		0.04	
P-XYLENE	699	112	22	1817	57
PYRENE	54	48.1	55	59.55	11.02
STYRENE	30312	154	24032	2650	9946
TETRACHLOROETHYLENE	19227	6557	674	81366	4146
TOLUENE	121112	34374	20666.3	452453.4	20921
TOLUENE-2,4-DIISOCYANATE				20	
TRICHLOROETHYLENE	52304	13796	1249	218511	12708
TRIFLURALIN				5550	
VINYL CHLORIDE		71			
XYLENES (MIXED ISOMERS)	93958	17821	5529.3	837013.08	13369

Table B-1: Indiana Emissions by County in pounds/year

	Union	Vanderburgh	Vermillion	Vigo	Wabash
1,1,1-TRICHLOROETHANE	2843	240557.06	16596.06	132774.3	56567
1,2-DIBROMOETHANE		0.01	3.08	1.42	
1,2-DICHLOROETHANE	0.03	2.04	98.48	94.21	51.2
1,3-BUTADIENE		26		0.04	
TCDD,2378		0.0000004	0.0000009	0.000008201	
TCDF,2378			0.000003	0.000031903	
ACENAPHTHENE	10	21.06	17.34	53.63	27
ACENAPHTHYLENE	110	241.51	182.63	596.36	309
ACETALDEHYDE		32	1390	26685.63	
ACROLEIN		0.04	708	349.48	13
ACRYLONITRILE				376	423
ANTHRACENE	13	28.41	21.52	570.24	36.01
ANTIMONY		2	44.02	22.8	9.68
ARSENIC	0.57	105.14	1001.11	728.78	735.15
ATRAZINE	15846	16138	16847	20225	26271
BENZ(A)ANTHRACENE	39	179.32	124.21	211.37	109
BENZENE	2783.84	45059.04	8858.11	34852.4	13898.44
BENZO(A)PYRENE	6	22.65	21.1	35.09	18
BENZO(B)FLUORANTHENE	6	14	11.01	35	18
BENZO(G,H,I)PERYLENE	3	7.01	5.08	18.04	9
BENZO(K)FLUORANTHENE	3	7	5.01	18	9.01
BERYLLIUM	0.4	1.39	53.15	31.81	73.26
CADMIUM	1.47	22.06	138.52	106.12	111.43
CARBON TETRACHLORIDE	0.7	2.07	1.08	3.7	2.8
CHLOROFORM	7	1362.07	161.08	179	38
CHROMIUM	7.11	254.94	658.14	639.84	1339.55
CHROMIUM (VI)		0.21	193.2	95.51	0.003
CHRYSENE	16	112.9	107.22	88.44	45
COBALT	0.03	2.04	244.51	120.44	0.26
COKE OVEN EMISSIONS					
COPPER	0.3	13558.12	1152	296.21	2151.5
DIBENZO(A,H)ANTHRACENE	3	7	5.01	18	9
DIBUTYL PHTHALATE	1	457.01	2	42	10
DIETHYLHEXYL PHTHALATE		250			
DIOCTYL PHTHALATE			177	88	
ETHYLBENZENE	843.7	33464.45	2809.25	19212.11	18095
ETHYLENE GLYCOL		5636	798	535	524
ETHYLENE OXIDE	111	2533	254	1606	523
FLUORANTHENE	19	302.61	327.77	107.01	55.01
FLUORENE	23	50.1	40.08	124.15	64.01
FORMALDEHYDE	87	2210.58	2701.84	1561.37	69441.6
GLYCOL ETHERS (MISC.)	313	72994	860	27489	27769
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	6	14	11.16	35.08	18
LEAD	1.2	935.75	1903.37	6903.28	1727.94
MANGANESE	6.5	44.84	2134.41	1628.98	1482.04
MERCURY	0.33	9.94	203.95	131.02	24.97
METHYLENE CHLORIDE	811	96551.86	502394	31215.02	12132
METHYLENE(B)4-PHENYLISOCYANATE		850			1381.3
M-XYLENE	11	2770.03	211	1731.03	804
NAPHTHALENE	746.2	20840.23	1655.14	51954.72	4381.5
NICKEL	12	574.05	727.24	758.16	1033.81
O-XYLENE	416	29061.92	1876	12640.02	5280
PHENANTHRENE	793.01	1736.84	1319.3	4292.75	2223.05
PHENOL		24.01	39	43.31	2091
PHOSGENE			160		
PCBS					
PCDD		0.0011		0.01	
PCDF		0.01	0.00007	0.02	
P-XYLENE	6	2454.6	169.6	1435	503
PYRENE	16	36.22	27.85	88.41	45.01
STYRENE	22	3206	101	121.4	1647
TETRACHLOROETHYLENE	207.6	162745.05	3918.06	71009.7	19260
TOLUENE	8180.2	799938.59	33858.9	287619.4	98953
TOLUENE-2,4-DIISOCYANATE					
TRICHLOROETHYLENE	4	188823.05	9516.06	143571	32329
TRIFLURALIN					
VINYL CHLORIDE				513	578
XYLENES (MIXED ISOMERS)	4411.2	863570.73	19865.37	220116.77	96449

Table B-1: Indiana Emissions by County in pounds/year

	Warren	Warrick	Washington	Wayne	Wells
1,1,1-TRICHLOROETHANE	3519	56105.3	38114	107191	31786
1,2-DIBROMOETHANE		4.21		0.3	
1,2-DICHLOROETHANE	0.04	141.8	12.1	12.3	0.1
1,3-BUTADIENE		1.91			
TCDD,2378		0.0000452	0.00000019	0.00000409	
TCDF,2378		0.0001747	0.0000001	0.000015	
ACENAPHTHENE	16	22.85	96.02	46.16	18
ACENAPHTHYLENE	180	241.91	1090.22	518.18	207
ACETALDEHYDE		2040.2	13.5	168	
ACROLEIN		1039.02	0.12	82.01	
ACRYLONITRILE		16	96		
ANTHRACENE	21	28.77	128.2	61.15	24
ANTIMONY		88.3		5	
ARSENIC	0.3	1481.25	2.52	150.1	0.7
ATRAZINE	41116	16972	15846	23144	22226
BENZ(A)ANTHRACENE	64.03	10794.3	385.01	183.03	73
BENZENE	4514.04	19045.44	26083.1	23925	7975.1
BENZO(A)PYRENE	11	4912.14	64	30.01	12
BENZO(B)FLUORANTHENE	11	14	64	30	12
BENZO(G,H,I)PERYLENE	5	7.1	32.01	15.01	6
BENZO(K)FLUORANTHENE	5	7	32	15	6
BERYLLIUM	0.09	81.86	1.21	8	1.22
CADMIUM	148.5	194.46	7.67	25.51	3.3
CARBON TETRACHLORIDE	2	2	2.2	2	2
CHLOROFORM	8	262.8	26.8	88	26
CHROMIUM	3.02	1138.54	15.3	469.19	10.02
CHROMIUM (VI)		282	0.06	22.04	
CHRYSENE	27	15188.36	160.17	76.14	30
COBALT	0.08	358.01	0.26	28.05	
COKE OVEN EMISSIONS					
COPPER	0.8	371.12	256.13	193.05	0.2
DIBENZO(A,H)ANTHRACENE	5	7	32	15	6
DIBUTYL PHTHALATE	1	7	2	1029	6
DIETHYLHEXYL PHTHALATE		30			
DIOCTYL PHTHALATE		262		21	
ETHYLBENZENE	1037	7282.92	23904	29378	18142
ETHYLENE GLYCOL				4042	
ETHYLENE OXIDE	124	756	403	1087	402
FLUORANTHENE	44	42200.56	192.54	91.37	37.01
FLUORENE	37	53.19	224.05	107.31	43
FORMALDEHYDE	1466	7533.04	185	7029.9	2047
GLYCOL ETHERS (MISC.)	367	176445	12668	61751	4822
HEXACHLORO-1,3-BUTADIENE					
HEXACHLOROETHANE					
INDENO(1,2,3-C,D)PYRENE	11	14.21	64	30.02	12
LEAD	186.8	2483.4	9.08	5250.88	4.6
MANGANESE	1.6	2430.42	49.4	8999.4	36.79
MERCURY	6.35	297.96	0.94	41.67	4.56
METHYLENE CHLORIDE	969	13314	8405	23838	6894
METHYLENE(B)4-PHENYLISOCYANATE					
M-XYLENE	21	547	546	1214	353
NAPHTHALENE	981.6	6880.36	4623.71	15572.11	2704
NICKEL	6.61	1265.82	275.96	174.86	20.51
O-XYLENE	743	3208	6646	7768	2587
PHENANTHRENE	1298.02	1742.05	7838.27	3724.95	1490.03
PHENOL		2319.2	2.1	172.6	348
PHOSGENE					
PCBS		2			
PCDD		0.002459	0.00013	0.00019	0.0008
PCDF		0.0043	0.00045	0.00073	0.003
P-XYLENE	15	483	448	1049	301
PYRENE	27	36.28	160.1	76.13	30.01
STYRENE	47	751.4	65	83	61
TETRACHLOROETHYLENE	349	17288.6	12779	33868	41150
TOLUENE	272840.5	106431.98	141140.08	418507.8	72741
TOLUENE-2,4-DIISOCYANATE					4
TRICHLOROETHYLENE	335	34706	26391	197079	20329
TRIFLURALIN					
VINYL CHLORIDE			132		
XYLENES (MIXED ISOMERS)	5734.5	52362.8	143948.1	363030	92433

Table B-1: Indiana Emissions by County in pounds/year

	White	Whitley	State Total
1,1,1-TRICHLOROETHANE	36655.2	53226	8854436.8
1,2-DIBROMOETHANE			61.363
1,2-DICHLOROETHANE	0.1	0.1	156209.71
1,3-BUTADIENE			749.7
TCDD,2378			0.000546895
TCDF,2378	0.00003		0.002217123
ACENAPHTHENE	22	26	3771.11
ACENAPHTHYLENE	254	294	42465.95
ACETALDEHYDE			152494.38
ACROLEIN			15339.5248
ACRYLONITRILE			11493.2
ANTHRACENE	30	35	6244.99
ANTIMONY		2213	7703.98
ARSENIC	0.3	0.5	27165.05
ATRAZINE	61633	13469	2335208
BENZ(A)ANTHRACENE	90	104	27283.44
BENZENE	11249.2	14657.1	2180157.33
BENZO(A)PYRENE	15	17	12964.35
BENZO(B)FLUORANTHENE	15	17	2497.45
BENZO(G,H,I)PERYLENE	7	9	1251.78
BENZO(K)FLUORANTHENE	7	9	1242.32
BERYLLIUM	0.7	0.81	2351.5
CADMIUM	1.2	1.8	6508.82
CARBON TETRACHLORIDE	3.01	2	245.12
CHLOROFORM	25.04	30	12113.52
CHROMIUM	5.02	6.83	86809.68
CHROMIUM (VI)			4197.1039
CHRYSENE	37	43	22890.73
COBALT	0.1	0.05	11882.629
COKE OVEN EMISSIONS			432108
COPPER	501	20941.5	112263.33
DIBENZO(A,H)ANTHRACENE	7	9	1242.48
DIBUTYL PHTHALATE	4	6	16597.23
DIETHYLHEXYL PHTHALATE			17154.8
DIOCTYL PHTHALATE			10344.25
ETHYLBENZENE	5206	5086	1712135.05
ETHYLENE GLYCOL			153990.2
ETHYLENE OXIDE	379	451	88194
FLUORANTHENE	45.01	52	51428.9
FLUORENE	52	61	8799.62
FORMALDEHYDE	91	135	518310.12
GLYCOL ETHERS (MISC.)	1153	9324	3400253.3
HEXACHLORO-1,3-BUTADIENE			8
HEXACHLOROETHANE			826
INDENO(1,2,3-C,D)PYRENE	15	17	2507.43
LEAD	0.6	1570.2	166527.15
MANGANESE	19.9	94.1	389893.62
MERCURY	0.6	0.4	9412.12
METHYLENE CHLORIDE	7731	10963	8090151.1
METHYLENE(B)4-PHENYLISOCYANATE			37228.03
M-XYLENE	1129	876	101341.23
NAPHTHALENE	2459.6	3121.5	1093128.48
NICKEL	15.71	65.01	98354.12
O-XYLENE	1864.2	4121	593698.43
PHENANTHRENE	1827.01	2115.01	305896.18
PHENOL		2256	1290635.051
PHOSGENE			161
PCBS	0.001		2.131
PCDD			0.2742158
PCDF			0.8588952
P-XYLENE	301	536	81344.7
PYRENE	37	43	6279.33
STYRENE	78	56	4233695.39
TETRACHLOROETHYLENE	19124.06	16454	4799776.1
TOLUENE	47564	130167	23240596.51
TOLUENE-2,4-DIISOCYANATE			1942.4
TRICHLOROETHYLENE	25568.02	39441	8546417.67
TRIFLURALIN			5550
VINYL CHLORIDE	0.07		12028.53
XYLENES (MIXED ISOMERS)	26190.4	47746	17003946.38

Appendix C: Michigan Toxic Emissions Inventory

BACKGROUND

The State of Michigan conducted its portion of the Great Lakes Region air toxic emissions inventory over all of its eighty-three counties for the calendar year 1996. With a 1990 population of 9,295,297, Michigan represents approximately 10.7 percent of the total population of the Great Lakes Region. The table below provides a brief demographic overview of the Michigan portion of the regional inventory.

Demographic Characteristics for the Michigan Area of the Great Lakes Region Air Toxics Emissions Inventory

	Michigan
Total Population, 1996	9,295,297
Urban Population, 1996	6,554,846
Rural Population, 1996	2,740,451

Source: U.S. Bureau of the Census

All point sources from the Michigan 1996 criteria pollutant Emission Inventory System (EIS) and ten additional categories of area sources are included in the inventory. Area sources for residential wood burning, architectural surface coating, dry cleaning, consumer and commercial solvent use, solvent cleaning/cleanup, graphic arts, industrial surface coating, pesticides-agricultural and nonagricultural, gasoline marketing (stage I and II), and auto body refinishing are included. Landfills were included in the point source inventory. The area source categories of traffic markings, petroleum vessel loading/unloading and asphalt paving were not included in the inventory. Michigan followed the *Air Toxic Emissions Inventory Protocol for the Great Lakes Commission* in developing its contribution to the regional inventory. The Factor Information Retrieval System (FIRE) and the Reference Tables in the Regional Air Pollutant Inventory Development System (RAPIDS) were used as a source of emission factors and constants. The RAPIDS software was used to estimate emissions. An evaluation of the protocol document and an assessment of the emission estimation techniques used in the project are provided below.

DATA SOURCES

The data for the point source emissions in the Michigan inventory were collected by the Michigan Department of Environmental Quality (DEQ), Air Quality Division (AQD) as part of its annual air emissions inventory process. The emission inventory report is required by the administrative rules of the Michigan Department of Environmental Quality under authority of Act 348, P.A. 1965 and by Section 182 (a) (3) (B) of the Clean Air Act. Data was collected from 2102 facilities under these reporting requirements. This data is deemed to be of high confidence as it was quality assured and used for criteria pollutant fee billings. A shortcoming is that it contains very little reported toxic emission information.

The Michigan EIS database was used to calculate toxic emissions for the processes within each facility. When using this technique one of the first problems encountered relates to volatile organic compounds. Specifically, there are few SCC codes with toxic pollutant emission factors and therefore the toxic components for the majority of criteria pollutant VOC's must be estimated as area source emissions. Factors from the EPA's speciate tables are acceptable for area and mobile source emission calculations but they are suspect when applied to individual process information and should be used only when no other acceptable measurement is available. Another concern is the lack of control efficiency information relating to the toxic emissions. There is a potential to end up with uncontrolled particulate toxic emissions larger than the total particulate material emitted from a process with emissions control equipment.

The EIS data include a process description, SIC codes to identify industry type, SCC codes to identify process type, fuel and material throughputs for each process within a facility. SCC codes from all sources were matched against available emission factors from FIRE Version 6.0. Source specific emission factors were used preferentially when available. Sources with no FIRE or source specific emission factors were assumed to be included in the area source emission calculations.

CALCULATION METHODS

Point Source Emissions

As a first step to estimating toxic emissions from the Michigan EIS, a data transfer program was developed by Radian® Corporation which converted the EIS tables into a format that could be imported into the RAPIDS software. After quality checks were applied to the import files the data was loaded into RAPIDS. RAPIDS then made an emissions estimate for the 82 toxic pollutants of interest for every SCC code which had a source specific or generic toxic emission factor and a proper corresponding throughput material and amount. The calculated results were then exported to spreadsheets for analysis. It was found that toxic pollutant control factors had not been applied uniformly by the RAPIDS software. These control factor corrections were applied in the spreadsheets for point source emissions of 10,000 pounds per year or greater of toxic particulate matter and VOC and for lead emissions of 1000 pounds per year or greater. Toxic point emissions less than the above *thresholds* may be in error to the high side and therefore over-reported. Mercury emissions are reported uncontrolled.

Area Source Emissions

Residential Wood Burning

Michigan followed the methodology in the Regional Protocol using state energy data reports. However, to convert wood use from cords to tons, Michigan used the method proposed in the EIIP guidance. (The conversion factor in the Regional Protocol was calculated from an earlier state energy data report.)

Emission factors were obtained from the EIIP guidance. This is consistent with the protocol.

Architectural Surface Coating

This category was estimated consistent with the Regional Protocol. Protocol provided speciation profiles were applied to an estimated VOC to estimate emissions.

Dry Cleaning

The Regional Protocol recommended either the EIIP guidance or AP-42 methodology to estimate emissions for dry cleaning. Michigan followed the EIIP guidance, alternative method two, utilizing per employee emission factors for SIC 7215 and 7216.

As employment data for dry cleaning was only available for 13 counties, an average per capita emission factor was developed by calculating and averaging the per capita emissions from those 13 counties. This Michigan specific per capita emission factor was then applied to the remaining 70 counties.

Consumer and Commercial Solvent Use

This category was estimated consistent with the Regional Protocol. Michigan used the preferred method from the EIIP guidance.

Solvent Cleaning/Cleanup

This category was estimated consistent with the Regional Protocol. Michigan selected the EIIP Alternative Method and developed the *Recommended Method for Solvent Cleaning Equipment* detailed in the protocol document.

Graphic Arts

The Regional Protocol recommending the use of the EIIP guidance was followed. Alternative method two, the per capita emission factor, was the method selected.

Industrial Surface Coating

These emissions were estimated in accordance with the Regional Protocol. The state that prepared this protocol recommended the use of a 1991 EPA procedural document. Michigan used alternative method one of the EIIP guidance, the method recommended by the 1991 EPA document.

Pesticides – Agricultural and Non-agricultural

The Regional Protocol was followed. Michigan's Department of Agriculture was contacted, they referred staff to contacts at Michigan State University. State specific emission factors for ATRAZINE and TRIFLURALIN were obtained from MSU.

Gasoline Marketing (Stage I and II)

The Regional Protocol recommendation to utilize the EIIP guidance was followed. An exception is that Michigan has not estimated emissions from vehicle refueling in the current report. Refueling emissions will be added to the inventory when available.

Auto Body Refinishing

The Regional Protocol recommendation to use the EIIP methodology was followed. Alternate method one, the apportionment of national data, was the specific method utilized.

Landfills

This area source category was covered as point source emissions in Michigan's inventory.

Traffic Markings

Michigan has elected to use the method recommended in the Regional Protocol. This utilizes the EIIP recommendations. Michigan will use alternate method one. Michigan is waiting for MSDS data from the supplier of traffic paint. If the MSDS data is unavailable the NPCA emission factors provided in the EIIP document will be considered as an alternative. Traffic marking emissions will be added to the inventory when available.

RESULTS

The toxic emissions for Michigan are listed in the tables following R*eferences.* The values are expressed in total pounds per year of pollutant by county. As indicated in the text, point source emissions were calculated at the source level, but, have been aggregated to and are only reported at the county level. Point source emissions at the site level have not been certified by the sources. For additional information, contact the Michigan Department of Environmental Quality, Air Quality Division, Emissions Reporting and Assessment Unit, Hollister Building, Fourth Floor, P.O. Box 30260, Lansing, Michigan, 48909, (517)-373-7023.

Michigan was only able to estimate emissions for 66 of the 82 toxic air pollutants of concern. This was due to lack of emission factors, throughput data, production or handling data, related processes or products no longer produced, products no longer used, or a lack of resources. For example Michigan was not able to produce area source emissions for *Traffic Markings* as we are still trying to obtain MSDS data from the paint supplier. *References* and toxic emissions tables follow.

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Table C-1: Michigan Emissions by County in pounds/year

	Alcona	Alger	Allegan	Alpena	Antrim
ACENAPHTHEN	64.2573993	59.4326407	132.5837948	93.1834443	85.3668765
ACENAPHTHYL	729.4300433	673.7894582	1502.6286902	1056.2592386	967.4912667
ACETALDEHYDE	647.2966919	120.4740620	6.7770000	146.6909952	
ACROLEIN	0.8630623	0.1606321	0.0090360	0.1955880	
ACRYLONITRIL					
ANTHRACENE	92.8974861	80.5874760	176.8539943	125.8731120	113.8225020
ANTIMONY			1.0283878		
ARSENIC	0.1898737	19.8950205	48.7732275	75.9114420	0.0008372
ATRAZINE	995.7784000	0.0000000	71531.5174000	3066.5840000	1276.5948000
BENZ(A)ANTHR	254.4835634	237.2566981	530.3085523	372.1250648	341.4675059
BENZ(GHI)PE	21.1771880	19.7725962	44.1924447	31.0118829	28.4556255
BENZENE	16962.5592143	16715.6450410	56828.2826206	33427.0331472	25529.9369808
BENZO(A)PYRE	42.3901930	39.5383656	88.3845053	62.0154939	56.9112510
BENZO(B)FLUO	42.3491976	39.5307356	88.3840761	62.0076630	56.9112510
BENZO(K)FLUORA NTHENE	21.1745988	19.7653678	44.1920381	31.0030815	28.4556255
BERYLLIUM		0.0705331	0.1708559	0.0013037	0.0012056
BUTADIENE,13	0.0000000	2830.7890543	14666.4773801	16091.3717791	34100.2144101
CADMIUM	0.5236959	2.3956052	8.2601417	20.5234988	0.6553166
CARBON TETRA	0.0000044	0.0000041	0.0000406	0.0000126	0.0000084
CHLOROFORM	10.7503680	9.8168460	98.1327840	30.4118080	20.4205460
CHROMIUM	0.2910825	62.5901940	149.3869218	252.7216010	0.0142278
CHROMIUM VI	0.0992522	0.2770903	0.0155871	0.3374165	0.0000268
CHRYSENE	115.1509129	100.5536339	221.0805798	157.1180534	142.2781275
COBALT	0.2804952	0.7830814	2.9529189	0.9534915	
COKE OVEN GS					
COPPER	0.4099546	1.1445036	0.3072769	1.3945141	0.0023441
DIBENZAHAN	21.1745988	19.7653678	44.1920381	31.0030815	28.4556255
DIBENZOFURAN	0.0875434	0.0799414	0.7991237	0.2476522	0.1662904
DIBROMOET,12	0.0000000	0.4030567	4.0950913	2.2911401	1.8573035
DIBUTYL PHTH	343.1432475	313.3459633	2443.8148832	970.7208683	651.8076842
DICHLORETH12	0.0504996	4.1852665	42.4915037	23.6715054	19.1643998
DIEYLHEX PHT					
DIOCTYL PHTH					
ETHYLBENZENE	1074.6894451	952.5679369	13662.5890286	3385.9755815	2268.9905560
ETHYLENE OXI	163.8048000	149.5806000	1495.2624000	463.3888000	311.1506000
FLUORANTHENE	146.4664967	122.2064287	265.3893059	190.4220899	170.7359855
FLUORENE	150.2935408	138.7430916	309.3659529	217.4914616	199.1893784
FORMALDEHYDE	1437.8075887	538.5402487	2115.4660096	31928.0615557	26.1251110
GLYCOL ETHERS	439.1834496	401.0463912	4009.0064448	1242.4098176	834.2380312
INDN(123CDPY	42.4225579	39.5443893	88.3848442	62.0227880	56.9112510
LEAD	0.0000000	28.2585840	64.0942547	906.5292190	
MANGANESE	21.5323404	56.1801320	9.5676572	592.9726337	11.5020289
MERCURY	1.4024762	0.3456668	12.4258093	14.4931700	0.3829084
METHYLENE CL	3119.8066944	2848.8942768	38950.5894272	8825.6478464	5926.1372368
NAPHTHALENE	3149.1212194	2734.1030612	12234.5273353	5949.1351008	4744.5726805
NICKEL	1.2315792	3.9028538	47.0043671	122.5708550	0.0359895
PCBS					
PCDD	0.0025892	0.0004819	0.0000271	0.0005965	
PCDF	0.0114356	0.0021284	0.0001197	0.0025915	
PERC	3758.0509440	3431.7157680	111929.5998720	34687.5056640	23291.5387680
PHENANTHRENE	5189.4880388	4834.9214348	10805.0820701	7583.1140529	6957.4004328
PHENOL	84.1485672	15.6616277	11.3530101	19.0698303	
PYRENE	109.4762787	99.4974780	220.9979156	155.8324673	142.2781275
STYRENE					
TCDD,2378	0.0000078	0.0000014	0.0000001	0.0000018	
TCDF,2378				2.6697761	
TCE,111	14599.7916480	13332.0000060	133271.5494240	41308.5275982	27739.8613613
TOLUENE	22548.1503460	18757.8687542	401170.9518879	80972.4753724	45626.2620904
TOLUENE DIISOCYANATE	4.2307200	3.8633400	30.1017600	11.9683200	8.0363400
TRICHLORETHY	9843.0000576	8988.2705172	97842.6404465	27844.9470656	18696.9818572
TRIFLURALIN	117.8650000	21.3950000	537.9575000	817.5950000	41.3600000
VINYL CHLOR					
XYLENE,M	107.2867200	97.9703400	979.3473600	303.5043200	203.7933400
XYLENE,O	2688.7299664	1910.5920656	34346.6317801	5812.9492584	3781.3864308
XYLENE,P	107.2867200	97.9703400	979.3473600	303.5043200	203.7933400
XYLENES ISO	7304.9632403	6388.3886194	90107.5788582	22557.5935241	14681.7882289

Table C-1: Michigan Emissions by County in pounds/year

	Arenac	Baraga	Barry	Bay	Benzie
ACENAPHTHEN	52.1957473	39.4042662	123.8896724	81.7035277	56.4776415
ACENAPHTHYL	591.5518031	446.5816831	1404.1471870	917.7432895	640.0799365
ACETALDEHYDE			35.2500000		
ACROLEIN			0.0470000		
ACRYLONITRIL				76.3199997	
ANTHRACENE	69.5943298	52.5390215	165.5794632	108.0108053	75.3035219
ANTIMONY				180.8985254	
ARSENIC		0.0066080	1.0340000	61.2861304	
ATRAZINE	11494.5216000	0.0000000	27992.0544000	38079.0484000	486.6910000
BENZ(A)ANTHR	208.7829893	157.6170646	495.4200395	324.0472042	225.9105658
BENZ(GHI)PE	17.3985824	13.1347554	41.2973408	27.0700560	18.8258805
BENZENE	18643.8906326	11685.8877910	42562.1583335	47891.2884783	16576.0169991
BENZO(A)PYRE	34.7971649	26.2695108	82.5687141	53.9882560	37.6517610
BENZO(B)FLUO	34.7971649	26.2695108	82.5664816	53.9843866	37.6517610
BENZO(K)FLUORA NTHENE	17.3985824	13.1347554	41.2832408	26.9921933	18.8258805
BERYLLIUM		0.0039333		4.0514702	
BUTADIENE,13	9352.6210660	2944.9567920	5962.8466082	40193.8937072	8118.1885369
CADMIUM	0.4001674	0.3194060	1.1492645	76.4104598	0.4329953
CARBON TETRA	0.0000067	0.0000035	0.0000218	0.0305734	0.0000057
CHLOROFORM	16.1453720	8.3888150	52.7479570	109.7933020	13.8502160
CHROMIUM	0.0086993	0.0970340	1.5481417	125.6443872	0.0094129
CHROMIUM VI			0.5405000	8.5442200	
CHRYSENE	86.9929122	65.6737769	206.9214539	135.0470082	94.1294024
COBALT			1.5275000	212.8990927	
COKE OVEN GS					
COPPER			2.2325001	185.4540903	
DIBENZAHAN	17.3985824	13.1347554	41.2832408	27.0497290	18.8258805
DIBENZOFURAN	0.1314764	0.0683126	0.4295419	0.8933329	0.1127863
DIBROMOET,12	1.3316556	0.4193122	2.0925910	5.7229331	0.6783693
DIBUTYL PHTH	515.3475100	267.7643427	1163.2195858	3501.5921102	442.0879450
DICHLORETH12	13.7511537	4.3454933	21.7250518	59.2864401	7.0287965
DIEYLHEX PHT				2.9001601	
DIOCTYL PHTH				2.9001601	
ETHYLBENZENE	1636.0452065	869.5881022	5655.0374887	11201.6920842	1361.0981335
ETHYLENE OXI	246.0092000	127.8215000	803.7277000	1671.5398000	211.0376000
FLUORANTHENE	104.3914947	78.8085323	248.7569448	162.1282165	112.9552829
FLUORENE	121.7900771	91.9432877	289.0954856	189.0993559	131.7811634
FORMALDEHYDE	20.6556493	11.2698656	145.0333227	1434.1428346	17.7193318
GLYCOL ETHERS	659.5848784	342.7072180	2154.9057404	4481.6306696	565.8211552
INDN(123CDPY	34.7971649	26.2695108	82.5704766	54.0581150	37.6517610
LEAD		0.0140000	0.0000000	272.9394656	
MANGANESE	1.9138441	1.4668498	109.1161534	173.8339097	2.0708469
MERCURY		0.0047200	0.0763750	278.6660842	
METHYLENE CL	4685.4618976	2434.4730520	15307.7019656	31837.1688944	4019.3969728
NAPHTHALENE	3237.1539193	1941.5146356	8145.8027501	12099.5414036	2926.8588537
NICKEL	0.0191384	0.0427682	6.6254115	3053.9086612	0.0207085
PCBS				0.0732672	
PCDD			0.0001410	0.0025949	
PCDF			0.0064625	0.0030528	
PERC	18415.3037760	2932.5130200	60163.9684560	125126.2700640	15797.4641280
PHENANTHRENE	4253.9534075	3211.4476918	10094.4221239	6599.9530190	4602.9277784
PHENOL			4.5825000	67.1615982	
PYRENE	86.9929122	65.6737769	206.6124290	135.1073897	94.1294024
STYRENE					
TCDD,2378			0.0000004		
TCDF,2378				0.0018317	
TCE,111	21926.6044920	11392.6287150	71635.6111770	148991.3279559	18809.6135760
TOLUENE	31914.3629219	18965.2277105	123727.4137637	198401.6942924	23910.9158649
TOLUENE DIISOCYANATE	6.3538800	3.3013500	14.3199300	43.1722200	5.4506400
TRICHLORETHY	14782.6472104	7680.7702330	48295.8484574	100443.7377476	12681.2102512
TRIFLURALIN	1902.0650000	25.2700000	556.3575000	7084.3425000	7.9550000
VINYL CHLOR				19.8432007	
XYLENE,M	161.1278800	83.7188500	526.4150300	1094.8032200	138.2226400
XYLENE,O	1737.1626873	1679.2299009	8895.6471638	6847.7372816	1852.9714450
XYLENE,P	161.1278800	83.7188500	526.4150300	1094.8032200	138.2226400
XYLENES ISO	10841.3260443	5824.1893496	38142.3653799	74919.3529446	9064.6521050

Table C-1: Michigan Emissions by County in pounds/year

	Berrien	Branch	Calhoun	Cass	Charlevoix
ACENAPHTHEN	115.3427853	72.9020812	107.8061697	107.1635430	90.7886742
ACENAPHTHYL	1307.1892004	826.2073858	1221.8032568	1213.8410066	1027.7322633
ACETALDEHYDE	1.7892315				
ACROLEIN					
ACRYLONITRIL			181.1910019		
ANTHRACENE	153.7877471	97.2013055	143.7415596	142.8231251	120.9421770
ANTIMONY	0.0787500		4.0161634		
ARSENIC	4.6403422	0.0000561	8.7713347	0.0776585	202.3683857
ATRAZINE	34360.3846000	76270.0788000	65652.4624000	57219.3564000	1167.1970000
BENZ(A)ANTHR	461.7004445	291.6024232	431.2247189	428.4069262	362.7155354
BENZ(GHI)PE	38.4467118	24.3002008	35.9353899	35.7005181	30.2261977
BENZENE	82935.6136279	29765.5275064	97798.7493230	35023.5532553	30750.5809381
BENZO(A)PYRE	76.8935440	48.6004092	71.8708254	71.4013519	60.4531674
BENZO(B)FLUO	76.8939236	48.6006806	71.8707798	71.4127322	60.4731655
BENZO(K)FLUORANTHENE	38.4467118	24.3002008	35.9353899	35.7005181	30.2261977
BERYLLIUM	0.0374785	0.0000808	0.5123149	0.1118282	146.3427553
BUTADIENE,13	31747.0347119	10187.0205741	44456.7507583	7620.1515576	9455.9428685
CADMIUM	2.0454879	0.5589607	510.3269296	0.8987704	81.1258467
CARBON TETRA	0.0000661	0.0000176	0.0725339	0.0000205	0.0000096
CHLOROFORM	159.7244250	42.5466030	139.1080612	49.4518910	23.1299400
CHROMIUM	2.3376294	0.0121501	134.5106141	0.0178503	417.4040237
CHROMIUM VI		0.0000018		0.0024851	
CHRYSENE	192.2346116	121.5010175	179.6900364	178.5043192	151.1323369
COBALT	0.2227500		15.6995823		
COKE OVEN GS					
COPPER	297.3615564	0.0001570	297.9779957	0.2174438	817.3138324
DIBENZAHAN	38.4467118	24.3002008	35.9353899	35.7005181	30.2261977
DIBENZOFURAN	1.3006823	0.3464693	1.1310266	0.4027011	0.1883538
DIBROMOET,12	9.7000852	2.3038384	8.9264338	1.5201653	1.3463669
DIBUTYL PHTH	3735.3303706	1358.0539311	4433.2791689	1576.6172649	738.2893987
DICHLORETH12	100.3078172	23.8460289	92.2727380	15.8351820	13.9350397
DIEYLHEX PHT			6.8852580		
DIOCTYL PHTH			6.8852580		
ETHYLBENZENE	22973.2059815	6994.2834824	24395.6639392	5161.8586671	2417.2088444
ETHYLENE OXI	2433.7425000	648.2883000	2116.2952000	753.5051000	352.4340000
FLUORANTHENE	230.8236096	145.8022250	215.6307263	214.2272111	181.3682038
FLUORENE	269.1271424	170.1014950	251.5477293	249.9073693	211.5900306
FORMALDEHYDE	383.9465540	129.7621766	42261.2591913	3227.6360698	5645.7847941
GLYCOL ETHERS	6525.2021100	1738.1510916	5674.0817504	2020.2519652	944.9245680
INDN(123CDPY	76.8934236	48.6004016	71.8707798	71.4010362	60.4523955
LEAD	1620.0997561		5116.9839827		1923.0569506
MANGANESE	2698.2403722	3.2338283	2504.1074757	780.5120332	548.3075170
MERCURY	8.6478733	0.0003320	10.1834359	0.0022987	28.9626797
METHYLENE CL	46352.7695400	12347.2216824	108775.5035992	25429.9886253	6712.4159520
NAPHTHALENE	18020.6360091	5981.4377223	16211.7015901	6867.9240934	4884.5449820
NICKEL	16.8219844	0.0270443	204.8070222	0.4741582	355.0490049
PCBS			0.1739434		
PCDD			0.0061605		
PCDF			0.0072476		
PERC	182180.6154000	48528.3720240	158420.6289120	56404.4975280	35225.8555200
PHENANTHRENE	9400.2455292	5941.4127708	8786.2028323	8729.3497740	7391.3230786
PHENOL	1.4620154		99777.5357547		0.0672960
PYRENE	192.2337189	121.5010934	179.6769495	178.5063331	151.1376351
STYRENE					
TCDD,2378					
TCDF,2378			0.0043486		
TCE,111	216917.5349250	60596.8371755	188624.1442104	67179.5019601	31412.1623400
TOLUENE	734416.7562519	277486.3288196	334941.5730458	236941.6221183	52139.1522868
TOLUENE DIISOCYANATE	45.9970500	16.7438700	54.6592800	19.4613900	9.1026000
TRICHLORETHY	150057.7854373	38955.5237346	154272.8648859	45277.9817362	21177.6937080
TRIFLURALIN	699.5150000	990.6800000	820.2800000	761.4825000	45.1650000
VINYL CHLOR			47.1096592		
XYLENE,M	1594.0207500	424.6073700	1386.1032800	493.5208900	230.8326000
XYLENE,O	60570.1731008	25937.2867060	12444.3734814	7192.5781912	4071.1695903
XYLENE,P	1594.0207500	424.6073700	1386.1032800	493.5208900	230.8326000
XYLENES ISO	153255.8168555	48416.1221145	130413.3953164	31019.7134443	16152.3832318

Table C-1: Michigan Emissions by County in pounds/year

	Cheboygan	Chippewa	Clare	Clinton	Crawford
ACENAPHTHEN	99.6439086	109.0018289	89.5403682	66.2880571	49.2767385
ACENAPHTHYL	1128.4614711	1235.3186406	1014.7908398	751.2646471	560.2252742
ACETALDEHYDE					963.4229736
ACROLEIN					1.2845640
ACRYLONITRIL					
ANTHRACENE	132.7827048	145.3325592	119.3871576	88.3840761	76.4498366
ANTIMONY					
ARSENIC	0.0329787	211.4226041		0.1280750	28.2604073
ATRAZINE	394.5212000	60.2980000	3095.8716000	49331.5166000	0.0000000
BENZ(A)ANTHR	398.2710562	436.0067010	358.1614729	265.1522284	193.3174905
BENZ(GHI)PE	33.1891962	36.3328653	29.8467894	22.0960190	16.4469889
BENZENE	42339.0737988	41185.5234325	31568.6849435	27646.1594439	17806.1748045
BENZO(A)PYRE	66.3787902	72.6678975	59.6935788	44.1920381	32.1842562
BENZO(B)FLUO	66.3927924	72.6663406	59.6935788	44.1920381	32.1232394
BENZO(K)FLUORA NTHENE	33.1891962	36.3328653	29.8467894	22.0960190	16.0616197
BERYLLIUM	0.0441351	0.0122065		0.1844280	
BUTADIENE,13	16738.1320128	23437.4948564	14195.0456572	14379.4265535	7540.7790699
CADMIUM	0.8027590	17.6561087	0.6864762	0.6362834	5.8288154
CARBON TETRA	0.0000095	0.0000470	0.0000117	0.0000256	0.0000056
CHLOROFORM	22.8465140	37.0346784	28.2871040	61.8086700	13.4776000
CHROMIUM	0.0709554	0.0187431	0.0149234	0.0110480	41.7563728
CHROMIUM VI	0.0009283	0.0003141		0.0040984	14.7725007
CHRYSENE	165.9467145	181.6809958	149.2339470	110.4800952	94.1171621
COBALT					41.7483296
COKE OVEN GS					
COPPER	0.0875285	0.0237349		0.3586100	61.0169422
DIBENZAHAN	33.1891962	36.3328653	29.8467894	22.0960190	16.0616197
DIBENZOFURAN	0.1860458	0.3015840	0.2303501	0.5033259	0.1097520
DIBROMOET,12	2.3832279	3.3371058	2.0211353	2.0473880	1.0736799
DIBUTYL PHTH	729.2426648	1182.1171001	902.9019964	1972.8838815	430.1943368
DICHLORETH12	24.5816541	34.4443386	20.8887351	21.3158019	13.7893643
DIEYLHEX PHT					
DIOCTYL PHTH					
ETHYLBENZENE	2366.8602723	3815.1930919	3143.0062053	6367.0372582	1394.2751147
ETHYLENE OXI	348.1154000	564.3021000	431.0144000	941.7870000	205.3600000
FLUORANTHENE	199.1442114	218.0592584	179.0807364	132.5863602	125.2724079
FLUORENE	232.3289815	254.3302524	208.9275258	154.6721332	115.5142916
FORMALDEHYDE	3918.0319034	249.7374174	36.1892250	79.0751808	79244.5701615
GLYCOL ETHERS	933.3458008	1512.9724092	1155.6095488	2525.0619240	550.5987200
INDN(123CDPY	66.3783924	72.6657306	59.6935788	44.1920381	32.2324274
LEAD	0.1929305	13.9826932			
MANGANESE	293.7445145	88.7642985	3.2831468	15.2380621	96.6160797
MERCURY	0.0036949	0.0004858	4.1093011	0.0037910	2.6087100
METHYLENE CL	6630.1644112	10747.6307445	8209.0488832	17937.1629360	3911.2620800
NAPHTHALENE	5602.0919281	7218.6431693	5473.6547701	6896.1686159	3567.0339882
NICKEL	0.2159705	0.0875403	0.0328315	0.7415256	179.8566322
PCBS		0.0000149			
PCDD					0.4065353
PCDF					0.0137416
PERC	26058.5817120	42241.4877009	32264.0824320	70498.5573600	15372.4608000
PHENANTHRENE	8115.4640731	8883.4154585	7297.5400095	5402.4766535	3945.3710596
PHENOL					125.2449927
PYRENE	165.9505890	181.6645218	149.2339470	110.4800952	85.6711532
STYRENE					
TCDD,2378					0.0000116
TCDF,2378					
TCE,111	31034.7910461	50298.0016895	38415.9709440	83974.0263695	18303.5736000
TOLUENE	51133.4905168	76710.7381304	57636.3157640	117404.4571030	54742.6311429
TOLUENE DIISOCYANATE	8.9910600	14.5746900	11.1321600	24.3243000	5.3040000
TRICHLORETHY	20918.1898348	33908.8085606	25899.5753728	228481.1499440	12340.0443200
TRIFLURALIN	87.2600000	181.7400000	89.2450000	1918.8775000	0.0000000
VINYL CHLOR					
XYLENE,M	228.0040600	369.6006108	282.3001600	616.8393000	134.5040000
XYLENE,O	3255.1199874	3925.9270687	3421.5293547	5990.6153701	1593.1466342
XYLENE,P	228.0040600	369.5993218	282.3001600	616.8393000	134.5040000
XYLENES ISO	15597.0190927	25237.9489136	19968.5539568	42885.6613995	9128.4764131

Table C-1: Michigan Emissions by County in pounds/year

	Delta	Dickinson	Eaton	Emmet	Genesee
ACENAPHTHEN	138.6054242	52.6991378	84.3370538	105.8137084	106.1531634
ACENAPHTHYL	1577.1760363	598.9216538	955.8199435	1199.3300504	1204.4201731
ACETALDEHYDE	3659.8038602	1367.0124401		59.2799988	741.3956909
ACROLEIN	4.8306398	1.7844360		0.0790400	0.9885276
ACRYLONITRIL					343.7558002
ANTHRACENE	225.1975275	85.1250988	112.4494051	141.7462459	149.8082321
ANTIMONY	3.1728750	0.0235350			15.1734722
ARSENIC	704.2155305	63.4797365	8.9724045	1.7388800	432.5233805
ATRAZINE	358.3424000	230.8552000	52747.8290000	863.9842000	32970.9464000
BENZ(A)ANTHR	540.0666491	205.2505300	337.3482827	423.0216658	421.6965434
BENZ(GHI)PE	46.2735773	17.5725720	28.1123513	35.2725535	35.4008633
BENZENE	47902.6413123	20730.0856263	39926.3057130	32372.9117748	140241.4640289
BENZO(A)PYRE	89.8783596	34.1596029	56.2247981	70.5014374	70.2555650
BENZO(B)FLUO	89.6537186	34.0878113	56.2247026	70.4976830	70.2086099
BENZO(K)FLUORA NTHENE	44.8243853	17.0372412	28.1123513	35.2488415	35.1043050
BERYLLIUM	4.3595780	3.0969332	1.1491109		4.3874861
BUTADIENE,13	15847.6236593	8033.4128578	32593.9162154	9085.4685600	164631.5901669
CADMIUM	69.6177870	9.9758191	1.3835257	1.1466434	69.0660700
CARBON TETRA	0.0000159	0.0000111	0.0000408	0.0000114	0.2262402
CHLOROFORM	38.4785480	26.8878120	98.6332390	27.5983590	432.2854552
CHROMIUM	398.6076511	312.9319106	122.6256064	2.5864244	3803.1141953
CHROMIUM VI	55.5544969	20.5224343	0.0016102	0.9089600	11.3688917
CHRYSENE	276.0642179	104.3695329	140.5618555	177.0938874	186.1485627
COBALT	165.9629751	52.2642159		2.5688000	37.8698317
COKE OVEN GS					
COPPER	244.3240351	364.1077525	0.2077315	3.7544000	84.5231651
DIBENZAHAN	44.8243853	17.0372412	28.1123513	35.2488415	35.1043050
DIBENZOFURAN	0.3133420	0.2189552	0.8031990	0.2247414	3.5145496
DIBROMOET,12	2.2564345	1.1438226	3.8325710	1.2936176	23.4423509
DIBUTYL PHTH	1228.2048657	858.2378798	3148.2950111	880.9178005	13775.9614153
DICHLORETH12	23.3529926	11.8726827	39.8146471	13.4143260	244.0113726
DIEYLHEX PHT					11.2538504
DIOCTYL PHTH					0.8905300
ETHYLBENZENE	3921.2421431	2682.1924028	9811.4542997	2746.1924480	46521.2176641
ETHYLENE OXI	586.3028000	409.6932000	1502.8879000	420.5199000	6576.1708000
FLUORANTHENE	377.6604293	142.3826731	168.6783301	213.2714488	232.8738034
FLUORENE	325.3658164	123.5475999	196.7864590	246.9315864	248.1026011
FORMALDEHYDE	9706.2253541	65135.3351207	129.6106874	165.7240765	2644.4712572
GLYCOL ETHERS	1571.9593456	1098.4444464	4029.4514708	1127.4723348	17631.6284816
INDN(123CDPY	90.0593750	34.2261594	56.2247026	70.5044014	70.2926348
LEAD	190.1145932	5021.4406966	40.0891616	8.7931995	464.2412287
MANGANESE	3936.9178744	2715.6503234	644.9100336	179.7413710	2596.4875039
MERCURY	9.5078436	3.0134382	138.6185551	0.1284400	14.7372364
METHYLENE CL	11166.6532384	7802.9678496	28623.8237912	8009.1718872	139798.6409044
NAPHTHALENE	10436.6203468	4831.4308988	10577.9345091	5654.0571109	43689.7482473
NICKEL	884.0952460	275.9879196	100.8909874	11.1043741	500.0375449
PCBS					0.5971908
PCDD	0.0159052	0.0247580		0.0002371	0.3220815
PCDF	0.0644270	0.0569685		0.0010473	0.1451506
PERC	43888.3755840	30668.0592960	112500.4155120	31478.5044720	572886.0773441
PHENANTHRENE	11028.6413769	4191.6873177	6873.4698879	8619.4680625	8689.5622819
PHENOL	470.9874319	174.0047584		7.7063999	616.3278561
PYRENE	244.2914829	92.6407580	140.5617564	176.5741994	179.6486277
STYRENE					
TCDD,2378	0.0000435	0.0000161		0.0000007	0.0000089
TCDF,2378	19.8922522	0.2073255		1.0788960	0.0005624
TCE,111	52274.0606793	36527.1703286	133964.2873137	37480.6044990	587317.5380362
TOLUENE	78307.0631898	46901.1902347	158140.6908780	52265.7086770	933728.3422954
TOLUENE DIISOCYANATE	15.1429200	10.5814800	38.8163100	10.8611100	169.8481200
TRICHLORETHY	35230.8265336	24618.3884184	90308.2552298	25268.9628138	396616.8141607
TRIFLURALIN	308.6150000	30.8050000	2123.1550000	54.9900000	740.6000000
VINYL CHLOR					54.1412225
XYLENE,M	384.0089200	268.3354800	984.3418100	275.4266100	4307.1741200
XYLENE,O	5416.5454128	2354.1537486	5388.9974590	3908.5140479	39866.9326824
XYLENE,P	384.0089200	268.3354800	984.3418100	275.4266100	4307.1741200
XYLENES ISO	26195.9243624	18000.1005740	65795.2241254	18393.4211728	312279.7346837

Table C-1: Michigan Emissions by County in pounds/year

	Gladwin	Gogebic	Grand Traverse	Gratiot	Hillsdale
ACENAPHTHEN	80.1635621	59.8381153	111.2327168	61.3557487	87.9143325
ACENAPHTHYL	908.5203705	678.1653070	1260.5073875	695.3651517	996.3624347
ACETALDEHYDE					
ACROLEIN					
ACRYLONITRIL					
ANTHRACENE	106.8847495	79.7841538	148.2984917	81.8076649	117.2191100
ANTIMONY			0.0589500		
ARSENIC			2.5957557		695.6771232
ATRAZINE	4577.4796000	0.0000000	3574.8100000	66703.3704000	63027.7766000
BENZ(A)ANTHR	320.6542484	239.3524613	444.8834866	245.4229947	351.6573980
BENZ(GHI)PE	26.7211874	19.9460384	37.0736149	20.4519162	29.3047775
BENZENE	23664.8916651	19539.7999520	56923.4269353	24344.6906322	30081.8074953
BENZO(A)PYRE	53.4423747	39.8920769	74.1472903	3182.2400141	58.6096362
BENZO(B)FLUO	53.4423747	39.8920769	74.1494699	40.9038325	58.6095550
BENZO(K)FLUORANTHENE	26.7211874	19.9460384	37.0736149	20.4519162	29.3047775
BERYLLIUM			0.1528805		82.3998674
BUTADIENE,13	4889.2333637	7334.1354648	25377.0610625	13063.6433774	10986.9322300
CADMIUM	0.6145873	0.4587589	1.3187163	0.4703941	45.9233486
CARBON TETRA	0.0000101	0.0000072	0.0000295	0.0000164	0.0000188
CHLOROFORM	24.3686900	17.4604290	71.3985770	39.5418910	45.4393320
CHROMIUM	0.0133606	0.0099730	7.7540908	0.0102260	11.2972032
CHROMIUM VI			0.0028733		
CHRYSENE	133.6059368	99.7301922	185.3681822	102.2595811	146.5240574
COBALT			0.0681200		
COKE OVEN GS					
COPPER			0.2514176		0.0568009
DIBENZAHAN	26.7211874	19.9460384	37.0736149	20.4519162	29.3047775
DIBENZOFURAN	0.1984413	0.1421853	0.5814193	0.3220011	0.3700256
DIBROMOET,12	0.6961444	1.0442573	6.1863201	1.8600426	1.5643540
DIBUTYL PHTH	777.8293193	557.3230898	2278.9865767	1262.1458996	1450.3875539
DICHLORETH12	7.2634606	10.8059212	63.8302114	19.2872789	16.2784352
DIEYLHEX PHT					
DIOCTYL PHTH					
ETHYLBENZENE	2451.7375625	1728.2256371	7928.1186227	3986.8740318	5639.3438912
ETHYLENE OXI	371.3090000	266.0469000	1087.9097000	602.5051000	692.3652000
FLUORANTHENE	160.3271242	119.6762306	222.4498585	122.7114974	175.8297676
FLUORENE	187.0483116	139.6222691	259.5160213	143.1634136	205.1334424
FORMALDEHYDE	31.1761856	22.3380730	697.0872622	50.5880838	61.5161417
GLYCOL ETHERS	995.5310680	713.3087388	2916.8372044	1615.3999652	1856.3273904
INDN(123CDPY	53.4423747	39.8920769	74.1472299	40.9038325	58.6095550
LEAD			46.4620048		0.0757750
MANGANESE	2.9393306	2.1940642	902.6530806	2.2497108	3.5054680
MERCURY			0.2157238		16.2978592
METHYLENE CL	7071.9069520	5067.0975432	20720.1984616	11475.2403128	13186.7050656
NAPHTHALENE	4344.3726117	3429.8424482	10717.9343277	5243.9677324	6310.8798576
NICKEL	0.0293933	0.0219406	2.6396161	0.0224971	0.3034915
PCBS					
PCDD					
PCDF				0.0171467	
PERC	27794.7655200	6103.7149320	81436.7414160	45101.2175280	51827.7994560
PHENANTHRENE	6533.3303112	4876.8063986	9064.6099065	5000.4935174	7165.0180965
PHENOL			0.0003668		
PYRENE	133.6059368	99.7301922	185.3694595	102.2595811	146.5238875
STYRENE					
TCDD,2378					
TCDF,2378					
TCE,111	33094.4760900	23712.5487690	96987.8729166	53700.8007510	61709.9600520
TOLUENE	46808.4080315	31852.5922142	185949.9994316	72511.7678190	156871.4754911
TOLUENE DIISOCYANATE	9.5901000	6.8714100	28.0983300	15.5613900	17.8822800
TRICHLORETHY	22311.8889580	15986.7088878	65372.2921414	36204.4197362	87961.1765605
TRIFLURALIN	474.8500000	8.9600000	47.9250000	6108.9450000	1083.9550000
VINYL CHLOR					
XYLENE,M	243.1951000	174.2519100	712.5448300	394.6208900	453.4762800
XYLENE,O	3647.6422251	1983.7764649	9699.3281582	3231.9067191	13502.3083267
XYLENE,P	243.1951000	174.2519100	712.5448300	394.6208900	453.4762800
XYLENES ISO	16519.3453638	11526.3026487	52859.0956957	28909.9037890	38062.3980248

Table C-1: Michigan Emissions by County in pounds/year

	Houghton	Huron	Ingham	Ionia	Iosco
ACENAPHTHEN	118.3786297	56.5913438	74.4724370	84.8443951	83.0904264
ACENAPHTHYL	1341.5891079	641.3104968	844.0209527	961.3558350	941.6914996
ACETALDEHYDE			0.1753563		
ACROLEIN					
ACRYLONITRIL					
ANTHRACENE	157.8349656	75.4498584	99.2965827	113.1064524	110.7872352
ANTIMONY		1.8941475			
ARSENIC		231.9302551	1521.2377928	48.4584935	
ATRAZINE	0.0000000	100666.6496000	46191.7136000	56044.4068000	2215.5208000
BENZ(A)ANTHR	473.5016374	226.3445330	655.2819498	375.2061374	332.3617057
BENZ(GHI)PE	39.4584673	18.8620146	24.8241457	28.2749549	27.6968088
BENZENE	39107.8742473	22165.4424522	84946.3549668	35375.8300199	27667.2676418
BENZO(A)PYRE	78.9169511	37.7244786	49.6487672	56.5500092	55.3936176
BENZO(B)FLUO	78.9175437	37.7250292	49.6482913	56.5535947	55.3936176
BENZO(K)FLUORANTHENE	39.4584673	18.8620146	24.8241457	28.2749549	27.6968088
BERYLLIUM		137.2237496	880.6493984		
BUTADIENE,13	15229.9761988	11736.6087395	92687.0777884	18153.0261596	11164.4630621
CADMIUM	0.9075447	100.1261198	584.3045601	4.5009723	0.6370266
CARBON TETRA	0.0000148	0.0000145	0.0001168	0.0000247	0.0000102
CHLOROFORM	35.7314960	34.9406780	282.3567110	59.8137870	24.6095030
CHROMIUM	0.0197292	30.7159881	3521.6860352	149.9024809	0.0138484
CHROMIUM VI		0.0006923	0.0012480		
CHRYSENE	197.2923660	94.3182312	183.6165964	147.3528986	138.4840441
COBALT		5.3577318		0.0010500	
COKE OVEN GS					
COPPER		0.8033356	1.2099449		
DIBENZAHAN	39.4584673	18.8620146	24.8241457	28.2749549	27.6968088
DIBENZOFURAN	0.2909719	0.2845321	2.2993125	0.4870810	0.2004023
DIBROMOET,12	2.1684919	1.6710717	13.1970778	2.9103092	1.5896314
DIBUTYL PHTH	1140.5211036	1115.2788183	7236.7269887	1909.2087933	785.5158799
DICHLORETH12	22.4369703	17.3250460	136.8525040	30.1529585	16.4401714
DIEYLHEX PHT					
DIOCTYL PHTH					
ETHYLBENZENE	3539.9560281	3839.5057938	29516.6353849	6285.0666267	2522.0748110
ETHYLENE OXI	544.4456000	532.3958000	4302.3071000	911.3907000	374.9783000
FLUORANTHENE	236.7510721	113.1864524	148.9622923	169.6513505	166.1808529
FLUORENE	276.2094663	132.0344223	173.7690197	197.9258632	193.8776617
FORMALDEHYDE	210.3994830	387.8434343	1075.5629351	1097.7453700	31.4842707
GLYCOL ETHERS	1459.7343712	1427.4271816	11535.0836692	2443.5652164	1005.3689716
INDN(123CDPY	78.9169347	37.7240292	49.6482913	56.5499097	55.3936176
LEAD	0.1584360	14.4193161	70.3701478	2055.1413409	
MANGANESE	4.3404314	340.7098978	964.8669859	3.4502450	3.0466490
MERCURY		28.0836946	177.4156200		
METHYLENE CL	10369.4459968	10139.9469424	81941.2281688	17358.2386296	7141.7920024
NAPHTHALENE	6906.5899171	4743.0429312	26134.8329573	7713.1794181	4847.8896602
NICKEL	0.0434043	99.4766292	417.9203996	0.0861025	0.0304665
PCBS					
PCDD					
PCDF					
PERC	40755.1063680	39853.1046240	383309.2984880	68657.3007239	28069.4352240
PHENANTHRENE	9647.6251078	4611.8115726	6069.5036157	6913.4070268	6771.8697546
PHENOL			0.1409509		
PYRENE	197.2925316	94.3103931	124.1207283	141.3759535	138.4840441
STYRENE		613.6635056			
TCDD,2378	0.0000008				
TCDF,2378	0.0000035				
TCE,111	48526.0036560	47457.6394860	383471.3527713	81231.5288070	33421.5178830
TOLUENE	365865.6145577	84896.7884923	528426.0544512	125020.4641793	50856.1939940
TOLUENE DIISOCYANATE	14.0618400	13.7506200	89.1495900	23.5392300	9.6848700
TRICHLORETHY	32715.6351472	31991.5648996	258524.8358602	54765.2981634	22532.3765146
TRIFLURALIN	40.8350000	17498.9325000	837.2750000	2288.2675000	98.5300000
VINYL CHLOR		13984.6123047			
XYLENE,M	356.5938400	348.7016200	2817.8686900	596.9307300	245.5983700
XYLENE,O	3933.2068235	5521.7026389	18861.1656571	6727.9556714	3369.9906495
XYLENE,P	356.5938400	348.7016200	2817.8686900	596.9307300	245.5983700
XYLENES ISO	23603.4967018	25768.9616569	197158.2602591	42164.3729691	16811.7469375

Table C-1: Michigan Emissions by County in pounds/year

	Iron	Isabella	Jackson	Kalamazoo	Kalkaska
ACENAPHTHEN	63.4535817	80.9223788	121.9526807	98.7133069	71.1661643
ACENAPHTHYL	719.1429281	917.1202928	1382.1303810	1118.6090704	806.5498624
ACETALDEHYDE	29.5470004				18.5162640
ACROLEIN	0.0393960				
ACRYLONITRIL				487.9500122	
ANTHRACENE	84.9297172	107.8965050	162.6035742	131.6048866	94.8882191
ANTIMONY				44.4829856	
ARSENIC	0.3104031	0.1031150	0.3701283	220.3653293	
ATRAZINE	0.0000000	34370.7214000	55527.5668000	43095.8420000	484.1068000
BENZ(A)ANTHR	253.6793466	323.6895151	487.8107227	498.6116284	288.1804037
BENZ(GHI)PE	21.1502835	26.9741263	40.6508936	32.9001232	23.7220548
BENZENE	20549.6321973	31205.1937235	73908.5670856	81716.2485274	23022.0434211
BENZO(A)PYRE	42.2788246	53.9482525	81.3017871	65.8003123	47.4441096
BENZO(B)FLUO	42.2778163	53.9482525	81.3017871	65.8026874	47.4441096
BENZO(K)FLUORANTHENE	21.1384647	26.9741263	40.6508936	32.9001232	23.7220548
BERYLLIUM	0.0015977	0.1484856	0.2278026	7.5150901	
BUTADIENE,13	8072.2298886	14989.0822724	41196.8572822	31792.0686005	3637.1804174
CADMIUM	0.5470441	0.7235199	1.1102625	159.1693424	8.6552626
CARBON TETRA	0.0000054	0.0000235	0.0000633	0.1952739	0.0000063
CHLOROFORM	12.9939920	56.7278130	153.0579680	227.5582340	15.2445530
CHROMIUM	2.1677992	0.0134871	598.6009254	530.0594825	15.5983374
CHROMIUM VI	0.4530895	0.0032997	0.0050623	0.0000221	
CHRYSENE	106.1158728	134.8706313	203.2544678	181.9343330	118.6102739
COBALT	0.4569110			113.5267185	
COKE OVEN GS					
COPPER	3.9874936	0.2887220	1011.8811494	47.9232075	81.0965500
DIBENZAHAN	21.1384647	26.9741263	40.6508936	32.9001232	23.7220548
DIBENZOFURAN	0.1058138	0.4619510	1.2463954	1.8483044	0.1241408
DIBROMOET,12	1.1493495	2.1341927	5.8657382	10.1730810	0.7073666
DIBUTYL PHTH	414.7579518	1779.0849429	2985.2043335	24.5329017	486.5940797
DICHLORETH12	11.8641747	22.1833673	60.9566286	105.4780239	7.3319967
DIEYLHEX PHT				18.5421009	
DIOCTYL PHTH				18.5421009	
ETHYLBENZENE	1370.5010929	5599.8937236	16977.8994632	23244.6293038	2495.9077180
ETHYLENE OXI	197.9912000	864.3693000	2332.1648000	3458.4134000	232.2833000
FLUORANTHENE	127.7176769	161.8530068	243.9180171	197.6187684	143.7386273
FLUORENE	148.0640868	188.8188838	284.5562549	230.3016434	166.0543834
FORMALDEHYDE	321.1173086	72.5749651	195.8153523	1745.2846944	1882.9068616
GLYCOL ETHERS	530.8419424	2317.4943036	6252.8581696	9272.4872968	622.7838316
INDN(123CDPY	42.2802780	53.9482525	81.3017871	65.8002464	47.4441096
LEAD	1.5622100	2200.0000000	2080.3989237	2655.8392149	
MANGANESE	44.7010618	3.0702689	4715.9845227	145.5915977	96.5970588
MERCURY	0.0640513	0.0030522	0.0046826	35.0751564	23.1903918
METHYLENE CL	3770.9167936	16462.6746504	46735.3796921	459679.3667168	4424.0400424
NAPHTHALENE	3314.4063858	7065.3531615	16072.4610644	22627.3370846	3494.1696760
NICKEL	1.9976975	0.6071156	19.5614150	1908.0129901	134.7963732
PCBS				0.4684320	
PCDD	0.0001182			0.0165903	
PCDF	0.0054170			0.0741684	
PERC	14820.8607360	64703.3657040	140655.9261440	298910.6479520	17387.8356240
PHENANTHRENE	5168.9594632	6595.1738706	9939.1434754	8044.3185285	5800.0423926
PHENOL	2.4020281		0.0011368	817.7513633	1016.3937025
PYRENE	105.8570854	134.8706313	203.2544678	164.5625971	118.6102739
STYRENE			77.6275244		
TCDD,2378	0.0000004		0.0000918	0.0000188	
TCDF,2378			0.0004257	0.0117978	
TCE,111	17647.0867820	77067.3586933	207905.1262733	308282.5590140	20703.2259330
TOLUENE	31328.1915368	92352.6865780	366718.6500912	404653.7065548	34247.9329584
TOLUENE DIISOCYANATE	5.1136800	21.9335700	36.7303200	0.0000000	5.9993700
TRICHLORETHY	11897.2544944	51939.7909566	143469.6003776	225727.8618764	13957.8604246
TRIFLURALIN	30.4600000	1696.6050000	437.7825000	613.5875000	14.8600000
VINYL CHLOR				126.8669968	
XYLENE,M	129.6776800	566.1332700	1527.4907200	2265.1462600	152.1378700
XYLENE,O	2440.3349326	3883.8882722	22868.1305811	14631.9156965	2735.0707241
XYLENE,P	129.6776800	566.1332700	1527.4907200	2265.1462600	152.1378700
XYLENES ISO	9077.6990101	37633.2487224	113578.9584719	156376.4209588	14475.5780257

Table C-1: Michigan Emissions by County in pounds/year

	Kent	Keweenaw	Lake	Lapeer	Leelanau
ACENAPHTHEN	198.0599954	9.8104156	55.7188248	95.4482981	74.4724370
ACENAPHTHYL	2244.0776735	111.1847107	631.4800141	1081.7473782	844.0209527
ACETALDEHYDE	6.2201111				
ACROLEIN	0.0082801				
ACRYLONITRIL					
ANTHRACENE	264.0936177	13.0805542	74.2917664	127.2643974	99.2965827
ANTIMONY	0.5243700				
ARSENIC	1.7642935				
ATRAZINE	34281.9972000	0.0000000	160.2204000	41228.3268000	2684.1224000
BENZ(A)ANTHR	791.9920434	39.2416626	222.8752991	381.7931923	297.8897480
BENZ(GHI)PE	66.0006809	3.2701385	18.5729416	31.8160994	24.8241457
BENZENE	105473.1947071	2521.5432660	15529.7821815	45337.7912217	20570.4407169
BENZO(A)PYRE	405.5836312	6.5402771	37.1458832	63.6321987	49.6482913
BENZO(B)FLUO	132.0085352	6.5402771	37.1458832	63.6321987	49.6482913
BENZO(K)FLUORA NTHENE	65.9989841	3.2701385	18.5729416	31.8160994	24.8241457
BERYLLIUM	0.0733527				
BUTADIENE,13	31014.7429867	0.0000000	8524.8448301	15222.3358937	2590.4963269
CADMIUM	13728.1009917	0.0752132	0.4271777	0.7317703	0.5709554
CARBON TETRA	0.0002197	0.0000008	0.0000040	0.0000351	0.0000075
CHLOROFORM	531.0045570	2.0028110	9.7544130	84.7909510	18.2036790
CHROMIUM	2.9393290	0.0016351	0.0092865	0.0159080	0.0124121
CHROMIUM VI	0.0651127				
CHRYSENE	330.0865455	16.3506927	92.8647080	159.0804968	124.1207283
COBALT	1.6670417				
COKE OVEN GS					
COPPER	11.5590372				
DIBENZAHAN	65.9989841	3.2701385	18.5729416	31.8160994	24.8241457
DIBENZOFURAN	4.3241239	0.0163095	0.0794330	0.6904773	0.1482378
DIBROMOET,12	3.4341957	0.0000000	0.5651060	4.0355610	0.3493288
DIBUTYL PHTH	3580.8996562	63.9281437	311.3531513	2706.4601216	581.0470422
DICHLORETH12	38.7798477	0.0094082	5.8472346	41.8179962	3.6711780
DIEYLHEX PHT					
DIOCTYL PHTH					
ETHYLBENZENE	91176.3274752	185.8080319	971.8476206	9316.0402500	1724.9301861
ETHYLENE OXI	32740.9877000	30.5171000	148.6293000	1291.9711000	277.3719000
FLUORANTHENE	396.2217306	19.6208313	111.4376495	190.8965962	148.9448740
FLUORENE	462.0161422	22.8909698	130.0105911	222.7126955	173.7690197
FORMALDEHYDE	3800.9362565	2.5623046	12.4793491	108.4776582	23.2889530
GLYCOL ETHERS	21693.0632604	81.8205892	398.4958236	3463.9541972	743.6726388
INDN(123CDPY	131.9986720	6.5402771	37.1458832	63.6321987	49.6482913
LEAD	2505.1447346				
MANGANESE	1095.0070330	0.3597152	2.0430236	3.4997709	2.7306560
MERCURY	6581.3047554				
METHYLENE CL	166516.1872425	581.2250488	2830.7759304	24606.7275608	5282.7921432
NAPHTHALENE	42544.8158299	431.4828606	2592.2574566	10132.2986609	3619.4876392
NICKEL	24.6247159	0.0035972	0.0204302	0.0349977	0.0273066
PCBS					
PCDD	0.0000248				
PCDF	0.0201003				
PERC	364483.9759560	700.1309880	3409.8908040	96711.9940080	20762.9950320
PHENANTHRENE	16137.3873812	799.5488751	4541.0842190	7779.0362934	6069.5036157
PHENOL	0.8171907				
PYRENE	330.0328712	16.3506927	92.8647080	159.0804968	124.1207283
STYRENE	762.6624298				
TCDD,2378	0.0000001				
TCDF,2378	0.0000001				
TCE,111	721253.5552190	2719.9648710	13247.2113930	115152.3574110	24721.9370190
TOLUENE	3612136.7369019	3014.8769007	18248.5175535	207693.5854295	28658.7180656
TOLUENE DIISOCYANATE	43.5909300	0.7881900	3.8387700	33.3687900	7.1639100
TRICHLORETHY	692007.5136878	1833.7668802	8931.1070766	77634.3038282	16667.2260378
TRIFLURALIN	703.9375000	0.0000000	21.6600000	1510.3775000	30.8750000
VINYL CHLOR					
XYLENE,M	5299.3290300	19.9876900	97.3472700	846.1982900	181.6694100
XYLENE,O	352111.0463892	318.8963950	1799.2358980	12369.6414505	2442.9229371
XYLENE,P	5299.3290300	19.9876900	97.3472700	846.1982900	181.6694100
XYLENES ISO	624294.3038029	1262.2026399	6427.3105411	71287.4946540	11645.2798344

Table C-1: Michigan Emissions by County in pounds/year

	Lenawee	Livingston	Luce	Mackinac	Macomb
ACENAPHTHEN	59.4108246	73.0632060	32.9098077	64.2284118	62.3855713
ACENAPHTHYL	673.4199855	828.0496683	373.0805382	727.9220007	707.0364749
ACETALDEHYDE	53.3999987		56.3696995		0.0348390
ACROLEIN	0.0712000		0.0751596		
ACRYLONITRIL					304.4500122
ANTHRACENE	79.8101395	97.4176080	44.5085788	85.6378824	83.1807618
ANTIMONY					3.0078524
ARSENIC	0.2131309	0.0005130	0.0281696		787.1536479
ATRAZINE	91907.0730000	26153.8268000	0.0000000	0.0000000	13343.0860000
BENZ(A)ANTHR	237.4332584	292.2528241	131.4175098	256.9136473	303.0320297
BENZ(GHI)PE	19.7863398	24.3544020	10.9490248	21.4094706	20.7951904
BENZENE	34650.6298914	53774.9128596	9628.9232382	20717.9804068	302673.3726808
BENZO(A)PYRE	39.5702517	48.7088040	21.9008514	42.8189412	41.5923969
BENZO(B)FLUO	39.5668697	48.7088040	21.8972813	42.8189412	41.5903809
BENZO(K)FLUORA NTHENE	19.7834349	24.3544020	10.9486407	21.4094706	20.7951904
BERYLLIUM	0.0001504	0.0007387			0.4433857
BUTADIENE,13	26597.0869951	15926.1817071	2178.8912725	8330.8198143	33830.5222343
CADMIUM	0.5006285	0.5606642	0.2572606	0.4924178	70.7320204
CARBON TETRA	0.0000398	0.0000565	0.0000027	0.0000045	0.1221165
CHLOROFORM	96.2667310	136.6361070	6.4325810	10.9901900	772.0560653
CHROMIUM	0.3245899	0.0121772	0.0470886	0.0107047	301.2865203
CHROMIUM VI	0.1113594	0.0000164	0.0147250		0.0000267
CHRYSENE	99.6825743	121.7720100	55.5511690	107.0473530	112.8844202
COBALT	0.3146982		0.0416143		9.7471103
COKE OVEN GS					
COPPER	0.4616993	0.0014363	0.0608208		24.0593425
DIBENZAHAN	19.7834349	24.3544020	10.9486407	21.4094706	20.7951904
DIBENZOFURAN	0.7839279	1.1126674	0.0523824	0.0894963	6.2841009
DIBROMOET,12	3.7869769	6.2242974	0.3102374	1.1861683	11.0918043
DIBUTYL PHTH	3072.7579467	4361.3165132	205.3229000	350.7981761	16159.1468457
DICHLORETH12	39.3422116	64.5244277	3.2161704	12.2328695	118.7742885
DIEYLHEX PHT					11.5691004
DIOCTYL PHTH					11.5691004
ETHYLBENZENE	10603.8191125	14290.1772132	628.9659312	1142.6836664	81316.5834436
ETHYLENE OXI	1466.8291000	2081.9427000	98.0141000	167.4590000	11758.3549000
FLUORANTHENE	120.3038029	146.1355214	67.3829351	128.4568236	124.8537758
FLUORENE	138.6549241	170.4808141	76.8208677	149.8662943	145.5663331
FORMALDEHYDE	240.6392447	174.8059757	21480.5631981	14.0603456	1274.9532436
GLYCOL ETHERS	3932.7728132	5581.9779204	262.7894332	448.9808680	31525.7847548
INDN(123CDPY	39.5729217	48.7088040	21.9036699	42.8189412	41.5903809
LEAD	40.0333781				4158.8967835
MANGANESE	71.2233668	7.8087144	4.0533263	2.3550418	129.5088092
MERCURY	0.1180175	2.7273833	0.1221344		591.9179315
METHYLENE CL	27937.0521848	39652.4324856	1866.7648648	3189.4041520	229388.1972671
NAPHTHALENE	9687.1096977	13707.0878183	1608.5023046	3217.6248180	57526.8720713
NICKEL	1.3779696	0.0296625	0.1913049	0.0235504	139.2518328
PCBS					0.2922860
PCDD	0.0002136		0.0002255		0.0103513
PCDF	0.0009434		0.0009959		0.0620753
PERC	109801.1922480	155846.2336560	7336.9590480	3841.8865200	913552.0083842
PHENANTHRENE	4838.0644247	5954.6512911	2678.0136670	5234.6155637	5084.4240623
PHENOL	6.9419998		7.3280611		267.9692467
PYRENE	99.2144343	121.7720100	55.0569947	107.0473530	103.9759522
STYRENE	24.4666004	8859.6480942			
TCDD,2378	0.0000006		0.0000007		
TCDF,2378					0.0073068
TCE,111	141473.6917546	185591.5036813	8735.9188410	14925.4875900	1048034.6291365
TOLUENE	229540.5764303	268291.3268796	12114.9069327	26299.4054934	8586944.3170980
TOLUENE DIISOCYANATE	37.8849900	53.7720300	2.5314900	4.3251000	198.8768100
TRICHLORETHY	97538.8489758	236999.9492249	5889.6490942	10062.5802580	1046097.2040788
TRIFLURALIN	2634.2250000	321.8250000	11.3550000	46.1450000	537.4500000
VINYL CHLOR					79.1569977
XYLENE,M	960.7244900	1363.6035300	64.1959900	109.6801000	7701.3344420
XYLENE,O	13143.5025525	10391.0023568	1065.6727919	2072.1486666	76515.2014178
XYLENE,P	960.7244900	1363.6035300	64.1959900	109.6801000	7701.3332336
XYLENES ISO	72041.2753706	95619.8286359	4209.1323251	7519.6591517	556300.7526099

Table C-1: Michigan Emissions by County in pounds/year

	Manistee	Marquette	Mason	Mecosta	Menominee
ACENAPHTHEN	79.2869232	137.9247366	80.0551597	91.6702770	86.4181989
ACENAPHTHYL	898.6571316	1563.1581428	907.2918101	1038.7714484	979.4408222
ACETALDEHYDE	40.5813965	29.1779995		1.2375000	18.9703809
ACROLEIN	0.0526840	0.0389040		0.0016500	0.0252938
ACRYLONITRIL					
ANTHRACENE	106.1566871	184.2213325	106.7402130	122.2262734	115.4358903
ANTIMONY		0.0292500			
ARSENIC	72.7446666	192.8364192	0.1489266	0.0457755	35.8003449
ATRAZINE	596.0888000	0.0000000	6399.3406000	9210.9502000	2849.5112000
BENZ(A)ANTHR	317.1951352	585.4706692	320.2206488	366.6177340	345.5981787
BENZ(GHI)PE	26.4142053	45.9742815	26.6850532	30.5518999	28.8039221
BENZENE	28006.8092906	48883.0407920	28973.3698348	33299.8753767	25802.3564615
BENZO(A)PYRE	52.8305971	91.9276619	53.3701065	61.1029628	57.5990009
BENZO(B)FLUO	52.8280946	91.9259446	53.3701065	61.1055758	57.5977994
BENZO(K)FLUORA NTHENE	26.4140473	45.9626103	26.6850532	30.5514049	28.7988997
BERYLLIUM		22.4580721		0.0056702	
BUTADIENE,13	27962.6020756	21626.2236990	16646.1535041	2550.8847961	6034.3357720
CADMIUM	6.8579841	13.9816755	0.6137562	0.7344541	3.5469872
CARBON TETRA	0.0000094	0.0000254	0.0000113	0.0000158	0.0000101
CHLOROFORM	22.7721890	61.4092970	27.4160150	38.1505270	24.3151760
CHROMIUM	89.9500840	400.8895796	0.0133425	0.1981388	111.3385552
CHROMIUM VI	0.0060587	0.4473992		0.0189761	0.1925249
CHRYSENE	132.6365894	235.8760240	133.4253446	152.7748947	144.2663686
COBALT	0.0171223	1.2981800		0.0536250	0.5440921
COKE OVEN GS					
COPPER	4.7043288	1.8520319	9.7002001	0.0784745	0.7952115
DIBENZAHAN	26.4140473	45.9626103	26.6850532	30.5514049	28.7988997
DIBENZOFURAN	0.1854405	0.5000737	0.2232566	0.3106708	0.1980055
DIBROMOET,12	2.4075412	3.0792098	2.0792856	1.7171602	0.8591877
DIBUTYL PHTH	726.8702696	1960.1364321	875.0975242	1217.7346607	776.1211948
DICHLORETH12	24.8211771	31.9101218	21.4717568	17.8027607	8.9375668
DIEYLHEX PHT					
DIOCTYL PHTH					
ETHYLBENZENE	2507.0400735	6016.6801824	2977.0489416	4143.2560391	2583.6306220
ETHYLENE OXI	346.9829000	935.7017000	417.7415000	581.3047000	370.4936000
FLUORANTHENE	159.7508177	276.6541127	160.1111749	183.3496636	173.3625096
FLUORENE	185.0247726	321.8318735	186.7953727	213.8646794	201.6530031
FORMALDEHYDE	1205.2164948	421.6735232	35.5077326	799.1185439	354.2449489
GLYCOL ETHERS	930.3094108	2508.7463884	1120.0230580	1558.5587444	993.3448672
INDN(123CDPY	52.8325727	91.9285275	53.3701065	61.1029500	57.5999494
LEAD	19.9999996	161.6264755	160.0000001	20.2035621	51.7492090
MANGANESE	9.5008880	535.6380716	2000.0353314	7.4185909	41.8649443
MERCURY	2.5508770	567.5065096		6.2961620	0.0411025
METHYLENE CL	6608.5949512	17821.2630376	7956.2548120	11071.4600216	7056.3769408
NAPHTHALENE	4983.9924060	9572.0163569	5136.5108164	6029.6889408	4621.2712065
NICKEL	7.8791130	327.8754062	0.0293536	0.3052626	2.3754602
PCBS					
PCDD	0.0001581	0.0001167		0.0000049	0.0000759
PCDF	0.0006981	0.0005155		0.0000219	0.0003351
PERC	25973.8071120	70049.7851760	31270.5241200	43514.2370160	27733.7278080
PHENANTHRENE	6458.9853075	11238.4487244	6524.4955170	7469.9775429	7041.6914149
PHENOL	5.9954641	3.7933219	0.0159768	0.1608750	2.4661494
PYRENE	132.2901921	229.9760390	133.4252662	152.7647983	144.1001003
STYRENE					
TCDD,2378	0.0000005	0.0000004		0.0000000	0.0000002
TCDF,2378					
TCE,111	30926.3101290	83463.5451097	37232.9679150	51820.4617973	33021.8001360
TOLUENE	46365.1830094	101322.2840702	66447.0939163	69097.5571542	56919.1968574
TOLUENE DIISOCYANATE	8.9618100	24.1671300	10.7893500	15.0138300	9.5690400
TRICHLORETHY	20850.1381198	56226.1416454	25102.0092730	34930.4916314	22262.8917232
TRIFLURALIN	205.6800000	25.6300000	120.7875000	607.4725000	170.1450000
VINYL CHLOR					
XYLENE,M	227.2623100	612.8536300	273.6068500	380.7353300	242.6610400
XYLENE,O	2624.4828872	4727.5015296	4473.7291012	3573.5826251	4833.3064325
XYLENE,P	227.2623100	612.8536300	273.6068500	380.7353300	242.6610400
XYLENES ISO	15995.5596720	40246.1302783	1219789.4885161	26450.2284762	17389.0017525

Table C-1: Michigan Emissions by County in pounds/year

	Midland	Missaukee	Monroe	Montcalm	Montmorency
ACENAPHTHEN	107.0254625	67.4194496	65.4886939	138.6466476	54.0524348
ACENAPHTHYL	1212.4634977	765.2961671	741.4617704	1571.3286732	613.8365825
ACETALDEHYDE	157.1430054	663.5153809			681.7620239
ACROLEIN	0.2095240	0.8846872			0.9090160
ACRYLONITRIL					
ANTHRACENE	144.3830608	97.2944825	87.2508294	184.8621968	79.6753465
ANTIMONY					
ARSENIC	0.0460953	0.0778528	1272.8377645		0.3799690
ATRAZINE	19553.7800000	3314.6672000	48.2384000	36755.0766000	567.6626000
BENZ(A)ANTHR	427.2003173	267.0679710	261.6877027	554.5865905	213.5281418
BENZ(GHI)PE	35.5927443	22.2235501	21.8069460	46.2155492	17.7651051
BENZENE	42651.8063662	19671.5342698	55560.5432456	59609.6681372	21368.7507375
BENZO(A)PYRE	71.1945456	44.4869996	43.6193959	92.4310984	35.5630257
BENZO(B)FLUO	71.1976314	44.4449770	43.6266950	92.4310984	35.5198474
BENZO(K)FLUORA NTHENE	35.5921157	22.2224885	21.8069460	46.2155492	17.7599237
BERYLLIUM			152.5158878		
BUTADIENE,13	21540.5978958	22919.2796614	27919.3592521	5020.4867553	13281.1329176
CADMIUM	0.8275234	0.5261570	84.8710048	1.0629576	0.4818813
CARBON TETRA	0.0000330	0.0000056	0.0000576	0.0000242	0.0000040
CHLOROFORM	79.8290140	13.4974200	139.2959510	58.3897200	9.7722510
CHROMIUM	0.0858914	0.1261210	2761.4969748	0.0231078	0.5701978
CHROMIUM VI	0.0240953	0.0406958			0.1986202
CHRYSENE	180.2136047	120.6228298	109.0415020	231.0777461	98.5715407
COBALT	0.0680953	0.1150098			0.5613179
COKE OVEN GS					
COPPER	0.0995239	0.1680912	2548.0653238		0.8203876
DIBENZAHAN	35.5921157	22.2224885	21.8069460	46.2155492	17.7599237
DIBENZOFURAN	0.6500708	0.1099134	1.1343273	0.4754844	0.0795783
DIBROMOET,12	3.0670181	1.9547049	7.5281899	4.6067956	1.8910095
DIBUTYL PHTH	968.8220154	430.8269756	1991.2961309	6.3007005	311.9225261
DICHLORETH12	31.8714468	11.7700243	77.9211449	47.5543383	19.4654477
DIEYLHEX PHT					
DIOCTYL PHTH					
ETHYLBENZENE	7754.8740049	1398.3703201	14698.7600212	6500.7041596	1230.0643906
ETHYLENE OXI	1216.3654000	205.6620000	2122.4711000	889.6920000	148.9011000
FLUORANTHENE	218.2728803	153.2403931	130.8667408	277.2932953	127.0124022
FLUORENE	249.6519555	157.6806686	152.6527190	323.5088445	126.5011045
FORMALDEHYDE	4065.8441830	1477.0018675	3828.9709309	74.7011328	1512.3785130
GLYCOL ETHERS	3261.2448008	551.4084240	5690.6401972	2385.3879840	399.2245572
INDN(123CDPY	71.2020409	44.5201754	43.6138920	92.4310984	35.5971138
LEAD			2218.4005794	1602.5716074	
MANGANESE	8.5770418	10.3182197	5464.8408360	5.9989384	40.3822720
MERCURY	0.8312465	1.4376167	3853.2387486	8.7724537	1.4771510
METHYLENE CL	23166.7504112	3917.0139360	40424.3315608	22293.6553370	2835.9526008
NAPHTHALENE	9873.5706333	3923.1159436	13789.6765882	10054.0147953	3637.0027403
NICKEL	0.3324849	0.5198715	2175.3936983	0.0508371	2.4375204
PCBS					
PCDD	0.0006286	0.0026541			0.0027270
PCDF	0.0027762	0.0117221			0.0120445
PERC	91052.4417120	4718.3493600	158880.0340080	66598.9257600	3416.1265080
PHENANTHRENE	8705.9146044	5446.0052257	5332.4256469	11299.7017823	4355.2548274
PHENOL	20.4285908	86.2570038			88.6290588
PYRENE	178.8396292	114.8060113	109.0388270	231.0777461	92.5947603
STYRENE					
TCDD,2378	0.0014893	0.0000080		0.0000002	0.0000082
TCDF,2378	2.8669010			0.0000009	
TCE,111	108413.6814540	18330.4906200	189174.1624110	79297.5409200	13271.4367110
TOLUENE	114269.6617805	24566.7632454	283093.5110700	121040.3521022	38218.7323115
TOLUENE DIISOCYANATE	11.8788600	5.3118000	24.4845900	0.0000000	3.8457900
TRICHLORETHY	73091.1713348	12358.1914440	127538.8948282	53461.4273040	8947.4394882
TRIFLURALIN	1586.4550000	172.9650000	77.0375000	3494.6200000	24.3900000
VINYL CHLOR					
XYLENE,M	796.6790600	134.7018000	1390.1482900	582.7188000	97.5252900
XYLENE,O	3898.9164996	2166.2536286	11740.9803891	5702.4960767	2776.9782159
XYLENE,P	796.6790600	134.7018000	1390.1482900	582.7188000	97.5252900
XYLENES ISO	51935.7791674	9071.0967345	92706.8375670	41686.6822221	7976.5391913

Table C-1: Michigan Emissions by County in pounds/year

	Muskegon	Newaygo	Oakland	Oceana	Ogemaw
ACENAPHTHEN	155.3619662	153.4435729	112.7389758	84.4454562	86.9493110
ACENAPHTHYL	1761.1518688	1739.0271594	1277.5045165	957.0485039	985.3093916
ACETALDEHYDE	210.1380005	1.2656511	111.2109468		
ACROLEIN	0.2801840		0.1482368		
ACRYLONITRIL					
ANTHRACENE	209.4934944	204.5914305	151.5220156	112.5939416	115.9218814
ANTIMONY	0.0098464		0.1393350		
ARSENIC	0.3837322	0.2595555	27.2413055	1.2108822	0.0044606
ATRAZINE	12724.6008000	11775.3380000	9607.1942000	7212.5022000	5387.1956000
BENZ(A)ANTHR	620.6214502	614.0146051	545.6626499	337.7818249	347.7549401
BENZ(GHI)PE	51.7080039	51.1478576	37.5284045	28.1484854	28.9795703
BENZENE	79662.1730353	45991.4732900	201743.3612246	26086.9673667	29682.2130140
BENZO(A)PYRE	103.4293639	102.2957153	91.7328211	56.2969708	57.9591947
BENZO(B)FLUO	103.4158732	102.2957153	75.0575830	56.2969708	57.9611407
BENZO(K)FLUORA NTHENE	51.7079366	51.1478576	37.5252915	28.1484854	28.9795703
BERYLLIUM	0.0013667		0.0373604	0.0011999	0.0064233
BUTADIENE,13	9951.7041196	23834.3553197	64231.2777389	14811.8826368	13698.4159986
CADMIUM	1.2228396	1.7513337	4.4735131	0.6482484	0.6709907
CARBON TETRA	0.0000676	0.0000182	0.1429077	0.0000100	0.0000085
CHLOROFORM	163.3267100	43.8705790	1149.0104553	24.1001290	20.6147820
CHROMIUM	0.0583564	1.9024774	80.2001888	0.0140742	0.0144898
CHROMIUM VI	0.0025778		0.1561497	0.0000267	0.0001427
CHRYSENE	261.5597267	255.7392882	318.2538245	140.7424270	144.8979477
COBALT	0.0351361		0.7313577		
COKE OVEN GS					
COPPER	23.4475213	5.5432314	0.6804082	78.8177781	0.0124897
DIBENZAHAN	51.7079366	51.1478576	37.5252915	28.1484854	28.9795703
DIBENZOFURAN	1.3300167	0.3572508	9.3556236	0.1962543	0.1678721
DIBROMOET,12	6.7900150	2.0210829	18.6043523	1.1104895	1.9504236
DIBUTYL PHTH	4417.2774599	1400.3141983	16302.9347092	769.2570645	658.0075437
DICHLORETH12	70.4544385	20.9532397	200.4715209	11.5131544	20.1265275
DIEYLHEX PHT					
DIOCTYL PHTH					
ETHYLBENZENE	16820.6359699	4352.0802130	126142.5564682	2363.5151247	2248.3674301
ETHYLENE OXI	2488.6310000	668.4619000	17853.5659000	367.2169000	314.1102000
FLUORANTHENE	316.5628248	306.9832712	280.8982689	168.8923012	173.8805877
FLUORENE	362.6279979	358.0350034	263.0350490	197.0393979	202.8576324
FORMALDEHYDE	693.7140498	99.9520187	4382.7852633	30.8326010	566.3736077
GLYCOL ETHERS	6672.3658120	1792.2393188	46934.8567268	984.5595788	842.1731304
INDN(123CDPY	103.4396889	102.2957153	75.0631832	56.2969708	57.9591407
LEAD	3695.2830347	0.3633237	55.0062655	3680.0000668	
MANGANESE	3107.7758953	12.0506452	75.2124759	1170.4796817	47.7939520
MERCURY	1.4521334	0.5327686	5.8198045	0.0005138	0.0008457
METHYLENE CL	132851.0053055	12731.4456632	334233.4238406	6993.9693032	5982.5054256
NAPHTHALENE	18389.3252415	8427.0735918	87164.1806792	4632.6318522	4873.9994067
NICKEL	0.7555259	9.2682799	8.2501815	0.0356296	0.0568570
PCBS			0.1153851		
PCDD	0.0008406		0.0004447		
PCDF	0.0037124		0.0141657		
PERC	195570.6076800	50038.4902320	1691537.1982524	8424.7825320	23513.0830560
PHENANTHRENE	12646.5831227	12505.6511907	9177.3891515	6882.3046821	7085.6029487
PHENOL	27.3379662	1.0173272	14.5167207	0.0324534	
PYRENE	259.7094513	255.7392882	188.2475862	140.7424270	144.8984917
STYRENE	25.5754007				
TCDD,2378	0.0000025		0.0000017		
TCDF,2378	3.8245115		0.0000312		
TCE,111	228559.7033100	59579.4779190	1568480.2016264	32734.2639835	28003.8207672
TOLUENE	325548.1420822	76816.7546856	2673041.2855375	39576.2681452	53755.9571964
TOLUENE DIISOCYANATE	54.4287000	17.2649100	200.1521100	9.4844100	8.1127800
TRICHLORETHY	282473.8131882	40167.7516178	1300488.5046032	22065.9954278	18874.8236724
TRIFLURALIN	125.0825000	157.0100000	78.0075000	112.6025000	119.6800000
VINYL CHLOR					
XYLENE,M	1629.9709000	437.8204100	11476.5834260	240.5149100	205.7317800
XYLENE,O	14663.0939046	5541.5717496	153445.3626474	2795.5810329	3952.0125618
XYLENE,P	1629.9709000	437.8204100	11466.5883468	240.5149100	205.7317800
XYLENES ISO	133036.7307777	29119.2594931	853078.5270851	15742.1786599	14888.4176953

Table C-1: Michigan Emissions by County in pounds/year

	Ontonagon	Osceola	Oscoda	Otsego	Ottawa
ACENAPHTHEN	59.0250974	80.2719645	63.4153940	58.3204820	132.8944183
ACENAPHTHYL	668.9511044	909.7489308	718.7077981	660.9654622	1506.2127888
ACETALDEHYDE					41.7336602
ACROLEIN					0.0556449
ACRYLONITRIL					
ANTHRACENE	78.7001299	107.0292860	84.5538586	77.7606426	177.6581199
ANTIMONY				0.0112500	7.9976925
ARSENIC	84.9991399			0.1500000	140.9556545
ATRAZINE	0.0000000	2231.0260000	0.0000000	285.9848000	36490.6268000
BENZ(A)ANTHR	236.1003898	321.0878640	253.6615758	233.2819278	531.4147985
BENZ(GHI)PE	19.6750325	26.7573215	21.1384647	19.4401607	44.2978961
BENZENE	16707.6983704	25447.4385938	17544.5995159	24003.8583346	81494.5581864
BENZO(A)PYRE	39.3500650	53.5146430	42.2769293	38.8803213	88.5686841
BENZO(B)FLUO	39.3500650	53.5146430	42.2769293	38.8803213	88.5647468
BENZO(K)FLUORA NTHENE	19.6750325	26.7573215	21.1384647	19.4401607	44.2823734
BERYLLIUM	9.3487761			0.0045000	15.7900387
BUTADIENE,13	3403.3402585	8171.6457180	2778.8427337	14348.6012643	22807.3379253
CADMIUM	6.1247054	0.6154184	0.4861847	0.4771237	35.2976015
CARBON TETRA	0.0000034	0.0000090	0.0000036	0.0000087	0.0000884
CHLOROFORM	8.3144900	21.8337120	8.6722410	21.1152370	213.6714920
CHROMIUM	182.0836432	0.0133787	0.0105692	0.4597201	276.0531413
CHROMIUM VI					0.5962863
CHRYSENE	98.3751624	133.7866555	105.6923233	97.2008033	222.0462715
COBALT				0.0130000	24.3036736
COKE OVEN GS					
COPPER					4.5111607
DIBENZAHAN	19.6750325	26.7573215	21.1384647	19.4401607	44.2823734
DIBENZOFURAN	0.0677073	0.1777982	0.0706206	0.1719475	1.7399888
DIBROMOET,12	0.4845783	1.1396140	0.3956604	2.0429990	7.1669304
DIBUTYL PHTH	0.8971975	696.9148257	276.8110766	673.9817567	2607.5635996
DICHLORETH12	5.0153880	11.8000093	4.1039344	23.3768230	74.5812779
DIEYLHEX PHT					
DIOCTYL PHTH					
ETHYLBENZENE	821.6481019	2433.3253818	879.8851971	2673.9633403	21676.1564967
ETHYLENE OXI	126.6890000	332.6832000	132.1401000	321.7357000	3255.7412000
FLUORANTHENE	118.0501949	160.5444530	126.8307879	116.6409639	267.0285968
FLUORENE	137.7252274	187.3012505	147.9692526	136.0811246	310.1101614
FORMALDEHYDE	46.4871177	174.9423525	11.0948678	393295.2932687	18329.5188583
GLYCOL ETHERS	339.6708280	891.9699264	354.2859852	862.6181564	8729.0949424
INDN(123CDPY	39.3500650	53.5146430	42.2769293	38.8803213	88.5694766
LEAD	70.5311620	0.0729000		44.9999991	93.2383284
MANGANESE	186.6155270	2.9433054	2.3252311	2.2634177	812.6188629
MERCURY	48.8901218	3.0919707	0.5497821	7.3220489	1285.6431721
METHYLENE CL	2412.9035920	6336.2445696	2516.7245928	6127.7397896	76446.0592575
NAPHTHALENE	2574.0678785	4377.0866834	2693.3612247	4059.5033975	21028.6534752
NICKEL	133.7967147	0.0294331	0.0232523	0.4213842	580.0287193
PCBS					
PCDD					0.0001669
PCDF					0.0007373
PERC	2906.5309200	24903.3864960	4505.5914280	24083.8986960	243712.2807360
PHENANTHRENE	4810.5454421	6542.1651054	5168.3546072	4753.1195273	10827.8332321
PHENOL				0.0000700	17.9783563
PYRENE	98.3751624	133.7866075	105.6923233	97.2009308	221.6441843
STYRENE					
TCDD,2378					0.0000006
TCDF,2378					0.0000006
TCE,111	12003.8148900	29651.7892320	11777.5421010	28676.0472570	297216.9923319
TOLUENE	17012.4175056	46124.6047298	17891.1179344	47305.6135563	398459.5825024
TOLUENE DIISOCYANATE	0.0000000	8.5924800	3.4128900	8.3097300	31.9732800
TRICHLORETHY	7612.7185180	19990.8717984	7940.2741062	19333.0385534	195636.8849944
TRIFLURALIN	47.0000000	196.8275000	22.6800000	50.0650000	177.6175000
VINYL CHLOR					
XYLENE,M	82.9771000	217.8964800	86.5473900	210.7262300	2132.4026800
XYLENE,O	1891.1089209	3458.3313190	2029.8470226	2349.1819108	15331.9726448
XYLENE,P	82.9771000	217.8964800	86.5473900	210.7262300	2132.4026800
XYLENES ISO	5482.3678755	15572.2571524	5766.1618862	16017.7923249	176951.8163298

Table C-1: Michigan Emissions by County in pounds/year

	Presque Isle	Roscommon	Saginaw	Saint Clair	Saint Joseph
ACENAPHTHEN	72.3123393	66.5153400	103.4723428	123.0641304	101.5188315
ACENAPHTHYL	819.4527459	753.7257218	1172.6616993	1393.8026830	1150.5467572
ACETALDEHYDE					
ACROLEIN					
ACRYLONITRIL					
ANTHRACENE	96.4085525	88.6767078	137.9608696	163.9813908	135.3584420
ANTIMONY			0.5302500	20.3100452	1.8014849
ARSENIC	0.0000218	0.0000331	54.4459863	220.0466864	4.7594008
ATRAZINE	2093.2020000	0.0000000	69001.5856000	88058.3378000	0.0000000
BENZ(A)ANTHR	289.2176294	266.0195424	413.8803182	491.9479783	406.0754674
BENZ(GHI)PE	24.1014631	22.1682873	34.4900248	41.0029108	33.8396105
BENZENE	20440.8825006	22853.2213372	81559.2992367	92759.5356564	38803.5233498
BENZO(A)PYRE	48.2029667	44.3366280	68.9800612	81.9917726	67.6792210
BENZO(B)FLUO	48.2044262	44.3385516	68.9804776	81.9883355	67.6792210
BENZO(K)FLUORANTHENE	24.1014631	22.1682873	34.4900248	40.9941678	33.8396105
BERYLLIUM	0.0000313	0.0000477	0.0707641	20.5933780	0.2161782
BUTADIENE,13	3617.4047666	9916.6096898	74646.8627280	33153.0019461	16149.2428855
CADMIUM	0.5771254	0.5099037	6.5900542	20.8538422	6.7000062
CARBON TETRA	0.0000059	0.0000094	150.6391815	0.0000638	0.0000250
CHLOROFORM	14.2485980	22.6255210	209.8353725	154.3026640	60.4400990
CHROMIUM	0.0120507	0.0110841	0.0193866	491.4940129	3.8515092
CHROMIUM VI	0.0000077	0.0000011	1.4998500	0.9594220	
CHRYSENE	120.5073876	110.8415313	356.3133069	204.9838543	169.2472080
COBALT				23.2888517	5.0956290
COKE OVEN GS					
COPPER	0.0077169	0.0000927		6.8531014	1.0870668
DIBENZAHAN	24.1014631	22.1682873	34.4900248	41.0006283	33.8396105
DIBENZOFURAN	0.1160305	0.1842462	1.7087499	1.2565313	0.4921812
DIBROMOET,12	0.5150575	1.4119581	10.6284552	8.8591686	2.6555431
DIBUTYL PHTH	454.8039835	722.1887430	6697.7778733	4925.2190458	1287.5451772
DICHLORETH12	5.3562664	14.6062527	110.1336102	91.6524176	27.5408444
DIEYLHEX PHT			0.1414000		
DIOCTYL PHTH					
ETHYLBENZENE	1375.3394999	2289.6395697	22800.6043890	23905.6258303	10298.5390621
ETHYLENE OXI	217.1078000	344.7481000	3197.2892370	2351.1304000	920.9339000
FLUORANTHENE	144.6096127	133.0132430	699.6080564	245.9935848	203.1150413
FLUORENE	168.7107218	155.1786437	241.4301736	286.9764670	236.8772735
FORMALDEHYDE	423.2290035	562.7360941	2594.4312152	692.8235324	204.3383658
GLYCOL ETHERS	582.0962056	924.3176012	8572.3767332	6303.7075808	2469.1518628
INDN(123CDPY	48.2029262	44.3365746	11528.6110519	81.9966143	67.6792210
LEAD	0.0059730	39.9999991	0.5636445	332.1177705	220.8167797
MANGANESE	2.8694199	2.7696840	1211.5939516	420.5495447	146.2700312
MERCURY	0.0006115	0.0009803	6.5721101	2595.3995302	5.7305577
METHYLENE CL	4135.0092784	6566.0312168	60919.1692514	45220.3293269	17539.9972792
NAPHTHALENE	3376.8932514	4128.8720335	21279.2348855	17541.3079943	8305.9740820
NICKEL	0.0266334	0.0245706	0.0379390	620.3096486	81.3614023
PCBS					
PCDD					
PCDF			0.0209720		
PERC	4980.9417840	25806.5185680	239336.9011982	196246.5909120	68937.5743920
PHENANTHRENE	5892.8812317	5420.2431149	8432.8112012	10023.1146404	8273.7847687
PHENOL			48.8850021		0.0060536
PYRENE	120.5077956	110.8420691	172.4501240	204.9872803	169.1980525
STYRENE				160296.3574219	
TCDD,2378			16.8484097		0.0000000
TCDF,2378			47.5459350		0.0000002
TCE,111	19351.2111780	30735.7347958	284971.8365910	209555.2970889	82082.1066390
TOLUENE	25512.7477976	43872.4911912	471525.9534511	315967.9821798	1071873.5641804
TOLUENE DIISOCYANATE	5.6074200	8.9040900	82.5789900	60.7245600	15.8477100
TRICHLORETHY	13045.9674436	20715.8494022	192124.5091442	141530.2722660	55338.7472818
TRIFLURALIN	721.7400000	8.3850000	5537.4250000	5879.6275000	0.0150000
VINYL CHLOR					
XYLENE,M	142.1984200	225.7985900	2094.1184900	1539.9125600	603.1812100
XYLENE,O	2346.5392497	2593.3867278	73094.3289643	10266.9336180	40183.7075670
XYLENE,P	142.1984200	225.7985900	2094.1184900	1539.9125600	603.1812100
XYLENES ISO	9237.8630403	15274.6740196	152842.5091529	130320.1189550	69711.1872021

Table C-1: Michigan Emissions by County in pounds/year

	Sanilac	Schoolcraft	Shiawassee	Tuscola	Van Buren
ACENAPHTHEN	72.8470377	44.9869889	79.7841538	97.5095334	128.6194272
ACENAPHTHYL	823.8113071	509.8525406	904.2204093	1105.0906247	1457.6868419
ACETALDEHYDE					
ACROLEIN					
ACRYLONITRIL					
ANTHRACENE	96.9671702	59.9826518	106.3788717	130.0111311	171.4925696
ANTIMONY			2.8205718	0.7689675	
ARSENIC	10.4906917	20.9055999	3.2384343	11.8154331	0.0972176
ATRAZINE	41869.2084000	27133.2386000	92745.2152000	73372.3292000	32952.8570000
BENZ(A)ANTHR	290.7366691	179.9479555	319.1366150	390.0317878	514.4779219
BENZ(GHI)PE	24.2279326	14.9956630	26.5947179	32.5026478	42.8731424
BENZENE	27261.7511187	19166.5274286	37087.2648319	36177.0315016	50947.6062034
BENZO(A)PYRE	48.4566967	29.9913259	53.1894358	65.0053037	85.7465033
BENZO(B)FLUO	48.4866651	29.9913259	53.1894358	65.0055956	85.7462848
BENZO(K)FLUORANTHENE	24.2279326	14.9956630	26.5947179	32.5026478	42.8731424
BERYLLIUM	0.0003578	0.0364044	0.0438756	0.0931036	0.0587127
BUTADIENE,13	13012.2678955	14657.4249946	24430.1833350	15747.7268889	13142.4594602
CADMIUM	1.3916546	2.1602212	2.1786628	4.0472033	1.2390801
CARBON TETRA	0.0000174	0.0000035	0.0000296	0.0000237	0.0000308
CHLOROFORM	42.0491210	8.5424200	71.5601100	57.2134030	74.5261730
CHROMIUM	0.0121140	66.0159989	5.3410442	1.6530536	1.3386959
CHROMIUM VI	0.0000080			0.0000184	0.0000320
CHRYSENE	121.1411412	74.9783148	132.9735896	162.5163292	214.3664053
COBALT			0.2193778	2.1750796	
COKE OVEN GS					
COPPER	0.0006957			5.8341342	0.1556070
DIBENZAHAN	24.2279326	14.9956630	26.5947179	32.5026478	42.8731424
DIBENZOFURAN	0.3424182	0.0695634	0.5827347	0.4659053	0.6068882
DIBROMOET,12	1.8527276	2.0869703	3.4784464	2.2422109	3.5725218
DIBUTYL PHTH	1342.1746990	272.6672929	2298.7673244	6.1737668	2378.8165230
DICHLORETH12	19.2239358	21.4720715	36.0577274	23.2949311	37.0172223
DIEYLHEX PHT			208.9312401		
DIOCTYL PHTH					
ETHYLBENZENE	4093.2993932	1009.0677788	8121.0813431	5684.8585408	7451.5137334
ETHYLENE OXI	640.7081000	130.1620000	1090.3710000	871.7683000	1135.5653000
FLUORANTHENE	145.3851227	89.9739777	159.5683075	195.0262952	257.2524008
FLUORENE	169.6053839	104.9696407	186.1630254	227.5186305	300.1119969
FORMALDEHYDE	8416.5088881	244.5208857	91.5507264	206.1396534	105.7509556
GLYCOL ETHERS	1717.8275212	348.9824240	2923.4362920	2337.3320516	3044.6084956
INDN(123CDPY	48.4558651	29.9913259	53.1894358	65.0052956	85.7462848
LEAD	8.0422964	28.1091196	15.6698437	748.0660591	0.2038500
MANGANESE	5.1496603	1.8533876	33.2204496	432.2815590	15.0404947
MERCURY	0.0014709	0.0436853	0.7834921	0.3691652	0.0716877
METHYLENE CL	12202.8500968	2479.0499360	21392.9360734	16603.5951224	21627.8413384
NAPHTHALENE	5756.5554350	2866.2104290	8578.0492533	7667.9132517	10304.2571535
NICKEL	0.0280421	0.2786070	7.5507789	34.7523615	0.4651220
PCBS					
PCDD					
PCDF					
PERC	47960.9473680	9743.4273600	81621.2773837	65257.2264240	85004.0565840
PHENANTHRENE	5925.2387113	3666.4395932	6502.4085315	7946.9120833	10482.4833188
PHENOL			8.9840436	0.0155123	
PYRENE	121.1495188	74.9783148	132.9735896	162.5133349	214.3657120
STYRENE	0.1957500		2.0893124	888.5939331	
TCDD,2378					
TCDF,2378					
TCE,111	57118.7236361	11601.2356200	97184.3916984	77719.8477470	101238.0424385
TOLUENE	66712.3751945	28710.7367912	188550.3985863	92323.0982851	135472.5331807
TOLUENE DIISOCYANATE	16.5480900	3.3618000	28.1619000	0.0000000	29.3291700
TRICHLORETHY	38500.0309222	7821.4104440	118804.1912020	52384.3954946	92879.7579180
TRIFLURALIN	2354.5900000	1304.7125000	1372.6525000	9877.2925000	596.6525000
VINYL CHLOR					
XYLENE,M	419.6425900	85.2518000	714.1569000	570.9793700	743.7576700
XYLENE,O	2563.3683382	1457.6088551	12250.6017729	4637.5492739	6144.3034739
XYLENE,P	419.6425900	85.2518000	714.1569000	570.9793700	743.7576700
XYLENES ISO	27437.9094288	6427.7307898	55636.7685098	38183.7994938	50089.9236719

Table C-1: Michigan Emissions by County in pounds/year

	Washtenaw	Wayne	Wexford	Pollutant Totals
ACENAPHTHEN	58.5372867	65.4710003	89.8017633	7162.7500623
ACENAPHTHYL	663.4225829	738.9958000	1019.8410772	81176.1092753
ACETALDEHYDE	10.9576950		1390.3559570	11271.5058108
ACROLEIN			1.8538080	14.8961942
ACRYLONITRIL	474.4554977	411.7530060		2279.8753300
ANTHRACENE	78.0497156	86.9646019	135.2054454	9672.7037584
ANTIMONY	6.5211799	12.9089620		308.2088495
ARSENIC	66.5516627	82.2991990	0.8020470	7689.5120229
ATRAZINE	45349.2644000	3689.3762000	1589.2830000	1858748.7322000
BENZ(A)ANTHR	236.2297218	500.4771056	353.5759358	29525.1510634
BENZ(GHI)PE	19.5124289	21.7371398	29.4019534	2385.5813637
BENZENE	73608.4618579	241316.7587199	37389.8637927	3901477.2138795
BENZO(A)PYRE	39.0248578	4834.8398676	58.8784888	12989.1040981
BENZO(B)FLUO	39.0248578	43.4763555	58.7979026	4765.5827192
BENZO(K)FLUORA NTHENE	19.5124289	21.7346778	29.3951128	2382.7024416
BERYLLIUM	2.1323001	4.2779807	39.9999991	1541.0665652
BUTADIENE,13	43085.8071133	223907.5484151	24866.4229856	1852608.0705286
CADMIUM	42.7483887	49.3076968	0.7729957	15899.0925701
CARBON TETRA	0.1899034	0.5237535	0.0000118	152.1442510
CHLOROFORM	293.6248936	2118.9004656	28.4575560	9646.8424372
CHROMIUM	211.7641753	917.0463156	0.7557593	16605.6716509
CHROMIUM VI	0.0000017	0.2807239	0.2622219	118.2941816
CHRYSENE	97.5621445	433.2094153	166.9043688	12808.8293881
COBALT	6.4127077	26.3878422	0.7410617	758.9752197
COKE OVEN GS		343173.8540039		343173.8540039
COPPER	101.8902092	1134.1771873	20.6497159	7495.8127162
DIBENZAHAN	19.5124289	21.7528710	29.3951128	2382.7846311
DIBENZOFURAN	2.3864362	17.2480271	0.2317381	78.5285648
DIBROMOET,12	9.3358155	17.3292945	3.2341133	307.5193107
DIBUTYL PHTH	9097.8128755	61823.2657141	908.3426895	232445.1435252
DICHLORETH12	97.5336439	196.5814031	33.3302420	3215.8082796
DIEYLHEX PHT	18.0293088	15.6466141		293.8990327
DIOCTYL PHTH	18.0293088	15.6466141		74.4630722
ETHYLBENZENE	30416.2867698	217891.1413930	3257.5597802	1084079.8375618
ETHYLENE OXI	7234.8267000	32273.2602000	433.6116000	174704.4676370
FLUORANTHENE	117.9124205	142.4746486	218.0847328	15192.1932326
FLUORENE	136.5870024	152.1936812	210.2173854	16714.9447202
FORMALDEHYDE	620.4627368	5878.1706915	5168.0981915	742262.8004542
GLYCOL ETHERS	11972.1618884	86529.0989304	1162.5730032	393958.4448100
INDN(123CDPY	39.0248578	43.4926690	58.9477993	16226.4073827
LEAD	2235.3296021	12664.1567080	898.0729032	60564.5340435
MANGANESE	121.8175395	3245.4085859	2715.6042281	48539.4833246
MERCURY	4.7626750	204.5185648	3.0124381	16601.5877776
METHYLENE CL	88694.6393493	899852.9994961	8258.5148448	3713082.0787977
NAPHTHALENE	25066.1919537	147938.4726103	7028.8467267	990789.2802500
NICKEL	251.4935275	557.5541926	3.2246006	13323.6994296
PCBS	0.4554773	0.6854429		2.8614395
PCDD	0.0161315	0.0139996	0.0055614	0.8531418
PCDF	0.0721172	0.1040412	0.0245630	0.7636422
PERC	339498.1252640	1929774.0967760	49322.7240480	10779879.1058114
PHENANTHRENE	4770.8878682	5314.5861003	7213.8980183	582884.9214327
PHENOL	426.3566109	617.1246403	180.7785042	105045.8393867
PYRENE	97.6131445	108.7219290	154.7176690	11976.0833992
STYRENE		541.3173969		172092.1973693
TCDD,2378	0.0000135	0.0007112	0.0000167	16.8508679
TCDF,2378	0.0114494	0.0131809		78.1365373
TCE,111	455010.9623403	2952318.2476740	38647.4573160	13267274.1812482
TOLUENE	572177.6007088	3734394.7306739	81309.6946744	30627137.4442924
TOLUENE DIISOCYANATE	112.1586300	762.0331800	11.1992400	2862.6547200
TRICHLORETHY	325837.1804744	2063522.9699639	46933.2812642	10438245.6691679
TRIFLURALIN	650.1650000	152.9925000	39.6100000	93131.8075000
VINYL CHLOR	123.3584270	560107.0557804		574542.1445889
XYLENE,M	2924.6411300	21165.6223807	284.0012400	96277.5740195
XYLENE,O	22473.1177585	168017.4923166	5273.1999513	1447436.1241789
XYLENE,P	2924.6411300	21140.4876599	284.0012400	96242.4417222
XYLENES ISO	205716.2079888	2237370.6482256	21464.6516367	9256321.5677245

Appendix D: Minnesota Toxic Emissions Inventory

INTRODUCTION

Minnesota developed a statewide inventory of the target air toxic compounds for the Great Lakes Air Toxic Emissions Inventory Project for calendar year 1993. Minnesota has a 1990 population of 4,375,099 million people, which represents approximately 5.0 percent of the total population of the Great Lakes region. The table below provides a brief demographic overview of Minnesota's portion of the regional inventory.

Demographic Characteristics for the Minnesota Area of the Great Lakes Region Air Toxics Emissions Inventory

	Minnesota
Total Population, 1990	4,375,099
Urban Population, 1990	3,055,728
Rural Population, 1990	1,319,371

Source: U.S. Bureau of the Census

Generally, the development of the Minnesota portion of the regional air toxics emission inventory follows the instructions illustrated in the protocol document and uses RAPIDS to estimate the emissions. However, because Minnesota does not have air toxic emission inventory reporting requirements for industrial point sources, we have established an alternative approach for development of the Minnesota inventory that meet the protocol requirements. Using this approach, 824 point sources were estimated to have emissions for one or more pollutants listed in the 1996 Great Lakes regional air toxics emission inventory. Also, various area sources were examined and emissions were estimated for 16 area source categories. Presented in the following sections is a detailed discussion on data acquisition, emission estimation, quality assurance and quality control plans, and uncertainties inherent in the inventory.

METHODOLOGY

Data Acquisition

The 1996 Minnesota portion of the air toxic emission inventory includes three principal source categories: point, area, and mobile sources. This report contains two parts: Part 1 for point and area sources, Part 2 for mobile sources. The following sections give separate discussions on emission data acquisition for point and area source categories.

Point Sources

Minnesota does not have air toxic emission inventory reporting requirements for industrial point sources. However, emission data for point sources are collected for the Minnesota criteria pollutant emission inventory (MCEI). Therefore, for the purpose of the Minnesota air toxics emission inventory, point sources are identified as facilities that are required to submit their annual inventories of criteria pollutants (carbon monoxide, nitrogen oxides, particulate matter, particulate matter smaller than 10 microns, lead, sulfur dioxide, and volatile organic compounds) to the Minnesota Pollution Control Agency (MPCA). According to this definition, there were a total of 2586 point sources in Minnesota in calendar year 1996.

To estimate emissions of air toxic pollutants from Minnesota point sources, computer software was developed to convert the MCEI data into the RAPIDS computing environment. The conversion process was started by converting MCEI data into Aerometric Information Retrieval System (AIRS) transaction record formatted data. Then, the AIRS transaction records are converted to RAPIDS format and imported to RAPIDS.

Area Sources

Area sources are stationary sources that are not required to submit criteria pollutant data to the MPCA. The categories of area sources have been determined by the Great Lakes States after reviewing the Emission Inventory Improvement Program (EIIP) documents and other available information. The emission data for area sources were obtained from surveys, literature, and the submittals for the National Emission Standards for Hazardous Air Pollutants. There are 16 source categories included in Minnesota portion of the regional emission inventory: Agricultural Pesticide Applications, Architectural Surface Coatings, Auto Body Refinishing, Chromium Electroplating, Consumer and Commercial Products, Commercial Dry Cleaning, Gasoline Marketing, Graphic Arts, Industrial Surface Coating, Marine Vessel Loading, Municipal Solid Waste Landfills, Public-Owned Treatment Works, Residential Fuel Combustion, Residential Wood Burning, Solvent Cleaners, and Traffic Marking. Table D-1 lists all these categories along with activity data and information sources.

Emission Estimation

Point Sources

RAPIDS was used to compile Minnesota's air toxics inventory for point sources. The approach was to first separately identify each device/process at each facility, and then estimate emissions for each device/process that was identified. The following describes the available emission estimation methods and their prioritization for use in the emission inventory.

1. **Direct reporting values**
   Because Minnesota does not have a rule to mandate point sources to report air toxics emissions, in October 1997, MPCA sent a letter to the top 188 emitters based on the sum of PM and VOC emissions to request that they voluntarily provide emission information. Some facilities responded, including refineries and other manufacturing facilities. This reported information was examined and appropriate emissions were used.
   Also, lead (Pb) emissions were available in the emission inventory for criteria pollutants and reviewed by facilities. These values were adapted to the air toxics emission inventory in order to maintain the consistency in these two MPCA inventories.

2. **Emission factors**

An emission factor is defined as "a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant."[1] Emission factors can be either source-specific or generic. In the current version of RAPIDS, the emission factors from the EPA Factor Information Retrieval (FIRE) Data System, version 6.0, are used as generic emission factors.[2] In most cases, these emission factors are derived from actual measurements of the emissions from representative sources/processes, and are assumed to be the long-term averages for all facilities in the source category. The source-specific emission factors are derived from source-specific emission testing, mass balance, or chemical analysis, therefore, they are preferred for estimating emissions from a source. Some source-specific emission factors were developed based on the information in facility permit applications.

The MPCA has focused on developing source-specific emission factors. Some source-specific emission factors were developed based on the information in facility permit applications and stack testing reports. Metal Mining/Iron Ores Process and Electric Services/Coal Burning facilities were selected for this special effort. These two industrial sectors are not covered by the TRI report but contributed almost 50% of PM emissions from point sources in 1996. A detailed discussion on the development of emission factors and the emission inventory for these two industrial sectors was presented in two papers.[3,4]

In addition, we also developed source-specific emission factors for municipal solid waste incinerators, chromium electroplating facilities, some paper mills, and some facilities manufacturing wood products.

We have noticed that a number of measurements from stack tests or chemical analyses are lower than detection limits. In these situations, the detection limits were used in place of the measurements.

3. **TRI data**
   The TRI report is prepared by the Minnesota Department of Public Safety for manufacturing point sources with certain reporting thresholds. The emission data are facility-based and of unknown accuracy. For many facilities reporting to the TRI, the emission estimates appear to be incomplete in terms of the number of pollutants included. However, when the source-specific or generic emission factors were not available, TRI emissions were used for some facilities.

Area Sources

For area sources, the activity data were pre-treated to a county-level by using spreadsheets. Also, source-specific emission factors and speciation profiles were developed for each area source category. Then, the county-level activity data were imported to RAPIDS and emission estimates were calculated by using the emission factor method and speciation method. In the speciation method, emissions of particulate matter (PM) or total organic gases (TOG) were speciated to individual air toxic compounds using speciation profiles.

Activity Data Pre-Treatment

There are different levels of source activity data available for different categories of area sources. Source activities are any parameters associated with the source that are surrogates for emissions, for example, fuel throughput, solvent usage, or population. Some source categories, such as Dry Cleaning, Chromium Electroplating, Halogenated Solvent Cleaners, need to comply with NESHAPs and the source-level or process-level activity data are available from the initial notification forms. In this case, spreadsheets were used to aggregate emission data for all similar or identical device/processes within each county. For example, county total PCE consumption values were calculated for all dry-to-dry machines with control, all dry-to-dry machines without control, all transfer machines with control, and all transfer machines without control, using PCE consumption data from each individual dry cleaner within the county.

However, for some area sources direct activity data are not available at the county level. In these cases, statewide activity data were apportioned to each county based on appropriate activity indicators. For example, fuel consumption data for Residential Fuel Combustion were calculated from the state fuel consumption by using population data. If state-level activity data were not available, appropriate surrogate activity data were used. For example, county-based population data were used as the most appropriate or applicable activity data for commercial and consumer solvent products and architectural surface coating.

Source-Specific Emission Factors and Speciation Profiles

Since FIRE version 6.01 and SPECIATE version 1.5 only contain scarce emission factors and speciation profiles for area sources, source-specific emission factors and speciation profiles were developed for the area sources included in the Minnesota portion of the regional emission inventory.[2, 5] These emission factors and speciation profiles were compiled from a review of available literature. EPA publications or studies, such as Emission Inventory Improvement Program (EIIP) documents, were given first preference.[6] Information from the California Air Resource Board and other resources were also incorporated. If information was not available for a source category, emission factors for similar processes or sources were used as surrogates such as the use of emission factors for commercial/institution combustion to estimate emissions from residential fuel combustion.

The resulting approaches and methodologies have been documented in the emission estimation protocols for Minnesota area sources.[7]

QUALITY ASSURANCE AND QUALITY CONTROL

To develop a reasonable and comprehensive air toxic emission inventory, procedures have been developed to provide quality assurance/quality control (QA/QC) of the data throughout the entire process of the emission inventory development. Quality assurance is a planned set of external activities that are conducted by personnel not directly involved in the development of the inventory to evaluate data quality. On the other hand, quality control is a planned set of internal activities conducted by inventory development personnel to ensure data accuracy and completeness.

Quality Control

The QC procedures in the inventory development include technical reviews, accuracy checks, and use of approved standardized procedures for emission calculations. The QC activities have been performed and will be performed in the following three aspects.

Activity Data

For point source, the Minnesota emission inventory data for criteria pollutants were used. Using the MCEI data minimized errors in the activity data because these data are the bases for emission fees. For this reason, facilities pay close attention to the quality of these data.

For area sources, the activity data were compared with other states data. Special attention was paid to point and area source reconciliation to eliminate double counting of emissions. This is because a given category of emissions can be comprised of both point and area sources. For example, some of the halogenated solvent cleaners are point sources and are subject to emissions fees, therefore their emissions are included with the point source emissions. To eliminate double counting of emissions, all facilities in area source categories were verified in the MCEI.

Emission Factors

There are many multiple generic emission factors found in FIRE 6.0. To select the appropriate emission factors, each state reviewed a section of FIRE 6.0. The generic criteria for emission factor selection were established after the review process. These selections were then reviewed and subsequently approved by the other states.

The source-specific emission factors for point sources that were developed in Minnesota were based on stack testing data, mass balance, chemical analysis results, available literature, and engineering calculations. These emission factors were reviewed by both the MPCA and the individual facilities. Most of these emission factors were derived from facility air quality permit applications.

Emission Results

To assess the reasonableness of estimated emission results for point sources, the process-based emissions for each pollutant were examined. The extraordinary emission values were re-calculated. The activity data and emission factors which led to the extraordinary emissions were verified. For area sources, the emissions were calculated using the RAPIDS software and spreadsheets. The results from these two approaches were compared and evaluated until a perfect match was reached.

Quality Assurance

The QA plan included the following activities:

- Release of the toxic emission estimates within the MPCA, obtain comments, particularly, from permit engineers and staff working on emission-related projects such as the Mercury Task Force.
- Release of the process-level emission inventories to selected facilities. Requested their voluntary validation of the emission data and estimates. The selection of these facilities was

based on the source-specific emission factor development efforts. The information and comments in the facility responses were also incorporated in the emission inventory.

- Requested technical review at Great Lakes regional level. Minnesota emission estimates were compared with estimates from other Great Lakes States. Extraordinary values, missing pollutants, and extra pollutants were examined.

RESULTS AND DISCUSSIONS

Emissions were estimated for the 82 target compounds in the Great Lakes regional air toxics emission inventory project. However, data were only available to obtain emissions for 65 out of the 82 air toxics. Among the 65 pollutants, 63 pollutants are emitted from point sources, 59 pollutants are emitted from area sources. The summary table (Table D-2) shows the name and the emissions of these 65 pollutants in each county.

It was estimated that 824 out of 2586 point sources emitted one or more pollutants listed in the summary table. Emissions from area sources were calculated for the 16 categories mentioned in the previous section. Point and area source emissions are from 192 distinct standard industrial classification (SIC) codes and 237 distinct source classification codes (SCC).

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UNCERTAINTIES

Although QA/QC plans were established to ensure the best results, there are uncertainties in the Minnesota portion of the Great Lakes regional air toxics emission inventory. Some uncertainties are common for all air toxics emission inventories. For example, not all pollutants are included in the inventory and some emission factors are missing or are of poor quality, resulting in unrepresentative emission estimates. These uncertainties are not discussed here. The following discussions focus on three uncertainties specifically for Minnesota.

Source Classification Code Assignment

Since Minnesota does not have air toxic emission inventory reporting requirements, the emission data in MCEI were used for point sources. These emission data, including facility identification, device identification, process identification, and process activities, were submitted by the individual facilities. However, the quality of a key component, source classification codes (SCC), is in question because these codes have never been reviewed by facilities in the MCEI reporting system. SCC codes are very important for estimating air toxics emissions because all emission factors are directly tied to SCC codes. It is interesting to note that the relationship of emissions and SCC codes for criteria pollutants is not as sensitive as for air toxics. An incrrect SCC assignment may still give correct emission values for criteria pollutants but lead to significant over-estimation or under-estimation of air toxics emissions.

Small Point Sources

Starting with the calendar year 1995 MCEI, facilities who used only VOC-containing materials and used or purchased less than 2000 gallons of VOC-containing materials in a 12 month period were not required to report information on their emission units but rather, reported only facility total VOC emissions or the amounts of VOC-containing materials. Without the information on the emission units and SCC codes, RAPIDS cannot estimate air toxics emissions for these facilities. Relying on the MCEI to convert point source emissions data to the RAPIDS computing environment caused the air toxics emission inventory to be incomplete. The small sources which do not report the process-level information to the MCEI include auto body shops, small painting shops, wood furniture shops, asphalt plants, grain elevators, seed elevators, feed mills, and others. There were 731 facilities in this source category in 1996. One possible way to overcome this deficiency is to treat the small point sources as area sources. The best solution is to collect material usage and composition data from these facilities.

Control Efficiencies

Most of control efficiencies used in the MCEI are default values and may not reflect the operating conditions in facilities. Therefore, uncertainties are introduced for criteria pollutant emission estimates. Due to scarce information on control efficiencies for air toxics, control efficiencies for particulate matter (PM) and volatile organic compounds (VOC) were used for all air toxics in PM format and VOC format, respectively. It is recognized that the control efficiencies for individual air toxics can deviate greatly from the control efficiencies for PM or VOC. However, PM and VOC control efficiencies have to be used until better information is obtained for each individual air toxic. Therefore, it is unlikely there will be a reduction in this uncertainty for some time.

REFERENCES

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3. Jiang, Hongming; Wu, Chun Yi; and Biewen, Todd. *Metals Emissions from Taconite Ore Processing Facilities in Minnesota*; A&WMA Emission Inventory Symposium; New Orleans, LA, Dec. 1998.
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7. *Protocols for Estimating Air Toxic Emissions from Minnesota Area Sources*, Minnesota Pollution Control Agency, Environmental Indicators Unit: St. Paul, MN, 1999; Unpublished Manuscript.

Table D-1: Area source categories and information sources for their activity data.

Source Categories	Sub-Source Category	Emission Estimation Method	Activity Data Information Source
Agricultural Pesticide Application		Use vapor pressure of the active ingredients to determine per acre emission factors. Consider pesticide application and formulation type.	MD of Agricultural U.S. Department of Agricultural
Architectural Surface Coatings		Apply speciation profiles to VOC. VOC emissions are obtained from population-based estimation method	Census data
Auto Body Refinishing		Use per capita emission factor for VOC and apply speciation profiles to VOC emissions.	Census data
Chromium Electroplating		Use both source-specific and generic emission factors. Activity data are source-specific.	NESHAP submittals Phone survey Stack testing reports
Consumer and Commercial Solvent Use		Use national per capita emission factors	Census data
Dry Cleaning	Coin-Op	Survey	No facilities in Minnesota
	Commercial	Use emission factor based on solvent usage and machine type	NESHAP submittals and survey letters
	Industrial	Use emission factor based on solvent usage and machine type	NESHAP submittals and survey letters
Gasoline Marketing	Gasoline Trucks in Transit	Use EPA emission factor for VOC. County activity data are allocated from state fuel consumption based on population. Apply speciation profiles to VOC emissions for air toxics.	MD of Revenue
	Stage I (Delivery to Outlets and Storage Tank Breathing)	Use EPA emission factor for VOC and some air toxics. County activity data are allocated from state fuel consumption based on population. Applied speciation profiles to VOC emissions for air toxics without emission factors.	MD of Revenue
	Stage II (Refueling)	Use EPA emission factor for VOC and some air toxics. County activity data are allocated from state fuel consumption based on population. Applied speciation profiles to VOC emissions for air toxics without emission factors.	MD of Revenue
Graphic Arts		Apply speciation profiles to VOC. VOC emissions are obtained from population-based estimation method	Census data

Source Categories	Sub-Source Category	Emission Estimation Method	Activity Data Information Source
Industrial Surface Coating		Use employee-based emission factors for VOC and apply sepciation profiles to VOC emissions	Census data
Landfills		Create a model based on AP-42, Section 2.4. Most concentrations of air toxics are obtained from MPCA landfill gas study. Use facility-specific activity information.	MPCA Ground Water and Solid Waste Division
Marine Vessel Loading, Ballasting, and Transit		VOC emissions based on estimates of amount and type of products transported to or from the inventory area by waterways and the traffic classification. Air toxics emissions are assumed to be proportional to their vapor phase weight concentrations	US Army Corps of Engineers
Public Owned Treatment Works		Survey to gather annual influent flowrate and chlorine consumption. Treat big facilities based on actual processes. Assume a typical plant then use emission factors for small facilities.	MPCA Water Quality Division, WWTIR
Residential Fuel Combustion		Use population-based fuel consumption and both state - specific and generic emission factors.	MD of Public Service, MN energy data book Census data
Residential Wood Combustion		Use population-based fuel consumption and emission factors	MD of Public Service, MN energy data book Census data
Solvent Cleaning	Cold and Vapor /In-Line Cleaning Equipment: Non-halogenated Solvents	Use employee-based emission factors for VOC and apply sepciation profiles to VOC emissions	Census data
	Halogenated Solvent Cleaning Equipment	Use emission factors and facility-specific data on type of degreasing and solvent consumption	NESHAP submittals Phone Survey
	Solvent Used for Cleanup: Non-halogenated Solvents	Use employee-based emission factors for VOC and apply sepciation profiles to VOC emissions	Census data
Traffic Markings		Use line-mile factor for pain usage. Apply Minnesota specific information from the MSDS for estimating VOC and air toxics.	MD of Transportation

DC = Department of Climatology, University of Minnesota. It provided heating degree days for adjusting the wood consumption.
DNR = Minnesota Department of Natural Resources
MD = Minnesota Department
NESHAP = National Emission Standards for Hazardous Air Pollutants
WWTIR = Wastewater Treatment Facilities Inventory Report

Table D-2: Minnesota Emissions by County in pounds/year

	Aitkin	Anoka	Becker	Beltrami	Benton
ACENAPHTHEN	165.0759593	387.9927732	319.27863	375.0402685	143.2526067
ACENAPHTHYL	3499.527083	8224.341213	6768.667737	7949.313309	3036.25488
ACETALDEHYDE	7.807786251	34.42454134	1.201162191	6752.220537	74.82699
ACROLEIN	0.062504308	4.057131716	0.144859847	1836.849274	0.09976932
ACRYLONITRIL	47.24	594.2279	136.3497	71.5756	0
ANTHRACENE	231.1230152	543.1934836	446.9898973	526.1164207	200.5051085
ANTIMONY	0	0.57225	0	0	0.00626421
ARSENIC	0.569687747	11.84720355	1.074911402	4.448240856	24.02468301
ATRAZINE	67.91400192	1122.842725	2408.679031	380.3183954	6429.178301
BENZ(A)ANTHR	330.1970655	777.1111048	639.1783082	749.9630501	286.5230245
BENZ(GHI)PE	66.02789516	155.1936029	127.7113283	149.9833658	57.26933745
BENZENE	34637.25755	125798.4598	67831.02767	79281.49058	32777.13655
BENZO(A)PYRE	66.02696798	155.1802011	127.7982169	149.9482234	57.26747202
BENZO(B)FLUO	99.04013456	232.7621111	191.5659989	224.9124047	85.90068164
BENZO(K)FLUO	33.01344764	77.59271854	63.85552399	74.97081894	28.63356055
BERYLLIUM	0.138764917	3.192780046	0.296801622	0.393788955	0.340537158
BUTADIENE,13	12547.2293	203162.828	22885.88405	22731.88174	23776.30322
CADMIUM	1.001267912	16.75230897	2.082814446	3.18805456	17.63544549
CARBON TETRA	8.502397282	90.87845884	20.76063819	14.83904928	1.38199E-05
CHLOROFORM	26.47001933	345.5470741	44.6085455	67.25155667	33.403637
CHROMIUM	31.11356562	1564.59368	66.0786838	88.44494233	176.4763304
CHROMIUM VI	0.113022	0.112144	0.0017394	2.51758	32.25009886
CHRYSENE	198.1125333	465.5611929	383.8082403	451.3191679	171.8807827
COBALT	97.47837395	1975.861839	207.3007449	266.5727878	239.1556319
COPPER	8.218308288	1711.324891	16.10036711	25.97823878	11.63358375
DIBENZAHAN	66.02705075	155.197408	127.7114755	149.9416768	57.26712109
DIBROMOET,12	17.82237141	522.5975381	39.95175588	53.43699997	32.24880904
DIBUTYL PHTH	2.610409961	52.9208875	5.556930078	7.024679688	6.404330078
DICHLORETH12	29.70780591	439.7729847	54.37264695	55.03669518	46.63250451
DIEYLHEX PHT	0	0	0	0	0
ETHYLBENZENE	1992.679206	50584.15915	4303.921603	5139.396254	4296.422182
ETHYLENE OXI	2082.075766	60544.86433	4688.225468	6303.006928	3893.234668
FLUORANTHENE	330.2065323	776.6508909	641.0504243	752.8403056	286.5049227
FLUORENE	396.1841246	932.3140013	766.3091037	899.987339	343.6204574
FORMALDEHYDE	328.7279511	6420.393483	665.561721	55897.84299	1277.796866
GLYCOL ETHRS	612.7243008	42758.36875	1312.028898	1669.880406	1466.762898
HEXCLBENZENE	1.81104E-05	0.000299425	0.000642314	0.000101418	0.001714448
INDN(123CDPY	330.1340617	775.8757521	638.5533998	749.7198378	286.3362334
LEAD	4.348388674	831.5230968	508.5478222	26.27020004	410.6894156
MANGANESE	14.57045038	553.9647956	16.30945311	329.5161591	131.4922425
MERCURY	0.172577246	4.060785931	0.368720322	0.701652014	3.107775303
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	1730.794438	67192.36156	3748.492717	4609.595852	5847.996795
NAPHTHALENE	6653.910004	46135.11414	12986.4862	15325.55896	8350.039205
NICKEL	28.93459908	1348.174197	60.67211586	96.24680842	70.96899817
PCBS	0	0.033974701	0.0006045	0	0
PCDD	0.047578516	0.112285526	0.091972454	0.108641063	0.041995388
PCDF	0.26261841	0.618837178	0.507717568	0.610223868	0.230979329
PERC	448.7888805	49298.73014	2091.232024	3442.351281	7775.5374
PHENANTHRENE	1287.58041	3027.155175	2490.402011	2925.846128	1116.814138
PHENOL	17.46490969	38.89592094	31.92764063	22161.7499	24.04428897
PYRENE	396.1755308	931.2450718	766.2708607	900.2306016	343.6335709
STYRENE	2.163990097	116740	0	6.514230194	8740
TCDD,2378	0.000122471	0.000291806	0.000236761	0.00027999	0.000108733
TCDF,2378	0.007264336	0.01807748	0.014051136	0.186303335	0.006302811
TCE,111	5332.11904	107890.8469	11340.08955	14342.55108	13044.609
TOLUENE	58059.93032	706904.9941	109365.1962	121786.9846	77756.07921
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	61.05950968	20475.71647	327.4110658	107.4937324	7631.661602
TRIFLURALIN	11.425752	30.70696992	352.058978	1.114020356	101.4044164
VINYL CHLOR	47.67394265	310.9107328	70.80769	106.8188921	0
XYLENE,M	585.2276841	10835.30372	1326.347178	1604.731896	1138.36182
XYLENE,O	4087.487099	26679.93243	8201.940469	9643.117897	4146.300981
XYLENE,P	286.5526546	5976.387466	737.3848274	707.395885	643.2642158
XYLENES ISO	18740.37413	512405.4299	41302.08511	47672.56717	49182.40948

Table D-2: Minnesota Emissions by County in pounds/year

	Big Stone	Blue Earth	Brown	Carlton	Carver
ACENAPHTHEN	15.96400024	137.1729408	72.69010422	208.6575205	84.34071465
ACENAPHTHYL	338.4368052	2907.506565	1540.859067	4412.693695	1787.83418
ACETALDEHYDE	0	17.14386036	5.241435014	2987.513669	5.787417828
ACROLEIN	0	2.067545089	0.632115696	190.2854286	0.697961081
ACRYLONITRIL	17.88844	160.6801	63.44874	43.60557	0
ANTHRACENE	22.34960034	192.0394796	101.7653395	290.9855526	118.0761101
ANTIMONY	0	3.99	2.408035205	50.62517879	2.723795738
ARSENIC	0.217869451	16.8552826	41.53146558	185.9154333	6.75720163
ATRAZINE	6148.469004	17059.96195	14035.53375	126.7717538	5650.432471
BENZ(A)ANTHR	31.95312074	274.5539257	145.4902294	417.1856592	168.9229192
BENZ(GHI)PE	6.385600098	54.86741052	29.07550183	82.97593623	33.73568976
BENZENE	4199.286688	45932.72303	19249.82291	46592.22246	28311.82612
BENZO(A)PYRE	6.385600098	54.86068261	29.07344489	82.95418638	33.73341856
BENZO(B)FLUO	9.578400146	82.28693577	43.60891745	124.4235802	50.59874776
BENZO(K)FLUO	3.192800049	27.43170477	14.5371393	41.47647152	16.86716956
BERYLLIUM	0.060004537	1.072806643	0.344266342	1.068400103	0.88777459
BUTADIENE,13	5175.84843	40902.55648	24223.31986	25432.11145	43219.23622
CADMIUM	0.305555509	22.65205207	5.761101416	14.03911713	10.60791015
CARBON TETRA	2.723602436	98.45337246	18.85929204	751.4151705	7.443984732
CHLOROFORM	7.937334	493.6278097	87.1375994	2753.500486	100.8546849
CHROMIUM	13.40648082	151.1037079	340.9825234	286.959388	139.3456215
CHROMIUM VI	0	0	0	17.113058	0
CHRYSENE	19.15680029	164.5932916	87.21889276	249.571567	101.2081556
COBALT	42.10940385	403.4967341	198.0377035	378.7475351	426.3423984
COPPER	1.608196831	119.5286251	30.79358797	53.12284087	51.770039
DIBENZAHAN	6.385600098	54.86951159	29.07614419	82.95729609	33.73639904
DIBROMOET,12	4.304191078	62.69395108	30.78448852	22.19467202	77.07467131
DIBUTYL PHTH	1.128790039	10.51365	15.73985	5.847439844	11.24477031
DICHLORETH12	11.38988874	193.9320931	64.67483723	52.88908094	95.13997603
DIEYLHEX PHT	0	0	149.14	0	0
ETHYLBENZENE	803.4525486	7680.864556	3774.021587	4017.803347	18383.18809
ETHYLENE OXI	524.9467665	7447.9062	3636.5959	2719.367464	9089.878672
FLUORANTHENE	31.9285452	274.4792333	145.4154383	417.0226783	168.7357297
FLUORENE	38.31360059	329.7915565	174.6325045	498.3147136	202.6123293
FORMALDEHYDE	134.7782451	1438.137822	671.7830064	508795.0477	2580.613248
GLYCOL ETHRS	253.6807002	14039.6365	1226.3055	1314.135203	13694.04409
HEXCLBENZENE	0.001639592	0.004549323	0.003742809	3.38058E-05	0.001506782
INDN(123CDPY	31.92800049	274.2907843	145.3633634	414.7516855	168.6628296
LEAD	1.736335765	7616.172386	60.35878246	16.46790441	18.20421405
MANGANESE	2.478724658	388.7519066	39.4657196	336.775533	43.13232487
MERCURY	0.072522414	10.03177497	2.797425743	30.95595596	1.883078843
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	716.1599944	7227.957809	3453.886096	6019.828074	80557.71841
NAPHTHALENE	1262.388757	11001.96017	5865.592035	11970.80113	9917.147972
NICKEL	12.25308184	299.757052	84.60636859	1237.917942	248.2163777
PCBS	0	0	0	0	0
PCDD	0.004601867	0.039536112	0.020951841	0.061348197	0.024329229
PCDF	0.02539659	1.745542801	0.115626772	0.334123608	0.134222469
PERC	186.49735	10356.17457	933.1521396	4743.27592	4857.746768
PHENANTHRENE	124.5192019	1070.358513	567.1080333	1618.911393	657.9958384
PHENOL	1.596400024	13.71412012	13.68106004	172.68016	8.433
PYRENE	38.31360059	329.2457246	174.4656259	498.0444861	202.4280676
STYRENE	0	122.1942018	16.67144753	327.7800003	12.26780396
TCDD,2378	1.19142E-05	0.000102424	5.4257E-05	0.000162665	6.34089E-05
TCDF,2378	0.00070302	0.00603984	0.003200774	1.02796341	0.003716538
TCE,111	2301.987	21873.41858	10859.56169	13136.9174	22947.33698
TOLUENE	22503.02742	149544.229	71501.45007	86607.27345	159427.8939
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	21.667816	465.4324152	248.1048598	344.7493663	55.88105148
TRIFLURALIN	746.2507967	1216.85295	959.7713434	1.671030534	239.9428358
VINYL CHLOR	9.289639	1390.050423	195.2843059	22.64479	131.2133135
XYLENE,M	241.8635753	2286.65928	1167.610473	1170.104711	2366.136334
XYLENE,O	567.4189175	5671.17534	2725.615793	12034.82831	5026.922447
XYLENE,P	121.9356793	1304.806287	615.0875853	614.7082419	1453.902166
XYLENES ISO	7473.298943	80666.75614	76000.10616	38423.39859	147066.8094

Table D-2: Minnesota Emissions by County in pounds/year

	Cass	Chippewa	Chisago	Clay	Clearwater
ACENAPHTHEN	269.2146046	35.80699951	149.2590866	128.2486733	91.88240234
ACENAPHTHYL	5707.331789	759.1083896	3164.142885	2718.754214	1947.90693
ACETALDEHYDE	0.545982814	0	4.586255638	3.603486572	58.44657
ACROLEIN	0.065845385	0	0.553101234	0.434579541	0
ACRYLONITRIL	47.9551	72.12806	158.4151	134.515	0
ANTHRACENE	376.9003624	50.12979932	208.9620156	179.5475883	128.6353633
ANTIMONY	0	0.140472033	0.6405	16.5375	0
ARSENIC	0.963706344	0.670855596	2.584865663	55.08529776	0.311053462
ATRAZINE	923.6272192	12115.8327	3069.706377	3622.071489	389.3714923
BENZ(A)ANTHR	538.5303147	71.66962591	298.6688209	256.715552	194.898119
BENZ(GHI)PE	107.6857856	14.3227998	59.70316224	51.29909818	36.75296094
BENZENE	56566.502	10062.8837	36149.13814	34027.89423	19284.53207
BENZO(A)PYRE	107.6855713	14.32279995	59.70136242	51.29768403	36.75296094
BENZO(B)FLUO	161.5282268	21.48419971	89.55094999	76.94566676	55.12944141
BENZO(K)FLUO	53.84282909	7.161399902	29.85104596	25.64912861	18.37648047
BERYLLIUM	0.290893185	0.188309841	0.453982025	2.682398156	0.085668823
BUTADIENE,13	18706.13205	11402.16088	33975.29243	32157.05546	6392.334011
CADMIUM	1.89822926	0.771859465	4.09582913	58.50567006	26.18636048
CARBON TETRA	8.001500879	16.67834697	28.06709636	34.75237445	0.29033917
CHLOROFORM	33.3596242	53.6172916	77.51252147	148.898165	10.05377295
CHROMIUM	55.510831	31.12107271	85.48577035	225.3893869	68.34611465
CHROMIUM VI	0	8.595E-07	0	0	0
CHRYSENE	323.0565638	42.96839956	179.1053876	153.9582108	110.2588828
COBALT	170.8687863	93.46030562	265.9718465	421.6936619	60.11984104
COPPER	13.47645715	4.724665184	11.90938384	17.75207799	260.6262892
DIBENZAHAN	107.6858525	14.3227998	59.70372431	51.29953981	36.75296094
DIBROMOET,12	17.2971419	25.55198321	41.2201128	41.70484642	6.072102446
DIBUTYL PHTH	4.580330078	2.49945	7.081110156	10.05005	1.61157998
DICHLORETH12	40.98734825	35.30143382	83.08283383	92.2610673	12.93807995
DIEYLHEX PHT	0	0	0	0	0
ETHYLBENZENE	3167.618423	2085.891038	5386.171394	6935.246852	1065.87797
ETHYLENE OXI	2130.094468	2938.7976	4858.388536	5160.9812	749.469533
FLUORANTHENE	538.4352402	71.61520545	298.5535956	256.6158495	188.2045624
FLUORENE	646.1334108	85.93679883	358.3760303	307.9179909	220.5177656
FORMALDEHYDE	554.2971529	302.6346604	858.2932367	1817.610697	1394.681782
GLYCOL ETHRS	1029.368898	615.0645	1638.392297	2273.2465	362.1814004
HEXCLBENZENE	0.000246301	0.003230889	0.000818588	0.000965886	0.000103832
INDN(123CDPY	538.4274544	71.61399902	298.5034337	256.4857657	183.7648047
LEAD	7.045589522	24.42234813	10.89235801	9335.459263	2.478976603
MANGANESE	13.79891706	9.279173604	17.27577779	45.66559448	301.3852581
MERCURY	0.351340959	0.692638019	2.833109388	11.7663574	24.62890517
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	2866.963156	1790.29427	4697.56084	6442.34323	979.6570958
NAPHTHALENE	10851.60856	2818.05349	9443.803957	10072.8375	3744.657914
NICKEL	50.34732177	28.71896912	105.853673	856.8027499	442.9927729
PCBS	0	0	0	0	0
PCDD	0.0775507	0.010321794	0.043010739	0.036971403	0.026468178
PCDF	0.428105731	0.056963752	0.237395204	0.204027914	0.146112765
PERC	736.6644383	2328.842896	1252.847671	9107.8049	241.6871639
PHENANTHRENE	2099.886959	279.2945962	1164.330443	1000.425741	716.6827383
PHENOL	26.92135938	3.580699951	14.92505957	12.8242002	56.16744523
PYRENE	646.1160276	85.93679883	358.2300116	307.8032619	220.5177656
STYRENE	3286.155294	9.393402466	15409.51884	23.5638	0.479066987
TCDD,2378	0.000199627	2.67205E-05	0.000111078	0.000095797	6.8137E-05
TCDF,2378	0.01184785	0.001576846	0.006570816	0.005648027	0.004043688
TCE,111	9341.067024	5135.674994	14471.20644	20575.1598	3284.233332
TOLUENE	89285.62553	48351.54831	97831.6663	124346.0543	36289.33376
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	64.61472521	102.8768518	198.8241329	218.9732271	5.180633271
TRIFLURALIN	1.114020356	983.337147	112.1161421	566.2936817	5.355866925
VINYL CHLOR	37.25822466	137.9188565	151.9726426	321.828324	5.123182757
XYLENE,M	886.0972123	695.4604728	1615.755564	1623.433365	285.6467651
XYLENE,O	6402.002798	1735.909625	4924.208704	4638.643527	2175.902455
XYLENE,P	464.534826	395.0290473	787.8971898	850.1337663	154.2708054
XYLENES ISO	29274.25734	21411.74186	50241.44807	61903.26389	14071.62131

Table D-2: Minnesota Emissions by County in pounds/year

	Cook	Cottonwood	Crow Wing	Dakota	Dodge
ACENAPHTHEN	33.4184814	34.83580275	561.0914103	474.9319596	40.98339844
ACENAPHTHYL	708.1799435	738.5154528	11895.09511	10066.81927	868.8480469
ACETALDEHYDE	30.63839313	0.109196563	1.310358754	53.24871105	0
ACROLEIN	0.066898154	0.013169077	0.158028924	6.420403875	0
ACRYLONITRIL	6.862776	19.33535	57.72343	1067.089453	33.92702
ANTHRACENE	46.78573896	48.77010705	785.5277729	705.8219537	57.37675781
ANTIMONY	0.0149552	0	0	284.0140453	0
ARSENIC	105.8574157	0.47150725	10.75257199	170.092791	0.620713387
ATRAZINE	15.12314947	16127.27895	1014.180337	9028.016279	10241.41228
BENZ(A)ANTHR	67.41867411	69.72553282	1122.390396	951.1579447	82.03836485
BENZ(GHI)PE	13.35510067	13.93430985	224.4364292	189.9673062	16.39335938
BENZENE	7523.662318	9385.867019	118997.6583	180569.9412	11822.06608
BENZO(A)PYRE	13.46140379	13.934267	224.4359215	189.9467185	16.39335938
BENZO(B)FLUO	20.03018886	20.90137446	336.6535599	295.6132198	24.59003906
BENZO(K)FLUO	6.676764349	6.967142184	112.2180617	94.97743485	8.196679688
BERYLLIUM	12.62200842	0.130615001	0.504071562	8.734334623	0.170953847
BUTADIENE,13	4300.473038	11492.72393	39880.46207	231871.4826	13500.07044
CADMIUM	7.309756038	0.665157464	4.214840896	62.66670547	0.860636118
CARBON TETRA	2.5827205	7.071348949	16.06920029	274.3111598	9.457648404
CHLOROFORM	13.79813207	38.32913313	96.99728665	1122.385855	45.0175674
CHROMIUM	228.5732337	28.90108324	218.7954232	3267.289472	38.19481926
CHROMIUM VI	0.4685808	0	78.9	0.004902857	0
CHRYSENE	40.9470783	41.80277096	673.3090968	569.8277507	49.18007813
COBALT	31.10127765	90.67591547	351.2779066	2326.766579	119.970336
COPPER	2.374539371	3.478625003	27.96479785	886.7451861	4.428835773
DIBENZAHAN	13.35360643	13.93432324	224.4365898	189.9738247	16.39335938
DIBROMOET,12	8.038858549	18.52069983	59.62945992	449.9974771	30.34131464
DIBUTYL PHTH	0.81947002	2.430669922	9.4164	61.9350125	3.215940039
DICHLORETH12	11.04505545	29.60161304	92.23946654	579.3997361	34.79962052
DIEYLHEX PHT	0	0	0	796.0994	0
ETHYLBENZENE	646.488171	1815.323256	6761.414933	63372.41783	2481.241787
ETHYLENE OXI	922.021867	2153.465432	7038.2931	52899.21878	3510.964064
FLUORANTHENE	69.94038205	69.67347014	1122.237405	950.2300838	81.96834876
FLUORENE	80.14112489	83.60959856	1346.663448	1141.62696	98.36015625
FORMALDEHYDE	174.2409104	291.0719667	3369.936715	24366.44359	384.4928909
GLYCOL ETHRS	200.4090996	576.9841016	2196.067	151551.1233	783.2622031
HEXCLBENZENE	4.03284E-06	0.004300608	0.000270448	0.002407471	0.002731043
INDN(123CDPY	66.76773987	69.67125456	1122.178609	949.6928274	81.96679688
LEAD	1001.824569	3.738923317	54.48456503	13435.78863	4.946847097
MANGANESE	288.9849582	5.353220771	27.97184801	722.3188573	6.985453553
MERCURY	3.002744592	1.139934498	5.094971932	115.1865192	0.206617471
METHENE(B)4-	0	0	0	1529.55	0
METHYLENE CL	553.3097732	1598.632032	6042.30969	47487.45254	9290.007792
NAPHTHALENE	1607.983926	2758.059323	22655.31547	67590.50359	3400.549921
NICKEL	188.6532703	26.39582408	102.8399447	4623.894442	34.90292009
PCBS	0.000744	0	0.003517152	1.583194	0
PCDD	0.009739232	0.010041773	0.161666233	0.137020091	0.011815285
PCDF	0.053627386	0.055418385	0.892388341	0.778581357	0.065203005
PERC	142.1263729	416.7322522	2620.398153	78796.34014	550.1430551
PHENANTHRENE	260.4727071	271.7218702	4376.544306	3705.741199	319.6705078
PHENOL	7.292960107	3.483560059	56.10889844	2806.759163	4.098339844
PYRENE	80.14317087	83.60612193	1346.621729	1139.931942	98.36015625
STYRENE	2.539548019	6.812196039	11.952825	2664.226685	7.079792825
TCDD,2378	2.51421E-05	2.59955E-05	0.000416047	0.000356895	3.0615E-05
TCDF,2378	0.001469317	0.001534067	0.024794433	0.020925726	0.001804991
TCE,111	1679.219885	4978.105016	19231.80566	126794.0935	6580.825227
TOLUENE	19910.57682	43475.41267	166656.7453	894266.2681	62566.03984
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	14.908497	41.56506513	111.1585077	7971.348606	59.48837322
TRIFLURALIN	1.106879157	1142.584896	1.663889335	425.6128744	592.7159233
VINYL CHLOR	30.71720689	82.88889594	158.0294917	1154.502614	93.33370756
XYLENE,M	219.8595307	554.6170811	2095.567312	13174.08623	821.2538361
XYLENE,O	990.4948291	1457.729249	14030.89419	195586.4569	2044.142812
XYLENE,P	123.41968	298.2634803	1216.396807	7424.375445	505.6504698
XYLENES ISO	6840.228234	18233.44625	67960.48274	477057.5768	35619.99513

Table D-2: Minnesota Emissions by County in pounds/year

	Douglas	Faribault	Fillmore	Freeborn	Goodhue
ACENAPHTHEN	138.6672739	45.92005211	92.29653117	89.24530638	187.1574937
ACENAPHTHYL	2939.624981	973.4195334	1956.547094	1891.825787	3967.599814
ACETALDEHYDE	3.712832096	2.620717507	6.19429001	5.350631577	7.058665949
ACROLEIN	0.447748618	0.316057848	0.425010464	0.645284773	0.513594003
ACRYLONITRIL	64.98236	78.01349	15.69594	155.7445	88.33276
ANTHRACENE	194.1336123	64.28766977	129.2445221	124.9426058	262.0198361
ANTIMONY	0.17325	0	0	0	5.575009942
ARSENIC	1.469235654	0.644671677	0.84623542	1.222117082	50.14381658
ATRAZINE	5170.507822	19867.06846	14741.83635	17431.22391	13492.2215
BENZ(A)ANTHR	277.4597011	91.90647726	184.6717165	178.6207771	374.4893694
BENZ(GHI)PE	55.46652717	18.36775091	36.91810856	35.69757145	74.86255886
BENZENE	33783.57866	13212.62716	22468.44577	24290.99116	45503.17812
BENZO(A)PYRE	55.57142389	18.36820223	36.91582827	35.69547165	74.86479646
BENZO(B)FLUO	83.19671993	27.54945873	55.37265265	53.54193156	112.2903159
BENZO(K)FLUO	27.73283036	9.18356965	18.45810654	17.84816137	37.43078249
BERYLLIUM	0.336666883	0.188874055	0.211253151	0.343948638	0.921081297
BUTADIENE,13	26680.36098	15109.10343	17370.06059	27256.99269	35620.39887
CADMIUM	6.545156147	0.949998115	1.170429153	1.744997293	68.24110856
CARBON TETRA	17.59395776	15.29803649	7.489029118	38.96812273	31.21915083
CHLOROFORM	81.76953313	44.82950527	51.44785493	136.990713	153.4182131
CHROMIUM	70.2450781	37.97597921	47.31972833	74.10157287	224.0498868
CHROMIUM VI	0	0	0.0414	0	21.361945
CHRYSENE	166.3948822	55.09980022	110.7847105	107.084943	224.5981562
COBALT	219.6985224	117.7589022	148.3681955	231.761198	314.1348425
COPPER	10.30162337	4.593036981	7.059699566	8.897853099	14.96684297
DIBENZAHAN	55.46698218	18.3680721	36.91745681	35.69822719	74.86308078
DIBROMOET,12	44.08617339	14.58467622	79.17962769	53.34480153	217.4031628
DIBUTYL PHTH	5.876130078	3.156659961	3.974039844	6.212619922	8.120979688
DICHLORETH12	67.54612124	39.78502652	42.247926	85.36297543	100.6190955
DIEYLHEX PHT	0	0	0	0	0
ETHYLBENZENE	4411.358702	2623.77461	3593.420906	4964.95374	8266.700624
ETHYLENE OXI	5137.835728	1744.935866	8959.685864	6190.989972	24483.55709
FLUORANTHENE	277.3614196	91.861106	184.6915912	178.526981	374.3753496
FLUORENE	332.9263043	110.2962522	221.6304737	214.3686616	449.3211916
FORMALDEHYDE	26410.11821	385.748838	486.42152	753.702277	1816.889368
GLYCOL ETHRS	1392.808906	717.7338008	1106.673203	1501.357594	2446.839375
HEXCLBENZENE	0.001378802	0.005297885	0.003931156	0.004648326	0.003597926
INDN(123CDPY	277.322616	91.83168171	184.5760183	178.4734168	374.3013009
LEAD	689.0388244	224.855661	6.513477629	9.556422475	10432.58099
MANGANESE	14.13319211	7.071372884	17.35007149	13.74241287	32.30300679
MERCURY	52.42856547	0.228865923	0.262416568	0.788753448	48.00728404
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	3879.553271	2088.0945	2936.450921	4341.565883	24545.85624
NAPHTHALENE	8171.981213	3634.607946	5439.598243	6916.564308	11117.2278
NICKEL	71.70980206	34.41922504	43.69295822	67.53889145	317.5518224
PCBS	0.0020925	0	0	0	0
PCDD	0.039956242	0.013235421	0.026604367	0.025723104	0.058173345
PCDF	0.22054203	0.073043843	0.146832722	0.141960402	2.240975391
PERC	4887.173852	580.6112344	650.2472124	1401.6636	6638.415642
PHENANTHRENE	1081.693434	358.2390167	720.0238554	696.241219	1459.930193
PHENOL	45613.86604	4.59152002	9.579700195	8.923540039	18.71496094
PYRENE	332.8080986	110.212813	221.5256114	214.1983065	449.1856028
STYRENE	12.69519604	7397.646567	45191.99681	25.213425	5231.340587
TCDD,2378	0.000103134	3.42593E-05	6.86798E-05	6.65893E-05	0.000146332
TCDF,2378	0.006115003	0.002021958	0.004062755	0.003929683	0.008407642
TCE,111	12024.02102	6461.947332	8126.782371	12768.1123	16659.16004
TOLUENE	95171.42986	60110.24251	102911.8474	111622.693	224625.8776
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	111.3108037	102.4496082	45.2239366	235.0626676	178.311493
TRIFLURALIN	320.6378985	1078.314566	507.0220703	1031.182864	506.3079608
VINYL CHLOR	169.523356	100.8936422	98.06384895	350.4579133	359.616781
XYLENE,M	1394.578209	902.4861316	1009.75952	1498.106136	2140.06805
XYLENE,O	4664.650324	1824.338087	4283.257783	3938.468893	10003.51967
XYLENE,P	783.0524757	530.9268688	598.7479654	798.0675625	1216.697256
XYLENES ISO	44601.37085	26121.68318	47942.66739	69551.91551	93268.45087

Table D-2: Minnesota Emissions by County in pounds/year

	Grant	Hennepin	Houston	Hubbard	Isanti
ACENAPHTHEN	16.88119995	1767.825054	83.14984113	187.1848361	116.3304004
ACENAPHTHYL	357.881439	37475.27057	1762.701757	3967.80293	2466.204488
ACETALDEHYDE	0	54.27069171	2.293127819	7935.100951	0
ACROLEIN	0	6.545031269	0.276550617	72139.63077	0
ACRYLONITRIL	0	554.7399	26.31348	96.35648	44.53499
ANTHRACENE	23.63367993	2474.890949	116.4094248	261.9913531	162.8625605
ANTIMONY	0	29.2277164	0	0	0.131548402
ARSENIC	0.228100994	110.3701766	0.705756196	1.624061118	1.096826701
ATRAZINE	5487.441504	1955.920056	6012.64125	1231.505112	4138.218062
BENZ(A)ANTHR	33.78869984	3540.023988	166.3775875	374.3534834	232.7838862
BENZ(GHI)PE	6.75247998	707.1089489	33.25970026	74.85145114	46.53216016
BENZENE	4671.292416	540446.7303	19718.90652	52049.97488	27995.27525
BENZO(A)PYRE	6.75247998	707.0874147	33.25880035	74.85056592	46.53216016
BENZO(B)FLUO	10.12871997	1060.617731	49.8876537	112.2754178	69.79824023
BENZO(K)FLUO	3.37623999	353.5478736	16.62958255	37.425365	23.26608008
BERYLLIUM	0.062822461	17.53779131	0.194375913	0.166045208	0.295986364
BUTADIENE,13	5658.820671	779295.9822	16001.57849	13193.25375	24919.33608
CADMIUM	0.320273463	122.082092	1.058953965	1.357297291	1.606129766
CARBON TETRA	0.12144748	85.69930384	9.709550293	14.67073674	10.61916578
CHLOROFORM	6.84777	1143.858281	54.47214133	27.33335	55.36186673
CHROMIUM	14.03609075	5469.264096	43.4314782	38.62140273	87.97457046
CHROMIUM VI	0	2737.742545	0	0.768706	0
CHRYSENE	20.25743994	2121.264372	99.77577022	224.5650917	139.5964805
COBALT	44.08693957	7665.07753	136.4072599	118.0341512	206.3841105
COPPER	1.689415758	2917.768635	6.278225305	9.372233709	16.94894882
DIBENZAHAN	6.75247998	707.1154601	33.2599813	74.85123526	46.53216016
DIBROMOET,12	4.526061466	2065.121101	18.65418042	20.55159682	36.99657959
DIBUTYL PHTH	1.1818	203.7611735	3.65655	3.1236	5.5309
DICHLORETH12	11.26330112	1568.450186	41.11691135	32.57145828	57.56610124
DIEYLHEX PHT	0	1.055328	0	0	0
ETHYLBENZENE	797.5617369	155040.276	2578.474963	2447.897591	4043.324423
ETHYLENE OXI	549.5992	239053.0575	2228.3265	2421.069	4328.002
FLUORANTHENE	33.76297019	3536.395744	166.3157078	374.2956118	232.6634698
FLUORENE	40.51487988	4244.510043	199.63673	449.1580993	279.1929609
FORMALDEHYDE	141.1219306	25994.35055	440.7972484	303610.5896	661.3893954
GLYCOL ETHRS	265.594	69140.0665	837.6125	731.07	1295.725
HEXCLBENZENE	0.001463318	0.000521579	0.001603371	0.000328401	0.001103525
INDN(123CDPY	33.7623999	3535.396104	166.2923126	374.2515858	232.6608008
LEAD	1.817877271	6158.386919	5.624605798	4.949376614	8.847982069
MANGANESE	2.597977602	2208.976927	8.563819356	112.5667603	129.8262526
MERCURY	0.0759282	122.4523984	0.235825654	0.276626408	0.360790159
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	717.90183	139221.0793	2330.534764	2127.15306	3570.482289
NAPHTHALENE	1349.677439	185663.4475	4938.413992	7572.448492	7249.901229
NICKEL	12.82874378	3622.351842	39.73607338	40.60534904	67.26696438
PCBS	0	0.031981835	0	0	0
PCDD	0.00486622	0.513195826	0.023959651	0.054104364	0.033523907
PCDF	0.026855587	2.826270133	0.132246297	0.298453324	0.1850331
PERC	176.439	380867.3677	2317.437139	2699.0546	2168.797177
PHENANTHRENE	131.6733596	13790.02209	648.6235447	1459.650978	907.377123
PHENOL	1.688119995	178.3401386	8.31455957	7035.072033	11.63304004
PYRENE	40.51487988	4242.782102	199.5637206	449.1152097	279.1929609
STYRENE	0.19875	66641.33558	9.413594806	1767.663806	6.223578214
TCDD,2378	1.25977E-05	0.001352318	6.18544E-05	0.000139353	8.65787E-05
TCDF,2378	0.000743405	0.078896246	0.003660363	0.008235189	0.005121498
TCE,111	2407.845	483978.2625	7485.356619	6377.47	11294.66609
TOLUENE	29968.10862	2909390.111	52375.67599	73978.07924	77751.2808
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	3.46368569	261751.3068	57.77261373	109.15134	74.76532503
TRIFLURALIN	806.23647	89.97856344	99.26206418	1.114020356	154.9630805
VINYL CHLOR	2.12766747	316.166049	114.330461	50.03884	89.83187956
XYLENE,M	297.193995	44311.47825	715.5913516	698.5203167	1148.125374
XYLENE,O	630.0771975	108118.246	2543.619694	4681.456896	3887.015082
XYLENE,P	181.4603184	26979.09851	363.8953427	346.8235552	592.417773
XYLENES ISO	20993.58364	1790089.448	24552.97	25393.36725	38708.77669

Table D-2: Minnesota Emissions by County in pounds/year

	Itasca	Jackson	Kanabec	Kandiyohi	Kittson
ACENAPHTHEN	472.3622547	31.58159912	59.83044266	106.2665538	15.14880005
ACENAPHTHYL	10005.25176	669.5299014	1268.33764	2252.601357	321.154561
ACETALDEHYDE	1122.643868	0	2.074734693	7.643759396	0
ACROLEIN	57.87626761	0	0.250212463	0.92183539	0
ACRYLONITRIL	141.4894	21.24948	46.96787	86.4167	27.4922
ANTHRACENE	660.0585733	44.21423877	83.76230054	148.7719993	21.20832007
ANTIMONY	75.77731815	0	0	0	0
ARSENIC	292.4634314	0.431744873	0.507216239	99.57556873	0.202980545
ATRAZINE	39.20805038	17720.99314	1883.476362	13709.54689	344.0965485
BENZ(A)ANTHR	950.6743955	63.2129102	119.7161613	212.6970324	30.32100366
BENZ(GHI)PE	188.5313056	12.63263965	23.93196337	42.50583421	6.05952002
BENZENE	102920.9081	8279.323502	14005.16165	28723.37858	3971.048991
BENZO(A)PYRE	188.5235737	12.63263965	23.93114916	42.50283853	6.05952002
BENZO(B)FLUO	282.7825285	18.94895947	35.896229	63.75242902	9.089280029
BENZO(K)FLUO	94.26158951	6.316319824	11.96573959	21.25202517	3.02976001
BERYLLIUM	1.564948113	0.119097761	0.139883705	0.420226818	0.05590391
BUTADIENE,13	35923.28556	10555.9545	9687.716395	33387.83423	4754.254482
CADMIUM	34.72847259	0.606204193	0.762023462	9.924306927	0.285280937
CARBON TETRA	69.15720955	3.865294866	9.185153917	24.65733556	4.185819269
CHLOROFORM	289.1899376	17.6640532	30.6274533	116.3814449	8.635465
CHROMIUM	431.3086824	26.53896276	31.18532428	93.67726291	12.49032776
CHROMIUM VI	14.210734	0	0	0	0
CHRYSENE	565.8179941	37.89791895	71.79287674	127.5064049	18.17856006
COBALT	309.9320737	83.33281648	97.91978185	294.1633644	39.23170444
COPPER	193.6977986	3.182199323	4.511597958	11.05809537	1.507670613
DIBENZAHAN	188.5248503	12.63263965	23.93221764	42.50677099	6.05952002
DIBROMOET,12	58.41126151	21.40888043	9.838218889	35.90321501	4.005023431
DIBUTYL PHTH	139.7414593	2.233830078	2.62485	7.885379688	1.05165
DICHLORETH12	85.6465852	23.04137998	25.09009182	87.39873897	11.23230762
DIEYLHEX PHT	0.0242	0	0	0	0
ETHYLBENZENE	6185.440901	1934.728782	1899.382	5557.695999	774.9358703
ETHYLENE OXI	6805.974672	2467.052168	1220.6934	4336.346768	489.0726
FLUORANTHENE	946.1127824	63.16427935	119.675058	212.5844578	30.29810758
FLUORENE	1131.362691	75.79583789	143.6628297	255.2967666	36.35712012
FORMALDEHYDE	25707.46342	266.8432943	316.8894788	1094.502643	125.5676829
GLYCOL ETHRS	1916.894094	544.9128984	589.9005	1792.232398	236.3445
HEXCLBENZENE	1.045172265	0.004725598	0.00050226	0.003655879	9.17591E-05
INDN(123CDPY	942.610694	63.16319824	119.6542175	212.5085419	30.2976001
LEAD	9482.689824	3.436138588	4.03761638	172.1295081	1.617676919
MANGANESE	4003.411254	4.907084209	6.151884781	17.23196625	2.31401983
MERCURY	362.6469511	0.143940375	6.85951492	2.143698901	25.85398818
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	5508.14217	1637.230976	1685.628606	5042.121572	686.02815
NAPHTHALENE	21464.57441	2516.244305	3427.594297	8483.798608	1179.648862
NICKEL	466.3712442	24.25086999	28.52721641	85.59647848	11.41610895
PCBS	0	0	0	0	0
PCDD	0.139472955	0.009103882	0.017239909	0.030630277	0.0043668
PCDF	0.758916343	0.050242111	0.095156456	0.16903793	0.024099477
PERC	1772.73036	359.4870883	738.6980325	1840.005175	185.2278
PHENANTHRENE	3676.678928	246.3364731	466.7270192	829.0617324	118.1606404
PHENOL	202.3536733	3.158159912	5.982660156	10.62524023	1.514880005
PYRENE	1131.254795	75.79583789	143.5967736	255.0534021	36.35712012
STYRENE	8.601815914	1.040019058	3.358716087	18.99588838	0
TCDD,2378	0.000357942	2.357E-05	4.45062E-05	7.93313E-05	1.13041E-05
TCDF,2378	0.020741689	0.001390786	0.002633775	0.004679326	0.00066711
TCE,111	16797.41548	4556.998124	5365.718936	16142.27564	2146.375
TOLUENE	150399.3641	43109.36333	47397.29925	107435.5559	28749.48822
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	588.1282179	30.32012386	63.44190739	152.8419214	31.55317
TRIFLURALIN	1.106879157	1214.710621	33.56343169	782.6706664	11.42584929
VINYL CHLOR	118.1555501	22.15634961	60.30599253	247.9930142	14.27696
XYLENE,M	1759.287138	478.3575901	490.3183291	1636.018457	233.6695365
XYLENE,O	11924.32583	1407.877402	1742.091227	3991.312216	539.5544302
XYLENE,P	894.5416016	237.2383051	254.138653	879.604413	114.8435198
XYLENES ISO	60763.12731	17734.62336	21240.14287	78478.89735	7047.406963

Table D-2: Minnesota Emissions by County in pounds/year

	Koochiching	Lac Qui Parle	Lake	Lake of the Woods	Le Sueur
ACENAPHTHEN	111.4162482	23.60101475	78.06759312	49.80439941	104.8472395
ACENAPHTHYL	2356.473441	500.3165544	1654.69419	1055.853268	2222.693734
ACETALDEHYDE	40970.30681	0.76437594	35.92319656	0	2.074734693
ACROLEIN	274.8809882	0.092183539	0.060921077	0	0.250212463
ACRYLONITRIL	109.8577	0	57.76715	9.285531	57.48138
ANTHRACENE	155.0681173	33.04130306	109.440165	69.72615918	146.7858162
ANTIMONY	0	1.9845	4.219159462	0	0.062642096
ARSENIC	10.96961085	4.090334703	90.58707378	0.162457775	0.921185287
ATRAZINE	39.29940067	12568.59105	15.03180038	39.20805038	8095.333271
BENZ(A)ANTHR	221.9129044	47.23767648	156.7711733	99.62753014	209.7959506
BENZ(GHI)PE	44.29890732	9.440327171	31.21718115	19.92175977	41.93868212
BENZENE	31233.6677	6153.457767	18136.26207	10370.82873	25709.58629
BENZO(A)PYRE	44.29812513	9.440027201	31.21175935	19.92175977	41.93787838
BENZO(B)FLUO	66.44692514	14.15985853	46.81609516	29.88263965	62.90630713
BENZO(K)FLUO	22.14902714	4.720074392	15.60538242	9.960879883	20.96909896
BERYLLIUM	2.064052472	0.326402234	10.89804134	0.044743325	0.250805364
BUTADIENE,13	12205.11899	7770.855468	9336.456001	3399.920845	21353.49945
CADMIUM	140.528634	6.856771025	15.46796954	0.311223564	1.368735385
CARBON TETRA	77.10160251	1.682048692	13.9345681	1.887649	14.15765989
CHLOROFORM	40075.16838	18.17737773	46.2632154	8.148663908	61.65087858
CHROMIUM	59.03402575	23.87372513	617.7313944	10.00054328	55.9637775
CHROMIUM VI	10.54387067	0	0.549148	0	0
CHRYSENE	132.9217443	28.32780932	93.9696331	59.7652793	125.8157584
COBALT	113.1153865	67.30666174	123.9767276	31.39953931	175.3742693
COPPER	11.03747161	2.832025948	81.28819667	2.487797374	11.70278771
DIBENZAHAN	44.29817088	9.440420849	31.2108037	19.92175977	41.93893639
DIBROMOET,12	31.04823851	6.323503876	25.34052046	3.175471806	17.92211908
DIBUTYL PHTH	3.029930078	1.653759961	2.006019922	0.8417	4.700410156
DICHLORETH12	70.34359017	17.56510163	29.4560276	7.96786329	53.2726049
DIEYLHEX PHT	0	0	0	0	0
ETHYLBENZENE	2701.228426	1112.085838	1745.413687	582.5053954	3301.166141
ETHYLENE OXI	3585.864568	769.085466	2894.175032	391.4348	2185.938066
FLUORANTHENE	221.5525662	47.21835737	156.5349798	99.609205	209.7762765
FLUORENE	265.8062155	56.66813916	187.319608	119.5305586	251.7031422
FORMALDEHYDE	45160.71819	214.9480328	44318.0055	100.5556741	565.3317053
GLYCOL ETHRS	746.3058984	371.6608008	509.7236016	189.161	1056.355301
HEXCLBENZENE	1.04798E-05	0.003351624	4.00848E-06	1.04555E-05	0.002158756
INDN(123CDPY	221.4899896	47.19957294	156.0554676	99.60879883	209.6878112
LEAD	8.515137984	922.5451091	885.4593978	1.294726046	407.3922999
MANGANESE	410.357985	6.387019734	4506.495727	2.492610037	11.94204401
MERCURY	1.344241081	1.05386205	4.865185333	0.054077476	0.305139792
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	23697.43388	1012.755835	1475.110807	529.5303639	3001.056716
NAPHTHALENE	5434.792114	1890.048507	3715.816519	1998.252448	6367.372862
NICKEL	76.24108073	107.5404868	117.8474863	9.189764008	54.49378569
PCBS	0	0	0	0	0.005597741
PCDD	0.034273532	0.006802889	0.022622501	0.014346825	0.030271861
PCDF	0.186578527	0.037543625	0.124719906	0.079199307	0.166983777
PERC	1726.028269	259.9113356	1446.488144	138.8470779	804.7706397
PHENANTHRENE	863.8589216	184.1061764	608.9168038	388.4743154	817.8580348
PHENOL	88.02343047	2.359959961	12.45850018	4.980439941	10.48433984
PYRENE	265.8003804	56.64380271	187.3539438	119.5305586	251.6370861
STYRENE	1014.021604	2.776457922	8.482172534	0.783233973	8.810985388
TCDD,2378	9.26117E-05	1.76115E-05	5.83488E-05	3.69305E-05	7.80041E-05
TCDF,2378	0.004874393	0.001039267	0.003434253	0.002191844	0.004777134
TCE,111	6825.911607	3378.296568	4125.143706	1718.648264	9615.241242
TOLUENE	56387.28764	32971.35255	42011.7133	19407.3255	86702.51564
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	541.7159168	10.36301824	84.51606342	13.63057994	18426.95097
TRIFLURALIN	1.114020356	1306.831507	1.106879157	1.114020356	536.3007975
VINYL CHLOR	343.8559196	29.690312	120.7051354	13.19626471	124.4573148
XYLENE,M	651.8968271	317.8016936	530.229402	140.0731295	1127.49314
XYLENE,O	3378.633003	807.5246738	2474.894058	1166.348345	3234.922821
XYLENE,P	302.3527969	158.8021375	282.287154	62.98646394	645.3560388
XYLENES ISO	23839.91981	10659.20493	17442.39446	5076.47844	47559.06382

Table D-2: Minnesota Emissions by County in pounds/year

	Lincoln	Lyon	Mc Leod	Mahnomen	Marshall
ACENAPHTHEN	18.34160034	65.05768257	87.0403713	55.58565566	28.33353706
ACENAPHTHYL	388.8419272	1378.759359	1845.206591	1178.34935	600.4463608
ACETALDEHYDE	0	14.19555316	5.265	7.11	53.51387346
ACROLEIN	0	1.71198001	0.00702	0.00948	0.829651851
ACRYLONITRIL	1.157059	77.54627	227.1491	9.475305	0
ANTHRACENE	25.67824048	91.07857167	121.914856	77.89869672	39.66589351
ANTIMONY	0	0.031321048	38.21216052	0	0
ARSENIC	0.268884012	1.137751239	39.17034928	1.490368721	0.19219892
ATRAZINE	7896.117305	17177.6809	8194.939102	778.7461377	624.8088062
BENZ(A)ANTHR	36.71182195	130.200804	174.1687104	111.304056	65.53348028
BENZ(GHI)PE	7.336640137	26.02161091	34.81586772	22.23388306	11.33270626
BENZENE	4870.735064	21838.6657	24142.63578	12872.23447	7355.790601
BENZO(A)PYRE	7.336640137	26.01604003	34.81543884	22.23148936	11.33000652
BENZO(B)FLUO	11.00496021	39.02067495	52.22064258	33.34655859	16.99336932
BENZO(K)FLUO	3.668320068	13.009149	17.40688086	11.11551953	5.665550384
BERYLLIUM	0.080659064	0.256542467	2.437299995	0.361898176	0.052934486
BUTADIENE,13	5872.133291	20906.36173	29569.01778	3398.914683	8900.113308
CADMIUM	0.402560177	1.319160631	60.39631192	1.791836629	20.72560243
CARBON TETRA	0.176170775	23.58187295	38.27422504	1.442674021	2.14881E-06
CHLOROFORM	6.840664	100.8962221	119.2201844	34.974984	5.193831
CHROMIUM	15.55767191	57.1387372	3395.429057	77.85317513	51.0838973
CHROMIUM VI	0	0	59.78308714	0.10902	0
CHRYSENE	22.00992041	78.04421493	104.5898002	66.79502719	33.98812707
COBALT	47.97821111	179.2242256	1978.749908	242.6941194	37.14785175
COPPER	1.837523431	8.596127135	12.61757208	8.472609136	206.1500545
DIBENZAHAN	7.336640137	26.02335065	34.81376172	22.23103906	11.33354936
DIBROMOET,12	4.90221194	25.97703384	208.6741094	22.82161686	4.117845798
DIBUTYL PHTH	1.286109961	4.803960156	4.345680078	6.497430078	0.995790039
DICHLORETH12	11.5903042	62.65849264	88.18674024	7.462660792	17.42074873
DIEYLHEX PHT	0	0	0	0	0
ETHYLBENZENE	866.1799517	3514.012983	9276.517538	1001.865695	1298.618001
ETHYLENE OXI	598.1088335	3093.467236	23262.57289	3021.646868	463.0947665
FLUORANTHENE	36.68393156	130.2059723	174.3307202	111.3717788	60.25219777
FLUORENE	44.01984082	156.6157937	208.8994183	133.4089864	68.23182278
FORMALDEHYDE	155.2423519	635.4049759	689.7432136	793.6953085	1088.735378
GLYCOL ETHRS	289.0362998	1105.433797	1614.520375	1460.211898	223.7907002
HEXCLBENZENE	0.002105631	0.004580715	0.002185317	0.000207666	0.000166616
INDN(123CDPY	36.68320068	130.0697432	174.0694053	111.1560011	56.64496502
LEAD	1.978329664	7.47058305	37.50611937	11.04917544	1.531751513
MANGANESE	2.895614684	10.98761146	51.18005829	34.83590693	239.1430202
MERCURY	0.097379897	5.289625054	36.32161464	0.452658541	19.63545367
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	782.5707486	3170.630708	5233.657766	1814.968581	1009.915824
NAPHTHALENE	1442.866549	5224.092135	6518.559823	4373.506754	1851.246965
NICKEL	14.04951334	53.85667326	870.6492565	71.92519249	350.257542
PCBS	0	0	0	0	0
PCDD	0.005287206	0.018747068	0.025103273	0.016059166	0.008160127
PCDF	0.029178902	0.103458785	0.13853096	0.088573596	0.045042273
PERC	192.112243	3496.528122	1497.624014	974.3989	147.7962
PHENANTHRENE	143.0644827	507.7890627	678.9683885	433.6403517	221.1659408
PHENOL	1.834160034	6.503140137	116.0778904	6.482059766	40.31676508
PYRENE	44.01984082	156.163831	208.9118788	133.4258134	68.01279469
STYRENE	0	19.46191831	22.70074753	0	46490
TCDD,2378	1.36877E-05	4.85525E-05	6.48569E-05	4.17933E-05	2.10464E-05
TCDF,2378	0.000807719	0.002863953	0.00383184	0.002448892	0.001246648
TCE,111	2619.783	9866.172729	8957.387406	13235.729	2028.267
TOLUENE	25659.03661	73664.92885	695031.1353	42912.30269	49506.64539
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	4.504492	136.6644167	8920.364922	26.567553	2.547126
TRIFLURALIN	567.0077912	1144.01321	577.0053717	173.530082	90.69267888
VINYL CHLOR	0.600872	248.3539233	326.3946727	4.920616	0
XYLENE,M	274.0984258	1095.268667	1922.998999	222.4858353	417.9920589
XYLENE,O	651.502164	2588.2509	7635.506481	1783.631729	930.2884348
XYLENE,P	152.9606764	601.0115784	1069.202708	132.1736713	237.9731156
XYLENES ISO	8573.473319	34985.47878	69313.09243	26606.81656	12891.82533

Table D-2: Minnesota Emissions by County in pounds/year

	Martin	Meeker	Mille Lacs	Morrison	Mower
ACENAPHTHEN	62.77477936	54.40060649	87.11461929	127.9853955	104.2804396
ACENAPHTHYL	1330.720014	1153.282161	1846.794274	2713.004073	2210.66171
ACETALDEHYDE	25.23287093	0.327589688	1.091965628	11.5677594	2.682835944
ACROLEIN	0.237043386	0.039507231	0.13169077	0.92706739	0.303117191
ACRYLONITRIL	47.57487	42.53742	5.634142	60.14669	140.2292
ANTHRACENE	87.8817061	76.16079869	121.960299	179.1873392	145.9920939
ANTIMONY	0.304409585	0	0	5.20275	5.6595
ARSENIC	10.15622554	0.788782019	0.74121818	11.08115746	40.2262075
ATRAZINE	20691.09	10748.5026	2843.328735	9580.381699	17666.6618
BENZ(A)ANTHR	130.0062497	108.8916638	174.3130492	256.1366449	208.7160918
BENZ(GHI)PE	25.10899779	21.76020885	34.84573524	51.19207163	41.71184381
BENZENE	16679.4119	15035.11325	20752.80679	30710.59772	27495.78445
BENZO(A)PYRE	25.10865945	21.7600803	34.84530672	51.45372186	41.71085457
BENZO(B)FLUO	37.66177349	32.64004233	52.26769968	76.78106573	62.56568192
BENZO(K)FLUO	12.55423705	10.8800662	17.4227402	25.59490407	20.85562668
BERYLLIUM	1.260934909	0.21724248	0.20414268	0.951191623	4.386245954
BUTADIENE,13	20133.99078	18455.57886	17225.04694	25612.9926	30436.41256
CADMIUM	11.49675072	1.098771086	1.111699252	18.68763905	22.03995782
CARBON TETRA	13.66828594	12.64425416	0.857833287	16.41249622	38.22787217
CHLOROFORM	52.56417834	61.16761767	20.675698	78.86150127	149.1394713
CHROMIUM	64.14844434	2159.536944	45.61374868	81.55607995	154.9701103
CHROMIUM VI	0.022816	0	0	0.066189	0.006486
CHRYSENE	75.32411783	65.28015077	104.5356197	155.6526811	125.1546634
COBALT	76.19083293	152.4543338	143.2612838	234.7848026	283.0395298
COPPER	115.0869443	5.706886184	6.586518789	11.22234262	11.63898743
DIBENZAHAN	25.10922171	21.760249	34.84586907	51.1925288	41.7121473
DIBROMOET,12	34.37269389	22.79613218	29.74546235	28.09297065	27.1847002
DIBUTYL PHTH	2.036040039	4.086710156	3.840280078	5.897789844	7.158060156
DICHLORETH12	51.6284335	47.7326389	34.15592274	64.45979141	92.93612154
DIEYLHEX PHT	0	0	0	0	0
ETHYLBENZENE	3265.97719	2950.649652	2800.39027	6790.741602	5127.320912
ETHYLENE OXI	3810.499364	2700.534336	3465.417768	3375.183164	3328.874536
FLUORANTHENE	127.3272282	108.8052224	174.2378827	263.6101307	208.6106111
FLUORENE	150.7210355	130.5724715	209.1118059	307.4151504	250.3570788
FORMALDEHYDE	730.033424	489.1887474	460.2118315	969.3948131	906.7279629
GLYCOL ETHRS	543.5682031	942.4582969	913.4873984	6584.441703	1608.679797
HEXCLBENZENE	0.005517624	0.002866267	0.000758221	0.002554768	0.00471111
INDN(123CDPY	125.5394209	108.8001602	174.2257292	255.9374668	208.5524206
LEAD	83.52879256	6.2862896	5.907224112	29.24999665	211.0123253
MANGANESE	148.2838191	363.9163173	8.990540162	24.54984346	89.35519029
MERCURY	10.13395556	0.262562631	4.723510009	4.977851519	3.81818059
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	2442.619421	2640.233925	2451.472367	3764.870058	4678.810307
NAPHTHALENE	4037.925851	4461.824263	5216.353831	7847.612825	7995.051627
NICKEL	218.746276	1803.356724	41.73238758	299.2829972	380.8335761
PCBS	0	0	0	0	0
PCDD	0.018085168	0.015682533	0.025102836	0.036892261	0.03005992
PCDF	0.099827972	0.08654607	0.138556081	0.20360879	0.165893369
PERC	2518.948982	2480.993491	1404.6224	2029.93127	6570.001556
PHENANTHRENE	489.6753971	424.3325569	679.520118	998.4567911	813.446121
PHENOL	24.97914312	5.44	8.711259766	13.30679969	10.44983052
PYRENE	150.6584497	130.5620416	209.0770396	307.1746235	250.2771417
STYRENE	111618.6077	21460.16726	21957	244055.9781	27.82817922
TCDD,2378	4.66311E-05	4.06211E-05	6.48064E-05	9.52695E-05	7.78086E-05
TCDF,2378	0.002762934	0.002395787	0.00383501	0.005633696	0.004591957
TCE,111	4192.240973	8366.757981	7822.934	12064.83728	14700.65928
TOLUENE	190494.0682	106942.6376	59495.39413	95070.49557	96112.51552
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	13520.58371	77.58406069	15.738132	104.6871531	227.0316866
TRIFLURALIN	1310.402055	696.9768134	54.27278543	18.56700445	1111.163888
VINYL CHLOR	138.1367646	130.8327875	2.925863	159.3196489	370.4464777
XYLENE,M	1065.262017	930.6900729	822.4642868	1199.97365	1454.351664
XYLENE,O	2704.124018	2194.8046	2943.212098	3964.790638	3625.530774
XYLENE,P	604.1789825	514.6971164	455.1334932	623.9550304	720.5727321
XYLENES ISO	64901.20013	41363.48823	27660.60263	53970.14103	47885.91214

Table D-2: Minnesota Emissions by County in pounds/year

	Murray	Nicollet	Nobles	Norman	Olmsted
ACENAPHTHEN	25.8752002	70.08600688	54.74660353	21.22879883	507.6783736
ACENAPHTHYL	548.5542441	1485.812649	1160.624429	450.0505352	10761.3986
ACETALDEHYDE	0	0.327589688	0.109196563	0	42.84047354
ACROLEIN	0	0.039507231	0.013169077	0	4.622346027
ACRYLONITRIL	23.79029	0	53.27566	0	284.5592
ANTHRACENE	36.22528027	98.12035923	76.64522814	29.72031836	710.7352802
ANTIMONY	0	0	0	0	3.466674244
ARSENIC	0.353409844	1.096423992	0.785910234	0.288830129	46.37117526
ATRAZINE	17440.28016	10793.7777	19423.36635	1811.035745	10630.78365
BENZ(A)ANTHR	51.79114839	140.2971872	109.5800516	42.49089964	1016.631329
BENZ(GHI)PE	10.35008008	28.03436901	21.89863017	8.491519531	203.065177
BENZENE	6676.413781	19077.56994	14458.11667	5722.212294	121109.9
BENZO(A)PYRE	10.35008008	28.03424045	21.89858731	8.491519531	203.0502454
BENZO(B)FLUO	15.52512012	42.05128256	32.84785493	12.7372793	304.5656787
BENZO(K)FLUO	5.175040039	14.01714628	10.94930234	4.245759766	101.5279877
BERYLLIUM	0.097334411	0.304047386	0.226452413	0.079548183	5.081519179
BUTADIENE,13	8828.323179	21045.51708	17692.87568	6791.791912	88270.09708
CADMIUM	0.495602322	1.524087393	1.139051635	0.40521941	36.44068739
CARBON TETRA	3.622186951	0.270327536	16.14110463	0.195018902	93.65231825
CHLOROFORM	12.276351	30.985111	72.07140653	8.908962017	269.6634231
CHROMIUM	21.74688471	67.15638571	46.86443157	17.77301561	367.851762
CHROMIUM VI	0	0	0	0	0.072912
CHRYSENE	31.05024023	84.10263124	65.6957319	25.47455859	609.1492633
COBALT	68.30639928	210.6604349	145.855465	55.82455435	824.1145257
COPPER	2.607994527	7.712877281	5.551704161	2.134210521	82.88624908
DIBENZAHAN	10.35008008	28.03440916	21.89864355	8.491519531	203.0698073
DIBROMOET,12	7.013917706	25.16319128	24.70108801	5.702372024	162.7115864
DIBUTYL PHTH	1.831030078	5.646989844	3.909819922	1.496440039	21.88210938
DICHLORETH12	18.95734275	41.65387464	49.55214276	13.58600843	197.7292838
DIEYLHEX PHT	0	0	0	0	0
ETHYLBENZENE	1297.35117	3772.989486	2894.340832	1003.914267	22131.24006
ETHYLENE OXI	851.525333	3068.804564	2904.484832	695.923334	19067.39996
FLUORANTHENE	51.75128397	140.1768107	109.4959398	42.45831978	1015.951224
FLUORENE	62.10048047	168.2174324	131.3955204	50.94911719	1219.702576
FORMALDEHYDE	218.6261457	675.3181307	470.496799	178.6989008	3274.846788
GLYCOL ETHRS	411.4999004	1282.379703	911.2996016	336.3051992	6864.715313
HEXCLBENZENE	0.004650741	0.002878341	0.005179564	0.000482943	0.002834876
INDN(123CDPY	51.75040039	140.1709609	109.4928561	42.45759766	1015.221404
LEAD	2.816540561	8.68635516	6.0141925	2.301865129	3174.728862
MANGANESE	4.020437724	12.25571314	8.680532994	3.287161866	154.9545212
MERCURY	0.117639878	0.367443104	1.335944118	5.554463167	78.05679352
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	1152.614449	27588.9452	2580.495848	909.2604043	14499.77393
NAPHTHALENE	2071.905901	5710.037842	4333.399626	1674.98301	29392.03083
NICKEL	19.87590965	61.31253667	42.5745727	16.24403621	512.8605246
PCBS	0	0	0	0	0
PCDD	0.007458928	0.020205782	0.015781633	0.006119509	0.146271248
PCDF	0.041164002	0.111504972	0.087094681	0.033772124	0.807354021
PERC	296.9803	2496.2606	2895.435728	223.774104	34333.42678
PHENANTHRENE	201.8265615	546.6786799	427.0261163	165.5846309	3960.759794
PHENOL	2.58752002	7.008540039	5.474640137	2.122879883	78.38724109
PYRENE	62.10048047	168.2070025	131.3920438	50.94911719	1218.482252
STYRENE	0	4776.4452	13.24724357	0.320862005	60.62132695
TCDD,2378	1.93112E-05	5.23677E-05	4.08617E-05	1.5843E-05	0.000561864
TCDF,2378	0.001139489	0.00308678	0.002410934	0.000934868	0.022346165
TCE,111	3733.269	11503.6062	8019.076222	3049.150152	44704.83955
TOLUENE	33579.11212	72021.0981	60282.43963	33791.96825	387678.6085
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	29.660222	15.42881755	95.20185731	4.537545321	493.8315761
TRIFLURALIN	1186.145956	706.9744415	1331.82553	571.2924482	384.9083002
VINYL CHLOR	12.35452	4.76213265	169.3364082	3.432573582	952.3381002
XYLENE,M	363.2200444	1073.245872	787.8844568	333.3691165	4486.043402
XYLENE,O	895.0215788	2700.461127	2137.578612	767.3229432	16776.66345
XYLENE,P	164.1261933	637.2677338	377.4311162	194.2833121	2397.321822
XYLENES ISO	11677.15365	36685.59715	27232.92197	10216.0909	205741.3074

Table D-2: Minnesota Emissions by County in pounds/year

	Otter Tail	Pennington	Pine	Pipestone	Polk
ACENAPHTHEN	241.4016399	36.5895039	98.77219727	27.85219971	83.61269403
ACENAPHTHYL	5117.684725	775.6772404	2093.970582	590.4666338	1772.565894
ACETALDEHYDE	1.307388057	0.803982814	0	0	1.393786251
ACROLEIN	0.092907539	0.066189385	0	0	0.053952308
ACRYLONITRIL	106.2501	0	41.75072	27.04974	127.5243
ANTHRACENE	337.9681947	51.2280801	138.2810762	38.99307959	117.068308
ANTIMONY	0	0	0.07830262	0	0
ARSENIC	76.81705266	0.727593343	0.872745484	0.38388442	68.26919163
ATRAZINE	15212.70475	153.9373508	2444.897725	10322.9093	2915.769199
BENZ(A)ANTHR	483.027652	77.45919756	197.6430109	55.74866112	167.3621797
BENZ(GHI)PE	96.56054828	14.63573156	39.50887891	11.14087988	33.44498159
BENZENE	57092.56284	9916.696849	23534.38887	7449.749032	21499.491
BENZO(A)PYRE	96.64566967	15.37463044	39.50887891	11.14087988	33.44448798
BENZO(B)FLUO	144.8398644	21.95299095	59.26331836	16.71131982	50.1665369
BENZO(K)FLUO	48.28007634	7.317750472	19.75443945	5.570439941	16.72224842
BERYLLIUM	6.352849372	0.142487455	0.236738552	0.105727569	0.334950452
BUTADIENE,13	45409.45856	10283.30375	19908.50257	8930.9546	23845.7526
CADMIUM	188.7693387	1.617719588	1.293911995	0.53777888	21.92660977
CARBON TETRA	26.11897229	0.00631957	6.356753562	4.591232412	19.41619348
CHLOROFORM	121.5521183	13.469721	27.89723	16.16077806	47.201805
CHROMIUM	217.6127496	31.42588584	52.80165631	23.62209648	280.1402308
CHROMIUM VI	0.008413612	0.018674	0	0	0.014674
CHRYSENE	289.687666	49.6297901	118.5266367	33.42263965	100.346879
COBALT	379.5964791	96.30782872	165.3442343	74.19647089	233.128118
COPPER	73.84645626	3.696765019	12.16782509	2.824238722	8.800762265
DIBENZAHAN	96.56042476	14.63569528	39.50887891	11.14087988	33.44465232
DIBROMOET,12	43.78125099	30.04178846	20.65526444	12.8097195	27.0035287
DIBUTYL PHTH	10.17487969	2.581340039	4.431369922	1.988919922	6.24815
DICHLORETH12	110.3197807	20.26474356	41.9295019	20.04294662	55.63978984
DIEYLHEX PHT	0	0	0	0	0
ETHYLBENZENE	7159.086867	1993.804977	3129.592727	1474.079243	4493.605749
ETHYLENE OXI	5288.031528	3455.235364	2481.332732	1506.537032	3298.0259
FLUORANTHENE	482.8280563	94.20084509	197.5465329	55.70535919	167.2576856
FLUORENE	579.3899002	87.83329303	237.0532734	66.8452793	200.6856129
FORMALDEHYDE	1220.676678	310.5172267	529.4359219	237.5343205	2028.261818
GLYCOL ETHRS	2303.372406	647.8332031	1008.520102	464.4486016	1415.9705
HEXCLBENZENE	0.004056721	4.105E-05	0.000651973	0.002752776	0.000777538
INDN(123CDPY	482.799654	73.17669755	197.5443945	55.70439941	167.2219236
LEAD	4041.931825	24.01895816	7.018955123	3.059411268	2229.753031
MANGANESE	296.3049946	6.464682006	11.55475502	4.362798861	16.49440692
MERCURY	47.65321167	0.526350242	0.2879452	0.127783979	46.41345031
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	6450.064493	1715.694351	2789.788055	88044.07623	4039.58089
NAPHTHALENE	14103.5849	2795.479635	5969.319134	2206.360972	6506.869834
NICKEL	207.8297964	28.52518642	52.42437787	21.58945653	74.28526001
PCBS	0	0	0	0	0
PCDD	0.10182534	0.010548119	0.028463019	0.008028896	0.165992181
PCDF	0.474533963	0.058211423	0.157102086	0.044309365	0.321059631
PERC	3603.394564	1299.109633	701.96296	327.9373741	3908.0285
PHENANTHRENE	1882.95657	285.4137955	770.4231387	217.2471577	652.1991716
PHENOL	24.21055094	3.692360068	9.877219727	2.785219971	8.485490078
PYRENE	579.3668488	87.81652045	237.0532734	66.8452793	200.6739713
STYRENE	16.36714208	62750	0	189937.7812	90784
TCDD,2378	0.000421265	0.000027927	7.34874E-05	2.07883E-05	0.000251097
TCDF,2378	0.011357189	0.001611262	0.004348348	0.001226561	0.004205494
TCE,111	20799.43103	5257.786653	9032.581	4058.146932	12746.595
TOLUENE	192584.1737	47103.7724	71911.53284	34030.17448	102521.6453
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	173.7721939	6.606382	55.167688	35.21078987	149.86571
TRIFLURALIN	554.1536776	17.85288901	38.56224275	644.8463921	512.0208844
VINYL CHLOR	230.2588853	0	21.68155	22.39961947	66.22459
XYLENE,M	2121.221408	603.1481642	937.589245	450.2424786	1111.293641
XYLENE,O	7182.494944	1811.448003	3042.882878	1130.022433	3007.427467
XYLENE,P	1104.647235	377.8457675	494.6786105	242.6967611	518.783267
XYLENES ISO	91203.17582	20783.46632	29809.53676	14288.88264	38755.20413

Table D-2: Minnesota Emissions by County in pounds/year

	Pope	Ramsey	Red Lake	Redwood	Renville
ACENAPHTHEN	49.29399902	795.5120215	11.7726001	45.46957149	46.39363107
ACENAPHTHYL	1045.032779	16864.54165	249.5791221	963.6696776	983.4950619
ACETALDEHYDE	0	13.89815252	0	8.735725024	1.528751879
ACROLEIN	0	0.956221544	0	1.05352616	0.184367078
ACRYLONITRIL	0	18.3937875	0	58.48895	46.86944
ANTHRACENE	69.01159863	1113.731574	16.48164014	63.65605613	64.9508483
ANTIMONY	0	37.74323722	0	0	0.671614125
ARSENIC	0.401780444	234.8341826	0.163374585	0.664845589	47.20808758
ATRAZINE	8520.926572	67.91400192	688.1930969	21569.44535	22230.47285
BENZ(A)ANTHR	98.63432315	1686.835618	23.56403721	90.99923345	92.85922837
BENZ(GHI)PE	19.71759961	318.2020687	4.709040039	18.18692883	18.55729497
BENZENE	11663.40258	278452.2814	3152.476376	12642.13978	12589.42278
BENZO(A)PYRE	19.71759961	318.1986454	4.709040039	18.1835676	18.55669503
BENZO(B)FLUO	29.57639941	477.2953908	7.063560059	27.27316776	27.83467799
BENZO(K)FLUO	9.858799805	159.0997138	2.35452002	9.092445056	9.278469096
BERYLLIUM	0.110656402	10.54295462	0.044995828	0.192543296	5.62143836
BUTADIENE,13	9216.713296	344008.2033	3730.957798	15395.17385	15897.90194
CADMIUM	0.607164622	287.191773	0.228691615	0.965894511	6.011875946
CARBON TETRA	0.976577943	7177.396746	1.82655E-06	12.56273949	11.59689099
CHLOROFORM	16.39631812	10143.15046	4.414905	44.6533856	48.11114933
CHROMIUM	24.72533321	3118.487882	10.0531483	39.4994133	134.4371349
CHROMIUM VI	0	0.700913429	0	0	0
CHRYSENE	59.15279883	954.6841838	14.12712012	54.54816811	55.67235098
COBALT	77.65538632	3657.537252	31.5767368	122.7984228	126.4134093
COPPER	3.640774803	9214.916936	1.199199517	4.699219924	4.886269152
DIBENZAHAN	19.71759961	318.2022261	4.709040039	18.18799944	18.55748232
DIBROMOET,12	16.41806938	465.2488011	3.216476102	23.07144855	16.13007795
DIBUTYL PHTH	2.081640039	94.25291875	0.84645	3.29175	3.337730078
DICHLORETH12	19.42762622	1723.555626	7.313646233	39.31122552	40.61131108
DIEYLHEX PHT	0	147.7725	0	0	0
ETHYLBENZENE	1512.408638	154736.289	565.9612394	2510.36648	2416.566631
ETHYLENE OXI	1911.660934	56002.15421	393.6438	2695.5711	1924.014568
FLUORANTHENE	98.58900256	1591.227668	23.54560866	90.99519723	92.80202605
FLUORENE	118.3055977	1909.483265	28.25424023	109.4207288	111.3961221
FORMALDEHYDE	248.6645873	50063.50488	101.0666689	409.3097475	504.6279493
GLYCOL ETHRS	496.1571992	331264.5566	190.2285	774.7545	761.2758984
HEXCLBENZENE	0.002272247	1.81104E-05	0.000183518	0.005751852	0.005928126
INDN(123CDPY	98.58799805	1590.985322	23.5452002	90.91106793	92.782349
LEAD	3.20203583	27780.34361	1.302032622	5.063460186	366.4641879
MANGANESE	4.908622519	8832.238248	1.855358028	7.308022603	114.1833874
MERCURY	0.133741044	73.72213383	0.054382656	0.35315944	2.869475914
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	1330.974776	162822.687	513.72387	2196.102017	2155.750265
NAPHTHALENE	2878.670285	84369.06104	932.2778084	3684.567995	3906.788845
NICKEL	22.62412154	1908.137886	9.187986766	35.85702819	143.3546751
PCBS	0	3.7332	0	0	0
PCDD	0.014204482	0.361696572	0.003393685	0.013102929	0.013373073
PCDF	0.078402962	1.857181499	0.018728805	0.072311233	0.073802266
PERC	317.3435282	88086.87779	125.631	1530.519523	583.4141105
PHENANTHRENE	384.4931924	6205.166537	91.82628076	354.8713583	361.9068449
PHENOL	4.929399902	120978.5203	1.17726001	4.545339844	4.639080078
PYRENE	118.3055977	1909.237718	28.25424023	109.1425979	111.3474492
STYRENE	1.610034034	18628.803	0	6.040886884	7.363290097
TCDD,2378	3.66635E-05	0.000597157	8.78735E-06	3.39296E-05	3.46274E-05
TCDF,2378	0.00217005	0.128382032	0.000518447	0.002001711	0.002042982
TCE,111	4245.683064	252952.9456	1724.085	6735.423052	6831.93784
TOLUENE	39300.93579	1755328.283	17733.78223	60809.05515	59229.60898
TOLUENE24DII	0	0.3	0	0	0
TRICHLORETHY	8.882978665	184770.3413	2.16513	83.16548812	74.0087933
TRIFLURALIN	519.1620269	1.663889335	98.54794874	1593.905998	1655.31989
VINYL CHLOR	17.21967453	13293.97952	0	94.96774569	103.0796287
XYLENE,M	438.1615202	19267.43561	179.2731389	841.8825681	765.7386669
XYLENE,O	1639.799053	38263.09	423.4773567	1960.649434	1766.108919
XYLENE,P	243.6318191	12106.83348	102.8121547	474.2101467	401.7446781
XYLENES ISO	15032.61346	1135378.267	5640.342718	25480.51215	23692.48096

Table D-2: Minnesota Emissions by County in pounds/year

	Rice	Rock	Roseau	St Louis	Scott
ACENAPHTHEN	205.781172	26.19540826	171.5889147	1449.23817	98.35246442
ACENAPHTHYL	4362.286306	555.3283933	3637.186125	30716.3462	2084.341603
ACETALDEHYDE	9.602615336	0.436786251	52.48258969	1351.881101	22.89890225
ACROLEIN	1.014018929	0.052676308	0.109047231	23719.27888	2.674298631
ACRYLONITRIL	114.335	26.58589	75.06743	630.9795	347.6731
ANTHRACENE	288.0923473	36.67350437	240.1661357	2028.096376	137.6900375
ANTIMONY	4.01625	0	19.2	604.9945295	7.416672519
ARSENIC	9.684166468	0.434251518	0.657729466	8797.393243	14.15619371
ATRAZINE	7850.842822	12939.8567	588.5869592	15.12314947	3857.508765
BENZ(A)ANTHR	411.99977	52.43219779	343.1590341	2908.105181	197.5120485
BENZ(GHI)PE	82.31160278	10.47811832	68.6126609	579.4028592	39.33840737
BENZENE	50100.94952	7046.759895	36354.81645	328889.5842	38016.61855
BENZO(A)PYRE	82.30830311	10.4779469	68.61188878	579.3881867	39.32967742
BENZO(B)FLUO	123.4604497	15.7168162	102.9175619	869.0605033	58.98922149
BENZO(K)FLUO	41.15482026	5.23900819	34.30590605	289.6939538	19.66659876
BERYLLIUM	1.084630504	0.141865504	0.1674361	97.62578426	2.450252081
BUTADIENE,13	39225.79505	8678.423443	12248.38493	156941.9783	54862.70965
CADMIUM	16.65141361	0.692572211	1.142549093	263.2115538	20.11741477
CARBON TETRA	38.58906265	7.304007593	11.42937665	278.4095136	232.6303609
CHLOROFORM	185.7410882	31.36064247	24.685766	948.2623593	1198.500783
CHROMIUM	130.3480359	23.39048748	240.8019116	2190.297424	495.1419971
CHROMIUM VI	0	0	0.79971	10.92802686	0.011224
CHRYSENE	246.9225963	31.43372056	205.8629052	1738.364587	117.9966183
COBALT	385.7519247	70.47531235	115.1208088	838.0215624	1421.780555
COPPER	601.7001303	2.67373033	8.864867538	1017.059406	295.0096406
DIBENZAHAN	82.31263325	10.47817185	68.61192869	579.4016887	39.34108744
DIBROMOET,12	73.89038506	7.220554956	25.25795905	65.10492389	149.362703
DIBUTYL PHTH	10.03598984	1.889169922	9.0837	2.80915	37.82956875
DICHLORETH12	114.2687155	23.403055	29.24198611	409.4898256	259.5916929
DIEYLHEX PHT	0	0	844.8	0	0
ETHYLBENZENE	11305.71793	1337.327188	2423.57507	25304.69703	26665.02049
ETHYLENE OXI	8672.521064	878.563467	2948.0673	5893.6108	19113.08567
FLUORANTHENE	411.7107425	52.39445085	343.1212994	2902.033149	196.8789666
FLUORENE	494.1575542	62.88366769	411.6887285	3477.86581	236.7896254
FORMALDEHYDE	1749.284784	232.2888308	590.9207296	211016.3175	4610.205613
GLYCOL ETHRS	35550.7347	424.5660996	22738.486	769.0735	80397.85407
HEXCLBENZENE	0.002093558	0.003450628	0.000156957	4.03284E-06	0.001028669
INDN(123CDPY	411.5353218	52.38941277	343.0587774	2896.871355	196.6320396
LEAD	15.43763576	2.905973214	5.029849676	7327.707451	1349.373956
MANGANESE	35.13921406	4.371626407	14.6941584	52946.67986	175.9768779
MERCURY	8.194398723	0.171103817	0.209865467	834.5032494	4.099346862
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	6668.3953	1210.273362	2101.99192	17588.56983	25135.23641
NAPHTHALENE	12914.23214	2099.039777	7045.99216	54461.49185	21499.78693
NICKEL	299.527759	20.80469177	34.03855124	3714.328685	878.4893701
PCBS	0	0	0	0.0277	0
PCDD	0.059298148	0.007551133	0.049620599	0.419942221	0.028458312
PCDF	0.327290272	0.041672559	0.273690613	2.315331676	0.15679026
PERC	11751.81284	336.5169212	1546.05245	13531.52371	10917.9551
PHENANTHRENE	1605.294016	204.3346195	1337.976998	11299.61843	767.6740681
PHENOL	218.5366805	2.619459961	23.93306992	5386.394373	9.92621957
PYRENE	493.8898532	62.86976115	411.6828684	3476.568021	236.0840848
STYRENE	34.9666426	5.366090845	0	275.6188104	158.762835
TCDD,2378	0.000153163	1.95528E-05	0.000127833	0.001080441	7.61385E-05
TCDF,2378	0.009059058	0.001153573	0.007548935	0.063732183	0.004345913
TCE,111	20583.78962	3871.165435	6292.84	6884.067076	77959.81955
TOLUENE	159266.9828	32006.76616	96678.24872	444800.2951	262769.3079
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	16942.94033	34.80853039	86.69861	4870.665048	891.3161749
TRIFLURALIN	361.3424965	791.2400754	5.355866925	1.106879157	215.662899
VINYL CHLOR	433.2884176	71.20085633	38.98323	927.0998507	1767.510255
XYLENE,M	2001.17563	404.1568198	676.0194758	7485.486288	3020.293733
XYLENE,O	7115.001754	939.8899507	4467.962122	35405.43748	6761.555059
XYLENE,P	1081.382886	205.7401802	356.6199255	3825.165334	1556.723708
XYLENES ISO	119662.3207	12813.0158	36005.53999	132149.6145	189101.4528

Table D-2: Minnesota Emissions by County in pounds/year

	Sherburne	Sibley	Stearns	Steele	Stevens
ACENAPHTHEN	203.5353261	37.58	505.0908071	82.29698957	26.44600098
ACENAPHTHYL	4314.73855	796.696	10707.58639	1744.382417	560.6552207
ACETALDEHYDE	6.442597205	0	14.35980947	13.47476753	0
ACROLEIN	0.776975543	0	1.251062315	1.158878776	0
ACRYLONITRIL	148.1393	14.42289	182.329	115.5221	26.33576
ANTHRACENE	284.9484653	52.612	707.1255339	115.2143071	37.02440137
ANTIMONY	113.0001991	0	5.74875	0	0
ARSENIC	269.1722632	1.97193669	37.5994451	1.207799982	0.390082026
ATRAZINE	3078.762627	12305.9918	21804.88078	10504.01215	11029.21189
BENZ(A)ANTHR	407.3641845	75.38736341	1010.709353	165.4487775	52.93697824
BENZ(GHI)PE	81.41346685	15.032	202.0352543	32.91780608	10.57840039
BENZENE	50126.73797	11742.89963	126751.0475	23765.44225	7042.009612
BENZO(A)PYRE	81.41095796	15.032	202.0311833	32.91403503	10.57840039
BENZO(B)FLUO	122.1148715	22.548	303.0443013	49.3687611	15.86760059
BENZO(K)FLUO	40.70598165	7.516	101.0164167	16.45778175	5.289200195
BERYLLIUM	32.74376239	0.543101171	2.089679296	0.343402012	0.107434485
BUTADIENE,13	40721.90216	13135.82918	97324.39266	27077.10099	7311.993113
CADMIUM	617.412105	2.530381039	27.64286189	3.419532272	0.542378152
CARBON TETRA	28.50702782	3.931243693	74.22082787	30.37393156	4.574867484
CHLOROFORM	121.7034633	64.77635087	411.9443065	117.6072554	16.76171796
CHROMIUM	1472.511754	121.331391	653.7376648	108.5613989	24.00327783
CHROMIUM VI	0	0	0	10.59558857	0
CHRYSENE	244.2329234	45.096	606.1020152	98.73946159	31.73520117
COBALT	538.2062904	381.1322908	927.2159695	226.941415	75.39433613
COPPER	123.3985021	10.92084579	40.88910599	31.46917569	2.806735459
DIBENZAHAN	81.41425642	15.032	202.0365257	32.91898376	10.57840039
DIBROMOET,12	65.26598671	36.47097787	183.3664654	181.6416524	11.42246872
DIBUTYL PHTH	13.59392969	10.21667969	24.41917969	6.083419922	2.021030078
DICHLORETH12	98.48496306	29.35366016	268.1314056	78.8350592	16.96453635
DIEYLHEX PHT	0	0	0	0	0
ETHYLBENZENE	29797.29422	2368.894265	17653.85447	6585.602966	1445.844821
ETHYLENE OXI	7989.690328	4751.293868	21478.83699	20421.36811	1368.089968
FLUORANTHENE	407.1199798	75.16493017	1010.274061	164.9504349	52.89297722
FLUORENE	488.7014285	90.192	1212.566774	197.835908	63.47040234
FORMALDEHYDE	1676.186839	1220.083121	3026.093093	3267.908919	241.3790268
GLYCOL ETHRS	17485.14091	2296.064398	5791.872375	133119.4646	467.0588984
HEXCLBENZENE	0.000821003	0.003281598	0.005814635	0.00280107	0.002941123
INDN(123CDPY	407.0499468	75.16	1010.148275	164.5630966	52.89200195
LEAD	35082.32522	15.71557773	997.5622533	9.357683713	403.1088039
MANGANESE	3481.906893	20.61746729	334.9574517	45.02783844	4.401684384
MERCURY	775.017147	0.656400498	4.546491991	4.681628803	0.129846985
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	39247.36254	3347.131945	16056.11697	5124.005548	1303.67952
NAPHTHALENE	14027.66066	5978.253636	31046.37578	6678.024079	2066.375226
NICKEL	1130.312795	110.7529916	796.6123954	118.3095045	21.93540936
PCBS	0	0	0	0	0
PCDD	0.061908742	0.010861372	0.14555224	0.023719234	0.007624031
PCDF	0.325544696	0.059877373	0.803363026	0.13089846	0.042073903
PERC	2895.219964	1546.546438	14919.19534	5297.737571	2443.81636
PHENANTHRENE	1587.72946	293.124	3940.262127	642.1460894	206.2788076
PHENOL	20.35233984	3.758	560.5071602	11.33497492	2.644600098
PYRENE	488.496307	90.192	1212.236493	197.529964	63.47040234
STYRENE	9.832242078	2.858978961	25752.64738	21.11472253	0.930944988
TCDD,2378	0.001526575	2.8722E-05	0.000375935	6.14301E-05	1.97506E-05
TCDF,2378	0.008970199	0.001658988	0.02223622	0.003623541	0.001164706
TCE,111	27746.92563	20822.17528	50038.64527	12484.07351	4123.97122
TOLUENE	182414.2976	72658.22667	349425.2254	124212.2074	33653.64167
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	212.0091179	47.59590642	18947.23117	183.4722762	34.87688826
TRIFLURALIN	92.83502521	850.5116393	441.323426	585.5747808	946.9172773
VINYL CHLOR	182.0620692	38.06991371	914.378001	285.7690785	23.63408014
XYLENE,M	2072.252841	654.3254165	5592.074766	1889.893292	392.6623324
XYLENE,O	6924.946497	1980.216898	17569.79041	6938.695768	1049.817653
XYLENE,P	1102.000159	357.1095191	3389.039639	1139.313484	218.8485556
XYLENES ISO	288604.5857	46234.54615	185387.3384	113476.3141	13529.35219

Table D-2: Minnesota Emissions by County in pounds/year

	Swift	Todd	Traverse	Wabasha	Wadena
ACENAPHTHEN	29.15162124	102.8778704	12.12579956	88.78	147.9818539
ACENAPHTHYL	617.9787156	2180.994476	257.0669507	1882.136	3137.129731
ACETALDEHYDE	1.091965628	0.112784246	0	0	2.620717507
ACROLEIN	0.13169077	0.01429094	0	0	0.316057848
ACRYLONITRIL	36.43325	54.58626	0	27.89717	59.01808
ANTHRACENE	40.81210174	144.0282441	16.97611938	124.292	207.1741922
ANTIMONY	0	0	0	0	0
ARSENIC	0.409781472	0.883502056	0.160404138	0.76419024	0.491297259
ATRAZINE	14135.1402	8611.479229	6881.937275	7850.842822	2644.113076
BENZ(A)ANTHR	58.34870257	205.8555188	24.27009365	177.6470224	296.0163906
BENZ(GHI)PE	11.66053603	41.15094956	4.850319824	35.512	59.19247162
BENZENE	7879.312513	23552.57764	3229.787598	21725.65866	31845.40352
BENZO(A)PYRE	11.6601075	41.15086414	4.850319824	35.512	59.19144315
BENZO(B)FLUO	17.48990085	61.72637331	7.275479736	53.268	88.78653978
BENZO(K)FLUO	5.830140593	20.57545349	2.425159912	17.756	29.59593
BERYLLIUM	0.113237399	0.245216763	0.044177723	0.213488673	0.135310685
BUTADIENE,13	9149.354177	19813.92697	3901.004004	17728.08579	10636.58299
CADMIUM	0.574404162	1.331122467	0.225781534	1.156888334	0.935381721
CARBON TETRA	8.383595773	10.31848951	1.79334E-06	10.54840464	10.237882
CHLOROFORM	31.3169378	41.35581697	4.334634	59.38047853	27.14910477
CHROMIUM	25.1591517	54.08740831	9.87042101	46.57574103	30.24291498
CHROMIUM VI	0	0	0	0	0
CHRYSENE	34.98002209	123.4526704	14.55095947	106.536	177.5736085
COBALT	78.97374113	169.6213046	31.00261602	145.876729	94.95702969
COPPER	2.989221256	7.789450181	1.196682321	756.7093845	7.433750218
DIBENZAHAN	11.66066985	41.15093304	4.850319824	35.512	59.1927928
DIBROMOET,12	22.52280447	23.64528812	3.175603347	94.34093434	144.0987583
DIBUTYL PHTH	2.116980078	4.546889844	0.831059961	3.910389844	2.545430078
DICHLORETH12	24.4143113	45.4383764	7.645657545	45.43161718	26.69930815
DIEYLHEX PHT	0	0	0	0	0
ETHYLBENZENE	1708.196159	3164.09125	559.4195938	3808.15363	3725.348027
ETHYLENE OXI	2592.197768	2822.234864	386.4866335	10635.67744	16109.55173
FLUORANTHENE	58.31106133	205.7578867	24.25200016	177.5619374	295.9812344
FLUORENE	70.00061064	246.9107842	29.10191895	213.072	355.2445765
FORMALDEHYDE	254.8802635	543.7980819	99.22909776	468.4169181	308.1060266
GLYCOL ETHRS	524.0423984	1043.105703	186.7697998	1143.587688	1020.273906
HEXCLBENZENE	0.003769371	0.002296394	0.001835183	0.002093558	0.000705097
INDN(123CDPY	58.2997331	205.7541162	24.25159912	177.56	295.9552852
LEAD	3.256396776	6.997901121	1.278359341	766.0150692	3.915450412
MANGANESE	4.639208037	10.65997008	1.831267476	403.387452	7.493170003
MERCURY	0.136854426	4.354215379	0.053393882	0.257977311	0.164567061
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	1469.61805	2911.974807	504.3834356	3038.216071	2640.234534
NAPHTHALENE	2308.949529	6121.096193	948.225737	5333.927135	6014.535464
NICKEL	22.98389445	49.43604653	9.02172708	297.5348388	27.78756304
PCBS	0	0	0	0	0
PCDD	0.008403027	0.029645636	0.003495348	0.025583311	0.042626927
PCDF	0.0463738	0.163630141	0.019290203	0.141208109	0.235314619
PERC	1942.218772	749.9477919	123.3468	664.1269888	451.1149236
PHENANTHRENE	227.4087333	802.4506095	94.58123657	692.484	1154.32107
PHENOL	2.914959961	10.2877002	1.212579956	8.878	14.7977002
PYRENE	69.96584427	246.9060134	29.10191895	213.072	355.1611372
STYRENE	4.680005942	3.30942599	0	10.40273416	16652.06668
TCDD,2378	2.17598E-05	7.65352E-05	9.04735E-06	6.60466E-05	0.00010973
TCDF,2378	0.001283715	0.004529022	0.00053398	0.003908413	0.00651235
TCE,111	4334.294776	9281.646096	1692.738	8006.147265	5201.269872
TOLUENE	45254.21917	68592.89348	21197.00772	182776.651	80030.19844
TOLUENE24DII	0	0	0	0	0
TRICHLORETHY	54.00470239	76.25320068	2.125764	62.26692737	73.0372372
TRIFLURALIN	1144.72732	92.83502521	968.3407524	183.52771	18.56700445
VINYL CHLOR	68.96889214	63.742484	0	125.7269616	52.74901732
XYLENE,M	486.0860381	913.4055644	184.8622333	1044.376723	902.7181709
XYLENE,O	1399.356496	3010.51721	430.9889264	4567.347169	6798.269268
XYLENE,P	260.397624	460.3737099	105.0413561	606.593556	548.7267226
XYLENES ISO	20718.06477	30384.37037	5648.594509	66996.78694	39891.54236

Table D-2: Minnesota Emissions by County in pounds/year

	Waseca	Washington	Watonwan	Wilkin	Winona
ACENAPHTHEN	46.92221789	254.2581689	31.33141317	19.11599976	205.777207
ACENAPHTHYL	994.7224955	5389.500285	664.2045664	405.2591948	4362.476789
ACETALDEHYDE	0.873572502	154.6424887	0.655179377	0	0
ACROLEIN	0.105352616	0.198727539	0.079014462	0	0
ACRYLONITRIL	42.53742	165.6409	85.97451	6.255469	105.3441
ANTHRACENE	65.69097065	387.7113623	43.86387765	26.76239966	288.0880898
ANTIMONY	0	90.20254967	0	0	0
ARSENIC	0.670147501	127.6480895	0.437388174	0.275617428	1.944944947
ATRAZINE	11364.255	2182.298005	11871.34471	3323.253076	7959.504902
BENZ(A)ANTHR	93.92038231	513.4186347	62.71152087	38.26323386	411.762543
BENZ(GHI)PE	18.76879718	101.679988	12.53249779	7.646399902	82.31088281
BENZENE	14001.24877	128437.0045	8734.151363	5037.125113	51304.40989
BENZO(A)PYRE	18.76845436	4209.502968	12.53236282	7.646399902	82.31088281
BENZO(B)FLUO	28.15247322	152.4998136	18.79820477	11.46959985	123.4663242
BENZO(K)FLUO	9.384296654	50.83339275	6.266172442	3.823199951	41.15544141
BERYLLIUM	0.184568737	3.189371496	0.122538959	0.07741877	0.580388091
BUTADIENE,13	15559.78845	136084.7924	10635.47663	5795.662566	34053.54313
CADMIUM	0.93505897	42.50663582	0.62078483	0.390673843	3.059565596
CARBON TETRA	11.79067964	50.73091915	19.25516712	1.056077831	35.18035059
CHLOROFORM	53.1350052	304.6364741	56.5214124	8.625891013	169.2917329
CHROMIUM	41.23695212	743.7652489	44.99301199	16.73407537	125.9984855
CHROMIUM VI	0	1.53557112	18.38909529	0	0
CHRYSENE	56.30512275	310.6839379	37.59656577	22.93919971	246.9326484
COBALT	129.524869	1450.615331	83.28320006	52.35855443	348.8892941
COPPER	4.872442338	52.26835163	3.172396404	1.9746812	35.8237625
DIBENZAHAN	18.76890424	101.6670576	12.53257808	7.646399902	82.31088281
DIBROMOET,12	17.38968334	233.8183758	16.91738562	5.30466113	49.23577107
DIBUTYL PHTH	3.472060156	34.53079063	2.2325	1.40352998	9.352370313
DICHLORETH12	40.85677306	298.2803826	35.37363157	11.94244182	100.8898293
DIEYLHEX PHT	0	750	0	0	0
ETHYLBENZENE	2493.075121	51134.1257	1842.472743	948.6046799	6606.863947
ETHYLENE OXI	2076.228666	27597.61714	1966.9004	652.715333	5915.776072
FLUORANTHENE	93.85154404	519.8046894	62.6682749	38.232702	411.5595351
FLUORENE	112.6426987	610.1321525	75.21742341	45.87839941	493.8652969
FORMALDEHYDE	416.5385114	5882.559588	268.9604534	167.9786455	4958.314994
GLYCOL ETHRS	13989.7598	44651.85669	529.613	315.4249004	2148.862094
HEXCLBENZENE	0.003030468	0.000581946	0.003165692	0.000886201	0.002122535
INDN(123CDPY	93.84162828	508.3364467	62.66072072	38.23199951	411.5544141
LEAD	5.340817994	2465.307252	3.434092767	2.158948375	2134.386073
MANGANESE	7.58722602	925.0651337	4.919876353	3.085293065	1622.252771
MERCURY	0.223072638	87.14394741	0.148069204	0.093545321	2.05805786
METHENE(B)4-	0	0	0	0	0
METHYLENE CL	2240.252688	23147.51698	1598.898508	863.2512629	6065.50438
NAPHTHALENE	3835.902855	38691.64629	2523.536057	1504.61853	12037.17175
NICKEL	37.68635893	12632.83652	24.26139259	15.2546026	108.2227179
PCBS	0	0.001659566	0	0	0
PCDD	0.01352616	0.07366664	0.009031474	0.005510674	0.059298925
PCDF	0.074646294	0.406025778	0.04984237	0.030411635	0.327300343
PERC	1288.97522	15864.39292	1264.650577	215.834915	4094.767485
PHENANTHRENE	366.0141696	1983.144239	244.4006753	149.1047981	1605.062215
PHENOL	4.692060059	4685.001842	3.13302002	1.911599976	19259.5778
PYRENE	112.6148856	610.1848755	75.19656359	45.87839941	493.8652969
STYRENE	8.764239349	10558.18316	10.18108812	0.171084004	9107.521113
TCDD,2378	3.50315E-05	0.000634575	2.33838E-05	1.42712E-05	0.000153111
TCDF,2378	0.002066365	0.01199155	0.001379724	0.000841855	0.009059203
TCE,111	7109.836245	70468.9129	4596.914048	2860.365864	19177.72174
TOLUENE	59764.38458	794950.2864	38990.35483	30782.19714	141838.5871
TOLUENE24DII	0	4	0	0	0
TRICHLORETHY	7512.906691	430.0151586	118.4564216	10.53540281	204.2219948
TRIFLURALIN	665.5557102	97.11971786	806.23647	864.7940194	112.8302635
VINYL CHLOR	115.8214872	494.0428261	153.5135318	5.078034439	391.8805022
XYLENE,M	1041.906729	6338.693461	595.0127049	269.4565835	2249.411083
XYLENE,O	2020.390156	14550.98615	1378.732855	677.8354574	6788.116512
XYLENE,P	687.1944991	3403.83866	304.7946114	145.5948247	1456.138391
XYLENES ISO	29252.28659	557313.913	17936.32864	8958.484345	70091.0814

Table D-2: Minnesota Emissions by County in pounds/year

	Wright	Yellow Medicine	Portable Sources	State Total
ACENAPHTHEN	313.0529433	31.68340088	0.044826114	14403.13077
ACENAPHTHYL	6636.410882	671.6880986	0.142769879	305294.3692
ACETALDEHYDE	9.641100964	0	18.51162205	62048.35083
ACROLEIN	1.145897699	0	2.243523821	98267.57042
ACRYLONITRIL	254.4235	34.49603	0	8369.087552
ANTHRACENE	438.2742214	44.35676123	0.047794496	20234.05133
ANTIMONY	0.159737345	0	0	1414.932798
ARSENIC	3.133381935	0.427050836	0.147413433	11163.46731
ATRAZINE	7859.899072	16091.0601	0	679138.6662
BENZ(A)ANTHR	626.429506	63.4159725	0.041838086	28968.79675
BENZ(GHI)PE	125.2201913	12.67336035	0.013031976	5759.566654
BENZENE	77315.66445	8403.964699	24.21586826	3850764.012
BENZO(A)PYRE	125.2171061	12.67336035	0.005108748	9868.53384
BENZO(B)FLUO	187.8223446	19.01004053	0.004912835	8649.509877
BENZO(K)FLUO	62.6089589	6.336680176	0.004225921	2879.674662
BERYLLIUM	0.905764165	0.117804951	0.212275344	252.9243556
BUTADIENE,13	66650.60164	10573.05926	0.94075615	3555093.587
CADMIUM	4.781153494	0.600601651	0.147413433	2375.970654
CARBON TETRA	50.765518	5.252187768	0	10304.03912
CHLOROFORM	176.4450273	15.477174	0	63604.00509
CHROMIUM	183.0464009	26.25016436	0	31940.10724
CHROMIUM VI	0.002162	0.000000843	0.011820688	3019.77586
CHRYSENE	375.6536128	38.02008105	0.01197845	17296.62789
COBALT	566.9933635	82.42556107	0	36563.87646
COPPER	34.43496968	3.162714866	0.412757613	19451.26144
DIBENZAHAN	125.2212992	12.67336035	0.014815283	5759.512874
DIBROMOET,12	81.61116689	14.20968814	0	7126.935414
DIBUTYL PHTH	15.19695938	2.209509961	0	1038.274868
DICHLORETH12	164.9112281	23.12214777	0	9543.64547
DIEYLHEX PHT	0	0	0	2688.891428
ETHYLBENZENE	11152.09028	1659.578588	0	870929.6458
ETHYLENE OXI	9715.335536	1665.999366	0	831850.0865
FLUORANTHENE	626.2962951	63.36786798	0.204071565	28873.44219
FLUORENE	751.6465926	76.04016211	0.731716629	34573.4436
FORMALDEHYDE	1845.314918	263.8649027	28.5708322	1400823.507
GLYCOL ETHRS	3494.834797	515.7313008	0	1059985.762
HEXCLBENZENE	0.002095973	0.004290949	0	1.226265454
INDN(123CDPY	626.0750514	63.36680176	0.009965646	28796.06149
LEAD	23.81039683	3.398728909	0	151486.74
MANGANESE	38.46099165	4.861257366	1474.134333	86839.46235
MERCURY	33.75294674	0.142377865	0.011391311	2953.480067
METHENE(B)4-	0	0	0	1529.55
METHYLENE CL	9939.432637	1443.100778	0	1013311.462
NAPHTHALENE	19659.09319	2515.495801	2.336436286	1041762.529
NICKEL	174.5282958	23.98749897	0.825515226	43059.17824
PCBS	0.009967766	0	0	5.434233761
PCDD	0.09031736	0.009133109	0	4.480739072
PCDF	0.498315624	0.050403678	0	27.34284798
PERC	4639.496521	1738.87893	0	852253.6568
PHENANTHRENE	2442.041352	247.1305269	0.800309724	112326.9374
PHENOL	31.32184953	3.168340088	0	230348.4624
PYRENE	751.344459	76.04016211	0.123459029	34559.37575
STYRENE	19.65176338	0	0	1150011.286
TCDD,2378	0.000233006	2.36431E-05	0	0.013243072
TCDF,2378	0.014069277	0.001395252	0	1.920726528
TCE,111	31065.28961	4505.863	0	1951754.273
TOLUENE	236041.9849	42097.02744	233.4423515	15402142.73
TOLUENE24DII	0	0	0	4.3
TRICHLORETHY	349.6040148	41.867944	0	581361.4258
TRIFLURALIN	433.4681739	1271.125747	0	42489.87712
VINYL CHLOR	342.9632571	17.91412	0	30092.47357
XYLENE,M	3555.090072	510.0488001	0	191619.9204
XYLENE,O	10423.15272	1270.233728	0	743008.5887
XYLENE,P	1974.5401	263.0491745	0	109303.1351
XYLENES ISO	137930.2572	15888.75616	7.296807605	8490364.217

Appendix E: New York Toxic Emissions Inventory

New York's emission estimates are part of the regional report, but the state report was unavailable at time of publication.

For further information please contact:
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Appendix F: Ohio Toxic Emissions Inventory

BACKGROUND

With a 1996 population of approximately 11,160,000, Ohio represents approxiamately 12.5 percent of the total population of the Great Lakes Region and ranks among the top in industrial activity. Ohio performed quality assurance/quality control checks on the data and compared its toxic emissions to the emissions released in other states.

Demographic Characteristics for the Ohio Area of the Great Lakes Region Air Toxics Emissions Inventory

	Ohio
Total Population, 1996	10,847,115
Urban Population, 1996	8,039,037
Rural Population, 1996	2,808,078

Source: U.S. Bureau of the Census

The Ohio EPA formed an Emission Inventory Unit and hired a supervisor for the unit in May of 1999. The unit currently consists of two persons, the unit supervisor and a staff level employee. The unit is in the process of creating one additional position to cover the emission inventory needs of the division. Data collection activities for import into the regional RAPIDs database became the first priority. The newly formed unit has been faced with the challenge of learning how to use RAPIDs, and develop an inventory in accordance with the RAPIDS protocol in a short period of time. Ohio lacks a point source emission inventory and thus utilized its previously developed Toxic Release Inventory (TRI) for the 1996 year of record. Also, due to time limitations, Ohio only completed six of the fourteen area source inventories.

DATA SOURCES

Point Sources

Ohio intended to conduct a survey on major facilities to collect point source information. This activity would have taken several months to complete and most likely it would have caused the state to miss the deadline for the 1996 year of record inventory. Ohio decided to follow a similar approach to the one used for the 1993 inventory year and utilized the Toxic Release Inventory (TRI) data to fulfil the point source inventory requirements. This data is considered of high confidence and it was quality assured. Because there are 1600 TRI facilities and approximately 750 major facilities in Ohio, the major facilities are, for the most part, a subset of the TRI inventory. This claim needs to be confirmed and we need to create a cross reference between permitted and TRI facilities to precise locate the exact number of major facilities that exist in the TRI database. A quick check on 10 percent of the larger major facilities that contribute 90 percent of the total air emissions has shown that they all reside in the TRI database. Based on this fact, Ohio feels that the TRI inventory is a fair replacement to the point source inventory and the reported toxic emissions are a close representation of what would have been reported if there was a complete point source inventory.

A different approach in compiling point source inventories is in the planning stages. In 1994, Ohio created a permitting, emission and billing computer system, referred to as STARS. The system was primarily developed for Title V facilities and served in that capacity for the last five years. However, the emission inventory component of the application was not utilized to its true potential. Also, it is one of the very first ORACLE based systems in the nation and it will have to either be upgraded or replaced by another system soon. For the future point source inventories, Ohio will request point source information from facilities and the generated data will be quality assured by district and local air agency staff and extracted for loading into RAPIDS.

Area sources

Area source emissions were initially calculated for all fourteen categories and the inventory does include criteria pollutant estimates for volatile organic compounds on a county basis. The majority of the calculations were based on county population data provided by the U.S. Bureau of Census. In many cases, Ohio used the RAPIDS alternative methods instead of the preferred methods of calculating emissions due to data availability and time restrictions associated with collecting the data and completing the project. Only six out of the 14 areas sources were successfully entered into RAPIDS. Air toxic emissions were speciated for the six sources using air toxic emission profiles. The emissions were not reconciled for any potential double counting of point source emissions. Compiling area source inventories was labor intensive and time consuming. The experience gained from this effort will pay dividends in future inventory years.

RESULTS

The toxic emissions for Ohio are listed in the tables following the References section of this Appendix. The emissions were given in total pounds per year of pollutant by county. For additional information concerning the Ohio portion of this report please contact: Ohio EPA, DAPC, 122 South Front Street, Columbus, Ohio, 43215, Attention Tom Velalis, (614) 644-4837.

REFERENCES

Ohio and Great Lakes States 1990 population data obtained from the U.S. Bureau of Census web site at http:/venus.census.gov/cdrom/lookup.

1990 Census of Population and Housing, Summary of Population and Housing Characteristics, Ohio. U.S. Department of Commerce, Economics and Statistics Administration, U.S. Bureau of Census.

1996 Toxic Release Inventory for Great Lakes Listed Pollutants, provided by Mark Besel, TRI Unit, Ohio EPA, Division of Air Pollution Control.

Ohio's toxic emissions inventory was prepared by Mr. Tom Velalis, Ohio EPA.

Table F-1: Ohio Emissions by County in pounds/year

	Adams	Allen	Ashland	Ashtabula	Athens
ACENAPHTHENE	337	1309	613	1242	731
ACENAPHTHYLENE	3814	14839	6949	14078	8285
ACETALDEHYDE		44005			
ACROLEIN		3800			
ACRYLAMIDE		0			
ACRYLONITRILILE		126100			
ANTHRACENE	449	1746	818	1656	975
ANTIMONY					
ARSENIC					
ATRAZINE	2537	2537	9761	6561	2798
BENZ(A)ANTHRACENE	1346	5237	2453	4969	2924
BENZO(G,H,I)PERYLENE	337	112	436	204	414
BENZENE	83198	364693	151373	307076	180718
BENZO(A)PYRENE	224	873	409	828	487
BENZO(B)FLUORATHNE	224	873	409	828	487
BENZO(K)FLUORATHENE	112	436	204	414	244
BERYLLIUM					
BUTADIENE,13		7450			
CADMIUM	3	10	5	10	6
CARBON TETRACHLORIDE	32	205	58	118	70
CHLOROFORM					
CHROMIUM	0	505	0	0	0
CHRYSENE	561	2182	1022	2070	1218
COBALT				14	
COPPER		505	0		
DIBENZO(A,H)ANTHRACENE	112	436	204	414	244
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	4287	16679	7811	15824	9312
ETHYLBENZENE	2757	26286	5773	10179	5988
ETHYLENE OXIDE					
FLUORANTHENE	673	2619	1226	2484	1462
FLUORENE	785	3055	1431	2898	1706
FORMALDEHYDE		14126			0
GLYCOL ETHERS	8	31	15	30	18
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	224	873	409	828	487
LEAD		0			
MANGANESE	132	48	1078	46	27
MERCURY				2260	
METHYLENE CL	2066	8036		7624	4487
NAPHTHALENE	11374	45650	20723	41980	24706
NICKEL	0	780	0	0	0
TETRACHLOROETHYLENE	53823	259802	98061	198658	116911
PHENANTHRENE	10635	41375	19376	39252	23100
PHENOL			54	5466	
PHOSGENE					
PYRENE	561	2182	1022	2070	1218
STYRENE	688	2676	32267	184124	1494
1,1,1,-TRICHLOROETHANE					
TOLUENE	86754	107375	41456	197675	49426
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	11330	44081	20643	41819	24611
XYLENE (MIXED ISOMERS)	15944	189616	30392	58849	34633

Table F-1: Ohio Emissions by County in pounds/year

	Auglaize	Belmont	Brown	Butler	Carroll
ACENAPHTHENE	570	829	475	3857	334
ACENAPHTHYLENE	6464	9398	5385	43717	3789
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE					
ANTHRACENE	760	1106	634	5143	446
ANTIMONY					
ARSENIC					
ATRAZINE	383	9271	356	4422	6207
BENZ(A)ANTHRACENE	2281	3317	1901	15430	1337
BENZO(G,H,I)PERYLENE	244	190	276	158	1286
BENZENE	140990	205004	117461	960918	82644
BENZO(A)PYRENE	380	553	317	2572	223
BENZO(B)FLUORATHNE	380	553	317	2572	223
BENZO(K)FLUORATHENE	190	276	158	1286	111
BERYLLIUM					
BUTADIENE,13					
CADMIUM	4	6	4	30	3
CARBON TETRACHLORIDE	54	79	45	367	32
CHLOROFORM					
CHROMIUM	0	0	0	506	0
CHRYSENE	951	1382	792	6429	557
COBALT				505	
COPPER				0	
DIBENZO(A,H)ANTHRACENE	190	276	158	1286	111
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	7265	10564	6053	49139	4258
ETHYLBENZENE	4672	6793	3892	31599	2739
ETHYLENE OXIDE					
FLUORANTHENE	1141	1659	950	7715	669
FLUORENE	1331	1935	1109	9001	780
FORMALDEHYDE				5058	
GLYCOL ETHERS	14	20	11	92	8
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	380	553	317	2572	223
LEAD					0
MANGANESE	346	30	17	641	12
MERCURY					
METHYLENE CL	3500	5090	2916	23676	2052
NAPHTHALENE	19275	28026	16058	136833	11298
NICKEL	750	0	0	506	0
TETRACHLOROETHYLENE	91211	132624	75990	616917	53465
PHENANTHRENE	18022	26205	15015	121895	10564
PHENOL				0	
PHOSGENE					
PYRENE	951	1382	792	6429	557
STYRENE	1166	1695	971	8927	683
1,1,1,-TRICHLOROETHANE				0	
TOLUENE	182879	56067	32125	263655	22603
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE				35696	
TRIFLURALIN		750			
VINYL CHLOR					
M-XYLENE					
XYLENE,O	19201	27918	15997	129867	11255
XYLENE (MIXED ISOMERS)	27019	39287	22511	183692	15838

Table F-1: Ohio Emissions by County in pounds/year

	Champaign	Clark	Clermont	Clinton	Columbiana
ACENAPHTHENE	452	1795	1989	460	1330
ACENAPHTHYLENE	5121	20338	22547	5211	15077
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE					
ANTHRACENE	602	2393	2653	613	1774
ANTIMONY					
ARSENIC					
ATRAZINE	2032	13688	10555	2716	14325
BENZ(A)ANTHRACENE	1807	7178	7958	1839	5321
BENZO(G,H,I)PERYLENE	111	151	598	663	153
BENZENE	111705	443624	491810	113675	328867
BENZO(A)PYRENE	301	1196	1326	307	887
BENZO(B)FLUORATHNE	301	1196	1326	307	887
BENZO(K)FLUORATHENE	151	598	663	153	443
BERYLLIUM					
BUTADIENE,13					
CADMIUM	3	14	15	4	10
CARBON TETRACHLORIDE	43	171	189	44	127
CHLOROFORM					
CHROMIUM	0	0	0	0	53
CHRYSENE	753	2991	3316	766	2217
COBALT					
COPPER	250	0	63	505	0
DIBENZO(A,H)ANTHRACENE	151	598	663	153	443
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	5756	22859	25343	5858	16946
ETHYLBENZENE	3701	14700	16296	3767	10897
ETHYLENE OXIDE					
FLUORANTHENE	904	3589	3979	920	2661
FLUORENE	1054	4187	4642	1073	3104
FORMALDEHYDE		15			
GLYCOL ETHERS	11	43	48	11	32
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	301	1196	1326	307	887
LEAD				15	
MANGANESE	17	1046	73	17	49
MERCURY					
METHYLENE CL	2773	11014	12210	2822	8165
NAPHTHALENE	15271	60648	67235	15540	44959
NICKEL	0	1	14	0	0
TETRACHLOROETHYLENE	72267	286995	318168	73541	212756
PHENANTHRENE	14279	56706	62866	14531	42038
PHENOL					0
PHOSGENE					
PYRENE	753	2991	3316	766	2217
STYRENE	924	31168	4067	4963	2719
1,1,1,-TRICHLOROETHANE					
TOLUENE	38190	136532	174493	31089	89944
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	15213	60415	66977	15481	44787
XYLENE (MIXED ISOMERS)	21408	157107	94252	21786	63025

Table F-1: Ohio Emissions by County in pounds/year

	Coshocton	Crawford	Cuyahoga	Darke	Defiance
ACENAPHTHENE	434	571	16808	650	489
ACENAPHTHYLENE	4923	6471	190488	7364	5539
ACETALDEHYDE	264470				
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE					
ANTHRACENE	579	761	22414	866	652
ANTIMONY			50		
ARSENIC					
ATRAZINE	4115	379	261	11	4016
BENZ(A)ANTHRACENE	1738	2284	67231	2599	1955
BENZO(G,H,I)PERYLENE	443	145	190	5603	217
BENZENE	504287	141140	4160763	161943	309611
BENZO(A)PYRENE	290	381	11205	433	326
BENZO(B)FLUORATHNE	290	381	11205	433	326
BENZO(K)FLUORATHENE	145	190	5603	217	163
BERYLLIUM					
BUTADIENE,13					
CADMIUM	3	4	129	5	4
CARBON TETRACHLORIDE	41	54	1599	62	46
CHLOROFORM					
CHROMIUM	0	0	1697	0	0
CHRYSENE	724	952	28013	1083	814
COBALT					
COPPER	0		2420		
DIBENZO(A,H)ANTHRACENE	145	190	5603	217	163
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	5534	7273	214900	8276	6225
ETHYLBENZENE	3559	4677	147780	14942	4004
ETHYLENE OXIDE					
FLUORANTHENE	869	1142	33615	1299	977
FLUORENE	1014	1332	39218	1516	1140
FORMALDEHYDE	261320		93643	120	306443
GLYCOL ETHERS	10	14	402	16	12
HEXCHLORETHANE			50		
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	290	381	11205	433	326
LEAD			5139		
MANGANESE	16	225	876	24	18
MERCURY					
METHYLENE CL	2666	3504	103161	3988	2999
NAPHTHALENE	14682	19296	576783	21959	124517
NICKEL	0	2	1740	0	0
TETRACHLOROETHYLENE	69476	206708	3214001	103911	78157
PHENANTHRENE	13728	18041	531140	20532	15443
PHENOL			63455		236190
PHOSGENE					
PYRENE	724	952	28013	1083	814
STYRENE	888	1167	49423	1328	999
1,1,1,-TRICHLOROETHANE			25074		
TOLUENE	29371	38602	1377121	43930	33041
TOLUENE-2,4-DIISOCYANETE			750		
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	14625	19221	565861	21874	16453
XYLENE (MIXED ISOMERS)	104909	27048	1090983	70536	23153

Table F-1: Ohio Emissions by County in pounds/year

	Delaware	Erie	Fairfield	Fayette	Franklin
ACENAPHTHENE	963	943	1424	344	12233
ACENAPHTHYLENE	10912	10686	16142	3894	138636
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE	0				15
ACRYLONITRILILE	3194				
ANTHRACENE	1284	1257	1899	458	16310
ANTIMONY					
ARSENIC					
ATRAZINE	5743	7574	4837	10957	14058
BENZ(A)ANTHRACENE	3851	3772	5697	1374	48930
BENZO(G,H,I)PERYLENE	163	321	314	475	115
BENZENE	238031	233092	352114	84941	3024054
BENZO(A)PYRENE	642	629	950	229	8155
BENZO(B)FLUORATHNE	642	629	950	229	8155
BENZO(K)FLUORATHENE	321	314	475	115	4078
BERYLLIUM					
BUTADIENE,13					
CADMIUM	7	7	11	3	94
CARBON TETRACHLORIDE	92	90	135	33	1164
CHLOROFORM					
CHROMIUM	0	0	0	0	752
CHRYSENE	1605	1571	2374	573	20388
COBALT					
COPPER	0				765
DIBENZO(A,H)ANTHRACENE	321	314	475	115	4078
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	12265	12011	18144	4377	155854
ETHYLBENZENE	19350	7724	11667	2814	114672
ETHYLENE OXIDE					2388
FLUORANTHENE	1926	1886	2849	687	24465
FLUORENE	2247	2200	3323	802	28543
FORMALDEHYDE			1740		6222
GLYCOL ETHERS	23	23	34	8	293
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	642	629	950	229	8155
LEAD		111			7
MANGANESE	35	35	62	13	8949
MERCURY					
METHYLENE CL	5910	5787	8742	2109	75080
NAPHTHALENE	40245	31865	48137	11612	440781
NICKEL	0	7	1	0	758
TETRACHLOROETHYLENE	153990	150795	227794	54951	1956361
PHENANTHRENE	30426	29795	45009	10858	386551
PHENOL	6682				2729
PHOSGENE					
PYRENE	1605	1571	2374	573	20388
STYRENE	1968	15341	31920	28302	25005
1,1,1,-TRICHLOROETHANE		104650			
TOLUENE	65101	63784	96302	28551	858340
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	32416	31744	47953	11568	411831
XYLENE (MIXED ISOMERS)	196502	48171	68609	16278	676955

Table F-1: Ohio Emissions by County in pounds/year

	Fulton	Gallia	Geauga	Greene	Guernsey
ACENAPHTHENE	485	389	1012	1722	484
ACENAPHTHYLENE	5497	4406	11470	19520	5482
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE					
ANTHRACENE	647	518	1349	2297	645
ANTIMONY					
ARSENIC					
ATRAZINE	4622	13436	639	1035	11153
BENZ(A)ANTHRACENE	1940	1555	4048	6890	1935
BENZO(G,H,I)PERYLENE	4078	162	130	337	574
BENZENE	119897	96110	250205	425796	119573
BENZO(A)PYRENE	323	259	675	1148	322
BENZO(B)FLUORATHNE	323	259	675	1148	322
BENZO(K)FLUORATHENE	162	130	337	574	161
BERYLLIUM					
BUTADIENE,13					
CADMIUM	4	3	8	13	4
CARBON TETRACHLORIDE	46	37	96	164	46
CHLOROFORM					
CHROMIUM	0	0	0	16	0
CHRYSENE	808	648	1687	2871	806
COBALT					
COPPER	28				
DIBENZO(A,H)ANTHRACENE	162	130	337	574	161
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	6178	4952	12892	21941	6161
ETHYLBENZENE	3973	3185	8291	15623	3962
ETHYLENE OXIDE					
FLUORANTHENE	970	778	2024	3445	967
FLUORENE	1132	907	2362	4019	1129
FORMALDEHYDE					77
GLYCOL ETHERS	12	9	24	41	12
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	323	259	675	1148	322
LEAD	220				
MANGANESE	268	14	37	63	18
MERCURY					
METHYLENE CL	2977	2386	6212	10571	2969
NAPHTHALENE	16391	13139	34205	58210	16347
NICKEL	0	0	0	1	0
TETRACHLOROETHYLENE	77566	62177	161865	275461	77355
PHENANTHRENE	15326	12285	31982	54427	15284
PHENOL	456				
PHOSGENE					
PYRENE	808	648	1687	2871	806
STYRENE	4702	795	23679	3521	989
1,1,1,-TRICHLOROETHANE					
TOLUENE	66790	26286	80817	116453	32702
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	16328	13089	34074	57987	16284
XYLENE (MIXED ISOMERS)	22978	18419	47951	87596	102170

Table F-1: Ohio Emissions by County in pounds/year

	Hamilton	Hancock	Hardin	Harrison	Henry
ACENAPHTHENE	10526	828	380	191	363
ACENAPHTHYLENE	119298	9386	4303	2170	4112
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE					
ANTHRACENE	14035	1104	506	255	484
ANTIMONY					
ARSENIC					
ATRAZINE	898	629	12718	10884	753
BENZ(A)ANTHRACENE	42105	3313	1519	766	1451
BENZO(G,H,I)PERYLENE	161	3509	276	127	64
BENZENE	2602226	204742	93862	47328	89687
BENZO(A)PYRENE	7018	552	253	128	242
BENZO(B)FLUORATHNE	7018	552	253	128	242
BENZO(K)FLUORATHENE	3509	276	127	64	121
BERYLLIUM					
BUTADIENE,13					
CADMIUM	81	6	3	1	3
CARBON TETRACHLORIDE	1001	79	36	18	35
CHLOROFORM	1349				
CHROMIUM	1027	0	0	0	0
CHRYSENE	17544	1380	633	319	605
COBALT	290				
COPPER	16				
DIBENZO(A,H)ANTHRACENE	3509	276	127	64	121
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	134090	10550	4836	2439	4622
ETHYLBENZENE	93291	21545	3110	1568	2971
ETHYLENE OXIDE					
FLUORANTHENE	21053	1656	759	383	726
FLUORENE	24561	1932	886	447	847
FORMALDEHYDE	4845		6742		
GLYCOL ETHERS	252	20	9	5	9
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	7018	552	253	128	242
LEAD		250			
MANGANESE	1818	30	14	7	13
MERCURY					
METHYLENE CL	64607	5083	2330	1175	2227
NAPHTHALENE	355750	27990	12835	6471	12261
NICKEL	2098	0	0	0	0
TETRACHLOROETHYLENE	1690627	132455	60719	30618	58022
PHENANTHRENE	332630	26171	11997	6050	11464
PHENOL			7554		
PHOSGENE					
PYRENE	17544	1380	633	319	605
STYRENE	158280	1693	776	391	742
1,1,1,-TRICHLOROETHANE	7260				25910
TOLUENE	860973	69716	25698	12943	64280
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE	37373				
XYLENE,O	354385	27883	12782	6445	12214
XYLENE (MIXED ISOMERS)	544532	129690	36268	9071	17814

Table F-1: Ohio Emissions by County in pounds/year

	Highland	Hocking	Holmes	Huron	Jackson
ACENAPHTHENE	475	339	435	715	388
ACENAPHTHYLENE	5384	3839	4935	8098	4394
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE					
ANTHRACENE	633	452	581	953	517
ANTIMONY					
ARSENIC				15	
ATRAZINE	12634	8941	583	4497	9146
BENZ(A)ANTHRACENE	1900	1355	1742	2858	1551
BENZO(G,H,I)PERYLENE	121	158	113	145	238
BENZENE	117432	83746	107645	176639	95842
BENZO(A)PYRENE	317	226	290	476	258
BENZO(B)FLUORATHNE	317	226	290	476	258
BENZO(K)FLUORATHENE	158	113	145	238	129
BERYLLIUM					
BUTADIENE,13					
CADMIUM	4	3	3	5	3
CARBON TETRACHLORIDE	45	32	41	68	37
CHLOROFORM					
CHROMIUM	0	0	0	15	0
CHRYSENE	792	565	726	1191	646
COBALT					
COPPER	0			15	0
DIBENZO(A,H)ANTHRACENE	158	113	145	238	129
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	6051	4315	5547	9102	4938
ETHYLBENZENE	3891	2775	4863	5853	3176
ETHYLENE OXIDE					
FLUORANTHENE	950	678	871	1429	775
FLUORENE	1108	790	1016	1667	905
FORMALDEHYDE					
GLYCOL ETHERS	11	8	10	17	9
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	317	226	290	476	258
LEAD					
MANGANESE	17	12	16	157	14
MERCURY					
METHYLENE CL	2916	2079	2673	4386	2380
NAPHTHALENE	16055	11450	14716	24148	13102
NICKEL	0	0	0	0	0
TETRACHLOROETHYLENE	75970	54178	69639	114274	62003
PHENANTHRENE	15011	10705	13760	22579	12251
PHENOL					4800
PHOSGENE					
PYRENE	792	565	726	1191	646
STYRENE	12241	692	890	1461	792
1,1,1,-TRICHLOROETHANE					
TOLUENE	32118	22904	29440	48310	26212
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	15992	11405	14660	24056	13052
XYLENE (MIXED ISOMERS)	22505	16050	29866	55653	20168

Table F-1: Ohio Emissions by County in pounds/year

	Jefferson	Knox	Lake	Lawrence	Licking
ACENAPHTHENE	962	612	2644	768	1661
ACENAPHTHYLENE	10901	6938	29969	8699	18828
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE			30842		
ANTHRACENE	1283	816	3526	13295	2215
ANTIMONY					
ARSENIC					
ATRAZINE	961	494	8320	145	197
BENZ(A)ANTHRACENE	3848	2449	10577	3070	6645
BENZO(G,H,I)PERYLENE	129	321	204	881	256
BENZENE	237789	151347	655247	242336	410698
BENZO(A)PYRENE	641	408	1763	512	1108
BENZO(B)FLUORATHNE	641	408	1763	512	1108
BENZO(K)FLUORATHENE	321	204	881	256	554
BERYLLIUM					
BUTADIENE,13			35137		
CADMIUM	7	5	20	6	13
CARBON TETRACHLORIDE	91	58	82318	73	158
CHLOROFORM					4600
CHROMIUM	0	5	17	0	0
CHRYSENE	1603	1020	4407	1279	2769
COBALT			12		0
COPPER			21		
DIBENZO(A,H)ANTHRACENE	321	204	881	256	554
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	12253	7799	33684	9778	21163
ETHYLBENZENE	7879	5016	34466	7042	13609
ETHYLENE OXIDE					
FLUORANTHENE	1924	1224	5289	1535	3323
FLUORENE	2244	1429	6170	1791	3876
FORMALDEHYDE			0		492029
GLYCOL ETHERS	23	15	63	18	40
HEXCHLORETHANE					
HYDRAZINE			0		
INDENO(1,2,3-C,D)PYRENE	641	408	1763	512	1108
LEAD			15		
MANGANESE	35	22	97	28	61
MERCURY			0		
METHYLENE CL	5904	3758	16230	4711	10197
NAPHTHALENE	32508	20691	90054	181773	56146
NICKEL	0	5	87	0	1
TETRACHLOROETHYLENE	153834	97912	422904	122752	265694
PHENANTHRENE	30396	19346	83560	33546	52498
PHENOL			3969	13008	390221
PHOSGENE					
PYRENE	1603	1020	4407	1279	2769
STYRENE	1966	1251	6855	15448	10796
1,1,1,-TRICHLOROETHANE					
TOLUENE	65034	120580	184836	51894	113514
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	32383	20611	89025	25840	55931
XYLENE (MIXED ISOMERS)	45571	29004	182001	61279	78708

Table F-1: Ohio Emissions by County in pounds/year

	Logan	Lorain	Lucas	Madison	Mahoning
ACENAPHTHENE	544	3423	5536	484	3241
ACENAPHTHYLENE	6168	38790	62739	5482	36728
ACETALDEHYDE			1400		
ACROLEIN					
ACRYLAMIDE		0			
ACRYLONITRILILE		6860			
ANTHRACENE	726	4564	7381	645	4321
ANTIMONY					
ARSENIC					
ATRAZINE	8683	10079	4171	3680	14415
BENZ(A)ANTHRACENE	2177	13691	22143	1935	12963
BENZO(G,H,I)PERYLENE	554	181	1141	1845	161
BENZENE	135047	846202	1397930	119574	801146
BENZO(A)PYRENE	363	2282	3691	322	2160
BENZO(B)FLUORATHNE	363	2282	3691	322	2160
BENZO(K)FLUORATHENE	181	1141	1845	161	1080
BERYLLIUM					
BUTADIENE,13			27		
CADMIUM	4	26	42	4	25
CARBON TETRACHLORIDE	52	326	527	46	308
CHLOROFORM					
CHROMIUM	5	261	1	0	950
CHRYSENE	907	5704	9226	806	5401
COBALT					250
COPPER	177	0	242	0	29
DIBENZO(A,H)ANTHRACENE	181	1141	1845	161	1080
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	6933	43599	70522	6161	41282
ETHYLBENZENE	35659	225466	273887	3962	29869
ETHYLENE OXIDE					
FLUORANTHENE	1089	6845	11072	967	6481
FLUORENE	1270	7986	12917	1129	7562
FORMALDEHYDE	4800		185809		
GLYCOL ETHERS	13	82	133	12	78
HEXCHLORETHANE					
HYDRAZINE		10			
INDENO(1,2,3-C,D)PYRENE	363	2282	3691	322	2160
LEAD	118		279		170
MANGANESE	770	131	203	23	130
MERCURY					
METHYLENE CL	3341	21007	33977	2969	19891
NAPHTHALENE	18394	115923	209900	16347	109525
NICKEL	0	261	2	0	1081
TETRACHLOROETHYLENE	87043	686170	900738	77356	518288
PHENANTHRENE	17199	108156	174931	15285	102407
PHENOL		27000	1422		
PHOSGENE					
PYRENE	907	5704	9226	806	5401
STYRENE	1113	177604	34161	989	6624
1,1,1,-TRICHLOROETHANE					
TOLUENE	36797	231410	376031	32704	219384
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR		2812			
M-XYLENE					
XYLENE,O	18323	115229	186371	16284	109104
XYLENE (MIXED ISOMERS)	285786	1606334	1408939	22916	203236

Table F-1: Ohio Emissions by County in pounds/year

	Marion	Medina	Meigs	Mercer	Miami
ACENAPHTHENE	775	1647	481	288	1170
ACENAPHTHYLENE	8779	18668	5454	3262	13259
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE					
ANTHRACENE	1033	2196	642	384	1560
ANTIMONY					
ARSENIC					
ATRAZINE	2769	10568	3153	607	14038
BENZ(A)ANTHRACENE	3099	6589	1925	1151	4680
BENZO(G,H,I)PERYLENE	1080	258	96	549	160
BENZENE	191498	407202	118959	71142	289212
BENZO(A)PYRENE	516	1098	321	192	780
BENZO(B)FLUORATHNE	516	1098	321	192	780
BENZO(K)FLUORATHENE	258	549	160	96	390
BERYLLIUM					
BUTADIENE,13					
CADMIUM	6	13	4	2	9
CARBON TETRACHLORIDE	74	157	46	27	111
CHLOROFORM					
CHROMIUM	15	0	0	0	750
CHRYSENE	1291	2745	802	480	1950
COBALT					
COPPER	282	1005			15
DIBENZO(A,H)ANTHRACENE	258	549	160	96	390
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	9868	20982	6130	3665	14902
ETHYLBENZENE	33688	13780	3942	115457	9583
ETHYLENE OXIDE					
FLUORANTHENE	1549	3294	962	576	2340
FLUORENE	1807	3843	1123	671	2730
FORMALDEHYDE	0				
GLYCOL ETHERS	19	39	12	7	28
HEXCHLORETHANE		0			
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	516	1098	321	192	780
LEAD	2650	999			
MANGANESE	28	670	18	11	43
MERCURY					
METHYLENE CL	4754	10110	2953	1766	7180
NAPHTHALENE	26267	55668	16263	35976	39538
NICKEL	15	1	0	0	15
TETRACHLOROETHYLENE	123886	263432	76958	46025	187100
PHENANTHRENE	24478	52051	15206	9094	36969
PHENOL	36				
PHOSGENE					
PYRENE	1291	2745	802	480	1950
STYRENE	1588	5567	984	588	14191
1,1,1,-TRICHLOROETHANE					
TOLUENE	53124	113521	32535	19457	294437
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	26079	55455	16200	9689	39386
XYLENE (MIXED ISOMERS)	200799	79320	22797	635634	55511

Table F-1: Ohio Emissions by County in pounds/year

	Monroe	Montgomery	Morgan	Morrow	Muskingum
ACENAPHTHENE	184	7034	171	365	1003
ACENAPHTHYLENE	2087	79716	1942	4141	11362
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE		56			
ACRYLONITRILILE					
ANTHRACENE	246	9378	229	487	1337
ANTIMONY		86			
ARSENIC					
ATRAZINE	11257	397	5679	919	7049
BENZ(A)ANTHRACENE	737	28135	686	1462	4010
BENZO(G,H,I)PERYLENE	390	61	2345	57	122
BENZENE	45532	1739340	42369	90332	247834
BENZO(A)PYRENE	123	4689	114	244	668
BENZO(B)FLUORATHNE	123	4689	114	244	668
BENZO(K)FLUORATHENE	61	2345	57	122	334
BERYLLIUM					
BUTADIENE,13					
CADMIUM	1	54	1	3	8
CARBON TETRACHLORIDE	18	669	16	35	95
CHLOROFORM		61000			
CHROMIUM	0	757	0	0	0
CHRYSENE	307	11723	286	609	1671
COBALT		0			
COPPER		170			
DIBENZO(A,H)ANTHRACENE	61	2345	57	122	334
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	2347	89600	2183	4655	12770
ETHYLBENZENE	1508	80094	1404	2994	8213
ETHYLENE OXIDE					
FLUORANTHENE	368	14067	343	731	2005
FLUORENE	430	16412	400	853	2339
FORMALDEHYDE		1272			4559
GLYCOL ETHERS	4	168	4	9	24
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	123	4689	114	244	668
LEAD		493			
MANGANESE	22	258	6	13	37
MERCURY					
METHYLENE CL	1130	43171	1052	2243	6153
NAPHTHALENE	6225	237716	5792	12349	38884
NICKEL	0	1772	0	0	250
TETRACHLOROETHYLENE	29456	1127720	32210	58438	160332
PHENANTHRENE	5820	222266	5416	11547	31679
PHENOL		118600			777
PHOSGENE					
PYRENE	307	11723	286	609	1671
STYRENE	376	14378	350	16477	2049
1,1,1,-TRICHLOROETHANE		1519			
TOLUENE	12452	494422	11588	24706	67781
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	6201	236803	5770	12302	33751
XYLENE (MIXED ISOMERS)	8726	510774	8119	17311	47495

Table F-1: Ohio Emissions by County in pounds/year

	Noble	Ottawa	Paulding	Perry	Pickaway
ACENAPHTHENE	145	486	250	407	628
ACENAPHTHYLENE	1640	5503	2837	4607	7117
ACETALDEHYDE					341631
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE					
ANTHRACENE	193	647	334	542	837
ANTIMONY	89				
ARSENIC					
ATRAZINE	3163	240	2606	8220	3374
BENZ(A)ANTHRACENE	579	1942	1001	1626	2512
BENZO(G,H,I)PERYLENE	334	48	162	83	136
BENZENE	35777	120040	61886	100498	262636
BENZO(A)PYRENE	96	324	167	271	419
BENZO(B)FLUORATHNE	96	324	167	271	419
BENZO(K)FLUORATHENE	48	162	83	136	209
BERYLLIUM		1653			
BUTADIENE,13					
CADMIUM	1	4	2	3	5
CARBON TETRACHLORIDE	14	46	24	39	60
CHLOROFORM					
CHROMIUM	0	0	0	4	0
CHRYSENE	241	809	417	678	1047
COBALT				4	
COPPER	2483				250
DIBENZO(A,H)ANTHRACENE	48	162	83	136	209
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	1844	6185	3189	5179	7999
ETHYLBENZENE	1185	3977	2051	3330	7905
ETHYLENE OXIDE					
FLUORANTHENE	289	971	501	813	1256
FLUORENE	338	1133	584	949	1465
FORMALDEHYDE					117000
GLYCOL ETHERS	3	12	6	10	15
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	96	324	167	271	419
LEAD	2027				
MANGANESE	5	18	9	15	23
MERCURY					
METHYLENE CL	888	2980	1536	2495	3854
NAPHTHALENE	4892	16411	8461	13739	21231
NICKEL	0	0	0	20	0
TETRACHLOROETHYLENE	23146	77658	40036	65015	100428
PHENANTHRENE	4573	15344	7911	12846	19843
PHENOL					
PHOSGENE					
PYRENE	241	809	417	678	1047
STYRENE	296	993	4555	55831	1284
1,1,1,-TRICHLOROETHANE					
TOLUENE	9785	32831	20846	27485	42457
TOLUENE-2,4-DIISOCYANETE					15
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	4872	16348	8428	13686	21141
XYLENE (MIXED ISOMERS)	26845	51050	11859	82531	51251

Table F-1: Ohio Emissions by County in pounds/year

	Pike	Portage	Preble	Putnam	Richland
ACENAPHTHENE	323	1776	509	428	1536
ACENAPHTHYLENE	3658	20130	5765	4853	17411
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE					
ANTHRACENE	430	2368	678	571	2048
ANTIMONY					
ARSENIC					
ATRAZINE	14600	1463	2884	13456	11664
BENZ(A)ANTHRACENE	1291	7105	2035	1713	6145
BENZO(G,H,I)PERYLENE	209	108	592	170	143
BENZENE	79788	439101	125743	105864	379783
BENZO(A)PYRENE	215	1184	339	285	1024
BENZO(B)FLUORATHNE	215	1184	339	285	1024
BENZO(K)FLUORATHENE	108	592	170	143	512
BERYLLIUM					
BUTADIENE,13		13400			
CADMIUM	2	14	4	3	12
CARBON TETRACHLORIDE	31	169	48	41	146
CHLOROFORM					
CHROMIUM	0	0	15	0	263
CHRYSENE	538	2960	848	714	2560
COBALT		0			
COPPER		0	5	0	302
DIBENZO(A,H)ANTHRACENE	108	592	170	143	512
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	4111	22627	6480	5455	19570
ETHYLBENZENE	2644	14550	4167	3508	12585
ETHYLENE OXIDE					
FLUORANTHENE	646	3552	1017	856	3073
FLUORENE	753	4144	1187	999	3585
FORMALDEHYDE					
GLYCOL ETHERS	8	43	12	10	37
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	215	1184	339	285	1024
LEAD			20		0
MANGANESE	12	65	19	16	56
MERCURY					
METHYLENE CL	1981	10902	3122	2628	9429
NAPHTHALENE	10908	60029	17190	14473	51921
NICKEL	0	1	20	0	327
TETRACHLOROETHYLENE	51618	284069	81583	68487	245694
PHENANTHRENE	10199	56128	16073	13532	48546
PHENOL					4200
PHOSGENE					
PYRENE	538	2960	848	714	2560
STYRENE	660	4381	1040	875	68940
1,1,1,-TRICHLOROETHANE		138993			
TOLUENE	48221	120091	34391	28953	104619
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	10866	59799	17124	14417	51721
XYLENE (MIXED ISOMERS)	15291	84321	34017	20288	72784

Table F-1: Ohio Emissions by County in pounds/year

	Ross	Sandusky	Scioto	Seneca	Shelby
ACENAPHTHENE	884	776	998	712	574
ACENAPHTHYLENE	10023	8794	11312	8066	6504
ACETALDEHYDE	63800		1680		
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE					
ANTHRACENE	1179	1035	1331	949	765
ANTIMONY					
ARSENIC					
ATRAZINE	7036	9580	9566	1461	12202
BENZ(A)ANTHRACENE	3538	3104	3992	2847	2295
BENZO(G,H,I)PERYLENE	512	295	259	333	237
BENZENE	332629	191825	252539	175951	141865
BENZO(A)PYRENE	590	517	665	474	383
BENZO(B)FLUORATHNE	590	517	665	474	383
BENZO(K)FLUORATHENE	295	259	333	237	191
BERYLLIUM					
BUTADIENE,13					
CADMIUM	7	6	8	5	4
CARBON TETRACHLORIDE	84	74	95	68	55
CHLOROFORM					
CHROMIUM	0	750	0	0	8
CHRYSENE	1474	1293	1663	1186	956
COBALT					0
COPPER		260		0	985
DIBENZO(A,H)ANTHRACENE	295	259	333	237	191
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	11266	9885	12714	9067	7310
ETHYLBENZENE	7245	26292	9116	5830	4701
ETHYLENE OXIDE					
FLUORANTHENE	1769	1552	1996	1423	1148
FLUORENE	2064	1811	2329	1661	1339
FORMALDEHYDE	13670				
GLYCOL ETHERS	21	19	24	17	14
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	590	517	665	474	383
LEAD					
MANGANESE	32	28	37	26	21
MERCURY					
METHYLENE CL	5428	4763	6126	4368	3522
NAPHTHALENE	29889	26224	33732	24054	24695
NICKEL	0	0	0	50	8
TETRACHLOROETHYLENE	141438	124098	159623	113829	91778
PHENANTHRENE	27946	24520	31539	22491	18134
PHENOL	500		334000		
PHOSGENE					
PYRENE	1474	1293	1663	1186	956
STYRENE	15208	20818	2300	23401	1173
1,1,1,-TRICHLOROETHANE					
TOLUENE	113294	75355	124230	124021	38799
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	29774	26124	33602	23962	19320
XYLENE (MIXED ISOMERS)	41898	130316	47287	33720	59002

Table F-1: Ohio Emissions by County in pounds/year

	Stark	Summit	Trumbull	Tuscarawas	Union
ACENAPHTHENE	4521	6398	2796	1044	441
ACENAPHTHYLENE	51234	72514	31684	11832	4995
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE		3340			
ANTHRACENE	6027	8531	3727	1392	588
ANTIMONY					144
ARSENIC					
ATRAZINE	9450	5327	271	3355	3698
BENZ(A)ANTHRACENE	18082	25593	11182	4176	1763
BENZO(G,H,I)PERYLENE	191	1507	2133	932	348
BENZENE	1142439	1581743	695323	258098	109020
BENZO(A)PYRENE	3014	4266	1864	696	294
BENZO(B)FLUORATHNE	3014	4266	1864	696	294
BENZO(K)FLUORATHENE	1507	2133	932	348	147
BERYLLIUM					
BUTADIENE,13	9303	21083			
CADMIUM	35	49	21	8	3
CARBON TETRACHLORIDE	4459	609	266	503	42
CHLOROFORM				291	
CHROMIUM	2424	1	0	18	0
CHRYSENE	7534	10664	4659	1740	735
COBALT	1294				
COPPER	0	1011	40	160	28
DIBENZO(A,H)ANTHRACENE	1507	2133	932	348	147
1,2 DIBROMOETHANE					
DIBUTYL PHTHALATE	57586	81506	35612	13300	5614
ETHYLBENZENE	44131	52478	74425	8892	89808
ETHYLENE OXIDE				109	
FLUORANTHENE	9041	12797	5591	2088	882
FLUORENE	10548	14929	6523	2436	1028
FORMALDEHYDE					25600
GLYCOL ETHERS	108	153	67	25	11
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	3014	4266	1864	696	294
LEAD	2800		0	10	
MANGANESE	9278	1485	5599	1768	16
MERCURY					
METHYLENE CL	27746	39271	17159	6408	2705
NAPHTHALENE	154712	216241	99615	35285	14896
NICKEL	6528	2	6	6	0
TETRACHLOROETHYLENE	723798	1032182	447104	166972	70492
PHENANTHRENE	142851	202187	88342	32991	13928
PHENOL	144000	350		864	
PHOSGENE		32			
PYRENE	7534	10664	4659	1740	735
STYRENE	116016	15034	5775	2134	901
1,1,1,-TRICHLOROETHANE					
TOLUENE	342898	795054	191055	166180	29801
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	152194	215410	94119	35149	14839
XYLENE (MIXED ISOMERS)	252141	333275	630207	111927	1057185

Table F-1: Ohio Emissions by County in pounds/year

	Van Wert	Vinton	Warren	Washington	Wayne
ACENAPHTHENE	364	146	1581	753	1270
ACENAPHTHYLENE	4124	1651	17922	8539	14394
ACETALDEHYDE					
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILILE					
ANTHRACENE	485	194	2108	1955	1693
ANTIMONY					
ARSENIC				20	
ATRAZINE	9004	12090	305	4916	1640
BENZ(A)ANTHRACENE	1455	583	6325	3014	5080
BENZO(G,H,I)PERYLENE	147	121	49	527	251
BENZENE	89946	36003	390929	255207	313984
BENZO(A)PYRENE	243	97	1054	502	847
BENZO(B)FLUORATHNE	243	97	1054	502	847
BENZO(K)FLUORATHENE	121	49	527	251	423
BERYLLIUM					
BUTADIENE,13					
CADMIUM	3	1	12	6	10
CARBON TETRACHLORIDE	35	14	150	72	121
CHLOROFORM					
CHROMIUM	0	0	0	0	0
CHRYSENE	606	243	2636	1256	2117
COBALT					
COPPER	0		3338		0
DIBENZO(A,H)ANTHRACENE	121	49	527	251	423
1,2 DIBROMOETHANE				150	
DIBUTYL PHTHALATE	4635	1855	20144	9597	16179
ETHYLBENZENE	2981	1193	19009	13907	10755
ETHYLENE OXIDE					
FLUORANTHENE	728	291	3163	1507	2540
FLUORENE	849	340	3690	1758	2964
FORMALDEHYDE					
GLYCOL ETHERS	9	3	38	18	30
HEXCHLORETHANE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	243	97	1054	502	847
LEAD	0			0	
MANGANESE	13	5	58	28	47
MERCURY					
METHYLENE CL	2233	894	9706		7796
NAPHTHALENE	12296	4922	53444	27264	44175
NICKEL	0	0	1	18	0
TETRACHLOROETHYLENE	58189	23292	252905	120497	203127
PHENANTHRENE	11497	4602	49971	24959	40135
PHENOL					25246
PHOSGENE					
PYRENE	606	243	2636	1256	2117
STYRENE	744	298	15232	15740	2596
1,1,1,-TRICHLOROETHANE					
TOLUENE	61931	9847	106917	55941	106465
TOLUENE-2,4-DIISOCYANETE					
TRICHLORETHYLENE					
TRIFLURALIN					
VINYL CHLOR					
M-XYLENE					
XYLENE,O	12249	4903	53239	25366	42760
XYLENE (MIXED ISOMERS)	17237	6899	121871	88551	87905

Table F-1: Ohio Emissions by County in pounds/year

	Williams	Wood	Wyandot	State Total
ACENAPHTHENE	455	1407	271	134786
ACENAPHTHYLENE	5161	15942	3068	1527553
ACETALDEHYDE				716986
ACROLEIN				3800
ACRYLAMIDE				71
ACRYLONITRILILE				170336
ANTHRACENE	607	1876	361	192939
ANTIMONY			15	384
ARSENIC				35
ATRAZINE	10454	7434	14986	524694
BENZ(A)ANTHRACENE	1821	5627	1083	539138
BENZO(G,H,I)PERYLENE	423	152	469	45174
BENZENE	112568	347742	66919	34371044
BENZO(A)PYRENE	304	938	180	89857
BENZO(B)FLUORATHNE	304	938	180	89857
BENZO(K)FLUORATHENE	152	469	90	44927
BERYLLIUM				1653
BUTADIENE,13				86400
CADMIUM	3	11	2	1035
CARBON TETRACHLORIDE	43	134	26	99404
CHLOROFORM				67240
CHROMIUM	2563	1	250	13629
CHRYSENE	759	2344	451	224639
COBALT				2369
COPPER	2031	1102	2530	21033
DIBENZO(A,H)ANTHRACENE	152	469	90	44927
1,2 DIBROMOETHANE				150
DIBUTYL PHTHALATE	5801	17919	3448	1717780
ETHYLBENZENE	3730	24177	2217	2023612
ETHYLENE OXIDE				2497
FLUORANTHENE	911	2813	541	269569
FLUORENE	1062	3282	632	314498
FORMALDEHYDE				1545090
GLYCOL ETHERS	11	34	6	3230
HEXCHLORETHANE				50
HYDRAZINE				10
INDENO(1,2,3-C,D)PYRENE	304	938	180	89857
LEAD	750	572	2575	19220
MANGANESE	290	52	10	37967
MERCURY				2260
METHYLENE CL	2795	8634	1661	818875
NAPHTHALENE	15389	47540	9148	4941238
NICKEL	3052	7	250	20444
TETRACHLOROETHYLENE	72824	224965	43292	22426649
PHENANTHRENE	14389	44450	8554	4269635
PHENOL				1391579
PHOSGENE				32
PYRENE	759	2344	451	224639
STYRENE	931	2875	553	1340456
1,1,1,-TRICHLOROETHANE				303406
TOLUENE	105637	96705	18301	11248365
TOLUENE-2,4-DIISOCYANETE				765
TRICHLORETHYLENE				35696
TRIFLURALIN				750
VINYL CHLOR				2812
M-XYLENE				37373
XYLENE,O	15330	47357	9113	4537726
XYLENE (MIXED ISOMERS)	84123	129438	12825	13665538

Appendix G: Ontario Toxic Emissions Inventory

BACKGROUND

The Province of Ontario, Canada, has developed an air toxics emission inventory on the target compounds for the Great Lakes Regional Air Toxics Emission Inventory Project for calendar year 1996. In 1996, Ontario had a population of 10,753,573 million people, which represented approximately 11.7 percent of the total population of the Great Lakes region. The table below provides a brief demographic overview of the province of Ontario.

Demographic Characteristics for the Ontario Area of Great Lakes Regional Air Toxics Emissions Inventory

	Ontario
Total Population, 1996	10,753,573
Urban Population, 1996	8,958,741
Rural Population, 1996	1,794,832

Source: 1996 Statistics Canada Census

This 1996 emission inventory included point and area sources. Ontario followed the Air Toxic Emissions Inventory Protocol and the area source methodologies agreed upon by the project=s Technical Steering Committee in developing the regional inventory where applicable. Targeted emissions information were collected from domestic regulatory and voluntary inventories for point sources, and various statistical organizations (e.g., Statistics Canada) for area sources. These sources of information were deposited into Ontario=s Regional Air Pollution Inventory Development System (RAPIDS Version 2.0) and emissions were compiled using its Reference Tables and the air toxic emission factors from the Factor Information Retrieval System (FIRE) and source specific profiles.

DATA SOURCES

Point Sources

The point source emission inventory contains industrial processes and releases information provided by regulatory and voluntary reporting programs, which include, National Pollutant Release Inventory (NPRI), Strategic Option Processes (SOP), National Emissions Reduction Master Plan (NERM) of the Canadian Chemical Producers Association, Accelerated Reduction and Elimination of Toxics (ARET). The 1996 Ontario point source inventory contained 468 sources with estimated emissions for 64 substances out of the 82 targeted toxics on the GLC substance list.

Area Sources

The area source inventory for this GLC inventory includes 9 sectors (out of a total of 14) which represent smaller emitting sources; wide spread sources and certain industrial sectors that cannot be completely considered in the point source inventory because of a lack of facility and process specific information. The area source inventory was developed using a top down approach with available statistical information, including energy demand statistics, census data, housing data, production statistics, employment information etc. The 1996 Ontario area source inventory contained 9 sectors with estimated emissions for 49 substances out of the 82 targeted toxics on the GLC substance list. The combined point and area source inventory emissions capture a total of 66 substances.

Architectural Surface Coating

VOC emissions from architectural surface coating were estimated by applying emission factors to the quantity of paint used per capita. The VOC emissions were then speciated into specific targeted air toxics.

Dry Cleaning

A perchloroethylene (PERC) emission factor of 0.375 lb/person/year was developed using provincial emissions from a provincial solvent usage survey. The provincial total was then distributed to the county level using population statistics.

Fuel Marketing

Emissions for fuel marketing were estimated using VOC speciation and toxic specific emission factors that were applied to county level fuel sales statistics. Emissions were estimated for Trucks in Transit Losses, Stage I (Gasoline Retail Operations - Balanced Submerged Filling), and Stage II (Filling Vehicle Gas Tanks - Vapour Loss and Liquid Spill Loss w/o Control) Losses.

Graphic Arts

Emissions for graphic arts were estimated using employee based emission factors. The SIC specific employment numbers used are from Statistics Canada=s 1996 Manufacturing Industries of Canada: National and Provincial Areas document. The Canadian SIC used for this category is 281X (Commercial Printing Industries). The total provincial emissions were then apportioned to the county level using population statistics.

Industrial Surface Coating

The Canadian SICs used for this category are 2521-2561, 26XX, 3042, 305X, 31XX, 32XX, 3311, 3321. Emissions were calculated by speciating each toxic from the total VOC emissions. VOC numbers for all, except three SCC groups from this source category (Other Product Coatings, High Performance Coatings, and Other Special Purpose Coatings), were calculated using a per employee emission factor. VOC emissions for the remaining three

SCC groups were calculated using a per capita emission factor. Both categories of VOC emissions were then speciated into the targeted air toxics.

Publicly Owned Treatment Works

POTW emission were estimated using effluent flow information from all POTWs in Ontario. The individual POTW facilities were separated into facilities with the dewatering process and those without. Specific sets of flow based emission factors from FIRE were used to estimate emissions from facilities with the dewatering process and those without the dewatering process.

Residential Wood Combustion

Emission estimations were based upon merchantable fuelwood statistics. Softwood and hardwood statistics for merchantable fuelwood were provided by the National Forestry Database. Emission factors were used for the three wood burning stove types used in Ontario: conventional, catalytic, and non-catalytic. Total provincial wood stove emissions were apportioned to the county level according to regional wood use statistics and rural dwelling statistics from an Ontario wood use study and Statistics Canada respectively.

Residential Fuel Combustion

Residential Fuel Combustion emissions were estimated using residential fuel consumption data from Statistics Canada and emission factors. The two fuel types for which targeted toxic emissions were estimated are fuel oil and natural gas. Fuel was apportioned to the county level according to population statistics.

Traffic Markings

Emissions for traffic markings were based on total traffic paint used in each county, the air toxic volume percent of the paint used, and the air toxic density. Total traffic paint was estimated by applying a paint use factor to the road length statistics provided by the Ontario Ministry of Transportation. Road length was apportioned to the county level using population statistics.

QUALITY CHECK ACTIVITIES

During the development of this air toxics inventory, quality check activities, such as technical reviews and accuracy checks, were performed to ensure the most appropriate emission profiles were used for each source.

UNCERTAINTIES

Most of the emission estimates in this air toxics inventory were based on the best available source information and source emission profiles. The NPRI reporting thresholds do not allow for the complete inventory of all point sources. Nevertheless, attempts were made to ensure that sources from the major industrial sectors were included in the 1996 emission inventory by including point sources from SOP, NERM, ARET inventories.

Uncertainties also exist on the use of emission factor tables which vary in terms of data quality. In preparing this emission inventory, Ontario has further updated some of the RAPIDS emission factor tables with the most recent information from FIRE, AP-42, and EIIP.

RESULTS

Ontario's 1996 Great Lakes Toxic Inventory included toxic estimates of 67 substances out of 82 Great Lakes air toxics. There are 5075 estimates for 468 different point sources and nine area source categories. There are 131 SCC codes and 101 SIC codes included in this Ontario inventory. Combined point and area source emissions for each county in Ontario are provided in the County Emissions table at the end of Ontario's portion of the report document.

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Table G-1: Ontario Emissions by County in pounds/year

	Algoma	Brant	Bruce	Cochrane	Dufferin
1,1,1-TRICHLOROETHANE	431	238	89	2,153	66
1,2-DIBROMOETHANE	1.12E-01	1.15E-01	6.66E-02	6.20E-02	2.39E-03
1,2-DICHLOROETHANE	8	7	4	17	1
1,3-BUTADIENE					
TCDD,2378	2.13E-06	3.47E-06	1.32E-06	1.99E-06	6.00E-07
TCDF,2378	3.71E-06	1.01E-05	2.84E-06	4.51E-06	5.67E-07
2,4,5-TRICHLOROPHENOL					
2,4,6-TRICHLOROPHENOL					
ACENAPHTHENE	14,766	41	55	200	21
ACENAPHTHYLENE	75,981	848	1,145	4,182	433
ACETALDEHYDE		51			
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILE					
ANTHRACENE	3,033	57	76	302	29
ANTIMONY	95	4.61E-01	23	1.79E-01	
ARSENIC	59,637	2	40	2	7.63E-01
BENZ(A)ANTHRACENE	11,862	79	107	399	41
BENZENE	412,055	13,059	12,927	57,432	4,959
BENZO(A)PYRENE	7,570	17	23	86	9
BENZO(B)FLUORANTHENE	21,470	24	33	120	12
BENZO(G,H,I)PERYLENE	7,552	16	22	82	8
BENZO(K)FLUORANTHENE	47	8	11	41	4
BERYLLIUM	97	1.16E+00	6.53E-01	9.27E-01	4.54E-01
CADMIUM	2,526	2,020	1,163	1,844	805
CARBON TETRACHLORIDE	118	59	24	532	18
CHLORDANE					
CHLOROFORM	439	243	90	2,195	68
CHROMIUM	556	252	177	205	100
CHROMIUM (VI)		7.88E-04			
CHRYSENE	315	49	66	242	25
COBALT	999	806	612	656	321
COPPER	321	21	12	17	8
DIBENZO(A,H)ANTHRACENE	2,153	1	2	7	5.74E-01
DIBUTYL PHTHALATE	4	3	2	3	1
DIETHYLHEXYL PHTHALATE					
ETHYLBENZENE	14,249	13,041	7,478	10,564	5,061
ETHYLENE OXIDE					
FLUORANTHENE	25,825	79	106	398	40
FLUORENE	48,811	97	131	497	50
FORMALDEHYDE	80,194	1,947	1,050	2,620	733
GLYCOL ETHERS (MISC.)	8,308	7,561	4,340	6,169	3,017
HEXACHLOROBENZENE					
HYDRAZINE			20		
INDENO(1,2,3-C,D)PYRENE	7,985	5	6	24	2
LEAD	135,110	23	527	21	8
M-XYLENE	1,545	1,580	915	851	33
MANGANESE	26,580	28	51	25	11
MERCURY	2,096	5	5	3	1
METHYLENE CHLORIDE	11,009	9,866	5,599	10,380	3,898
METHYLENE(B)4-					
NAPHTHALENE	14,705	3,308	2,791	7,996	763
NICKEL	708	279	179	227	111
O-XYLENE	14,029	9,569	6,103	10,848	3,671
P-XYLENE	598	612	354	329	13
PHENANTHRENE	168,726	395	532	2,003	201
PHENOL	37,118	92	124	450	47
PCBS	4.17E-04	1.67E-03	1.56E-02	6.50E-04	
PCDD	6.39E-04	7.66E-04	1.80E-04	8.66E-03	
PCDF	1.72E-03	2.57E-03	6.04E-04	1.35E-02	
PYRENE	52,984	96	130	489	49
STYRENE	348	87	75	675	53
TETRACHLOROETHYLENE	47,691	43,280	24,729	38,642	17,199
TOLUENE	168,909	131,734	68,730	146,402	58,215
TRICHLOROETHYLENE	698	43,441	143	3,486	108
VINYL CHLORIDE	1,851	1,022	380	9,248	286
XYLENES (MIXED ISOMERS)	27,659	71,232	11,501	59,667	58,273

Table G-1: Ontario Emissions by County in pounds/year

	Durham	Elgin	Essex	Frontenac	Grey
1,1,1-TRICHLOROETHANE	1,752	155	781	342	122
1,2-DIBROMOETHANE	5.49E-01	5.44E-02	3.07E-01	1.64E-01	4.37E-02
1,2-DICHLOROETHANE	37	4	19	10	3
1,3-BUTADIENE					
TCDD,2378	6.01E-06	2.57E-05	9.29E-06	1.79E-06	1.32E-05
TCDF,2378	5.69E-06	1.09E-04	2.50E-05	1.69E-06	5.41E-05
2,4,5-TRICHLOROPHENOL					
2,4,6-TRICHLOROPHENOL					
ACENAPHTHENE	98	40	70	93	62
ACENAPHTHYLENE	2,040	839	1,455	1,945	1,296
ACETALDEHYDE	54			86,062	
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILE					
ANTHRACENE	136	56	97	130	87
ANTIMONY		6	7.05E-01		3
ARSENIC	8	1	6	2	2
BENZ(A)ANTHRACENE	191	79	136	182	121
BENZENE	48,710	10,223	29,438	24,893	14,355
BENZO(A)PYRENE	41	17	29	39	26
BENZO(B)FLUORANTHENE	59	24	42	56	37
BENZO(G,H,I)PERYLENE	39	16	28	37	25
BENZO(K)FLUORANTHENE	20	8	14	19	13
BERYLLIUM	5	7.90E-01	3	1	8.73E-01
CADMIUM	8,084	1,398	6,175	2,404	1,546
CARBON TETRACHLORIDE	431	27	193	87	33
CHLORDANE					
CHLOROFORM	1,786	103	797	349	125
CHROMIUM	1,009	640	964	300	193
CHROMIUM (VI)	8.34E-04			1.27E-03	
CHRYSENE	117	48	84	112	74
COBALT	3,225	662	2,464	959	616
COPPER	81	247	63	25	18
DIBENZO(A,H)ANTHRACENE	3	1	2	3	2
DIBUTYL PHTHALATE	13	2	10	4	2
DIETHYLHEXYL PHTHALATE					
ETHYLBENZENE	73,892	158,797	68,646	15,610	9,836
ETHYLENE OXIDE					
FLUORANTHENE	189	78	135	180	120
FLUORENE	234	96	167	223	148
FORMALDEHYDE	8,175	1,262	40,740	2,379	1,403
GLYCOL ETHERS (MISC.)	30,263	5,229	23,117	9,005	5,788
HEXACHLOROBENZENE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	11	5	8	10	7
LEAD	81	47	66	24	31
M-XYLENE	7,547	750	4,214	2,254	601
MANGANESE	109	73	83	34	21
MERCURY	16	49	10	2	25
METHYLENE CHLORIDE	40,676	6,741	31,351	11,814	7,475
METHYLENE(B)4-					
NAPHTHALENE	12,804	2,251	7,924	5,624	2,704
NICKEL	1,117	992	2,798	333	214
O-XYLENE	37,514	6,715	27,960	12,406	7,688
P-XYLENE	2,922	290	1,631	873	233
PHENANTHRENE	949	391	677	905	603
PHENOL	221	91	312	211	141
PCBS		2.09E-02	4.00E-03		1.03E-02
PCDD	1.42E-04	9.65E-03	1.83E-03		4.72E-03
PCDF	3.44E-04	3.23E-02	6.15E-03		1.58E-02
PYRENE	232	96	165	221	147
STYRENE	1,164	79	240	155	84
TETRACHLOROETHYLENE	192,727	29,794	132,440	51,618	33,001
TOLUENE	1,888,833	186,118	627,549	146,605	85,695
TRICHLOROETHYLENE	2,837	19,608	1,265	554	198
VINYL CHLORIDE	7,526	433	3,357	1,469	525
XYLENES (MIXED ISOMERS)	3,267,062	563,034	569,733	28,065	14,853

Table G-1: Ontario Emissions by County in pounds/year

	Haldimand - Norfolk	Haliburton	Halton	Hamilton - Wentworth	Hasting
1,1,1-TRICHLOROETHANE	136	8	739	1,289	228
1,2-DIBROMOETHANE	1.21E-02		5.08E-01	5.83E-01	1.04E-01
1,2-DICHLOROETHANE	1	5.04E-02	28	36	6
1,3-BUTADIENE					
TCDD,2378	1.34E-06	2.01E-07	4.46E-06	2.41E-05	1.56E-06
TCDF,2378	1.27E-06	1.90E-07	4.22E-06	8.48E-05	1.47E-06
2,4,5-TRICHLOROPHENOL					
2,4,6-TRICHLOROPHENOL					
ACENAPHTHENE	10,412	347	32	16,110	124
ACENAPHTHYLENE	51,972	7,265	677	81,569	2,597
ACETALDEHYDE			77	117	
ACROLEIN					
ACRYLAMIDE			209		
ACRYLONITRILE					
ANTHRACENE	549	485	45	28,813	173
ANTIMONY	8		6.10E-05	4	
ARSENIC	41	2.56E-01	6	8	2
BENZ(A)ANTHRACENE	7,503	681	63	12,952	243
BENZENE	160,710	64,776	40,620	1,541,201	28,323
BENZO(A)PYRENE	7,959	145	1,558	7,675	52
BENZO(B)FLUORANTHENE	15,435	209	19	22,859	75
BENZO(G,H,I)PERYLENE	5,454	138	13	7,768	49
BENZO(K)FLUORANTHENE	14	71	7	7	25
BERYLLIUM	1	1.52E-01	3	5	1
CADMIUM	1,818	271	5,991	8,248	2,093
CARBON TETRACHLORIDE	36	5	182	316	61
CHLORDANE					
CHLOROFORM	139	8	754	1,314	233
CHROMIUM	489	34	1,468	1,030	261
CHROMIUM (VI)			1.18E-03	1.80E-03	
CHRYSENE	774	417	39	256	149
COBALT	772	108	2,390	3,290	835
COPPER	927	3	60	87	21
DIBENZO(A,H)ANTHRACENE	1,660	10	9.00E-01	4,366	3
DIBUTYL PHTHALATE	3	4.30E-01	10	13	3
DIETHYLHEXYL PHTHALATE				66	
ETHYLBENZENE	21,145	1,697	231,261	56,924	13,471
ETHYLENE OXIDE					
FLUORANTHENE	17,010	674	63	26,381	241
FLUORENE	34,468	832	78	52,449	297
FORMALDEHYDE	1,639	238	5,693	8,273	1,936
GLYCOL ETHERS (MISC.)	6,775	1,018	22,425	30,865	7,846
HEXACHLOROBENZENE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	5,892	39	4	8,304	14
LEAD	19	3	60	106	21
M-XYLENE	166		6,975	8,005	1,431
MANGANESE	83	10	80	111	30
MERCURY	215	1.83E-01	4	446	1
METHYLENE CHLORIDE	8,741	1,290	29,310	40,668	10,204
METHYLENE(B)4-					
NAPHTHALENE	10,145	9,821	14,757	41,106	5,499
NICKEL	519	38	828	1,140	289
O-XYLENE	8,698	7,864	27,558	59,193	11,439
P-XYLENE	64		2,700	3,099	554
PHENANTHRENE	120,692	3,378	315	175,469	1,208
PHENOL	6,660	788	73	2,238	282
PCBS				1.53E-02	
PCDD		6.93E-06	2.24E-04	7.01E-03	
PCDF		1.67E-05	5.42E-04	2.35E-02	
PYRENE	38,731	826	77	55,357	295
STYRENE	456	56	432	2,961	153
TETRACHLOROETHYLENE	38,616	5,746	128,455	315,065	44,827
TOLUENE	142,475	38,413	644,305	626,080	145,522
TRICHLOROETHYLENE	220	12	1,197	2,087	370
VINYL CHLORIDE	585	33	3,175	5,537	981
XYLENES (MIXED ISOMERS)	100,192	2,286	1,051,236	234,721	22,065

Table G-1: Ontario Emissions by County in pounds/year

	Huron	Kenora	Kent	Lambton	Lanark
1,1,1-TRICHLOROETHANE	105	114	1,158	288	122
1,2-DIBROMOETHANE		5.27E-02	7.71E-02	1.11E-01	3.72E-02
1,2-DICHLOROETHANE	6.99E-01	3	11	29	3
1,3-BUTADIENE				229,137	
TCDD,2378	1.55E-06	2.36E-06	8.38E-06	1.69E-06	7.85E-07
TCDF,2378	4.09E-06	7.50E-06	3.18E-05	1.60E-06	7.43E-07
2,4,5-TRICHLOROPHENOL					
2,4,6-TRICHLOROPHENOL					
ACENAPHTHENE	47	187	50	58	80
ACENAPHTHYLENE	982	3,868	1,046	1,216	1,684
ACETALDEHYDE	3	32,628			
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILE				18,849	
ANTHRACENE	66	260	70	81	112
ANTIMONY	1.78E-01	3.58E-01	2	39	
ARSENIC	1	1	2	203	1
BENZ(A)ANTHRACENE	92	364	98	114	158
BENZENE	10,270	36,969	21,826	845,202	17,370
BENZO(A)PYRENE	20	79	21	3,612	33
BENZO(B)FLUORANTHENE	28	113	30	175	48
BENZO(G,H,I)PERYLENE	19	76	20	108	32
BENZO(K)FLUORANTHENE	10	40	10	12	16
BERYLLIUM	5.99E-01	6.30E-01	1	1	5.95E-01
CADMIUM	1,062	1,117	1,934	2,325	1,055
CARBON TETRACHLORIDE	28	37	286	76	32
CHLORDANE					
CHLOROFORM	107	116	1,180	335	125
CHROMIUM	133	140	241	1,643	132
CHROMIUM (VI)					
CHRYSENE	56	224	60	70	97
COBALT	424	445	771	1,164	421
COPPER	11	13	21	4,666	11
DIBENZO(A,H)ANTHRACENE	1	8	1	2	2
DIBUTYL PHTHALATE	2	2	3	4	2
DIETHYLHEXYL PHTHALATE					
ETHYLBENZENE	6,666	7,180	15,547	191,631	6,741
ETHYLENE OXIDE				3,732	
FLUORANTHENE	91	371	97	129	156
FLUORENE	112	444	120	139	193
FORMALDEHYDE	980	1,091	2,315	7,632	87,550
GLYCOL ETHERS (MISC.)	3,980	4,202	7,243	8,517	3,954
HEXACHLOROBENZENE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	5	23	6	133	9
LEAD	12	21	29	27	11
M-XYLENE	6.18E-02	724	1,059	1,522	511
MANGANESE	15	18	26	329	15
MERCURY	2	4	15	149	7.14E-01
METHYLENE CHLORIDE	5,162	5,433	10,559	11,131	5,151
METHYLENE(B)4-					
NAPHTHALENE	1,509	6,661	2,960	30,193	3,036
NICKEL	147	156	267	2,771	146
O-XYLENE	5,208	8,393	9,201	10,916	6,033
P-XYLENE	5.74E-03	280	410	589	198
PHENANTHRENE	457	1,860	487	1,653	783
PHENOL	106	419	113	35,833	183
PCBS	6.47E-04	1.30E-03	5.90E-03	6.07E-05	
PCDD	2.97E-04	4.30E-03	2.70E-03		
PCDF	9.95E-04	1.10E-02	9.07E-03	8.92E-06	
PYRENE	112	446	119	904	191
STYRENE	79	208	365	94,998	75
TETRACHLOROETHYLENE	22,714	23,896	43,045	48,759	22,604
TOLUENE	56,769	77,878	163,372	858,484	71,526
TRICHLOROETHYLENE	170	185	1,874	468	37,676
VINYL CHLORIDE	450	490	4,973	12,989	525
XYLENES (MIXED ISOMERS)	10,337	11,786	112,802	549,050	19,876

Table G-1: Ontario Emissions by County in pounds/year

	Leeds and Grenville	Lennox and Addington	Manitoulin	Middlesex	Muskoka
1,1,1-TRICHLOROETHANE	123	46	9	287,245	98
1,2-DIBROMOETHANE	5.23E-02	1.73E-02	1.37E-03	5.05E-01	1.62E-02
1,2-DICHLOROETHANE	3	1	1.29E-01	30	1
1,3-BUTADIENE					
TCDD,2378	1.26E-06	5.14E-07	7.23E-07	1.60E-05	6.61E-07
TCDF,2378	1.19E-06	4.87E-07	2.65E-06	1.64E-05	6.26E-07
2,4,5-TRICHLOROPHENOL					
2,4,6-TRICHLOROPHENOL					
ACENAPHTHENE	144	68	216	64	756
ACENAPHTHYLENE	3,007	1,429	4,526	1,336	15,835
ACETALDEHYDE					59
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILE					
ANTHRACENE	201	95	302	89	1,057
ANTIMONY		3	1.34E-01	2.73E-01	
ARSENIC	2	4	1.93E-01	7	8.43E-01
BENZ(A)ANTHRACENE	282	134	424	125	1,484
BENZENE	29,826	13,848	40,437	34,037	142,419
BENZO(A)PYRENE	60	28	90	27	315
BENZO(B)FLUORANTHENE	86	41	130	38	455
BENZO(G,H,I)PERYLENE	57	27	86	25	301
BENZO(K)FLUORANTHENE	29	14	44	13	154
BERYLLIUM	9.57E-01	3.90E-01	1.14E-01	4	5.02E-01
CADMIUM	1,697	692	202	6,868	891
CARBON TETRACHLORIDE	34	14	8	238	28
CHLORDANE					
CHLOROFORM	126	46	9	1,040	100
CHROMIUM	212	92	25	859	111
CHROMIUM (VI)					
CHRYSENE	173	82	260	77	910
COBALT	677	296	80	2,740	355
COPPER	17	7	2	79	10
DIBENZO(A,H)ANTHRACENE	4	2	6	2	21
DIBUTYL PHTHALATE	554	1	3.20E-01	11	1
DIETHYLHEXYL PHTHALATE					
ETHYLBENZENE	10,821	4,394	1,271	52,068	5,638
ETHYLENE OXIDE					
FLUORANTHENE	279	133	420	124	1,469
FLUORENE	344	164	518	153	1,814
FORMALDEHYDE	4,335	623	179	9,227	26,717
GLYCOL ETHERS (MISC.)	6,363	2,595	768	25,712	3,339
HEXACHLOROBENZENE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	16	8	24	7	85
LEAD	17	78	3	70	9
M-XYLENE	718	238	19	6,941	223
MANGANESE	25	15	6	101	25
MERCURY	1	25	1	270	6.02E-01
METHYLENE CHLORIDE	8,200	3,333	965	33,754	4,337
METHYLENE(B)4-					
NAPHTHALENE	5,167	2,318	6,147	14,015	21,716
NICKEL	235	98	28	992	124
O-XYLENE	9,945	4,219	5,040	31,705	18,446
P-XYLENE	278	92	7	2,687	86
PHENANTHRENE	1,399	665	2,105	621	7,364
PHENOL	326	155	491	145	1,717
PCBS			4.86E-04	9.91E-04	
PCDD			2.23E-04	4.54E-04	5.83E-05
PCDF			7.48E-04	1.68E-03	1.41E-04
PYRENE	342	163	515	152	1,800
STYRENE	28,286	77	116	313	101
TETRACHLOROETHYLENE	36,240	14,748	4,285	147,450	19,051
TOLUENE	100,197	41,704	27,632	749,000	100,561
TRICHLOROETHYLENE	200	74	14	295,230	79,524
VINYL CHLORIDE	530	196	37	4,111	419
XYLENES (MIXED ISOMERS)	16,176	6,492	1,906	148,648	9,501

Table G-1: Ontario Emissions by County in pounds/year

	Niagara	Nipissing	Northumber Land	Ottawa Carleton	Oxford
1,1,1-TRICHLOROETHANE	1,054	167	133	1,630	170
1,2-DIBROMOETHANE	4.47E-01	8.37E-02	7.29E-02	8.00E-01	1.01E-01
1,2-DICHLOROETHANE	28	5	4	48	6
1,3-BUTADIENE					
TCDD,2378	5.29E-06	1.28E-06	1.09E-06	1.16E-05	1.27E-06
TCDF,2378	5.01E-06	1.79E-06	1.08E-06	1.84E-05	1.21E-06
2,4,5-TRICHLOROPHENOL					
2,4,6-TRICHLOROPHENOL					
ACENAPHTHENE	72	759	104	141	47
ACENAPHTHYLENE	1,502	15,891	2,173	2,943	978
ACETALDEHYDE	231	29		87	
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILE					
ANTHRACENE	100	1,061	145	196	65
ANTIMONY		3.94E-02	3.39E-03	5.06E-01	
ARSENIC	7	1	1	12	2
BENZ(A)ANTHRACENE	141	1,489	204	276	92
BENZENE	35,545	145,200	22,738	63,583	13,146
BENZO(A)PYRENE	30	316	43	59	19
BENZO(B)FLUORANTHENE	43	457	62	85	28
BENZO(G,H,I)PERYLENE	29	302	41	56	19
BENZO(K)FLUORANTHENE	15	155	21	29	10
BERYLLIUM	4	8.54E-01	8.13E-01	7	9.66E-01
CADMIUM	7,113	1,497	1,442	12,712	1,712
CARBON TETRACHLORIDE	260	61	35	400	44
CHLORDANE					
CHLOROFORM	1,075	170	136	1,662	173
CHROMIUM	889	203	180	1,589	214
CHROMIUM (VI)	1.20E-03	4.45E-04		1.88E-03	
CHRYSENE	86	913	125	169	56
COBALT	2,838	597	575	5,072	683
COPPER	72	16	15	129	17
DIBENZO(A,H)ANTHRACENE	2	21	3	4	1
DIBUTYL PHTHALATE	11	2	2	20	3
DIETHYLHEXYL PHTHALATE					
ETHYLBENZENE	46,966	9,672	9,282	82,376	20,054
ETHYLENE OXIDE					
FLUORANTHENE	139	1,476	202	274	91
FLUORENE	173	1,820	249	338	112
FORMALDEHYDE	8,781	85,763	11,062	15,463	19,690
GLYCOL ETHERS (MISC.)	26,627	5,647	5,403	47,579	6,415
HEXACHLOROBENZENE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	8	86	12	16	5
LEAD	71	15	14	130	17
M-XYLENE	6,142	1,150	1,002	10,996	1,386
MANGANESE	97	33	21	173	23
MERCURY	5	1	1	13	19
METHYLENE CHLORIDE	36,298	7,295	7,000	62,263	8,328
METHYLENE(B)4-					
NAPHTHALENE	10,306	23,011	4,323	18,789	3,203
NICKEL	984	208	199	1,849	237
O-XYLENE	32,540	21,306	8,243	58,402	8,373
P-XYLENE	2,378	445	388	4,257	536
PHENANTHRENE	699	7,397	1,010	1,372	455
PHENOL	7,491	4,209	236	319	106
PCBS		1.43E-04	1.23E-05	1.84E-03	
PCDD		3.33E-04	5.63E-06	8.42E-04	
PCDF		8.66E-04	1.89E-05	2.83E-03	
PYRENE	171	1,807	247	337	111
STYRENE	322	423	24,498	455	91
TETRACHLOROETHYLENE	152,811	32,032	30,835	272,659	36,643
TOLUENE	453,771	145,277	87,211	731,182	348,213
TRICHLOROETHYLENE	1,707	271	216	2,639	275
VINYL CHLORIDE	12,193	718	572	7,001	730
XYLENES (MIXED ISOMERS)	162,668	16,701	14,676	140,982	436,452

Table G-1: Ontario Emissions by County in pounds/year

	Parry Sound	Peel	Perth	Peterborough	Prescott and Russell
1,1,1-TRICHLOROETHANE	32	1,607	110	193	83
1,2-DIBROMOETHANE	3.49E-02	1.30E+00	4.46E-02	1.52E-01	2.46E-04
1,2-DICHLOROETHANE	2	73	3	8	5.53E-01
1,3-BUTADIENE					
TCDD,2378	5.22E-07	4.21E-05	1.58E-05	1.65E-06	9.70E-07
TCDF,2378	4.96E-07	7.67E-04	6.59E-05	1.66E-06	9.19E-07
2,4,5-TRICHLOROPHENOL		2.17E-02			
2,4,6-TRICHLOROPHENOL		2.11E-01			
ACENAPHTHENE	695	102	33	123	92
ACENAPHTHYLENE	14,558	2,129	701	2,583	1,922
ACETALDEHYDE		246			
ACROLEIN					
ACRYLAMIDE		355			
ACRYLONITRILE					
ANTHRACENE	972	142	47	172	128
ANTIMONY		22	3	6.89E-03	
ARSENIC	6.67E-01	76	1	2	1
BENZ(A)ANTHRACENE	1,364	199	66	242	180
BENZENE	130,731	85,076	8,809	28,865	18,586
BENZO(A)PYRENE	290	42	14	51	38
BENZO(B)FLUORANTHENE	418	104	20	74	55
BENZO(G,H,I)PERYLENE	277	66	13	49	37
BENZO(K)FLUORANTHENE	141	21	7	25	19
BERYLLIUM	3.97E-01	9	7.19E-01	1	7.36E-01
CADMIUM	705	15,049	1,273	2,176	1,305
CARBON TETRACHLORIDE	35	394	29	54	22
CHLORDANE					
CHLOROFORM	33	1,639	112	197	84
CHROMIUM	88	2,338	159	272	163
CHROMIUM (VI)		3.77E-03			
CHRYSENE	836	122	40	148	110
COBALT	281	6,074	507	868	521
COPPER	8	1,583	16	22	13
DIBENZO(A,H)ANTHRACENE	19	3	9.32E-01	3	3
DIBUTYL PHTHALATE	1	24	2	3	2
DIETHYLHEXYL PHTHALATE		4,409			
ETHYLBENZENE	4,541	123,470	269,807	69,068	8,191
ETHYLENE OXIDE		5,997			
FLUORANTHENE	1,351	203	65	240	178
FLUORENE	1,667	245	80	296	220
FORMALDEHYDE	732	14,929	1,160	1,988	1,174
GLYCOL ETHERS (MISC.)	2,702	56,244	4,763	8,160	4,887
HEXACHLOROBENZENE		8			
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	78	50	4	14	10
LEAD	7	215	32	22	13
M-XYLENE	480	17,840	613	2,082	3
MANGANESE	21	301	17	31	19
MERCURY	4.76E-01	458	40	2	8.83E-01
METHYLENE CHLORIDE	3,376	782,863	6,162	10,556	6,289
METHYLENE(B)4-		2,205	223	1,166	
NAPHTHALENE	20,263	26,420	1,871	6,239	2,820
NICKEL	98	2,735	176	301	180
O-XYLENE	16,602	69,663	6,031	12,013	7,069
P-XYLENE	186	6,908	237	806	1
PHENANTHRENE	6,770	1,323	326	1,201	894
PHENOL	1,579	515	76	280	208
PCBS		3.46E-01	1.26E-02	2.50E-05	
PCDD		1.56E-02	5.77E-03	1.15E-05	
PCDF		5.33E-02	1.94E-02	3.85E-05	
PYRENE	1,655	476	80	294	218
STYRENE	529	12,638	76	171	52
TETRACHLOROETHYLENE	14,987	330,447	27,170	46,526	27,836
TOLUENE	98,631	2,401,276	70,509	154,272	70,386
TRICHLOROETHYLENE	52	54,100	178	313	134
VINYL CHLORIDE	137	6,905	472	830	355
XYLENES (MIXED ISOMERS)	7,285	967,807	1,354,962	130,489	11,632

Table G-1: Ontario Emissions by County in pounds/year

	Prince Edward	Rainy River	Renfrew	Simcoe	Stormont, Dundas
1,1,1-TRICHLOROETHANE	20	54	133	451	260
1,2-DIBROMOETHANE		1.47E-02	7.52E-02	3.88E-01	7.00E-02
1,2-DICHLOROETHANE	1.31E-01	1	4	21	5
1,3-BUTADIENE					
TCDD,2378	3.28E-07	3.26E-07	1.26E-06	4.33E-06	1.92E-06
TCDF,2378	3.11E-07	3.88E-07	1.19E-06	4.09E-06	3.40E-06
2,4,5-TRICHLOROPHENOL					
2,4,6-TRICHLOROPHENOL					
ACENAPHTHENE	48	66	992	153	133
ACENAPHTHYLENE	1,010	1,364	20,780	3,203	2,779
ACETALDEHYDE				59	33
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILE					
ANTHRACENE	67	92	1,388	214	186
ANTIMONY		5.40E-03			1.08E-01
ARSENIC	4.18E-01	113	2	6	2
BENZ(A)ANTHRACENE	95	128	1,947	300	261
BENZENE	9,413	13,088	188,256	43,414	259,641
BENZO(A)PYRENE	20	28	413	64	56
BENZO(B)FLUORANTHENE	29	40	597	92	80
BENZO(G,H,I)PERYLENE	19	27	395	61	53
BENZO(K)FLUORANTHENE	10	14	202	31	28
BERYLLIUM	2.49E-01	2.30E-01	9.57E-01	3.29E+00	1.12E+00
CADMIUM	442	410	1,698	5,815	1,962
CARBON TETRACHLORIDE	6	18	40	116	68
CHLORDANE					
CHLOROFORM	20	55	135	459	265
CHROMIUM	55	316	212	726	245
CHROMIUM (VI)				5.79E-04	5.12E-04
CHRYSENE	58	79	1,193	184	160
COBALT	176	163	677	2,320	783
COPPER	4	4	19	58	20
DIBENZO(A,H)ANTHRACENE	1	3	28	4	4
DIBUTYL PHTHALATE	1	1	3	9	3
DIETHYLHEXYL PHTHALATE					
ETHYLBENZENE	2,772	2,612	10,888	121,717	12,540
ETHYLENE OXIDE					
FLUORANTHENE	94	131	1,928	299	260
FLUORENE	116	157	2,380	367	319
FORMALDEHYDE	393	383	1,540	5,545	1,885
GLYCOL ETHERS (MISC.)	1,655	1,539	6,366	21,777	7,353
HEXACHLOROBENZENE					
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	5	8	112	17	15
LEAD	4	4	17	58	20
M-XYLENE		202	1,033	5,326	961
MANGANESE	7	787	40	80	29
MERCURY	2.99E-01	207	1	4	2
METHYLENE CHLORIDE	2,119	2,002	8,206	28,127	9,620
METHYLENE(B)4-					
NAPHTHALENE	1,437	2,296	29,437	11,428	5,279
NICKEL	61	57	236	875	271
O-XYLENE	2,727	2,998	26,630	28,561	10,894
P-XYLENE		78	400	2,062	372
PHENANTHRENE	469	657	9,663	1,491	1,305
PHENOL	110	148	2,254	161,063	301
PCBS		1.96E-05			3.92E-04
PCDD		3.02E-03			3.44E-03
PCDF		2.02E-02			2.33E-03
PYRENE	115	157	2,362	367	317
STYRENE	26	98	172	230	24,397
TETRACHLOROETHYLENE	9,406	8,761	36,234	316,536	42,097
TOLUENE	25,053	28,526	163,522	590,737	1,308,761
TRICHLOROETHYLENE	32	88	543,473	93,764	420
VINYL CHLORIDE	86	233	570	1,936	1,115
XYLENES (MIXED ISOMERS)	3,779	4,558	244,483	456,813	71,783

Table G-1: Ontario Emissions by County in pounds/year

	Sudbury District	Sudbury Region	Thunder Bay	Timiskaming	Toronto
1,1,1-TRICHLOROETHANE	25	420	381	113	4,991
1,2-DIBROMOETHANE	5.28E-03	2.08E-01	1.95E-01	3.80E-02	2.89E+00
1,2-DICHLOROETHANE	4.13E-01	12	12	3	167
1,3-BUTADIENE					
TCDD,2378	8.66E-07	4.70E-06	2.68E-06	1.08E-06	1.37E-04
TCDF,2378	2.65E-06	1.32E-05	4.65E-06	3.02E-06	4.92E-04
2,4,5-TRICHLOROPHENOL					
2,4,6-TRICHLOROPHENOL					
ACENAPHTHENE	91	91	287	84	8.21E-01
ACENAPHTHYLENE	1,889	1,910	5,956	1,758	9.87E-01
ACETALDEHYDE	41,861	99	63,572		389
ACROLEIN					
ACRYLAMIDE					
ACRYLONITRILE					
ANTHRACENE	132	128	413	128	2.12E-01
ANTIMONY	1.25E-01	5.98E-01	2	1.36E-01	7,291
ARSENIC	4.28E-01	3	12	6.34E-01	520
BENZ(A)ANTHRACENE	180	179	565	168	2.11E-02
BENZENE	17,278	26,422	61,424	17,619	124,680
BENZO(A)PYRENE	39	38	123	36	2.50E-03
BENZO(B)FLUORANTHENE	55	55	181	50	8.19E-03
BENZO(G,H,I)PERYLENE	38	36	122	34	4.02E-03
BENZO(K)FLUORANTHENE	19	19	61	17	1.73E-02
BERYLLIUM	2.53E-01	2	2	3.76E-01	36
CADMIUM	449	2,892	2,781	667	43,090
CARBON TETRACHLORIDE	16	104	105	32	1,219
CHLORDANE					9.39E-01
CHLOROFORM	54,995	429	26,403	115	5,089
CHROMIUM	56	369	410	83	27,845
CHROMIUM (VI)		6.31E-04			6.29E-03
CHRYSENE	110	110	346	102	2.54E-02
COBALT	179	1,154	1,121	266	17,215
COPPER	5	30	248	7	1,182
DIBENZO(A,H)ANTHRACENE	4	3	12	3	7.13E-04
DIBUTYL PHTHALATE	7.14E-01	5	4	1	523
DIETHYLHEXYL PHTHALATE					4,586
ETHYLBENZENE	2,839	18,812	18,064	4,307	282,296
ETHYLENE OXIDE					
FLUORANTHENE	183	177	575	166	1
FLUORENE	221	219	694	210	1
FORMALDEHYDE	402	2,867	115,727	180,975	75,240
GLYCOL ETHERS (MISC.)	1,704	10,826	10,429	2,506	157,367
HEXACHLOROBENZENE					4.59E-02
HYDRAZINE					
INDENO(1,2,3-C,D)PYRENE	12	10	42	10	1.24E-03
LEAD	5	32	1,088	7	6,909
M-XYLENE	73	2,864	2,679	521	63,880
MANGANESE	7	40	56	10	560
MERCURY	1	7	183	2	496
METHYLENE CHLORIDE	2,158	14,223	13,638	3,297	2,008,015
METHYLENE(B)4-					
NAPHTHALENE	3,169	6,358	12,781	3,549	52,892
NICKEL	62	400	449	92	5,912
O-XYLENE	3,594	14,583	17,799	4,524	187,631
P-XYLENE	28	1,109	1,037	202	17,594
PHENANTHRENE	920	889	2,938	837	4
PHENOL	204	207	30,476	189	
PCBS	4.53E-04	2.17E-03	5.22E-04	4.94E-04	1.07E-01
PCDD	9.02E-03	9.95E-04	1.42E-02	2.25E-03	6.24E-01
PCDF	7.33E-03	3.34E-03	2.68E-02	5.65E-03	3.03E-01
PYRENE	221	217	733	206	2
STYRENE	188	1,917	325	114	78,064
TETRACHLOROETHYLENE	9,568	62,113	59,638	14,342	918,308
TOLUENE	32,846	174,952	185,452	45,758	3,896,765
TRICHLOROETHYLENE	40	681	617	183	135,270
VINYL CHLORIDE	106	1,805	1,636	485	21,440
XYLENES (MIXED ISOMERS)	4,275	33,990	32,101	8,041	953,290

Table G-1: Ontario Emissions by County in pounds/year

	Victoria	Waterloo	Wellington	York	Prov. Total
1,1,1-TRICHLOROETHANE	81	633	273	59	310,906
1,2-DIBROMOETHANE	1.73E-02	4.96E-01	1.38E-01	9.30E-01	12
1,2-DICHLOROETHANE	1	27	8	43	744
1,3-BUTADIENE					229,137
TCDD,2378	9.26E-07	8.40E-06	3.65E-06	7.89E-06	3.88E-04
TCDF,2378	9.99E-07	1.86E-05	8.30E-06	7.88E-06	1.80E-03
2,4,5-TRICHLOROPHENOL					2.17E-02
2,4,6-TRICHLOROPHENOL					2.11E-01
ACENAPHTHENE	106	32	53	85	48,530
ACENAPHTHYLENE	2,218	669	1,112	1,776	360,980
ACETALDEHYDE		2,420	36	218	228,333
ACROLEIN					
ACRYLAMIDE					564
ACRYLONITRILE					18,849
ANTHRACENE	148	45	74	119	42,566
ANTIMONY	8.32E-03	7.21E-01	3.29E-01	2.84E-02	7,506
ARSENIC	1	7	3	10	60,763
BENZ(A)ANTHRACENE	208	63	104	166	46,530
BENZENE	21,475	25,447	16,751	40,851	5,073,924
BENZO(A)PYRENE	44	13	22	35	31,362
BENZO(B)FLUORANTHENE	64	19	32	51	64,314
BENZO(G,H,I)PERYLENE	42	13	21	34	23,782
BENZO(K)FLUORANTHENE	22	7	11	17	1,548
BERYLLIUM	6.75E-01	4	2	6	216
CADMIUM	1,198	7,147	3,021	10,444	191,227
CARBON TETRACHLORIDE	27	156	70	18	6,229
CHLORDANE					9.39E-01
CHLOROFORM	83	645	278	60	106,138
CHROMIUM	149	899	377	2,297	51,402
CHROMIUM (VI)			5.56E-04	1.89E-03	2.36E-02
CHRYSENE	127	38	64	102	10,055
COBALT	478	2,851	1,205	4,167	76,859
COPPER	12	72	31	105	10,437
DIBENZO(A,H)ANTHRACENE	3	8.91E-01	1	2	8,391
DIBUTYL PHTHALATE	2	11	5	17	1,309
DIETHYLHEXYL PHTHALATE					9,061
ETHYLBENZENE	7,575	46,443	25,154	68,461	2,271,534
ETHYLENE OXIDE			5,194		14,923
FLUORANTHENE	206	62	105	165	83,361
FLUORENE	254	77	127	204	153,126
FORMALDEHYDE	1,080	6,980	2,993	9,352	865,033
GLYCOL ETHERS (MISC.)	4,500	26,750	11,316	39,091	710,004
HEXACHLOROBENZENE					8
HYDRAZINE					20
INDENO(1,2,3-C,D)PYRENE	12	4	6	10	23,179
LEAD	12	76	32	136	145,360
M-XYLENE	238	6,819	1,890	12,778	189,781
MANGANESE	18	95	41	141	30,551
MERCURY	8.80E-01	11	5	14	4,821
METHYLENE CHLORIDE	5,778	34,665	22,233	958,666	4,360,226
METHYLENE(B)4				148	3,741
NAPHTHALENE	3,469	9,961	4,194	18,848	518,266
NICKEL	166	988	418	1,479	33,169
O-XYLENE	7,002	32,163	13,986	48,832	1,002,527
P-XYLENE	92	2,640	732	4,947	66,335
PHENANTHRENE	1,031	312	519	827	537,147
PHENOL	241	4,665	3,178	3,072	309,463
PCBS	3.02E-05	2.62E-03	1.20E-03	1.03E-04	5.53E-01
PCDD	1.39E-05	1.20E-03	5.48E-04	6.56E-05	7.23E-01
PCDF	4.65E-05	4.03E-03	1.84E-03	2.92E-04	5.72E-01
PYRENE	252	76	130	202	165,395
STYRENE	159	1,776	135	26,856	305,348
TETRACHLOROETHYLENE	25,557	152,799	64,605	224,194	4,442,726
TOLUENE	70,712	1,104,050	226,612	986,938	20,754,124
TRICHLOROETHYLENE	132	1,025	164,839	81,800	1,573,884
VINYL CHLORIDE	349	2,718	1,173	254	124,943

Appendix H: Pennsylvania Toxic Emissions Inventory

BACKGROUND

The Commonwealth of Pennsylvania conducted its portion of the Great Lakes Region air toxic emissions inventory for the calendar year 1996. This includes both Point and Area source data drawn from a variety of sources. With a 1990 population of 11,881,643, Pennsylvania represents approximately 13.7 percent of the total population of the Great Lakes Region. The table below provides a brief demographic overview of the Pennsylvania portion of the regional inventory.

Demographic Characteristics for the Pennsylvania Area of the Great Lakes Region Air Toxics Emissions Inventory

	Pennsylvania
Total Population, 1990	11,881,643
Urban Population, 1996	8,188,295
Rural Population, 1996	3,693,348

Source: U.S. Bureau of the Census

DATA SOURCES

Point Sources

Point source emissions information included in the Pennsylvania inventory were collected by PA Department of Environmental Protection's Bureau of Air Quality, as part of its annual air emissions inventory process. Every January, Pa DEP mails preprinted forms to every active facility in the emission inventory. Facilities are required to submit activity data for the previous year. This data includes operating schedules, throughputs, fuel usage, and emission estimates. The reports are to be completed and notarized and sent to Pa DEP by March 1st. Regional inspectors then verify and enter the data into the emission inventory database. The data is then quality assured and completed by September. Since a limited amount of actual toxic emission estimates exist for 1996, the decision was made to take current emission factors from the Factor Information Retrieval System (FIRE) and apply them to the annual throughputs for each Source Classification Code (SCC) and generate an emission estimate. In future years, the reporting of toxic emissions over certain thresholds is required and should generate actual estimates supplemented with estimates from emission factors.

Area Sources

Emissions from 35 area sources were inventoried for this project. These area sources are:

Architectural Surface Coating	Autobody Refinishing
Commercial/Consumer	Degreasing
Electrical Appliances	Electrical Insulation
Factory Finished Wood	Fuel Oil Comb (Commercial)

Fuel Oil Comb (Residential)	Gasoline Marketing (Stage II)
Gasoline Marketing (Truck Transit)	Gasoline Marketing (UST Breathing)
Graphic Arts	High Performance Coatings
Landfills	Machinery & Equipment
Marine Surface Coating	Metal Cans Surface Coating
Metal Furniture & Fixtures	Misc. Finished Metals
Misc. Manufacturing	Motor Vehicle Surface Coating
Other Special Purpose Coating	Pesticides
POTWs	Railroad
Traffic Line Painting	Wood Furniture

The 1996 emissions of criteria pollutants were first calculate for these sources using methodologies approved by the U.S. EPA. The data were then compared with the Point Source inventory to adjust for double counting and then loaded into the RAPIDS inventory system. Once in RAPIDS, the default profiles for each source category code (SCC) were used to speciate the data into the various air toxics reported.

Summary Of The Methodology Used To Determine Criteria Emissions By Area Source Type For Calendar Year 1996

The methodology used to determine the VOC, NOx, and CO emissions are summarized below for each source category. Each summary contains a brief description of the source category, the type of pollutant, the source of data used in the calculations, and a sample calculation of a specific county.

Architectural Surface Coating

The coatings in this source category are used by home owners and painting contractors to coat the interior and exterior of buildings and other structures. The coatings are applied by spray, brush, or roller and dry or cure at ambient conditions. The VOC emissions from this source category result from the evaporation of the paint and cleanup solvents. Each county's emissions for a typical ozone season day were calculated per the sample calculation below using a capita emission factor and U.S. Census Bureau population data. There were no point source emissions.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Population)(ton\ conversion)(Activity\ Days)\left(\frac{SAF}{POS}\right)$$

where: *Emission Factor = 4.6 lbs VOC/person/year* [1]

Population = 547,592 (Delaware County) [2]

Activity Days = 7 days ≈ 1 year/365 days [3]

Seasonal Activity Factor = 0.33 [3]

Peak Ozone Season = 0.25 years (3 months) [3]

$$Emissions = \left| \frac{4.6\, lbs\, VOC \big/ person}{year} \right| (547{,}592\, persons) \left(\frac{1\, ton}{2000\, lbs} \right) \left(\frac{1\, year}{365\, days} \right) \left(\frac{0.33}{0.25} \right)$$

$$Emissions = 4.5548\, tons\, VOC / day$$

Auto Refinishing

Auto refinishing is the painting of worn or damaged automobiles, light trucks, and other vehicles. The coating of new cars, however, is considered in the point source inventory, and therefore not included in this inventory.

The typical ozone season day emissions were calculated for each county using an employee emission factor and the number of employees in SIC code 7532 obtained from the *County Business Patterns*. The total number of employees in the state, but not for each county, was given. The balance of the number of employees was apportioned to those counties with missing data using the ratio equation illustrated below.

$$\frac{Employees_{Unknown}}{Population_{County}} = \frac{Employees_{Unknown}}{Population_{Unknown}}$$

where: $Employees_{Unknown}$ = *unknown number of employees in county*
$Population_{County}$ = *population of county with unknown number of employees*
$Employees_{Unknown}$ = *Total Employees -* $Employees_{Known}$
= *total employees(given) minus the sum of known number of employees*
$Population_{Unknown}$ = *sum of population in counties with unknown number of employees*

Therefore:

$$Employees_{Unknown} = \frac{(Employees_{Unknown})(Population_{County})}{Population_{Unknown}}$$

$$Employees_{Unknown} = \frac{(TotalEmployees - Employees_{Known})(Population_{County})}{Population_{Unknown}}$$

As the *County Business Patterns* reflected 1995 data, the population data for this calculation was from 1995 estimates. There were no point source emissions. The sample calculations below include a county with a known and a county with an unknown number of employees. For those counties with a known number of employees, the sample calculation used the number of employees given in the *County Business Patterns*. For those counties with unknown number of employees, the sample calculation used the above ratio to calculate the number of employees.

SAMPLE CALCULATIONS:

Counties with a known number of employees:

$$Emissions = (Emission\ Factor)(Employees)(ton\ conversion)(Activity\ Days)\left(\frac{SAF}{POS}\right)$$

where: *Emission Factor = 3,519 lbsVOC /employee/year* [1]
Employees = 586 (Delaware County) [7]
Activity Days = 5 days ≈ (1 year/52 weeks)(1 week/5 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]

$$Emissions = \left|\frac{3{,}519\ lbsVOC / employee}{year}\right|(586\ employees)\left(\frac{1\ ton}{2000\ lbs}\right)\left[\left(\frac{1\ year}{52\ weeks}\right)\left(\frac{1\ week}{5\ activity\ days}\right)\right]\left(\frac{0.25}{0.25}\right)$$

$$Emissions = 3.9656\ tonsVOC\ /\ day$$

Counties with a calculated number of employees:

$$Emissions = (Emission\ Factor)(Employees)(ton\ conversion)(Activity\ Days)\left|\frac{SAF}{POS}\right|$$

Since:

$$Employees = \frac{(TotalEmployees - Employees_{Known})(Population_{County})}{Population_{Unknown}}$$

Therefore:

$$Emissions = (Emission\ Factor)\left|\frac{(Total\ Employees - Employees_{Known})(Population_{County})}{Population_{Unknown}}\right|$$

$$(ton\ conversion)(Activity\ Days)\left(\frac{SAF}{POS}\right)$$

Where: *Emission Factor = 3,519 lbs /employee/year* [1]
Total Employees = 8,049 employees [7]
EmployeesKnown = 6,459 employees [7]
PopulationCounty = 83,998 people (Adams County - 1995 data) [2]

PopulationUnknown = 3,456,818 people (1995 data) [2]
Activity Days = 5 days ≈ (1 year/52 weeks)(1 week/5 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]

$$Emissions = \left| \frac{3{,}519\, lbs VOC \big/ employee}{year} \right| \left[\left[\frac{(8{,}049\, employees - 6{,}459\, employees)(83{,}998\, people)}{3{,}456{,}818\, people} \right] \left(\frac{1\, ton}{2000\, lbs} \right) \right.$$

$$\left[\left(\frac{1\, week}{5\, activity\ days} \right) \left(\frac{1\, year}{52\, weeks} \right) \right] \left(\frac{0.25}{0.25} \right)$$

$$Emissions = 0.2615\, tons VOC / year$$

Commercial and Consumer Solvent Use

This source category covers household products such as special napthas, alcohols, carbonyls, and other organics which contain VOCs. Emissions were assumed to be reactive and uniform throughout the year. There were no point sources. The typical ozone season day emissions for each county were calculated using a capita emission factor (based on the following subcategories and corresponding emission factors) and U.S. Census Bureau population data. Each county's emissions are estimated per the sample calculation given below.

SUBCATEGORY	EMISSION FACTOR
Household Products	2.0 lbs/ capita/year
Toiletries	1.4 lbs/ capita/year
Aerosol Products	0.8 lbs/ capita/year
Rubbing Compounds	0.6 lbs/ capita/year
Windshield Washing Liquids	0.6 lbs/ capita/year
Polishes and Waxes	0.3 lbs/ capita/year
Nonindustrial Adhesives	0.3 lbs/ capita/year
Space Deodorants	0.2 lbs/ capita/year
Moth Control	0.1 lbs/ capita/year
Laundry Detergent and Treatments	<0.1 lbs/ capita/year
Total	6.3 lbs/ capita/year

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Population)(ton\ conversion)(Activity\ Days)\left(\frac{SAF}{POS} \right)$$

where: Emission Factor = 6.3 lbs VOC/capita/year [1]

Population = 547,592 (Delaware County) [2]
Activity Days = 7 days ≈ 1 year/365 days [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]

$$Emissions = \left| \frac{6.3\, lbs VOC \big/ person}{year} \right| (547{,}592\, persons) \left(\frac{0.25}{0.25} \right) \left(\frac{1\, ton}{2000\, lbs} \right) \left(\frac{1\, year}{365\, days} \right)$$

$$Emissions = 4.7258\, tons VOC / day$$

Degreasing (All Processes)

Surface cleaning, also known as "degreasing", includes the solvent cleaning or conditioning of metal surfaces and parts, fabricated plastics, electronic and electrical components and other nonporous substrates. These cleaning processes are designed to remove foreign material, such as oils, grease, waxes and moisture, usually in the preparation for further treatment, such as painting, electroplating, galvanizing, anodizing or applying conversion coatings. Three basic types of surface cleaning operations are currently used: cold cleaning, vapor cleaning, and in-line or conveyorized cleaning, which can be either a cold or vapor cleaning process. VOC emission result from the evaporation of solvents used in these processes.

Cold cleaning is a batch process in which solvents are applied at room temperature or slightly heated. Parts are immersed in a solvent, usually mineral spirits. Parts too large for immersion may be sprayed or wiped with a solvent. The primary cold cleaning application is cleaning of tools or metal parts as service and automotive repair stations and manufacturing facilities. Cold cleaning may incorporate covers or freeboards to limit the evaporative loss of solvents.

In-line cleaners use automated load systems typically conveyors to maintain a continuous feed to the cleaning unit. These units use both cold and vapor cleaning methods as described above, with the majority being halogenated solvent cleaning systems. These units are used for large-scale operations and are usually enclosed except to the conveyor inlet or exit. A common application of in-line cleaners is the cleaning of printed circuit boards for the electronic and electrical component industries.

The typical ozone season day emissions for each county were calculated using an employee emission factor and the number of employees for SIC codes 25*xx*, 33*xx*-39*xx*, and 753*x* which were obtained from the *Pennsylvania Industrial Directory* and *551x, 552x, and 554x* from the *County Business Patterns*. However, the number of employees in the state, but not for each county, was given in the *County Business Patterns*. The Department apportioned the balance of employees to the counties with no data using population using the simple ratio equation illustrated below. This assumes that the number of employees in the degreasing industry is uniform across the state and is a function of population.

$$\frac{Employees_{Unknown}}{Population_{County}} = \frac{Employees_{Unknown}}{Population_{Unknown}}$$

where: $Employees_{Unknown}$ *= unknown number of employees in county*
$Population_{County}$ *= population of county with unknown number of employees*
$Employees_{Unknown}$ *=Total Employees -* $Employees_{Known}$
= total employees(given) minus the sum of known number of employees
$Population_{Unknown}$ *= sum of population in counties with unknown number of employees*

Therefore:

$$Employees_{Unknown} = \frac{\left(Employees_{Unknown}\right)\left(Population_{County}\right)}{Population_{Unknown}}$$

$$Employees_{Unknown} = \frac{\left(TotalEmployees - Employees_{Known}\right)\left(Population_{County}\right)}{Population_{Unknown}}$$

Sample Calculations are included for a county with a known and a county with an unknown number of employees. For those counties with known number of employees, the sample calculation used the number of employees given in the *County Business Patterns* in addition to those provided in the *Pennsylvania Industrial Directory*. For those counties with unknown number of employees, the sample calculation used the above ratio to calculate the number of employees for SIC codes *551x, 552x, and 554x*.

SAMPLE CALCULATIONS:

<u>*Known Number of Employees*</u>:

$$Emissions = \left(Emission\ Factor\right)\left(Employees_{PID} + Employees_{CBP}\right)\left(ton\ conversion\right)\left(Activity\ Days\right) \left|\frac{SAF}{POS}\right| - Point\ Sources$$

where: *Emission Factor = 87 lbs VOC/employee/year* [1]
$Employees_{PID}$ = *Employees in SIC codes 25xx, 33xx-39xx, and 753x from the Pennsylvania Industrial Directory*
= *44,227 employees (Allegheny County)* [6]
$Employees_{CBP}$ = *Employees in SIC codes 551x, 552x, and 554x from the County Business Patterns*
= 9,762 *(Allegheny County)* [7]

Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]
Point Sources = 0.0645 lbsVOC/day (Allegheny County) [9]

$$Emissions = \left|\frac{87\, lbs\, VOC \big/ Employee}{year}\right|(44{,}227\, Employees + 9{,}762\, Employees)\left(\frac{1\, ton}{2000\, lbs}\right)\left[\left(\frac{1\, year}{52\, weeks}\right)\left(\frac{1\, week}{6\, days}\right)\right]$$

$$\left(\frac{0.25}{0.25}\right) - \frac{0.0645\, lbs\, VOC}{day}$$

$$Emissions = 7.4628\, lbs\, VOC / day$$

Unknown Number of Employees:

$$Emissions = (Emission\ Factor)(Employees_{PID} + Employees_{CBP})(ton\ conversion)(Activity\ Days)$$
$$\left(\frac{SAF}{POS}\right) - Point\ Sources$$

Since the number of employees for SIC codes 551*x*, 552*x*, and 554*x* were obtained from the *County Business Patterns*, the equation becomes:

$$Emissions = (Emission\ Factor)[Employees_{PID} + Employees_{551} + Employees_{552} + Employees_{554}](ton\ conversion)$$
$$(Activity\ Days)\left(\frac{SAF}{POS}\right) - Point\ Sources$$

The number of employees for SIC code 552*x* was unavailable. Using the previously described ratio, the above equation then becomes:

$$Emissions = (Emission\ Factor)\left[\begin{array}{c} Employees_{PID} + Employees_{551} + Employees_{554} + \\ \left(\frac{(Total\ Employees - Employees_{Known})(Population_{County})}{Population_{Unknown}}\right) \end{array}\right](ton\ conversion)$$
$$(Activity\ Days)\left(\frac{SAF}{POS}\right) - Point\ Sources$$

where: *Emission Factor = 87 lbs VOC/employee/year* [1]
$Employees_{PID}$ = 1,492 Employees (Adams County) [6]
$Employees_{551}$ = 210 Employees [7]

Total Employees = 3,436 Employees [7]
$Employees_{Known}$ = 1,826 Employees [7]
$Population_{County}$ = 83,998 People (1995 est. census) [2]
$Population_{Unknown}$ = 6,124,581 People (1995 est. census) [2]
$Employees_{554}$ = 160 Employees [7]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]
Point Sources = 0.0 lbsVOC/day (Adams County) [9]

$$Emissions = \left| \frac{87\,lbsVOC \big/ Employee}{year} \right| \left[1{,}495\,Employees + 210\,Employees + 160\,Employees + \left(\frac{(3{,}436\,Employees - 1{,}826\,Employees)(83{,}998\,People)}{6{,}124{,}581\,People} \right) \right] \left(\frac{1\,ton}{2000\,lbs} \right)$$

$$\left[\left(\frac{1\,year}{52\,weeks} \right) \left(\frac{1\,week}{6\,days} \right) \right] \left(\frac{0.25}{0.25} \right) - \frac{0.0\,tonsVOC}{day}$$

$$Emissions = 0.2631\,tonsVOC/day$$

Electrical Appliances

The VOC emissions from this source category result from the evaporation of the solvent used in the coating process in the manufacture of electrical appliances such as refrigerators, freezers, laundry equipment, and electric housewares. Point source emissions, where present, were subtracted from the emissions of the corresponding county. The typical ozone season day emissions for each county were estimated per the sample calculation below using an employee emission factor and the number of employees in SIC code 363*x* obtained from the *Pennsylvania Industrial Directory*.

SAMPLE CALCULATION:

$$Emissions = (Emission\,Factor)(Employees)(ton\,conversion)(Activity\,Days)\left| \frac{SAF}{POS} \right| - Point\,Sources$$

where: *Emission Factor = 463 lbs VOC/Employee/year* [1]
Employees = 130 (Chester County) [6]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [1]
Seasonal Activity Factor = 0.25 [1]
Peak Ozone Season = 0.25 years (3 months) [1]
Point Sources = 0.0 tonsVOC/day (Chester County) [9]

$$Emissions = \left| \frac{463\,lbsVOC \big/ Employee}{year} \right| (130\,Employees) \left(\frac{1\,ton}{2000\,lbs} \right) \left[\left(\frac{1\,year}{52\,weeks} \right) \left(\frac{1\,week}{6\,days} \right) \right] \left(\frac{0.25}{0.25} \right) - \frac{0.0\,tons}{day}$$

$$Emissions = 0.0965\,tonsVOC/day$$

Electrical Insulation

The volatile organic compound emissions from this source category result from the evaporation of the solvent used to insulate wire and cable. There were no point sources. The emissions for each county were calculated using an employee emission factor and the number of employees in SIC codes 3357 and 3612 were obtained from the *Pennsylvania Industrial Directory*. Each county's typical ozone season day emissions were estimated per the sample calculation below.

SAMPLE CALCULATION:

$$Emissions = (Emission\,Factor)(Employees)(ton\,conversion)(Activity\,Days)\left(\frac{SAF}{POS}\right)$$

where: *Emission Factor = 290 lbs VOC/Employee/year* [1]
Employees = 55 (Westmoreland County) [6]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]

$$Emissions = \left|\frac{290\,lbs\,VOC / Employee}{year}\right|(55\,Employees)\left(\frac{1\,ton}{2000\,lbs}\right)\left[\left(\frac{1\,year}{52\,weeks}\right)\left(\frac{1\,week}{6\,days}\right)\right]\left(\frac{0.25}{0.25}\right)$$

$$Emissions = 0.0256\,tons\,VOC/day$$

Factory Finished Wood

The VOC emissions from this source category result from the evaporation of the solvent used in the gluing and coating process. Point source emissions, where present, were subtracted from the emissions of the corresponding county. The emissions for each county were calculated using an employee emission factor and the number of employees in SIC codes 2426-2429, 243*x*-245x, 2492, and 2499 which were obtained from the *Pennsylvania Industrial Directory*. Each county's typical ozone season day emissions were estimated per the sample calculation below.

SAMPLE CALCULATION:

$$Emissions = (Emission\,Factor)(Employees)(ton\,conversion)(Activity\,Days)\left(\frac{SAF}{POS}\right) - Point\,Sources$$

where: *Emission Factor = 131 lbs VOC/Employee/year* [1]
Employees = 644 (Montgomery County) [6]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]
Point Sources = 0.0072 tonsVOC/day (Montgomery County) [9]

$$Emissions = \left| \frac{131\, lbs VOC \big/ Employee}{year} \right| (644\, Employees) \left(\frac{1\, ton}{2000\, lbs} \right) \left[\left(\frac{1\, year}{52\, weeks} \right) \left(\frac{1\, week}{6\, days} \right) \right] \left(\frac{0.25}{0.25} \right) - \frac{0.0072\, tons VOC}{day}$$

$$Emissions = 0.1280\, tons VOC / day$$

Fuel Oil Combustion (Residential And Commercial/Institutional)

Fuel oil combustion sources, which emit VOC, NOx, and CO, are grouped into three categories:
1. Commercial/Institutional; 2. Residential; and 3. Industrial. Industrial source emissions are in the point source inventory. Other point source emissions, where present, were subtracted from the emissions of the corresponding county. The emissions for a typical ozone or CO season day were calculated for each county using an AP-42 emission factor and fuel usage obtained from industry data. Other needed data was obtained from the *County Business Patterns* and the U.S. Census Bureau.

SAMPLE CALCULATIONS:

<u>*Residential*</u>:

The emissions for residential fuel oil combustion were determined by allocating the total residential fuel oil usage to each county. The residential fuel oil consumption was allocated by the ratio of dwelling units which use distillate fuel oil and kerosene in a county to the number of dwelling units which use distillate fuel oil and kerosene in the state. U.S. Census Bureau population data was used to adjust the dwelling unit information to reflect more recent conditions. The following is the general equation for the calculation of emissions for residential sources of fuel oil combustion.

$$Emissions = (Emission\ Factor) \left(\frac{County\ DU_{FO}}{State\ DU_{FO}} \right) (Residential\ Fuel\ Oil\ Useage) \left(\frac{SAF}{POS} \right) (ton\ conversion) (Activity\ Days)$$

where:

$$County\ DU_{FO} = Number\ of\ Dwelling\ Units\ in\ County\ Which\ Use\ Fuel\ Oil$$

$$= (1995\ County\ Population) \left(\frac{1990\ County\ Dwelling\ Units}{1990\ County\ Population} \right) (Dwelling\ Unit\ Factor)$$

$$StateDU_{FO} = Number\ of\ Dwelling\ Units\ in\ State\ Which\ Use\ Fuel\ Oil$$

$$= \sum County\ DU_{FO}$$

$$Residential\ Fuel\ Oil\ Useage = Distillate\ Useage + Kerosene\ Useage$$

therefore:

$$Emissions = \left(Emission\ Factor\right)\left[\frac{\left(1995\ County\ Population\right)\left(\frac{1990\ County\ Dwelling\ Units}{1990\ County\ Population}\right)\left(Dwelling\ Unit\ Factor\right)}{County\ DU_{FO}}\right]$$

$$\left(Distillate\ Useage + Kerosene\ Useage\right)\left(ton\ conversion\right)\left(Activity\ Days\right)\left(\frac{SAF}{POS}\right)$$

where: *Emission Factor = 0.713 lbs VOC/1000 gallons/year; 18 lbs NOx/1000 gallons/year; 5 lbs CO/1000 gallons/year* [19]

1995 County Population = 1,309,821 people (Allegheny County) [2]

1990 County Dwelling Units = 541,261 Dwelling Units [15]

1990 County Population = 1,336,449 people [2]

% DU_{FO} = % Dwelling Units which use fuel oil = 1.9% [15]

County DU_{FO} =1,290,615 Dwelling Units [15]

Residential Fuel Oil Useage = Distillate Oil Useage + Kerosene Useage
= 826,651,000 gallons + 86,682,000 gallons
= 913,333,000 gallons [20]

Activity Days = 7 days ≈ 1 year/365 days [3]

Seasonal Activity Factor = 0.08 (VOC), 0.08 (NOx), 0.43 (CO) [3]

Peak Ozone Season = 0.25 years (3 months) [3]

<u>*VOC Emissions*</u>:

$$Emissions_{VOC} = \left(\frac{0.713\ lbs\ VOC / 1000\ gallons}{year}\right)\left[\frac{\left(1{,}309{,}821\ people\right)\left(\frac{541{,}261\ Dwelling\ Units}{1{,}336{,}446\ people}\right)(1.9\%)}{1{,}290{,}615\ Dwelling\ Units}\right]$$

$$\left(826{,}651{,}000\ gallons + 86{,}682{,}000\ gallons\right)\left(\frac{1\ ton}{2000\ lbs}\right)\left(\frac{1\ year}{365\ days}\right)\left(\frac{0.08}{0.25}\right)$$

$$Emissions_{VOC} = 0.0022\ tons\ VOC / day$$

<u>*NOx Emissions*</u>:

$$Emissions_{NOx} = \left(\frac{18.0\ lbsNOx \big/ 1000\ gallons}{year} \right) \left[\frac{(1{,}309{,}821\ people)\left(541{,}261\ Dwelling\ Units \big/ 1{,}336{,}446\ people \right)(1.9\%)}{1{,}290{,}615\ Dwelling\ Units} \right]$$

$$(826{,}651{,}000\ gallons + 86{,}682{,}000\ gallons)\left(\frac{1\ ton}{2000\ lbs} \right)\left(\frac{1\ year}{365\ days} \right)\left(\frac{0.08}{0.25} \right)$$

$$Emissions_{NOx} = 0.0563\ tonsNOx / day$$

<u>*CO Emissions*</u>:

$$Emissions_{CO} = \left(\frac{5.0\ lbsCO \big/ 1000\ gallons}{year} \right) \left[\frac{(1{,}309{,}821\ people)\left(541{,}261\ Dwelling\ Units \big/ 1{,}336{,}446\ people \right)(1.9\%)}{1{,}290{,}615\ Dwelling\ Units} \right]$$

$$(826{,}651{,}000\ gallons + 86{,}682{,}000\ gallons)\left(\frac{1\ ton}{2000\ lbs} \right)\left(\frac{1\ year}{365\ days} \right)\left(\frac{0.43}{0.25} \right)$$

$$Emissions_{CO} = 0.0840\ tonsCO / day$$

<u>*Commercial/Institutional:*</u>

The total amount of fuel oil was apportioned to each county according to the number of commercial facilities which was obtained from the *County Business Patterns*. The total state usage, available as the total amount of distillate, residual, and kerosene, was obtained from the *National Petroleum News*. Each county's emissions for commercial/institutional fuel oil combustion was estimated per the following sample calculations.

$$Emissions = (Emission\ Factor)\left(\frac{Number\ of\ County\ Facilities}{Number\ of\ State\ Facilities} \right)(Commercial\ Fuel\ Oil\ Useage)$$

$$(ton\ conversion)(Activity\ Days)\left(\frac{SAF}{POS} \right)$$

where: Emission Factor = 0.34 lbs VOC/1000 gallons/year; 20 lbs NOx/1000 gallons/year;

5 lbs CO/1000 gallons/year [19]

County Facilities = 34,506 (Allegheny County) [7]

State Facilities = 283,968 [7]

Commercial Fuel Oil Useage = Distillate Oil Useage + Residual Oil Useage + Kerosene Useage

=257,826,000 gallons + 54,705,000 gallons + 22,166,000 gallons

= 334,697,000 gallons [20]

Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]

Seasonal Activity Factor = 0.15 (VOC), 0.15 (NOx), 0.35 (CO)
Peak Ozone Season = 0.25 years (3 months) [3]

<u>*VOC Emissions*</u>:

$$Emissions_{VOC} = \left| \frac{0.34 lbs VOC / 1000 gallons}{year} \right| \left(\frac{34{,}506\, Facilities}{283{,}968\, Facilities} \right) (334{,}697{,}000\, gallons)$$

$$\left(\frac{1\, ton}{2000\, lbs} \right) \left[\left(\frac{1\, year}{52\, weeks} \right) \left(\frac{1\, week}{6\, days} \right) \right] \left(\frac{0.15}{0.25} \right)$$

$$Emissions_{VOC} = 0.0133\, tons VOC / day$$

<u>*NOx Emissions*</u>:

$$Emissions_{NOx} = \left| \frac{20.0 lbs NOx / 1000 gallons}{year} \right| \left(\frac{34{,}506\, Facilities}{283{,}968\, Facilities} \right) (334{,}697{,}000\, gallons)$$

$$\left(\frac{1\, ton}{2000\, lbs} \right) \left[\left(\frac{1\, year}{52\, weeks} \right) \left(\frac{1\, week}{6\, days} \right) \right] \left(\frac{0.15}{0.25} \right)$$

$$Emissions_{NOx} = 0.7821\, tons NOx / day$$

<u>*CO Emissions*</u>:

$$Emissions_{CO} = \left| \frac{5.0 lbs CO / 1000 gallons}{year} \right| \left(\frac{34{,}506\, Facilities}{283{,}968\, Facilities} \right) (334{,}697{,}000\, gallons)$$

$$\left(\frac{1\, ton}{2000\, lbs} \right) \left[\left(\frac{1\, year}{52\, weeks} \right) \left(\frac{1\, week}{6\, days} \right) \right] \left(\frac{0.35}{0.25} \right)$$

$$Emissions_{CO} = 0.4562\, tons CO / day$$

FUEL OIL COMBUSTION TOTAL EMISSIONS:

Below are the total emissions for VOC, NOx, and CO for fuel oil combustion in Allegheny County. The VOC point sources, where present, were subtracted from the inventory of the corresponding county.

$$\begin{aligned} Emissions_{VOC} &= Residential + Commercial - Point\ Sources \\ &= 0.0022\ tonsVOC/day + 0.0133\ tonsVOC/day - 0.0569\ tonsVOC/day\ ^{9} \\ &= -0.0414\ tonsVOC/day \approx 0.0000\ tonsVOC/day \end{aligned}$$

$$\begin{aligned} Emissions_{NOx} &= Residential + Commercial \\ &= 0.0563\ tonsNOx/day + 0.7821\ tonsNOx/day \\ &= 0.8384\ tonsNOx/day \end{aligned}$$

$$\begin{aligned} Emissions_{CO} &= Residential + Commercial \\ &= 0.0840\ tonsCO/day + 0.4562\ tonsCO/day \\ &= 0.5402\ tonsCO/day \end{aligned}$$

Gasoline Marketing

Gasoline marketing involves the operations typically associated with transporting gasoline from refineries to final consumption in gasoline powered vehicles. Evaporative emissions of VOCs occur at all points in the distributive process. The operations that were generally inventoried as area sources are gasoline dispensing outlets and gasoline tank trucks in transit. Bulk terminals and outlets are usually inventoried as point sources. VOC emissions result from the following sources: 1) truck transit, 2) tank truck unloading into underground storage tanks (Stage I), 3) vehicle fueling (Stage II), and 4) underground storage tank breathing.

Each category's AP-42 emission factor is based on the average daily throughput that was calculated from monthly data obtained from the Pennsylvania Department of Revenue. The vehicle miles traveled (VMT), which were obtained from the Pennsylvania Department of Transportation, was used to apportion the throughput to each county. Control efficiency and control effectiveness were applied to Stage I for each county. Rule effectiveness was applied to Stage II to each regulated county. There were no point sources for this source category. Each county's emissions were estimated per the following sample calculation.

SAMPLE CALCULATION:

<u>Stage I</u>:

$$Emissions = (EmissionFactor)(State\ Throughput)\left|\frac{CountyVMT}{StateVMT}\right|(Control\ Efficiency)(Rule\ Effectiveness)(ton\ conversion)$$

where: Emission Factor = 0.3 lbs VOC/1000 gallons [19]

State Throughput = 13,969,015 gallons/day [27]
County VMT = 19,013,693 VMT (Montgomery County) [5]
State VMT = 289,714,968 VMT [5]
Control Efficiency = 0.96 ≈ (1-0.96)
Rule Effectiveness = 0.8 ≈ (1-0.8) [9]

$$Emissions = \left(\frac{0.3\, lbs VOC}{1000\, gallons} \right) \left(\frac{13{,}969{,}015\, gallons}{day} \right) \left(\frac{19{,}013{,}693\, VMT}{289{,}714{,}968\, VMT} \right) (1 - 0.96)(1 - 0.8) \left(\frac{1\, ton}{2000\, lbs} \right)$$

$$Emissions = 0.0011\, tons VOC / day$$

<u>*Stage II*</u>:

$$Emissions = (Emission Factor)(State\, Throughput)\left(\frac{County VMT}{State VMT} \right)(Rule\, Effectiveness)(ton\, conversion)$$

where: Emission Factor = 1.8 lbs VOC/1000 gallons (for counties with Stage II) [19]
= 11.7 lbsVOC/1000 gallons (for counties without Stage II)
State Throughput = 13,969,015 gallons/day [27]
County VMT = 19,013,693 VMT (Montgomery County) [5]
State VMT = 289,714,968 VMT [5]
Rule Effectiveness = 0.9 □ (1-0.9) [9] *(not applicable for counties without Stage II)*

$$Emissions = \left(\frac{1.8\, lbs VOC}{1000\, gallons} \right) \left(\frac{13{,}969{,}015\, gallons}{day} \right) \left(\frac{19{,}013{,}693\, VMT}{289{,}714{,}968\, VMT} \right) (1 - 0.9) \left(\frac{1\, ton}{2000\, lbs} \right)$$

$$Emissions = 0.0825\, tons VOC / day$$

<u>*Underground Storage Tank Breathing*</u>:

$$Emissions = (Emission Factor)(State\, Throughput)\left(\frac{County VMT}{State VMT} \right)(ton\, conversion)$$

where: Emission Factor = 1.0 lbs VOC/1000 gallon [19]
State Throughput = 13,969,015 gallons/day [27]
County VMT = 19,013,693 VMT (Montgomery County) [5]
State VMT = 289,714,968 VMT [5]

$$Emissions = \left(\frac{1.0\, lbs VOC}{1000\, gallons} \right) \left(\frac{13{,}969{,}015\, gallons}{day} \right) \left(\frac{19{,}013{,}693\, VMT}{289{,}714{,}968\, VMT} \right) \left(\frac{1\, ton}{2000\, lbs} \right)$$

$$Emissions = 0.4584\, tons VOC / day$$

<u>*Truck Transit*</u>:

$$Emissions = (EmissionFactor)(State\,Throughput)\left(\frac{County\,VMT}{State\,VMT}\right)(ton\,conversion)$$

where: Emission Factor = 0.11 lbs VOC/1000 gallon [19]
State Throughput = 13,969,015 gallons/day [27]
County VMT = 19,013,693 VMT (Montgomery County) [5]
State VMT = 289,714,968 VMT [5]

$$Emissions = \left(\frac{0.11\,lbs\,VOC}{1000\,gallons}\right)\left(\frac{13{,}969{,}015\,gallons}{day}\right)\left(\frac{19{,}013{,}693\,VMT}{289{,}714{,}968\,VMT}\right)\left(\frac{1\,ton}{2000\,lbs}\right)$$

$$Emissions = 0.0504\,tons\,VOC\,/\,day$$

<u>TOTAL VOC EMISSIONS FOR GASOLINE MARKETING</u>:

Emissions = Stage I Emissions + Stage II Emissions + UST Breathing + Truck Transit
Emissions = 0.0011 tonsVOC/day + 0.0825 tonsVOC/day + 0.4584 tonsVOC/day + 0.0504 tonsVOC/day
Emissions = 0.5924 tonsVOC/day

Graphic Arts

Graphic arts include operations that are involved in the printing of newspapers, magazines, books, and other printed material. Emissions of VOCs are from the evaporation of solvents used in inks and cleaning. Point source emissions, where present, were subtracted from the emissions of the corresponding county. The emissions for each county were calculated using a capita emission factor and U.S. Census Bureau population data. Each county's emissions was estimated per the following sample calculation.

SAMPLE CALCULATION:

$$Emissions = (Emission\,Factor)(Population)(ton\,conversion)(Activity\,Days)\left(\frac{SAF}{POS}\right) - Point\,Sources$$

where: Emission Factor = 1.3 lbs VOC/capita/year [1]
Population = 547,592 (Delaware County) [2]
Activity Days = 5 days ≈ (1 year/52 weeks)(1week/5 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]
Point Sources = 0.3767 tonsVOC/day (Delaware County) [9]

$$Emissions = \left| \frac{1.3\, lbs VOC \big/ person}{year} \right| (547{,}592\, persons) \left(\frac{1\, ton}{2000\, lbs} \right) \left[\left(\frac{1\, year}{52\, weeks} \right) \left(\frac{1\, week}{5\, days} \right) \right] \left(\frac{0.25}{0.25} \right)$$

$$- 0.3767\, tons VOC / day$$

$$Emissions = 0.9923\, tons VOC \big/ day$$

High Performance Industrial Maintenance Solvent

The VOC emissions from this source category result from the evaporation of solvents from surface coating of objects and materials, such as a jet, which may exist in extreme conditions. There were no point sources. The emissions for each county were calculated using a capita emission factor and U.S. Census Bureau population data. Each county's emissions were estimated per the following sample calculation.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Population)(ton\ conversion)(Activity\ Days)\left(\frac{SAF}{POS} \right)$$

where: *Emission Factor = 0.8 lbs VOC/capita/year* [1]
Population = 547,592 people (Delaware County) [2]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]

$$Emissions = \left| \frac{0.8\, lbs VOC \big/ person}{year} \right| (547{,}592\, persons) \left(\frac{1\, ton}{2000\, lbs} \right) \left[\left(\frac{1\, year}{52\, weeks} \right) \left(\frac{1\, week}{6\, days} \right) \right] \left(\frac{0.25}{0.25} \right)$$

$$Emissions = 0.7020\, tons VOC \big/ day$$

Landfills

Municipal solid waste landfills receive primarily household and/or commercial waste. The VOC emissions from landfills are produced by volatilization, chemical reaction, and biological decomposition of refuse material. The emissions were calculated using the amount of refuse in the landfill, not the capacity. This data was obtained from the Department of Environmental Protection. The sum of the emissions from each landfill in a county was used for the total landfill emissions in the county. The estimate was adjusted for precipitation. Each county's emissions were estimated per the following sample calculation.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Precipitation\ Adjustment\ Factor)(Amount\ of\ Waste)(Activity\ Days)$$

where: *Emission Factor = 13.6 tonsVOC/10*^{6} *tons of waste* [1]
Precipitation Adjustment Factor = 2.6 [1]
Amount of Waste = 20,959,149 tons of refuse (Bucks County) [19]
Activity Days = 7 days ≈ 1 year/365 days

$$Emissions = \left| \frac{13.6\,tons\,VOC \big/ 1{,}000{,}000\,tons\,refuse}{year} \right| (2.6)(20{,}959{,}149\,tons\ of\ refuse)\left(\frac{1\,year}{365\,days}\right)$$

$$Emissions = 2.0305\,tonsVOC\,/\,day$$

Machinery and Equipment

The VOC emissions of from this source category result from the evaporation of the solvent used in the coating process in manufacturing facilities such as engines, turbines, farm and garden equipment, computers, and office machinery. There were no point sources. The emissions for each county were calculated using an employee emission factor and employee data from SIC code 35*xx* obtained from the *Pennsylvania Industrial Directory*. Each county's emissions were estimated per the following sample calculation.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Employees)(ton\ conversion)(Activity\ Days)\left(\frac{SAF}{POS}\right)$$

where: *Emission Factor = 77 lbsVOC /employee/year* [1]
Employees = 7,950 employees (Allegheny County) [6]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]

$$Emissions = \left| \frac{77\,lbsVOC \big/ Employee}{year} \right| (7{,}950\,Employees)\left(\frac{1\,ton}{2000\,lbs}\right)\left[\left(\frac{1\,year}{52\,weeks}\right)\left(\frac{1\,week}{6\,days}\right)\right]\left(\frac{0.25}{0.25}\right)$$

$$Emissions = 0.9810\,tonsVOC\,/\,day$$

Marine Coating

This source category includes ship and boat building and repairing. There were no point source emissions. The emissions were calculated using an employee emission factor and employee data from SIC code 373*x* obtained from the *Pennsylvania Industrial Directory*. Each county's emissions were estimated per the following sample calculation.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Employees)(ton\ conversion)\left[Activity\ Days\right]\left(\frac{SAF}{POS}\right)$$

where: *Emission Factor = 308 lbsVOC /employee/year* [1]
Employees = 37 employees (Allegheny County) [6]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]

$$Emissions = \left|\frac{308\,lbsVOC \big/ Employee}{year}\right|\left(37\,Employees\right)\left(\frac{1\,ton}{2000\,lbs}\right)\left[\left(\frac{1year}{52weeks}\right)\left(\frac{1week}{6days}\right)\right]\left(\frac{0.25}{0.25}\right)$$

$$Emissions = 0.0183\,tonsVOC / day$$

Metal Cans

This source category includes the manufacturing of metal cans, barrels, drums, kegs, and pails. The emissions from point sources, where present, were subtracted from the emissions of the corresponding county. The emissions for each county were calculated per the calculation below using an employee emission factor and employee data from SIC code 341*x* obtained from the *Pennsylvania Industrial Directory*.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Employees)(ton\ conversion)\left[Activity\ Days\right]\left(\frac{SAF}{POS}\right) - Point\ Sources$$

where: *Emission Factor = 6,029 lbsVOC /employee/year* [1]
Employees = 200 employees (Berks County) [6]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]
Point Sources = 0.2090 tonsVOC/day (Berks County) [9]

$$Emissions = \left| \frac{6{,}029\, lbsVOC \big/ Employee}{year} \right| (200\, Employees) \left(\frac{1\, ton}{2000\, lbs} \right) \left[\left(\frac{1 year}{52 weeks} \right) \left(\frac{1 week}{6 days} \right) \right] \left(\frac{0.25}{0.25} \right)$$

$$- \frac{0.2090\, tonsVOC}{day}$$

$$Emissions = 1.7234\, tonsVOC / day$$

Metal Furniture and Fixtures

This source category includes the manufacturing metal household and office furniture such as beds, cabinets, desks, bookcases, and chairs. The emissions from point sources, where present, were subtracted from the emissions of the corresponding county. The emissions for each county were calculated per the sample calculation below using an employee emission factor and employee data from SIC codes 2514 and 2522 obtained from the *Pennsylvania Industrial Directory*.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Employees)(ton\ conversion)[Activity\ Days] \left| \frac{SAF}{POS} \right| - Point\ Sources$$

where: Emission Factor = 1,597 lbsVOC /employee/year [1]
Employees = 605 employees (Chester County) [6]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]
Point Sources = 0.1060 tonsVOC/day (Chester County) [9]

$$Emissions = \left| \frac{1{,}597\, lbsVOC \big/ Employee}{year} \right| (605\, Employees) \left(\frac{1\, ton}{2000\, lbs} \right) \left[\left(\frac{1 year}{52 weeks} \right) \left(\frac{1 week}{6 days} \right) \right] \left(\frac{0.25}{0.25} \right)$$

$$- \frac{0.1060\, tonsVOC}{day}$$

$$Emissions = 1.4424\, tonsVOC / day$$

Miscellaneous Finished Metal

This source category includes facilities which enamel, lacquer, and/or varnish metals. The emissions from point sources, where present, were subtracted from the emissions of the corresponding county. The emissions for each county were calculated per the sample calculation below using an employee emission factor and employee data from SIC code 3479 obtained from the *Pennsylvania Industrial Directory*.

SAMPLE CALCULATIONS:

$$Emissions = (Emission\ Factor)(Employees)(ton\ conversion)[Activity\ Days]\left(\frac{SAF}{POS}\right) - Point\ Sources$$

where: Emission Factor = 2,877 lbsVOC /employee/year [1]
Employees = 99 employees (Westmoreland County) [6]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]
Point Sources = 0.1765 tonsVOC/day (Westmoreland County) [9]

$$Emissions = \left|\frac{2{,}877\ lbsVOC \big/ Employee}{year}\right|(99\ Employees)\left(\frac{1\ ton}{2000\ lbs}\right)\left[\left(\frac{1 year}{52 weeks}\right)\left(\frac{1 week}{6 days}\right)\right]\left(\frac{0.25}{0.25}\right)$$

$$-\frac{0.1765\ tonsVOC}{day}$$

$$Emissions = 0.2799\ tonsVOC / day$$

Miscellaneous Manufacturing

This source category includes establishments primarily engaged in manufacturing products not classified in any other group such as jewelry, silverware, musical instruments, dolls, toys, games, pens, pencils, buttons, brooms, and caskets. There are no point source emissions. The emissions for each county were calculated per the sample calculation below using a capita emission factor and U.S. Census Bureau population data.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Population)(ton\ conversion)(Activity\ Days)\left(\frac{SAF}{POS}\right)$$

where: Emission Factor = 0.6 lbs VOC/capita/year [1]
Population = 321,309 (Luzerne County) [2]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]

$$Emissions = \left|\frac{0.6\ lbsVOC \big/ person}{year}\right|(321{,}309\ persons)\left(\frac{1\ ton}{2000\ lbs}\right)\left[\left(\frac{1\ year}{52\ weeks}\right)\left(\frac{1\ week}{6\ days}\right)\right]\left(\frac{0.25}{0.25}\right)$$

$$Emissions = 0.3090\ tonsVOC/day$$

Motor Vehicles

This source category includes the finishing of new vehicles such as cars, trucks, emergency vehicles, buses, and trailers. The emissions from point sources, where present, were subtracted from the emissions of the corresponding county. The emissions for each county were calculated using an employee emission factor and employee data from SIC codes 3711, 3713, and 3715 obtained from the *Pennsylvania Industrial Directory*. Each county's emissions were estimated per the following sample calculation.

SAMPLE CALCULATIONS:

$$Emissions = (Emission\ Factor)(Employees)(ton\ conversion)\left[Activity\ Days\right]\left(\frac{SAF}{POS}\right) - Point\ Sources$$

where: *Emission Factor = 793.9 lbsVOC /employee/year* [1]
Employees = 300 employees (Franklin County) [6]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]
Point Sources = 0.1028 tonsVOC/day (Franklin County) [9]

$$Emissions = \left|\frac{793.9\ lbsVOC/Employee}{year}\right|(300\ Employees)\left(\frac{1\ ton}{2000\ lbs}\right)\left[\left(\frac{1 year}{52 weeks}\right)\left(\frac{1 week}{6 days}\right)\right]\left(\frac{0.25}{0.25}\right)$$

$$-\frac{0.1028\ tonsVOC}{day}$$

$$Emissions = 0.2789\ tonsVOC / day$$

Other Special Purpose Coating

The emissions for this category were estimated using a capita emission factor and U.S. Census Bureau population data. The emissions from point sources, where present, were subtracted from the emissions of the corresponding county. Each county's emissions were calculated per the following sample calculation.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Population)(ton\ conversion)\left[Activity\ Days\right]\left(\frac{SAF}{POS}\right) - Point\ Souces$$

where: *Emission Factor = 0.8 lbs VOC/capita/year* [1]
Population = 578,715 (Bucks County) [2]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]
Point Sources = 0.3653 tonsVOC/day (Bucks County) [9]

$$Emissions = \left| \frac{0.8\,lbs\,VOC \big/ person}{year} \right| (578{,}715\ persons) \left(\frac{1\,ton}{2000\,lbs} \right) \left[\left(\frac{1\,year}{52\,weeks} \right) \left(\frac{1\,week}{6\,activity\ days} \right) \right] \left(\frac{0.25}{0.25} \right)$$

$$-0.3653\,tons\,VOC / day$$

$$Emissions = 0.3766\,tons\,VOC / day$$

Pesticide Application

Pesticides are used to kill or retard the growth of insects, rodents, fungi, weeds, or microorganisms and contains petroleum solvents and synthetic organic ingredients. The bulk of pesticide application is associated with agriculture and, therefore, occurs in rural areas. There were no point source emissions. The emissions for each county were estimated using an emission factor based on the number of harvested acres, which was obtained from the U.S. Census Bureau.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Harvested Acres)(ton\ conversion)[Activity\ Days] \left| \frac{SAF}{POS} \right|$$

where: *Emission Factor = 3.5 lbsVOC /harvested acre/year* [1]
Harvested Acres = 114,158 harvested acres (Chester County) [23]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.33 [3]
Peak Ozone Season = 0.25 years (3 months) [3]

$$Emissions = \left| \frac{3.5\,lbs\,VOC \big/ Harvested\ Acre}{year} \right| (114{,}158\ Harvested\ Acres) \left(\frac{1\,ton}{2000\,lbs} \right) \left[\left(\frac{1\,year}{52\,weeks} \right) \left(\frac{1\,week}{6\,days} \right) \right] \left(\frac{0.33}{0.25} \right)$$

$$Emissions = 0.8452\,tons\,VOC / day$$

Public Owned Treatment Works

Public Owned Treatment Works (POTWs) are typically municipally owned wastewater treatment plants. A wide variety of sources discharge into POTWs, including industrial facilities that contribute the bulk of the VOC emissions from this source category. The typical ozone season day emission were calculated by using an EPA emission factor based on total flow through POTWs and adjusted for industrial only discharges. The point sources, where present, were subtracted from the emissions of the corresponding county. Each county's emissions were calculated per the following sample calculation.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Flow)(Industrial\ Discharge\ Adjustment)(tonconversion)(ActivityDays)$$

$$\left(\frac{SAF}{POS}\right) - Point\ Sources$$

where: *Emission Factor = 0.00011lbsVOC /gallon flow/year* [1]
Flow = 91,623.71 million gallons (Allegheny County) [24]
Industrial Discharge Adjustment = 16% [1]
Activity Days = 7 days ≈ 1 year/365 days [3]
Seasonal Activity Factor = 0.35 [3]
Peak Ozone Season = 0.25 years (3 months) [3]
Point Sources = 0.1240 tonsVOC/day [9]

$$Emissions = \left|\frac{0.00011\,lbsVOC \big/ gallon}{year}\right|(9.162371E10\ \ gallons)(16\%)\left(\frac{1\,ton}{2000\,lbs}\right)\left(\frac{1\,year}{365\,days}\right)$$

$$\left(\frac{0.35}{0.25}\right) - \frac{0.1240\,tonsVOC}{day}$$

$$Emissions = 2.9686\,tonsVOC\,/\,day$$

Railroad Solvents

This source category includes the finishing of rail cars or locomotives for freight or passenger service. This does not include mining cars, and railroad car or locomotive repair establishments. There were no point source emissions. The emissions for each county were calculated per the sample calculation below using an employee emission factor and employee data from SIC code 374*x* obtained from the *Pennsylvania Industrial Directory*.

SAMPLE CALCULATION:

$$Emissions = (Emission\,Factor)(Employees)(ton\,conversion)(Activity\,Days)$$

where: *Emission Factor = 424 lbsVOC /employee/year* [8]
Employees = 1,860 employees (Allegheny County) [6]
Activity Days = 7 days ≈ 1 year/365 days [3]

$$Emissions = \left|\frac{424\,lbsVOC \big/ Employee}{year}\right|(1{,}860\,Employees)\left(\frac{1\,ton}{2000\,lbs}\right)\left(\frac{1year}{365days}\right)$$

$$Emissions = 1.0803\,tonsVOC\,/\,day$$

Traffic Line Painting

Traffic paints are used to mark pavement in applications such as dividing lines for traffic lanes, parking space markings, crosswalks, and arrows. The markings are usually applied by state or local highway maintenance crews. Volatile organic compound emissions result from the evaporation of organic solvents during and shortly after application of the marking paint. There were no point source emissions. Each county's emissions were calculation per the sample calculation below using a capita emission factor and U.S. Census Bureau population data.

SAMPLE CALCULATION:

$$Emissions = (Emission\ Factor)(Population)(ton\ conversion)[Activity\ Days]\left(\frac{SAF}{POS}\right)$$

where: *Emission Factor = 0.5 lbs VOC/capita/year* [1]
Population = 578,715 (Bucks County) [2]
Activity Days = 5 days ≈ (1 year/52 weeks)(1 week/5 days) [25]
Seasonal Activity Factor = 0.33 [25]
Peak Ozone Season = 0.25 years (3 months) [25]

$$Emissions = \left|\frac{0.5\ lbs\,VOC/person}{year}\right|(578{,}715\ persons)\left(\frac{1\,ton}{2000\,lbs}\right)\left[\left(\frac{1\,year}{52\,weeks}\right)\left(\frac{1\,week}{5\,activity\ days}\right)\right]\left(\frac{0.33}{0.25}\right)$$

$$Emissions = 0.7345\ tons\,VOC/day$$

Wood Furniture Manufacturing

This source category includes establishments engaged in the manufacture of wood home or office furniture. VOC emissions result from the evaporation of solvents used in the finish coats and cleanup procedures. The emissions from point sources, where present, were subtracted from the emissions of the corresponding county. Each county's emissions were calculated per the sample calculation below using an employee emission factor. The number of employees in SIC codes 2511, 2517, 2521, 2541 was obtained from the *Pennsylvania Industrial Directory*.

SAMPLE CALCULATIONS:

$$Emissions = (Emission\ Factor)(Employees)(ton\ conversion)[Activity\ Days]\left(\frac{SAF}{POS}\right) - Point\ Sources$$

where: *Emission Factor = 1311 lbsVOC /employee/year* [8]
Employees = 589 employees (Lancaster County) [6]
Activity Days = 6 days ≈ (1 year/52 weeks)(1 week/6 days) [3]
Seasonal Activity Factor = 0.25 [3]
Peak Ozone Season = 0.25 years (3 months) [3]

Point Sources = 0.0792 tonsVOC/day (Lancaster County) [9]

$$Emissions = \left| \frac{1311\, lbsVOC \big/ Employee}{year} \right| (589\, Employees) \left(\frac{1\, ton}{2000\, lbs} \right) \left[\left(\frac{1 year}{52 weeks} \right) \left(\frac{1 week}{6 days} \right) \right]$$

$$\left(\frac{0.25}{0.25} \right) - \frac{0.0792\, tonsVOC}{day}$$

$$Emissions = 1.1583\, tonsVOC / day$$

Table H-1: Pennsylvania Emissions by County in pounds/year

	Adams	Allegheny	Armstrong	Beaver	Bedford
1,3-BUTADIENE	10.40000003	0	10.40000003	0.3402	31.19999915
ACETALDEHYDE					
ACROLEIN	0				
ACRYLONITRILE	0				
ANTIMONY					
ARSENIC	0.17424		3997.498752	4654.72311	0.0112409
BENZENE	73460.25202	426227.6033	46313.09333	82600.52891	63704.41845
BERYLLIUM			571.0628	664.89374	
CADMIUM	0.0191664		0.006506678	85.97295826	0.001236499
CHLOROFORM	0			724172.82	
CHROMIUM	0.0243936		0.082099027	29011.41058	0.001573726
CHRYSENE					
COPPER	1.9990055		0.47828639	2.2037832	0.05265405
DIBUTYL PHTH	11002.40032	168547.7979	9602.399742	24206.20032	6401.399987
DICHLOROMETHANE	0				
ETHYLBENZENE	24804.79927	335589.7978	19271.0003	50368.80016	24644.0009
FLURANTHENE					
FORMALDEHYDE	3281.438657	55600.00101	2808.319134	8251.64841	1864.221562
HEXCLBENZENE	0				
LEAD	0		0	0	0
MANGANESE	0.2965905		11.1216171	28.1376	0.00207
MERCURY	0.0052272		0.001774549	0.014715888	0.000337227
METHYLENE CL	6723.999977	192535.9955	13447.99995	27552.00005	12218.00041
NAPHTHALENE	7744.128049	127491.2012	6515.008693	16780.1336	6661.433747
NICKEL	2.952612		4.50777041	18725.80324	0.12009945
PERC	12169.99968	351689.9977	24285.99936	50246.00064	22124.00005
PHENANTHRENE				0.0816	
PHENOL	0		3.69089	9.3648	
STYRENE	802.3999748	10339.39999	629.0000102	624873.81	904.3999803
TCE,111	36555.59921	1046738.403	73111.19843	149788.8031	66424.20197
TOLUENE	508271.8719	7767495.58	399083.7801	1125137.822	338045.401
TRICHLORETHY	34587.60071	990386.4136	69175.20142	175744.7925	62848.20175
XYLENE,M					
XYLENE,O	76843.20012	1126717.569	59140.60122	156190.8006	59371.59961
XYLENES ISO	128316.4004	1423612.987	94220.20103	176146.1986	94176.4022

Table H-1: Pennsylvania Emissions by County in pounds/year

	Berks	Blair	Bradford	Bucks	Butler
1,3-BUTADIENE	42121.08	176.7999977	0	0	0
ACETALDEHYDE	2556.110935			0.0144392	
ACROLEIN	958.536				
ACRYLONITRILE	0	46478			
ANTIMONY					
ARSENIC	3.99064356	0.07424438	0.33257368	0.59652856	0.9323804
BENZENE	218184.7515	112301.5929	80728.64368	232701.0437	89434.61868
BERYLLIUM	4.22247				577.106
CADMIUM	0.632972792	0.008166882	0.036583105	0.065618142	0.102561844
CHLOROFORM	0.7483744	3859.6136			
CHROMIUM	749.9509249	6083.160394	0.046560315	0.083513998	36805.33437
CHRYSENE					2165301.6
COPPER	334.692747	3.32107371	1.88055516	41.34760917	6.4074318
DIBUTYL PHTH	45817.39998	17019.7998	8002.000103	75341.80163	21829.20015
DICHLOROMETHANE	2522593.627	41.5012216	318.790815	149.904	16945.476
ETHYLBENZENE	117557.855	33975.3997	17003.4003	168712.4033	46018.6008
FLURANTHENE	0.7545944			0.0000048	
FORMALDEHYDE	6006228.219	6505.159404	2476.715128	30463.69155	6849.646582
HEXCLBENZENE	0				
LEAD	324	0	0	0	0
MANGANESE	171391.5352			616.3890568	32895.042
MERCURY	34984.56607	0.002227331	0.00997721	0.017895857	0.027971412
METHYLENE CL	115374.0005	21565.99998	15005.99957	108486.0001	41164.00146
NAPHTHALENE	38017.7563	13583.01806	5553.725699	70894.08118	18925.53442
NICKEL	395.7132774	0.77956599	8.68353644	28.5826238	23635.23999
PERC	209701.9924	39097.99978	27223.99964	200490.0009	74379.99762
PHENANTHRENE	95.70932				
PHENOL	5316.0137				
STYRENE	25927.7599	1043.799993	540.6000002	16148.80018	1512.999996
TCE,111	627240.6006	117328.4019	81581.39801	589793.396	223791.5955
TOLUENE	3507760.095	816855.974	396528.0783	4003958.636	961275.6655
TRICHLORETHY	768821.9952	170950.903	77189.39972	572772.7514	211801.2066
XYLENE,M	32.9284736				
XYLENE,O	462127.2099	114632.4012	54620.40013	568459.403	139841.5993
XYLENES ISO	598404.803	180769.7976	133884.2018	874336.9977	240896.2029

Table H-1: Pennsylvania Emissions by County in pounds/year

	Cambria	Cameron	Carbon	Centre	Chester
1,3-BUTADIENE	10.40000003	83.20000023	135.1999938	10.40000003	20.80000006
ACETALDEHYDE					0.0007776
ACROLEIN					
ACRYLONITRILE					
ANTIMONY					121.5992568
ARSENIC	0.26472896		0.018291	0.06648112	54.89084844
BENZENE	61205.38122	2916.800022	25252.41974	79207.99361	229537.6396
BERYLLIUM					8.74566
CADMIUM	0.029120186		0.00201201	0.007312923	0.296350768
CHLOROFORM					173.2962
CHROMIUM	2506.262582		0.00256074	0.009307357	31567.82151
CHRYSENE					
COPPER	9123.95954		2.0765835	0.29916504	44.90915142
DIBUTYL PHTH	20605.19911	600.1999839	7601.800074	17004.1998	53328.00099
DICHLOROMETHANE			0		1.8634
ETHYLBENZENE	40895.60097	1647.999953	25822.20009	39266.19939	134048.9285
FLURANTHENE					0.00110832
FORMALDEHYDE	7088.182566	216.0000056	2226.859154	5996.875885	22559.89541
HEXCLBENZENE					
LEAD	0		0	0	0
MANGANESE	121331.4863				501.629288
MERCURY	0.007941869		6871.922149	0.001994434	0.104845181
METHYLENE CL	20007.99942	4673.999786	8937.999725	30176.0006	73307.99866
NAPHTHALENE	13595.19435	537.7999935	5962.627375	12615.39943	59749.25591
NICKEL	2304.368694		0.1920555	0.69805176	22782.62777
PERC	36383.99951	8435.99987	16131.99997	54546.0007	133399.9965
PHENANTHRENE					131.80576
PHENOL					
STYRENE	1251.199997	54.39999909	683.4000072	1308.999992	4335.84156
TCE,111	108775.1999	25410.60066	48592.20123	164054.3976	398553.512
TOLUENE	948569.8341	39249.79946	752684.9497	765944.5365	2835952.204
TRICHLORETHY	102919.1971	24042.60063	45976.2001	155222.3969	377089.2029
XYLENE,M					
XYLENE,O	138569.3991	5105.799928	104453.2002	116227.8009	416993.395
XYLENES ISO	164169.8042	7897.599936	97065.79912	163385.8004	702737.2061

Table H-1: Pennsylvania Emissions by County in pounds/year

	Clarion	Clearfield	Clinton	Columbia	Crawford
1,3-BUTADIENE	10.40000003	31.19999915	249.5999932	10.40000003	52.00000107
ACETALDEHYDE			0.01126248		
ACROLEIN					
ACRYLONITRILE					
ANTIMONY					
ARSENIC		1029.858505	0.11221	3.982713	0.0028
BENZENE	33663.06056	42517.26383	24245.96458	49090.0032	75931.21436
BERYLLIUM		147.0542		5.76594	
CADMIUM		0.005731594		0.05370243	0.000308
CHLOROFORM			3240.1665		
CHROMIUM		0.190728756		10.78251342	0.000392
CHRYSENE					
COPPER		0.2344743		1.885997	0.8077398
DIBUTYL PHTH	5401.399915	10202.60026	4801.199871	8202.200118	11403.00035
DICHLOROMETHANE			34.8405		55.386
ETHYLBENZENE	18838.2005	29662.15174	13551.12745	20006.00016	31387.99991
FLURANTHENE		0.0049133	0.0041171		
FORMALDEHYDE	1583.999991	3862.797017	2548.632691	2464.063609	3529.062454
HEXCLBENZENE					
LEAD		0	0	0	0
MANGANESE		27.5151		69.2017109	543.2299938
MERCURY		0.001563162		0.04260219	8.4E-05
METHYLENE CL	3279.999971	10496.00029	4346.000195	7953.999996	24763.99994
NAPHTHALENE	4860.399971	8747.331107	3949.132387	8714.807252	8824.408285
NICKEL		9.7188067		501.1821374	0.7633752
PERC	5930.000076	19016.00024	8065.999862	14385.99995	44747.99915
PHENANTHRENE				130.69464	
PHENOL		9.1717			
STYRENE	622.2000143	1054.000017	479.4000036	679.9999794	945.1999855
TCE,111	17832.00073	57062.40082	23697.08044	43242.59949	134631.6071
TOLUENE	351673.196	442401.9491	206393.3907	357582.1791	778057.8583
TRICHLORETHY	16871.99974	64677.95841	22355.40009	40914.60037	306183.5983
XYLENE,M					
XYLENE,O	56227.60008	76831.19891	35421.20011	56812.7996	109169.8025
XYLENES ISO	64788.60042	78723.99936	42287.2007	84531.79937	160130.3977

Table H-1: Pennsylvania Emissions by County in pounds/year

	Cumberland	Dauphin	Delaware	Elk	Erie
1,3-BUTADIENE	0	0	0	52.00000107	0
ACETALDEHYDE			0.1390464	8.3872	7.77331
ACROLEIN			0		
ACRYLONITRILE			413542		521424
ANTIMONY		10.98531	266.071119		
ARSENIC	3.10417056	57.8284451	67.66833982	108.2727649	80.38284138
BENZENE	129754.7133	144420.0266	156786.8363	20820.83542	145365.3832
BERYLLIUM	4.30776		1.95345	15.4048	10.5489
CADMIUM	0.054274762	8764.989243	74437.7416	0.048308143	0.725889552
CHLOROFORM		0.0856028	0.01320648	15106.3143	
CHROMIUM	1184.606078	62784.36395	54129.95414	0.900203092	72047.07847
CHRYSENE					
COPPER	5.03485548	10.26149555	119.0205565	2.00829223	88.05904801
DIBUTYL PHTH	26825.79908	32017.20041	71135.20086	4401.199842	36425.40168
DICHLOROMETHANE		288481.436	44714.8076	217.4491	183.37572
ETHYLBENZENE	71854.40024	81903.37685	113458.0615	10671.59974	75257.99867
FLURANTHENE		0.0856028	0.01419592		0.000024
FORMALDEHYDE	9917.292822	697584.9583	134715.0613	4761.746255	11506.751
HEXCLBENZENE			0		
LEAD	0	0	0	0	0
MANGANESE	51.81849	6.48522	416.0026703	0.03205	2401.621026
MERCURY	0.035688317	4672.464772	39624.51453	15395.13317	0.215817641
METHYLENE CL	31077.99911	34358.00171	55759.99832	27305.99976	95283.99658
NAPHTHALENE	26489.94138	26749.42919	61446.02353	3147.517526	26472.75444
NICKEL	1134.355151	41061.52528	4439.310523	15.92205717	2463.371578
PERC	57995.99907	62468.00104	100835.9994	49310.0004	172379.9979
PHENANTHRENE	97.64256		44.2782		
PHENOL			0		4580.926
STYRENE	2495.599968	2845.800072	3570.000101	285.5999898	2470.050016
TCE,111	168958.2062	186790.6214	303261.3809	148656.211	518019.5923
TOLUENE	1198751.204	1343486.238	2657024.903	355652.2723	2237967.712
TRICHLORETHY	159862.1979	176734.2072	288510.107	279913.1064	499431.5918
XYLENE,M		3.7665232	0.58108512		
XYLENE,O	195604.8016	222713.0006	368557.3957	43638.00091	283184.7991
XYLENES ISO	269679.995	256481.2018	665148.1924	63496.99916	412857.7992

Table H-1: Pennsylvania Emissions by County in pounds/year

	Fayette	Forest	Franklin	Fulton	Greene
1,3-BUTADIENE	62.39999831	10.40000003	10.40000003	0	0
ACETALDEHYDE					
ACROLEIN					
ACRYLONITRILE					
ANTIMONY					
ARSENIC	0.0523538		0.0206726		2410.198573
BENZENE	58853.95154	2736.800063	122727.7743	28108.20043	23413.73794
BERYLLIUM					344.3122
CADMIUM	0.005758918		0.055013986		0.001449008
CHLOROFORM					
CHROMIUM	0.007329532		0.050360164		0.001844192
CHRYSENE					
COPPER	0.2791843		6.9760167		0.1583576
DIBUTYL PHTH	18804.80041	600.1999839	16427.20024	1800.400011	5401.199915
DICHLOROMETHANE					0
ETHYLBENZENE	37784.60014	2712.000079	44276.00059	12776.80022	12053.40025
FLURANTHENE					
FORMALDEHYDE	6515.763235	180.0000072	5807.834856	540.0000215	1589.237031
HEXCLBENZENE					
LEAD	0		0		0
MANGANESE	0.0435922		554.60319		0.09908
MERCURY	0.001570614		0.016442178		0.000395184
METHYLENE CL	13119.99989	82.00000226	28371.99974	8036.000252	2131.999969
NAPHTHALENE	12590.55732	597.4000181	16333.6643	2817.599999	3862.839463
NICKEL	7.0371124		0.2438523		0.2521891
PERC	23940.00031	148.0000019	51924.00019	14503.99971	3848.00005
PHENANTHRENE					
PHENOL			369.18		
STYRENE	1200.199961	102.0000023	1434.799983	462.4000138	418.2000069
TCE,111	71328.00293	445.8000064	156241.6457	43688.40027	11590.80029
TOLUENE	797322.7135	29124.80019	948266.1176	185618.9961	195510.3169
TRICHLORETHY	74927.99896	421.7999876	145942.7948	41336.39908	10966.79974
XYLENE,M					
XYLENE,O	120715.8015	6084.40006	137435.3977	31893.59962	32753.59982
XYLENES ISO	146058.3991	4171.600029	266792.2017	42103.40095	44096.20011

Table H-1: Pennsylvania Emissions by County in pounds/year

	Huntingdon	Indiana	Jefferson	Junitata	Lackawanna
1,3-BUTADIENE	10.40000003	0	31.19999915	0	114.3999994
ACETALDEHYDE		0.219593			
ACROLEIN		0.019963			
ACRYLONITRILE					
ANTIMONY					
ARSENIC	7.5182656	13662.14363	0.0262006		1699.839022
BENZENE	40137.75944	56063.71394	34304.07151	26208.39894	80554.51489
BERYLLIUM		1951.721			2.63685
CADMIUM	0.005835016	0.010629498	0.002882066		116.4708014
CHLOROFORM					
CHROMIUM	0.007426384	0.013528452	0.175300084		165.0416691
CHRYSENE					
COPPER	0.2609852	0.4927731	0.1179027	0.12437	1.50706989
DIBUTYL PHTH	5801.399943	11602.99989	6001.399958	2800.599965	27607.19914
DICHLOROMETHANE					
ETHYLBENZENE	13534.39987	28177.39977	17701.34043	8049.799908	57167.41452
FLURANTHENE			0.0625816		0.000486
FORMALDEHYDE	1711.958971	3432.690105	1803.3168	816.3730947	9333.380488
HEXCLBENZENE					
LEAD	0	0	0		0
MANGANESE	0.02228	0.05793	25.7448	0.12437	31.6422
MERCURY	0.001591368	0.002898954	0.000786018		271.6685917
METHYLENE CL	6067.99984	10578.00007	10987.99992	1230.000019	39195.99915
NAPHTHALENE	4382.159216	8416.411839	4959.933256	2260.600012	20588.50913
NICKEL	0.5792588	9.7133446	27.29013648	0.12437	13571.44613
PERC	10971.99966	19217.99905	19846.00073	2220.000029	73844.0033
PHENANTHRENE					59.7686
PHENOL			8.5816		
STYRENE	476.0000056	873.8000286	581.4000054	261.8000042	1907.399961
TCE,111	32989.20059	57508.2016	59737.20169	6686.999798	213092.4072
TOLUENE	221385.4147	633063.7957	351906.5666	161438.4218	1091614.533
TRICHLORETHY	162894.4196	54412.20093	56521.19827	6327.000141	247096.4071
XYLENE,M					
XYLENE,O	35900.79874	93462.80194	53667.79974	24673.39978	168756.3986
XYLENES ISO	65472.39943	124119.2013	68612.00013	43057.79898	192973.4023

Table H-1: Pennsylvania Emissions by County in pounds/year

	Lancaster	Lawrence	Lebanon	Lehigh	Luzerne
1,3-BUTADIENE	63.73520003	0	10.40000003	0	156.0000032
ACETALDEHYDE				0.19576	
ACROLEIN			0		
ACRYLONITRILE			0		978792
ANTIMONY					
ARSENIC	27.0943096	445.185904	0.031441	1.6761524	3.0605698
BENZENE	293266.6587	50732.52199	71214.61411	150883.8452	121177.1852
BERYLLIUM	65.75859	1260.9823		1.8051	4.45179
CADMIUM	0.378837256	0.01207844	0.00345851	0.064036764	0.039876678
CHLOROFORM			0	0.0646	
CHROMIUM	30.44339254	13730.0453	0.07142774	428.6403853	128114.923
CHRYSENE					
COPPER	191.2596416	1077.342118	0.1414845	8.9974842	1.9860743
DIBUTYL PHTH	58664.40091	12403.19994	15203.60015	38660.60137	41599.7992
DICHLOROMETHANE	7361.76	0	0	217790.4	0
ETHYLBENZENE	132198.8102	27936.61846	32937.79992	96019.64735	90454.59987
FLURANTHENE	0.00037213	0.00059		0.0649954	
FORMALDEHYDE	23549.04367	3653.568583	6279.790292	531239.1941	15349.32854
HEXCLBENZENE			0		
LEAD	0	0	0	0	0
MANGANESE	3747.00599	202261.6	2019.6683	101899.2201	53.674207
MERCURY	0.169146888	192.7232941	0.00094323	0.026216572	0.032459894
METHYLENE CL	102335.9985	13694.00024	16563.99918	54776.00098	57236.00006
NAPHTHALENE	52982.25845	8585.8639	10496.24568	36743.31119	29470.03418
NICKEL	1309.570511	8276.152942	3.6814305	161.8965802	410.1921176
PERC	185263.9948	24795.9996	30087.99991	99091.99841	103636.0009
PHENANTHRENE	284.0802			40.9156	100.90724
PHENOL	1299.2		3.3513		
STYRENE	3931.624422	846.6000077	1037.00002	2947.799891	2838.999897
TCE,111	556358.3984	74448.60077	90051.5976	297794.4031	311168.396
TOLUENE	3561455.204	662958.2986	727136.0535	2256157.73	2182845.826
TRICHLORETHY	526406.3721	3569100.598	85203.59802	281762.3901	294416.4124
XYLENE,M				2.8424	
XYLENE,O	485288.5957	95963.60177	106927.1995	324046.9961	295550.9979
XYLENES ISO	770887.7935	120765.2002	149331.7992	457882.8048	299807.6018

Table H-1: Pennsylvania Emissions by County in pounds/year

	Lycoming	McKean	Mercer	Mifflin	Monroe
1,3-BUTADIENE	0	0	10.40000003	0	353.5999954
ACETALDEHYDE			0.9678824		0.00101664
ACROLEIN					
ACRYLONITRILE					
ANTIMONY					
ARSENIC	0.0533604	34.48487548	0.1991092	0.22613338	3.821238
BENZENE	76277.05003	22035.12748	83235.17979	35584.7621	44808.86607
BERYLLIUM		4.92			5.6232
CADMIUM	0.005869644	0.004936303	0.021902012	0.024874672	0.19042618
CHLOROFORM		199.752			
CHROMIUM	0.007470456	0.006282567	12179.34788	7158.394979	10.63725432
CHRYSENE					
COPPER	0.581319	2.74729446	0.8959914	1.01760021	20.1759238
DIBUTYL PHTH	15403.99969	6201.599972	15803.79971	6001.599958	15403.19969
DICHLOROMETHANE	673.78		0	0	0
ETHYLBENZENE	43999.59992	12837.7999	49654.40082	12097.59998	40673.00067
FLURANTHENE					
FORMALDEHYDE	5522.954915	2023.651858	4896.317572	1860.80004	5539.165829
HEXCLBENZENE					
LEAD	0	0	0	0	0
MANGANESE	111.4335642	1.24066	1277.12925		242.8921
MERCURY	0.001600812	0.001346264	0.005973276	0.006784001	0.08315214
METHYLENE CL	37965.9996	13201.99966	35916.00037	14350.00038	10413.99956
NAPHTHALENE	11619.97128	4090.783011	11890.71841	4053.678336	14810.67211
NICKEL	0.8459031	0.47792254	7849.590647	4614.7219	488.104599
PERC	69174.00209	23865.99911	64935.9975	25983.99962	18811.99953
PHENANTHRENE					127.4592
PHENOL		0.00673			1014.79
STYRENE	1196.799993	384.1999937	1251.199997	380.7999957	1424.600049
TCE,111	206405.3955	71773.80371	195260.4065	78014.99939	56616.60004
TOLUENE	1288715.647	325012.8881	1597368.657	286555.638	627041.7889
TRICHLORETHY	195293.396	82956.71767	308981.5178	73815.00244	53568.5997
XYLENE,M					
XYLENE,O	173737.9985	45161.80012	211732.4034	39627.80032	108502.8031
XYLENES ISO	211451.5996	57720.00028	247906.7961	71460.79964	97479.00025

Table H-1: Pennsylvania Emissions by County in pounds/year

	Montgomery	Montour	Northamption	Northumberland	Perry
1,3-BUTADIENE	14155.27	0	0	10.40000003	0
ACETALDEHYDE	0.05137468				
ACROLEIN	0.0026106				
ACRYLONITRILE	44009.6				
ANTIMONY			353.374384		
ARSENIC	301.2215423	1972.29406	709.6294561	10.2384629	
BENZENE	315899.9766	18725.41086	108150.8463	63087.43939	37689.00067
BERYLLIUM	9.55219	283.46834	1284.0389	1.015	
CADMIUM	19.96032465	0.016890578	0.572799555	0.019163419	
CHLOROFORM	0.06836	0.0893942		130.914	
CHROMIUM	5803.75191	3.548957972	1611.579549	0.024389806	
CHRYSENE			0		
COPPER	17.44573572	0.1732491	135.618514	0.79532925	0.09226
DIBUTYL PHTH	92199.19714	2200.599921	33409.00004	12402.99994	5601.399929
DICHLOROMETHANE	2191684.824	301258.454	887.41971	5229.31168	
ETHYLBENZENE	224691.8367	7891.830225	61420.30836	26744.59914	14532.00011
FLURANTHENE	0.08573502	0.0893942	0.00138002		
FORMALDEHYDE	584882.4281	715840.0374	14907.50358	4537.155384	1644.276833
HEXCLBENZENE					
LEAD	0	0	0	0	
MANGANESE	872.5008913	22.78008	368472.1492		0.09226
MERCURY	2348.50015	0.013810594	0.14409544	0.005226387	
METHYLENE CL	168755.9967	3608.00004	52234.00116	12710.00004	1148.000002
NAPHTHALENE	97153.96845	2781.998459	21633.7438	8389.526253	4476.79985
NICKEL	3037.845238	164.9270479	5637.749126	1.82923545	0.09226
PERC	306714.0149	6528.000085	95446.00099	23034.00053	2072.000027
PHENANTHRENE	198.12684	43.02904			
PHENOL					
STYRENE	18448.95731	238.0000018	1876.800009	812.5999984	509.9999851
TCE,111	922608.6209	19615.20004	283987.9443	69098.99902	6241.19997
TOLUENE	5400770.657	189286.9625	1478599.619	2772048.437	226877.6588
TRICHLORETHY	1364037.496	18559.20029	268686.615	65378.9978	5905.200005
XYLENE,M	3.00784	3.9333448			
XYLENE,O	759887.7906	27271.80004	209356.5946	91511.80024	38498.60096
XYLENES ISO	1165426.195	37306.4001	278766.0034	131950.5994	61330.99961

Table H-1: Pennsylvania Emissions by County in pounds/year

	Philadelphia	Pike	Potter	Schuylkill	Snyder
1,3-BUTADIENE	0	31.19999915	0	52.00000107	0
ACETALDEHYDE				0.0169536	
ACROLEIN					
ACRYLONITRILE					
ANTIMONY					
ARSENIC			0.1853316	0.67195238	464.03667
BENZENE	360449.4021	13077.80021	18825.54615	75846.47027	36847.48065
BERYLLIUM				0.96678	196.81782
CADMIUM			0.020386476	0.009462762	7.17E-05
CHLOROFORM					
CHROMIUM			0.025946424	1.808496533	17.3734106
CHRYSENE					
COPPER			0.8339922	5.14926181	411.1687459
DIBUTYL PHTH	192078.1987	4800.999871	2200.399921	19804.99905	4801.199871
DICHLOROMETHANE			0		
ETHYLBENZENE	255201.6033	14002.80004	5513.800114	48627.60092	13135.25722
FLURANTHENE					0.0018486
FORMALDEHYDE	66222.00045	1440.000057	705.4993276	7612.039286	1430.555813
HEXCLBENZENE					
LEAD			0	0	0
MANGANESE				11.6408991	0.0983379
MERCURY			0.005559948	0.007268171	5.65E-05
METHYLENE CL	99384.00269	1722.000003	3033.99992	22139.99939	5576.000214
NAPHTHALENE	105164.8001	4174.999976	1674.755967	14585.9632	3660.058535
NICKEL			1.9459818	84.23379639	548.8739866
PERC	182672.0071	3108.00004	5475.999832	40393.99909	10074.00013
PHENANTHRENE				21.91368	0.17272
PHENOL					
STYRENE	6222.000003	509.9999851	186.9999999	6255.010527	387.5999935
TCE,111	540309.5703	9361.800194	16494.6003	120365.9973	30314.39972
TOLUENE	8443857.312	180087.1965	103139.1509	1216627.471	331085.9717
TRICHLORETHY	511221.5881	8857.79953	15606.59981	113886.0016	28682.39975
XYLENE,M					
XYLENE,O	1118154.598	34141.80084	15759.20005	174289.7994	46761.80054
XYLENES ISO	1369846.221	26300.60005	30894.19949	197801.2028	71947.00036

Table H-1: Pennsylvania Emissions by County in pounds/year

	Somerset	Sullivan	Susquehanna	Tioga	Union
1,3-BUTADIENE	0	0	41.60000011	135.1999938	0
ACETALDEHYDE					
ACROLEIN					
ACRYLONITRILE					
ANTIMONY					
ARSENIC	0.0475476			0.0832566	2.7386056
BENZENE	74588.53251	7741.000116	42066.59895	53828.00216	35020.18827
BERYLLIUM					3.8217
CADMIUM	0.062890236			2.166338226	0.046466616
CHLOROFORM					
CHROMIUM	147.3729507			1.953117924	7.160552784
CHRYSENE					
COPPER	12283.94306		0.0203108	280.8080547	0.9677472
DIBUTYL PHTH	10402.3998	600.3999839	5401.199915	5201.3999	5201.3999
DICHLOROMETHANE					0
ETHYLBENZENE	31825.20086	2505.200047	17372.00003	13154.00066	19905.6002
FLURANTHENE				0.0000079	
FORMALDEHYDE	3893.930237	228.0000001	1584.060924	1591.226405	1608.980513
HEXCLBENZENE					
LEAD	0			0	0
MANGANESE	163707.8019		0.0203108	5037.0378	45.8604
MERCURY	0.018724428			0.649651698	0.031202168
METHYLENE CL	14760.00023	737.9999757	2706.00009	8118.000031	7708.000183
NAPHTHALENE	8896.142629	698.1999967	4714.999994	4082.850822	5800.278836
NICKEL	1019.45715		0.0203108	0.8741943	333.2174588
PERC	27243.99937	1332.000017	4889.999825	14674.00043	13933.9997
PHENANTHRENE					86.6252
PHENOL	403.62			15100.26	
STYRENE	1081.2	88.40000303	598.4000249	455.5999881	469.2000097
TCE,111	80244.0033	4012.199879	14711.40003	44134.20105	41905.20096
TOLUENE	571816.3412	39737.9995	289243.6958	235960.4214	679504.232
TRICHLORETHY	75974.6176	3796.200037	13919.40022	41758.2016	39649.20044
XYLENE,M					
XYLENE,O	90549.59893	6582.200114	47886.20006	36110.59996	89799.40178
XYLENES ISO	131498.6009	11942.99984	69456.20098	82273.20078	103462.7996

Table H-1: Pennsylvania Emissions by County in pounds/year

	Venango	Warren	Washington	Wayne	Westmoreland
1,3-BUTADIENE	20.80000006	0	0	0	93.59999746
ACETALDEHYDE					
ACROLEIN					
ACRYLONITRILE					53206.6
ANTIMONY					
ARSENIC	9.7605382	118.7292405	1057.572953	1.74346	0.91786352
BENZENE	31826.60683	30186.22002	104971.3783	30900.60011	158580.0733
BERYLLIUM	1.3767	16.9353	151.04359	2.61519	
CADMIUM	0.013600202	0.020035457	0.029460581	0.0174346	0.177518987
CHLOROFORM					
CHROMIUM	2250.366869	0.025499673	2134.043055	4.881688	11660.45528
CHRYSENE					
COPPER	1.3451415	10.29309124	1.20520557		14.08240584
DIBUTYL PHTH	7601.800074	5801.399943	26806.79908	5801.199944	48800.80163
DICHLOROMETHANE	291.461	0			0
ETHYLBENZENE	19579.20224	16923.20022	65931.39828	13845.20033	109970.1971
FLURANTHENE	0.0000652				
FORMALDEHYDE	2268.453108	1756.658577	9072.433562	1679.999948	17860.65
HEXCLBENZENE					
LEAD	0	0	0	0	0
MANGANESE		23966.46719	160164.0556	31.38228	7740.23034
MERCURY	0.003709146	0.005464216	0.008034704	0.0174346	0.050502106
METHYLENE CL	13366.00018	11562.00027	34439.99863	2706.00009	67732.00226
NAPHTHALENE	5754.930733	4329.646653	20610.06909	5365.448958	33581.15319
NICKEL	1451.265701	2.66121906	1378.856146	226.6498	3149.941232
PERC	24164.00055	21034.00002	62899.99982	4891.999825	123624.0011
PHENANTHRENE				59.27764	
PHENOL			1.054		535.878
STYRENE	632.3999783	455.5999881	2227.000114	455.5999881	3573.39995
TCE,111	72665.39764	62857.79953	187235.9924	14711.40003	378550.8044
TOLUENE	406387.5539	496284.4849	1195954.463	265631.1997	2251544.524
TRICHLORETHY	68753.40271	71192.35866	177156.0059	13919.40022	375384.7833
XYLENE,M					
XYLENE,O	61142.79938	67454.00131	189818.2002	41607.8004	339680.0011
XYLENES ISO	70839.79944	77438.19936	223385.8012	58743.39922	364854.2063

Table H-1: Pennsylvania Emissions by County in pounds/year

	Wyoming	York	Grand Total
1,3-BUTADIENE	0	0	58389.22537
ACETALDEHYDE		0.0014972	2573.891048
ACROLEIN		0.0014972	958.5600708
ACRYLONITRILE		0	2057452.2
ANTIMONY			752.0300698
ARSENIC	0.66102	1907.095567	34918.04619
BENZENE	20105.51904	223269.3414	5930380.25
BERYLLIUM		450.1654	8055.09366
CADMIUM	0.0727122	90393.41705	173824.7209
CHLOROFORM	9782.8188	10665.2865	767332.0514
CHROMIUM	0.0925428	39.40226015	482383.7481
CHRYSENE		0	2165301.6
COPPER	3.83259	127.4950839	24401.27142
DIBUTYL PHTH	3800.800037	47827.40108	1562664.198
DICHLOROMETHANE	105.1916	180.4211972	5599201.48
ETHYLBENZENE	9120.400004	107612.0612	3418766.233
FLURANTHENE		0.0147814	1.18679811
FORMALDEHYDE	4718.013672	20897.22498	9132916.737
HEXCLBENZENE		0	0
LEAD	0	0	324
MANGANESE		10216.74809	1382806.613
MERCURY	0.0198306	48117.94744	152481.2627
METHYLENE CL	1230.000019	112503.9978	2109941.989
NAPHTHALENE	2840.868991	35859.98371	1241812.442
NICKEL	6.94071	25.56280465	171321.2825
PERC	2220.000029	204667.9998	3842649.999
PHENANTHRENE			1522.48804
PHENOL		6393.93202	35049.02074
STYRENE	319.600001	3216.401482	778783.0553
TCE,111	6897.382998	611866.9357	11489283.52
TOLUENE	142403.5287	2759751.569	82902904.99
TRICHLORETHY	6327.000141	660491.6079	15916478.53
XYLENE,M			47.05966672
XYLENE,O	24260.20066	379301.5998	11529165.56
XYLENES ISO	33492.1993	554979.0013	15814232.42

Appendix I: Wisconsin Toxic Emissions Inventory

BACKGROUND

The State of Wisconsin conducted its statewide air toxic emissions inventory for the Great Lakes Air Toxic Emissions Inventory Project for calendar year 1996. With a 1996 population of 5,161,920, Wisconsin represents approximately 5.6 percent of the total population of the overall Great Lakes region. The table below provides a brief demographic overview of Wisconsin.

Demographic Characteristics for the Wisconsin Area of the Great Lakes Regional Air Toxics Emissions Inventory

	Wisconsin
Total Population, 1996	5,161,920
Urban Population, 1996	3,212,077
Rural Population, 1996	1,679,692

Source: 1996 Population Estimates: Wisconsin Center for Health Statistics

The sources inventoried were individual point sources and area sources. Wisconsin followed the Air Toxic Emissions Inventory Protocol and the area source methodologies agreed upon by the projects Technical Steering Committee in developing its portion of the regional inventory. The Factor Information Retrieval System (FIRE 6.1) and the Reference Tables in the Regional Air Pollution Inventory Development System (RAPIDS) were also utilized in the inventory development. Combined point and area source county emissions for the state of Wisconsin are provided in the County Emissions table following this Wisconsin portion of the report document.

DATA SOURCES

Point Sources:

Point source emissions information included in the Wisconsin inventory were collected by the Bureau of Air Management of the Wisconsin Department of Natural Resources (WDNR), as part of its annual air emissions inventory process. State regulation, ch. NR 438, Wis. Adm. Code, requires detailed annual emission reports from any source with total, actual, annual emissions above a reporting threshold. The reporting threshold varies for each of the air contaminants covered by the rule. The following are the reporting thresholds (in pounds per year) for each of the pollutants inventoried for this project:

Material Code	GLC Name	NR438 Name	THRESHOLD (LB)
ACENAPHTHEN	Acenaphthene		
ACENAPHTHYL	Acenaphthylene		
ACETALDEHYDE	Acetaldehyde	Acetaldehyde	6000
ACROLEIN	Acrolein	Acrolein	91
ACRYLAMIDE	Acrylamide	Acrylamide	105

ACRYLONITRIL	Acrylonitrile	Acrylonitrile	12
ANTHRACENE	Anthracene		
ANTIMONY	Antimony	Antimony & compounds, as Sb	179
ARSENIC	Arsenic	Arsenic and inorganic compounds, as As	12
ATRAZINE	Atrazine	Atrazine	1829
BENZ(A)ANTHR	Benz(a)anthracene	Benz(a)anthracene	12
BENZ(GHI)PE	Benzo(ghi))perylene		
BENZENE	Benzene (including benzene from gasoline)	Benzene	150
BENZO(A)PYRE	Benzo(a)pyrene	Benzo(a)pyrene	12
BENZO(B)FLUO	Benzo(b)fluoranthene	Benzo(b)fluoranthene	12
BENZO(K)FLUO	Benzo(k)fluoranthene		
BERYLLIUM	Beryllium	Beryllium and beryllium compounds, as Be	12
BIS(2-CLETH)	Dichloroethyl ether (bis(2-chloroethyl) ether)	Dichloroethyl ether	6000
BUTADIENE,13	1,3-Butadiene	1,3-Butadiene	6000
CADMIUM	Cadmium	Cadmium and cadmium compounds, as Cd	12
CARBON TETRA	Carbon tetrachloride	Carbon tetrachloride	12
CHLORDANE	Chlordane	Chlordane	179
CHLOROFORM	Chloroform	Chloroform	125
CHROMIUM	Chromium	Chromium (metal)	179
CHROMIUM VI	Chromium	Chromium (VI) compounds, as Cr, water soluble	18
CHROMIUM VI	Chromium	Chromium (VI) compounds, as Cr, water insoluble	1
CHRYSENE	Chrysene	Benzo(a)phenanthrene	12
COBALT	Cobalt	Cobalt, as Co, metal, dust	18
COKE OVEN GS	Coke oven emissions	Coke oven emissions	12
COPPER	Copper	Copper, dust & mists, as Cu	368
DIBENZAHAN	Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	12
DIBROMOET,12	Ethylene dibromide (Dibromoethane)	1,2-Dibromoethane (EDB)	125
DIBUTYL PHTH	Di-n-butyl phthalate	Dibutyl phthalate	1829
DICHLORETH12	Ethylene dichloride (1,2-Dichloroethane)	1,2-Dichloroethane (EDC)	12
DIEYLHEX PHT	Diethylhexyl phthalate (Bis(2-ethylhexyl)phthalate) (DEHP)	Di(2-ethylhexyl) phthalate (DEHP)	125
DIOCTYL PHTH	Di-n-octyl phthalate	n-Dioctyl phthalate	6000
ETHYLBENZENE	Ethylbenzene	Ethyl benzene	6000
ETHYLENE OXI	Ethylene oxide	Ethylene oxide	12
FLUORANTHENE	Fluoranthene	Benzo(j,k)fluorene	12
FLUORENE	Fluorene		
FORMALDEHYDE	Formaldehyde	Formaldehyde	125
GLYCOL ETHRS	Glycol ethers	Glycol ethers	6000
HEPTACHLOR	Heptachlor	Heptachlor	179
HEXCHLORETH	Hexachloroethane	Hexachloroethane	6000
HEXCL-13-BUT	Hexachlorobutadiene	Hexachlorobutadiene	46
HEXCLBENZENE	Hexachlorobenzene	Hexachlorobenzene (HCB)	12
HYDRAZINE	Hydrazine	Hydrazine and hydrazine sulfate	125
INDN(123CDPY	Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	12
LEAD	Lead	Lead compounds	6000
MANGANESE	Manganese	Manganese, as Mn, dust and compounds	1114
MERCURY	Mercury, as Hg, alkyl compounds	Mercury, as Hg, alkyl compounds	3.7
MERCURY	Mercury, as Hg, aryl & inorganic compounds, all forms excpt alkyl	Mercury, as Hg, aryl & inorganic compounds, all forms excpt alkyl	37
MERCURY	Mercury, as Hg, vapor, all forms except alkyl	Mercury, as Hg, vapor, all forms except alkyl	18
METHENE(B)4-	Methylene diphenyl diisocyanate (MDI)	Methylene bisphenyl isocyanate (MDI)	44
METHOXYCHLOR	Methoxychlor	Methoxychlor	6000
METHYLENE CL	Methylene chloride (Dichloromethane)	Methylene chloride	6000
NAPHTHALENE	Naphthalene	Naphthalene	6000
NICKEL	Nickel	Nickel compounds other than nickel subsulfide, as Ni	125
NICKEL	Nickel subsulfide	Nickel subsulfide	12

PARATHION	Parathion	Parathion	37
PCBS	Total polychlorinated biphenyls (PCBs)	Polychlorinated biphenyls (PCB)	0.05
PCDD	Total polychlorinated dibenzodioxins (PCDDs)		
PCDF	Total polychlorinated dibenzofurans (PCDFs)		
PCP	Pentachlorophenol	Pentachlorophenol	179
PENTCLNITBEN	Pentachloronitrobenzene (quintobenzene)	Pentachloronitrobenzene (Quintobenzene) (PCNB)	6000
PERC	Tetrachloroethylene (Perchloroethylene)	Perchloroethylene	6000
PHENANTHRENE	Phenanthrene		
PHENOL	Phenol	Phenol	6000
PHOSGENE	Phosgene	Phosgene	147
PYRENE	Pyrene		
STYRENE	Styrene	Styrene, monomer	6000
TCDD,2378	2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.00005
TCDF,2378	2,3,7,8-tetrachlorodibenzo-furan (TCDF)		
TCE,111	Methyl chloroform (1,1,1-Trichloroethane)	Methyl chloroform (1,1,1-Trichloroethane)	6000
TOLUENE	Toluene	Toluene (Toluol)	6000
TOLUENE24DII	2,4-Toluene diisocyanate	Toluene-2,4-diisocyanate (TDI)	15
TRICHLORETHY	Trichloroethylene	Trichloroethylene	6000
TRICLPHN,245	2,4,5-Trichlorophenol	2,4,5-Trichlorophenol	6000
TRICLPHN,246	2,4,6-Trichlorophenol	2,4,6-Trichlorophenol	6000
TRIFLURALIN	Trifluralin	Trifluralin	6000
VINYL CHLOR	Vinyl chloride	Vinyl chloride	150
XYLENES ISO	Xylenes (includes o, m, and p)	Xylene, mixed isomers (Xylol)	6000

Each December, the Wisconsin DNR mails electronic update forms to every source on the existing emissions inventory. Sources are asked to update any out-of-date information and enter their activity data for that year. Responses are returned to the DNR and entered into the emissions inventory database. Sources are added to the mailing list when they are identified through permitting or surveillance work. Annual emissions inventories are generally completed by August of the following year (e.g., the calendar year 1996 inventory was completed by August 1997).

The point source data submitted by Wisconsin are for calendar year 1996 and include emission estimates as reported by all sources in the state. Toxic emission estimates are made by sources and then reported to the WDNR. Sources are required to report and certify actual, annual emissions in LB/yr., and identify the method used to make the estimate (emission factor, stack test, material balance, fuel analysis, MSDS, or other). These estimates account for any emission controls in place.

The WDNR does not make its own estimates of toxic emissions for point sources. Instead, the DNR compliance inspector most familiar with the source is expected to review the reported emission estimates and verify their completeness and reasonableness. The Department runs a number of automated quality assurance checks once the data are entered into the electronic emissions inventory database. In some cases this will include the emission estimation of toxic compounds, for comparison with reported information.

For the calendar year 1996 inventory, these internal quality assurance checks were not directly related to any of the quality assurance checks described in the protocol. They were intended to identify gross errors in the reported data. Any problems identified by the compliance inspector or the automated procedures are forwarded to the reporting source for correction. An attempt has not been made to estimate how complete the point source inventory is, nor has any attempt been made to scale-up the point source emission estimates to account for missing sources.

Wisconsin's annual emissions inventory is not limited to any particular type of industry or process. If the total emissions for a source exceed the reporting threshold for a given pollutant, the source is required to provide information on any process emitting any amount of that pollutant. This approach should cover most source industrial categories (SIC) and industrial process codes (SCCs). However, many SIC and SCC codes are not responsible for air emissions above any of the reporting thresholds. For the 1996 Great Lakes Inventory, point source data have been added from the Environmental Protection Agency's Community Right to Know Toxic Release Inventory (TRI). The TRI data were added to include some pollutants not reported to the state inventory because emission levels were below the reporting threshold or to include pollutants that may have been reported in the state inventory as part of volatile organic compounds (VOC), but were reported to TRI as individual toxics.

Area Sources

Emissions from fourteen area sources were inventoried for this project. These area sources are: Agricultural Pesticides, Architectural Surface Coatings, Auto Body Refinishing, Consumer and Commercial Solvents, Dry Cleaning, Fuel Marketing, Graphic Arts, Industrial Surface Coatings, Landfills, Publicly Owned Treatment Works, Residential Fuel Combustion, Residential Wood Combustion, Solvent Cleaning and Traffic Markings. Where appropriate, area source estimates were reconciled with the state point source inventory. The following subsections describe the general procedures used to calculate each source type as well as any deviations from the standard methodologies set by the project's Technical Steering Committee. 1996 county population data were obtained from the Official Municipal Population Projections 1990-2015 published by the Demographic Services Center, Wisconsin Department of Administration. SIC and county specific employment numbers were estimated using a combination of the 1996 statewide employment numbers for major SICs reported by the Wisconsin Department of Workforce Development and the 1996 Wisconsin Business Patterns published by the U.S. Department of Commerce, Bureau of the Census.

Agricultural Pesticides

The SIC code for this category is 0115 (Agricultural Production Crops, Corn). Emissions were calculated using a per acre emission factor. Corn crops were the only crop with a pollutant of interest (Atrazine) applied to it. The information on state total acres of corn and the percent of corn crops to which atrazine is applied was obtained from the USDA (http://usda.mannlib.cornell.edu/usda). The County specific corn acreage was obtained from the 1990 Base Year Implementation Plan – Emission Inventory for Precursors of Ozone. Hexachlorobenzene was also included based on information included in the 1996 National Toxics Inventory (NTI) and was estimated from the calculated Atrazine emissions.

Architectural Surface Coating

Emissions were calculated by speciating each toxic from the total VOC content of all surface coatings used. The total amounts of coatings used were estimated using a per capita emission factor.

Auto Body Refinishing

The SIC for this category is 7532 (Top and Body Repair and Paint Shops). Emissions were calculated by speciating each toxic from total VOC emissions. VOC numbers for this source category were calculated using a per employee factor.

Consumer and Commercial Solvents

Emissions were calculated by multiplying the estimated 1996 county population by a per capita emission factor.

Dry Cleaning

The SICs for this category are 7211 (Power Laundries, Family, and Commercial) and 7215 (Coin-operated Laundries and Dry Cleaning). This category included commercial and coin operated dry cleaners. Perchloroethylene emissions were calculated from a per employee emission factor. The calculated emissions were reduced by 30% to account for state regulations for this source type.

Fuel Marketing

The SIC for this category is 5541 (Gasoline Service Stations). Emissions were calculated using VOC speciation and toxic specific emission factors. VOC emission factors were based on units of gasoline dispensed. County gasoline usage was derived from population, statewide gasoline consumption, and county vehicle miles traveled (VMT). Stage 1 calculations for all counties, except 20 counties in or around the ozone non-attainment area of the state, where controlled submerge filling is required, included 80% uncontrolled submerge filling and 20 % uncontrolled splash filling. Information on tank filling procedures was obtained from the state's Liquid Underground Storage Tank (LUST) Program. In addition, a 15% reduction was applied to VOC emissions from transit losses, tank breathing and spillage to account for the effect of gasoline vapor pressure regulations. A rule effectiveness of 90 % and rule penetration of 100% was assumed for Stage I. This resulted in an overall control efficiency of 96.22%. Stage 2 controls were applied to a 9 county ozone non-attainment area of the state. This included 95% control with rule effectiveness and rule penetration of 90%.

Graphic Arts

The SIC for this category is 27%% (Printing, Publishing, and Allied Industries). Emissions were calculated by speciating each toxic from the total VOC emissions. A VOC emission factor of 70.1 LB/employee/year was developed using emissions information from the 1996 and 1997 Wisconsin inventory for small point sources (emissions less than 5 TPY) in SIC group 27%%.

Industrial Surface Coating

The SICs for this category are 2426-2429, 243-245, 2499, 25, 26, 341, 3479, 35, 3612, 3357, and 37. Emissions were calculated by speciating each toxic from the total VOC emissions. VOC numbers for all, except three SCC groups from this source category, were calculated using a per employee emission factor. VOC for the remaining three SCC groups were calculated using a per capita emission factor.

Landfills

The SIC for this category is 4953 (Refuse Systems). Emissions were calculated by applying the equations from the US EPA Landfill Air Emissions Estimation Model. The input variables needed to generate emissions for a single facility using these equations were tons of waste received per year, total years since the facility opened, and total years the facility has been closed. Landfill data were obtained from the WDNR, Bureau of Solid and Hazardous Waste. Emissions for each facility in a county were added to obtain emissions per county. Adjustments were made to emissions for facilities with flaring by applying a 75% capture efficiency and a 98% control efficiency in accordance to state regulations.

Publicly Owned Treatment Works

The SIC for this category is 4952 (Sewerage Systems). Emissions were calculated by speciating each toxic from the total VOC emissions. VOC emissions were based on the amount of total waste. The actual total waste present was calculated from effluent wastewater flow data. Wastewater data were obtained from the WDNR, Bureau of Integrated Science Services.

Residential Fuel Combustion

Emissions were based on units of fuel used. Four fuel types were included with this source category: coal, distillate fuel oil, liquefied petro gas, and natural gas. Fuel use data were obtained from the 1997 Wisconsin Energy Statistics published by the Wisconsin Energy Bureau, Department of Administration. Fuel was apportioned to the county level using the fraction of total households for each county.

Residential Wood Combustion

Calculated emissions were based on units of wood fuel used. Emission factors were available for three wood burning stove types including conventional, catalytic, and non-catalytic. Wisconsin chose to apportion the 1996 county specific wood fuel use data obtained from the 1997 Wisconsin Energy Statistics into the three wood burning types based on county specific percentages. These percentages were developed from data obtained in the Residential Fuelwood Consumption and Production in Wisconsin, 1994 developed by the United States Department of Agriculture, Forest Service.

Solvent Cleaning

The SICs for this category are 25, 265, 33-39, 3465, 3711, 3713, 3714, 3861, 417, 423, 551, 552, 554-556, and 753. Emissions were calculated by speciating each toxic from the total VOC emissions. VOC emissions were calculated using a per employee emission factor.

Traffic Markings

The SIC for this category is 1611 (Highway and Street Construction). Emissions were based on total traffic paint used in each county, the air toxic volume percent in the paint used, and the air toxic density. Total traffic paint used in each county was calculated by multiplying the average gallons of paint applied per mile of paved road by the total miles in each county. The average gallons of paint applied were calculated from data obtained from the Wisconsin Department of Transportation. The assumption was made that the reapplication rate was once per year. The miles of paved road in each county were obtained from the Wisconsin Blue Book 1997-1998. Park and forest roads were not included.

Table I-1: Wisconsin Emissions by County in pounds/year

	Adams	Ashland	Barron	Bayfield	Brown
1,3-BUTADIENE	9096.26	9775.86	15948.19	9307.94	8117.93
2378, TCDF	6.35E-06	6.65E-06	1.64E-05	5.87E-06	7.69E-05
2378, TCDD	2.42E-07	2.54E-07	2.95E-03	2.24E-07	2.93E-06
246, TRICHLOPHEN					
TOLUENE34DII					31.31
ACENAPHTHEN	233.16	262.82	503.07	300.73	268.30
ACENAPHTHY	3400.24	2644.52	5061.65	3025.98	5098.54
ACETALDEHYDE	55.73	1088.33	1256.62	1295.56	36297.51
ACROLEIN	52.15	1018.46	1175.94	1212.39	14767.73
ACRYLAMIDE					
ACRYLONITRIL	6.82	13.48	9.80	3.84	150.31
ANTHRACENE	289.40	295.56	565.73	338.19	365.52
ANTIMONY					
ARSENIC	1.84	1.93	4.80	1.70	348.20
ATRAZINE	2204.48	139.31	5478.42	139.31	4744.96
BENZ(A)ANTHR	388.99	347.59	665.31	397.72	566.44
BENZENE	34877.56	30470.92	59329.59	33382.87	107902.06
BENZO(A)PYRE	117.23	191.78	331.11	221.63	793.54
BENZO(B)FLUO	127.70	132.75	254.10	151.89	159.77
BENZO(GHI))PERY	203.86	324.72	621.54	371.56	131.18
BENZO(K)FLUO	43.34	44.39	84.98	50.79	56.07
BERYLLIUM	0.18	0.19	0.49	0.16	3.60
CADMIUM	300.41	314.77	1037.51	277.75	3719.84
CARBON TETRA	26.66	20.37	36.69	39.53	39.11
CHLOROFORM	17.55	16.44	41.93	14.49	108577.30
CHROMIUM	37.81	39.60	97.98	34.93	2395.46
CHROMIUM VI					0.06
CHRYSENE	278.85	307.68	588.91	352.05	332.87
COBALT	122.62	128.42	316.93	113.23	2079.56
COPPER	3.16	3.31	10.08	2.92	556.45
DIBUTYL PHTH			765.47		16374.32
DIBENZAHAN	37.49	69.96	133.92	80.05	16.56
DICHLORETH ETHR					
DIEYLHEX PHTH					
ETHYLBENZENE	3127.82	3690.36	8613.38	1874.61	62002.29
DIBROMOETHANE	77.80	125.83	138.55	10.83	2759.60
DICHLORETH12	14.90	15.99	25.07	13.92	27.10
ETHYLENE OXIDE	8768.94	14082.57	15783.80	1288.80	309780.32
FLUORANTHENE	381.96	358.81	686.78	410.56	517.24
FLUORENE	487.41	488.88	935.74	559.39	625.76
FORMALDEHYDE	845.98	3835.31	16586.32	4381.44	66134.83
GLYCOL ETHERS	1036.39	1131.94	2253.93	722.35	17965.10
HEXCHBENZENE	8.53E-04	5.39E-05	2.12E-03	5.39E-05	1.84E-03
HYDRAZINE					
INDN(123CD)PY	32.80	56.50	108.16	64.65	23.41
LEAD	9.14	9.58	145.58	8.44	627.31
MANGANESE	18.68	20.13	94.26	18.96	978.44
MERCURY	0.23	0.24	192.96	0.21	251.41
TCE, 111	7362.25	24359.05	59154.63	5682.16	348349.74
METHYLENE CL	2635.14	6116.60	13606.85	1735.34	93392.14
METHENE (B) 4-					
NAPHTHALENE	7786.74	7672.08	17140.49	8306.62	31934.30
NICKEL	45.77	47.98	119.40	42.40	1453.73
PENTACLPHENOL					
PHENANTHRENE	4172.45	5779.56	11062.14	6613.23	4389.05
PHENOL			17334.52		0.90
PYRENE	426.48	376.75	721.12	431.09	595.88
STYRENE	508.16	387.96	68989.82	753.41	273729.61
PERC	686.06	6451.17	19953.18	418.39	137853.18
TOLUENE	64818.96	131629.89	206451.87	59692.71	1025684.96
PCBS					1.93
TRICHLOROETHY	517.19	17015.90	48495.00	11.32	253153.16
VINYL CHLOR					
XYLENE,M	760.64	1047.55	1731.30	594.25	11837.74
XYLENE,O	5643.45	6289.20	9625.88	3843.22	74147.82
XYLENE,P	340.56	588.45	1017.32	234.82	7816.03
XYLENES ISO	25098.14	63098.19	165517.27	14301.70	768875.13

Table I-1: Wisconsin Emissions by County in pounds/year

	Buffalo	Burnett	Calumet	Chippewa	Clark
1,3-BUTADIENE	8681.18	8513.90	655.44	19213.06	13667.47
2378, TCDF	5.45E-06	5.58E-06	1.25E-05	2.03E-05	1.19E-05
2378, TCDD	2.08E-07	2.12E-07	4.77E-07	7.73E-07	4.54E-07
246, TRICHLOPHEN					
TOLUENE34DII					
ACENAPHTHEN	180.43	338.83	107.35	522.46	493.45
ACENAPHTHY	1748.42	3409.27	2040.12	7619.17	7196.17
ACETALDEHYDE	266.59	183.22	1292.61	1993.93	1229.56
ACROLEIN	249.48	171.46	1209.62	1865.92	1150.62
ACRYLAMIDE					
ACRYLONITRIL	4.64	3.87	4.77	17.67	8.95
ANTHRACENE	206.77	381.04	146.26	648.48	612.48
ANTIMONY					
ARSENIC	39.28	1.62	3.63	21.34	3.46
ATRAZINE	4687.59	1204.67	3474.72	5916.86	6072.57
BENZ(A)ANTHR	315.49	448.11	226.65	871.66	823.26
BENZENE	23508.20	36046.20	31636.64	85339.72	75767.72
BENZO(A)PYRE	115.82	194.15	103.72	344.06	296.50
BENZO(B)FLUO	95.25	171.15	63.91	286.16	270.28
BENZO(GHI))PERY	202.85	418.63	52.48	456.82	431.45
BENZO(K)FLUO	35.29	57.23	22.42	97.13	91.73
BERYLLIUM	0.15	0.16	0.36	4.71	0.34
CADMIUM	257.84	264.14	591.22	963.35	564.05
CARBON TETRA	19.48	28.52	15.00	38.12	39.78
CHLOROFORM	13.59	13.58	35.58	53.30	32.06
CHROMIUM	32.43	33.19	575.51	382.04	131.98
CHROMIUM VI				0.18	
CHRYSENE	226.38	396.66	133.19	624.85	590.17
COBALT	141.76	107.63	241.72	391.73	230.16
COPPER	2.71	2.77	516.24	87.36	5.95
DIBUTYL PHTH				1145.70	
DIBENZAHAN	52.67	90.20	6.61	84.01	79.34
DICHLORETH ETHR					
DIEYLHEX PHTH					
ETHYLBENZENE	1760.03	2547.46	9059.67	9257.81	6103.21
DIBROMOETHANE	10.13	66.28	184.59	238.53	177.42
DICHLORETH12	13.82	13.52	3.06	30.57	21.43
ETHYLENE OXIDE	1208.48	7441.06	21030.13	27019.32	19981.37
FLUORANTHENE	260.01	462.57	206.95	855.91	808.38
FLUORENE	345.19	630.26	250.38	1092.19	1031.55
FORMALDEHYDE	1097.41	838.31	5768.04	8767.36	4595.69
GLYCOL ETHERS	632.39	842.36	15815.04	3050.22	1990.45
HEXCHBENZENE	1.81E-03	4.66E-04	1.34E-03	2.29E-03	2.35E-03
HYDRAZINE					
INDN(123CD)PY	54.91	72.85	9.36	73.50	69.42
LEAD	7.85	8.02	18.04	39.23	17.18
MANGANESE	16.50	18.96	560.95	591.45	36.05
MERCURY	92.28	0.20	5.60	1.72	0.42
TCE, 111	5481.95	14773.01	47897.07	84218.80	44483.87
METHYLENE CL	1635.26	3750.89	11622.23	19442.64	10800.93
METHENE (B) 4-					
NAPHTHALENE	5879.60	9065.28	5838.09	19385.83	15468.44
NICKEL	39.21	40.40	844.73	218.06	86.01
PENTACLPHENOL					
PHENANTHRENE	5956.45	7450.90	1756.23	9349.50	8830.46
PHENOL			0.12		
PYRENE	256.64	485.71	238.42	955.67	902.61
STYRENE	371.16	543.50	285.88	726.25	3893.28
PERC	454.17	3538.81	15967.49	27138.37	14134.14
TOLUENE	39161.34	63595.15	100260.62	261566.08	133926.84
PCBS					
TRICHLOROETHY	182.57	8977.53	32176.48	83716.02	30266.46
VINYL CHLOR					
XYLENE,M	587.90	787.11	1629.79	2335.52	1546.98
XYLENE,O	2999.36	5655.01	7148.50	14592.24	12340.51
XYLENE,P	233.88	401.66	948.73	1437.09	898.89
XYLENES ISO	12623.17	23202.06	75475.17	106594.69	68646.97

Table I-1: Wisconsin Emissions by County in pounds/year

	Columbia	Crawford	Dane	Dodge	Door
1,3-BUTADIENE	17404.57	9535.16	14740.68	2491.03	698.80
2378, TCDF	1.79E-05	6.29E-06	1.52E-04	2.86E-05	1.07E-05
2378, TCDD	6.84E-07	2.40E-07	5.79E-06	1.09E-06	4.08E-07
246, TRICHLOPHEN					
TOLUENE34DII			85.00		
ACENAPHTHEN	287.31	201.80	442.24	214.91	175.79
ACENAPHTHY	5459.39	1955.46	8403.49	4083.82	3340.66
ACETALDEHYDE	1998.98	795.08	29070.15	4912.58	1381.64
ACROLEIN	1870.63	744.03	27203.84	4597.19	1290.74
ACRYLAMIDE					
ACRYLONITRIL	10.78	7.17	131.87	69.73	64.64
ANTHRACENE	391.40	231.26	602.48	292.78	239.50
ANTIMONY				3.87	
ARSENIC	364.04	1.82	107.83	29.42	3.10
ATRAZINE	11055.19	2884.67	18602.87	12415.57	1573.45
BENZ(A)ANTHR	606.55	352.85	933.64	453.71	371.23
BENZENE	66364.94	28816.98	181182.01	58227.61	39032.70
BENZO(A)PYRE	214.02	151.15	1460.81	308.83	137.69
BENZO(B)FLUO	171.07	106.53	263.33	127.96	104.67
BENZO(GHI))PERY	140.46	226.86	216.22	105.07	85.94
BENZO(K)FLUO	60.04	39.47	92.42	44.91	36.73
BERYLLIUM	17.31	0.18	48.65	18.96	0.30
CADMIUM	963.93	297.64	7205.51	1364.23	505.76
CARBON TETRA	31.89	19.97	314.68	37.44	23.49
CHLOROFORM	47.05	16.09	833.67	80.57	27.02
CHROMIUM	694.38	37.44	924.73	198.20	63.71
CHROMIUM VI			1.77	0.87	
CHRYSENE	356.43	253.19	548.65	266.61	218.30
COBALT	346.36	121.43	2932.04	551.40	206.69
COPPER	2066.21	3.13	1825.17	692.62	1109.34
DIBUTYL PHTH	1164.29		25589.73	15.83	890.18
DIBENZAHAN	17.72	58.90	27.29	13.26	10.84
DICHLORETH ETHR					
DIEYLHEX PHTH		583.70			
ETHYLBENZENE	7216.22	7148.22	53495.83	24193.14	4518.89
DIBROMOETHANE	139.07	111.06	842.51	358.51	111.33
DICHLORETH12	26.92	15.03	34.25	12.94	9.94
ETHYLENE OXIDE	15907.62	12438.51	99523.18	41010.73	12758.22
FLUORANTHENE	553.84	290.80	852.54	414.29	339.44
FLUORENE	670.06	386.06	1031.41	501.23	410.00
FORMALDEHYDE	8052.82	2823.62	107732.07	17463.61	4877.68
GLYCOL ETHERS	2451.37	8320.57	73920.11	63273.00	23519.80
HEXCHBENZENE	4.28E-03	1.12E-03	7.20E-03	4.80E-03	6.09E-04
HYDRAZINE					
INDN(123CD)PY	25.07	61.41	38.59	18.75	15.33
LEAD	671.65	9.05	437.95	102.01	15.42
MANGANESE	1202.01	18.91	2183.66	2256.11	47.84
MERCURY	316.94	0.22	50.80	5.03	0.39
TCE, 111	102614.04	44525.72	590688.61	122117.96	60315.70
METHYLENE CL	21828.64	9676.81	422956.39	38132.14	13221.53
METHENE (B) 4-					
NAPHTHALENE	14732.62	6611.37	73501.56	14175.21	7207.36
NICKEL	759.98	45.26	2078.16	765.05	76.83
PENTACLPHENOL					
PHENANTHRENE	4699.70	6661.74	7234.09	3515.54	2875.79
PHENOL		10.00		170.00	
PYRENE	638.05	287.04	982.15	477.28	390.42
STYRENE	1010.24	380.62	3703.88	711.54	445.86
PERC	34698.79	62480.98	255929.76	38558.10	22842.18
TOLUENE	554254.20	80781.85	1004448.85	325368.31	91630.53
PCBS					
TRICHLOROETHY	79724.30	36199.84	421689.39	94322.00	47370.08
VINYL CHLOR					
XYLENE,M	2231.74	1221.28	12591.69	3254.10	1506.27
XYLENE,O	10106.50	5994.61	34676.50	14135.23	6864.26
XYLENE,P	1472.46	776.02	8099.03	2029.09	961.03
XYLENES ISO	110500.09	69744.29	755264.89	196528.00	55347.32

Table I-1: Wisconsin Emissions by County in pounds/year

	Douglas	Dunn	Eau Claire	Florence	Fond du Lac
1,3-BUTADIENE	18733.43	14706.95	28443.27	6312.83	3303.53
2378, TCDF	1.74E-05	1.30E-05	3.33E-05	1.87E-06	3.47E-05
2378, TCDD	6.64E-07	4.96E-07	1.27E-06	7.11E-08	1.32E-06
246, TRICHLOPHEN					
TOLUENE34DII					14.00
ACENAPHTHEN	349.21	338.85	383.04	98.67	157.75
ACENAPHTHY	3513.81	3283.36	5586.11	1227.15	2997.66
ACETALDEHYDE	6254.39	1187.11	4076.98	13.47	6514.90
ACROLEIN	5852.86	1110.90	3815.20	12.60	6211.04
ACRYLAMIDE					
ACRYLONITRIL	20.76	29.47	33.01	1.47	25.18
ANTHRACENE	392.72	388.31	475.44	118.20	214.90
ANTIMONY					
ARSENIC	13.64	7.52	29.73	0.54	10.11
ATRAZINE	24.58	6662.61	3306.72	90.14	10350.41
BENZ(A)ANTHR	461.85	592.47	639.06	165.91	333.04
BENZENE	50147.27	47753.51	76595.28	14242.79	57244.46
BENZO(A)PYRE	464.10	247.40	366.06	52.74	353.29
BENZO(B)FLUO	176.38	178.89	209.79	53.05	93.92
BENZO(GHI))PERY	431.46	380.94	334.91	97.77	77.12
BENZO(K)FLUO	58.98	66.29	71.20	18.61	32.96
BERYLLIUM	7.85	3.57	18.16	0.05	1.00
CADMIUM	849.76	619.07	1586.25	88.40	1639.12
CARBON TETRA	37.30	32.19	28.11	9.19	32.09
CHLOROFORM	41.88	37.27	88.75	5.24	91.87
CHROMIUM	103.65	77.55	198.03	11.10	698.42
CHROMIUM VI	0.35	0.42	0.47		
CHRYSENE	408.81	425.14	458.11	120.13	195.70
COBALT	336.22	251.54	642.34	36.03	670.32
COPPER	80.96	40.31	186.05	0.92	625.71
DIBUTYL PHTH	792.05		3960.06		4889.11
DIBENZAHAN	92.95	98.92	61.58	21.45	9.73
DICHLORETH ETHR					
DIEYLHEX PHTH					
ETHYLBENZENE	27046.84	6053.05	12517.82	797.41	24723.02
DIBROMOETHANE	97.85	133.92	200.25	6.54	231.30
DICHLORETH12	26.79	25.63	45.29	9.99	8.21
ETHYLENE OXIDE	11263.40	15217.57	23186.39	717.18	27069.20
FLUORANTHENE	476.75	488.29	627.52	152.64	304.10
FLUORENE	649.58	648.24	800.75	198.25	367.91
FORMALDEHYDE	25063.27	4603.76	15287.62	571.65	25741.06
GLYCOL ETHERS	2112.79	17028.94	16901.38	255.90	37250.63
HEXCHBENZENE	9.51E-06	2.58E-03	1.28E-03	3.49E-05	4.00E-03
HYDRAZINE					
INDN(123CD)PY	75.07	103.13	53.88	20.56	13.76
LEAD	25.10	18.77	47.96	2.68	55.05
MANGANESE	765.29	299.02	595.67	6.16	403.56
MERCURY	2.23	2.40	5.46	0.06	1.24
TCE, 111	52287.83	73470.35	137356.29	2043.63	146421.60
METHYLENE CL	12204.02	16083.11	30390.84	631.04	33515.67
METHENE (B) 4-					
NAPHTHALENE	11581.29	11399.45	23339.87	3430.74	15724.15
NICKEL	598.31	138.84	482.24	13.47	1181.63
PENTACLPHENOL					
PHENANTHRENE	7679.37	11185.57	6854.73	2369.07	2580.53
PHENOL					
PYRENE	500.59	481.97	700.65	162.77	350.33
STYRENE	710.56	612.77	534.72	175.33	20298.89
PERC	25514.60	24321.63	58455.32	151.57	51716.56
TOLUENE	126169.83	228664.92	255369.72	22325.80	249639.50
PCBS					
TRICHLOROETHY	33951.82	55872.05	99147.17	4.18	108971.47
VINYL CHLOR					
XYLENE,M	1595.22	1809.77	3202.84	430.47	3435.26
XYLENE,O	6879.90	8753.07	12019.72	1751.06	10213.11
XYLENE,P	897.40	1147.75	1997.67	169.63	2158.05
XYLENES ISO	170215.77	61595.89	189613.50	7593.08	254088.01

Table I-1: Wisconsin Emissions by County in pounds/year

	Forest	Grant	Green	Green Lake	Iowa
1,3-BUTADIENE	7411.36	18357.15	13746.34	10260.86	10515.91
2378, TCDF	3.50E-06	1.83E-05	1.23E-05	7.65E-06	7.88E-06
2378, TCDD	1.33E-07	6.96E-07	4.68E-07	2.91E-07	3.00E-07
246, TRICHLOPHEN					
TOLUENE34DII			4.00		
ACENAPHTHEN	190.04	370.90	139.13	109.41	181.93
ACENAPHTHY	2363.33	3593.91	2643.95	2079.42	1762.99
ACETALDEHYDE	124.96	1826.47	2028.01	893.09	660.48
ACROLEIN	116.94	1709.21	1897.81	835.75	618.08
ACRYLAMIDE					
ACRYLONITRIL	3.37	14.05	35.63	70.85	2.28
ANTHRACENE	227.64	425.03	189.54	149.07	208.49
ANTIMONY					
ARSENIC	1.00	66.94	3.56	2.22	2.29
ATRAZINE	122.92	12575.38	7949.24	5097.35	6506.91
BENZ(A)ANTHR	319.52	648.50	293.74	231.01	318.11
BENZENE	26683.82	54554.00	35101.06	26393.25	25496.47
BENZO(A)PYRE	105.90	293.73	149.78	87.24	133.83
BENZO(B)FLUO	102.19	195.80	82.84	65.15	96.05
BENZO(GHI))PERY	188.32	416.97	68.02	53.49	204.54
BENZO(K)FLUO	35.87	72.55	29.07	22.85	35.59
BERYLLIUM	0.10	10.02	0.35	0.22	0.22
CADMIUM	165.75	887.40	579.71	361.15	372.46
CARBON TETRA	19.14	39.03	22.90	13.15	24.03
CHLOROFORM	8.95	50.14	30.71	19.73	20.70
CHROMIUM	20.84	223.51	119.05	399.50	237.89
CHROMIUM VI		0.82			
CHRYSENE	231.39	465.35	172.60	135.75	228.27
COBALT	67.55	352.55	236.98	147.60	152.06
COPPER	1.73	103.01	926.11	13.81	3.92
DIBUTYL PHTH		1460.42	4123.59	1142.51	
DIBENZAHAN	41.33	108.27	8.58	6.74	53.11
DICHLORETH ETHR					
DIEYLHEX PHTH					
ETHYLBENZENE	1723.28	7093.86	4334.06	2691.80	3156.16
DIBROMOETHANE	43.39	108.89	61.33	28.39	55.25
DICHLORETH12	11.74	28.82	24.04	23.83	16.06
ETHYLENE OXIDE	4841.34	12592.91	7081.65	3295.82	6292.38
FLUORANTHENE	293.97	534.47	268.22	210.93	262.17
FLUORENE	381.82	709.55	324.50	255.21	348.07
FORMALDEHYDE	647.41	6890.69	7176.85	3186.70	2460.71
GLYCOL ETHERS	554.10	2493.58	1493.95	897.55	1084.29
HEXCHBENZENE	4.76E-05	4.86E-03	3.08E-03	1.97E-03	2.52E-03
HYDRAZINE					
INDN(123CD)PY	39.61	112.87	12.13	9.54	55.37
LEAD	5.02	132.31	14777.68	11.01	11.34
MANGANESE	131.80	800.49	311.89	19.61	22.18
MERCURY	0.12	52.45	0.44	0.31	0.28
TCE, 111	9267.82	77955.79	50917.92	24648.74	26729.87
METHYLENE CL	2384.72	17199.78	11184.76	5761.52	6156.60
METHENE (B) 4-					
NAPHTHALENE	5925.48	14564.69	8412.96	5294.95	6489.63
NICKEL	32.84	266.42	133.03	190.84	56.59
PENTACLPHENOL					
PHENANTHRENE	4562.49	12243.52	2276.02	1790.06	6006.04
PHENOL	5.26			11300.08	
PYRENE	313.49	527.55	309.00	243.02	258.79
STYRENE	364.75	216417.73	1782.52	248.41	458.10
PERC	2178.31	26246.34	17544.04	6379.53	6778.41
TOLUENE	45365.07	190703.14	111860.92	53676.98	65092.99
PCBS					
TRICHLOROETHY	5474.61	55270.49	36960.40	16357.54	17641.35
VINYL CHLOR					
XYLENE,M	632.38	1973.44	1366.71	882.57	975.91
XYLENE,O	4034.85	8686.72	4846.62	3234.82	4264.18
XYLENE,P	305.12	1192.39	808.94	465.52	526.02
XYLENES ISO	16563.32	82356.43	95584.67	20982.61	26199.31

Table I-1: Wisconsin Emissions by County in pounds/year

	Iron	Jackson	Jefferson	Juneau	Kenosha
1,3-BUTADIENE	6793.04	9550.17	2609.81	10986.85	6827.84
2378, TCDF	2.77E-06	6.65E-06	2.56E-05	8.79E-06	5.00E-05
2378, TCDD	1.05E-07	2.53E-07	9.73E-07	3.35E-07	1.91E-06
246, TRICHLOPHEN					
TOLUENE34DII					
ACENAPHTHEN	103.69	224.54	182.19	290.22	69.56
ACENAPHTHY	1043.50	3274.70	3462.14	4232.56	1321.97
ACETALDEHYDE	193.34	505.20	5146.82	853.63	13465.20
ACROLEIN	180.93	472.77	4816.39	798.83	12600.73
ACRYLAMIDE					
ACRYLONITRIL	1.62	21.28	159.89	18.35	111.07
ANTHRACENE	116.62	278.71	248.21	360.23	94.76
ANTIMONY					
ARSENIC	0.80	1.93	18.88	2.55	29.58
ATRAZINE	49.17	3359.99	6965.83	3925.45	3073.16
BENZ(A)ANTHR	137.14	374.63	384.64	484.22	146.86
BENZENE	11795.90	36001.70	55098.05	47938.02	55377.65
BENZO(A)PYRE	65.38	132.55	304.56	180.07	616.83
BENZO(B)FLUO	52.37	122.99	108.48	158.96	41.41
BENZO(GHI))PERY	128.13	196.33	89.07	253.76	34.00
BENZO(K)FLUO	17.51	41.74	38.07	53.95	14.52
BERYLLIUM	0.08	0.19	10.61	0.25	1.45
CADMIUM	130.92	314.50	1214.97	415.68	2361.02
CARBON TETRA	13.52	27.13	25.33	27.87	17.58
CHLOROFORM	6.36	17.23	24595.24	22.88	139.54
CHROMIUM	16.46	39.58	3148.63	52.33	332.67
CHROMIUM VI			0.47		
CHRYSENE	121.39	268.55	226.03	347.11	86.30
COBALT	53.41	128.39	854.21	169.71	965.71
COPPER	1.37	3.31	172.15	4.37	350.04
DIBUTYL PHTH			6194.19		3935.25
DIBENZAHAN	27.60	36.10	11.24	46.66	4.28
DICHLORETH ETHR					
DIEYLHEX PHTH					
ETHYLBENZENE	1101.55	2836.25	13958.28	4769.41	22819.73
DIBROMOETHANE	19.29	58.38	402.54	137.14	502.23
DICHLORETH12	10.51	17.04	29.30	18.71	25.74
ETHYLENE OXIDE	2137.81	6606.78	45757.13	15412.78	57855.33
FLUORANTHENE	141.57	367.85	351.22	475.46	134.11
FLUORENE	192.90	469.41	424.92	606.72	162.24
FORMALDEHYDE	938.62	1910.61	17889.23	3115.43	45851.89
GLYCOL ETHERS	354.82	953.63	249956.44	1448.88	8909.01
HEXCHBENZENE	1.90E-05	1.30E-03	2.69E-03	1.52E-03	1.19E-03
HYDRAZINE					
INDN(123CD)PY	22.29	31.59	15.89	40.83	6.06
LEAD	3.97	9.57	36.85	27.85	126.14
MANGANESE	8.25	19.23	583.00	280.32	464.77
MERCURY	0.09	0.25	3.14	0.31	1387.85
TCE, 111	2486.82	44645.53	181135.50	109308.56	275303.24
METHYLENE CL	854.82	9395.12	65832.34	110440.27	60566.40
METHENE (B) 4-					
NAPHTHALENE	3420.53	7633.06	13193.29	9740.91	18415.68
NICKEL	19.94	47.90	1989.87	63.31	621.15
PENTACLPHENOL					
PHENANTHRENE	2280.55	4018.40	2980.36	5193.80	1138.00
PHENOL	8.31E-04				
PYRENE	148.65	410.73	404.62	530.88	154.49
STYRENE	257.79	516.69	63495.03	530.75	10071.38
PERC	183.77	13132.76	63825.04	26219.26	97217.93
TOLUENE	27632.67	75027.08	268681.45	140203.19	398925.31
PCBS					
TRICHLOROETHY	4.89	35968.31	145300.97	96790.27	246057.03
VINYL CHLOR			106.00		
XYLENE,M	481.75	1123.22	3851.80	1766.20	3283.41
XYLENE,O	1777.37	5342.90	14944.10	8543.36	14975.86
XYLENE,P	196.50	707.08	2686.44	1245.70	2948.57
XYLENES ISO	10481.32	28093.00	225710.30	49939.46	334095.63

Table I-1: Wisconsin Emissions by County in pounds/year

	Kewaunee	La Crosse	Lafayette	Langlade	Lincoln
1,3-BUTADIENE	559.95	33050.46	9477.42	11003.50	12565.21
2378, TCDF	7.19E-06	3.90E-05	6.25E-06	8.05E-06	1.08E-05
2378, TCDD	2.74E-07	1.49E-06	2.38E-07	3.07E-07	4.12E-07
246, TRICHLOPHEN					
TOLUENE34DII					
ACENAPHTHEN	88.93	272.57	91.79	302.64	335.48
ACENAPHTHY	1689.97	2641.25	889.57	3763.58	4171.90
ACETALDEHYDE	1104.29	6915.19	614.16	1939.56	2601.47
ACROLEIN	1033.39	6471.21	574.73	1815.04	1255.33
ACRYLAMIDE					
ACRYLONITRIL	32.70	51.31	28.95	15.23	10.61
ANTHRACENE	121.15	312.37	105.20	362.53	401.87
ANTIMONY					
ARSENIC	2.08	61.31	1.81	2.34	3.14
ATRAZINE	2810.91	2954.33	10653.63	909.65	516.29
BENZ(A)ANTHR	187.75	476.59	160.51	508.83	564.04
BENZENE	19658.60	60781.78	14875.09	45610.00	50186.78
BENZO(A)PYRE	87.37	458.43	79.75	244.42	235.74
BENZO(B)FLUO	52.95	143.90	48.45	162.74	180.40
BENZO(GHI))PERY	43.47	306.44	103.20	299.90	332.44
BENZO(K)FLUO	18.57	53.32	17.95	57.13	63.33
BERYLLIUM	0.20	10.86	0.18	0.23	0.31
CADMIUM	339.36	1930.40	295.30	380.63	511.05
CARBON TETRA	14.17	20.92	21.38	21.11	23.45
CHLOROFORM	19.39	102.07	16.35	20.33	28.20
CHROMIUM	42.76	233.07	37.19	47.89	88.32
CHROMIUM VI		7.51			
CHRYSENE	110.33	342.00	115.18	368.48	408.46
COBALT	138.72	752.83	120.65	155.29	208.59
COPPER	3.58	373.98	3.11	4.01	5.38
DIBUTYL PHTH	2768.67	10291.16			581.77
DIBENZAHAN	5.48	79.57	26.79	65.82	72.96
DICHLORETH ETHR					
DIEYLHEX PHTH					
ETHYLBENZENE	22984.17	14226.15	2741.27	3578.13	9699.69
DIBROMOETHANE	78.36	219.86	58.29	88.11	348.23
DICHLORETH12	4.53	52.36	17.66	17.43	19.81
ETHYLENE OXIDE	8988.21	25955.69	6582.15	9943.43	38904.08
FLUORANTHENE	171.43	392.79	132.28	468.14	518.94
FLUORENE	207.41	521.47	175.62	608.05	674.02
FORMALDEHYDE	8098.05	30810.75	2237.86	6525.80	5113.76
GLYCOL ETHERS	1074.00	201538.94	899.51	1165.57	22302.56
HEXCHBENZENE	1.09E-03	1.14E-03	4.12E-03	3.52E-04	2.00E-04
HYDRAZINE					
INDN(123CD)PY	7.76	82.95	27.93	63.08	69.92
LEAD	10.34	56.21	9.00	11.59	15.56
MANGANESE	18.19	909.91	16.48	24.35	31.37
MERCURY	0.25	3.52	0.22	0.28	0.38
TCE, 111	29161.18	144878.37	34001.55	36255.08	43838.00
METHYLENE CL	6838.92	32615.64	7428.75	8208.60	11791.16
METHENE (B) 4-					
NAPHTHALENE	3447.79	25227.60	4096.53	9513.48	10917.99
NICKEL	51.51	926.90	44.82	57.97	94.77
PENTACLPHENOL					
PHENANTHRENE	1454.80	8998.05	3030.56	7265.73	8054.00
PHENOL	4539.60				13170.00
PYRENE	197.50	387.71	130.58	499.24	553.40
STYRENE	269.21	6177.08	406.78	402.19	2983.98
PERC	7800.97	67734.76	9708.77	13633.17	11717.23
TOLUENE	76879.38	378224.22	60238.32	82916.34	189859.13
PCBS					0.14
TRICHLOROETHY	20561.33	132475.29	26255.48	26822.37	31085.55
VINYL CHLOR					
XYLENE,M	380.42	3477.34	1009.03	1130.80	1820.90
XYLENE,O	3816.47	10543.45	3103.21	6985.20	13700.09
XYLENE,P	328.18	2131.43	597.95	665.93	1106.84
XYLENES ISO	122555.76	210344.93	26065.45	67581.03	107490.50

Table I-1: Wisconsin Emissions by County in pounds/year

	Manitowoc	Marathon	Marinette	Marquette	Menominee
1,3-BUTADIENE	3733.98	36406.80	18363.04	8389.07	
2378, TCDF	3.20E-05	4.42E-05	1.65E-05	5.14E-06	1.15E-06
2378, TCDD	1.22E-06	8.17E-05	6.30E-07	1.96E-07	4.37E-08
246, TRICHLOPHEN					
TOLUENE34DII					
ACENAPHTHEN	220.17	972.13	481.46	171.97	49.77
ACENAPHTHY	4183.87	14176.79	5987.13	2507.87	619.11
ACETALDEHYDE	7363.79	168298.91	16293.73	311.74	
ACROLEIN	6981.72	4624.44	5860.58	291.73	
ACRYLAMIDE					
ACRYLONITRIL	69.02	66.50	13.87	3.90	
ANTHRACENE	299.95	1206.63	576.74	213.44	59.63
ANTIMONY					
ARSENIC	1549.33	101.50	119.88	1.48	0.32
ATRAZINE	5457.93	6818.32	2196.28	2638.82	
BENZ(A)ANTHR	464.83	1621.88	809.51	286.90	83.70
BENZENE	61705.65	166301.44	103668.41	27429.40	9107.11
BENZO(A)PYRE	417.85	693.82	520.80	98.24	26.31
BENZO(B)FLUO	131.10	532.47	259.54	94.18	26.76
BENZO(GHI))PERY	107.64	850.00	477.10	150.36	49.32
BENZO(K)FLUO	46.01	180.74	90.90	31.96	9.39
BERYLLIUM	257.08	14.37	0.47	0.14	0.03
CADMIUM	2525.24	2252.90	784.52	242.96	54.29
CARBON TETRA	28.55	100.74	39.08	16.01	2.92
CHLOROFORM	82.81	77448.31	8513.67	13.34	4.31
CHROMIUM	4750.39	3032.24	1846.93	38.59	6.82
CHROMIUM VI		5.78	20.54		
CHRYSENE	273.15	1162.66	586.19	205.66	60.61
COBALT	618.32	954.63	576.95	99.19	22.14
COPPER	578.99	27.08	897.47	2.56	0.56
DIBUTYL PHTH	3302.51	10391.31	1169.19		
DIBENZAHAN	13.58	156.32	104.73	27.65	10.82
DICHLORETH ETHR					
DIEYLHEX PHTH					
ETHYLBENZENE	14215.82	24708.30	54367.53	4496.78	17660.83
DIBROMOETHANE	410.70	338.42	3053.53	208.29	1230.20
DICHLORETH12	13.75	61.09	25.46	13.33	0.02
ETHYLENE OXIDE	46838.06	38886.70	339341.43	23200.25	136618.36
FLUORANTHENE	424.44	1592.56	744.74	281.72	77.00
FLUORENE	513.51	2032.22	967.30	359.49	100.02
FORMALDEHYDE	29744.14	37536.81	33135.93	1227.01	54.81
GLYCOL ETHERS	4787.85	10460.05	26584.63	1273.71	4283.95
HEXCHBENZENE	2.11E-03	2.64E-03	8.50E-04	1.02E-03	
HYDRAZINE					
INDN(123CD)PY	19.21	136.78	100.37	24.19	10.37
LEAD	4679.04	63.71	30.77	7.40	1.64
MANGANESE	6507.22	3661.60	3384.45	14.84	3.57
MERCURY	109.89	255.12	16.46	0.18	0.03
TCE, 111	118841.29	207915.12	90146.08	23528.90	13119.87
METHYLENE CL	55384.46	48685.39	41060.43	6396.44	11605.73
METHENE (B) 4-					
NAPHTHALENE	13605.58	39903.71	17421.95	5990.71	1401.50
NICKEL	7156.34	586.27	963.04	37.00	8.24
PENTACLPHENOL					
PHENANTHRENE	3601.67	17396.39	11558.34	3077.42	1195.24
PHENOL	1377.28	916.83	52527.64		
PYRENE	488.97	1778.19	794.20	314.55	82.12
STYRENE	4850.95	14482.59	58636.59	305.02	55.74
PERC	39013.42	69321.62	30233.61	6469.37	3919.21
TOLUENE	253382.82	566509.13	844695.34	89410.67	285944.00
PCBS					
TRICHLOROETHY	126953.74	152276.80	69815.69	17349.32	10822.11
VINYL CHLOR					
XYLENE,M	1708.31	4578.82	7877.75	1150.43	2578.34
XYLENE,O	14823.34	24981.74	80261.29	7905.58	29935.13
XYLENE,P	1434.51	2976.29	5221.47	677.31	1758.21
XYLENES ISO	222619.63	391088.41	601015.13	46824.05	200634.48

Table I-1: Wisconsin Emissions by County in pounds/year

	Milwaukee	Monroe	Oconto	Oneida	Outagamie
1,3-BUTADIENE	38461.08	15047.22	13878.47	13604.21	7029.18
2378, TCDF	3.97E-04	1.40E-05	1.20E-05	1.35E-05	5.38E-05
2378, TCDD	1.51E-05	5.33E-07	4.57E-07	5.13E-07	2.35E-06
246, TRICHLOPHEN	12783.93				
TOLUENE34DII					
ACENAPHTHEN	70.69	399.69	350.65	309.25	291.24
ACENAPHTHY	1343.40	5828.99	4360.52	3845.69	5534.43
ACETALDEHYDE	113972.03	1501.22	2343.79	1089.02	33799.78
ACROLEIN	71401.22	1404.84	2193.32	1019.10	15189.14
ACRYLAMIDE					
ACRYLONITRIL	225.43	43.62	12.00	17.10	112.10
ANTHRACENE	96.30	496.11	420.04	370.45	396.79
ANTIMONY	260.00				
ARSENIC	279.05	4.06	3.49	213.95	622.58
ATRAZINE	180.29	4531.89	4458.13	32.78	7891.88
BENZ(A)ANTHR	149.25	666.85	589.55	519.94	614.88
BENZENE	245575.30	62771.02	53759.59	48925.90	102924.11
BENZO(A)PYRE	3332.62	262.16	287.39	210.90	732.13
BENZO(B)FLUO	54.78	218.92	188.57	166.30	173.43
BENZO(GHI))PERY	34.55	349.48	347.47	306.45	142.39
BENZO(K)FLUO	14.76	74.30	66.20	58.38	60.86
BERYLLIUM	27.68	0.40	0.34	0.41	64.21
CADMIUM	18764.71	660.91	567.51	668.91	2618.03
CARBON TETRA	51.51	30.17	35.97	30.85	429.04
CHLOROFORM	1950.95	38.66	4976.54	33.54	997.42
CHROMIUM	8620.44	83.23	71.43	786.18	5145.89
CHROMIUM VI	112.11				3.60
CHRYSENE	87.70	478.03	426.93	376.52	361.32
COBALT	7696.89	269.90	231.68	260.08	1108.19
COPPER	8237.62	6.97	5.99	504.62	1435.48
DIBUTYL PHTH	71803.80	764.01		954.01	8481.50
DIBENZAHAN	4.35	64.26	76.27	67.26	17.97
DICHLORETH ETHR	923.15				
DIEYLHEX PHTH	614.88				
ETHYLBENZENE	136886.35	5015.21	5426.69	5322.01	59172.77
DIBROMOETHANE	1036.57	49.03	133.54	111.12	969.65
DICHLORETH12	94.37	27.54	21.18	22.41	93.82
ETHYLENE OXIDE	129959.30	5813.53	15112.57	12642.96	109907.34
FLUORANTHENE	136.38	654.79	542.41	478.37	561.45
FLUORENE	164.87	835.57	704.50	621.31	679.27
FORMALDEHYDE	266643.35	5413.08	9731.84	4834.83	55850.00
GLYCOL ETHERS	684959.39	27728.46	1812.22	1803.16	41104.89
HEXCHBENZENE	6.97E-05	1.75E-03	1.72E-03	1.27E-05	3.05E-03
HYDRAZINE					
INDN(123CD)PY	6.16	56.23	73.09	64.46	25.42
LEAD	3276.64	20.14	17.29	19.41	92.63
MANGANESE	14025.20	39.26	2693.45	37.15	2302.92
MERCURY	700.34	0.50	0.42	36.48	897.61
TCE, 111	1448460.33	42552.54	55539.91	58144.44	234475.79
METHYLENE CL	390630.56	9881.48	12530.62	12908.12	63916.22
METHENE (B) 4-					
NAPHTHALENE	106650.74	13597.84	11555.95	12868.44	44984.92
NICKEL	7439.57	100.61	86.35	604.03	2988.01
PENTACLPHENOL	20886.33				
PHENANTHRENE	1156.46	7152.77	8418.14	7424.24	4764.29
PHENOL	1376.03				
PYRENE	156.99	731.12	578.43	510.13	646.82
STYRENE	163963.65	573.84	122578.42	587.54	6697.14
PERC	585353.35	10324.52	15258.40	20489.55	97252.27
TOLUENE	1829044.92	211058.04	141282.75	333639.04	579981.13
PCBS					
TRICHLOROETHY	1138468.00	26164.44	88170.28	90337.57	166443.04
VINYL CHLOR	86.75				
XYLENE,M	13053.84	1327.84	1552.37	1550.78	6419.23
XYLENE,O	34075.50	7853.16	8939.10	7820.99	31203.96
XYLENE,P	12362.82	714.42	947.47	946.90	4137.80
XYLENES ISO	1836026.55	51894.57	128548.05	92401.26	561728.15

Table I-1: Wisconsin Emissions by County in pounds/year

	Ozaukee	Pepin	Pierce	Polk	Portage
1,3-BUTADIENE	1893.45	7097.75	13862.56	14425.97	21885.23
2378, TCDF	2.73E-05	2.78E-06	1.17E-05	1.39E-05	2.27E-05
2378, TCDD	1.04E-06	1.06E-07	4.46E-07	5.29E-07	8.63E-07
246, TRICHLOPHEN					
TOLUENE34DII	20.60				
ACENAPHTHEN	60.73	99.64	180.77	458.95	399.33
ACENAPHTHY	1154.03	965.59	1751.65	4617.84	5823.53
ACETALDEHYDE	3734.08	324.91	1066.04	1191.10	4261.87
ACROLEIN	3494.35	304.05	997.60	1114.63	2639.49
ACRYLAMIDE					
ACRYLONITRIL	2.17	2.72	7.53	31.06	29.00
ANTHRACENE	82.72	114.19	207.16	516.12	495.65
ANTIMONY					
ARSENIC	14.95	0.80	8.94	4.04	24.19
ATRAZINE	2122.53	2040.58	5961.93	4572.86	4204.08
BENZ(A)ANTHR	128.21	174.23	316.08	606.96	666.23
BENZENE	31762.68	13585.87	26610.38	51488.54	73429.58
BENZO(A)PYRE	189.35	71.69	150.81	304.02	319.40
BENZO(B)FLUO	36.15	52.59	95.43	231.81	218.72
BENZO(GHI))PERY	29.68	112.02	203.23	567.04	349.15
BENZO(K)FLUO	12.68	19.49	35.36	77.52	74.24
BERYLLIUM	0.79	0.08	3.42	0.40	13.92
CADMIUM	1290.62	131.48	556.09	656.78	1084.30
CARBON TETRA	15.06	8.58	23.40	35.95	34.39
CHLOROFORM	79.98	7.05	34.30	36.14	65.18
CHROMIUM	917.71	16.53	79.70	82.66	134.88
CHROMIUM VI			0.15		0.63
CHRYSENE	75.34	125.02	226.81	537.26	477.59
COBALT	534.87	53.62	226.10	268.09	437.50
COPPER	1265.65	1.38	36.74	6.93	141.97
DIBUTYL PHTH	2624.72		820.08	1549.05	5368.17
DIBENZAHAN	3.74	29.08	52.76	122.17	64.21
DICHLORETH ETHR					
DIEYLHEX PHTH			1.16		
ETHYLBENZENE	16571.52	984.76	4765.16	5368.78	12853.62
DIBROMOETHANE	455.33	5.58	43.65	93.57	405.64
DICHLORETH12	7.98	11.15	21.67	25.31	35.50
ETHYLENE OXIDE	51758.98	627.07	5166.47	10720.61	45715.23
FLUORANTHENE	117.07	143.58	260.50	626.55	654.19
FLUORENE	141.63	190.63	345.84	853.69	834.79
FORMALDEHYDE	20114.99	1159.33	3946.96	5112.69	13900.85
GLYCOL ETHERS	6158.61	324.21	1594.67	1857.22	99075.93
HEXCHBENZENE	8.21E-04	7.89E-04	2.31E-03	1.77E-03	1.63E-03
HYDRAZINE					
INDN(123CD)PY	5.29	30.32	55.01	98.67	56.18
LEAD	539.40	3.99	16.87	20.01	32.67
MANGANESE	4771.74	8.55	199.66	40.48	454.56
MERCURY	74.97	0.09	1.08	0.50	5.94
TCE, 111	217283.29	2756.24	52467.11	42562.49	90937.27
METHYLENE CL	49930.01	838.14	7771.67	10062.24	22429.31
METHENE (B) 4-					
NAPHTHALENE	10056.66	3519.77	7510.40	13432.49	20397.54
NICKEL	955.75	19.99	158.33	100.06	459.84
PENTACLPHENOL					
PHENANTHRENE	993.44	3289.54	5967.47	10092.19	7146.07
PHENOL	4414.00				6641.40
PYRENE	134.86	141.73	257.13	657.88	730.44
STYRENE	12751.19	163.42	445.99	684.49	654.66
PERC	79034.82	205.15	7466.15	15932.42	32537.20
TOLUENE	267593.13	23748.81	75768.96	128194.56	287946.95
PCBS					
TRICHLOROETHY	188028.27	6.45	18488.11	27053.33	83124.37
VINYL CHLOR					
XYLENE,M	2829.29	469.35	1170.00	1395.74	2839.81
XYLENE,O	13420.91	1705.06	4051.26	7920.57	16716.58
XYLENE,P	2525.74	184.24	600.11	771.64	1739.19
XYLENES ISO	211616.46	8571.43	34499.42	41488.25	222611.81

Table I-1: Wisconsin Emissions by County in pounds/year

	Price	Racine	Richland	Rock	Rusk
1,3-BUTADIENE	9431.39	8899.81	9538.31	7161.30	9128.06
2378, TCDF	6.44E-06	6.78E-05	7.01E-06	5.56E-05	6.06E-06
2378, TCDD	2.45E-07	2.58E-06	2.67E-07	2.12E-06	2.31E-07
246, TRICHLOPHEN					
TOLUENE34DII					
ACENAPHTHEN	371.82	105.28	222.15	224.68	337.37
ACENAPHTHY	3741.21	2000.81	2152.77	4269.62	3394.60
ACETALDEHYDE	756.08	17551.35	24.29	14122.83	414.27
ACROLEIN	1504.54	16424.55	22.73	13220.14	387.67
ACRYLAMIDE					
ACRYLONITRIL	5.04	322.03	9.25	875.23	46.77
ANTHRACENE	418.14	143.44	254.58	306.10	379.41
ANTIMONY					
ARSENIC	18.88	19.76	2.04	377.35	1.75
ATRAZINE	426.14	3794.33	3183.79	13267.86	1458.72
BENZ(A)ANTHR	491.74	222.28	388.44	474.35	446.18
BENZENE	42131.35	85043.29	31292.85	91414.84	36306.80
BENZO(A)PYRE	237.20	810.47	129.36	714.03	203.40
BENZO(B)FLUO	187.81	62.69	117.27	133.78	170.41
BENZO(GHI))PERY	459.38	51.47	249.75	109.85	416.83
BENZO(K)FLUO	62.81	22.00	43.44	46.95	56.98
BERYLLIUM	0.18	1.96	0.20	54.36	0.17
CADMIUM	357.82	3213.76	331.80	2659.11	286.80
CARBON TETRA	49.09	21.31	21.06	36.88	22.83
CHLOROFORM	22638.23	181.27	17.82	142.97	157.67
CHROMIUM	1029.54	908.43	46.74	2465.65	36.05
CHROMIUM VI		0.60			
CHRYSENE	435.28	130.62	278.73	278.74	394.95
COBALT	134.80	1308.79	135.38	1072.96	182.88
COPPER	3.20	809.49	253.49	1108.03	3.01
DIBUTYL PHTH	1762.99	7266.12		3807.97	
DIBENZAHAN	98.98	6.49	64.84	13.86	89.81
DICHLORETH ETHR					
DIEYLHEX PHTH		8.00			
ETHYLBENZENE	57100.35	47408.18	2783.44	34181.54	2691.14
DIBROMOETHANE	94.67	553.00	50.66	1013.59	59.67
DICHLORETH12	14.67	29.50	15.89	15.48	19.52
ETHYLENE OXIDE	10611.94	64125.98	5749.31	123539.74	6721.03
FLUORANTHENE	507.61	202.97	320.13	433.13	460.58
FLUORENE	691.62	245.56	425.01	524.03	627.55
FORMALDEHYDE	31164.97	59864.15	1197.15	51768.27	1594.14
GLYCOL ETHERS	10907.84	76434.04	941.24	292749.95	871.98
HEXCHBENZENE	1.65E-04	1.47E-03	1.23E-03	5.13E-03	5.64E-04
HYDRAZINE					
INDN(123CD)PY	79.94	9.18	67.60	19.60	72.53
LEAD	9.27	97.73	10.10	80.12	8.72
MANGANESE	21.57	1870.18	21.02	2832.78	20.07
MERCURY	2.93	2.49	0.25	35.93	0.22
TCE, 111	30839.29	324021.22	48919.97	379190.97	14729.87
METHYLENE CL	7009.88	179408.96	10097.08	96915.38	19953.06
METHENE (B) 4-				44.00	
NAPHTHALENE	9977.52	42193.03	7212.46	23050.63	9173.64
NICKEL	256.32	495.41	50.45	1792.81	43.84
PENTACLPHENOL					
PHENANTHRENE	8176.36	1722.39	7333.98	3675.48	7418.85
PHENOL	3671.00	2988.00			
PYRENE	533.00	233.83	315.99	498.99	483.61
STYRENE	501.15	4658.54	401.39	700.83	1858.77
PERC	8671.14	118544.52	14462.64	122909.43	3433.04
TOLUENE	104472.37	531617.45	69723.59	587430.24	61584.81
PCBS					
TRICHLOROETHY	23442.02	310303.42	39750.75	351399.59	8366.37
VINYL CHLOR		130.88			
XYLENE,M	1043.42	3717.97	1164.98	8009.64	799.50
XYLENE,O	6829.53	17145.04	4890.88	32016.40	5486.40
XYLENE,P	613.10	3349.32	744.07	5709.93	397.52
XYLENES ISO	257885.56	603467.11	27279.72	678325.55	36977.43

Table I-1: Wisconsin Emissions by County in pounds/year

	Sauk	Sawyer	Shawano	Sheboygan	St. Croix
1,3-BUTADIENE	17753.00	8694.00	15279.25	4417.63	18800.56
2378, TCDF	1.88E-05	5.92E-06	1.47E-05	4.11E-05	1.88E-05
2378, TCDD	7.17E-07	2.26E-07	5.58E-07	1.56E-06	7.15E-07
246, TRICHLOPHEN					
TOLUENE34DII					
ACENAPHTHEN	348.70	336.82	497.52	166.96	230.68
ACENAPHTHY	3378.79	3389.10	6186.85	3172.74	2235.28
ACETALDEHYDE	1777.01		1702.42	8886.73	2215.79
ACROLEIN	1646.19		1593.12	9410.91	2073.54
ACRYLAMIDE					
ACRYLONITRIL	16.98	3.83	32.12	28.90	19.45
ANTHRACENE	399.59	378.79	595.98	227.46	264.35
ANTIMONY				565.63	
ARSENIC	5.48	1.71	4.44	101.91	5.46
ATRAZINE	7367.39	372.87	5171.10	5671.01	7203.49
BENZ(A)ANTHR	609.69	445.45	836.47	352.49	403.34
BENZENE	70457.12	36302.03	75212.05	72694.72	41159.08
BENZO(A)PYRE	277.98	185.07	337.12	453.00	229.68
BENZO(B)FLUO	184.09	170.13	267.54	99.41	121.78
BENZO(GHI))PERY	392.02	416.15	493.01	81.63	259.34
BENZO(K)FLUO	68.22	56.89	93.92	34.89	45.12
BERYLLIUM	0.54	0.17	0.46	4.12	0.54
CADMIUM	889.99	280.57	693.25	2339.00	886.29
CARBON TETRA	33.00	27.66	31.73	26.27	31.50
CHLOROFORM	50.73	14.94	139.27	115.25	54.48
CHROMIUM	112.07	35.26	590.52	1063.23	111.66
CHROMIUM VI				23.23	
CHRYSENE	437.50	394.31	605.75	207.13	289.43
COBALT	363.50	114.34	282.85	964.23	362.18
COPPER	1108.50	2.95	626.66	13033.01	1007.36
DIBUTYL PHTH	2594.90		1380.83	7781.25	2478.55
DIBENZAHAN	101.79	89.66	108.21	10.30	67.33
DICHLORETH ETHR					
DIEYLHEX PHTH				916.00	
ETHYLBENZENE	8062.11	3457.50	6047.02	49883.80	15729.43
DIBROMOETHANE	175.18	121.13	127.14	688.51	255.04
DICHLORETH12	28.38	14.02	26.35	10.33	30.00
ETHYLENE OXIDE	19960.40	13539.25	14475.76	78030.76	28870.58
FLUORANTHENE	502.49	459.83	769.59	321.87	332.43
FLUORENE	667.08	626.53	999.56	389.40	441.32
FORMALDEHYDE	9348.26	20654.13	6205.53	41046.56	8722.70
GLYCOL ETHERS	12751.57	1078.10	2036.05	84839.92	3135.51
HEXCHBENZENE	2.85E-03	1.44E-04	2.00E-03	2.19E-03	2.79E-03
HYDRAZINE				1.70	
INDN(123CD)PY	106.12	72.41	103.70	14.57	70.20
LEAD	307.13	8.53	21.12	27690.14	27.04
MANGANESE	523.76	19.74	843.61	4044.02	54.60
MERCURY	0.68	0.21	0.55	209.97	0.67
TCE, 111	117151.30	17930.79	37828.15	180170.47	106156.06
METHYLENE CL	24926.14	4782.37	9529.92	67517.67	38114.59
METHENE (B) 4-					0.50
NAPHTHALENE	30933.74	9124.83	15546.13	13855.89	12918.73
NICKEL	294.40	42.89	1133.59	1484.41	134.55
PENTACLPHENOL					
PHENANTHRENE	11510.67	7406.81	11943.91	2731.23	7615.00
PHENOL		1228.00	810.00	12863.09	
PYRENE	495.98	482.83	820.69	370.80	328.12
STYRENE	6276.64	527.09	604.02	8582.32	7921.99
PERC	40048.95	4451.21	12448.43	66764.74	34006.97
TOLUENE	175931.01	77257.59	120643.62	419787.18	192025.78
PCBS					
TRICHLOROETHY	92157.44	11468.47	21857.60	131352.34	166267.73
VINYL CHLOR					
XYLENE,M	2470.26	941.78	1445.16	2808.49	2547.04
XYLENE,O	10223.61	6955.25	10836.81	20725.62	10353.02
XYLENE,P	1669.01	508.82	775.68	2349.46	1658.60
XYLENES ISO	105777.79	32834.47	59402.32	506926.97	165183.84

Table I-1: Wisconsin Emissions by County in pounds/year

	Taylor	Trempealeau	Vernon	Vilas	Walworth
1,3-BUTADIENE	10251.58	11977.34	11898.01	9725.82	2094.68
2378, TCDF	7.12E-06	1.01E-05	1.03E-05	7.76E-06	2.94E-05
2378, TCDD	2.71E-07	3.85E-07	3.94E-07	2.96E-07	1.12E-06
246, TRICHLOPHEN					
TOLUENE34DII					
ACENAPHTHEN	406.81	259.40	319.31	246.43	101.71
ACENAPHTHY	4093.33	2513.46	3094.12	3064.57	1932.94
ACETALDEHYDE	752.53	1032.08	702.09	303.35	4130.92
ACROLEIN	704.22	965.82	657.02	283.87	3865.71
ACRYLAMIDE					
ACRYLONITRIL	4.79	10.53	10.25	12.02	180.43
ANTHRACENE	457.50	297.25	365.93	295.21	138.57
ANTIMONY					
ARSENIC	2.06	2.94	302.63	2.25	8.55
ATRAZINE	1819.31	5970.13	4031.98	24.58	9375.19
BENZ(A)ANTHR	538.03	453.54	558.31	414.33	214.74
BENZENE	44288.38	36386.69	42314.05	35115.09	39637.68
BENZO(A)PYRE	256.29	194.75	214.99	143.49	224.76
BENZO(B)FLUO	205.49	136.94	168.58	132.52	60.56
BENZO(GHI))PERY	502.62	291.62	358.98	244.20	49.72
BENZO(K)FLUO	68.72	50.74	62.46	46.52	21.25
BERYLLIUM	0.20	0.29	30.25	0.22	0.84
CADMIUM	337.16	477.62	489.40	366.92	1386.75
CARBON TETRA	26.66	24.84	30.45	27.27	27.53
CHLOROFORM	19.25	25.74	26.15	19.00	82.89
CHROMIUM	42.38	60.11	405.15	46.19	1052.81
CHROMIUM VI					
CHRYSENE	476.24	325.46	400.64	300.04	126.19
COBALT	137.40	194.97	379.54	149.76	567.15
COPPER	3.54	5.03	5.16	3.86	293.96
DIBUTYL PHTH		742.98	1135.50		3557.28
DIBENZAHAN	108.29	75.72	93.21	53.60	6.27
DICHLORETH ETHR					
DIEYLHEX PHTH					
ETHYLBENZENE	6101.41	4390.10	3546.17	2774.16	15683.72
DIBROMOETHANE	276.47	104.31	40.65	40.98	473.02
DICHLORETH12	15.96	19.09	19.15	16.33	26.21
ETHYLENE OXIDE	30836.71	11801.92	4731.24	4692.75	53737.99
FLUORANTHENE	555.39	373.79	460.13	381.20	196.08
FLUORENE	756.72	496.24	610.87	495.11	237.23
FORMALDEHYDE	2718.24	5520.85	2705.62	1447.68	14478.86
GLYCOL ETHERS	1768.33	11688.06	1270.03	971.77	4947.23
HEXCHBENZENE	7.04E-04	2.31E-03	1.56E-03	9.51E-06	3.63E-03
HYDRAZINE					
INDN(123CD)PY	87.47	78.94	97.18	51.37	8.87
LEAD	10.25	14.54	14.90	11.17	52.34
MANGANESE	23.77	29.01	30.86	22.62	1099.16
MERCURY	0.25	0.36	73.59	0.27	1.15
TCE, 111	17470.21	45408.90	30632.89	21468.36	215373.57
METHYLENE CL	6029.00	161951.37	7008.25	5039.29	45184.29
METHENE (B) 4-					
NAPHTHALENE	10985.81	8675.86	10053.87	8037.56	11374.50
NICKEL	51.55	72.60	495.93	55.83	1124.37
PENTACLPHENOL					
PHENANTHRENE	8945.90	8562.74	10540.88	5916.25	1663.95
PHENOL					
PYRENE	583.16	368.96	454.19	406.51	225.90
STYRENE	508.19	21116.41	580.41	519.45	518.64
PERC	3857.83	12490.50	7545.13	5234.82	102480.70
TOLUENE	138545.82	154176.39	77172.09	63386.33	285859.13
PCBS					
TRICHLOROETHY	9426.73	33488.09	19361.06	13347.18	575723.01
VINYL CHLOR					
XYLENE,M	1307.96	1331.48	1055.93	860.66	4319.03
XYLENE,O	11432.60	6683.15	5915.03	4921.53	15185.55
XYLENE,P	723.52	795.93	559.90	444.20	3033.68
XYLENES ISO	59948.16	61005.68	26855.82	22194.47	186269.63

Table I-1: Wisconsin Emissions by County in pounds/year

	Washburn	Washington	Waukesha	Waupaca	Waushara
1,3-BUTADIENE	8592.00	2439.38	7584.86	17790.87	10406.96
2378, TCDF	5.80E-06	3.51E-05	1.13E-04	1.81E-05	8.10E-06
2378, TCDD	2.21E-07	1.34E-06	4.30E-06	6.90E-07	3.09E-07
246, TRICHLOPHEN					
TOLUENE34DII			10.00		
ACENAPHTHEN	287.79	185.19	187.46	390.15	241.75
ACENAPHTHY	2895.77	3519.31	3562.18	5689.81	3525.76
ACETALDEHYDE		4810.71	14958.13	2261.74	822.30
ACROLEIN		4501.87	13997.81	5085.74	769.51
ACRYLAMIDE					
ACRYLONITRIL	52.34	86.13	196.70	13.18	5.97
ANTHRACENE	323.65	252.30	255.38	484.27	300.07
ANTIMONY	4.40		845.80		
ARSENIC	1.68	10.21	32.84	5.30	2.35
ATRAZINE	1048.97	3507.50	4031.98	5179.30	3573.06
BENZ(A)ANTHR	380.61	390.99	395.76	650.92	403.34
BENZENE	31505.87	56004.78	121738.33	115730.56	39835.34
BENZO(A)PYRE	158.14	291.25	733.94	290.57	154.83
BENZO(B)FLUO	145.37	110.27	111.62	213.70	132.41
BENZO(GHI))PERY	355.57	90.54	91.65	341.13	211.38
BENZO(K)FLUO	48.61	38.69	39.18	72.53	44.93
BERYLLIUM	0.16	1.01	3.25	0.53	0.23
CADMIUM	274.75	1677.84	5338.09	856.37	382.97
CARBON TETRA	24.46	24.20	47.47	30.09	24.81
CHLOROFORM	14.97	110.90	338.71	49.05	20.12
CHROMIUM	34.55	1019.82	4085.41	1050.76	58.21
CHROMIUM VI		383.21	32.00	2.42	
CHRYSENE	336.90	229.76	232.56	466.61	289.14
COBALT	112.02	738.84	2205.65	349.83	156.37
COPPER	2.89	2207.72	2722.46	967.91	4.03
DIBUTYL PHTH		14913.01	44344.24	5285.01	
DIBENZAHAN	76.61	11.42	11.57	62.73	38.86
DICHLORETH ETHR					
DIEYLHEX PHTH		140.00			
ETHYLBENZENE	5051.14	14418.78	64320.18	62112.67	17078.91
DIBROMOETHANE	233.68	133.27	1161.76	3001.08	1054.14
DICHLORETH12	19.78	18.67	50.01	27.61	16.31
ETHYLENE OXIDE	26024.60	16468.91	134082.61	333620.35	117171.04
FLUORANTHENE	392.90	357.02	361.39	639.17	396.05
FLUORENE	535.33	431.94	437.20	815.62	505.40
FORMALDEHYDE	267.85	36329.42	59996.42	16396.63	2983.00
GLYCOL ETHERS	1425.32	98135.90	228118.90	12067.01	4390.98
HEXCHBENZENE	4.06E-04	1.36E-03	1.56E-03	2.00E-03	1.38E-03
HYDRAZINE					
INDN(123CD)PY	61.88	16.16	16.36	54.89	34.00
LEAD	23.95	50.56	467.53	5026.12	11.66
MANGANESE	18.59	195.23	3169.44	15047.51	22.90
MERCURY	0.23	1.29	24.15	0.64	0.29
TCE, 111	25456.59	179145.14	711611.41	56391.15	26616.76
METHYLENE CL	7146.70	67453.07	191084.43	34407.76	63977.52
METHENE (B) 4-			54.00	528.00	
NAPHTHALENE	8042.94	16725.43	55993.68	14186.41	8266.24
NICKEL	41.94	1111.35	3230.01	694.59	58.30
PENTACLPHENOL					
PHENANTHRENE	6328.66	3029.58	3066.48	6981.99	4326.48
PHENOL		14.00	1225.00	15648.50	
PYRENE	412.54	411.31	416.32	713.66	442.22
STYRENE	464.63	497.08	70797.66	573.29	472.91
PERC	7084.49	60844.47	282481.57	20068.82	6808.58
TOLUENE	102154.30	261569.66	1016344.95	781870.90	293770.41
PCBS					
TRICHLOROETHY	18810.85	128862.45	565524.18	35258.80	17761.96
VINYL CHLOR		136.00			
XYLENE,M	1240.31	1670.15	8209.44	7486.79	2962.17
XYLENE,O	9121.37	7932.95	35632.09	77698.54	29043.44
XYLENE,P	735.34	1581.31	7434.94	4810.52	1854.28
XYLENES ISO	51963.30	227980.99	855111.37	625112.98	186548.96

Table I-1: Wisconsin Emissions by County in pounds/year

	Winnebago	Wood	State Total
1,3-BUTADIENE	8121.66	26025.92	833153.75
2378, TCDF	5.66E-05	2.92E-05	1.94E-03
2378, TCDD	2.16E-06	1.11E-06	3.10E-03
246, TRICHLOPHEN			12783.93
TOLUENE34DII			164.91
ACENAPHTHEN	173.36	468.38	19439.35
ACENAPHTHY	3294.21	6830.51	260667.91
ACETALDEHYDE	16016.76	62456.04	651286.24
ACROLEIN	15207.28	7896.26	328514.65
ACRYLAMIDE	255.00	1.47E-03	255.00
ACRYLONITRIL	89.80	66.00	3919.18
ANTHRACENE	236.17	581.36	23705.26
ANTIMONY		3184.52	4864.22
ARSENIC	40.62	273.95	5368.70
ATRAZINE	5048.18	3269.84	316404.33
BENZ(A)ANTHR	365.98	781.43	33115.03
BENZENE	100970.29	89734.58	4117741.96
BENZO(A)PYRE	773.78	531.71	24804.51
BENZO(B)FLUO	103.23	256.54	10586.12
BENZO(GHI))PERY	84.76	409.54	18066.94
BENZO(K)FLUO	36.23	87.08	3677.95
BERYLLIUM	19.66	0.84	665.57
CADMIUM	2690.13	1411.47	94157.98
CARBON TETRA	27.06	3807.26	6505.96
CHLOROFORM	132392.52	73732.17	459809.35
CHROMIUM	601.84	195.92	52473.74
CHROMIUM VI	0.78		597.96
CHRYSENE	215.07	560.18	23581.89
COBALT	1092.76	564.14	39400.87
COPPER	699.33	14.59	47827.44
DIBUTYL PHTH	32712.35	3041.05	326116.68
DIBENZAHAN	10.70	75.31	3748.71
DICHLORETH ETHR			923.15
DIEYLHEX PHTH			2263.74
ETHYLBENZENE	28583.38	17652.55	1230334.68
DIBROMOETHANE	145.00	661.38	27240.71
DICHLORETH12	18.40	669.97	2308.14
ETHYLENE OXIDE	18328.17	74210.28	3101364.46
FLUORANTHENE	334.19	767.31	30994.00
FLUORENE	404.31	979.14	39859.56
FORMALDEHYDE	60319.49	54793.40	1445852.16
GLYCOL ETHERS	71791.63	6848.07	2628579.87
HEXCHBENZENE	1.95E-03	1.26E-03	1.22E-01
HYDRAZINE			1.70
INDN(123CD)PY	15.13	65.90	3554.68
LEAD	83.00	42.12	60410.10
MANGANESE	1658.02	2309.04	85796.60
MERCURY	5.67	1151.71	5993.05
TCE, 111	362937.28	120828.11	8833147.38
METHYLENE CL	74359.19	30412.27	3016376.60
METHENE (B) 4-			626.50
NAPHTHALENE	28884.52	30932.62	1165519.89
NICKEL	648.50	1344.14	49996.50
PENTACLPHENOL			20886.33
PHENANTHRENE	2835.81	8381.73	425657.28
PHENOL	5.15	16001.71	168238.10
PYRENE	385.00	856.74	33675.18
STYRENE	512.93	614.71	1199796.12
PERC	184466.73	42332.32	3345812.84
TOLUENE	1062041.66	448479.07	20134772.73
PCBS			2.07
TRICHLOROETHY	297824.75	86346.88	7506393.01
VINYL CHLOR			459.63
XYLENE,M	6103.40	3816.76	194107.52
XYLENE,O	10292.55	24094.92	1017508.80
XYLENE,P	4373.75	2421.96	133081.13
XYLENES ISO	456527.33	240796.23	14743910.36

J. Architectural Surface Coating

PREFERRED EMISSION CALCULATION METHODS

1. Survey
   EIIP (Volume III - Area Sources) describes the ideal survey in detail.

2. Apply speciation profiles to the VOC emission estimate
   Although the survey approach is the preferred method of emission estimation, it is costly and time consuming. Applying speciation profiles to a VOC emission estimate is the more feasible alternative. Architectural surface coating speciation profiles are obtained from the California Air Resource Board Speciation Manual (CARB, 1991, VOC Profile 196 and 717). The pollutants pertinent to RAPIDS for the solvent-based paint profile are Ethylbenzene, Isomers of Xylene and Toluene and for the water-based paint profile are Benzene and Methylene Chloride. All compounds are classified as VOC. The speciation profiles listed for the compounds are given in Table J-1.

Table J-1: Speciation Profile for Architectural Surface Coating (CARB, 1991)

Air Toxin (TOX)		Speciation (TOX/VOC), % by wt
Solvent based paints	Ethylbenzene	4.3
	Isomers of Xylene	2.6
	Toluene	5.2
Water based paints	Benzene	0.3
	Methylene chloride	5.5

EMISSION FACTOR

The emission factors used in calculating the VOC emissions were acquired from the STAPPA-ALAPCO-EPA EIIP (Emission Inventory Improvement Program), Volume III, July 1997.

Since resources may be unavailable for accounting actual usage of architectural coatings in a given state, the 1996 population census can be used to determine the paint usage in each county. The paint usage is also acquired from EIIP, July 1997 and this data is based upon the U.S. Bureaus of Census MA28F - Paint and Allied Products - a compilation of national usage data.

Table J-2: VOC Emission Factors and Paint Usage Factors

Paint Type	VOC Emission Factor (lb/gal)	Usage Factors (gal/person)
Solvent-Based Paint	3.87	0.59
Water-Based Paint	0.74	1.82

VOC EMISSION ESTIMATE

The following equations provide an estimation of VOC emissions using the population data, the paint usage factors and the appropriate emission factors.

VOC_{wb} = Population * 1.82 gal/person * (0.74 lb/gal)
VOC_{sb} = Population * 0.59 gal/person * (3.87 lb/gal)

where,

VOC_{wb} = Total VOC emitted from water-based paint for a county
VOC_{sb} = Total VOC emitted from solvent-based paint for a county

Using the estimated VOC emissions calculated above for each paint type, the TOX emissions from solvent-based and water-based paints were calculated by applying the appropriate speciation profiles from Table J-1 for the two paints in the following equation.

E = VOC * TOX/VOC

where,

E = Emissions of a pollutant, lb/yr
VOC = Total VOC for a county for each paint type, lb/yr
TOX/VOC = Ratio of TOX/VOC for each paint type, % by weight

REFERENCES

Environmental Protection Agency (EPA). *STAPPA-ALAPCO-EPA Emission Inventory Improvement Program (EIIP).* Volume III - Area Sources Preferred and Alternative Methods. July 1997.

California Air Resources Board (CARB). 1991. *Air Resources Board Speciation Manual Identification of Volatile Organic Compound Species Profiles*. Emission Inventory Branch. Profile 783. 1991.

Environmental Protection Agency (EPA). 1991. *Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone*. Volume 1. General Guidance for Stationary Sources. Research Triangle Park, NC. May 1991. 234P.

K. Autobody Refinishing

The following is a summary of preferred and alternative methodologies for estimating toxic emissions from the auto body refinishing area source category. All quotes and information contained within are from the source, Emission Inventory Improvement Program, Volume 3, Chapter 11, *Auto Body Refinishing*.

OVERVIEW

"Auto body refinishing is the repairing of worn or damaged automobiles, light trucks, and other vehicles, and refers to any coating applications that occur subsequent to those at original equipment manufacture (OEM) assembly plants." "This source category covers solvent emissions from the refinishing of automobiles, including paint solvents, thinning solvents, and solvents used for surface preparation and cleanup." Auto body refinishing also, can be both an area and a point source (SIC 7532). Therefore, states will need to adjust their area source estimations by removing total point source emissions.

ASC: 2401005000

VOC emissions are influenced by

1) VOC content of the product used
2) transfer efficiency of spraying equipment
3) cleanup/housekeeping practices
4) regulations

METHODOLOGY

Table K-1: Descriptions of Different Methods for Calculating Emissions

Methods	Description
Preferred Method – Survey	Gather detailed information from auto body refinishing operations. This may include information on activity (number of partial/complete refinishing jobs performed, temporal resolution of activity, etc.), number of employees, product use by product category, type of equipment used, pollution control measures used, business projections, etc. These data are then reviewed and compiled to develop an accurate description of the auto body refinishing activity in the survey area. Emission factors can be developed from specific product data such as Material Data Safety Sheets or can be based on typical VOC content ranges for product types.

Alternate Method 1 - Apportion National Data	Use national data on the number of refinishing jobs performed in year, apportion to inventory area by population to estimate activity. Use estimate of typical amount of surface preparation, coating, and cleaning products and typical VOC contents to estimate emissions.
Alternate Method 2 - Per Employee Factor	Use per employee emission factor and number of employees in inventory area to estimate emissions.
Alternate Method 3 - Per Capita Factor	Use per capita emission factor and population in inventory area to estimate emissions.

Table K-2: Data Elements Needed for Each Method

Data Element	Method			
	Preferred[a]	Alt 1[b]	Alt 2[c]	Alt 3[d]
Number of refinish jobs completed	x	x		
Type and amount of product used by product type or by specific product	x	x		
VOC content of product type or of specific product	x	x		
Population (inventory area and/or U.S.)		x		x
Amount of product type used by activity (surface preparation, coating, cleaning)	x	x		
Employment in SIC 7532 in inventory area[e]			x	
Per capita emission factor				x
Per employee emission factor			x	

[a]Preferred method is the survey method.
[b]Alt 1 method is the apportion national data method.
[c]Alt 2 method is the per employee factor method.
[d]Alt 3 method is the per capita factor method.

EMISSION CALCULATIONS

1) **Survey Method** - (Use EIIP for examples of surveys and additional ideas on how to implement this method)

Emissions = amount of product (gal) * product VOC content (lbs/gal) ÷ 2000 lbs/ton
Sum emissions of all products

An alternative to this method is to assume that the number of jobs performed in an area is directly proportional to the area's population. Using the latest national figures on refinishing jobs performed:

# of jobs in the area of estimation is = US total jobs * (area population/US population)

The next step is to calculate emissions by:
Emissions=# of jobs in area * gal product per job * VOC content in lbs/gal ÷ 2000 lbs/ton

2) **Per Employee**

Emissions=area employment in SIC 7532*employee EF of lbs VOC/yr ÷ 2000 lbs/ton

Employee EF for VOC from EIIP document = 3,519 lbs/employee/yr

3) **Per Capita**

Emissions = population * lbs VOC/person/yr ÷ 2000 lbs/ton

***Per capita EF for VOC in Rapids is 0.84 lbs/person/yr
Per capita EF for VOC from EIIP document is 2.3 lbs/yr/person***

The per capita emission factor of 2.3 lbs per person is referenced from, Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources.

SPECIATION

ASC: 2401005000
Profile Name Auto Body Repair
Profile Code: 1194

000071-43-2	Benzene	0.0151 lbs/lbs VOC
000084-74-2	Dibutyl Phthalate	0.0001 lbs/lbs VOC
000091-20-3	Naphthalene	0.0146 lbs/lbs VOC
000108-88-3	Toluene	0.0865 lbs/lbs VOC
001330-20-7	Xylene, (m, o, & p mixture)	0.2067 lbs/lbs VOC

Adjusting for regulations and control

EF_A	=	emission factor for pollutant A
Q	=	activity factor for category
CE	=	control efficiency/100
RP	=	rule penetration/100
RE	=	rule effectiveness/100
UAE_A	=	uncontrolled area source emissions of pollutant A
CAE_A	=	controlled area source emissions of pollutant A

Adjustments to preferred survey method

CAE SUB A~=~(UAE SUB A)[1~-~(CE)(RP)(RE)]

Adjustments to other methods using emission factors and activity data

CAE SUB A~=~(EF SUB A)(Q)[1~-~(CE)(RP)(RE)]

An example calculation to determine CE is included below and based on the following background information:

> New York had a regulation in place affecting the NY Metropolitan Area (NYMA) nonattainment area before the inventory year being developed. This regulation established controlled VOC limits of:
>
> Touch up/repair products = 6.2 lbs VOC/gal (lacquers)
> Full paint job products = 5.0 lbs/gal (enamels)
>
> The average 1990 uncontrolled VOC content = 6.75 lbs VOC/gal per "Meeting the 15-Percent Rate-of-Progress Requirement Under the Clean Air Act," dated September 1993 as provided by STAPPA/ALAPCO. Additional information provided by EPA document, Reduction of Volatile Organic Compound Emissions from Automobile Refinishing, indicates that:
>
> 53% of total usage is for full paint jobs
> 47% is for touch up/repair jobs
>
> Because New York State's existing regulation (6NYCRR Part 228) limits VOC below this uncontrolled average VOC content value, the calculation below needs to be made to estimate control efficiency.
>
> CE=(0.47[(6.75-6.2)/6.75]+(0.53[(6.75-5.0)/6.75])*100
> CE=17.6%
>
> RP=50% based on good engineering judgement
> RE=80% EPA default based on good engineering judgement

Any federal regulations affecting the area source need to also, be considered. In the case of auto body refinishing, a federal regulation was promulgated in September, 1998. While it is arguable that VOC limits in auto body refinishing coatings have decreased in anticipation of this regulation, it is most likely that adjustments to actual emissions would be made beginning with the 1999 inventory year.

Spatial and temporal resolution

Emissions would most appropriately be represented by county except where attainment designations require a further breakdown. While EPA reports no evidence of seasonal variation, there may be a correlation between number of accidents and seasons. Accident statistics may be an indicator for increases or decreases in refinishing. Daily resolution of refinishing activity has been reported as being typically five days of the week.

RECOMMENDATIONS

Although the preferred method is to survey auto refinishing facilities including original coating facilities which may also refinish autos, each state and province needs to assess whether or not this is feasible. There are other alternatives such as employee and per capita based estimation techniques which enables states to estimate emissions for this source category when the preferred method is not feasible.   When using other alternative methods, states should use the most recent emission factors available.

When estimating emissions using emission factors, each state and province will need to use the latest published emission factors available. It is important that point source estimates are subtracted out from the area source estimates. Additional work may need to be performed, as demonstrated within, in order to account for regulations and controls on the industry.

L. Consumer and Commercial Solvent Use

OVERVIEW

All quotes and information contained within are from the source, Emission Inventory Improvement Program, Volume 3, Chapter 5, *Consumer and Commercial Solvent Use*. The consumer and commercial solvent source category includes a wide array of products including personal care products, household cleaning products and household pesticides. However, all VOC emitting products used by businesses, institutions and numerous industrial manufacturing operations are also included. Products included in this category are shown in Table K-1. The majority of VOC's introduced into the atmosphere from this category is a result of evaporation of the solvent contained in the product or from the propellant. There are two methods for estimating emissions for consumer and commercial solvent use recommended by the Emissions Inventory Improvement Program (EIIP). The choice as to which one is employed depends on the desired level of accuracy as well as available data and resources.

ASC: 2465000000

METHODOLOGY

The two methodologies for estimating emissions of VOC's and HAP's from this source category are outlined below.

VOC's

-Use of national average per capita emission factors adjusted for state or local emission limits.
-Surveying consumer and commercial product use or sales in the inventory area.

The former population based method is preferred for emissions estimating. Surveying may be more accurate but will be quite expensive if done correctly. The procedure for the preferred method is outlined below:

- Identify applicable state and local regulations;
- Create a database or spreadsheet with per capita emission factors for the source categories of interest;
- Obtain population data for the base year of interest and allocate it to geographic areas as needed;
- Multiply per capita emission factors by population to obtain overall emissions estimates;
- Adjust estimated emissions for applicable regulations as needed.

Example:

To estimate VOC emissions from personal care products:

Emissions = Population x Per Capita Emission Factor

Given a population of 1 million persons for a particular area, the VOC emissions from personal care products would be:

1,000,000 persons x 2.32 lbs VOC's/person/year = 2,320,000 lb VOC/year
= 1,160 tons VOC/year

HAP's

-Use of national average per capita emission factors adjusted for state or local emission limits.
-Identify speciation profiles and apply them to the VOC emissions estimate developed using the alternative method.

The population based method is again the preferred method with adjustments made for state and local regulations on this industry.

An alternative procedure for estimating VOC and HAP emissions would include:

- Perform a survey of distributors and retailers or consumers of consumer and commercial products in the inventory region;
- Obtain data on the amounts of products sold or used in the inventory region;
- Estimate the total amount of VOC's (or HAP's) emitted in the inventory region from consumer and commercial products.

DATA NEEDED

Data needs for estimating the emissions of VOC's and HAP's from this source category are as follows:

Population-based method:

- Population in the inventory area.
- National average per capita emission factors.
- Information on state and local regulations.

Survey method:

-Product type.
-Product amount distributed or used by type (weight or volume).
-Product density.

EMISSION FACTORS

Table L-1: Consumer and Commercial Solvent Product Categories and Emission Factors

Product Category	Per Capita Emission Factor (lb VOC/Person)
Personal Care Products	2.32
Household Products	0.79
Automotive Aftermarket Products	1.36
Adhesives and Sealants	0.57
FIFRA-Regulated Products	1.78
Coatings and Related Products	0.95
Miscellaneous Products	0.07
Total for All Consumer and Commercial Products	7.84

SPECIATION

ASC: 2465000000

Profile code: 0197 - didn't use speciation factors associated with this profile code but, those provide by EIIP below

Table L-2: Per Capita Consumer and Commercial Solvent HAP Emission Factors (lb/yr/person)

CAS code	Chemical name	Per Capita Emission Factor (lb /Person)
000071-43-2	Benzene	4.72e-06
000056-23-5	Carbon tetrachloride	4.10e-10
000067-66-3	Chloroform	9.91e-04
	Dibenzofuran	8.07e-06
000107-06-2	Ethylene dichloride	4.65e-06
000100-41-4	Ethyl benzene	2.07e-03
000075-21-8	Ethylene oxide	1.51e-02
000050-00-0	Formaldehyde	1.26e-03
	Glycol ethers	4.04e-02
000075-09-2	Methylene Chloride	3.64e-02
000091-20-3	Naphthalene	4.61e-02
000127-18-4	Perchloroethylene	2.82e-02
000108-88-3	Toluene	4.29e-01
000071-55-6	1,1,1-Trichloroethane	3.87e-01
000079-01-6	Trichloroethylene	4.86e-04
001330-20-7	Xylenes, m,o, & p	2.03e-01

Table L-3: Per Capita Consumer and Commercial Solvent HAP Emission Factors by Category (lb/yr/person).

Pollutant	Personal Care Products	Household Products	Automotive Aftermarket Products	Adhesives & Sealants	FIFRA-Regulated Products[b]	Coatings & Related Products	Misc.	Overall Emission Factor (lb/yr/person)
Acetamide	1.38E-07							1.38E-07
Acetophenone						8.53E-06		8.53E-06
Acrylic acid				3.94E-09				3.94E-09
Benzene			4.72E-06					4.72E-06
Carbon tetrachloride						4.10E-10		4.10E-10
Chlorobenzene					7.16E-02	1.51E-05		7.16E-02
Chloroform			3.60E-05			9.55E-04		9.91E-04
Dibenzofurans				8.07E-06				8.07E-06
1,4-Dichlorobenzene		4.79E-02			3.52E-02			8.31E-02
1,2-Dichloroethane	4.62E-06	3.52E-08						4.65E-06
1,3-Dichloropropene					1.60E-01			1.60E-01
Dimethyl formamide	2.71E-05		2.78E-08	2.29E-07			7.43E-06	3.49E-05
1,4-Dioxane				1.09E-05				1.09E-05
Ethyl benzene		2.56E-06	7.51E-05	1.36E-05	1.30E-03	6.86E-04		2.07E-03
Ethylene oxide					1.51E-02			1.51E-02
Formaldehyde		6.74E-06		2.51E-05	3.81E-04	8.55E-04		1.26E-03
Glycol ethers	1.52E-05	5.31E-03	2.69E-02	1.28E-04	5.65E-03	2.24E-03	2.42E-04	4.04E-02
Hexane		2.09E-03	3.53E-03	7.83E-02		2.39E-03		8.63E-02
Hydrochloric acid		1.75E-06						1.75E-06
Hydrogen fluoride		8.75E-08	1.41E-05					1.41E-05
Isophorone					9.47E-04			9.47E-04
Methanol	5.67E-07	6.66E-04	6.61E-01	6.82E-04	9.48E-04	1.60E-02	1.84E-02	6.97E-01
Methyl bromide					2.22E-01			2.22E-01
Methyl ethyl ketone	1.75E-05	4.49E-04	3.04E-03	3.91E-02	2.01E-05	7.94E-03	1.01E-05	5.06E-02
Methyl isobutyl ketone		1.08E-04	8.73E-04	1.24E-03	9.01E-05	5.26E-03		7.57E-03
Methyl-tert-butyl ether			2.36E-05					2.36E-05
Methylene chloride		2.39E-03	4.83E-03	8.78E-03	6.81E-04	1.97E-02	2.38E-05	3.64E-02
Naphthalene		5.52E-07	2.26E-06	1.07E-04	4.60E-02	5.75E-06		4.61E-02
2-Nitropropane				2.12E-06				2.12E-06
Perchloroethylene		2.96E-03	2.35E-02	6.75E-04	1.92E-04	1.48E-04	7.53E-04	2.82E-02
Toluene	3.41E-03	5.82E-04	2.49E-02	8.43E-02		3.16E-01	2.46E-06	4.29E-01
1,1,1-TCE	7.45E-04	2.85E-02	7.63E-02	2.14E-01	5.99E-02	7.69E-03	2.46E-04	3.87E-01
Trichloroethylene		4.34E-05	2.67E-04	3.88E-05		1.37E-04		4.86E-04
Triethylamine					3.13E-04	5.26E-04		8.39E-04
Vinyl acetate				4.94E-08				4.94E-08
Xylenes		3.28E-03	1.20E-02	9.76E-03	1.37E-01	4.05E-02	4.31E-04	2.03E-01

When estimating emissions using emission factors, each state and province will need to use the latest published emission factors available. It is important that point source estimates are subtracted out from the area source estimates. Additional work may need to be performed, as demonstrated below, in order to account for regulations and controls on the industry.

Adjusting for regulations and control of VOC and HAP's

EF_A	=	emission factor for pollutant A
Q	=	activity factor for category
CE	=	control efficiency/100
RP	=	rule penetration/100
RE	=	rule effectiveness/100
UAE_A	=	uncontrolled area source emissions of pollutant A
CAE_A	=	controlled area source emissions of pollutant A

Adjustments to preferred method using emissions factors and activity data

$$CAE_A = (EF_A)(Q)[1 - (CE)(RP)(RE)]$$

Adjustments to survey method

$$CAE_A = (UAE_A)[1 - (CE)(RP)(RE)]$$

Example:

New York has a regulation in place affecting various product subcategories of the categories listed in Table L-3. Hair spray, antiperspirants, deodorants, and all purpose cleaners had limits on the % VOC by weight of the products in these subcategories pursuant to 6NYCRR Part 235. The products regulated make up only parts of several categories listed in Table L-3. Therefore, when estimating emissions, CE and RP need to be calculated per affected category (see Table L-3) as follows:

RP = per capita emissions of regulated portion of category/per capita emissions of all products in category)*100

RE = 80% EPA default based on good engineering judgement (RE of 100 for federal regulation)

CE = (Uncontrolled VOC content - controlled VOC content)/uncontrolled VOC *100

Calculate speciated contaminant and VOC emission estimates with CE, RE, & RP calculated for the relevant category using the formula for the preferred method above.

Refer to Appendix A of the Emission Inventory Improvement Program, Volume 3, Chapter 5, *Consumer and Commercial Solvent Use* for additional information on product types per category and associated per capita emissions estimates.

Spatial and temporal resolution

Emissions would most appropriately be represented by county except where attainment designations require a further breakdown. Consumer and commercial product use is not influenced by season. While some exceptions can be noted as with pesticide use and with products like windshield washer (which typically has a higher VOC content in colder climates and seasons), there is no significant difference in the use between seasons. Daily resolution of product use is 7 days per week.

M. Chromium Electroplating

Chromium electroplating and anodizing operations include hard chromium, decorative chromium, decorative trivalent chromium, and chromic acid anodizing. Chromium electroplating and anodizing operations produce chromic acid mists. As these mists escape into the air, chromium emissions are released. As a result, these operations produce significant emissions of hexavalent chromium and chromium compounds. This section will focus on chromium emissions from chromic acid operations, hard and decorative hexavalent chromium electroplating operations. Decorative trivalent electroplating operations will not be included due to lack of information available for estimating emissions. Chromium electroplating and anodizing operations are regulated by the NESHAP for Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks, finalized on January 25, 1995.

Source Identification

Chromium electroplating operations are classified under the Standard Industrial Classification Code (SIC) 3471 - Plating and Polishing.

The following codes were found for chromium electroplating operations in the Source Classification Code (SCC) list:

3	Industrial Processes
309	Fabricated Metal Products
309010	Electroplating Operations
30901018	Hard Chromium Electroplating - Uncontrolled
30901028	Decorative Chromium Electroplating - Uncontrolled
30901038	Chromic Acid Anodizing Tank - Uncontrolled and Packed Scrubber

The following codes were found for electroplating and anodizing operations in the Area and Mobile Source Code (AMS) list:

A23	Industrial Processes
A2309	Fabricated Metals
A2309100	Coating, Engraving, and Allied Services
A2309100010	Electroplating
A2309100050	Anodizing

Pollutants

The targeted pollutant emissions of concern for chromium electroplating operations are Chromium and Chromium VI (hexavalent chromium).

Emission Factors

There were no emission factors found for any of the applicable AMS codes in the FIRE database. The following emission factors were found in FIRE for the corresponding SCC codes.

Table M-1: Emission Factors from FIRE 5.1B

Pollutant	**SCC Code**	**Description**	**Factor Quality**	**Emission Factor** (lb/1000 amp-hr)
Chromium VI	30901018	Hard Chrome - Electroplating	B	0.12
Chromium VI	30901028	Decorative Chrome - Electroplating	D	0.033
Chromium VI	30901038	Chromic Acid Anodizing (uncontrolled)	D	2.0 (lb/1000hr-ft^2)
Chromium VI	30901038	Chromic Acid Anodizing (packed bed scrubber)	D	0.0096 (lb/1000hr-ft^2)

All emission factors are from FIRE 5.1, Version B, but are referenced from EPA AP-42, Supplement B, October 1996.

Because emissions from chromium electroplating are considered area source emissions, the final emissions estimates will be included in the inventory with the appropriate AMS code, A2309100010 or A2309100050.

Facility Identification

Applicable chromium electroplating facilities were identified by using the Initial Notification forms submitted to the PCA by electroplating facilities as required by the NESHAP for chromium electroplating facilities (subpart N). The initial notification forms provided information such as type of process, rectifier capacity (amperes), and location of the facility. Only those facilities with hexavalent chromium operations were included for the inventory. Trivalent chromium operations are significantly less toxic. In addition, emission factors and calculation methods for trivalent chromium were difficult to find.

Although some electroplating facilities do have fume suppressant equipment or incorporate some other type of emissions control method, the emission factors from FIRE are for uncontrolled systems. Therefore, these factors will be applied for all electroplating operations. One chromic anodizing facility in Minnesota has a packed bed scrubber for emissions control, but this facility is included in the point source inventory and therefore, the emissions from this facility were not included in the area source inventory. The emission factor for chromic anodizing with a packed bed scrubber is shown in Table M-1 for reference.

Data was gathered using the information contained in the NESHAP Initial Notification forms, the facilities' Compliance Certification reports for the NESHAP, facility performance test results, and by calling the facilities directly and requesting any additional information needed. Table M-2 shows a summary of the data collected.

Emission Estimation

Total chromium emissions from hard and decorative chromium electroplating for each county are calculated by multiplying the total production ampere-hours per year by the appropriate emission factors in Table M-1. The following equation is an example calculation used to determine the chromium emissions at each facility.

$$E = EF \times PR$$

where:
- E = Chromium emissions (lb/yr)
- EF = Chromium emission factor from FIRE (lb/A-hr)
- PR = total production rectifier ampere-hours per year (Amp-hr/yr)

Emissions from chromic anodizing tanks were calculated using the operating hours of the unit and the surface area of the tank, then multiplying by the appropriate emission factor.

$$E = EF \times SA \times OP$$

where:
- E = Chromium emissions (lb/yr)
- EF = Chromium emission factor from FIRE (lb/ft^2-hr)
- SA = Surface area of the anodizing tank (ft^2)
- OP = Operating hours of the unit (hr/yr)

The emission factors from FIRE are specific to hexavalent chromium emissions. Therefore, all emissions calculated using the emission factors in Table M-1 are hexavalent chromium emissions. It can be assumed that 75 percent of chromium emissions are hexavalent, therefore, total chromium emissions can be back-calculated from the hexavalent chromium emissions.

After each facility's emissions were calculated, process emissions were totalled by county. Those emissions are included in Table M-3.

Table M-2: Facility-Specific Information for 1996

Facility Name	County	Tank type	1996 Activity	Units	EIS?
United Defense	Anoka	hard	1,440,000	Amp-hr	√
United Defense	Anoka	anodizing	28,800	ft^2-hr	√
Rapid Plating	Benton	dec. hex	6,240,000	Amp-hr	
North Star Plating	Crow Wing	dec. hex	10,500,000	Amp-hr	

Bo-Decor Metal Finishing	Dakota	dec. hex	1040	Amp-hr	
D.S. Manufacturing	Goodhue	dec. hex	2,265,655	Amp-hrs	
Douglas Corp. Plating Division	Hennepin	dec. hex	50,000,000	Amp-hr	√
Hard Chrome	Hennepin	hard	99,300,000	Amp-hr	
Hard Chrome	Hennepin	dec. hex	720,000	Amp-hr	
Hiawatha Panel & Name Plate	Hennepin	anodizing	49,275	ft^2-hr	
J&R Chrome Plating	Hennepin	dec. hex	114,000	Amp-hr	
Joyner's	Hennepin	dec. hex	3,120,000	Amp-hr	
Maxwell Aircraft Service	Hennepin	anodizing	1,500	ft^2-hr	
Minnesota Rubber Company	Hennepin	hard	3,600,000	Amp-hr	
Nico Products, Inc.	Hennepin	dec. hex	0		
Superior Plating	Hennepin	dec. hex	4.4	lbs	√
Superior Plating	Hennepin	hard	2.2	lbs	√
Twin City Plating	Hennepin	hard	3.99	lbs	
VisionEase Lens	Hennepin	hard	2800	Amp-hrs	√
New Dimension Plating	McLeod	dec. hex	300,000	Amp-hr	
New Dimension Plating	McLeod	hard	3,400,000	Amp-hr	
Prestige Plating	McLeod	dec. hex	500	Amp-hr	
Northwest Airlines, MSP Maint.	Ramsey	hard	42,666,667	Amp-hr	√
St. Paul Electroplating	Ramsey	dec. hex	73,810	Amp-hr	
Wolkerstorfer Co, Inc.	Ramsey	hard	15,190	Amp-hrs	√
Plating Specialties, Inc.	St. Louis	dec. hex	52,000	Amp-hr	
SPX, Power Team Divsions	Steele	hard	618,076	Amp-hr	
Olson Industries	Watonwan	hard	212,052	Amp-hr	
St. James Automotive Products	Watonwan	dec. hex	3,129,619	Amp-hr	

Table M-3: Chromium Emissions (lbs) by County

County	Dec. Hex Emissions	Hard Chrome Emissions	Anodizing	Hexavalent Chromium Emissions	Total Chromium Emissions
Benton	20.59			20.59	27.46
Crow Wing	34.65			34.65	46.2
Dakota	0.003			0.003	0.004
Goodhue	7.48			7.48	9.97
Hennepin	178.05	1238.8	101.55	1518.4	2024.5
McLeod	0.99	40.8		41.79	55.72
Ramsey	0.24			0.24	0.32
St. Louis	0.17			0.17	0.23
Steele	7.42			7.42	9.89
Watonwan	10.33			10.33	13.77

Total chromium emissions are calculated assuming that hexavalent chromium is 75% of total chromium emissions.

Those facilities which are included in the point source inventory (EIS) are not included in this summary.

REFERENCES

Strong, Phyllis, 1995. Minnesota Small Business Assistance Program, Minnesota Pollution Control Agency. Conversation with Cathy Tran, October 2, 1995.

U.S. Environmental Protection Agency. AP-42, Supplement B, Compilation of Air Pollution Emission Factors, Section 12.20. Oct. 1996.

NESHAP Subpart N - 1997 Compliance Certification Reports

N. Drycleaners

General Hierarchy of Methods

Coin operated
- local per facility emission factor (through survey/permits)
- local per machine factor from commercial dry cleaners
- national per employee emission factor

Commercial/Industrial
- local per facility solvent consumption (through survey/permits)
- local per employee factors (through surveys/permits)
- national employee factors
- national per capita factors

Data Requirements

The data requirements for calculating emissions from dry cleaners depends upon the methods used. These elements are described perfectly in the EIIP document on dry cleaning (Volume III: Area Sources - Chapter 4: Dry Cleaning). The data items include:
- type of solvent used
- amount of solvent used
- number of employees
- number of employees by SIC
- machines per facility
- type of machines
- control methods
- number of facilities
- applicable emission factors (can be per facility, per machine, per employee or per capita and be a national value or a local (source specific) value)

Pollutants emitted by dry cleaners pertinent to RAPIDS

- 1,1,1-trichloroethane (second most common)
- Ethylbenzene
- Naphthalene
- Perchloroethylene (most common)
- Toluene

- Xylenes

These pollutants came from the following speciation profiles in RAPIDS: 0085, 1193, 1196 and 9017. Profile 0085 is 100% perc while profile 1193 looks to be for petroleum solvent dry cleaning. The other two profiles are composites (sometimes with degreasers) and probably shouldn't be used.

Point source emission factors exist for dry cleaners in RAPIDS. No area source emission factors exist in RAPIDS for dry cleaners.

AP-42 has emission factors on a per capita basis and machine basis.

Reference Documents

The following are good reference documents to read about calculating emissions from dry cleaners

- AP-42 Section 4.1 (www.epa.gov/ttn/chief/ap42.html)
- EIIP Document Volume III: Chapter 4 (www.epa.gov/ttn/chief/eiip/techrep.htm)

Method to use for RAPIDS calculations

For states that have the manpower, need, rules or capability, a survey is the way to go. This method should give accurate emissions that were based upon actual usage. Since emissions from the dry cleaners can be significant, some calculation methodology would need to be applied to the sources that do not submit the questionnaire to have a complete inventory.

Other states should be able to calculate emissions using per capita factors, at a minimum. Data available to the state will determine if the state uses employee based or population based emission factors. I would imagine that every state should have population by county. The Census Bureau (www.census.gov) does have data on number of employees per county per SIC code called County Business Patterns. This data can be obtained at www.census.gov/epcd/cbp/view/cbpview.html.

Another possible option is to use the data compiled for the 1993 inventory and convert that to a population based emission factor. For the Pilot Project Inventory compiled by Illinois, Indiana and Wisconsin, the calculated per capita emission factors for Illinois and Wisconsin were very close. Again, a state specific emission factor should probably override the national per capita factor.

Emission Factors

From EIIP

Subcategory	Reactive VOC (lb/year/employee)	Total Organics (lb/year/employee)
All solvents (total)	1,800	2,300
Halogenated Solvents PERC, TCA and CFC 113 Coin Operated Commercial/Industrial		 980 52 1,200
Mineral Spirits and Other Unspecified Solvents	1,800	1,800

On a per-unit basis: 0.8 tons/facility-year (assumes that average coin-op facility has two dry cleaning units and each emits 0.4 tons of PERC per year.

From AP-42

Commercial: 1.3 lb/year/person (all nonmethane VOC)
Coin Operated: 0.4 lb/year/person (all nonmethane VOC)

O. Gasoline Marketing

DESCRIPTION OF EMISSION SOURCES

Currently, there are essentially two types of fuel dispensed at gasoline service stations to consumers in the Great Lakes States and Ontario, unleaded gasoline and diesel. As a result of the low volatility of diesel fuel, the evaporative emissions from diesel fuel at service stations are very small and considered negligible. However, the evaporative emissions from gasoline fuel are significant and will be discussed in this section. The following emissions are covered:

a) delivery trucks in transit;
b) stage I (transfer of gasoline from tank trucks to storage tanks at service stations);
c) stage II (transfer of gasoline from storage tanks at service stations to the vehicle gasoline tank);
d) gasoline station storage tanks; and
e) spillage.

GASOLINE TRUCKS IN TRANSIT

Introduction

Evaporative emissions of gasoline vapor occur (1) from loaded tank trucks during the transportation of gasoline from the bulk terminals/plants to the gasoline service stations, and (2) from empty tank trucks returning from service stations to bulk terminals/plants.

Source Identification

There is no uniquely defined SIC that categorizes the emissions resulting from the transportation of gasoline between bulk terminals/plants and service stations. This type of emission occurs neither at the bulk terminals/plants nor the service stations. Since the transportation of gasoline is part of the services provided by the bulk terminals/plants to their customers (service stations), the SIC of 5171 in the Standard Industrial Classification Code 1972 for bulk terminals/plants is used to identify this type of emission source, or under 42271 (petroleum bulk stations and terminals) in the North America Industry Classification System 1997 (NAICS).

There are also Source Classification Codes (SCC) and Area Mobile Source Codes (AMS) that describe the evaporative emissions from transportation of gasoline by trucks. Table O.1.1 shows the SCC relating to the transportation of gasoline.

Table O-1.1 SCC Codes for Transportation of Gasoline

FIRE SCC Code	Description	
406001	Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Tank Cars and Trucks	
40600162	Gasoline: Loaded with Fuel (Transit Losses)	
40600163	Gasoline: Return with Vapor (Transit Losses)	
FIRE AMS Code	**Description**	**Equivalent SCC**
A2505030	Storage and Transport Petroleum and Petroleum Product Transport Truck	
A2505030120	Gasoline	40600162 40600163

Identification of Emission Factors

There are four sources of information that contain the emission factors regarding gasoline service station operation, i) AP42-Chapter 5 Section 2[1], ii) Emission Inventory Improvement Program, Volume III, Chapter 11[2], iii) FIRE 6.1 (Factor Information Retrieval System Version 6.1)[3], and iv) other technical documents[5]. A search of the first three sources revealed some emission factors on VOCs. Reference 5 provided a HAP profile on gasoline (Table O.1.2) and was used to generate a speciation profile for Benzene, Ethylbenzene, Naphthalene, Toluene, and Xylene. Only Ethylbenzene is included in the GLC 49 substance list.

Since the emissions from gasoline transportation are inventoried under area sources, new AMS codes are created for this GREAT LAKES COMMISSION (GLC) inventory and will be used to identify the sources. In FIRE 6, there are no associated emission factors for the AMS codes. The emission factors from the equivalent SCC codes will be applied as state-specific emission factors. A state-specific VOC speciation profile will be created for HAPs when there are no direct emission factors for the concerned HAPs in FIRE. Table O.1.3 presented a summary of the available emission factors from FIRE and the HAP profile.

Table O-1.2 HAP Profile in Gasoline Vapor

HAP	Weight Percentage	
Benzene	0.9%	lb/lb VOC
Ethylbenzene	0.1%	lb/lb VOC
Naphthalene	0.5%	lb/lb VOC
Toluene	1.3%	lb/lb VOC
Xylenes	0.5%	lb/lb VOC

Table O-1.3 Emission Factors for Gasoline Truck in Transit

Pollutant	Emission Factors		Remarks	Reference
SCC 40600162: Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Tank Cars and Trucks Gasoline: Loaded with Fuel (Transit Losses)				
VOC	5.000E-3 [1]	Lb per 1000 Gallons Transferred	UNCONTROLLED	EIIP/FIRE
Benzene	9.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Ethylbenzene	1.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Naphthalene	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Toluene	1.300E-2	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Xylene, mixed isomers	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
SCC 40600163: Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Tank Cars and Trucks Gasoline: Return with Vapor (Transit Losses)				
VOC	5.500E-2 [2]	Lb per 1000 Gallons Transferred	UNCONTROLLED	EIIP/FIRE
Benzene	9.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Ethylbenzene	1.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Naphthalene	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Toluene	1.300E-2	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Xylene, mixed isomers	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
AMS A2505030132 Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Trucks Gasoline: (Transit Losses)				
VOC	6.000E-2 [3]	Lb per 1000 Gallons Transferred	UNCONTROLLED	EIIP/FIRE
Benzene	9.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE

Ethylbenzene	1.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Naphthalene	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Toluene	1.300E-2	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Xylene, mixed isomers	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE

Notes:
1. EIIP document recommends the midpoint value of the typical range, i.e. 5.000E-3 lb/1000 gallon throughput
2. EIIP document recommends the midpoint value of the typical range, i.e. 5.500E-2 lb/1000 gallon throughput
3. This factor is the sum of transit losses (loaded with fuel and return with vapor).

Facility Identification

As recommended by the Emission Inventory Improvement Program, the county-level fuel sales statistics should be obtained by survey data or from other sources (e.g. tax department, statistics agencies). If county-level statistics are not readily available, the state/province total fuel sales should be obtained from the relevant department. This state/province total fuel sales data must be apportioned to the county level based on such factors as:

a) gasoline service stations $-sales in each county;
b) previous county-level sales survey data;
c) number of gasoline vehicle registrations in each county, travelling patterns and fuel economy.

Emission Estimation

Gasoline Trucks in Transit

The emissions from gasoline trucks in transit for each county can be estimated from the following equations.

$$GTA = \frac{\text{TGD} + \text{TGT}}{\text{TGD}} \qquad \text{(eq. O.1.1)}$$

Where GTA = Gasoline transportation adjustment factor
TGD = Total gasoline dispensed in a county (1,000 gallons)
TGT = Amount of gasoline transported twice within a county (1,000 gallons)

and

$$TTE = \frac{(\text{TGD x LEF x GTA}) + (\text{TGD x UEF x GTA})}{2{,}000} \qquad \text{(eq. O.1.2)}$$

Where TTE = Annual emission of a pollutant from tank trucks in-transits (tons)

LEF	=	Loaded tank truck in-transit emission factor (lb/1,000 gallons throughput)
UEF	=	Unloaded tank truck in-transit emission factor (lb/1,000 gallons throughput)

GASOLINE SERVICE STATIONS

Introduction

There are two stages of fueling losses from gasoline fuel. Stage I fueling losses occur at the gas retail operations and result from truck delivery drop losses and underground tank breathing losses. Stage II fueling losses occur via the filling of vehicle gas tanks and include refueling losses from motor vehicle tanks and spillage.

Source Identification

Gasoline service stations are categorized under SIC 5541 in the Standard Industrial Classification Code 1972, and under 44711 (gasoline service station with convenience store) and 44719 (other gasoline service station) in the North America Industry Classification System 1997 (NAICS).

There are also Source Classification Codes (SCC) and Area Mobile Source Codes (AMS) that describe the evaporative emissions from gasoline service station operations. Table O.2.1 shows the SCC regarding gasoline service station operations.

Table O-2.1 SCC Codes for Gasoline Service Stations (Stage I and II)

FIRE SCC Code	Description	
406003	Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Gasoline Retail Operations - Stage I	
40600301	Splashing Filling	
40600302	Submerged Filling w/o Controls	
40600305	Unloading	
40600306	Balanced Submerge Filling	
40600307	Underground Tank Breathing & Emptying	
406004	Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Filling Vehicle Gas Tanks - Stage II	
40600401	Vapor Loss w/o Control	
40600402	Liquid Spill Loss w/o Control	
40600403	Vapor Loss w/o Control	

FIRE AMS Code	Description	Equivalent SCC
A250106005	Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations: Stage I	
A2501060050	Total	40600300
A2501060051	Submerged Filling	40600302
A2501060052	Splash Filling	40600301
A2501060053	Balanced Submerged Filling	40600306
A250106010	Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations: Stage II	
A2501060100	Total	
A2501060101	Displacement Loss/Uncontrolled	40600401
A2501060102	Displacement Loss/Controlled	40600403
A2501060103	Spillage	40600402
A250106020	Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations: Underground Tank	
A2501060200	Total	
A2501060201	Breathing and Emptying	40600307

Emission Factors Identification

There are four sources of information that contain emission factors regarding gasoline service station operation, i) AP42-Chapter 5 Section 2[1], ii) Emission Inventory Improvement Program, Volume III, Chapter 11[2], iii) FIRE 6.1 (Factor Information Retrieval System Version 6.1)[3], iv) MOBILE 5B Transportation model[4] and v) other technical documents[5]. A search of the first three sources revealed some emission factors for Benzene, 1,3-Butadiene, 1,2-Dibromoethane, 1,2-Dichloroethane, Ethylbenzene, Toluene, VOC, and Xylene. Only 1,2-Dichloroethane and Ethylbenzene are included in the GLC 49 substance list.

Since the emissions from gasoline service stations are inventoried under area sources, the AMS code will be used to identify the sources. In FIRE 6, there are no associated emission factors for the AMS code for gasoline service stations. The emission factors from the equivalent SCC codes will be applied as state-specific emission factors. A state-specific VOC speciation profile will be created for the HAPs shown in table O.1.2 when there are no direct emission factors for the concerned HAPs in FIRE. The following table presented a summary of the available emission factors.

Table O-2.2 Emission Factors for Gasoline Service Stations (Stage I and II)

Pollutant	Emission Factors		Remarks	Reference
SCC 40600301: AMS A2501060052	Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Gasoline Retail Operations - Stage I Splashing Filling			
Benzene	6.930E-2	Lb per 1000 Gal Gas Stored	UNCONTROLLED	FIRE
1,3-Butadiene	3.940E0	Lb per 1000 Gal Gas Pumped	UNCONTROLLED	FIRE
1,2-Dibromoethane	1.490E-4	Lb per 1000 Gal Material Processed	UNCONTROLLED	FIRE
1,2-Dichloroethane	1.530E-3	Lb per 1000 Gal Material Processed	UNCONTROLLED	FIRE
Ethylbenzene	1.980E-2	Lb per 1000 Gal Gas Pumped	UNCONTROLLED	FIRE
Toluene	1.760E-1	Lb per 1000 Gal Gas Pumped	UNCONTROLLED	FIRE
Xylene, mixed isomers	8.800E0	mg per L Gas Stored	UNCONTROLLED	FIRE
VOC	1.150E1	Lb per 1000 Gallons Transferred	UNCONTROLLED	FIRE
Naphthalene	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
SCC 40600302: AMS A2501060051	Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Gasoline Retail Operations - Stage I Submerged Filling w/o Controls			
Benzene	4.420E-2	Lb per 1000 Gal Gas Stored	SUBMERGED FILLING	FIRE
1,2-Dibromoethane	9.510E-5	Lb per 1000 Gal Material Processed	UNCONTROLLED	FIRE
1,2-Dichloroethane	9.760E-4	Lb per 1000 Gal Material Processed	UNCONTROLLED	FIRE
Toluene	9.330E1	mg per Liter Gas Stored	UNCONTROLLED	FIRE
Xylene, mixed isomers	5.600E0	mg per L Gas Stored	UNCONTROLLED	FIRE
VOC	7.300E0	Lb per 1000 Gallons Transferred	UNCONTROLLED	FIRE
Ethylbenzene	1.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Naphthalene	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE

SCC 40600306: AMS A2501060053	Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Gasoline Retail Operations - Stage I Balanced Submerged Filling			
Benzene	1.670E-3	Lb per 1000 Gal Gas Stored	SUBMERGED FILLING	FIRE
1,2-Dibromoethane	3.840E-6	Lb per 1000 Gal Material Processed	UNCONTROLLED	FIRE
1,2-Dichloroethane	4.420E-5	Lb per 1000 Gal Material Processed	UNCONTROLLED	FIRE
Toluene	4.200E0	mg per Liter Gas Stored	UNCONTROLLED	FIRE
Xylene, mixed isomers	7.500E-1	mg per L Gas Stored	UNCONTROLLED	FIRE
VOC	3.000E-1	Lb per 1000 Gallons Throughput	UNCONTROLLED	FIRE
Ethylbenzene	1.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Naphthalene	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
SCC 40600307: AMS 2501060201	Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Gasoline Retail Operations - Stage I Underground Tank Breathing and Emptying			
Benzene	5.840E-3	Lb per 1000 Gal Gas Stored	UNCONTROLLED	FIRE
Toluene	1.270E1	mg per Liter Gas Stored	UNCONTROLLED	FIRE
Xylene, mixed isomers	6.380E1	mg per L Gas Stored	UNCONTROLLED	FIRE
VOC	1.000E0	Lb per 1000 Gallons Throughput	UNCONTROLLED	FIRE
Ethylbenzene	1.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Naphthalene	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
SCC 40600401: AMS A2501060101	Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Filling Vehicle Gas Tanks - Stage II Vapor Loss w/o Control			
Benzene	6.590E-2	Lb per 1000 Gal Gas Stored	UNCONTROLLED	FIRE
Toluene	9.940E-2	Lb per Ton Gas Stored	UNCONTROLLED	FIRE

Xylene, mixed isomers	4.050E0	mg per L Gas Stored	UNCONTROLLED	FIRE
Xylene, meta	1.710E-2	Lb per Ton Gas Stored	UNCONTROLLED	FIRE
Xylene, ortho	6.620E-3	Lb per Ton Gas Stored	UNCONTROLLED	FIRE
Xylene, para	6.620E-3	Lb per Ton Gas Stored	UNCONTROLLED	FIRE
VOC	1.100E1	Lb per 1000 Gallons Pumped	UNCONTROLLED	FIRE
Ethylbenzene	1.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Naphthalene	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
SCC 40600402: AMS A2501060103	Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Filling Vehicle Gas Tanks - Stage II Liquid Spill Loss w/o Control			
1,2-Dichloroethane	1.330E-4	Lb per 1000 Gal Gas Transferred	UNCONTROLLED	FIRE
Toluene	8.900E0	mg per Liter Gas Stored	UNCONTROLLED	FIRE
Xylene, mixed isomers	3.000E-1	mg per L Gas Stored	UNCONTROLLED	FIRE
VOC	7.000E-1	Lb per 1000 Gallons Pumped	UNCONTROLLED	FIRE
Benzene	9.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Ethylbenzene	1.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
Naphthalene	5.000E-3	Lb per lb of VOC	UNCONTROLLED	HAP SPECIATE
SCC 40600403:	Petroleum and Solvent Evaporation Transportation and Marketing of Petroleum Products Filling Vehicle Gas Tanks - Stage II Vapor Loss w/o Control			
1,2-Dichloroethane	1.750E-3	Lb per 1000 Gal Gas Transferred	MISCELLANEOUS CONTROL DEVICES	FIRE
Toluene	1.390E1	mg per L Gas Stored	MISCELLANEOUS CONTROL DEVICES	FIRE

Xylene, mixed isomers	4.500E-1	mg per L Gas Stored	MISCELLANEOUS CONTROL DEVICES	FIRE
VOC	1.100E0	Lb per 1000 Gallons Pumped	MISCELLANEOUS CONTROL DEVICES	AP42
Benzene	9.000E-3	Lb per lb of VOC	MISCELLANEOUS CONTROL DEVICES	HAP SPECIATE
Ethylbenzene	1.000E-3	Lb per lb of VOC	MISCELLANEOUS CONTROL DEVICES	HAP SPECIATE
Naphthalene	5.000E-3	Lb per lb of VOC	MISCELLANEOUS CONTROL DEVICES	HAP SPECIATE

Facility Identification

As recommended by the Emission Inventory Improvement Program, the county-level fuel sales statistics should be obtained by survey data or from other sources (e.g. tax department, statistics agencies). If the county-level statistics are not readily available, the state/province total fuel sales should be obtained from the relevant department. This state/province total fuel sales data must be apportioned to the county level based on such factors as:

a) gasoline service stations $-sales in each county;
b) previous county-level sales survey data;
c) number of gasoline vehicle registrations in each county, travelling pattern and fuel economy.

The control technology applied in the operation of the stations (e.g. filling underground tanks and dispensing fuel, etc) and the amount of fuel handled by each technology should also be obtained.

Emission Estimation

Stage I: Gas Retail Operations - Gasoline Filling

The emissions from gasoline service stations include the evaporative emissions from the filling of underground gasoline storage tanks. Emissions are generated when gasoline vapors in the underground storage tanks are displaced to the atmosphere by the gasoline being loaded into the tank. Two methods are commonly used in filling the tanks, splash loading and submerged loading. With the splash loading method, the filling pipe dispensing the gasoline is lowered only part way into the tank. Significant turbulence and vapor/liquid contact occur during the splash loading operation, resulting in high levels of vapor generation and loss. In submerged loading, the fill pipe extends almost to the bottom of the storage tanks with the opening situated below the liquid surface level. Liquid turbulence is controlled significantly, resulting in much lower vapor generation than the splash loading method.

The Stage I emissions of a specific pollutant from gasoline filling operations in a county is estimated by the following formula:

$$EM_{fill} = [\ (BQ * P_{splash} * EF_{splash}) + (BQ * P_{submerged} * EF_{submerged}) + (BQ * P_{balsub} * EF_{balsub})\ ] \ / \ 100{,}000 \qquad \text{(eq. O.2.1)}$$

Where EM_{fill} = Annual emission of a pollutant in a county (lb/yr)
BQ = Total annual consumption of gasoline in a county (gal)
P_{splash} = Percentage of gasoline filling using splash method (%)
EF_{splash} = Emission factor of pollutant for splash filling (lb/1000 gal)
$P_{submerged}$ = Percentage of gasoline filling using submerged method (%)
$EF_{submerged}$ = Emission factor of pollutant for submerged filling (lb/1000 gal)
P_{balsub} = Percentage of gasoline filling using balanced submerged method (%)
EF_{balsub} = Emission factor of pollutant for balanced submerged filling (lb/1000 gal)

Stage I: Gas Retail Operations - Storage Tank Breathing and Emptying

Storage tank breathing losses occur daily and are attributed to gasoline evaporation that results from temperature and barometric pressure changes. As gasoline is withdrawn from the tank fresh air enters and enhances evaporation. This has a major effect on these emissions.

The Stage I emissions of a specific pollutant from storage tank breathing/emptying in a county is estimated by the following formula:

$$EM_{breath} = BQ * EF_{breath} \ / \ 1{,}000 \qquad \text{(eq. O.2.2)}$$

Where EM_{breath} = Annual emission of a pollutant in a county (lb/yr)
BQ = Total annual consumption/throughput of gasoline in a county (gal)
EF_{breath} = Emission factor of pollutant for splash filling (lb/1000 gal)

Stage II: Motor Vehicle Refueling - refueling

Service station vehicle refueling also produces evaporate emissions. Vehicle refueling emissions result from vapors displaced from the automobile tank via dispensed gasoline and from spillage. The quantity of displaced vapors depends on gasoline temperature, auto tank temperature, gasoline RVP, and dispensing rate. The refueling emission rate (in lb/gal) can be obtained from the MOBILE model. Since variation in factors will affect the emission rate, it is preferable to obtain an individual emission rate for each county instead of a generic state/province rate.

The Stage II emissions of a specific pollutant from vehicle refueling in a county is estimated by the following formula:

$$EM_{refuel} = BQ * P_{refuel} * EF_{refuel} + BQ * P_{refuel\_con} * EF_{refuel\_con} \quad \text{(eq. O.2.3)}$$

Where
EM_{refuel} = Annual emission of a pollutant in a county (lb/yr)
BQ = Total annual consumption/throughput of gasoline in a county (gal)
P_{refuel} = Percentage of gasoline dispensed without Stage II control (%)
EF_{refuel} = Emission factor of pollutant for vehicle refueling without Stage II control (lb/gal)
P_{refuel_con} = Percentage of gasoline dispensed with Stage II control (%)
EF_{refuel_con} = Emission factor of pollutant for vehicle refueling with Stage II control (lb/gal)

Stage II: Motor Vehicle Refueling - Spill

Other evaporate emissions from vehicle refueling include spillage loss which is a result of prefill and postfill nozzle drip and from spit-back and overflow from the vehicle's tank filler pipe during filling.

The Stage II emissions of a specific pollutant from spillage loss in a county is estimated by the following formula:

$$EM_{spill} = BQ * EF_{spill} / 1{,}000 \quad \text{(eq. O.2.4)}$$

Where
EM_{spill} = Annual emission of a pollutant in a county (lb/yr)
BQ = Total annual consumption/throughput of gasoline in a county (gal)
EF_{spill} = Emission factor of pollutant for spilling loss (lb/1,000 gal)

REFERENCES

1. USEPA, "Compilation of Air Pollutant Emission Factors, 5th Edition, Volume I and Supplements, Section 5.2", AP-42, U.S. Environmental Protection Agency, January 1995

2. USEPA, "Emission Inventory Improvement Program documents, Volume III: Chapter 11>", U.S. Environmental Protection Agency, September 1997

3. USEPA, "User Guide to Mobile 5B" , U.S. Environmental Protection Agency, September 1996

4. USEPA, "Factor Information Retrieval System Version 6.1", U.S. Environmental Protection Agency, November 1998

5. USEPA, "Technical Guidance - Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities, Volume I, EPA-450/3-91-022a, November 1991.

P. Graphic Arts

POLLUTANTS OF CONCERN

The following HAPs are associated with the this source category

*Toluene
*Xylene
*Trychloroethylene
Toluene Diisoyanate
Dibuthyl Phthalate

* Obtained from those reported by establishments in SIC 27%% to the Wisconsin emissions inventory.

AMS CODES FOR THIS CATEGORY

A2425000 All Processes
A2425010 Lithography
A2425020 Letterpress
A2425030 Rotogravure
A2425040 Flexography

EMISSION FACTORS

No toxic emission factors were found in FIRE, EIIP or AP-42.
The following speciation factors were found:

SCC: 2425040000, 2425040999
Profile Code: 1086
Process: Printing/Flexographic
Pollutant: Toluene
EF: 0.0648lb/lb TOG

AMS: 242500000, 2425000999
Profile Code: 1191

Pollutant: Dibuthyl Phthalate
EF: 0.09999lb/lb TOG

Pollutant: Toluene Diisoyanate
EF: 0.0003lb/lb TOG

EIIP'S EMISSION ESTIMATION METHODOLOGY REVIEW

VOCs:

Release to the atmosphere are from evaporation of the VOC contained in the raw materials used in the process (inks, fountain solutions and cleaning agents).

The three main approaches to estimating VOC emissions:

Facility Survey
Ink sales emission factor method
Per capita emission factor method (NOT RECOMMENDED FOR HAPs)

The facility survey method provides the most accurate information. The Ink sales emission factor method is recommended over the per capita method for speciating HAPs.

DATA NEEDS

For facility survey

Type of printing
Number of employees involved in the printing operation
Amount of VOC or HAPs contained in the raw materials and solvents (weigh %), and amount of material recycled
Controls used

For Ink Sales Emission Factor Method

- Ink sales for the state or data from the US Census Bureau
- Uncontrolled point source emissions from graphic arts operations
- Controls used in region (Note: controls may also include local state regulations)

Advantages of Method

- Inks are common to all printers and not used by any other sources
- VOC content of the inks is consistent
- Consistency of the printing process (same VOC content used in the same type of printing process)

Summary of Method:

- Obtain amount of ink produced in pounds, in the US (Ref. Census of Manufacturer's, Industry Series for SIC Code 289, Miscellaneous Chemical Products).

  (Note: I checked with the National Association of Printing Ink Manufacturers about the availability of ink sales data per state. That information is not available. Also, the NAPIM does not agree with this method).

- Apportion nationwide ink amount to the state level by the ration between state and national employment in printing and publishing (SIC Code 27). This information can be obtained from the Census Bureau's report Statistics for industry Groups and Industries. State information is also available from the state's departments of industry.

- Correct for point sources in the state.
- Apportion statewide ink sales data for each type of printing.
- Table 7.5-2, Chapter 3 EIIP, offers VOC emission factors for VOC per pound of ink used.

REFERENCES

Environmental Protection Agency (EPA). *STAPPA-ALAPCO-EPA Emission Inventory Improvement Program (EIIP).* Volume III - Area Sources Preferred and Alternative Methods. July 1997.

Personal communication, National Association of Printing Ink Manufacturer's

Q. Industrial Surface Coatings

ASSOCIATED TOXIC POLLUTANTS

The EPA's *Speciate* database contains fifteen different profiles associated with various surface coating operations. According to those profiles, eight of the 79 target compounds may be produced. These are Benzene, Ethylbenzene, Ethylene Oxide, Glycol Ether, Methyl Chloride, O-Xylene, P-Xylene, and Toluene. Although the profiles do not appear to include Lead, it is also possible that small amounts of Lead based coatings are still in use.

Table Q-1: Profiles in the Speciate Database

By Solvent	**Profile**
Naptha	0282
Butyl Acetate	0288
Butyl Alcohol	0289
Cellosolve	0290
Methyl Alcohol	0291
Dimethylformamide	0292
By Thinning Solvent	
Hexylene Glycol	1026
Ethylene Oxide	1031
By Coating type	
Thinning	1016
Lacquer	1017
Enamel	1018
Primer	1019
Adhesives	1020
Composite Profiles	
Surface Coating (solvent based)	1003
Surface Coating (average)	9021

TOXIC POLLUTANT EMISSION FACTORS

Emission factors for these pollutants have not yet been identified.

OTHER AVAILABLE METHODS

Speciation of VOC emissions

The EIIP has consolidated a number of separate categories under the definition of "Industrial Surface Coating".

Pennsylvania has used the employee emission factors for these categories that were found in the EPA's May 1991 procedures document. Other per capita emission factors used were all EPA approved.

Table Q-2: VOC emission factors for Industrial Surface Coating

Coating Type	VOC emission Factor	Units
Furniture and Fixtures	1,597	lb/employee
Metal Containers	6,029	lb/employee
Automobiles (new)	793	lb/employee
Machinery and Equipment	77	lb/employee
Appliances	463	lb/employee
Other Transportation Equipment	35	lb/employee
Sheet, Strip and Coil	2877	lb/employee
Factory Finished Wood	131	lb/employee
Electrical insulation	290	lb/employee
Other Product Coatings	0.6	lb/capita
High Performance Coatings	0.8	lb/capita
Marine Coatings	308	lb/employee
Other Special Purpose Coatings	0.8	lb/capita

RECOMMENDATIONS

A survey of manufactures or trade associations may provide more information on this category. Speciation of the VOC inventory may also be possible; however, a method to validate the profiles used should be developed.

R. Marine Vessel Loading, Ballasting and Transit

AMS-SCC Code 2505020120

Method 1

The first method was found in AP 42 Chapter 5: *Petroleum Refining*. The method involves applying VOC emission factors to the amount of fuel transferred. There are several VOC emission factors based on previous barge load and vessel tank condition. In RAPIDS, the speciation profile for barge loading is 1190. The speciation profile is based on Total Organics (TOG). It is assumed that a 1:1 ratio exists for VOC: TOG.

Table R-1: Speciation Profiles for Toxins Associated with Marine Vessel Loading:

Toxic	Speciation (tox/tog), % by weight
Benzene	3.25
Ethylbenzene	4.07
Naphthalene	0.8
Styrene	0.17
Toluene	15.22
Xylene, O	6.41
Xylene, M, P	15.28
Xylene isomers (not in speciation profile)	21.69 (O,M, and P added together)

Note: The Xylene isomers should be added together so that it will correspond w/ the RAPIDS pollutant list.

Method 2

The preferred method found is in *Technical Support Document for the Development of a VOC Rule for Marine Vessel Loading Operations,* U.S. EPA; May 1992.

This method lists out several toxic emission factors based on gallons transferred. The following emission factors are listed:

Toxic	Emission Factor (lb/1000 gal) barges
Benzene	0.029
Toluene	0.048
Xylene	0.015

The amount of fuel loaded and unloaded to barges by state can be found in *Waterborne Commerce of the United States*, 1996; US Army Corps of Engineers, December 1997.

Each states river system and/or city that has gasoline barge loading is available from this document.

S. Municipal Landfills

PREFERRED METHOD (landfill based)

The preferred method requires the following information:

- landfill design capacity, amount of refuse in place or annual refuse acceptance rate
- methane generation rate
- potential methane generation capacity
- NMOC concentration in landfill gas
- Toxics concentration in landfill gas
- years the landfill has been in operation
- controls in place
- has the landfill been used for disposal of hazardous waste?

The calculation methodology is AP-42. The LAEEM program (Landfill Air Emissions Estimation Model) calculates emissions using AP-42 methodology

- provides defaults for methane generation rate, potential methane generation capacity and NMOC concentration. AP-42 also provides concentrations for HAPs.

The alternative methods are really variations on the preferred method. The difference is in the detail of data needed to calculate or the assumptions made. For all methods, the minimum information for using AP-42 or LAEEM is waste in place and the open and close dates for the landfills. Some examples of simplifying assumptions are:

- acreage of the landfills and landfill depth substituted for waste in place
- assumptions for open and close dates (opened 25 years before inventory year or if only the closed date is known, assume waste received for 10 years)
- estimate waste in place by using estimate of capacity and percent filled

ALTERNATIVE METHOD (population based)

Information needed:

- population figures for the inventory year and the 24 years previous
- use the waste generation factor of 0.69 tons/person/year of waste generated
- convert to Mg by multiplying by 0.9072
- use the annual waste estimates in LAEEM or calculate average annual waste estimates and use that value in the equation

POLLUTANTS EMITTED PERTINENT TO RAPIDS

- 1,1,1-trichloroethane
- 1,2-dichloroethane
- Acrylonitrile
- Benzene

- Carbon tetrachloride
- Chloroform
- Ethylbenzene
- Mercury
- Methylene chloride
- Perchloroethylene
- Toluene
- Trichloroethylene
- Xylenes

There is a speciation profile (0202) in RAPIDS which shows pollutants of perchloroethylene, toluene and xylene. These factors are probably out of date since the landfill section of AP-42 was updated recently.

There were no point source emission factors for landfills in FIRE or RAPIDS.

REFERENCES

The following are good reference documents to read about calculating emissions from landfills

- AP-42 Section 2.4 (www.epa.gov/ttn/chief/ap42.html)
- EIIP Document Volume III: Chapter 15 (www.epa.gov/ttn/chief/eiip/techrep.htm)
- LAEEM (www.epa.gov/ttn/chief/software.html)

METHOD TO USE FOR RAPIDS CALCULATIONS

In my opinion, you are either going to have the data handy (for either method) or you're not. Through pure coincidence while I was writing this, there was a notification sent to me that a Landfill Capacity report for 1996 had been placed on our web site (www.epa.state.il.us). This report gave me all the data I need. Using the population based method would be acceptable, but how many of the states can get population data for the last 25 years?

The EIIP document also makes mention of a method of calculation emissions by a regression model. In this case, you use data you've collected through a survey or permitting (or other states calculations) and relate that data to surrogate data (e.g., population, population density, rural/urban population mix, property values, land use, etc.). If states who calculate emissions in a detailed manner can relate those emissions (or landfill capacity, etc.) to a value that another state has that didn't have the data available to calculate landfill emissions, the second state could then calculate emissions. Basically, this method is creating an emission factor in one or more states to be used by others.

Really the only method to calculate emissions is by using the LAEEM/AP-42 method. How you use this methodology depends upon your available data. Having states create emission factors for others to use remains to be seen. My recommendation is to use the preferred method.

T. Pesticides

AGRICULTURAL PESTICIDES

Emission factors for pesticides in FIRE are in Kg per hectare. The conversion to acres is 1 hectare equals 2.47 acres. The number of acres harvested for each crop by county can be found in the 1992 Census of agriculture.

http://www.nass.usda.gov/census/census92/atlas92/datafile/**st.txt
** insert 2 letter state abbreviation

A list of active ingredients used on a given crop can be obtained from each state's Department of Agriculture. For example, in Ohio, atrizine is the ingredient used almost exclusively on corn. Most commonly used pesticides on crops can be found at:

http://130.118.109.185/pnsp/crop/corn.html.

Substitute wheat, soybean, etc. in the address for other crops.

Once you know the method of application (emission factors are broken down by application method) multiply the appropriate emission factor from FIRE by the number of hectares harvested per county for that crop to get each county's emissions.

Example

Adams County

15792 acres of corn harvested. Converting to hectares equals 39006 hectares. Atrizine applied by **spraying** has an emission factor of 1.800E-1 kg per hectare of pesticide applied.

Multiply 1.800E-1 * 39006 to obtain atrizine emissions used in Adams County in 1992. Multiply by .0011023 to get tons used.

7.7 tons atrizine used in

NON AGRICULTURAL PESTICIDES

Since non agriculture use of pesticides account for less than 25% of all pesticide use, the use of per capita emission factor is justified when compared with a survey approach of government agencies, commercial exterminators, lawn care companies, and consumers pesticide buying habits.

A per capita FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) emission factor is 1.78 E+00 RVOC (lbs/yr/person).

If active ingredient is known, the total tons of FIFRA used in 1992 in the US was 1411632.3.

U. Publicly Owned Treatment Works

ASSOCIATED TOXIC POLLUTANTS

The source of the majority of those toxics associated with POTW's can be categorized as domestic, non-domestic (industrial/commercial), and sewer runoff. This suggests that the main toxic pollutants associated with POTW's include the residue of consumer/commercial solvents and pesticide applications.

The EPA's document *Guidance to Protect POTW Workers from Toxic and Reactive Gasses and Vapors* include a listing of associated toxins that should be screened for. This listing contains a number of the targeted toxic pollutants, including:

Acrylonitrile
Benzene
Bis (2 - chlormethyl) ether
Carbon Tetrachloride
Chlordane
Chloroform
Ethyl Benzene
Ethylene Dichloride
Formaldehyde
Hexachloro-1,3-butadiene
Hexachloroethane
Methylene Chloride
Pentachlorophenol
Phenol
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
Trichloroethylene
Vinyl Chloride

TOXIC POLLUTANT EMISSION FACTORS

Emission factors for these pollutants have not yet been identified.

OTHER AVAILABLE METHODS

Speciation of VOC emissions

The PA Bureau of Water Quality provided effluent wastewater data for each PA county. The EPA's procedures document relates that approximately 16% of all flow of wastewater effluent is waste, with a VOC content of 0.0011 lb/ gallon. Multiplying total flow by 16%, and then by this emission factor provides emissions.

Speciation profiles for these sources have not been identified.

RECOMMENDATIONS

A more complete search of the literature may identify existing methods to estimate the concentration of these pollutants or actual sampling data from a number of facilities. Because of the wide variety of chemicals that can end up at a POTW and the lack of detail in the VOC estimation, Speciation of the VOC data would probably not be the preferable approach.

V. Residential Fuel Combustion

RESIDENTIAL FUEL COMBUSTION

Energy consumption by households by Census Region and Division is available from The Energy Information Administration State Energy Data Report 1995 (by State). Internet address is **www.eia.doe.gov/pub/pdf/multi.fuel/**

Energy is broken down into electricity, natural gas, fuel oil and liquefied petro gas (LPG) and coal.

Emission factors from the MN methodology for Residential Fuel were reviewed and found more than worthy of use.

Pollutant	**Factor (lb/MMBTU)** **Distillate Fuel Oils**	**SCC**
Arsenic	4.2 x 10-6	10300501
Benzene	2.75 x 10-3 (lb/10^{00gal})	10300501
Beryllium	2.5 x 10-6	10300501
Cadmium	1.1 x 10-5	10300501
Chromium	6.7 x 10-5	10300501
Fluoranthene	2.48 x 10-8	10300501
Formaldehyde	6.1 x 10-2 (lb/10^{00gal})	10300501
Manganese	1.4 x 10-5	10300501
Mercury	3 x 10-6	10300501
Nickel	1.7 x 10-4	10300501
POM	3.3 x 10-3 (lb/10^{00gal})	10300501

Pollutant	**LPG Factor (lb/1000gal)**	**Nat. Gas Factor (lb/MMcf)**
Benzene	2.04 x10-2	2.30 x 10-1
Cadmium	2.00 x 10-2	6.00 x 10-1
Cobalt	8.00 x 10-3	2.40 x 10-1
Copper	2.00 x 10-4	6.00 x 10-3
Chromium	2.20 x 10-3	6.6 x 10-2
Formaldehyde	4.09 x 10-2	4.61 x 10-1
Lead	2.00 x 10-4	6.00 x 10-3
Manganese	2.00 x 10-4	6.00 x 10-3
Nickel	2.00 X 10-3	6.00 x 10-2
Toluene	1.02 X 10-2	1.15 x 10-1

POLLUTANT	EMISSION FACTOR
Arsenic	1.176 x 10-3 lb/ MMBTU
Benz(a)anthrancene	3.00 x 10-3 mg/Mg
Cadmium	5.882 x 10-5 lb/MMBTU
Cobalt	2.343 x 10-3 lb/ MMBTU
Copper	1.42 x 10-4 lb /MMBTU
Lead	4.706 x 10-3 lb/MMBTU
Mercury	1.399 x 10-4 lb/ton
Manganese	8.235 x 10-3 lb/MMBTU
Nickel	2.353 x 10-3 lb/ MMBTU
POM	4.273 x 10-3 lb/MMBTU
2378-TCDD	2.40 x 10-3 mgMg
2378-TCDF	6.30 x 10-2 mg/Mg

Emissions are estimated by first calculating total statewide emsiions for each individual pollutant and then pro rating emsisions to county based levels using 1996 county and state population.

W. Residential Wood Combustion

SOURCE IDENTIFICATION

There are no SIC codes associated with Residential Wood Combustion

AMS-SCC CODES

1. Wood Stoves 2104008030

POLLUTANTS

The following pollutant(s) were inventoried for wood stoves:

Acenaphthene	Acenaphthylene	Benz(a)anthracene	Benzene
Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene
Cadmium	Chromium	Chrysene	Dibenz(ah)anthracene
Fluoranthene	Fluorene	Indeno(123-cd)pyrene	Manganese
Naphthalene	Nickel	Phenanthrene	Pyrene
Toluene	Xylene, ortho		

For the 1996 inventory Fireplaces were dropped due to lack of emission factors. All emission factors associated with fireplaces were deleted from FIRE 6.0.

IDENTIFYING SOURCES

Each counties number of house hold using wood as their primary heating source was obtained from Census of Housing, Detailed Housing Characteristic[1]. The average amount of wood used (in cords) for each household was obtained from EIA State Energy Data Report 1995[3]. The conversion factor from cords to tons was taken from the State Energy Data Report 1993[2]. All emission factors were obtained from EIIP Volume III; chapter 2 Residential wood Combustion[3].

Below you will find emission factors for both Conventional and Catalytic wood stoves. It is up to the individual as to which emission factor set should be used in their respective state. Indiana chose catalytic for all wood burned in the state.

Pollutant	Emission Factor (lbs/ton)		
	Conventional	Cat	Non-Cat
Acenaphthene	1.0e-2	6.0e-3	1.0e-2
Acenaphthylene	2.12e-1	6.8e-2	3.2e-2
Anthracene	1.4e-2	8.0e-3	9.0e-3
Benz(a)anthracene	2.0e-2	2.4e-2	1.0e-3
Benzene	1.938	1.464	NA
Benzo(a)pyrene	4.0e-3	4.0e-3	6.0e-3
Benzo(b)fluoranthene	6.0e-3	4.0e-3	4.0e-3

Benzo(ghi)perylene	4.0e-3	2.0e-3	2.0e-2
Benzo(k)fluoranthene	2.0e-3	2.0e-3	1.0e-3
Cadmium	2.2e-5	4.6e-5	2.2e-5
Chromium	1.0e-6	1.0e-6	1.0e-6
Chrysene	1.2e-2	1.0e-2	1.0e-2
Dibenz(ah)anthracene	Bdl	2.0e-3	4.0e-3
Fluoranthene	2.0e-2	1.2e-2	8.0e-3
Fluorene	2.4e-2	1.4e-2	1.4e-2
Indeno(123-cd)pyrene	Bdl	4.0e-3	2.0e-3
Manganese	1.4e-4	2.2e-4	1.4e-4
Naphthalene	2.88e-1	1.86e-1	1.44e-1
Nickel	1.4e-5	2.2e-6	2.0e-5
Phenanthrene	7.8e-2	4.89e-1	1.18e-1
Pyrene	2.4e-2	1.0e-2	8.0e-3
Toluene	7.30e-1	5.2e-1	NA
Xylene, ortho	2.02e-1	1.86e-1	NA

SAMPLE CALCULATIONS

Adams County

Wood Stoves

850 Households using wood as primary heat source in Adams County.
86,977 total houses using wood as primary heat source
499,000 cords used in Indiana.
1.25 tons/cord

(850/86,977)*499,000*1.25 = 6095.72 tons burned in Adams county

6095.72 tons * 1.464 lbs Benzene/ ton of wood burned = 8924 lbs of Benzene

REFERENCES

Detailed Housing Characteristics, 1990 Census of Housing; table 67; Fuel, Occupancy and Social Characteristics.

State Energy Data Report 1993, 1995, Energy Information Administration, Office of Energy Markets and End Use, U.S. Department of Energy.

Environmental Protection Agency (EPA). *STAPPA-ALAPCO-EPA Emission Inventory Improvement Program (EIIP).* Volume III - Area Sources Preferred and Alternative Methods. Chapter 2 - Residential Wood Combustion. July 1997.

X. Solvent Cleaning

In this category, the use of solvents is broken into two broad classifications. The classifications are solvent cleaning (which is composed of cold cleaning and vapor/in-line cleaning), and solvent cleanup (predominantly wipe cleaning of external surfaces).

EIIP Preferred Method

Solvent Cleaning Equipment:

Cold Cleaners

Conduct survey of suppliers, until cold cleaner NSPS is promulgated.

Vapor/In-line Cleaners

Facility specific data submitted per the halogenated solvent cleaning NESHAP; or data from facilities permitted as VOC and/or HAP sources.

Solvent Cleanup

Conduct survey of subset of users.

EIIP Alternative Method

Solvent Cleaning Equipment (both Cold Cleaners and Vapor/In-line Cleaners):

Surveys

Useable only if data available for reasonable subset of facilities.

Emission factors

EIIP Table 6.5-2 provides per capita and per employee emission factors, as reproduced below. Throughput for per capita emission factors may be found with the U.S. Department of Commerce, Bureau of the Census (http://www.census.gov/population/www/estimates/countypop.html), in the form of county population estimates. Throughput for per employee emission factors may be found in *County Business Patterns 1995*, published by the U.S. Department of Commerce, Bureau of the Census (http://www.census.gov/epcd/cbp/view/cbpview.html). This data will be available as employee numbers by SIC code per county. 1995 is the most recent year for which this data is currently available.

Recommended Method for Solvent Cleaning Equipment

Michigan opted to utilize the per employee emission factor from Table 6.5-2 for calculating solvent cleaning equipment emissions. Cold cleaning and vapor/in-line cleaning cab be calculated separately, or together by the use of the total solvent cleaning emission factor. Michigan calculated the two categories separately as this will produce a more precise estimate of the solvent cleaning emissions than would the total solvent cleaning factor.

Point source facilities must be accounted for. Point source employment by SIC code, from Michigan's 1996 Emission Inventory System, was subtracted from the Bureau of the Census employment numbers to generate area source employment numbers for each county. Then the area source employment numbers were multiplied by the per employee emission factor to produce the emissions estimates.

Table X-1: Per Capita and Per Employee Solvent Cleaning Emission Factors (EPA, 1991)

Subcategory	SIC Codes	Per Capita Factor (lb/yr/person)		Per Employee Factor (lb/yr/person)	
		VOCs	Organics	VOCs	Organics
Solvent cleaning (total)	25, 33-39, 417 423, 551, 552, 554-556, 753	4.3	7.2	87	144
Cold Cleaning					
Automobile Repair	417, 423, 551, 552, 554-556, 753	2.5	2.5	270	270
Manufacturing	25, 33-39	1.1	1.1	24	24
Vapor and In-Line Cleaning					
Electronics and Electrical	36	0.21	1.1	29	150
Other	25, 33-39, 417, 423, 551, 552, 554-556, 753	0.49	25	9.8	49

<u>Solvent Cleanup</u>

Facility-specific data:

Useable only if data available for reasonable subset of facilities.

Emission factors:

Solvent usage and emissions data provided in Table 6.5-4 can be used to estimate local emissions by developing a national per employee or per capita emission factor. The tables are reproduced below. Throughput will be based on employment data from the *County Business Patterns 1995* publication, or population data from the U.S. Department of Commerce, Bureau of the Census.

<u>Recommended Method for Solvent Cleanup:</u>

Michigan utilized the nationwide emission estimates from VOC solvent usage presented in Table 6.5-4. In order to correlate with data on national employment by SIC code, the categories were matched to SIC codes where possible. The national employment data was obtained from the *1996 Annual Survey of Manufacturers M96(AS)-1, Statistics for Industry Groups and Industries*, available from the U.S. Bureau of the Census (http://www.census.gov/prod/www/abs/industry.html). The categories of industries considered in Table X-2, and the SIC codes matched to them, are presented below.

Furniture:	SIC 25
Magnetic Tape:	included under SIC 36, Electrical Equipment
Packaging:	SIC 265
Photographic supplies:	SIC 3861
Automotive - manufacturing:	SIC 3711
Automotive - trucks and buses:	SIC 3713
Automotive - parts/accessories:	SIC 3714
Automotive - stamping:	SIC 3465
Electrical equipment:	SIC 36 (entire 2 digit SIC number considered for expediency)

Table X-2: Solvent Cleanup Emission Factors Per Employee for Individual SIC

SIC	National employment by SIC code in 1996*	National solvent cleanup emissions by SIC, tons/yr **	Solvent cleanup emissions per employee, tons/yr
25	527000	47000	0.089
265	212000	7000	0.033
3465	119500	330	0.003
36	1556500	2400	0.002
3711	225200	34000	0.151
3713	37300	16000	0.429
3714	459900	2200	0.005
3861	60700	480	0.008

* from 1996 Annual Survey of Manufacturers M96(AS)-1, Statistics for Industry Groups and Industries
** Table X-2, EIIP Area Source Guidance Chapter 6 - Solvent Cleaning

Next, total employment for each relevant SIC code per county in Michigan was obtained from *County Business Patterns 1995*. Point source employment per county per SIC code was obtained from Michigan's 1996 Emission Inventory System, and subtracted from the total employment figure to obtain area source employment per SIC code per county. The area source employment numbers were then multiplied by the national per employee emission factor, to provide VOC solvent emission estimates per SIC at the county level.

Table X-3: Nationwide VOC solvent usage and emission estimates for selected industries , tons / yr [a] (epa, 1994 B) [b]

Industry	Equipment Cleaning	Floor Cleaning	Large Manuf'd Component Cleaning	Line Cleaning	Parts Cleaning	Small Manuf'd Component Cleaning	Spray Booth Cleaning	Spray Gun Cleaning	Tank Cleaning	Total
Automotive - Manufacturing										
Solvent Usage	220	570	8400	14000	129	180	17000	28000	3100	72000
Emissions	220	570	7700	130	130	180	15000	9500	110	34000
Automotive - Trucks and Buses										
Solvent Usage			6900					8800		16000
Emissions			6900					8800		16000
Automotive - Parts/Accessories										
Solvent Usage	15				7600			130		7700
Emissions	15				2100			55		2200
Automotive - Stamping										
Solvent Usage					1000	13				1000
Emissions					320	13				330
Electrical Equipment										
Solvent Usage	500	77			1900	290		2800		5600
Emissions	450	77			520	290		1100		2400
Furniture										
Solvent Usage	7300		900	39000	1800	130		180000		230000
Emissions	5600		840	3800	540	72		36000		47000
Magnetic Tape										
Solvent Usage	670			330	2400				7700	11000
Emissions	230			6.6	440				430	1100
Packaging										
Solvent Usage	1300	5900			23000					30000
Emissions	960	2500			3500					7000
Photographic Supplies										
Solvent Usage	4400	3.1			130			5.3	36000	41000
Emissions	110	3.1			1.3			5.3	360	480
Total Usage[c]	14000	6600	16200	53000	38000	610	17000	220000	47000	410000
Total Emissions[c]	7600	3200	15400	3900	7600	490	15000	55000	900	109000

[a]Usage and emission values are from a 1990 report.

[b]Estimates based on nationwide extrapolation of usage- per- employee factors from surveyed plants (using total plant employment).

[c]Totals are different due to rounding.

GREAT LAKES TOXICS

AMS codes were found for the following SIC groups.

SIC	AMS CODE	DESCRIPTION	INDUSTRY DESCRIPTION
25	2415005000	TOTAL: ALL SOLVENTS	FURNITURE & FIXTURES
33	2415010000	TOTAL: ALL SOLVENTS	PRIMARY METAL INDUSTRY
33	2415015000	TOTAL: ALL SOLVENTS	SECONDARY METAL INDUSTRY
34	2415020000	TOTAL: ALL SOLVENTS	FABRICATED METAL
35	2415025000	TOTAL: ALL SOLVENTS	INDUSTRIAL MACHINERY & EQUIPMENT
36	2415030000	TOTAL: ALL SOLVENTS	ELECTRONIC AND OTHER ELEC.
37	2415035000	TOTAL: ALL SOLVENTS	TRANSPORTATION EQUIPMENT
38	2415040000	TOTAL: ALL SOLVENTS	INSTRUMENTS AND RELATED PRODUCTS
39	2415045000	TOTAL: ALL SOLVENTS	MISC MANUFACTURING
40-45	2415050000	TOTAL: ALL SOLVENTS	TRANSPORTATION MAINTENANCE FACILITIES
55	2415055000	TOTAL: ALL SOLVENTS	AUTOMOTIVE DEALERS
75	2415060000	TOTAL: ALL SOLVENTS	AUTO REPAIR SERVICES

These SIC codes each matched Profile Number 1195 in RAPIDS. Under Profile Number 1195, the following pollutants from the proposed GLC Toxics material group are speciated. Next to the pollutants, emission factors from the RAPIDS Generic Speciation Factor table are provided, in lb of emittants per lb of throughput. The throughput is TOG. One lb of TOG is emitted for every lb of VOC throughput. This relationship came from the RAPIDS emission factor table.

Please note that point source emissions must be considered when using these emission factors. When calculating VOC emissions as Michigan did, by using per employee numbers, the point source employment can be subtracted from total employment to produce area source employment. VOC, and TOG, can then be calculated for the area sources.

benzene	0.010000 LB/LB TOG
methylene chloride	0.041000 LB/LB TOG
naphthalene	0.000300 LB/LB TOG
perchloroethylene	0.074000 LB/LB TOG
1,1,1 trichloroethane	0.222900 LB/LB TOG
toluene	0.082900 LB/LB TOG
trichloroethylene	0.210900 LB/LB TOG
xylene, m	0.002300 LB/LB TOG
xylene, o	0.001700 LB/LB TOG
xylene, p	0.002300 LB/LB TOG
xylenes iso	0.034000 LB/LB TOG

REFERENCES

Environmental Protection Agency (EPA). *STAPPA-ALAPCO-EPA Emission Inventory Improvement Program (EIIP).* Volume III - Area Sources Preferred and Alternative Methods. Chapter 6, Solvent Cleaning. September 1997.

US Department of Commerce, Bureau of the Census. *County Business Patterns 1995.* October 1997.

US Department of Commerce, Bureau of the Census. *1996 Annual Survey of Manufacturers M96(AS)-1, Statistics for Industry Groups and Industries.*

Y. Traffic Markings

PREFERRED METOHD: Survey of Traffic Marking Usage

Data requirements of the preferred method as per EIIP Document Volume III: Chapter 14 - Traffic Markings.

- product type, including thinning and cleanup solvents
- product amount used by type (gallon)
- product density (lb/gallon)
- estimates of the proportion of products used during the inventory season
- VOC/solvent content or air toxic/solvent content of each product type (lb/gallon or weight percent), depending on the inventory type

ALTERNATIVE METHODS

Data requirement of each alternative approach

1. Alternative Method One: National traffic paint sales and National Paint & Coating Association (NPCA) emission factor
   - National traffic paint usage
   - National and state spending for highway maintenance
   - State and county paved lane miles (preferred approach) or state and county population
   - Proportion of solvent- versus water-based coatings for the state or county to develop a local emission factor from the NPCA solvent and water-based coating factors, or the NPCA national average emission factor

2. Alternative Method Two: Lane miles emission factor
   - Traffic lane miles painted (preferred approach) or total lane miles
   - Proportion of solvent- versus water-based coatings for the state or county to develop a local emission factor (preferred approach), or the solvent-based emission factor

3. Alternative Method Three: Per capita emission factor
   - National traffic paint sales data, in gallons
   - National population and inventory area population figures for the inventory year
   - NPCA per-gallon emission factor

CHOOSING A METHOD & CALCULATING EMISSIONS

All of the alternative methods, even the preferred method to an extent, are based on an assumed proportional relationship between traffic marking usage and some acceptable and accessible surrogate measurement for county/state/national level, i.e. highway maintenance spending, population, traffic lane miles, etc. While the survey method may be a necessity in some states, others need to consider issues of cost and complexity before undertaking this method. A state may have some but not all of the necessary information to do a thorough survey method, i.e. you know the solvent usage from the paint but not the solvent usage from the thinning and cleanup activities, the paint usage provided by the state highway department is categorized by districts or subdivision of the state that cuts across county boundaries, etc. You may start out trying to do a survey method only to combine it with one of the alternative methods when you have insufficient information. Once a baseline survey method has been established, using a smaller sample size or updating traffic marking coating usage maybe sufficient in following years. Using the Preferred Method, Alternative Method One or Three will give the county-based pain usage. Alternative Method Two assumes 16 gallons of traffic paint of either solvent- or water-based paint are used for every mile counted (EPA, 1988). The air toxic emission factors are available from EIIP Document Volume III: Chapter 14 - Traffic Markings. The equation for calculating air toxic emissions is the following:

Air Toxic Emissions = County Traffic Paint Usage * Air Toxic Volume % * Air Toxic Density

Table Y-1: Pollutants emitted of interest to RAPIDS and Species Profile

AIR Toxic	Volume Percent (%)	Density (lb./gal)
Carbon tetrachloride	0.009	12.19
Ethylbenzene	0.009	7.24
Glycol ethers	0.040	7.01
Naphthalene	0.002	9.55
Styrene	0.277	7.55
Toluene	6.914	7.23
Xylenes (mixed isomers)	0.499	7.18

The FIRE 6.01 is also checked. The SCC A2401008xxx (traffic markings) has no air toxic emission factors and the SCC 402001-01 (paint: solvent based) is too generic and its Air Toxic emission factors may differ substantially from traffic marking paint formulations.

REFERENCES

Environmental Protection Agency (EPA). *STAPPA-ALAPCO-EPA Emission Inventory Improvement Program (EIIP).* Volume III - Area Sources Preferred and Alternative Methods. Chapter 14 - Traffic Markings. July 1997.

Appendix Z: Index of SIC Code

SIC	DESCRIPTION
01	Agricultural Production-crops
011	Cash Grains
0111	Wheat
0112	Rice
0115	Corn
0116	Soybeans
0119	Cash Grains, n.e.c.
0130	Field Crops, Except Cash Grains
0131	Cotton
0132	Tobacco
0133	Sugar Crops
0134	Irish Potatoes
0139	Field Crops Except Cash Grains
016	Vegetables and Melons
0161	Vegetables and Melons
017	Fruits and Tree Nuts
0171	Berry Crops
0172	Grapes
0173	Tree Nuts
0174	Citrus Fruits
0175	Deciduous Tree Fruits
0179	Fruits and Tree Nuts, n.e.c.
018	Horticultural Specialties
0181	Ornamental Nursery Products
0182	Food Crops Grown under Cover
0189	Horticultural Specialties, n.e.c.
019	General Farms, Primarily Crop
0191	General Farms Primarily Crop
02	Agricultural Production-livestock & Animal Special
021	Livestock, Except Dairy and Poultry
0211	Beef Cattle Feedlots
0212	Beef Cattle Except Feedlots
0213	Hogs
0214	Sheep and Goats
0219	General Livestock, n.e.c.
024	Dairy Farms
0241	Dairy Farms
025	Poultry and Eggs
0251	Broiler, Fryer, and Roaster Chickens
0252	Chicken Eggs
0253	Turkeys and Turkey Eggs
0254	Poultry Hatcheries
0259	Poultry and Eggs, n.e.c.
027	Animal Specialties
0271	Fur-bearing Animals and Rabbit
0272	Horses and Other Equines
0273	Animal Aquaculture
0279	Animal Specialties, n.e.c.
029	General Farms, Primarily Livestock and Animal Specialties
0291	General Farms Primarily Livestock

SIC	DESCRIPTION
07	Agricultural Services
071	Soil Preparation Services
0711	Soil Preparation Services
072	Crop Services
0721	Crop Planting and Protection
0722	Crop Harvesting
0723	Crop Prep Services for Market
0724	Cotton Ginning
0729	General Crop Services
074	Veterinary Services
0741	Veterinary Services Farm Livestock
0742	Veterinary Services Specialties
075	Animal Services, Except Veterinary
0751	Livestock Services, Except Specialties
0752	Animal Specialty Services
076	Farm Labor and Management Services
0761	Farm Labor Contractors
0762	Farm Management Services
078	Landscape and Horticultural Services
0781	Landscape Counseling and Planning
0782	Lawn and Garden Services
0783	Ornamental Shrub and Tree Services
08	Forestry
081	Timber Tracts
0811	Timber Tracts
0821	Forest Nurseries & Seed Gather
083	Forest Nurseries & Gathering of Forest Products
0831	Forest Products
0843	Extraction of Pine Gum
0849	Gathering of Forest Products
085	Forestry Services
0851	Forestry Services
09	Fishing, Hunting and Trapping
091	Commercial Fishing
0912	Finfish
0913	Shellfish
0919	Miscellaneous Marine Products
092	Fish Hatcheries and Preserves
0921	Fish Hatcheries and Preserves
097	Hunting, Trapping, & Game Propagation
0971	Hunting, Trapping, & Game Propagation
10	Metal Mining
101	Iron Ores
1011	Iron Ores
102	Copper Ores
1021	Copper Ores
103	Lead and Zinc Ores
1031	Lead and Zinc Ores
104	Gold and Silver Ores
1041	Gold Ores
1044	Silver Ores

SIC	DESCRIPTION
1051	Bauxite and Other Aluminum Ore
106	Ferroalloy Ores, Except Vanadium
1061	Ferroalloy Ores Except Vanadium
108	Metal Mining Services
1081	Metal Mining Services
109	Miscellaneous Metal Ores
1092	Mercury Ores
1094	Uranium-Radium-Vanadium Ores
1099	Metal Ores, n.e.c.
1111	Anthracite
1112	Anthracite Mining Services
12	Coal Mining
1211	Bituminous Coal and Lignite
1213	Bituminous & Lignite Mine Services
122	Bituminous Coal and Lignite Mining
1221	Bituminous Coal & Lignite - Surface
1222	Bituminous Coal & Lignite - Underground
123	Anthracite Mining
1231	Anthracite Mining
124	Coal Mining Services
1241	Coal Mining Services
13	Oil and Gas Extraction
131	Crude Petroleum and Natural Gas
1311	Crude Petroleum & Natural Gas
132	Natural Gas Liquids
1321	Natural Gas Liquids
138	Oil and Gas Field Services
1381	Drilling Oil and Gas Wells
1382	Oil and Gas Exploration Service
1389	Oil and Gas Field Services, n.e.c.
14	Mining and Quarrying of Nonmetallic Minerals
141	Dimension Stone
1411	Dimension Stone
142	Crushed & Broken Stone, Including Riprap
1422	Crushed and Broken Limestone
1423	Crushed and Broken Granite
1429	Crushed and Broken Stone, n.e.c.
144	Sand and Gravel
1442	Construction Sand and Gravel
1446	Industrial Sand
145	Clay, Ceramic, and Refractory Minerals
1452	Bentonite
1453	Fire Clay
1454	Fullers Earth
1455	Kaolin and Ball Clay
1459	Clay and Related Minerals, n.e.c.
147	Chemical & Fertilizer Mineral Mining
1472	Barite
1473	Fluorspar
1474	Potash Soda & Borate Minerals
1475	Phosphate Rock
1476	Rock Salt
1477	Sulfur
1479	Chemical and Fertilizer Mining
148	Nonmetallic Minerals Services, Except Fuels
1481	Nonmetallic Minerals Services
149	Miscellaneous Nonmetallic Minerals, Except Fuels
1492	Gypsum

SIC	DESCRIPTION
1496	Talc Soapstone & Pyrophyllite
1499	Nonmetallic Minerals, n.e.c.
15	Building Construction-General Contractors & Builders
152	General Building Contractors-Residential Buildings
1521	Single-family Housing Construction
1522	Residential Construction, n.e.c.
153	Operative Builders
1531	Operative Builders
154	General Building Contractors-Nonresidential Buildings
1541	Industrial Building/Warehouses
1542	Nonresidential Construction N.e.c.
16	Heavy Construction other than Building Construction-Contract
161	Highway & Street Construction, Except Elevated Highway
1611	Highway and Street Construction
162	Heavy Construction, Except Highway & Street Construction
1622	Bridge Tunnel & Elevated Hwy
1623	Water Sewer and Utility Lines
1629	Heavy Construction, n.e.c.
17	Construction-special Trade Contractors
171	Plumbing, Heating, and Air-conditioning
1711	Plumbing Heating Air Condition
172	Ainting and Paper Hanging
1721	Painting and Paper Hanging
173	Electrical Work
1731	Electrical Work
174	Masonry, Stoneworks, Tile Setting, & Plastering
1741	Masonry and Other Stonework
1742	Plastering Drywall/Insulation
1743	Terrazzo Tile Marble Mosaic Work
175	Carpentry and Floor Work
1751	Carpentry Work
1752	Floor Laying & Floor Work, n.e.c.
176	Roofing, Siding, and Sheet Metal Work
1761	Roofing and Sheet Metal Work
177	Concrete Work
1771	Concrete Work
178	Water Well Drilling
1781	Water Well Drilling
179	Misc. Special Trade Contractors
1791	Structural Steel Erection
1793	Glass and Glazing Work
1794	Excavating and Foundation Work
1795	Wrecking and Demolition Work
1796	Installing Building Equipment
1799	Special Trade Contractors, n.e.c.
20	Food and Kindred Products
201	Meat Products
2011	Meat Packing Plants
2013	Sausages & Other Prepared Meat
2015	Poultry Slaughtering & Processing
2016	Poultry Dressing Plants
2017	Poultry and Egg Processing
202	Dairy Products

SIC	DESCRIPTION
2021	Creamery Butter
2022	Cheese Natural and Processed
2023	Condensed and Evaporated Milk
2024	Ice Cream and Frozen Desserts
2026	Fluid Milk
203	Preserved Fruits and Vegetables
2032	Canned Specialties
2033	Canned Fruits and Vegetables
2034	Dehydrated Fruits/Vegetable Soups
2035	Pickles Sauces and Salad Dress
2037	Frozen Fruits and Vegetables
2038	Frozen Specialties
204	Grain Mill Products
2041	Flour & Other Grain Mill Prod
2042	Grain Mill Products
2043	Cereal Breakfast Foods
2044	Rice Milling
2045	Blended and Prepared Flour
2046	Wet Corn Milling
2047	Dog Cat and Other Pet Food
2048	Prepared Feeds, n.e.c.
205	Bakery Products
2051	Bread Cake and Related Product
2052	Cookies and Crackers
2053	Frozen Bakery Products, Except Bread
206	Sugar and Confectionery Products
2061	Raw Cane Sugar
2062	Cane Sugar Refining
2063	Beet Sugar
2064	Candy and Other Confectionery Products
2065	Confectionery Products
2066	Chocolate and Cocoa Products
2067	Chewing Gum
2068	Salted and Roasted Nuts and Seeds
207	Fats and Oils
2074	Cottonseed Oil Mills
2075	Soybean Oil Mills
2076	Vegetable Oil Mills, n.e.c.
2077	Animal and Marine Fats and Oil
2079	Shortening and Cooking Oils
208	Beverages
2082	Malt Beverages
2083	Malt
2084	Wines Brandy & Brandy Spirits
2085	Distilled Liquor Except Brandy
2086	Bottled and Canned Soft Drinks
2087	Flavoring Extracts and Syrups, n.e.c.
209	Misc. Food Preparations & Kindred Products
2091	Canned and Cured Seafoods
2092	Fresh or Frozen Packaged Fish
2095	Roasted Coffee
2096	Potato Chips and Similar Snacks
2097	Manufactured Ice
2098	Macaroni and Spaghetti
2099	Food Preparations, n.e.c.
21	Tobacco Products
211	Cigarettes
2111	Cigarettes

SIC	DESCRIPTION
212	Cigars
2121	Cigars
213	Chewing and Smoking Tobacco and Snuff
2131	Chewing and Smoking Tobacco
214	Tobacco Stemming and Redrying
2141	Tobacco Stemming and Redrying
22	Textile Mill Products
221	Broadwoven Fabric Mills, Cotton
2211	Weaving Mills, Cotton
222	Broadwoven Fabric Mills, Manmade Fiber & Silk
2221	Weaving Mills, Synthetics
223	Broadwoven Fabric Mills, Wool (Including Dyeing & Finishing)
2231	Weaving & Finishing Mills Wool
224	Narrow Fabric & Smallwares Mills: Cotton, Wool, Silk, & Manmade Fiber
2241	Narrow Fabric Mills
225	Knitting Mills
2251	Women's Hosiery, Except Socks
2252	Hosiery, n.e.c.
2253	Knit Outerwear Mills
2254	Knit Underwear Mills
2257	Circular Knit Fabric Mills
2258	Warp Knit Fabric Mills
2259	Knitting Mills, n.e.c.
226	Dyeing & Finishing Textiles, Except Wool Fabrics & Knit Goods
2261	Finishing Plants, Cotton
2262	Finishing Plants, Synthetics
2269	Finishing Plants, n.e.c.
227	Carpets and Rugs
2271	Woven Carpets and Rugs
2272	Tufted Carpets and Rugs
2273	Carpets and Rugs
2279	Carpets and Rugs, n.e.c.
228	Yarn and Thread Mills
2281	Yarn Mills, Except Wool
2282	Throwing and Winding Mills
2283	Wool Yarn Mills
2284	Thread Mills
229	Miscellaneous Textile Goods
291	Felt Goods Except Woven Felt/Hats
2292	Lace Goods
2293	Padding & Upholstery Filling
2294	Processed Textile Waste
2295	Coated Fabrics, Not Rubberized
2296	Tire Cord and Fabric
2297	Nonwoven Fabrics
2298	Cordage and Twine
2299	Textile Goods, n.e.c.
23	Apparel & Other Finished Products Made from Fabric
231	Men's and Boys' Suits, Coats, & Overcoats
2311	Men's and Boys' Suits and Coat
232	Men's & Boys' Furnishings, Work Clothing, & Allied Garments
2321	Men & Boys Shirts/nightwear
2322	Men's and Boy's Underwear

SIC	DESCRIPTION
2323	Men's and Boys' Neckwear
2325	Men's and Boy's Trousers and Slacks
2326	Men's and Boy's Work Clothing
2327	Men & Boys Separate Trousers
2328	Men's and Boys' Work Clothing
2329	Men's and Boys' Clothing, n.e.c.
233	Outerwear: Women, Misses, & Juniors
2331	Women's & Misses' Blouses & Shirts
2335	Women's and Misses' Dresses
2337	Women's & Misses Suits & Coats
2339	Women's & Misses Outerwear n.e.c.
234	Undergarments: Women, Misses, Childrens, & Infants
2341	Women's & Children's Underwear
2342	Brassieres and Allied Garments
235	Hats, Caps, and Millinery
2351	Millinery
2352	Hats & Caps Except Millinery
2353	Hats, Caps, and Millinery
236	Outerwear: Girls, Children, & Infants
2361	Children's Dresses and Blouses
2363	Children's Coats and Suits
2369	Children's Outerwear, n.e.c.
237	Fur Goods
2371	Fur Goods
238	Miscellaneous Apparel & Accessories
2381	Fabric Dress and Work Gloves
2384	Robes and Dressing Gowns
2385	Waterproof Outergarments
2386	Leather & Sheep Lined Clothing
2387	Apparel Belts
2389	Apparel and Accessories, n.e.c.
239	Misc. Fabricated Textile Products
2391	Curtains and Draperies
2392	House Furnishings, n.e.c.
2393	Textile Bags
2394	Canvas and Related Products
2395	Pleating and Stitching
2396	Automotive & Apparel Trimmings
2397	Schiffli Machine Embroideries
2399	Fabricated Textile Products
24	Lumber & Wood Products, Except Furniture
241	Logging
2411	Logging
242	Sawmills and Planing Mills
2421	Sawmills & Planing Mills General
2426	Hardwood Dimension & Flooring
2429	Special Product Sawmills, n.e.c.
243	Millwork, Veneer, Plywood & Structural Members
2431	Millwork
2434	Wood Kitchen Cabinets
2435	Hardwood Veneer and Plywood
2436	Softwood Veneer and Plywood
2439	Structural Wood Members, n.e.c.
244	Wood Containers
2441	Nailed Wood Boxes and Shook
2448	Wood Pallets and Skids
2449	Wood Containers, n.e.c.

SIC	DESCRIPTION
245	Wood Buildings and Mobile Homes
2451	Mobile Homes
2452	Prefabricated Wood Buildings
249	Miscellaneous Wood Products
2491	Wood Preserving
2492	Particleboard
2493	Reconstituted Wood Products
2499	Wood Products, n.e.c.
25	Furniture and Fixtures
251	Household Furniture
2511	Wood Household Furniture
2512	Upholstered Household Furniture
2514	Metal Household Furniture
2515	Mattresses and Bedsprings
2517	Wood TV and Radio Cabinets
2519	Household Furniture, n.e.c.
252	Office Furniture
2521	Wood Office Furniture
2522	Metal Office Furniture
253	Public Building & Related Furniture
2531	Public Building & Related Furniture
254	Partitions, Shelving, Lockers, & Office & Store Fixtures
2541	Wood Partitions and Fixtures
2542	Metal Partitions and Fixtures
259	Miscellaneous Furniture and Fixtures
2591	Drapery Hardware/Blinds/Shades
2599	Furniture and Fixtures, n.e.c.
26	Paper and Allied Products
261	Pulp Mills
2611	Pulp Mills
262	Paper Mills
2621	Paper Mills Except Building Paper
263	Paperboard Mills
2631	Paperboard Mills
2641	Paper Coating and Glazing
2642	Envelopes
2643	Bags, Except Textile Bags
2645	Die-cut Paper and Board
2646	Pressed and Molded Pulp Goods
2647	Sanitary Paper Products
2648	Stationery Products
2649	Converted Paper Products, n.e.c.
265	Paperboard Containers and Boxes
2651	Folding Paperboard Boxes
2652	Set-up Paperboard Boxes
2653	Corrugated and Solid Fiber Box
2654	Sanitary Food Containers
2655	Fiber Cans Drums like Products
2656	Sanitary Food Containers
2657	Folding Paperboard Boxes
2661	Building Paper and Board Mills
267	Converted Paper & Paperboard Products, Except Containers & Boxes
2671	Paper Coated and Laminated Packaging
2672	Paper Coated and Laminated, n.e.c.
2673	Bags: Plastics, Laminated, and Coated
2674	Bags: Uncoated Paper and Multiwall

SIC	DESCRIPTION
2675	Die-cut Paper and Board
2676	Sanitary Paper Products
2677	Envelopes
2678	Stationery Products
2679	Converted Paper Products, n.e.c.
27	Printing, Publishing and Allied Industries
271	Newspapers: Publishing, or Publishing & Printing
2711	Newspapers
272	Periodicals: Publishing, or Publishing & Printing
2721	Periodicals
273	Books
2731	Book Publishing
2732	Book Printing
274	Miscellaneous Publishing
2741	Miscellaneous Publishing
275	Commercial Printing
2751	Commercial Printing Letterpress
2752	Commercial Printing Lithograph
2753	Engraving and Plate Printing
2754	Commercial Printing, Gravure
2759	Commercial Printing, n.e.c.
276	Manifold Business Forms
2761	Manifold Business Forms
277	Greeting Cards
2771	Greeting Card Publishing
278	Blankbooks, Looseleaf Binders, & Bookbinding & Related Work
2782	Blankbooks & Looseleaf Binders
2789	Bookbinding and Related Work
279	Service Industries for the Printing Trade
2791	Typesetting
2793	Photoengraving
2794	Electrotyping and Stereotyping
2795	Lithographic Platemaking Services
2796	Platemaking Services
28	Chemicals and Allied Products
281	Industrial Inorganic Chemicals
2812	Alkalies and Chlorine
2813	Industrial Gases
2816	Inorganic Pigments
2819	Industrial Inorganic Chemicals
282	Plastics Materials and Synthetics
2821	Plastics Materials and Resins
2822	Synthetic Rubber
2823	Cellulosic Man-Made Fibers
2824	Organic Fibers, Noncellulosic
283	Drugs
2831	Biological Products
2833	Medicinals and Botanicals
2834	Pharmaceutical Preparations
2835	Diagnostic Substances
2836	Biological Products, Except Diagnostic
284	Soap, Cleaners, and Toilet Goods
2841	Soap and Other Detergents
2842	Polishes and Sanitation Goods
2843	Surface Active Agents
2844	Toilet Preparations

SIC	DESCRIPTION
285	Paints, Varnishes, Lacquers, Enamels, & Allied Products
2851	Paints and Allied Products
286	Industrial Organic Chemicals
2861	Gum and Wood Chemicals
2865	Cyclic Crudes and Intermediate
2869	Industrial Organic Chemicals, n.e.c.
287	Agricultural Chemicals
2873	Nitrogenous Fertilizers
2874	Phosphatic Fertilizers
2875	Fertilizers, Mixing Only
2879	Agricultural Chemicals, n.e.c.
289	Miscellaneous Chemical Products
2891	Adhesives and Sealants
2892	Explosives
2893	Printing Ink
2895	Carbon Black
2899	Chemical Preparations, n.e.c.
29	Petroleum Refining and Related Industries
291	Petroleum Refining
2911	Petroleum Refining
295	Asphalt Paving and Roofing Materials
2951	Paving Mixtures and Blocks
2952	Asphalt Felts and Coatings
299	Misc. Petroleum and Coal Products
2992	Lubricating Oils and Greases
2999	Petroleum and Coal Products, n.e.c.
30	Rubber and Miscellaneous Plastics Products
301	Tires and Inner Tubes
3011	Tires and Inner Tubes
302	Rubber and Plastics Footwear
3021	Rubber and Plastics Footwear
3031	Reclaimed Rubber
3041	Rubber & Plastics Hose and Belting
305	Gaskets, Packing, Sealing Devices, & Rubber & Plastics Hose & Belting
3052	Rubber and Plastics Hose and Belting
3053	Gaskets, Packing and Sealing Devices
306	Fabricated Rubber Products, n.e.c.
3061	Mechanical Rubber Goods
3069	Fabricated Rubber Products, n.e.c.
3079	Miscellaneous Plastics Products
308	Miscellaneous Plastics Products, n.e.c.
3081	Unsupported Plastics Film and Sheet
3082	Unsupported Plastics Profile Shapes
3083	Laminated Plastics Plate and Sheet
3084	Plastics Pipe
3085	Plastics Bottles
3086	Plastics Foam Products
3087	Custom Compound Purchased Resins
3088	Plastics Plumbing Fixtures
3089	Plastics Products, n.e.c.
31	Leather and Leather Products
311	Leather Tanning and Finishing
3111	Leather Tanning and Finishing
313	Boot & Shoe Cut Stock & Findings
3131	Boot and Shoe Cut Stock and Findings
314	Footwear, Except Rubber

SIC	DESCRIPTION
3142	House Slippers
3143	Men's Footwear, Except Athletic
3144	Women's Footwear, Except Athletic
3149	Footwear, Except Rubber, n.e.c.
315	Leather Gloves and Mittens
3151	Leather Gloves and Mittens
316	Luggage
3161	Luggage
317	Handbags and Personal Leather Goods
3171	Women's Handbags and Purses
3172	Personal Leather Goods, n.e.c.
319	Leather Goods, n.e.c.
3199	Leather Goods, n.e.c.
32	Stone, Clay, Glass and Concrete Products
321	Flat Glass
3211	Flat Glass
322	Glass and Glassware, Pressed or Blown
3221	Glass Containers
3229	Pressed and Blown Glass, n.e.c.
323	Glass Products, Made of Purchased Glass
3231	Products of Purchased Glass
324	Cement, Hydraulic
3241	Cement, Hydraulic
325	Structural Clay Products
3251	Brick and Structural Clay Tile
3253	Ceramic Wall and Floor Tile
3255	Clay Refractories
3259	Structural Clay Products, n.e.c.
326	Pottery and Related Products
3261	Vitreous Plumbing Fixtures
3262	Vitreous China Food Utensils
3263	Fine Earthenware Food Utensils
3264	Porcelain Electrical Supplies
3269	Pottery Products, n.e.c.
327	Concrete, Gypsum, and Plaster Products
3271	Concrete Block and Brick
3272	Concrete Products, n.e.c.
3273	Ready-mixed Concrete
3274	Lime
3275	Gypsum Products
328	Cut Stone and Stone Products
3281	Cut Stone and Stone Products
329	Abrasive, Asbestos, & Misc. Nonmetallic Mineral Products
3291	Abrasive Products
3292	Asbestos Products
3293	Gaskets/packing/sealing Device
3295	Minerals, Ground or Treated
3296	Mineral Wool
3297	Nonclay Refractories
3299	Nonmetallic Mineral Products
33	Primary Metal Industries
331	Steel Works, Blast Furnaces, & Rolling & Finishing Mills
3312	Blast Furnaces and Steel Mills
3313	Electrometalurgical Products
3315	Steel Wire and Related Products
3316	Cold Finishing of Steel Shapes

SIC	DESCRIPTION
3317	Steel Pipe and Tubes
332	Iron and Steel Foundries
3321	Gray Iron Foundries
3322	Malleable Iron Foundries
3324	Steel Investment Foundries
3325	Steel Foundries, n.e.c.
333	Primary Smelting & Refining of Nonferrous Metals
3331	Primary Copper
3332	Primary Lead
3333	Primary Zinc
3334	Primary Aluminum
3339	Primary Nonferrous Metals, n.e.c.
334	Secondary Smelting & Refining of Nonferrous Metals
3341	Secondary Nonferrous Metals
335	Rolling, Drawing, & Extruding of Nonferrous Metals
3351	Copper Rolling and Drawing
3353	Aluminum Sheet Plate & Foil
3354	Aluminum Extruded Products
3355	Aluminum Rolling & Drawing n.e.c.
3356	Nonferrous Rolling and Drawing
3357	Nonferrous Wire Drawing/Insulating
336	Nonferrous Foundries (Castings)
3361	Aluminum Foundries
3362	Brass Bronze & Copper Foundry
3363	Aluminum Die-castings
3364	Nonferrous Die-castings, Except Aluminum
3365	Aluminum Foundries
3366	Copper Foundries
3369	Nonferrous Foundries, n.e.c.
339	Miscellaneous Primary Metal Products
3398	Metal Heat Treating
3399	Primary Metal Products, n.e.c.
34	Fabricated Metal Products, Except Machinery & Transportation Equipment
341	Metal Cans and Shipping Containers
3411	Metal Cans
3412	Metal Barrels, Drums & Pails
342	Cutlery, Handtools, and General Hardware
3421	Cutlery
3423	Hand and Edge Tools, n.e.c.
3425	Hand Saws and Saw Blades
3429	Hardware, n.e.c.
343	Heating Equipment, Except Electric & Warm Air; & Plumbing Fixtures
3431	Metal Sanitary Ware
3432	Plumbing Fittings & Brass Good
3433	Heating Equipment, Except Elec.
344	Fabricated Structural Metal Products
3441	Fabricated Structural Metal
3442	Metal Doors, Sash, and Trim
3443	Fabricated Plate Work (Boiler Shops)
3444	Sheet Metal Work
3446	Architectural Metal Work
3448	Prefabricated Metal Buildings
3449	Miscellaneous Metal Work

SIC	DESCRIPTION
345	Screw Machine Products, Bolts, Nuts, Screws, Rivets, and Washers
3451	Screw Machine Products
3452	Bolts Nuts Rivets & Washers
346	Metal Forgings and Stampings
3462	Iron and Steel Forgings
3463	Nonferrous Forgings
3465	Automotive Stampings
3466	Crowns and Closures
3469	Metal Stampings, n.e.c.
347	Coating, Engraving, and Allied Services
3471	Electroplating, Polishing, Anodizing, and Coloring
3479	Metal Coating and Allied Services, n.e.c.
348	Ordnance and Accessories, Except Vehicles and Guided Missiles
3482	Small Arms Ammunition
3483	Ammunition, Exc. For Small Arm
3484	Small Arms
3489	Ordnance and Accessories, n.e.c.
349	Misc. Fabricated Metal Products
3491	Industrial Valves
3492	Fluid Power Valves and Hose Fittings
3493	Steel Springs, Except Wire
3494	Valves and Pipe Fittings
3495	Wire Springs
3496	Misc. Fabricated Wire Products
3497	Metal Foil and Leaf
3498	Fabricated Pipe and Fittings
3499	Fabricated Metal Products, n.e.c.
35	Industrial and Commercial Machinery & Computer Equipment
351	Engines and Turbines
3511	Turbines and Turbine Generator
3519	Internal Combustion Engines
352	Farm and Garden Machinery and Equipment
3523	Farm Machinery and Equipment
3524	Lawn and Garden Equipment
353	Construction, Mining, and Materials Handling Machinery & Equipment
3531	Construction Machinery
3532	Mining Machinery
3533	Oil Field Machinery
3534	Elevators and Moving Stairways
3535	Conveyors and Conveying Equipment
3536	Hoists, Cranes, and Monorails
3537	Industrial Trucks and Tractors
354	Metalworking Machinery and Equipment
3541	Machine Tools Metal Cutting Types
3542	Machine Tools Metal Forming Types
3543	Industrial Patterns
3544	Special Dies/Tools/Jigs/Fixtures
3545	Machine Tool Accessories
3546	Power Driven Hand Tools
3547	Rolling Mill Machinery
3548	Welding Apparatus
3549	Metalworking Machinery, n.e.c.
355	Special Industry Machinery, Except Metalworking Machinery

SIC	DESCRIPTION
3551	Food Products Machinery
3552	Textile Machinery
3553	Woodworking Machinery
3554	Paper Industries Machinery
3555	Printing Trades Machinery
3556	Food Products Machinery
3559	Special Industry Machinery, n.e.c.
356	General Industrial Machinery and Equipment
3561	Pumps and Pumping Equipment
3562	Ball and Roller Bearings
3563	Air and Gas Compressors
3564	Blowers and Fans
3565	Packaging Machinery
3566	Speed Changers Drives & Gears
3567	Industrial Furnaces and Ovens
3568	Power Transmission Equipment
3569	General Industrial Machinery, n.e.c.
357	Computer and Office Equipment
3571	Electronic Computers
3572	Computer Storage Devices
3573	Electronic Computing Equipment
3574	Calculating & Accounting Mach
3575	Computer Terminals
3576	Scales & Balances Except Lab
3577	Computer Peripheral Equipment, n.e.c.
3578	Calculating and Accounting Equipment
3579	Office Machines, n.e.c.
358	Refrigeration & Service Industry Machinery
3581	Automatic Vending Machines
3582	Commercial Laundry Equipment
3585	Refrigeration & Heating Equipment
3586	Measuring and Dispensing Pumps
3589	Service Industry Machinery, n.e.c.
359	Misc. Industrial & Commercial Machinery and Equipment
3592	Carburetors, Pistons, Rings, & Valves
3593	Fluid Power Cylinders and Actuators
3594	Fluid Power Pumps and Motors
3596	Scales and Balances, Except Laboratory
3599	Machinery Except Electrical, n.e.c.
36	Electronic & Other Electrical Equipment & Components
361	Electric Transmission and Distribution Equipment
3612	Transformers
3613	Switchgear & Switchboard Apparatus
362	Electrical Industrial Apparatus
3621	Motors and Generators
3622	Industrial Controls
3623	Welding Apparatus, Electric
3624	Carbon and Graphite Products
3625	Relays and Industrial Controls
3629	Electrical Industrial Apparatus, n.e.c.
363	Household Appliances
3631	Household Cooking Equipment
3632	Household Refrigerators/Freezers
3633	Household Laundry Equipment
3634	Electric Housewares and Fans
3635	Household Vacuum Cleaners

SIC	DESCRIPTION
3636	Sewing Machines
3639	Household Appliances, n.e.c.
364	Electric Lighting and Wiring Equipment
3641	Electric Lamps
3643	Current-carrying Wiring Device
3644	Noncurrent-carrying Wiring Devices
3645	Residential Lighting Fixtures
3646	Commercial Lighting Fixtures
3647	Vehicular Lighting Equipment
3648	Lighting Equipment, N.e.c.
365	Household Audio and Video Equipment, and Audio Recordings
3651	Radio and TV Receiving Sets
3652	Phonograph Records
366	Communications Equipment
3661	Telephone/Telegraph Apparatus
3662	Radio & TV Communication Equipment
3663	Radio and TV Communications Equipment
3669	Communications Equipment, n.e.c.
367	Electronic Components and Accessories
3671	Electron Tubes, Receiving Type
3672	Printed Circuit Boards
3673	Electron Tubes, Transmitting
3674	Semiconductors & Related Devices
3675	Electronic Capacitors
3676	Electronic Resistors
3677	Electronic Coils & Transformer
3678	Electronic Connectors
3679	Electronic Components, n.e.c.
369	Misc. Electrical Machinery, Equipment, and Supplies
3691	Storage Batteries
3692	Primary Batteries, Dry and Wet
3693	X-ray Apparatus and Tubes
3694	Engine Electrical Equipment
3695	Magnetic and Optical Recording Media
3699	Electrical Equipment & Supply
37	Transportation Equipment
371	Motor Vehicles & Motor Vehicle Equipment
3711	Motor Vehicles and Car Bodies
3713	Truck and Bus Bodies
3714	Motor Vehicle Parts & Accessories
3715	Truck Trailers
3716	Motor Homes
372	Aircraft and Parts
3721	Aircraft
3724	Aircraft Engines & Engine Part
3728	Aircraft Equipment, n.e.c.
373	Ship and Boat Building and Repairing
3731	Ship Building and Repairing
3732	Boat Building and Repairing
374	Railroad Equipment
3743	Railroad Equipment
375	Motorcycles, Bicycles, and Parts
3751	Motorcycles Bicycles & Parts
376	Guided Missiles and Space Vehicles and Parts
3761	Guided Missiles and Space Vehicles
3764	Missile/space Propulsion Units & Parts

SIC	DESCRIPTION
3769	Space Vehicle Equipment, n.e.c.
379	Miscellaneous Transportation Equipment
3792	Travel Trailers and Campers
3795	Tanks and Tank Components
3799	Transportation Equipment, n.e.c.
38	Measuring, Analyzing & Controlling Instruments
381	Search and Navigation Equipment
3811	Engineering & Scientific Instruments
3812	Search and Navigation Equipment
382	Lab Apparatus, Analytical, Optical, Measure, & Control Instruments
3821	Laboratory Apparatus and Furniture
3822	Environmental Controls
3823	Process Control Instruments
3824	Fluid Meters & Counting Device
3825	Instruments to Measure Elec.
3826	Analytical Instruments
3827	Optical Instruments and Lenses
3829	Measuring & Controlling Device
3832	Optical Instruments and Lenses
384	Surgical, Medical, Dental Instruments, & Supplies
3841	Surgical & Medical Instruments
3842	Surgical Appliances & Supplies
3843	Dental Equipment and Supplies
3844	X-ray Apparatus and Tubes
3845	Electromedical Equipment
385	Ophthalmic Goods
3851	Ophthalmic Goods
386	Photographic Equipment and Supplies
3861	Photograph Equipment & Supplies
387	Watches, Clocks, Clockwork Operated Devices, & Parts
3873	Watches Clocks & Watchcases
39	Miscellaneous Manufacturing Industries
391	Jewelry, Silverware, and Plated Ware
3911	Jewelry, Precious Metal
3914	Silverware and Plated Ware
3915	Jewelers' Materials & Lapidary
393	Musical Instruments
3931	Musical Instruments
394	Dolls, Toys, Games, and Sporting and Athletic Goods
3942	Dolls
3944	Games/Toys/Children's Vehicles
3949	Sporting & Athletic Goods, n.e.c.
395	Pens, Pencils, and Other Artists' Materials
3951	Pens and Mechanical Pencils
3952	Lead Pencils and Art Goods
3953	Marking Devices
3955	Carbon Paper and Inked Ribbons
396	Costume Jewelry and Notions, Except Precious Metal
3961	Costume Jewelry
3962	Artificial Flowers
3963	Buttons
3964	Needles, Pins, and Fasteners
3965	Fasteners, Buttons, Needles and Pins
399	Miscellaneous Manufacturing Industries

SIC	DESCRIPTION
3991	Brooms and Brushes
3993	Signs and Advertising Displays
3995	Burial Caskets
3996	Hard Surface Floor Coverings
3999	Manufacturing Industries, n.e.c.
40	Railroad Transportation
401	Railroads
4011	Railroads, Line-haul Operating
4013	Switching & Terminal Services
4041	Railway Express Service
41	Local & Suburban Transit & Interurban Hwy Pass
411	Local and Suburban Passenger Transportation
4111	Local and Suburban Transit
4119	Local Passenger Transportation
412	Taxicabs
4121	Taxicabs
413	Intercity and Rural Bus Transportation
4131	Intercity Hwy Transportation
414	Bus Charter Service
4141	Local Passenger Charter Service
4142	Charter Service, Except Local
415	School Buses
4151	School Buses
417	Terminal & Service Facilities: Motor Vehicle Passenger Transportation
4171	Bus Terminal Facilities
4172	Bus Service Facilities
4173	Bus Terminal and Service Facilities
42	Motor Freight Transportation and Warehousing
421	Trucking and Courier Services, Except Air
4212	Local/Trucking w/o Storage
4213	Trucking, Except Local
4214	Local Trucking and Storage
4215	Courier Services, Except by Air
422	Public Warehousing and Storage
4221	Farm Product Warehousing/Store
4222	Refrigerated Warehousing
4224	Household Goods Warehousing
4225	General Warehousing & Storage
4226	Special Warehousing & Storage
423	Terminal & Joint Terminal Maintenance Facilities: Motor Freight Trans
4231	Trucking Terminal Facilities
43	United States Postal Service
431	Unite States Postal Service
4311	United States Postal Service
44	Water Transportation
441	Deep Sea Foreign Transportation of Freight
4411	Deep Sea Foreign Transportation
4412	Deep Sea Foreign Transportation of Freight
442	Deep Sea Domestic Transportation of Freight
4421	Noncontiguous Area Transportation
4422	Coastwise Transportation
4423	Intracoastal Transportation
4424	Deep Sea Domestic Transportation of Freight
443	Freight Transportation on the Great Lakes -St Lawrence Seaway
4431	Great Lakes Transportation

SIC	DESCRIPTION
4432	Freight Transportation on the Great Lakes
444	Water Transportation of Freight, n.e.c.
4441	Transport on Rivers & Canals
4449	Water Transportation of Freight, n.e.c.
4452	Ferries
4453	Lighterage
4454	Towing and Tugboat Service
4459	Local Water Transportation, n.e.c.
4463	Marine Cargo Handling
4464	Canal Operation
4469	Water Transportation Services
448	Water Transportation of Passengers
4481	Deep Sea Passenger Transportation, Except by Ferry
4482	Ferries
4489	Water Passenger Transportation, n.e.c.
449	Water Transportation Services
4491	Marine Cargo Handling
4492	Towing and Tug Boat Service
4493	Marinas
4499	Water Transportation Services, n.e.c.
45	Transportation by Air
451	Air Transportation, Scheduled, & Air Courier Services
4511	Certificated Air Transportation
4512	Air Transportation, Scheduled
4513	Air Courier Services
452	Air Transportation, Nonscheduled
4521	Noncertified Air Transportation
4522	Air Transportation, Non-scheduled
458	Airports, Flying Fields, and Airport Terminal Services
4581	Airports, Flying Fields, and Services
4582	Airports and Flying Fields
4583	Airport Terminal Services
46	Pipelines, Except Natural Gas
461	Pipelines, Except Natural Gas
4612	Crude Petroleum Pipe Lines
4613	Refined Petroleum Pipe Lines
4619	Pipe Lines, n.e.c.
47	Transportation Services
4712	Freight Forwarding
472	Passenger Transportation Arrangement
4722	Passenger Transport Arrangement
4723	Freight Transport Arrangement
4724	Travel Agencies
4725	Tour Operators
4729	Passenger Transport Management, n.e.c.
473	Freight and Cargo Transportation Arrangement
4731	Freight Transportation Management
474	Rental of Railroad Cars
4741	Rental of Railroad Cars
4742	Railroad Car Rental with Services
4743	Railroad Rental Car w/o Services
478	Miscellaneous Transportation Services
4782	Inspection & Weighing Services
4783	Packing and Crating
4784	Fixed Facilities for Vehicles
4785	Inspection and Fixed Facilities

SIC	DESCRIPTION
4789	Transportation Services, n.e.c.
48	Communications
481	Telephone Communications
4811	Telephone Communication
4812	Radio Telephone Communications
4813	Telephone Communications, Except Radio
482	Telegraph and Other Message Communications
4821	Telegraph Communication
4822	Telegraph and Other Communications
483	Radio & Television Broadcasting Stations
4832	Radio Broadcasting
4833	Television Broadcasting
484	Cable and Other Pay Television Services
4841	Cable and Other Pay TV Services
489	Communications Services, n.e.c.
4899	Communication Services, n.e.c.
49	Electric, Gas and Sanitary Services
491	Electric Services
4911	Electric Services
492	Gas Production and Distribution
4922	Natural Gas Transmission
4923	Gas Transmission and Distribution
4924	Natural Gas Distribution
4925	Gas Production/distribution
493	Combination Electric, Gas, and Other Utility Services
4931	Elec. & Other Services Combined
4932	Gas & Other Services Combined
4939	Combination Utility Services
494	Water Supply
4941	Water Supply
4950	Sanitary Services
4952	Sewerage Systems
4953	Refuse Systems
4959	Sanitary Services, n.e.c.
496	Steam and Air-conditioning Supply
4961	Steam Supply
497	Irrigation Systems
4971	Irrigation Systems
50	Wholesale Trade-durable Goods
501	Motor Vehicles, Parts, and Supplies
5012	Autos & Other Motor Vehicles
5013	Automotive Parts and Supplies
5014	Tires and Tubes
5015	Motor Vehicle Parts, Used
502	Furniture and Homefurnishings
5021	Furniture
5023	Home Furnishings
503	Lumber and Construction Materials
5031	Lumber, Plywood and Millwork
5032	Brick, Stove, and Related Materials
5033	Roofing, Siding and Insulation
5039	Construction Materials, n.e.c.
504	Professional and Commercial Equipment and Supplies
5041	Sporting & Recreational Goods
5042	Toys & Hobby Goods and Supplies
5043	Photograph Equipment & Supply

SIC	DESCRIPTION
5044	Office Equipment
5045	Computers, Peripherals, and Software
5046	Commercial Equipment, n.e.c.
5047	Medical and Hospital Equipment
5048	Ophthalmic Goods
5049	Professional Equipment, n.e.c.
505	Metals and Minerals, Except Petroleum
5051	Metals Services Centers & Offices
5052	Coal & Other Minerals & Ores
506	Electrical Goods
5063	Elec. Apparatus & Equipment
5064	Elec. Appliances TV & Radios
5065	Electronic Parts and Equipment
507	Hardware, Plumbing, Heating Equipment, and Supplies
5072	Hardware
5074	Plumbing/Hydronics Heat Supply
5075	Warm Air Heat & Air Condition
5078	Refrigeration Equip & Supplies
508	Machinery, Equipment, and Supplies
5081	Commercial Machines & Equipment
5086	Professional Equipment & Supplies
5087	Service Establishment Equipment
5088	Transportation Equipment & Supplies
509	Miscellaneous Durable Goods
5091	Sporting and Recreational Goods
5092	Toys and Hobby Goods and Supplies
5093	Scrap and Waste Materials
5094	Jewelry, Watches, & Precious Stones
5099	Durable Goods, n.e.c.
51	Wholesale Trade-Nondurable Goods
511	Paper and Paper Products
5111	Printing and Writing Paper
5112	Stationery Supplies
5113	Industrial & Personal Service
512	Drugs, Drug Proprietaries, & Druggists' Sundries
5122	Drugs, Proprietaries, and Sundries
513	Apparel, Piece Goods, and Notions
5131	Piece Goods and Notions
5133	Piece Goods
5134	Notions and Other Dry Goods
5136	Men's Clothing and Furnishings
5137	Women's and Children's Clothing
5139	Footwear
514	Groceries and Related Products
5141	Groceries, General Line
5142	Frozen Foods
5143	Dairy Products
5144	Poultry and Poultry Products
5145	Confectionery
5146	Fish and Seafoods
5147	Meats and Meat Products
5148	Fresh Fruits and Vegetables
5149	Groceries and Related Products
515	Farm-product Raw Materials
5152	Cotton
5153	Grain
5154	Livestock

SIC	DESCRIPTION
5159	Farm-product Raw Materials, n.e.c.
516	Chemicals and Allied Products
5161	Chemicals and Allied Products
5162	Plastics Materials and Basic Shapes
5169	Chemicals and Allied Products, n.e.c.
517	Petroleum and Petroleum Products
5171	Petroleum Bulk Stations & Terminals
5172	Petroleum Products, n.e.c.
518	Beer, Wine, and Distilled Alcoholic Beverages
5181	Beer and Ale
5182	Wines and Distilled Beverages
519	Misc. Nondurable Goods
5191	Farm Supplies
5192	Books, Periodicals and Newspapers
5193	Flowers and Florists Supplies
5194	Tobacco and Tobacco Products
5198	Paints, Varnishes, and Supplies
5199	Nondurable Goods, n.e.c.
52	Building Materials, Hardware, Garden Supply, Mobil
521	Lumber and Other Building Materials Dealers
5211	Lumber and Other Building Materials
523	Paint, Glass, and Wallpaper Stores
5231	Paint, Glass, and Wallpaper Stores
525	Hardware Stores
5251	Hardware Stores
526	Retail Nurseries, Lawn & Garden Supply Stores
5261	Retail Nurseries and Garden Stores
527	Mobile Home Dealers
5271	Mobile Home Dealers
53	General Merchandise Stores
531	Department Stores
5311	Department Stores
533	Variety Stores
5331	Variety Stores
539	Misc. General Merchandise Stores
5399	Misc. General Merchandise Stores
54	Food Stores
541	Grocery Stores
5411	Grocery Stores
542	Meat and Seafood Markets, Including Freezer Provisioners
5421	Meat and Fish Markets
5422	Freezer and Locker Meat Provisions
5423	Meat and Fish (Seafood) Market
543	Fruit and Vegetable Markets
5431	Fruit Stores and Vegetable Markets
544	Candy, Nut, and Confectionery Stores
5441	Candy, Nut, and Confectionery
545	Dairy Products Stores
5451	Dairy Products Stores
546	Retail Bakeries
5461	Retail Bakeries
5462	Retail Bakeries-Baking and Selling
5463	Retail Bakeries-Selling Only
5490	Miscellaneous Food Stores
5499	Miscellaneous Food Stores
55	Automotive Dealers and Gasoline Service Stations

SIC	DESCRIPTION
551	Motor Vehicle Dealers (New & Used)
5511	New and Used Car Dealers
552	Motor Vehicle Dealers (Used Only)
5521	Used Car Dealers
553	Auto and Home Supply Stores
5531	Auto and Home Supply Stores
554	Gasoline Service Stations
5541	Gasoline Service Stations
555	Boat Dealers
5551	Boat Dealers
556	Recreational Vehicle Dealers
5561	Recreational Vehicle Dealers
557	Motorcycle Dealers
5571	Motorcycle Dealers
559	Automotive Dealer, n.e.c.
5599	Automotive Dealers, n.e.c.
56	Apparel and Accessory Stores
561	Men's & Boys' Clothing & Accessory Stores
5611	Men's & Boys' Clothing & Accessory Stores
562	Women's Clothing Stores
5621	Women's Ready-to-wear Stores
563	Women's Accessory & Specialty Stores
5631	Women's Accessory and Specialty Stores
5632	Women's Accessory and Specialty Stores
564	Children's & Infants' Wear Stores
5641	Children's and Infants' Wear Stores
565	Family Clothing Stores
5651	Family Clothing Stores
566	Shoe Stores
5661	Shoe Stores
5681	Furriers and Fur Shops
569	Misc. Apparel & Accessory Stores
5699	Miscellaneous Apparel & Access
57	Home Furniture, Furnishings & Equipment Stores
571	Home Furniture & Furnishings Stores
5712	Furniture Stores
5713	Floor Covering Stores
5714	Drapery and Upholstery Stores
5719	Misc. Home Furnishings Stores
572	Household Appliance Stores
5722	Household Appliance Stores
573	Radio, Television, Consumer Electronics, and Music Stores
5731	Radio, Television and Electronic Stores
5732	Radio and Television Stores
5733	Music Stores
5734	Computer and Software Stores
5735	Record and Prerecorded Tape Stores
5736	Musical Instrument Stores
58	Eating and Drinking Places
581	Eating and Drinking Places
5812	Eating Places
5813	Drinking Places
59	Miscellaneous Retail
591	Drug Stores and Proprietary Stores
5912	Drug Stores and Proprietary Stores
592	Liquor Stores
5921	Liquor Stores

SIC	DESCRIPTION
593	Used Merchandise Stores
5931	Used Merchandise Stores
5932	Used Merchandise Stores
594	Misc. Shopping Goods Stores
5941	Sporting Goods and Bicycle Shops
5942	Book Stores
5943	Stationery Stores
5944	Jewelry Stores
5945	Hobby, Toy, and Game Shops
5946	Camera & Photographic Supply Stores
5947	Gift, Novelty, and Souvenir Shops
5948	Luggage and Leather Goods Store
5949	Sewing, Needlework, and Piece Goods Stores
596	Nonstore Retailers
5961	Mail Order Houses
5962	Merchandising Machine Operator
5963	Direct Selling Organizations
598	Fuel Dealers
5982	Fuel and Ice Dealers, n.e.c.
5983	Fuel Oil Dealers
5984	Liquefied Petroleum Gas Dealers
5989	Fuel Dealers, n.e.c.
599	Retail Stores, n.e.c.
5992	Florists
5993	Cigar Stores and Stands
5994	News Dealers and Newsstands
5995	Optical Goods Stores
5999	Miscellaneous Retail Stores, n.e.c.
60	Depository Institutions
601	Central Reserve Depository Institutions
6011	Federal Reserve Banks
6019	Central Reserve Depository, n.e.c.
602	Commercial Banks
6021	National Commercial Banks
6022	State Banks, Federal Reserve
6023	State Banks, Not Fed. Reserve
6024	State Banks, Not Fed Reserve, Not FDIC
6025	National Banks, Federal Reserve
6026	National Banks, Not Fed. Reserve
6027	National Banks, Not FDIC
6028	Private Banks, Not Incorporated, Not FDIC
6029	Commercial Banks, n.e.c.
603	Savings Institutions
6032	Mutual Savings Banks, Federal
6033	Mutual Savings Banks, n.e.c.
6034	Mutual Savings Banks, Not FDIC
6035	Federal Savings Institutions
6036	Savings Institutions, Except Federal
6042	Nondeposit Trusts, Federal Res.
6044	Nondeposit Trusts, Not FDIC
6052	Foreign Exchange Establishment
6054	Safe Deposit Companies
6055	Clearinghouse Associations
6056	Corporations for Banking Abroad
6059	Functions Related to Banking
606	Credit Unions
6061	Federal Credit Unions
6062	State Credit Unions

SIC	DESCRIPTION
608	Foreign Banking and Branches & Agencies of Foreign Banks
6081	Foreign Bank and Branches and Agencies
6082	Foreign Trade and International Banks
609	Depository Banking Functions
6091	Nondeposit Trust Facilities
6099	Functions Related to Deposit Banking
61	Nondepository Credit Institutions
611	Federal & Federally-sponsored Credit Agencies
6111	Federal and Federally-sponsored Credit
6112	Rediscounting, Not for Agriculture
6113	Rediscounting, for Agriculture
6122	Federal Saving & Loan Associations
6123	State Associations, Insured
6124	State Associations, Noninsured
6125	State Associations, Noninsured
6131	Agricultural Credit Institutions
614	Personal Credit Institutions
6141	Personal Credit Institutions
6142	Federal Credit Unions
6143	State Credit Unions
6144	Nondeposit Industrial Loan Companies
6145	Licensed Small Loan Lenders
6146	Installment Sales Finance Companies
6149	Misc. Personal Credit Institutions
615	Business Credit Institutions
6153	Short-term Business Credit
6159	Misc. Business Credit Institute
616	Mortgage Bankers and Brokers
6162	Mortgage Bankers and Correspondents
6163	Loan Brokers
62	Security & Commodity Brokers, Dealers, Exchanges
621	Security Brokers, Dealers, & Flotation Companies
6211	Security Brokers and Dealers
622	Commodity Contracts Brokers & Dealers
6221	Commodity Contracts Brokers, Dealers
623	Security and Commodity Exchanges
6231	Security and Commodity Exchanges
628	Exchange of Security and Commodity Services
6281	Security and Commodity Service
6282	Investment Advice
6289	Security and Commodity Services, n.e.c.
63	Insurance Carriers
631	Life Insurance
6311	Life Insurance
632	Accident & Health Insurance & Medical Service Plans
6321	Accident and Health Insurance
6324	Hospital and Medical Service Plans
633	Fire, Marine, and Casualty Insurance
6331	Fire, Marine, and Casualty Ins
635	Surety Insurance
6351	Surety Insurance
636	Title Insurance
6361	Title Insurance
637	Pension, Health, and Welfare Funds
6371	Pension, Health, and Welfare Funds

SIC	DESCRIPTION
639	Insurance Carriers, n.e.c.
6399	Insurance Carriers, n.e.c.
64	Insurance Agents, Brokers and Service
641	Insurance Agents, Brokers, and Service
6411	Insurance Agents, Brokers & Service
65	Real Estate
651	Real Estate Operators (Except Developers) & Lessors
6512	Nonresidential Building Operators
6513	Apartment Building Operators
6514	Dwelling Operators, Except Apart
6515	Mobile Home Site Operators
6517	Railroad Property Lessors
6519	Real Property Lessors, n.e.c.
653	Real Estate Agents and Managers
6531	Real Estate Agents and Manager
654	Title Abstract Offices
6541	Title Abstract Offices
655	Land Subdividers and Developers
6552	Subdividers & Developers, Except Cemeteries
6553	Cemetery Subdividers and Developers
6611	Combined Real Estate, Insurance
67	Holding and Other Investment Offices
671	Holding Offices
6711	Holding Offices
6712	Bank Holding Companies
6719	Holding Companies, n.e.c.
672	Investment Offices
6722	Management Investment, Open-end
6723	Management Investment, Closed-end
6724	Unit Investment Trusts
6725	Face-amount Certificate Offices
6726	Investment Offices, n.e.c.
673	Trusts
6732	Educational, Religious, and Charitable Trusts
6733	Trusts, n.e.c.
679	Miscellaneous Investing
6792	Oil Royalty Traders
6793	Commodity Traders
6794	Patent Owners and Lessors
6798	Real Estate Investment Trusts
6799	Investors, n.e.c.
70	Hotels, Rooming Houses, Camps, & Other Lodging Place
701	Hotels and Motels
7011	Hotels and Motels
702	Rooming and Boarding Houses
7021	Rooming and Boarding Houses
703	Camps and Recreational Vehicle Parks
7032	Sporting and Recreational Camp
7033	Recreational Vehicle Parks and Campsites
704	Membership-basis: Organization Hotels & Lodging Houses
7041	Membership-basis Organization
72	Personal Services
721	Laundry, Cleaning, and Garment Services
7211	Power Laundries, Family & Commercial
7212	Garment Pressing & Cleaners' Agents

SIC	DESCRIPTION
7213	Linen Supply
7214	Diaper Service
7215	Coin-operated Laundries and Drycleaning
7216	Dry Cleaning Plants, Except Rugs
7217	Carpet and Upholstery Cleaning
7218	Industrial Launderers
7219	Laundry and Garment Services
722	Photographic Studios, Portrait
7221	Photographic Studios, Portrait
723	Beauty Shops
7231	Beauty Shops
724	Barber Shops
7241	Barber Shops
725	Shoe Repair and Shoeshine Parlors
7251	Shoe Repair Shops and Shoeshine Parlors
726	Funeral Service and Crematories
7261	Funeral Service and Crematories
729	Miscellaneous Personal Services
7291	Tax Return Preparation Services
7299	Miscellaneous Personal Service
73	Business Services
731	Advertising
7311	Advertising Agencies
7312	Outdoor Advertising Services
7313	Radio, TV, Publisher Advertising Representatives
7319	Advertising, n.e.c.
732	Credit & Mercantile Reporting, Adjustment & Collection Agencies
7321	Credit Reporting and Collection
7322	Adjustment and Collection Services
7323	Credit Reporting Services
733	Mailing, reproduction, Commercial Art, Photography, & Steno Services
7331	Direct Mail Advertising Service
7332	Blueprinting and Photocopying
7333	Commercial Photography and Art
7334	Photocopying and Duplicating Services
7335	Commercial Photography
7336	Commercial Art and Graphic Design
7338	Secretarial and Court Reporting
7339	Stenographic and Reproduction, n.e.c.
734	Services to Dwellings & Other n.e.c. Buildings
7341	Window Cleaning
7342	Disinfecting and Exterminating
7349	Building Maintenance Services,
735	Misc. Equipment Rental & Leasing
7351	News Syndicates
7352	Medical Equipment Rental
7353	Heavy Construction Equipment Rental
7359	Equipment Rental and Leasing, n.e.c.
736	Personnel Supply Services
7361	Employment Agencies
7362	Temporary Help Supply Services
7363	Help Supply Services
7369	Personnel Supply Services, n.e.c.
737	Computer and Data Processing Services
7371	Custom Computer Programming Services
7372	Prepackaged Software

SIC	DESCRIPTION
7373	Computer Integrated Systems Design
7374	Data Processing Services
7375	Information Retrieval Services
7376	Computer Facilities Management
7377	Computer Rental and Leasing
7378	Computer Maintenance and Repair
7379	Computer Related Services, n.e.c.
738	Miscellaneous Business Services
7381	Detective and Armored Car Services
7382	Security Systems Services
7383	News Syndicate
7384	Photofinishing Laboratories
7389	Business Services, n.e.c.
7391	Research & Development Laboratories
7392	Management and Public Relations
7393	Detective and Protective Services
7394	Equipment Rental and Leasing
7395	Photofinishing Laboratories
7396	Trading Stamp Services
7397	Commercial Testing Laboratories
7399	Business Services, n.e.c.
75	Automotive Repair, Services & Parking
751	Automotive Rental and Leasing, Without Drivers
7512	Passenger Car Rental and Leasing
7513	Truck Rental and Leasing
7514	Passenger Car Rental
7515	Passenger Car Leasing
7519	Utility Trailer Rental
752	Automobile Parking
7521	Automobile Parking
7523	Parking Lots
7525	Parking Structures
753	Automotive Repair Shops
7531	Top and Body Repair Shops
7532	Top and Body Repair and Paint Shops
7533	Auto Exhaust System Repair Shops
7534	Tire Retreading and Repair Shops
7535	Paint Shops
7536	Automotive Glass Replacement Shops
7537	Automotive Transmission Repair Shops
7538	General Automotive Repair Shop
7539	Automotive Repair Shops, n.e.c.
754	Automotive Services, Except Repair
7542	Car Washes
7549	Automotive Services, n.e.c.
76	Miscellaneous Repair Services
7620	Electrical Repair Shops
7622	Radio and Television Repair
7623	Refrigeration Service and Repair Shops
7629	Electrical Repair Shops, n.e.c.
763	Watch, Clock, and Jewelry Repair
7631	Watch, Clock, and Jewelry Repair Shops
764	Reupholstery and Furniture Repair
7641	Reupholstery and Furniture Repair
769	Misc. Repair Shops and Related Services
7692	Welding Repair
7694	Armature Rewinding Shops
7699	Repair Services, n.e.c.

SIC	DESCRIPTION
78	Motion Pictures
781	Motion Picture Production & Allied Services
7812	Motion Picture and Video Production
7813	Motion Picture Production, Except TV
7814	Motion Picture Production for TV
7819	Services Allied to Motion Pictures
782	Motion Picture Distribution & Allied Services
7822	Motion Picture and Tape Distribution
7823	Motion Picture Film Exchanges
7824	Film or Tape Distribution for TV
7829	Motion Picture Distribution Services
783	Motion Picture Theaters
7832	Motion Picture Theaters, Except Drive-ins
7833	Drive-in Motion Picture Theaters
784	Video Tape Rental
7841	Video Tape Rental
79	Amusement and Recreation Services
791	Dance Studios, Schools, & Halls
7911	Dance Halls, Studios, and Schools
792	Theatrical Producers (Non Motion Picture), Orchestras, Entertainers
7922	Theatrical Producers and Services
7929	Entertainers & Entertainment Groups
793	Bowling Centers
7932	Billiard and Pool Establishments
7933	Bowling Alleys
794	Commercial Sports
7941	Sports Clubs and Promoters
7948	Racing, Including Track Operation
799	Misc. Amusement and Recreation Services
7991	Physical Fitness Facilities
7992	Public Golf Courses
7993	Coin-operated Amusement Device
7996	Amusement Parks
7997	Membership Sports & Recreation Clubs
7999	Amusement and Recreation, n.e.c.
80	Health Services
801	Offices & Clinics of Medical Doctors
8011	Offices of Physicians
802	Offices and Clinics of Dentists
8021	Offices of Dentists
803	Offices of Osteopathic Doctors
8031	Offices of Osteopathic Physicians
804	Offices & Clinics of Other Health Practitioners
8041	Offices of Chiropractors
8042	Offices of Optometrists
8043	Offices and Clinics of Podiatrists
8049	Offices of Health Practitioner
805	Nursing and Personal Care Facilities
8051	Skilled Nursing Care Facilities
8052	Intermediate Care Facilities
8059	Nursing and Personal Care, n.e.c.
806	Hospitals
8061	Hospitals
8062	General Medical & Surgical Hospitals
8063	Psychiatric Hospitals
8069	Specialty Hospitals, Except Psychiatric
807	Medical and Dental Laboratories

SIC	DESCRIPTION
8071	Medical Laboratories
8072	Dental Laboratories
808	Home Health Care Services
8081	Outpatient Care Facilities
8082	Home Health Care Services
809	Misc. Health & Allied Services, n.e.c.
8091	Health and Allied Services, n.e.c.
8092	Kidney Dialysis Centers
8099	Health and Allied Services, n.e.c.
81	Legal Services
811	Legal Services
8111	Legal Services
82	Educational Services
821	Elementary and Secondary Schools
8211	Elementary and Secondary Schools
822	Colleges, Universities, Professional Schools, & Junior Colleges
8221	Colleges and Universities, n.e.c.
8222	Junior Colleges
823	Libraries
8231	Libraries and Information Centers
824	Vocational Schools
8241	Correspondence Schools
8243	Data Processing Schools
8244	Business and Secretarial Schools
8249	Vocational School, n.e.c.
829	Schools & Educational Services, n.e.c.
8299	Schools & Educational Services
83	Social Services
832	Individual and Family Social Services
8321	Individual and Family Services
8322	Individual and Family Services
833	Job Training, Vocational Rehabilitation Services
8331	Job Training and Related Services
835	Child Day Care Services
8351	Child Day Care Services
836	Residential Care
8361	Residential Care
839	Social Services, n.e.c.
8399	Social Services, n.e.c.
84	Museums, Art Galleries & Botanical & Zoological Gardens
841	Museums and Art Galleries
8411	Museums and Art Galleries
8412	Museums and Art Galleries
842	Arboreta, Botanical, or Zoological Gardens
8421	Botanical and Zoological Gardens
8422	Botanical and Zoological Gardens
86	Membership Organizations
861	Business Associations
8611	Business Associations
862	Professional Membership Organizations
8621	Professional Organizations
863	Labor Unions/similar Labor Organizations
8631	Labor Organizations
864	Civic, Social, & Fraternal Associations
8641	Civic and Social Associations
865	Political Organizations

SIC	DESCRIPTION
8651	Political Organizations
866	Religious Organizations
8661	Religious Organizations
869	Membership Organizations, n.e.c.
8699	Membership Organizations, n.e.c.
87	Engineering, Accounting, Research, Management
871	Engineering, Architectural, & Surveying Services
8711	Engineering Services
8712	Architectural Services
8713	Surveying Services
872	Accounting, Auditing, & Bookkeeping Services
8721	Accounting, Auditing, and Bookkeeping
873	Research, Development, & Testing Services
8731	Commercial Physical Research
8732	Commercial Nonphysical Research
8733	Noncommercial Research Organizations
8734	Testing Laboratories
874	Management & Public Relations Services
8741	Management Services
8742	Management Consulting Services
8743	Public Relations Services
8744	Facilities Support Services
8748	Business Consulting, n.e.c.
88	Private Households
881	Private Households
8811	Private Households
89	Services Not Elsewhere Classified
8911	Engineering & Architectural Services
8922	Noncommercial Research Organizations
8931	Accounting, Auditing & Bookkeeping
899	Services, n.e.c.
8999	Services, n.e.c.
91	Executive, Legislative, & General Government Except Finance
911	Executive Offices
9111	Executive Offices
9120	Legislative Bodies
9121	Legislative Bodies
913	Executive & Legislative Offices Combined
9131	Executive and Legislative Combined
919	General Government, n.e.c.
9199	General Government, n.e.c.
92	Justice, Public Order and Safety
921	Courts
9211	Courts
922	Public Order and Safety
9221	Police Protection
9222	Legal Counsel and Prosecution
9223	Correctional Institutions
9224	Fire Protection
9229	Public Order and Safety, n.e.c.
93	Public Finance, Taxation, & Monetary Policy
931	Public Finance, Taxation, & Monetary Policy
9311	Finance, Taxation, & Monetary Policy
94	Administration of Human Resource Programs
941	Educational Programs Administration
9411	Educational Programs Administration
943	Public Health Programs Administration

SIC	DESCRIPTION
9431	Public Health Program Administration
944	Social, Human Resource & Income Maintenance Program Administration
9441	Admin of Social & Manpower Programs
945	Veterans' Affairs (Except Health & Insurance) Administration
9451	Administration of Veterans' Affairs
95	Admin. of Environmental, Quality & Housing Program
951	Environmental Quality Programs Administration
9511	Air, Water, & Solid Waste Management
9512	Land, Mineral, Wildlife Conservation
953	Housing & Urban Development Programs Administration
9531	Housing Programs
9532	Urban and Community Development
96	Administration of Economic Programs
961	General Economic Program Administration
9611	Admin of General Economic Programs
962	Transportation Programs Regulation & Administration
9621	Regulation, Administration of Transportation
963	Communications, electric, gas, & Utilities Regulation & Administration
9631	Regulation, Admin of Utilities
964	Agricultural Marketing & Commodities Regulation
9641	Regulation of Agricultural Marketing & Commodities
965	Misc. Commercial Sectors Regulation, Licensing, & Inspection
9651	Regulation Misc. Commercial Sectors
966	Space Research and Technology
9661	Space Research and Technology
97	National Security and International Affairs
971	National Security
9711	National Security
972	International Affairs
9721	International Affairs
999	Nonclassifiable Establishments
9999	Nonclassifiable Establishments

Appendix AA

Table AA-1: Carcinogenicity Ratings for Target Compounds Included in the Regional Toxic Air Emissions Inventory Based on the U.S. EPA's Integrated Risk Information System (IRIS) Database

Pollutant Name	CAS No.	Key for U.S. EPA IRIS Ratings
Non-Metal Compounds (Excluding PAHs)		
Actetaldehyde	75-07-0	B2
Acrolein	107-02-8	C
Acrylamide	79-06-1	B2
Acrylonitrile	107-13-1	B1
Atrazine	1912-24-9	Under Review
Benzene (including benzene from gasoline)	71-43-2	A
1,3-Butadiene	106-99-0	B2
Carbon Tetrachloride	56-23-5	B2
Chlordane	57-74-9	B2
Chloroform	67-66-3	B2
Coke Oven Emissions	8007-45-2	A
Dibutyl Phthalate	84-74-2	D
Dioctyl Phthalate	117-84-0	Under Review
Dichloroethyl ether	111-44-4	B2
Diethylhexyl Phthalate	117-81-7	B2
Ethylbenzene	100-41-4	D
Ethylene dibromide	106-93-4	B2
1,2-Dichloroethane	107-06-2	B2
Ethylene oxide	75-21-8	
Formaldehyde	50-00-0	B1
Glycol ethers		
Heptachlor	76-44-8	B2
Hexachlorobenzene	118-74-1	C
Hexachlorobutadiene	87-68-3	C
Hexachloroethane	67-72-1	C
Hydrazine	302-01-2	B2
Methoxychlor	72-43-5	D
1,1,1-Trichloroethane	71-55-6	D
Methylene Chloride	75-09-2	B2
Methylene diphenyl diisocyanate	101-68-8	D
Parathion	56-38-2	C
Pentachloronitrobenzene	82-68-8	Under Review
Pentachlorophenol (PCP)	87-86-5	B2
Phenol	108-95-2	D
Phosgene	75-44-5	Under Review
Styrene	100-42-5	Under Review
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	B**
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	B**
Tetrachloroethylene	127-18-4	Under Review
Toluene	108-88-3	D
2,4-toluene diisocyanate	26471-62-5	Under Review
Polychlorinated Biphenyls (PCBs)	1336-36-3	B2
Polychlorinated Dibenzodioxins, Total		B**
Polychlorinated Dibenzofurans, Total		B**
Trichloroethylene	79-01-6	In Preparation
2,4,5-Trichlorophenol	95-95-4	To Be Reviewed

2,4,6-Trichlorophenol	88-06-2	B2
Trifluralin	1582-09-8	C
PAH (EPA's 16 PAH approach)		
Acenapthene	83-32-9	Under Review
Acenaphthylene	208-96-8	D
Anthracene	120-12-7	D
Benz(a)anthracene	56-55-3	B2
Benzo(a)pyrene	50-32-8	B2
Benzo(b)fluoranthene	205-99-2	B2
Benzo(ghi)perylene	191-24-2	D
Benzo(k)fluoranthene	207-08-9	B2
Chrysene	218-01-9	B2
Dibenz(a,h)anthracene	53-70-3	B2
Fluoranthene	206-44-0	D
Fluorene	86-73-7	D
Indeno(1,2,3-cd)pyrene	193-39-5	B2
Naphthalene	91-20-3	D
Phenanthrene	85-01-8	D
Pyrene	129-00-0	D
Metal Compounds		
Antimony	7440-36-0	
Arsenic	7440-38-2	A
Beryllium	7440-41-7	B1
Cadmium	7440-43-9	B1
Chromium	7440-47-3	Under Review
Chromium (VI)	18540-29-9	A
Cobalt	7440-48-4	D
Copper	7440-50-8	D
Lead	7439-92-1	B2
Alkylated Lead Compounds		B2
Manganese	7439-96-5	D
Mercury	7439-97-6	Elem. = D, (HgC12 = C)
Nickel	7440-02-0	Ni carbonyl = B2 Ni cyanide = Under Review Ni subsulfied = A (in redining dust) Ni soluble salts = not evaluated

**Not specifically listed or rated in IRIS, but CDD's and CDF's are regarded as likely to present a cancer hazard to humans in the U.S. EPA draft reassessment for 2,3,7,8-TCDD and related compounds.

Key A = human carcinogen
B = probable human carcinogen
B2 = limited human evidence in animals, inadequate evidence in humans
C = possible human carcinogen
D = not classifiable as to human carcinogenicity
E = evidence of non-carcinogenicity for humans

Ratings are from U.S. EPA's Integrated Risk Information System (IRIS) database, containing agency consensus positions on the potential adverse human health effects of approximately 500 substances, updated monthly. The ratings provided above are from August 1998.

Appendix BB

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