

Great Lakes Regional Air Toxic Emissions Inventory Report

Executive Summary

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**U.S. Environmental Protection Agency
Under the Clean Air Act
Sections 112(c), 112(k), and 112(m)**

On behalf of:

Illinois Environmental Protection Agency, Division of Air Pollution Control
Indiana Department of Environmental Management, Office of Air Management
Michigan Department of Environmental Quality, Air Quality Division
Minnesota Pollution Control Agency, Environmental Indicator Unit
New York Department of Environmental Conservation, Division of Air Resources
Ohio Environmental Protection Agency, Division of Air Pollution Control
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Pennsylvania Department of Environmental Protection, Air Quality Control
Wisconsin Department of Natural Resources, Bureau of Air Management

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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 of toxic air emissions that have a potential to impact environmental quality in the Great Lakes basin. This unprecedented initiative was undertaken through a U.S. federal/state/provincial partnership involving the U.S. Environmental Protection Agency, the eight Great Lakes states and the province of Ontario. 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 49 toxic contaminants. The inventory project presents a compilation of best available data for calendar year 1993 emissions from point and area sources. The data will be updated annually and the level of detail will increase year to year. This report represents the beginning of a long-term U.S. federal/state and provincial effort to categorize emissions from various sources in the Great Lakes basin. In so doing, 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 study focused on the identification of point and area source categories that contribute to the total emissions of toxic contaminants listed in Table 3-1. This list of 49 contaminants was compiled using the U.S. EPA list of targeted toxic chemicals and compounds listed in the U.S. Clean Air Act Amendments of 1990, section 112 (c)(6), International Joint Commission's list of Great Lakes critical pollutants, and those pollutants suggested by the Great Lakes states. This project also concentrated on identifying significant sources not currently regulated under the U.S. Clean Air Act. These sources include many traditionally unregulated sites with relatively small gas-fired, coal-fired, or oil-fired boilers; asphalt and concrete plants; industries dealing with primary metals (including zinc, aluminum and iron) or secondary metals (primarily used in the processing of refined metals); cultured marble companies; woodburning stoves and fireplaces; non-road engines; 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 Great Lake jurisdictions and inform the larger Great Lakes community. 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 sections 112(c)(6), 112(k) and 112(m) of the 1990 U.S. Clean Air Act Amendments.

Inventory Scope and Findings

The emissions inventory effort began in January 1996 with primary funding provided by the U.S. Environmental Protection Agency (U.S. EPA). 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) and the *Air Toxic Emissions Inventory Protocol for the Great Lakes States*.

The air toxic emissions inventory is an initiative of unprecedented scope. In compiling the inventory, challenges were encountered in the area of data breadth, quality, availability and consistency from one jurisdiction to the next. Further, staffing resources varied as well and, consequently, some jurisdictions were unable to provide the data needed in certain areas addressed by the inventory. Thus, this initial 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 will provide 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 49 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. Staffs at each agency follow a 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, Great Lakes National Program Office, and joint;
- 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 Great Lakes National Program Office (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 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, monthly or 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 a representative from each of the air departments from the eight Great Lakes states as well as Ontario and observers from U.S. EPA and Environment Canada. A complete list of members with contact information can be found in the appendix of this report.

The Steering Committee worked closely with the project software development contractor, Radian Corporation and later with Alpine Geophysics, LLC, to develop and test RAPIDS. The effort represents the first attempt to prepare software for estimating toxic pollutant emissions on a multistate basis. RAPIDS is a client/server system consisting of an ORACLE back-end database designed using ORACLE CASE tools and a suite of front-end applications developed using various software tools (primarily PowerBuilder and SAS). The software takes full advantage of new Internet/Great Lakes Information Network (GLIN) connections between the states and Ontario, the Great Lakes Commission, and GLNPO in Chicago.

Finally, a Quality Assurance/Quality Control (QA/QC) Committee was formed to review the inventory report, establish QA/QC criteria for use by all states and province, and ensure the report provides an accurate and useful summary of toxic air emissions at the regional level.

Report Organization and Content

The development of the emissions inventory was prompted by the Great Lakes Toxic Substances Control Agreement signed by the Great Lakes Governors in 1986, it

identified the need for coordinating regional actions to quantify and control toxic pollutants entering the Great Lakes system. For further information on this agreement see <http://www.cglg.org/pub/toxics/index.html>.

Following completion of the Air Toxic Emissions Inventory Protocol and development and testing of RAPIDS, collection of the best available inventory data commenced using 1993 records. An intensive process of quality control/quality assurance efforts ensured accuracy as 1993 data were compiled and analyzed.

Emissions estimates for the 49 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 Look to the Future

This inventory, using 1993 data, lays the groundwork for future inventory collection, and analysis and reporting on an annual basis.

The next inventory report, using 1996 data, is currently underway. In addition to the point and area sources used in the 1993 collection, a mobile source emissions module will be integrated into RAPIDS. This mobile source estimation module will be used by each Great Lakes jurisdiction to estimate emissions from cars, trucks, trains, airplanes, marine, and recreation vehicles. This expansion of RAPIDS will provide a complete profile for air toxic emissions and will expand the list of toxic compounds of concern from 49 to 79. In addition to the expansion of RAPIDS and the toxic pollutant list, the 1996 inventory will be served online through the Great Lakes Information Network (GLIN).

This project is an initial effort to bridge 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 jurisdictions recommend that regulatory decisions not be based on this data alone.

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.